



Verification Report

**WWU Site, Rivulet Road,
Wrexham**

Final Report

For:



Hydrock Ref. HC15016/R002

June 2016

DOCUMENT CONTROL SHEET

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Client: Wales & West Utilities Limited

Project: Rivulet Road, Wrexham

Title: Verification Report

Status: Final

Report Date: June 2016

Document Provision Record

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Document Revision Record

Issue number	Status	Date	Revision Details
1	Interim Draft	October 2015	Original Issue. Report covers soil remediation works.
2	Final	June 2016	Report covers remediation works and subsequent water monitoring programme. Incorporates client comments.

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1.0 INTRODUCTION

In April 2015, Hydrock was instructed by Wales & West Utilities Limited (WWU) to carry out remediation works at the WWU Site located on Rivulet Road in Wrexham. A site location plan is provided as drawing HC15016-D001.

The Site has planning consent (code number WRC P2014/0101) for the erection and installation of a new gas pressure reduction kiosk and equipment to replace the existing unit. The remediation works were undertaken to satisfy Condition 3 of the consent which deals with the presence of historical contamination at the site.

1.1 Objectives

The primary objective of the works is to render the site suitable for its proposed use as an operational gas reduction facility. This will be located in the eastern portion of the site. The strategy was designed such that, following remediation, the site will not pose a statutory risk to human health or controlled waters given the stated end-use.

It is possible that the western site area will be redeveloped for a residential end-use at some point in the future, however, no plans or specific site layout are currently available. Given this, WWU also had a stated objective that the site should be remediated to a standard suitable for a *generic* future residential use without incurring additional remediation costs for WWU. This is discussed further in Section 7.4.

The remediation strategy and subsequent works undertaken by Hydrock relate solely to remediation works designed to satisfy the planning condition detailed above. If future redevelopment in the western site area is proposed, a further planning application will need to be submitted by the developer/purchaser. This should cover any development-specific risk mitigation measures deemed necessary over and above those undertaken in this phase of works.

Possible measures that may need to be considered as part of any future works are discussed in Strategy Document (Hydrock, April 2015, HC15016/R001) and summarised in Section 7.4 of this report. The list is not exhaustive and it will be the developer's responsibility to assess the requirements for further risk mitigation works.

1.2 Health & Safety

Health and Safety Management and Site Management were undertaken by Hydrock's Site Manager and Project Manager for the duration of the works. Hydrock Contracting Limited was appointed as Principal Contractor by WWU for the project. The site works were conducted in accordance with the Construction Design and Management Regulations (2015).

Richard Delaney of Capita was appointed as the Construction Design and Management Advisor (CDM-A) and Principal Designer for the duration of the works. The Health and Safety Executive was notified of the works on 1st June 2015. Hydrock undertook an audit to review site documentation and visited the site during the site works.

All Health and Safety documentation was filed within the site's Health and Safety Plan which will be stored at the Hydrock Bristol Office. This includes all relevant Method Statements and Risk Assessments for the work.

1.3 Information Sources

Grontmij completed a geo-environmental investigation of the WWU site in October 2014 (Ref. 114238/MH/141028). The investigation was undertaken in three phases between July 2013 and October 2014 and comprised the excavation of 17 hand-dug and 17 machine-dug trial pits and the drilling and installation of eight groundwater monitoring wells.

Relevant information from this investigation is provided in the strategy document.

The WWU site forms part of a larger former gasworks site that extended to the east, south and west. The remainder of the gasworks was investigated, remediated and developed between 1997 and the present day. Some limited information regarding the remediation works is provided in the Grontmij report.

A historical photograph of the site was also provided by WWU. This is provided in the Grontmij report.

2.0 BACKGROUND INFORMATION

2.1 Site Location

The site is located on Rivulet Road, Wrexham, LL13 8EQ. The National Grid Reference for the site is 333780 349932. A location plan is provided as drawing HC15016-D001 in Appendix A.

2.2 Site Description

The current site layout is illustrated on drawing HC15016-D002 and the site description is summarised in Table 2.1 below.

Table 2.1: Site Description

Item	Brief Description
Site access	The site is accessed via a set of double gates located in the north-west corner of the site.
Land area	Approximately 0.8 hectares.
Site boundaries	The boundaries comprise a combination of wooden fencing (along the northern boundary) and brick retaining walls which separate the site from the surrounding residential properties. A temporary boundary is formed by Heras fencing in the south-east corner of the site.
Topography	The site is predominately level with a slight rise in the south-eastern corner of the site. The ground cover comprises a mixture of concrete slabs, asphalt and gravel.
Present land use	A temporary pressure reduction kiosk and an electrical sub-station are present adjacent to the northern boundary of the site. The remainder of the site is currently disused.
Surrounding land	Rivulet Road is located to the north of the site. Industrial and commercial properties are situated on the northern side of the road. The site is bounded by residential property to the east, south and west.

2.3 Site History

As discussed previously, the WWU site formed part of a larger gasworks which operated from the late 1800s until 1953 (Grontmij, 2014). It appears that the first generation of gas manufacturing plant was partially located on the site, extending off-site to the east. The aerial photograph and a site plan (date stamped 1960, but probably originating from an earlier date) suggest that the condensers, scrubbers and a tank were located at the western end of the large retort building. The purifiers are shown to the west of the current site. Four gas holders are situated to the south-east and south-west of the site.

The 1966 Ordnance Survey map shows a further gas holder (no.5) encroaching onto the south-eastern corner of the WWU site. A second aerial photograph indicates that this was an above-ground structure. The holder is understood to have been decommissioned in the late 1990s/early 2000s.

Further details of the site history are available in the Grontmij report. The known locations of historical structures are illustrated on drawing HC15016-D004.

Remediation of the surrounding gasworks was undertaken in 2004 by SecondSite Property Holdings Ltd. (now National Grid Property Holdings Ltd.). The works included the excavation of a 50-200mm layer of sand and gravel contaminated with 'brown oil' which extended from the river wall (30 m west of the WWU site) into the western portion of the WWU site (see drawing HC15016-D003). The Grontmij report states that the contamination was observed at a depth of 2.0 to 2.3m below ground level (bgl).

The concrete base of holder no.5 was removed (along with the underlying piles) and a brown tarry residue present within made ground to the south-east of the WWU site was excavated for off-site disposal.

2.4 Ground Conditions

2.4.1 Geology

The site geology, as recorded by the Grontmij investigation, is summarised in Table 2.2.

Table 2.2 Summary of Site Geology

Stratum	Depth Range (Approximate Thickness) (m)	Description
Made Ground	0 – 2.7 (0.7 to 2.7)	Clayey, sandy gravel with brick, concrete, mudstone, clinker and limestone.
Sandy, Gravelly Clay	1.0 – 3.0 (0 to 1.8)	Discontinuous horizon of clay with sand that appears to have been removed where deeper structures have been constructed.
Sandy Gravel and Sands	3.0 – (Not confirmed)	A horizon of sand and gravel approximately 1.0m thick underlain by silty, fine to medium sand.

The British Geological Survey website indicates that the underlying bedrock comprises mudstone, sandstone and conglomerate of the Salop Formation.

2.4.2 Hydrogeology

The superficial and solid geology are classified as Secondary A aquifers. The site is not located within a source protection zone.

The Water Framework Directive River Basin Management Plans record the current and predicted (2015) quantitative groundwater and chemical quality as good. The Grontmij report states that there are no groundwater abstractions within 1km of the site. One groundwater abstraction is located approximately 1370m north-west of the site. The abstracted water is used as process water during brewing.

The Grontmij investigation identified perched groundwater in the made ground. The perched water was present above clay (where present) and did not appear to be laterally continuous. Where the clay is absent, it is likely that infiltrating water percolates into the underlying gravels.

Shallow groundwater was encountered in the gravels. Groundwater appears to be confined by the overlying clay, with the piezometric surface recorded at approximately 1.5 – 2.0m bgl. The recorded groundwater levels in the gravels suggest a north-easterly groundwater flow direction towards the open section of the River Gwenfro (see Section 2.4.3). The distance to the river down-hydraulic gradient of the site is estimated to be approximately 100m.

The perched and shallow groundwater are likely to be hydraulically connected where the clay has been removed.

A schematic cross section is provided as Drawing HC15016-D005.

2.4.3 Hydrology

The nearest watercourse is the River Gwenfro which flows north-south approximately 30m to the west of the site, where it passes under Rivulet Road. Beyond the commercial property to the north of the site, the river changes course and flows west to east parallel to the road (approximately 50m north of the site at its closest point). The section of river beneath the road and commercial properties is culverted. The open sections to the east and west flow through stone and brick channels, respectively.

The current ecological quality of the River Gwenfro is recorded as 'moderate' and the chemical quality as 'not requiring assessment' (Grontmij, 2014).

2.5 Evidence of Contamination Prior to Remediation

The visual observations of contamination prior to remediation are summarised on Drawings HC15016-D004, D005 and D007.

Free phase contamination had been observed in the made ground and natural soils and both perched and shallow groundwater. The sources of contamination are discussed in detail in Section 3.0.

3.0 PRE-REMEDIATION CONCEPTUAL MODEL OF RISK

For contamination to pose a risk to a receptor a source-pathway-receptor linkage must be present. Sections 3.1 to 3.3 detail the identified sources of contamination, the plausible pathways by which a contaminant could migrate away from a source area and the potential receptors on, or in the vicinity of, the site. Section 3.4 identifies the combinations of sources, pathways and receptors that could result in the plausible contaminant linkages that required further assessment and/or risk mitigation.

A pre-remediation schematic conceptual site model is provided as Drawing HC15016-D005.

3.1 Potential Sources

Based on the provided information the primary sources of contamination were interpreted to be:

- **Tar contamination in made ground and perched groundwater.** Tar contamination was identified in the made ground across the site. This primarily appeared to be associated with the former retort house, condensers and scrubbers that were located along the northern site boundary. A number of brick arches were identified which were likely to have formed part of the retort house. It was also deemed possible that an as yet unidentified tar tank could be present in this area (in the vicinity of TP112), as was later proven to be the case. 'Tar globules' had been recorded in perched water above the horizon of natural clay.
- **Tar contamination in natural soils and shallow groundwater.** Tar/hydrocarbons were noted in fractures and rootlets in the clay and as free phase ('tar globules') in the gravels which underlie the clay. Shallow groundwater in the gravels was impacted with free phase hydrocarbons and associated dissolved phase contamination. The contamination largely appears to be associated with the gravels in the upper 4 – 5m, with limited contamination observed in the underlying sands.
- **Asbestos in shallow soils.** Asbestos was recorded in BH01 (asbestos lagging at 0.8 m – 0.99% chrysotile), HP01 (<0.001% amosite at 0.8 m), HP02 (<0.001% chrysotile at 0.2 m), HP04 (asbestos lagging – 1.1% amosite at 0.7 m) and BH02 (<0.001% amosite at 0.8 m).

Initial observations appeared to suggest that the density of the free phase was similar to water, with no measureable thickness of light non-aqueous phase liquid (LNAPL) in the wells. The sands underlying the gravels did not appear to be significantly impacted, with the majority of the contamination limited to the gravels. No evidence of dense non-aqueous phase liquid (DNAPL) had been recorded.

It appears that similar free phase contamination was observed and remediated historically to the west (and in the western portion) of the site. Free phase contamination was removed from a layer between 2.0 and 2.3 mbgl. It is not known what, if any, impact this off-site contamination has had on groundwater quality.

3.2 Pathways

The key contact and/or migration pathways were determined to be:

- Dermal contact, ingestion or inhalation of soils, water, dusts, vapours or fibres by current or future workers on the site;
- Ingestion or inhalation of windblown dusts or asbestos fibres by adjacent site users and the general public;

- Vapour migration into adjacent residential properties and indoor inhalation of air (assuming the new-build properties do not have gas/vapour protection measures);
- Leaching of contaminants/dissolution from free phase hydrocarbons in the Made Ground into perched groundwater and subsequent lateral migration;
- Leaching of contaminants/dissolution from free phase hydrocarbons in the gravels into shallow groundwater and subsequent lateral migration; and
- Lateral migration in groundwater and potential entry into the river.

3.3 Receptors

The key receptors given the proposed end-use were interpreted to be:

- Site staff, visitors and trespassers;
- Adjacent residents and site users of adjacent properties;
- The shallow and bedrock aquifers, both of which are classified by the EA as 'Secondary A'; and
- The River Gwenfro. The river is culverted approximately 50m to the north of the site. Open sections of the river are evident 30m west and 100m north-east of the site.

3.4 Assessment of Plausible Contaminant Linkages

3.4.1 Summary

Tar contamination was present in the made ground and perched water and also the gravels and associated shallow groundwater. The two units are separated by a layer of alluvium. The alluvium comprises a sandy, gravelly clay, which to some extent appears to have impeded the downwards migration of free phase contamination. However, it was evident in some locations that free phase has migrated vertically downwards where the localised removal of the clay during construction of the gasworks has removed the barrier to downwards migration.

Given the distribution of groundwater contamination, it appeared likely that this vertical migration had primarily occurred on the vicinity of TP112. Also, given the historical layout of the early generation of the gasworks infrastructure, it was feasible that a tar and/or liquor tank is located in this area.

3.4.2 Potential Risks to Human Health

The highest levels of contamination were observed at depth, which limited the potential for exposure via direct contact routes (eg. dermal contact, ingestion, etc.). The primary risk was interpreted to be associated with asbestos, although again this had not been recorded in the upper 300mm, where contact and/or windblown dusts could potentially be viable pathways.

The risks to current and future site users, given the proposed use (commercial), were interpreted to be low to moderate.

Free phase contamination at depth could pose a potential risk to adjacent residents via vapour generation and migration into buildings. The presence of vapour barriers in buildings would reduce or eliminate this risk. Free phase in the made ground and perched water was interpreted to be the primary risk driver in this potential scenario. Contamination in the gravels was largely located below a layer of clay which will restrict the migration pathway to some extent.

The potential risk to human health would be more significant if the site is redeveloped for a residential end-use. Assessment of risks associated with a future residential end-use are beyond

the scope of this project, but given that soil remediation works were required to address other risk drivers, the works undertaken will also have a positive impact on possible risks associated with future residential development. This is discussed further in Section 7.4.

3.4.3 Potential Risks to Controlled Waters

Shallow groundwater flow in the gravels appears to be towards the north-east and the River Gwenfro. The tar contamination in the aquifer primarily appeared to have a density similar to water, with evidence that the NAPL is largely confined to the upper gravel horizon.

Given this observation, the primary potential risk to controlled waters was interpreted to be associated with the migration of free and dissolved phase contamination off-site with potential subsequent impact on surface water quality in the river. The construction of the river banks to the north-east of the site is unknown. Engineered banks may reduce the significance of the pathway by reducing the connectivity between groundwater and the river, however, given the depth to groundwater and the proximity and location of the river, discharge of some groundwater to the river seems likely.

Given the above, the key contaminant linkages that were interpreted to require mitigation as part of the remediation works were:

- Migration of free phase contamination off-site in perched and/or shallow groundwater and potential impact on surface water quality in the river; and
- Leaching/dissolution and migration of dissolved phase contamination into the shallow aquifer and entry into the river via shallow groundwater. This pathway is primarily associated with contamination present in areas where the clay is absent and a potential vertical migration pathway exists.

3.5 Remediation Strategy Overview

The development of the CSM identified a potential risk to human health and controlled waters associated with tar-related contamination (and to some extent, asbestos) at the site.

The primary risk driver was interpreted to be the risk to controlled waters, with the primary sources identified as:

- free phase tars and tar-impacted made ground and perched waters at shallow depth; and
- tar-related contamination in the gravel aquifer and shallow groundwater.

Given the nature of contamination an 'environmental betterment' approach was proposed with regard to remediation of the soil sources above the water table through source removal and pathway management.

The following works were proposed in the strategy.

1. The removal of free phase and visually tar-impacted made ground and clay and the recovery/treatment of perched water;
2. Off-site disposal/ treatment of tar impacted soils;
3. Placement of a clay layer at the base of the made ground where the natural clay is absent (thus reinstating the low permeability horizon to mitigate the potential vertical migration pathway in these areas);
4. Re-use of visually unimpacted soils and replacement of exported soils with imported material;

5. Extraction of free and dissolved phase contamination from the gravel aquifer within the primary source area; and
6. Completion of six months of groundwater monitoring to determine groundwater quality following completion of the remediation works.

A schematic of the indicative scope of works is provided as drawing HC15016-D006. The inferred extent of groundwater contamination is illustrated on HC15016-D007.

3.6 Remediation Criteria

3.6.1 Human Health Criteria

Site-won material was to be placed at depth in the excavations where it would not pose a risk to future site users via the typical contact exposure routes. Material at shallow depth would comprise site-won crushed material (where chemically suitable) and imported stone.

Table 3.1 details the remediation target criteria that were agreed with the local council for determining the suitability of material for use in the upper 600 mm. Although it was not an objective to render the site suitable for a residential end-use, as the western site area is likely to be developed for housing at some point in the future it was deemed sensible to ensure that shallow soils are generally suitable for such an end-use (see Section 7.4). The adopted criteria are therefore deemed to be protective of human health for a generic residential setting without plant uptake (assuming 1% soil organic matter).

The criteria comprise a combination of published Soil Guideline Values (SGVs), criteria developed by LQM/CIEH and the recently published 'Category 4 screening Levels' (C4SLs)¹.

'Category 4' relates to the statutory guidance published by DEFRA in April 2012, which introduced a four category test for supporting the decision making process when assessing whether a site could be determined as contaminated land under Part 2A of the Environmental Protection Act, 1990. Under this approach Category 3 and 4 sites would not represent contaminated land.

In March 2014 C4SLs were published for six contaminants; arsenic, benzene, benzo(a)pyrene, cadmium, chromium VI and lead. These are intended to provide a set of more pragmatic generic screening levels that represent 'low risk' to human health receptors, while still maintaining a strongly precautionary approach to assessment. As such, with the exception of lead, these new screening levels are higher than the previously published SGVs.

The DCLG's Planning Practice Guidance on Land Affected by Contamination was revised on 12th June 2014 and now includes reference to the use of C4SLs within the planning regime.

Table 3.1 Remediation Target Criteria for Shallow Soils (finished ground level to 0.6m below finished ground level)

Contaminant	Concentration (mg/kg)	Source
Arsenic	40	C4SL (2014)
Beryllium	51	LQM/CIEH + CLEA 1.06
Boron	1000	(LQM/CIEH + CLEA 1.06)
Cadmium	149	C4SL
Chromium (III)	630	(LQM/CIEH + CLEA 1.06)
Chromium (VI)	21	C4SL
Copper	6200	(LQM/CIEH + CLEA 1.06)
Lead	310	C4SL

¹ DEFRA, SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination – Policy Companion Document, March 2014

Contaminant	Concentration (mg/kg)	Source
Mercury, inorganic	240	(SGV report + CLEA 1.06)
Nickel	130	(SGV report + CLEA 1.06)
Selenium	600	(SGV report + CLEA 1.06)
Vanadium	190	(LQM/CIEH + CLEA 1.06)
Zinc	40000	(LQM/CIEH + CLEA 1.06)
Cyanide (free)	760	(Hydrock + CLEA 1.06)
Phenol (total)	310	(SGV report + CLEA 1.06)
Acenaphthene	2000	(LQM/CIEH + CLEA 1.06)
Acenaphthylene	2000	(LQM/CIEH + CLEA 1.06)
Anthracene	20000	(LQM/CIEH + CLEA 1.06)
Benz(a)anthracene	3.7	LQM/CIEH + CLEA 1.06
Benzo(a)pyrene	5.3	C4SL
Benzo(b)fluoranthene	7	LQM/CIEH + CLEA 1.06
Benzo(ghi)perylene	47	LQM/CIEH + CLEA 1.06
Benzo(k)fluoranthene	10	LQM/CIEH + CLEA 1.06
Chrysene	8.8	LQM/CIEH + CLEA 1.06
Dibenz(a,h)anthracene	0.86	LQM/CIEH + CLEA 1.06
Fluoranthene	970	(LQM/CIEH + CLEA 1.06)
Fluorene	1900	(LQM/CIEH + CLEA 1.06)
Indeno(1,2,3,cd)pyrene	4.2	LQM/CIEH + CLEA 1.06
Naphthalene	1.6	LQM/CIEH + CLEA 1.06
Phenanthrene	840	(LQM/CIEH + CLEA 1.06)
Pyrene	2300	(LQM/CIEH + CLEA 1.06)
Benzene	3.3	C4SL

3.6.2 Risks to Controlled Waters, Liaison with Natural Resources Wales and Proposed Objectives for Groundwater

Following issue of the strategy and subsequent discussions with Natural Resources Wales, the following criteria were agreed to meet the objectives for groundwater at the site.

1. No visual evidence of tar-related contamination in soils (ie. removal of the primary sources);
2. No visual evidence of hydrocarbon globules in groundwater (taking into consideration the rules of diminishing returns and the costs/benefits of continued recovery if some minor evidence of a hydrocarbon emulsion remains);
3. Demonstration that there is no measureable impact on surface water quality in the River Gwenfro associated with the tar/hydrocarbon contamination present at the site.
4. Completion of groundwater monitoring along the downgradient site boundary over a 6 month period (as per the strategy document) following groundwater remediation to demonstrate stable conditions and record final groundwater quality on the understanding that the sources have been removed and that groundwater quality is likely to improve over the longer term.

It was agreed that controlled waters- based soil criteria for soils at the site would be inappropriate for a number of reasons. The primary one being the conceptualisation of the site

and the strategy to ensure that no significant pathway exists between the made ground and groundwater in the gravel aquifer following remediation.

Where present, the natural clay layer appears to prevent the downwards migration of infiltrating water (and thus leachable contamination), creating a perched water table. The active contaminant linkage appears to be associated with areas of the site where the clay is absent (around structures, etc.). As such, it was inferred that the primary risk drivers were;

- a) the ongoing vertical migration of tars and impacted perched water into the gravels where the clay is absent; and
- b) the lateral migration of tar/dissolved phase in groundwater in the gravels.

The strategy was to remove the mobile sources in the made ground (and the deep structures themselves) and replace the clay layer where absent. As such, where contamination had extended to the gravel and the aquifer water table, it was proposed to excavate the contamination and then place and compact a layer of clay before backfilling to surface with site-won material. This approach would remove the primary source and break the future pathway between the made ground and the gravels. With the linkage broken and the tar removed it was Hydrock's view that criteria for the remaining made ground would not actually be necessary.

It was agreed that the risks to controlled waters posed by soils in the unsaturated zone will be managed by the removal and off-site disposal of material visually impacted by tar contamination. This was to be verified by providing a photographic record as part of the Verification report.

It was however proposed to sample and test the site-won material placed at depth to provide a record of final ground conditions at the site.

Regulatory correspondence is provided as Appendix G.

4.0 SOIL REMEDIATION WORKS

4.1 Overview of Scope of Works Undertaken

The scope of works for the remediation comprised:

- Provision and agreement of Remedial Strategy and Verification Plan;
- Coordination with appointed Principal Designer and provision of required documentation;
- Liaison with adjacent landowners and community with respect to works and access throughout the remediation works. Establishment of a road traffic plan (see Drawings HC15016-D008);
- Location of utility services present at the site;
- Liaison with appropriate WWU Network Operations/ Plant Protection to further define and agree the method of work for the site;
- Mobilisation to site and site-up of welfare and working areas (see Drawing HC15016-D008);
- Inspection by structural engineer of site boundaries and wall structures and internal condition survey of the residential property immediately to the east of the site (Appendix H);
- Removal of the brick wall and existing gate at the site entrance. Site security was maintained by the provision of a temporary site gate and fencing supplemented with CCTV cameras positioned within the site;
- Breakout of concrete hard standing and footings and excavation and segregation of soils in the upper 1.0 – 1.5 m deemed potentially suitable for re-use (soils to be stockpiled and tested);
- Extraction and treatment of perched water in excavations;
- Excavation of deeper made ground where safe and practicable to do so and segregation of material potentially suitable for re-use;
- Removal of any structures encountered in excavations;
- Localised excavation of any heavily tar-impacted clay material above the water table in the west-central site area;
- Placement of a clay layer where excavation work extended to the gravels and shallow groundwater;
- Removal of contaminated material from site for off-site treatment or disposal;
- Backfilling and compaction of site-won and imported material to a depth of 600mm bgl in accordance with the WWU backfill specification;
- Placement of a suitable geo-membrane to prevent vegetation growth;
- The placement and compaction of a final layer of imported material in the upper 300mm; and
- Post works inspection by structural engineer of internal condition survey of the residential property immediately to the east of the site (Appendix H).

A photographic record is provided as Appendix C.

4.2 Service Location

The service information for the site was obtained from the previous investigation reports and from WWU to identify the presence and location of valve covers and other services known to exist. The whole site was scanned by a competent person using a cable avoidance tool and genny along with the careful use of hand tools and any services were located and marked up in accordance with the HSE guidance note HSG47. Known services and drainage runs were marked out on the ground and the locations made aware to all site operatives.

4.3 Initial Phase of Trial Pitting

An initial phase of trial pitting was undertaken during the week of 5th May 2015 to assess ground conditions around the boundaries of the site and investigate the nature and depth of foundations of the retaining wall along the southern and south-western boundary. A number of trial pits were also advanced in the centre of the site to assess the extent of contamination and establish whether a former tar tank was located in this area. The remains of a tank were encountered, with the structure appearing to be approximately 2 m by 4 m in size. The Grontmij trial pit TP113 appears to have been located within the tank, which was full of tarry water and slate and asbestos roof tiles.

4.4 Site Set-up and Preparation

On 8th June 2015 a welfare unit and site plant was mobilised to site. Upon commencement of the site set-up all personnel undertook a site induction. Once inducted all personnel were given a method statement briefing to ensure that all were working in accordance with the Hydrock method statement for the site and their respective sub-contractor method statements. In addition, all visitors to site were signed in upon arrival, or if visiting for longer periods, were given a visitors induction. All visitors were escorted by fully inducted personnel.

The wall adjacent to the site entrance was removed and replaced with Heras fencing. During the week of 8th June a condition survey of the retaining wall along the southern boundary and the adjacent residential property was completed (provided as Appendix H). The surface and shallow sub-surface concrete and brickwork was broken out and stockpiled for subsequent crushing and, if appropriate, reuse as backfill across the site (Photo 5 and 7). Shallow former gasworks pipework was also removed for off-site disposal (Photo 6).

4.5 Excavation and Reinstatement Works

Due to the size of the site and working constraints associated with structures, live plant and services, the excavation of contaminated soils was undertaken in a phased approach within discrete excavations 'Areas'. These are illustrated on Drawing HC15016-D009 and the works conducted in each area are summarised in the following sections.

4.5.1 Excavation Areas Nos. 1 to 6

Initially, work commenced along the southern retaining wall, with excavation undertaken in a number of small zones (Areas 1 to 6) to limit the length of open excavation against the wall at any one time (Photo 8). Works were undertaken in accordance with the method statement recommended by the structural inspection (Ref: C151410/02/B001, 9th June 2015). Excavations along the wall extended to depths ranging from 1.5 m to 1.75 mbgl (see Table 4.1) where, in all cases, visually unimpacted natural clay was encountered (Photos 9 – 20). Some ingress of perched water was noted from beneath the retaining wall in Area 1 and site-won clay was used

against the excavation face to prevent flow onto site and to facilitate backfilling (Photo 10). No visual impact was noted on the water.

Clean and contaminated materials were visually segregated with contaminated material placed in a separate stockpile and visually unimpacted material used to backfill excavations up to a depth of 600mm below final site level. Site-won crushed concrete was used to bring excavations to within 300mm of final site level.

4.5.2 Excavation Areas Nos.7 and 8

During the excavation of Area 7 a large brick structure and perched water was encountered. Perched water with a slight hydrocarbon sheen was also present in Area 8. In both cases the water was pumped into an IBC for future treatment and disposal to sewer. The brick structure in Area 7 was broken out and the bricks were stockpiled for crushing and future re-use. The structure extended to approximately 2.5 mbgl. Visually unimpacted clay was noted in the base of the excavation at a depth of 3.0 mbgl (Photos 21 and 22). Excavation in Area 8 extended to clay at a depth of approximately 1.5 mbgl (Photos 23 and 24). In general, there was relatively limited evidence of hydrocarbon-related contamination in these areas, with soil impact present in the form of occasional discrete pockets. These were segregated and stockpiled for off-site disposal. Some minor impact (in the form of a hydrocarbon sheen) was noted in the perched water. As with Areas 1 to 6, the excavation was backfilled with site-won visually unimpacted material and imported quarried stone to 600mm below final site level and site-won crushed concrete to a depth of 300mm bgl.

4.5.3 Excavation Area No.9

Tar contaminated made ground and some impacted perched water were encountered in excavation Area 9 (Photo 26). The soil material was excavated and segregated for future disposal. The water was pumped into an IBC for future treatment. The excavation extended to a depth of 2.5 mbgl, where visually unimpacted natural clay was encountered (Photos 27 to 29). Imported stone was used to backfill Area 9 to 300mm below the final site level (Photo 31 and 32).

4.5.4 Excavation Area No.10 and 11

Again, significant evidence of tar contamination was apparent in these excavations, which were located immediately east and south of the former tar tank (in Area 12), respectively. Excavation extended to a depth of 2.5 mbgl in both areas. Clay was present at 2.0 to 2.5 m depth in Area 10 (Photos 33 and 34). In the western half of the Area 11 the layer of natural clay was absent. In this area the base of the excavation was formed by the upper horizon of natural sands and gravels (Photos 35 and 36). However, in the eastern portion of the area natural clay was apparent at 2.0 to 2.5 mbgl (Photo 37). The depth to natural clay decreased towards the east. The remains of a brick arch were also apparent in the northern face of the excavation. This structure was located on the northern site boundary and appeared to extend off-site, towards Rivulet Road (Photo 38).

It appears likely that the clay was removed from the western portion of Area 11 when the tar tank and other below-ground structures were constructed. There was some evidence of residual tar impact on the sands and gravels in this area. Groundwater was also evident within this stratum.

A layer of imported clay was placed across the base of the excavation where the natural clay was absent. As with Area 9, imported stone was used to backfill the Area to 300mm below the final site level.

4.5.5 Excavation Area No. 12

The upper made ground was initially removed from Area 12 to expose the walls of the tar tank (Photo 39). Contained and perched water was pumped into IBCs for future treatment. The tank contained slate and asbestos cement tiles (Photo 40). These were excavated and disposed of off-site under Notifiable Non Licensed Works (Photos 41 to 43). The tank was of brick construction with an internal concrete render. The base was located at approximately 1.75 mbgl. The dewatering of the tank continued after the asbestos containing material (ACM) had been removed. The tank walls were broken out where possible, with the western wall left in place due to its proximity to the site access.

Following removal of the structure the surrounding made ground was excavated and stockpiled for removal from site. There was no evidence of natural clay below the made ground and tar-related contamination was noted in the sands and gravels and associated groundwater. Excavation continued to 2.5 to 3.0 mbgl to remove the any impacted material present above the water table. Tar-related contamination extended up to the site boundary, where the foundations of a wall or structure were noted. The brick work extended to approximately 1.5m bgl and was founded on natural clay (Photos 51 and 52). Tar-related contamination was noted on the brickwork and some residual contamination was apparent in the natural clay. Excavation was continued up to the foundations to a depth of approximately 2.5 mbgl. This excavation was completed in short sections to prevent the failure of the wall. The northern face of each section was immediately backfilled with clay to provide stability and prevent recontamination of the backfill material to be used in the remainder of the excavation. Using this technique, as much contamination was removed as was possible and the excavation was able to extend to within 0.5 m of the site boundary (ie. against the wall).

The base of the excavation was dewatered and imported clay was placed across the base (Photos 53 to 55). The remainder of the excavation was backfilled with imported stone and compacted (Photos 56 to 59).

4.5.6 Excavation Areas 13 and 14

Area 13 was excavated to a depth of approximately 2.5m down to natural clay. Minor areas of contamination were identified and this was segregated for off-site disposal. A number of brick arches had been identified in this area during the Grontmij investigation, these structures were broken out and removed. Some evidence of hydrocarbon contamination was observed to extend under the electrical substation but due to constraints posed by the electrical plant, this could not be removed.

Area 13 was backfilled with visually unimpacted site-won material and imported stone. At the request of WWU, and in order to facilitate the construction of the relocated PRI, the area was left 1m below final site levels. Hydrock returned to site on 16 November 2015 to reinstate the area to the final level and undertake additional works at the request of WWU. The additional works are detailed in section 4.5.7.

In Area 14 the asphalt surfacing was removed. During this process four high voltage cables were exposed which had been wrapped round a redundant gas pipe that was leaking tar into the ground. The pipe was removed and areas of tar contamination excavated for off-site disposal

(Photos 60 to 62). All other works in this area were stopped due to the presence of the shallow HV cables. Scottish and Southern Electricity (SSE) were contacted and informed of the nature of the cables position. No further response was received. Hydrock therefore worked to protect the cables when reinstating the surface as detailed in section 4.5.7.

4.5.7 Additional Works

As per the request of WWU, Hydrock returned to site on 16th November 2015 to undertake additional works. The main entrance gate and adjoining fence panel was replaced with a wooden double gate and wooden fence panel to match the existing along the northern boundary.

The existing brick wall (approx. 2m high) positioned alongside the electricity sub-station building on the northern boundary was demolished, by hand. Care was taken to remove a connecting section of the wall to the sub-station building and make good. The brick wall was replaced with green palisade fencing, as per WWU fencing specification (Ref: T/SP/CE9), and a concrete sill. The existing access gate was removed and replaced with a double palisade gate (refer to Photo 79).

The palisade fencing and concrete sill was extended on the western and southern boundaries of the PRI compound to increase security. The palisade fence was installed with a 'dog-leg' to avoid the existing brick retaining wall on the south west corner of the PRI compound. Refer to drawing HC15016 D010 for details. A resident owned wooden fence runs along the eastern boundary and is deemed satisfactory to create a secure compound. A pedestrian panic gate was installed on the southern boundary, with steps constructed for access, in consultation with WWU operations team (refer to Photo 78).

Within the eastern entrance area, tarmacadam was placed to improve the surface for WWU vehicle parking (refer to Photo 77 and 79). A shallow aco drainage channel was installed across the entrance to capture any runoff from the ramp. The channel runs into a slightly deeper pit, filled with stone chippings, for drainage to ground. A shallow HV electrical cable was encountered (Photo 61 and 62) within the upper 100mm within the entrance area, which runs into the sub-station. The cable was located prior to commencing works by hand digging and was observed to run deeper towards the sub-station. A layer of sand was placed over the cable, prior to laying the tarmac.

During the week of 18th November 2015 a post remediation works condition survey within the adjacent residential property was completed (provided in Appendix H).

4.5.8 Final Reinstatement

Terram geotextile and a 300 mm layer of compacted Type 1 material was placed across the site to return the site to pre-remediation levels (Photos 63 to 66).

Within the PRI compound area, terram geotextile and a 300 mm layer of 20 mm stone chippings were placed across the area to the agreed levels with WWU (Photos 76 and 77).

As agreed with WWU, an area to the immediate west of the sub-station was not excavated due to a series of gas valves. WWU requested a standoff from the vales of a minimum of 1m. However, a capping layer (20mm stone) was placed in accordance with the remediation design. Details of the location of the valves are illustrated on drawing HC15016 D010 and depicted in photo 74 and 76.

4.5.9 Remediation Area Summary

A summary of the excavation and backfilling works are provided as Table 4.1 below.

Table 4.1 Summary of Remediation Excavation, Verification and Backfilling

Excavation	Depth (m)	Geology in base of excavation	Depth contamination encountered (m)	Depth unimpacted material encountered (m)	PID headspace (ppm)	Verification of excavations		Additional comments
						Any remaining visual evidence of contamination	Any remaining olfactory evidence of contamination	
1	1.5	Grey Clay	1.4	1.5	0.0	No	No	Backfilled with site-won material
2	1.5	Grey Clay	1.4	1.5	0.0	No	No	Backfilled with site-won material
3	1.75	Grey Clay	1.4	1.75	0.0	No	No	Backfilled with site-won material
4	1.5	Grey Clay	1.3	1.5	0.0	No	No	Backfilled with site-won material
5	1.5	Grey Clay	1.4	1.5	0.0	No	No	Backfilled with site-won material
7	3	Grey Clay	2.2	3	0.0	No	No	Large brick structure encountered, photo not possible due to perched water
8	1.5	Grey Clay	1	1.5	0.0	No	No	Backfilled with site-won material
9	2.5	Grey Clay	1	2.5	0.0	No	No	Backfilled with imported primary 6F5
10	2.5	Grey Clay	1	2.5	0.0	No	No	Backfilled with imported primary 6F5
11	2.5	Sands and Gravel	0.5	2.5	0.0	Yes	Yes	Excavation ceased when sands and gravels and shallow groundwater encountered. Imported clay placed across the excavation base. Below-ground remnant brick arch present on northern site boundary.
12	2.5	Sands and Gravel	0.5	2.5	0.0	Yes	Yes	Tar tank and associated contamination removed. Excavation ceased when sands and gravels and shallow groundwater encountered. Imported clay placed across the excavation base.
13	2.5	Grey Clay	2	2.5	0.0	No	No	Brick arches and associated contamination removed. Backfilled with imported 6F5. Area left 1m below final finished levels.
14	0.5	Made Ground	0.2	0.5	0.0	No	No	Excavation restricted due to live HV Cables. Pipe containing tar removed. No other visual evidence of hydrocarbon contamination noted.

4.5.10 Verification Soil Sampling

The soil analytical results are summarised in Table 1 (Appendix B) and the laboratory certificates are provided as Appendix D.

The agreed strategy required that soils/stone placed in the upper 600mm met the criteria detailed in Table 3.1 (Section 3.6.1). As such, five soil samples were taken from site-won crushed material, six from the imported stone and one of the imported clay. Only one sample (CRUSH 1) failed the criteria. This material was subsequently removed from site.

Five soil samples were also collected from the visually unimpacted made ground that was re-used as fill material below 600mm depth. It was not part of the strategy to compare these results against the criteria as the soils do not pose a risk to human health at these depths. However, it is noted that none of the contaminant concentrations in the five samples exceeded the shallow soils criteria.

A further 12 soil samples were collected from the base and sides of the excavation areas (with the exception of areas where the clay was absent). Again, it was not a requirement of the strategy to compare these results against the shallow soil criteria but it is noted that none of the contaminant concentrations in the 12 samples exceeded the criteria.

The results from both the site-won material and the excavations provide further confidence that residual contaminant concentrations at the site are low.

4.5.11 Airborne Fibre & Environmental Monitoring

During excavation work and removal of the asbestos, reassurance airborne fibre monitoring was undertaken. Results of the monitoring are presented in Appendix E and show that levels of fibres identified were below 0.01 fibres per millilitre (f/ml). The HSE trigger (control limit) for asbestos is 0.1 f/ml.

Daily visual dust and odour assessment (by Photoionisation Detector; PID) was also carried out by the site manager or foreman in accordance with the method statement. There were no incidences of dust or organic vapours generated during the works on site (see Environmental Monitoring in Appendix E).

5.0 WASTE MANAGEMENT & IMPORT MATERIALS

5.1 Disposal of Contaminated materials

The segregated tar- and hydrocarbon- impacted material was transported off-site between 23rd June and 17th July 2015 and taken to FCC Environment's Teesport Landfill, Middlesbrough, TS6 6UG. The haulier was Clwyd Transport Ltd of Clwyd House, Ash Road South, Wrexham LL13 9UG (carrier registration CB/CP3010RB).

As discussed in Section 4.5.9, one stockpile of crushed material failed the re-use criteria for use in the upper 600mm (sample Crush 1). The stockpile comprised approximately 10m³ of material. This was also removed from site and transported for disposal at Teesport Landfill.

The asbestos material was placed in a lined '20 yard' skip and transported to Oak Farm Quarry Landfill on 7th July 2015. The landfill is operated by Himley Environmental of Crooked House Lane, Dudley, DY3 4DA. The material was transported by Acumen (Acumen House, Headlands Lane, Knottingley, WF11 0LA, carrier registration CB/UM3588VS).

Copies of the waste transfer notes and haulier details are provided as Appendix F. A summary of waste volumes is provided in Table 5.1 below.

Table 5.1. Summary of materials off-site

Date Removed	Waste Type	Quantity Disposed to Landfill (Tonnes)	Quantity Estimated in Strategy (Tonnes)
23/06/15 to 17/07/15	Hazardous – Contaminated Soils	1714.24	1080 (~600 m ³ at 1.8T/m ³)
07/07/15	Hazardous – Bonded Asbestos	3.0	0

5.2 Imported Material

5.2.1 Geotextile

On completion of the excavation and backfilling to 300 mm below final site level, a geotextile membrane was placed prior to the placement of imported stone.

5.2.2 Backfill

The deficit in site materials was replaced with imported materials as summarised in Table 5.2 below.

Table 5.2. Summary of imported materials

Date Imported	Material Type	Source	Quantity (Tonnes)	Backfill Location
23/06/15 to 14/07/15	6F5 Stone	Hendre Quarry	1102.89	Excavations below depth of 600mm
06/07/15	Clay	Hooton	40.0	Base of excavations above sands and gravels in Areas 11 and 12
13/07/15 – 22/07/15	Type 1 Stone	Aberdo Quarry	367.70	Surface cover layer in upper 300mm
15/11/15 – 22/11/15	Type 1 Stone	Aberdo Quarry	81.08	Backfill in PRI compound in upper 600mm

Date Imported	Material Type	Source	Quantity (Tonnes)	Backfill Location
22/11/15	20mm Stone	Halkyn Quarry	20.08	Surface cover layer in upper 300mm in PRI compound

Copies of the tickets are provided as Appendix F.

6.0 GROUNDWATER EXTRACTION AND WATER MONITORING PROGRAMME

6.1 Groundwater Extraction

Following completion of the soil remediation works, four groundwater extraction wells and four groundwater monitoring wells were drilled and installed on-site (Photos 67 and 68). The locations of the wells are illustrated on drawing HC15016-D010.

The extraction wells were located in the areas where residual contamination was noted in the top of the sands and gravels stratum. Monitoring wells MW1 to MW3 were installed along the down-hydraulic gradient site boundary. MW4 was installed on the upgradient boundary of the site, immediately downgradient of the off-site area remediated by National Grid Property in 2004. The wells were drilled to a depth of 5m bgl and installed with a screened section across the upper horizon of the sands and gravels between 2.5m and 5m depth.

Groundwater was abstracted from the four wells between 22nd July and 1st September 2015. In total 205 m³ of groundwater were extracted over this period. Water samples were collected from the four wells on 23rd July 2015. The results are presented as Table 3 in Appendix B. No free phase was noted in the four samples. The highest dissolved phase concentrations were recorded in the sample from MW3, located in the vicinity of the former tar tank.

The extracted groundwater (and the water recovered during the soil remediation works and stored in IBCs) was treated on-site. The water treatment plant consisted of an oil/water separator, sand filter and granular activated carbon unit (Photos 69-70). The treated water was discharged under license to the foul sewer.

6.2 Surface Water Sampling

Surface water in the River Gwenfro was sampled upstream and downstream of the site during and after the soil remediation works. The two sampling locations are illustrated on drawings HC15016-D011.

The analytical results are summarised in Table 2 (Appendix B). Thirteen rounds of sampling were conducted during (seven rounds) and after the works (six rounds). The results have been compared against relevant freshwater EQS, as detailed in Table 2.

Mercury was the only contaminant that exceeded the EQS. Elevated mercury was detected in three of the sample rounds. In two of these rounds the highest concentration was recorded in the upstream samples. A downstream increase was noted in the sample round collected in July 2015. The results do not suggest that the site is the source of the mercury impact noted in the surface water.

Typically, across the thirteen sample rounds, contaminant concentrations in the downstream samples are equivalent to, or lower than, those recorded in the upstream samples. The only notable exceptions are ammonium in 'Downstream 6' and 'Downstream 13' in which concentrations of 49µg/l and 310µg/l was recorded, respectively. The upstream recorded concentrations were <15 µg/l and 51µg/l (the EQS ranges from 300 to 600µg/l, dependent on water hardness).

It is noted that overall there has been an increase in ammonium concentrations in the river over the period covering December 2015 to April 2016. Prior to December, ammonium concentrations were less than 50µg/l. Since then concentrations have typically been in the range 140µg/l to 310 µg/l, with upstream concentrations typically higher than the downstream

ones. The 51 µg/l recorded upstream in the April sample round was the lowest and is inconsistent with the other four samples across this period.

The results suggest that a source up-hydraulic gradient and upstream of the site has caused an increase in ammonium contaminant loading to the river over the last 4 months. This could potentially be a groundwater source or a direct discharge.

The recorded concentrations of dissolved phase PAHs and BTEX were below detection limits in both upstream and downstream samples from all of the thirteen monitoring rounds.

6.3 Groundwater Sampling

Six rounds of groundwater sampling have been undertaken from wells MW1 to MW4 since the completion of the site works. The sample rounds cover a seven month period.

The results are provided as Table 4 and the observations for key contaminants are summarised below.

Well MW1 (Downgradient boundary)

- **Ammonium.** Typically, a downwards trend across five samples from 1300µg/l in November to 360µg/l in April. However, a concentration of 1100µg/l was recorded in the sample from February.
- **Naphthalene.** Again, typically a decreasing trend over time with three of the last four samples with concentrations below detection limits (<0.01µg/l). However, a higher concentration was recorded in February 2016 (33.7µg/l).
- **Benzene.** All concentrations below the detection limit of 0.1µg/l for all six rounds.

Well MW2 (Downgradient boundary)

- **Ammonium.** A downwards trend across the latest five samples from 11,000µg/l in November to 520µg/l in April.
- **Naphthalene.** A fluctuation in concentrations over the last seven months, but the last three samples had recorded concentrations below the EQS for naphthalene, with two below detection limits.
- **Benzene.** A decreasing trend across the six samples with a recorded decrease from 408µg/l to 16.8µg/l, fractionally above the EQS of 10µg/l.

Well MW3 (Site of former tar tank)

- **Ammonium.** Fluctuating concentrations across five rounds with concentrations ranging from 19,000µg/l to 29,000µg/l.
- **Naphthalene.** Again, no real discernible trend, with the highest concentration recorded in February (4470µg/l).
- **Benzene.** Relatively steady concentrations across the last three rounds, ranging from 387µg/l to 458µg/l, again with the highest concentration recorded in February.

Well MW4 (Close to upgradient boundary)

- **Ammonium.** Recorded concentrations in the range of 220 to 620µg/l, with the highest concentrations recorded in January and February (620 and 530µg/l, respectively).
- **Naphthalene.** Recorded concentrations in the range of <0.01 to 59.9µg/l, over the last 5 rounds, again, with the highest concentrations in that period recorded in February.
- **Benzene.** All six rounds below detection limits.

The results suggest that a narrow plume of impacted groundwater remains in the vicinity of the former tar tank which was removed as part of the remediation works. Generally decreasing trends were noted in wells further away from the former primary source area, but in the vicinity of MW3 no trends were really identifiable.

A peak in concentrations was noted in February, it is not currently clear what caused these.

The results from MW4, which is upgradient of the sources identified on the site, suggests some impact by ammonium and organics from an off-site source, possibly the former gasworks that extended to the south and west of the WWU site.

7.0 SUMMARY AND CONCLUSIONS

7.1 Updated Conceptual Site Model

7.1.1 Contaminant Linkages Associated with the Unsaturated Zone

The removal of free phase tars, impacted perched water and tar-contaminated made ground from the unsaturated zone has removed the primary sources of contamination on the site. In conjunction with the placement of the clay layer where natural clay is absent, the works have mitigated the risks posed by contamination in the unsaturated zone by removing the source term and breaking the pathway. As such, contamination in the unsaturated zone no longer poses a potential significant risk to controlled waters.

Removal of shallow soil contamination and asbestos and the placement of a 600mm cover layer have mitigated any potential risks to human health associated with physical contact pathways for the proposed end-use.

7.1.2 Contaminant Linkages Associated with Groundwater

The groundwater results suggest that groundwater quality has improved significantly, with an order of magnitude decrease in concentrations of ammonium and naphthalene in the source area. Prior to the works, concentrations of 120 -200 mg/l ammonium and 13 -40 mg/l naphthalene were recorded in the Grontmij wells BH07 and BH08. The highest concentrations in the vicinity of the tar tank have been reduced to 19-29 mg/l ammonium and 0.07-4.5 mg/l naphthalene. Concentrations in the other downgradient boundaries are significantly lower.

A narrow area of impacted groundwater remains in the vicinity of the former tar tank (MW3) although the width of this band is significantly smaller than prior to the works. With some exceptions, decreasing trends are observed for key contaminants in the wells on the boundary and east of the former tank (MW01 and MW02).

The surface water results from the river suggest that there is no discernible impact to surface water quality as a result of residual contamination on the site. However, a broader increase in ammonium concentrations has been noted in the river over the last 4 months. The concentrations recorded in the upstream wells suggest that any potential source is upstream and up-hydraulic gradient of the site.

Given that the groundwater plume is likely to have reached a steady state condition prior to the remediation, the fact that the shallow sources have now been removed and the recorded improvements in groundwater quality that have been recorded, it is interpreted that residual dissolved phase contamination in the aquifer will not pose a significant risk to surface water quality in the river. Groundwater concentrations should continue to decrease over time.

7.2 Review of the Remediation Objectives

A review of the whether the remediation objectives for the site have been met is provided in Table 7.1.

Table 7.1. Review of remediation objectives

Remediation Objective	Has the objective been met?
1. No visual evidence of tar-related contamination in soils (ie. removal of the primary sources);	✓
2. No visual evidence of hydrocarbon globules in groundwater (taking into consideration the rules of diminishing returns and the costs/benefits of continued recovery if some minor evidence of a hydrocarbon emulsion remains);	✓
3. Demonstration that there is no measureable impact on surface water quality in the River Gwenfro associated with the tar/hydrocarbon contamination present at the site.	✓
4. Completion of groundwater monitoring along the downgradient site boundary over a 6 month period (as per the strategy document) following groundwater remediation to demonstrate stable conditions and record final groundwater quality on the understanding that the sources have been removed and that groundwater quality is likely to improve over the longer term.	✓
5. Soil samples from material placed in the upper 600mm achieve the human health criteria for shallow soils.	✓

7.3 Final Site Conditions and Residual Contamination

On completion of the works the site was left level and tidy. The upper 300 mm comprises an imported stone layer over geotextile (Photos 71 to 73). Surface concrete and structures in the made ground have been removed, where possible.

WWU instructed Hydrock to undertake additional works to secure the site and ensure surface reinstatement around the new PRI. Works included; a new wooden main gate with adjoining section of wooden boundary fence to match existing, palisade fencing and gates to create a secure compound around the new PRI, and creation of a tarmacadam surfaced entrance ramp with aco channel for drainage.

Residual dissolved phase contamination in the sands and gravels is present in the north-western site area under the footprint of the former tar tank. The tank and surrounding contamination in the unsaturated zone was removed as part of the works.

7.4 Conclusions

The site is deemed suitable for its intended use as an operational pressure reduction facility. Additionally, surface and shallow sub-surface soils across the site (the upper 600mm) are deemed suitable for a generic residential (without plant uptake) end-use.

Further development-specific risk assessment and possibly mitigation works will likely be required if and when a specific development plan is produced for the site. The assessment, design and implementation of any such measures will need to be addressed by any future planning application for development of the site.

An initial assessment of potential post remediation risks to a future residential development is provided as Table 7.2.

Table 7.2: Interpreted Post-Remediation Risk Assessment

Plausible Contaminant Linkage	Considerations for any Potential Future Residential Development
Dermal contact, ingestion and/or inhalation of soils and/or dusts by future site users.	The requirement for an appropriate thickness of soil in any proposed garden/landscaped areas should be considered.
Soil/Groundwater vapour generation and migration in made ground and inhalation by residents/site workers in indoor or outdoor air.	Potential vapour migration can be managed by the incorporation of vapour barriers or other mitigation measures into any new buildings.
Diffusion of contaminants through water mains and impact on on-site potable water supplies.	As part of any future development the potential linkage associated with any proposed new water mains is best mitigated through the use of appropriate pipe materials (eg. Protecta-line pipe or equivalent) and by adopting practises such as the installation of services in 'clean' corridors.

Appendix A

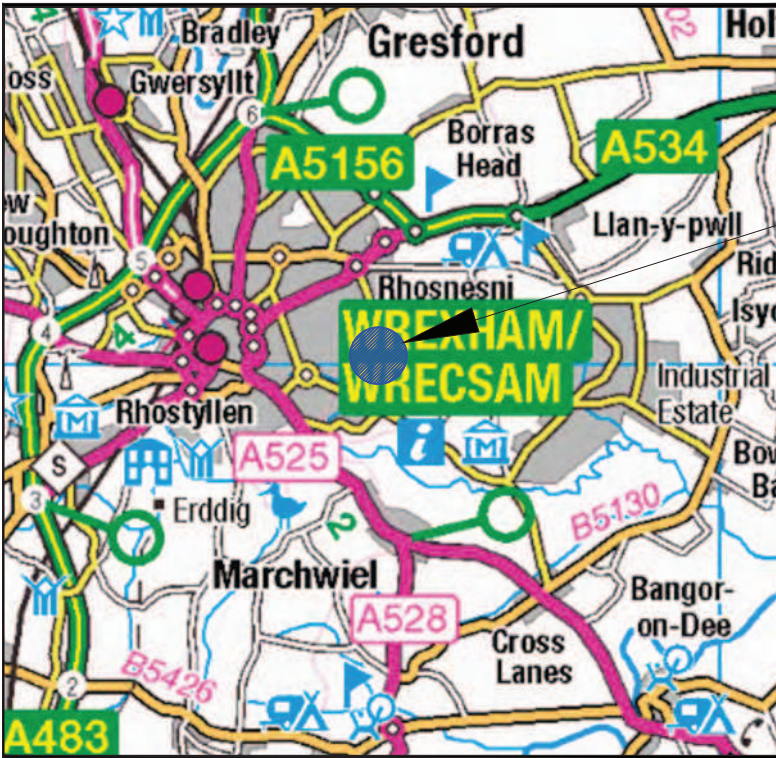
Drawings

OS NORTH



Notes:

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THE SITE



Rev	Date	Description	By	Ckd
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Client:

**WALES & WEST
UTILITIES**

Project:

**RIVULET ROAD
WREXHAM**

Project Number: **HC15016**

Drawing Title:

**SITE LOCATION
PLAN**

Drawn:	Checked:	Scale @ A4:	Drawn Date:	First Issue:
JWH	JR	As Shown	28/04/2015	28/04/2015

Drawing Status: **INFORMATION**

Drawing No. **HC15016-D001** Revision -



- LEGEND**
- SITE BOUNDARY
 - EXISTING BUILDINGS
 - CONCRETE
 - FENCING

Rev	Date	Description	By	Ckd



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WALES & WEST UTILITIES

Project:	RIVULET ROAD WREXHAM
Project Number:	HC15016

Drawing Title:
**PRE WORKS SITE LAYOUT
PLAN**

Drawn: Checked: Scale @ A3: Drawn Date: First Issue:	JWH MK 1:200 27/04/2015 27/04/2015
Drawing Status:	INFORMATION
Drawing No.	HC15016 - D002 Revision -

Notes:
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- LEGEND**
- SITE STUDY AREA
 - EXISTING BUILDINGS
 - CONCRETE
 - FENCING

PHASE 1 GRONTMIJ SI 2013

- BH01 BOREHOLE 2013
- HP02 HAND DUG PIT 2013
- IP03 INSPECTION PIT 2013

PHASE 2 GRONTMIJ SI 2014

- HP101 HAND DUG PIT 2014
- TP101 TRIAL PIT / TRIAL TRENCH 2014

PHASE 3 GRONTMIJ SI 2014

- TP105 TRIAL PIT
- BH07A BOREHOLE
- GW - GROUNDWATER MONITORING INSTALLATION
- GAS - GAS MONITORING INSTALLATION

Rev	Date	Description	By	Ckd



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Client:

WALES & WEST UTILITIES

Project:

**RIVULET ROAD
WREXHAM**

Project Number: **HC15016**

Drawing Title:

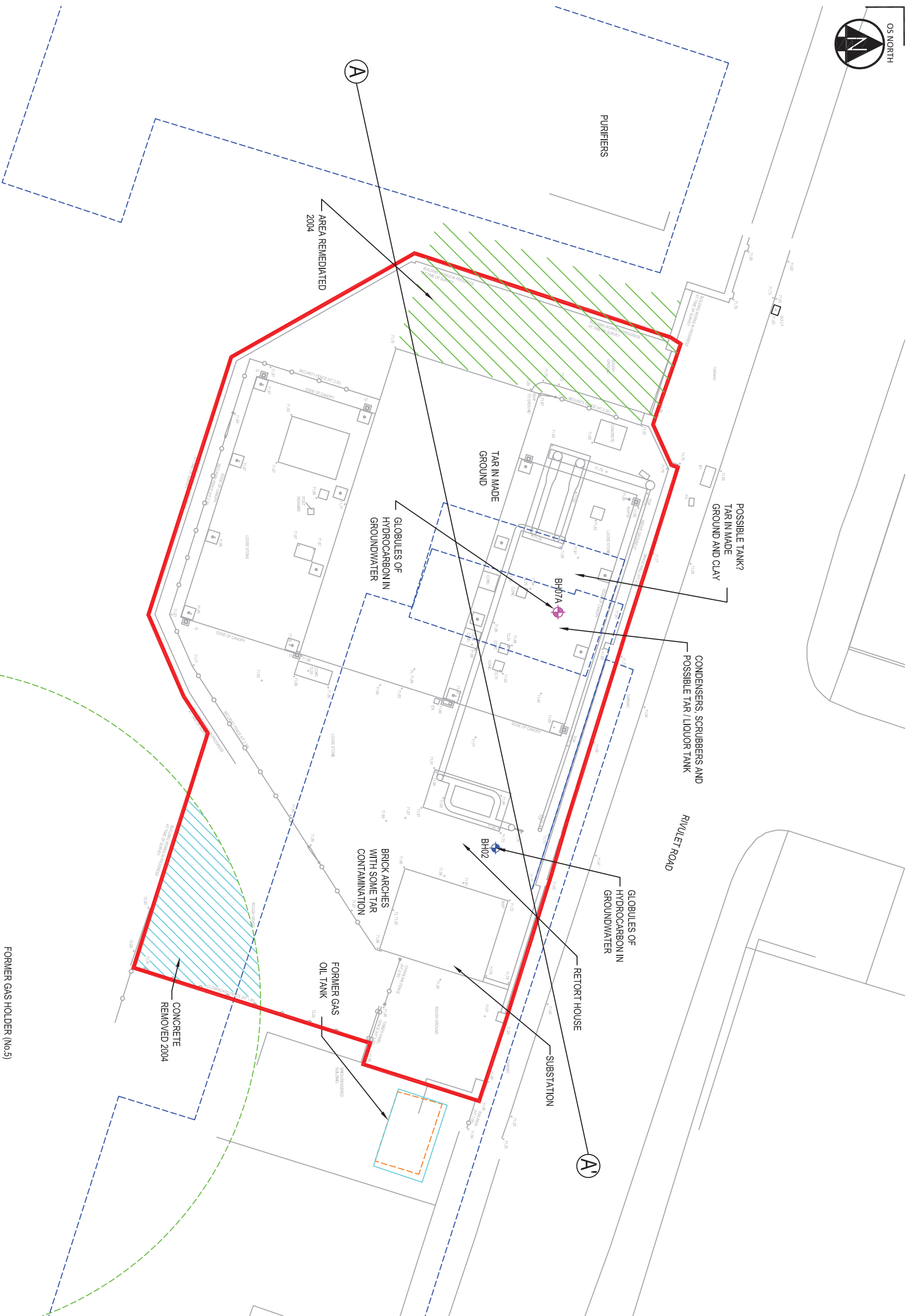
**PREVIOUS INVESTIGATION
LOCATIONS**

Drawing Status:

INFORMATION

Drawing No. **HC15016 - D003** Revision -

Notes:
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SITE BOUNDARY

1966-CIRCA 2006

CONCRETE REMOVED

REMEDIATED (2004)

SECTION (DRAWING D005)

GROUNDWATER CONTAMINATION

Rev	Date	Description	By	Ckd
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Client:

WALES & WEST UTILITIES

Project:

RIVULET ROAD
WREXHAM

Project Number: HC15016

Drawing Title:

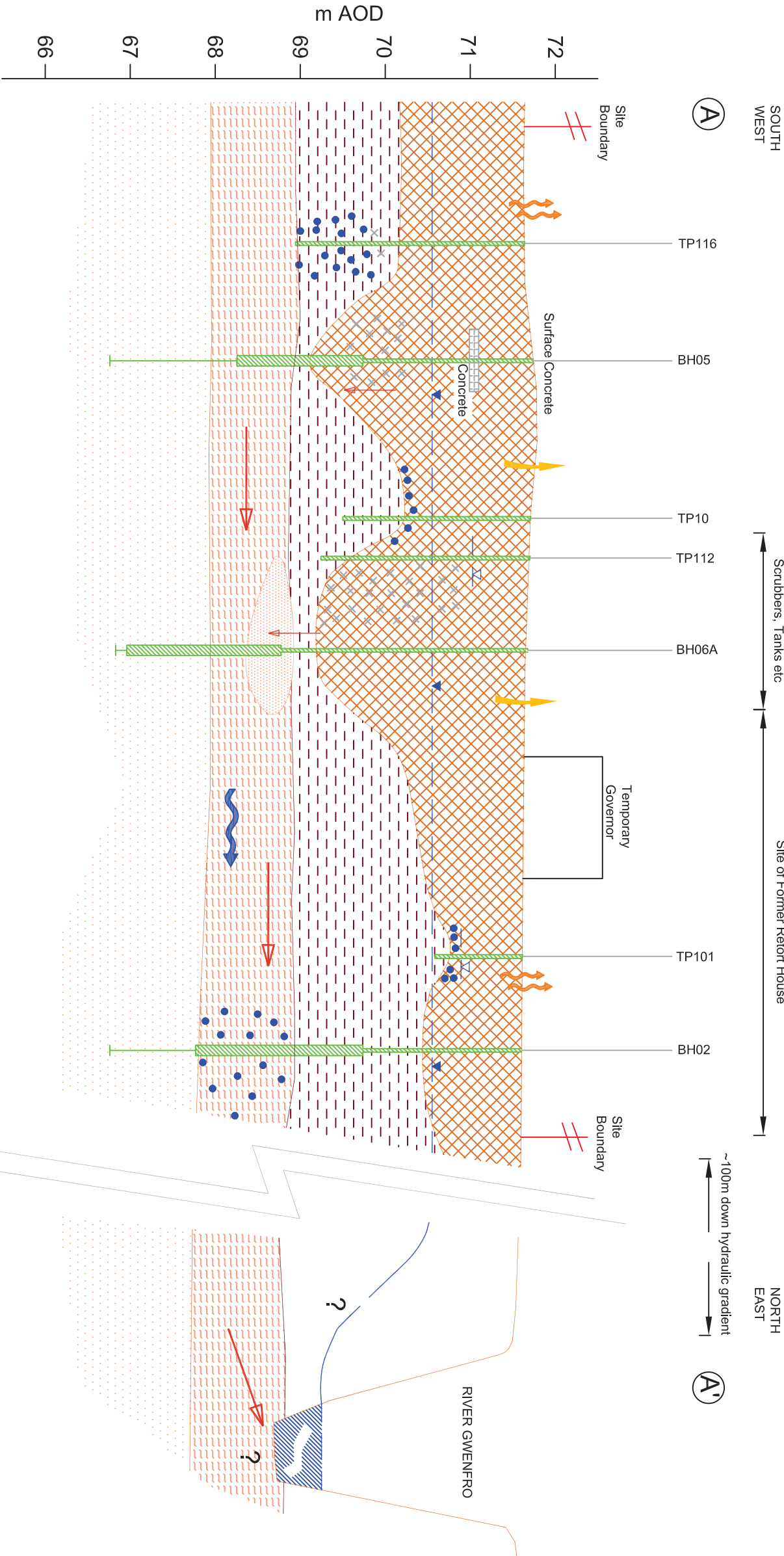
HISTORICAL AND VISUAL INDICATIONS OF CONTAMINATION FROM PREVIOUS INVESTIGATION

Drawn:	Thickness:	Scale @ 10x:	Drawn Date:	Test Date:
JWH	MK	1:200	27/04/2015	27/04/2015

Drawing Status.

INFORMATION

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Legend

- Made Ground
- Clay
- Sand
- Gravel
- Piezometric surface (shallow)
- Perched groundwater surface
- Groundwater flow direction
- Dissolved / Free Phase migration
- Dermal contact
- Vapour migration
- Tar contamination
- Free phase 'globules' in groundwater
- Groundwater well screen

Note: See drawing D004 for indicative location of cross section

Rev	Date	Description	By	Ckd
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Client:

WALES & WEST UTILITIES

Project:

RIVULET ROAD
WREXHAM

Project Number: HC15016

Drawing Title:

SCHEMATIC CONCEPTUAL
SITE MODEL

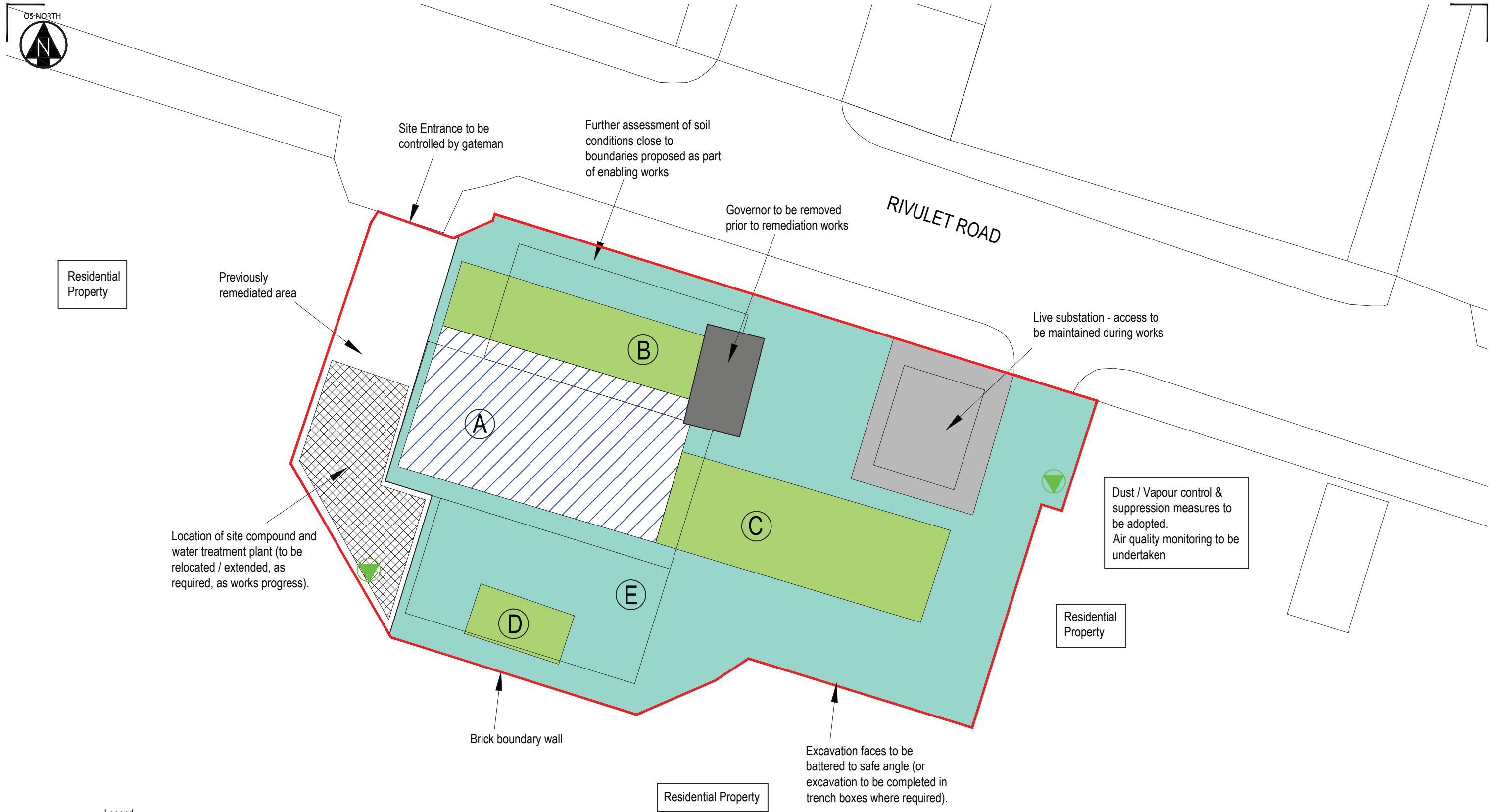
Drawing Status:

INFORMATION

Drawn: Checked: Scale @ A3: Drawn Date: First Issue:
JWH MK NTS 28/05/2015 28/05/2015

Drawing No. HC15016 - D005 Revision -

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Legend

- Site boundary
- Area excluded from remediation works
- Gas Governor
- Assumed excavation area to 1.5m bgl
- Assumed excavation area to 2.5m bgl
- Assumed excavation area to 3m bgl
- Proposed environmental monitoring locations

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Rev	Date	Description	By	Ckd

Project:
**RIVULET ROAD
WREXHAM**

Client:
**WALES & WEST
UTILITIES**

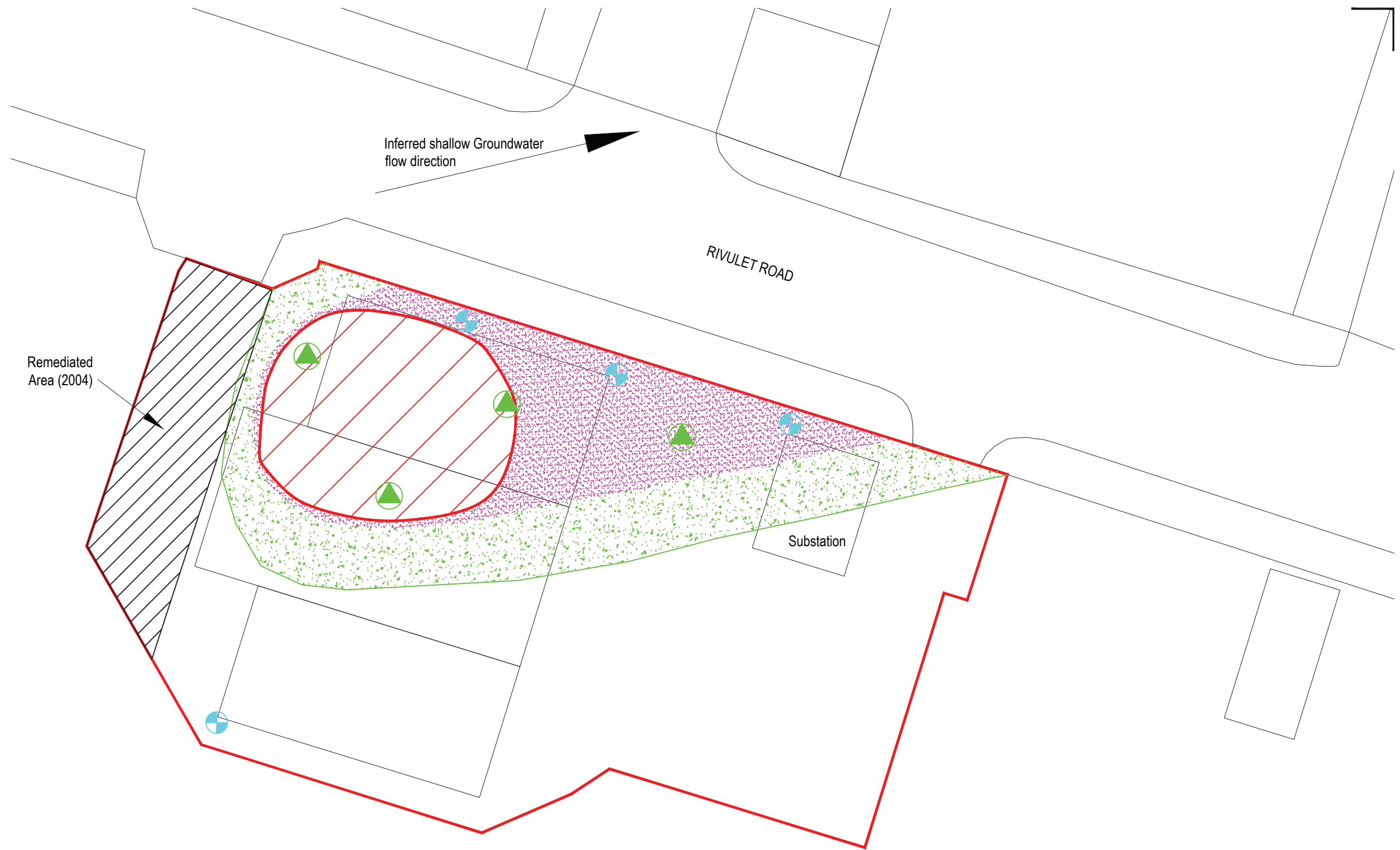
Drawing Title:
**INDICATIVE SCOPE OF SOIL
REMEDATION WORKS**

Project Number: **HC15016**

Drawn:	Checked:	Scale @ A3:	Drawn Date:	First Issue:
JWH	JR	1:200	28/04/2015	28/04/2015

Drawing Status: **INFORMATION**

Drawing No. **HC15016-D006** Revision -



Legend

- Site boundary
- Inferred primary source area
- Tar contamination to ~4m bgl (in gravels)
- Significant dissolved phase contamination in groundwater
- Indicative location of extraction wells
- Indicative location of Groundwater Monitoring wells

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Notes:
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Rev	Date	Description	By	Ckd

Project: **RIVULET ROAD WREXHAM**

Client: **WALES & WEST UTILITIES**

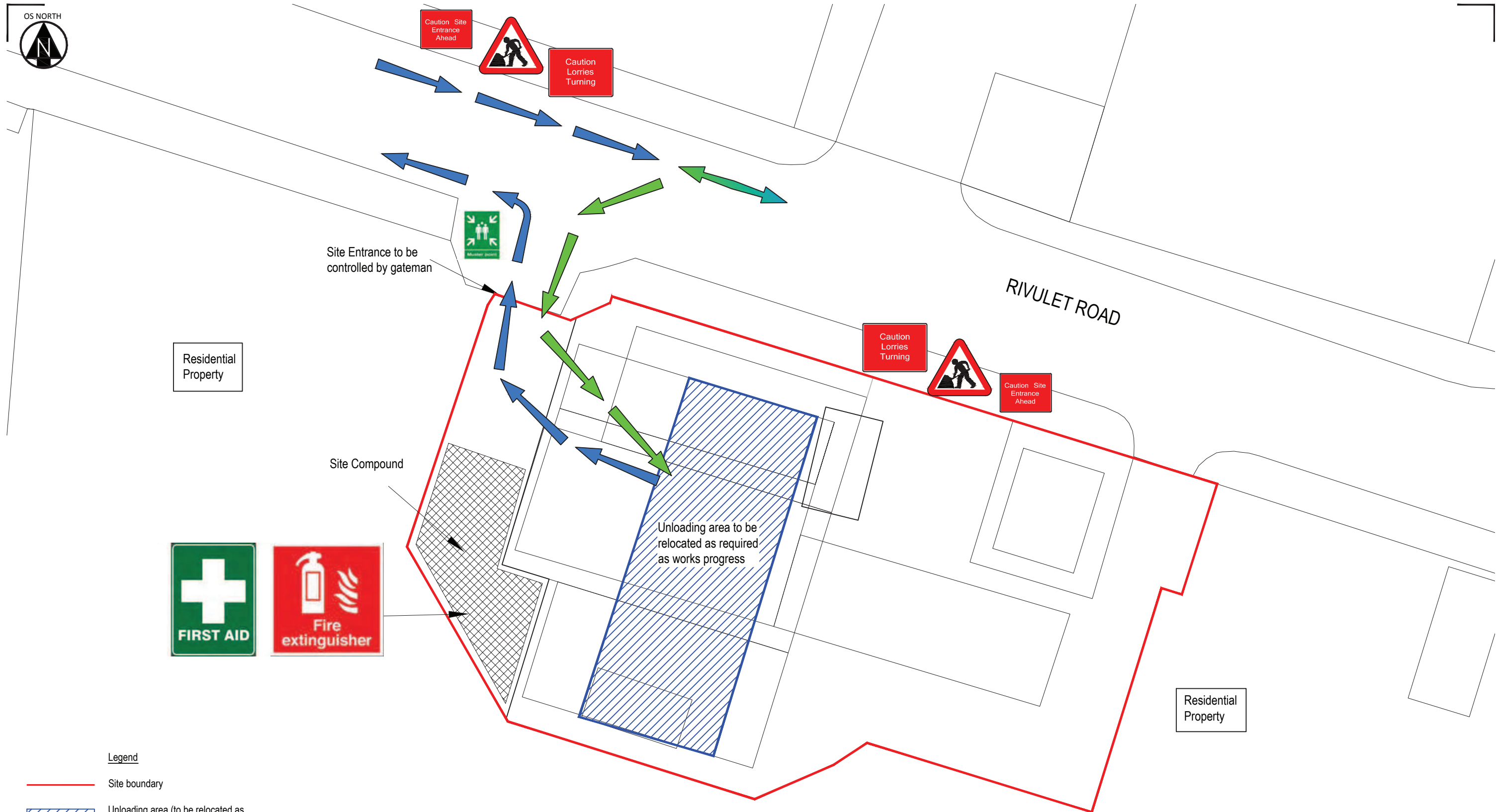
Drawing Title: **INFERRED EXTENT OF SIGNIFICANT GROUNDWATER IMPACT**

Project Number: **HC15016**

Drawn: JWH	Checked: MK	Scale @ A3: 1:200	Drawn Date: 28/04/2015	First Issue: 28/04/2015
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Drawing Status: **INFORMATION**

Drawing No. **HC15016-D007** Revision -



Legend

- Site boundary
- Unloading area (to be relocated as required as works progress).
- Muster Point
- First Aid Location
- Fire Extinguisher Location
- Delivery Route
- Reversing Vehicle

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Notes:
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Rev	Date	Description	By	Ckd

Project: **RIVULET ROAD WREXHAM**

Client: **WALES & WEST UTILITIES**

Drawing Title: WELFARE AND TRAFFIC MANAGEMENT PLAN			
Project Number: HC15016			
Drawn: JWH	Checked: JR	Scale @ A3: 1:200	Drawn Date: 30/04/2015 First Issue: 30/04/2015
Drawing Status: INFORMATION			
Drawing No. HC15016-D008 Revision -			



LEGEND

SITE BOUNDARY

EXISTING BUILDINGS

CONCRETE

FENCING

AREA UNREMATIED DUE TO GAS VALVE

Rev	Date	Description	By	Ckd

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Client:

WALES & WEST UTILITIES

Project:

RIVULET ROAD
WREXHAM

Project Number:

HC15016

Drawing Title:

SITE EXCAVATION
VERIFICATION PLAN

Drawing Status:

INFORMATION

Drawing No.

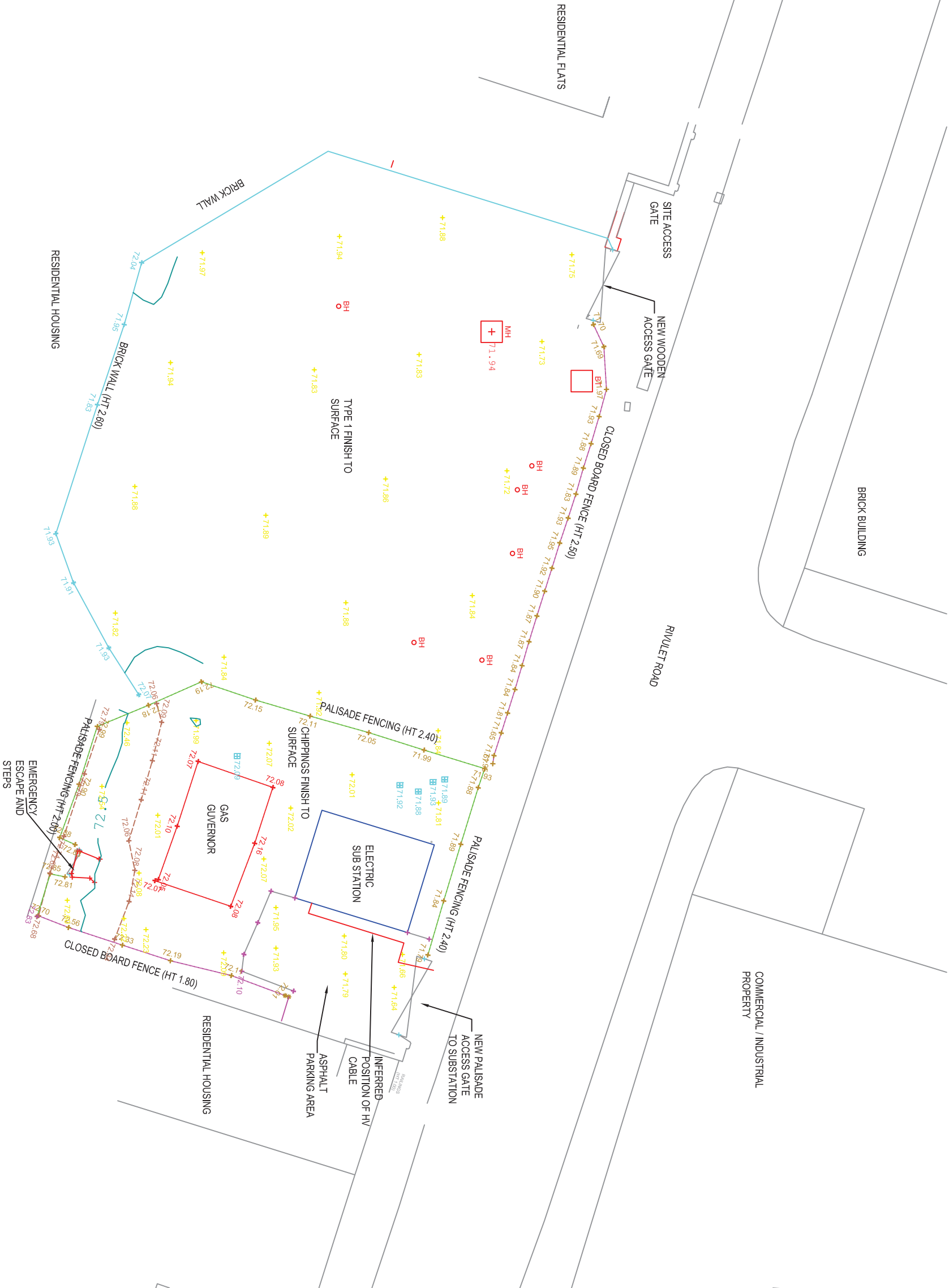
HC15016 - D009

Revision

-

Drawn: Checked: Scale @ A3: Drawn Date: First Issue:

MD MK NTS 30/07/2015 30/07/2015



LEGEND

- ELECTRICAL SUBSTATION
- GAS GUVERNOR
- RETAINING WALL
- PALISADE FENCING
- WOODEN FENCING
- GATE
- KERB LINE
- MANHOLE
- BT BOX COVER
- BOREHOLE
- GAS VALVE
- HV CABLE
- SPOT LEVEL

Rev	Date	Description	By	Ckd



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Client:

WALES & WEST UTILITIES

Project:

RIVULET ROAD
WREXHAM

Project Number: HC15016

Drawing Title:

FINAL ASBUILT

Drawing Status:

INFORMATION

Drawing No. HC15016 - D010 Revision -

Notes:
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Appendix B

Tables

Table 1: Soil Results**Site Name: Rivulet Road, Wrexham****Project No: HC15016**

Units - mg/kg

Sample Reference		Human Health Criteria for Upper 600mm	Area A Base	Area A South Face	Area 2 Base	Area 2 South Face	Area 3 Base	Area 4 Base	Area 5 Base	Area 6 Base	Area 7 Base	Area 8 Base	Area 9 Base	Area 10 Base
Analytical Parameter	LOD													
Arsenic	1	40	5	14	4.8	13	4.2	< 1.0	7.2	6.3	3.8	11	14	15
Beryllium	0.06	51	1	0.5	1.5	0.6	1	1	1.2	1	0.6	1.5	1.6	1.6
Boron	0.2	1000	1.6	0.5	3.4	0.4	0.7	1.1	3.9	5.8	0.5	1.6	1.9	1.5
Cadmium	0.2	149	0.6	0.2	1.5	< 0.2	0.5	0.4	0.3	0.5	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (III)	1	630	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	36	37	39
Chromium (VI)	1.2	21	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Copper	1	6200	31	26	66	28	29	27	25	24	17	14	15	16
Lead	1	310	87	63	95	76	37	54	150	270	14	38	38	35
Mercury, inorganic	0.3	240	< 0.3	0.4	< 0.3	< 0.3	< 0.3	0.5	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel	1	130	20	16	30	18	30	28	27	26	20	33	37	38
Selenium	1	600	< 1.0	< 1.0	1.8	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium	1	190	29	16	29	20	29	26	32	25	19	40	45	43
Zinc	1	40000	53	77	78	85	69	73	87	120	40	68	73	75
Cyanide (free)	1	760	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Phenol (total)	1	310	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Acenaphthene	0.1	2000	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	0.1	2000	< 0.10	0.39	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene	0.1	20000	< 0.10	0.46	< 0.10	0.3	< 0.10	< 0.10	< 0.10	0.11	0.13	0.29	0.18	0.15
Benzo(a)anthracene	0.1	3.7	< 0.10	1.3	0.21	1.5	< 0.10	< 0.10	0.36	0.5	< 0.10	0.92	0.74	0.51
Benzo(a)pyrene	0.1	5.3	< 0.10	1.1	0.13	1	< 0.10	< 0.10	0.26	0.36	< 0.10	0.67	0.5	0.54
Benzo (b) fluoranthene	0.1	7	< 0.10	0.96	< 0.10	0.89	< 0.10	< 0.10	0.37	0.29	< 0.10	0.79	0.58	0.51
Benzo(ghi)perylene	0.05	47	< 0.05	0.61	< 0.05	0.64	< 0.05	< 0.05	0.23	0.23	< 0.05	0.32	0.3	0.28
Benzo (k) fluoranthene	0.1	10	< 0.10	1	< 0.10	1	< 0.10	< 0.10	0.2	0.37	< 0.10	0.43	0.33	0.34
Chrysene	0.05	8.8	< 0.05	0.87	0.14	1.1	< 0.05	< 0.05	0.27	0.32	< 0.05	0.74	0.63	0.48
Dibenzo(a,h)anthracene	0.1	0.86	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	0.1	970	0.29	2.3	0.42	2.5	< 0.10	< 0.10	0.59	0.82	0.4	1.6	1.5	0.9
Fluorene	0.1	1900	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3,cd)pyrene	0.1	4.2	< 0.10	0.66	< 0.10	0.59	< 0.10	< 0.10	< 0.10	0.2	< 0.10	0.31	0.2	0.26
Naphthalene	0.05	1.6	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	0.1	840	< 0.10	0.8	< 0.10	0.61	< 0.10	< 0.10	0.22	0.44	0.64	0.95	0.47	0.34
Pyrene	0.1	2300	0.28	2.5	0.37	2.6	< 0.10	< 0.10	0.58	0.73	0.32	1.6	1.6	0.99
Benzene	0.001	3.3	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001

Notes

Concentrations in red exceed the target for final depth

* CRUSH 1 material was removed from site to landfill as unsuitable for use in the upper 600mm

Table 1: Soil Results**Site Name: Rivulet Road, Wrexham****Project No: HC15016****Units - mg/kg**

Sample Reference		Human Health Criteria for Upper 600mm	Site-Won Visually unimpacted Made Ground used below 600mm					Site-won crushed material used in below 300 mm depth				
Analytical Parameter	LOD		REUSE 1	REUSE 2	REUSE 3	REUSE 4	REUSE 5	CRUSH1*	CRUSH2	CRUSH 3	CRUSH 4	CRUSH 5
Arsenic	1	40	8	7.6	7	8.1	7.1	12	4.1	14	7.1	27
Beryllium	0.06	51	0.5	0.4	0.5	0.7	0.5	2.8	0.3	0.7	0.3	0.2
Boron	0.2	1000	0.2	0.3	< 0.2	0.3	< 0.2	0.6	0.8	2.8	2	1.6
Cadmium	0.2	149	0.3	0.5	< 0.2	< 0.2	0.2	1.6	0.5	< 0.2	< 0.2	0.2
Chromium (III)	1	630	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	18
Chromium (VI)	1.2	21	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<4
Copper	1	6200	33	32	28	47	24	300	26	20	12	31
Lead	1	310	49	58	53	76	49	190	64	24	22	25
Mercury, inorganic	0.3	240	1.3	2.6	3.3	3.4	1.6	< 0.3	1.6	< 0.3	< 0.3	< 0.3
Nickel	1	130	16	18	17	23	15	53	12	14	8.1	17
Selenium	1	600	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium	1	190	15	23	24	27	17	18	21	23	18	18
Zinc	1	40000	76	89	77	130	62	790	94	60	27	150
Cyanide (free)	1	760	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	< 1
Phenol (total)	1	310	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	16	< 1.0	< 1.0	< 1.0	< 1.0
Acenaphthene	0.1	2000	< 0.10	< 0.10	< 0.10	0.12	< 0.10	40	0.2	0.41	0.12	< 0.10
Acenaphthylene	0.1	2000	0.25	0.26	0.28	0.43	0.4	150	0.38	0.45	0.28	< 0.10
Anthracene	0.1	20000	0.48	0.37	0.43	0.6	0.77	240	1	2.3	0.75	< 0.10
Benzo(a)anthracene	0.1	3.7	2.1	1.9	1.9	3.2	3.4	310	2.2	3.5	2.2	< 0.10
Benzo(a)pyrene	0.1	5.3	1.4	1.3	1.4	3	2.6	250	1.9	2.1	2.3	< 0.10
Benzo(b)fluoranthene	0.1	7	1.4	1.7	1.5	3.3	2.7	270	2.1	2.3	2.1	< 0.10
Benzo(ghi)perylene	0.05	47	0.63	0.71	0.72	1.5	1.2	110	0.99	0.95	1.4	< 0.05
Benzo(k)fluoranthene	0.1	10	1.3	0.94	1.2	1.9	2	140	1.3	2	1.9	< 0.10
Chrysene	0.05	8.8	1.6	1.5	1.6	3.1	2.6	240	2.2	3.1	2	< 0.05
Dibenzo(a,h)anthracene	0.1	0.86	< 0.10	0.14	0.16	0.32	0.27	28	0.19	0.2	0.31	< 0.10
Fluoranthene	0.1	970	3	2.6	3	4.7	5.2	700	5.4	9.5	3.7	2.0
Fluorene	0.1	1900	< 0.10	< 0.10	< 0.10	< 0.10	0.21	170	0.53	0.65	0.24	< 0.10
Indeno(1,2,3,cd)pyrene	0.1	4.2	0.6	0.57	0.58	1.3	1.1	98	0.95	0.88	1.3	< 0.10
Naphthalene	0.05	1.6	0.15	< 0.05	< 0.05	0.19	0.2	850	0.59	0.21	< 0.05	< 0.05
Phenanthrene	0.1	840	1.2	0.82	1	1.3	2.1	740	5	8.1	1.7	< 0.10
Pyrene	0.1	2300	3	2.7	3	4.5	5	490	4.6	8.3	3.5	1.5
Benzene	0.001	3.3	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 1.0

Notes

Concentrations in red exceed the target for final depth

* CRUSH 1 material was removed from site to landfill as unsuitable for use in the upper 600mm

Table 1: Soil Results**Site Name: Rivulet Road, Wrexham****Project No: HC15016**

Units - mg/kg

Sample Reference		Human Health Criteria for Upper 600mm	Imported materials used at depth and as final cover layer							PRI area capping	
Analytical Parameter	LOD		Import 1 (6F5)	Import 2 (6F5)	Import 3 (6F5)	Import 4 (6F5)	Import 5 (6F5)	Import 6 (Type 1)	Clay 1	Import 7 (Type 1)	Import 8 (20mm stone)
Arsenic	1	40	< 1.0	2.5	1.7	3.1	3.4	5.8	8.0	3.8	5.9
Beryllium	0.06	51	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.4	0.7	< 0.1	< 0.1
Boron	0.2	1000	0.2	0.4	0.3	0.5	< 0.2	0.7	0.2	0.3	0.3
Cadmium	0.2	149	0.3	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	0.3	0.4
Chromium (III)	1	630	N/A	4.6	4.1	3.2	5.1	14	29	6	4.4
Chromium (VI)	1.2	21	N/A	<4	<4	<4	<4	<4	<4	<4	<4
Copper	1	6200	3.4	4.7	6.9	4.1	5.0	12	15	9.3	5
Lead	1	310	8.8	7.3	6.0	5.8	7.4	38	10	17	6.8
Mercury, inorganic	0.3	240	< 0.3	0.5	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel	1	130	3.2	7.7	10	5.8	8.1	9.3	30	9	2
Selenium	1	600	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium	1	190	2.9	3.8	3.8	3.0	3.9	19	30	3.9	2.3
Zinc	1	40000	15	4.2	9.4	4.2	9.1	41	41	19	11
Cyanide (free)	1	760	<1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Phenol (total)	1	310	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Acenaphthene	0.1	2000	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	0.1	2000	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene	0.1	20000	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(a)anthracene	0.1	3.7	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(a)pyrene	0.1	5.3	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(b)fluoranthene	0.1	7	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(ghi)perylene	0.05	47	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene	0.1	10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene	0.05	8.8	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dibenzo(a,h)anthracene	0.1	0.86	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	0.1	970	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	0.1	1900	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3,cd)pyrene	0.1	4.2	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Naphthalene	0.05	1.6	< 0.05	< 0.05	0.88	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	0.1	840	< 0.10	< 0.10	1.0	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Pyrene	0.1	2300	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzene	0.001	3.3	< 0.001	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Notes

Concentrations in red exceed the target for final depth

* CRUSH 1 material was removed from site to landfill as unsuitable for use in the upper 600mm

Table 2: Surface Water Results - River Gwenfro

Site Name: Rivulet Road, Wrexham

Project No: HC15016

Lab Sample Number			Surface Water EQS	460741	460742	453439	453440	457182	457181	458395	458396	465806	465807	469776
Sample Reference				Upstream 1	Downstream 1	Upstream 2	Downstream 2	Upstream 3	Downstream 3	Upstream 4	Downstream 4	Upstream 5	Downstream 5	upstream 6
Date Sampled				01/06/2015	01/06/2015	10/06/2015	10/06/2015	17/06/2015	17/06/2015	19/06/2015	19/06/2015	13/07/2015	13/07/2015	23/07/2015
Analytical Parameter	Units	LOD												
pH	pH Units	N/A		7.9	7.9	8.0	8.1	7.9	7.5	7.8	7.9	7.2	7.7	7.7
Total Cyanide	µg/l	10		< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10			
Ammonium as NH ₄	µg/l	15	300 - 600	46	43	< 15	< 15	< 15	< 15	< 15	< 15	30	25	< 15
Chemical Oxygen Demand (Total)	mg/l	2		5.4	5.3	10	6.9	4.7	8.1	11	7.6	26	22	2.5
BOD (Biochemical Oxygen Demand)	mg/l	1		< 1.0	1.5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.1	1.2	1.0	< 1.0
Total Suspended Solids	mg/l	2		2.0	2.0	< 2.0	2.0	4.0	2.0	2.0	3.0	3.0	< 2.0	< 2.0
Arsenic (dissolved)	µg/l	0.15	50	0.57	0.43	0.39	0.36	0.39	0.45	0.34	0.39	0.43	0.40	1.04
Beryllium (dissolved)	µg/l	0.1						< 0.1	< 0.1					
Boron (dissolved)	µg/l	10	2000	72	71	57	56	59	60	63	63	59	58	64
Cadmium (dissolved)	µg/l	0.02	0.08	< 0.02	< 0.02	< 0.02	< 0.02	0.02	0.03	0.03	< 0.02	0.02	0.03	0.04
Chromium (hexavalent)	µg/l	5	3.4	< 5.0	< 5.0			< 5.0	< 5.0					
Chromium (dissolved)	µg/l	0.2		0.3	1.0	0.2	< 0.2	0.4	0.6	0.2	0.3	0.4	0.3	0.4
Copper (dissolved)	µg/l	0.5		4.9	4.6	7.2	5.8	7.3	6.6	4.8	12	11	9.8	5.7
Lead (dissolved)	µg/l	0.2	7.2	< 0.2	< 0.2	0.8	0.4	0.8	1.0	0.5	0.4	0.7	0.9	0.4
Manganese (dissolved)	µg/l	0.05	30	10	8.5	2.0	1.6	3.7	2.8	2.6	1.2	3.9	2.7	1.6
Mercury (dissolved)	µg/l	0.05	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nickel (dissolved)	µg/l	0.5	20	3.3	3.8	1.0	1.2	1.4	1.6	1.0	1.1	3.1	2.1	1.3
Selenium (dissolved)	µg/l	0.6		1.2	0.8	1.1	1.2	1.4	1.3	0.6	0.8	1.0	0.9	< 0.6
Zinc (dissolved)	µg/l	0.5		< 0.5	< 0.5	4.6	5.0	3.7	6.1	2.1	4.4	12	8.5	3.4
Naphthalene	µg/l	0.01	2.4	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	µg/l	0.01	0.1	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	0.1	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	0.03	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	0.05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	0.002	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Total EPA-16 PAHs	µg/l	0.2		< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Benzene	µg/l	1	10	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/l	1	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	20	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/l	1	30	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH1 (C10 - C40)	µg/l	10										< 10	< 10	310

Table 2: Surface Water Results - River Gwenfro

Site Name: Rivulet Road, Wrexham

Project No: HC15016

Lab Sample Number			Surface Water EQS	469777	479862	479863	485218	485219	508671	508672	517862	517863	531629	531630
Sample Reference				downstream 6	Upstream 7	Downstream 7	Upstream 8	Downstream 8	Upstream 9	Downstream 9	Upstream 10	Downstream 10	Upstream 11	Downstream 11
Date Sampled				23/07/2015	26/08/2015	26/08/2015	08/09/2015	08/09/2015	12/11/2015	12/11/2015	08/12/2015	08/12/2015	28/01/2016	28/01/2016
Analytical Parameter	Units	LOD												
pH	pH Units	N/A		7.9	8.1	8.1	8.2	8.2	8.9	8.6	7.4	7.7	8.0	8.0
Total Cyanide	µg/l	10	300 - 600		1200	640	< 15	< 15	< 10	< 10	< 10	< 10	< 10	< 10
Ammonium as NH ₄	µg/l	15		49	1.2	0.64	< 0.015	< 0.015	< 15	< 15	230	140	270	170
Chemical Oxygen Demand (Total)	mg/l	2		< 2.0	20	17	12	9.0	15	16	15	15	16	11
BOD (Biochemical Oxygen Demand)	mg/l	1		< 1.0	< 1.0	< 1.0	1.1	<1.0	< 1.0	1.4	1.1	4.8	1.3	1.6
Total Suspended Solids	mg/l	2		< 2.0	11	4.0	6.0	4.0	4.0	2.0	5.0	< 2.0	15	6.0
Arsenic (dissolved)	µg/l	0.15	50	0.63	0.49	0.56	0.68	0.67	0.51	0.57	0.63	0.60	0.40	0.20
Beryllium (dissolved)	µg/l	0.1			< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Boron (dissolved)	µg/l	10	2000	63	62	61	60	60	58	56	49	48	51	52
Cadmium (dissolved)	µg/l	0.02	0.08	0.04	0.02	0.02	< 0.02	0.03	< 0.02	0.03	0.03	0.05	0.02	0.04
Chromium (hexavalent)	µg/l	5	3.4		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chromium (dissolved)	µg/l	0.2		0.3	0.3	0.3	5.0	4.4	0.4	0.4	1.0	1.2	1.2	0.9
Copper (dissolved)	µg/l	0.5		8.6	13	7.2	7.7	7.7	6.4	5.7	4.2	5.0	3.1	4.6
Lead (dissolved)	µg/l	0.2	7.2	0.9	0.7	0.4	1.4	0.5	0.6	0.4	0.8	0.7	1.3	0.5
Manganese (dissolved)	µg/l	0.05	30	1.5	12	5.7	19	8.4	14	10	6.8	6.1	24	12
Mercury (dissolved)	µg/l	0.05	0.05	0.39	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	0.16	0.11	0.30	0.22
Nickel (dissolved)	µg/l	0.5	20	1.5	2.5	2.0	4.0	3.3	4.4	4.5	2.2	2.6	2.3	1.8
Selenium (dissolved)	µg/l	0.6		0.9	0.9	0.9	0.8	1.1	1.1	1.0	0.7	1.0	0.7	1.1
Zinc (dissolved)	µg/l	0.5		4.6	5.0	5.1	4.8	7.0	4.1	5.7	6.7	3.8	5.5	5.9
Naphthalene	µg/l	0.01	2.4	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	µg/l	0.01	0.1	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	0.1	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	0.03	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	0.002	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Total EPA-16 PAHs	µg/l	0.2		< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.16	< 0.16	< 0.16	< 0.16
Benzene	µg/l	1	10	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/l	1	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	20	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/l	1	30	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH1 (C10 - C40)	µg/l	10		< 10	< 10	< 10	< 10	< 10						

Table 2: Surface Water Results - River Gwenfro

Site Name: Rivulet Road, Wrexham

Project No: HC15016

Lab Sample Number			Surface Water EQS	540210	540211	540210	540211
Sample Reference				Upstream 12	Downstream 12	Upstream 13	Downstream 13
Date Sampled				22/02/2016	22/02/2016	07/04/2016	07/04/2016
Analytical Parameter	Units	LOD					
pH	pH Units	N/A		8.0	8.1	8.0	8.0
Total Cyanide	µg/l	10		< 10	< 10	< 10	< 10
Ammonium as NH ₄	µg/l	15	300 - 600	180	160	51	310
Chemical Oxygen Demand (Total)	mg/l	2		10	9.2	21	21
BOD (Biochemical Oxygen Demand)	mg/l	1		2.0	1.6	1.4	1.2
Total Suspended Solids	mg/l	2		6.0	16	12	8.0
Arsenic (dissolved)	µg/l	0.15	50	0.30	0.20	0.59	0.43
Beryllium (dissolved)	µg/l	0.1		< 0.1	< 0.1	< 0.1	< 0.1
Boron (dissolved)	µg/l	10	2000	46	46	35	37
Cadmium (dissolved)	µg/l	0.02	0.08	0.05	< 0.02	< 0.02	0.06
Chromium (hexavalent)	µg/l	5	3.4	< 5.0	< 5.0	< 5.0	< 5.0
Chromium (dissolved)	µg/l	0.2		0.9	0.6	1.1	1.3
Copper (dissolved)	µg/l	0.5		4.5	3.1	4.7	6.4
Lead (dissolved)	µg/l	0.2	7.2	5.5	0.9	2.3	3.3
Manganese (dissolved)	µg/l	0.05	30	50	15	14	24
Mercury (dissolved)	µg/l	0.05	0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nickel (dissolved)	µg/l	0.5	20	4.0	2.1	2.3	2.5
Selenium (dissolved)	µg/l	0.6		< 0.6	< 0.6	< 0.6	0.8
Zinc (dissolved)	µg/l	0.5		9.8	2.9	6.2	8.1
Naphthalene	µg/l	0.01	2.4	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthylene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	µg/l	0.01	0.1	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	µg/l	0.01	0.1	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	0.03	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	0.05	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	0.002	< 0.01	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01
Total EPA-16 PAHs	µg/l	0.2		< 0.16	< 0.16	< 0.16	< 0.16
Benzene	µg/l	1	10	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/l	1	50	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	20	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/l	1	30	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/l	1		< 1.0	< 1.0	< 1.0	< 1.0
TPH1 (C10 - C40)	µg/l	10					

Table 3: Groundwater Results from Extraction Wells

Site Name: Rivulet Road, Wrexham

Project No: HC15016

Lab Sample Number			Surface Water EQS	469778	469779	469780	469781
Sample Reference				AW1	AW2	AW3	AW4
Date Sampled				23/07/2015	23/07/2015	23/07/2015	23/07/2015
Analytical Parameter	Units	LOD					
pH	pH Units	N/A		7.6	7.5	7.4	7.7
Total Cyanide	µg/l	10		-	-	-	-
Ammonium as NH ₄	µg/l	15	300 - 600	3500	7200	40000	61000
Chemical Oxygen Demand (Total)	mg/l	2		26	94	170	54
BOD (Biochemical Oxygen Demand)	mg/l	1		1.9	5.4	120	1.2
Total Suspended Solids	mg/l	2		140	4100	560	140
Arsenic (dissolved)	µg/l	0.15	50	1.10	1.22	4.26	2.76
Beryllium (dissolved)	µg/l	0.1		-	-	-	-
Boron (dissolved)	µg/l	10	2000	160	100	110	140
Cadmium (dissolved)	µg/l	0.02	0.08	0.02	0.06	0.04	< 0.02
Chromium (hexavalent)	µg/l	5	3.4	-	-	-	-
Chromium (dissolved)	µg/l	0.2		0.6	< 0.2	0.8	1.2
Copper (dissolved)	µg/l	0.5		6.1	7.2	4.7	14
Lead (dissolved)	µg/l	0.2	7.2	1.3	0.4	1.1	1.8
Manganese (dissolved)	µg/l	0.05	30	1100	490	470	750
Mercury (dissolved)	µg/l	0.05	0.05	< 0.05	0.11	0.66	0.20
Nickel (dissolved)	µg/l	0.5	20	1.4	4.8	9.7	1.4
Selenium (dissolved)	µg/l	0.6		0.7	3.4	23	2.0
Zinc (dissolved)	µg/l	0.5		39	6.4	10	92
Naphthalene	µg/l	0.01	2.4	< 0.01	3.3	130	3.3
Acenaphthylene	µg/l	0.01		7.7	1.2	28	0.46
Acenaphthene	µg/l	0.01		49	3.2	5.2	0.95
Fluorene	µg/l	0.01		19	1.3	8.1	0.43
Phenanthrene	µg/l	0.01		0.98	0.55	0.75	< 0.01
Anthracene	µg/l	0.01	0.1	2.4	0.89	2.6	< 0.01
Fluoranthene	µg/l	0.01	0.1	8.9	2.2	4.1	0.53
Pyrene	µg/l	0.01		6.2	1.8	3.0	0.61
Benzo(a)anthracene	µg/l	0.01		1.7	< 0.01	1.1	< 0.01
Chrysene	µg/l	0.01		1.3	< 0.01	0.81	< 0.01
Benzo(b)fluoranthene	µg/l	0.01		0.91	< 0.01	0.72	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	0.03	0.67	< 0.01	0.42	< 0.01
Benzo(a)pyrene	µg/l	0.01	0.05	0.83	< 0.01	0.62	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	0.002	< 0.01	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01
Total EPA-16 PAHs	µg/l	0.2		99.6	14.4	190	6.26
Benzene	µg/l	1	10	< 1.0	< 1.0	792	< 1.0
Toluene	µg/l	1	50	< 1.0	< 1.0	467	< 1.0
Ethylbenzene	µg/l	1	20	< 1.0	< 1.0	14.1	< 1.0
p & m-xylene	µg/l	1	30	< 1.0	< 1.0	123	< 1.0
o-xylene	µg/l	1		< 1.0	< 1.0	58.1	< 1.0
TPH1 (C10 - C40)	µg/l	10		1200	14	780	< 10

Table 3: Groundwater Results from Extraction Wells**Site Name: Rivulet Road, Wrexham****Project No: HC15016**

Lab Sample Number			Surface Water EQS
Sample Reference			
Date Sampled			
Analytical Parameter	Units	LOD	
pH	pH Units	N/A	
Total Cyanide	µg/l	10	
Ammonium as NH ₄	µg/l	15	300 - 600
Chemical Oxygen Demand (Total)	mg/l	2	
BOD (Biochemical Oxygen Demand)	mg/l	1	
Total Suspended Solids	mg/l	2	
Arsenic (dissolved)	µg/l	0.15	50
Beryllium (dissolved)	µg/l	0.1	
Boron (dissolved)	µg/l	10	2000
Cadmium (dissolved)	µg/l	0.02	0.08
Chromium (hexavalent)	µg/l	5	3.4
Chromium (dissolved)	µg/l	0.2	
Copper (dissolved)	µg/l	0.5	
Lead (dissolved)	µg/l	0.2	7.2
Manganese (dissolved)	µg/l	0.05	30
Mercury (dissolved)	µg/l	0.05	0.05
Nickel (dissolved)	µg/l	0.5	20
Selenium (dissolved)	µg/l	0.6	
Zinc (dissolved)	µg/l	0.5	
Naphthalene	µg/l	0.01	2.4
Acenaphthylene	µg/l	0.01	
Acenaphthene	µg/l	0.01	
Fluorene	µg/l	0.01	
Phenanthrene	µg/l	0.01	
Anthracene	µg/l	0.01	0.1
Fluoranthene	µg/l	0.01	0.1
Pyrene	µg/l	0.01	
Benzo(a)anthracene	µg/l	0.01	
Chrysene	µg/l	0.01	
Benzo(b)fluoranthene	µg/l	0.01	
Benzo(k)fluoranthene	µg/l	0.01	0.03
Benzo(a)pyrene	µg/l	0.01	0.05
Indeno(1,2,3-cd)pyrene	µg/l	0.01	
Benzo(ghi)perylene	µg/l	0.01	0.002
Dibenz(a,h)anthracene	µg/l	0.01	
Total EPA-16 PAHs	µg/l	0.2	
Benzene	µg/l	1	10
Toluene	µg/l	1	50
Ethylbenzene	µg/l	1	20
p & m-xylene	µg/l	1	30
o-xylene	µg/l	1	
TPH1 (C10 - C40)	µg/l	10	

Table 4: Groundwater Results from Monitoring Wells

Site Name: Rivulet Road, Wrexham

Project No: HC15016

			Post Groundwater Extraction Phase										
Lab Sample Number					469782	474247	479864	485220	508673	517864	531631	540212	
Sample Reference					MW1	MW1	MW1	MW1	MW1	MW1	MW1	MW1	MW1
Date Sampled					23/07/2015	05/08/2015	26/08/2015	08/09/2015	12/11/2015	08/12/2015	28/01/2016	22/02/2016	07/04/2016
Analytical Parameter			Units	LOD									
pH	pH Units	N/A			11.6	11.7	10.8	10.9	11.2	11.2	10.9	11.7	7.8
Total Cyanide	µg/l	10					1800	900	64	49	21	23	24
Ammonium as NH ₄	µg/l	15	300 - 600		2900	2200	1.8	0.90	1300	940	690	1100	360
Chemical Oxygen Demand (Total)	mg/l	2			77	41	48	100	33	40	21	29	24
BOD (Biochemical Oxygen Demand)	mg/l	1			4.0	38	5.3	<1.0	<1.0	<1.0	<1.0	2.4	1.5
Total Suspended Solids	mg/l	2			64	9.0	170	170	18	22	7.0	460	3.0
Arsenic (dissolved)	µg/l	0.15	50		2.88	0.92	1.75	1.71	1.88	1.64	0.89	1.38	1.04
Beryllium (dissolved)	µg/l	0.1					< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Boron (dissolved)	µg/l	10	2000		38	70	110	80	37	49	50	110	76
Cadmium (dissolved)	µg/l	0.02	0.08		0.06	< 0.02	< 0.02	< 0.02	0.03	< 0.02	< 0.02	< 0.02	< 0.02
Chromium (hexavalent)	µg/l	5	3.4				< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chromium (dissolved)	µg/l	0.2			2.4	2.1	2.2	4.9	1.3	0.8	0.5	0.6	0.5
Copper (dissolved)	µg/l	0.5			15	7.0	6.3	5.5	6.0	5.1	3.4	5.0	5.8
Lead (dissolved)	µg/l	0.2	7.2		15	24	2.9	4.5	5.0	0.2	0.4	2.4	0.2
Manganese (dissolved)	µg/l	0.05	30		11	5.3	3.2	3.3	4.6	0.71	1.4	1.7	
Mercury (dissolved)	µg/l	0.05	0.05		0.77	0.25	0.21	< 0.05	0.10	0.18	0.21	< 0.05	< 0.05
Nickel (dissolved)	µg/l	0.5	20		12	7.8	4.5	5.3	13	6.1	2.8	7.1	2.9
Selenium (dissolved)	µg/l	0.6			6.1	3.0	11	23	36	15	4.8	4.3	2.8
Zinc (dissolved)	µg/l	0.5			7.0	1.6	0.9	1.5	0.9	0.7	< 0.5	0.8	1.8
Naphthalene	µg/l	0.01	2.4		87	6.7	< 0.01	0.63	0.40	< 0.01	< 0.01	33.7	< 0.01
Acenaphthylene	µg/l	0.01			30	22	< 0.01	0.18	1.5	2.08	1.04	4.78	< 0.01
Acenaphthene	µg/l	0.01			31	29	0.92	0.26	4.1	3.34	1.51	5.40	< 0.01
Fluorene	µg/l	0.01			24	28	0.67	< 0.01	2.8	1.87	0.63	5.29	< 0.01
Phenanthrene	µg/l	0.01			28	32	< 0.01	< 0.01	0.69	0.90	< 0.01	5.60	< 0.01
Anthracene	µg/l	0.01	0.1		4.7	5.8	< 0.01	< 0.01	0.39	0.40	< 0.01	1.80	< 0.01
Fluoranthene	µg/l	0.01	0.1		5.2	4.4	0.95	1.2	2.1	1.47	0.43	3.02	< 0.01
Pyrene	µg/l	0.01			3.8	2.9	0.69	0.78	1.7	1.10	0.39	2.43	< 0.01
Benzo(a)anthracene	µg/l	0.01			0.99	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.68	< 0.01
Chrysene	µg/l	0.01			0.88	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.87	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	0.03		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.37	< 0.01
Benzo(k)fluoranthene	µg/l	0.01			< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.21	< 0.01
Benzo(a)pyrene	µg/l	0.01	0.05		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.33	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01			< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	0.002		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01			< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Total EPA-16 PAHs	µg/l	0.2			215	131	3.23	3.08	13.6	11.2	4.00	64.5	< 0.16
Benzene	µg/l	1	10		49.4	46.7	48.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/l	1	50		68.5	10.2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	20		16.5	3.2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/l	1			35.4	11.2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/l	1	30		17.5	6.3	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH1 (C10 - C40)	µg/l	10			1200	1300	< 10	86					
TPH-CWG - Aliphatic >C5 - C6	µg/l	10							< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C6 - C8	µg/l	10							< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C8 - C10	µg/l	10							< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C10 - C12	µg/l	10							< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C12 - C16	µg/l	10							< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C16 - C21	µg/l	10							< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C21 - C35	µg/l	10							< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10							< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C5 - C7	µg/l	10							< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C7 - C8	µg/l	10							< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C8 - C10	µg/l	10							< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C10 - C12	µg/l	10							< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C12 - C16	µg/l	10							33	35	< 10	160	< 10
TPH-CWG - Aromatic >C16 - C21	µg/l	10							< 10	61	< 10	180	< 10
TPH-CWG - Aromatic >C21 - C35	µg/l	10							< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (C5 - C35)	µg/l	10							33	96	< 10	540	< 10

Table 4: Groundwater Results from Monitoring Wells

Site Name: Rivulet Road, Wrexham

Project No: HC15016

				Post Groundwater Extraction Phase																			
Lab Sample Number		Surface Water EQS		469783		474248		479865		485221		508674		517865		531632		540213					
Sample Reference				MW2		MW2		MW2		MW2		MW2		MW2		MW2		MW2		MW2			
Date Sampled				23/07/2015		05/08/2015		26/08/2015		08/09/2015		12/11/2015		08/12/2015		28/01/2016		22/02/2016		07/04/2016			
Analytical Parameter		Units	LOD																				
				300 - 600																			
pH		pH Units	N/A		8.0	8.0	7.7	7.6	8.5	8.5	7.9	8.2	7.5										
Total Cyanide		µg/l	10				220000	30000	85	120	24	23	14										
Ammonium as NH ₄		µg/l	15		83000	250000	220	30	11000	7800	2600	1600	520										
Chemical Oxygen Demand (Total)		mg/l	2		23000	460	480	88	40	44	23	20	15										
BOD (Biochemical Oxygen Demand)		mg/l	1		190	260	59	41	2.9	6.3	2.6	2.8	2.7										
Total Suspended Solids		mg/l	2		160	260	880	16	22	19	5.0	320	2.0										
Arsenic (dissolved)		µg/l	0.15	50	5.94	10.4	11.0	2.17	1.00	0.80	0.57	0.60	0.66										
Beryllium (dissolved)		µg/l	0.1				0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.2										
Boron (dissolved)		µg/l	10	2000	64	130	130	110	70	49	39	89	35										
Cadmium (dissolved)		µg/l	0.02	0.08	0.04	0.02	< 0.02	0.03	0.05	< 0.02	0.03	0.03	0.02										
Chromium (hexavalent)		µg/l	5	3.4			< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0										
Chromium (dissolved)		µg/l	0.2		1.5	2.7	4.0	5.0	0.3	< 0.2	< 0.2	< 0.2	0.2										
Copper (dissolved)		µg/l	0.5		4.6	5.7	5.8	6.0	3.6	1.3	2.6	1.5	3.8										
Lead (dissolved)		µg/l	0.2	7.2	1.0	2.2	3.6	0.6	0.9	< 0.2	0.2	0.2	0.2										
Manganese (dissolved)		µg/l	0.05	30	130	130	130	220	450	280	72	450	55										
Mercury (dissolved)		µg/l	0.05		0.66	< 0.05	< 0.05	0.05	0.15	0.20	0.15	< 0.05	< 0.05										
Nickel (dissolved)		µg/l	0.5	20	8.5	4.9	6.2	19	27	19	16	9.7	8.1										
Selenium (dissolved)		µg/l	0.6		27	16	14	18	68	45	5.3	5.6	4.4										
Zinc (dissolved)		µg/l	0.5		3.3	3.5	3.2	2.6	3.5	2.8	1.2	3.2	1.9										
				2.4		490		7300		2900		810		2.6		52.9		< 0.01		1.14		0.36	
Naphthalene		µg/l	0.01				12	12	430	140	73	32	62.7	17.2	11.3	0.39							
Acenaphthylene		µg/l	0.01				2.0	72	19	13	9.5	12.5	5.22	6.88	1.15								
Acenaphthene		µg/l	0.01				4.1	320	63	31	20	30.2	12.5	18.9	0.72								
Fluorene		µg/l	0.01				4.2	1000	90	15	13	24.0	8.54	11.8	< 0.01								
Phenanthrene		µg/l	0.01				0.99	290	22	5.1	3.3	5.10	1.89	4.23	< 0.01								
Anthracene		µg/l	0.01	0.1			0.65	680	26	2.4	4.3	2.89	1.63	5.10	0.85								
Fluoranthene		µg/l	0.01	0.1			0.41	520	22	1.6	3.1	2.00	1.14	4.00	0.56								
Pyrene		µg/l	0.01				< 0.01	260	< 0.01	< 0.01	1.1	< 0.01	< 0.01	1.32	< 0.01								
Benzo(a)anthracene		µg/l	0.01				< 0.01	210	< 0.01	< 0.01	1.2	< 0.01	< 0.01	1.16	< 0.01								
Chrysene		µg/l	0.01				< 0.01	200	< 0.01	< 0.01	0.57	< 0.01	< 0.01	0.84	< 0.01								
Benzo(b)fluoranthene		µg/l	0.01	0.03			< 0.01	98	< 0.01	< 0.01	0.21	< 0.01	< 0.01	0.38	< 0.01								
Benzo(k)fluoranthene		µg/l	0.01				< 0.01	180	< 0.01	< 0.01	0.45	< 0.01	< 0.01	0.67	< 0.01								
Benzo(a)pyrene		µg/l	0.01	0.05			< 0.01	70	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01								
Indeno(1,2,3-cd)pyrene		µg/l	0.01				< 0.01	82	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01								
Benzo(ghi)perylene		µg/l	0.01	0.002			< 0.01	14	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01								
Dibenz(a,h)anthracene		µg/l	0.01				< 0.01	18	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01								
Total EPA-16 PAHs		µg/l	0.2		515	11800	3240	954	92.3	192	48.1	67.7	4.03										
				10		1480		3400		4520		408		142		114		50.0		32.9		16.8	
Benzene		µg/l	1				3570	7460	9170	791	27.7	7.6	6.4	6.7	1.9								
Toluene		µg/l	1	50			263	736	57.9	< 1.0	< 1.0	< 1.0	< 1.0										
Ethylbenzene		µg/l	1				1880	3650	2640	595	50.7	31.0	18.6	5.4	17.0								
p & m-xylene		µg/l	1	30			821	1530	1030	239	81.0	75.9	23.6	5.3	23.0								
o-xylene		µg/l	1																				
TPH1 (C10 - C40)				µg/l	10		1300	95000	3200	2100													
TPH-CWG - Aliphatic >C5 - C6		µg/l	10								< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	
TPH-CWG - Aliphatic >C6 - C8		µg/l	10								< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10		
TPH-CWG - Aliphatic >C8 - C10		µg/l	10								< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10		
TPH-CWG - Aliphatic >C10 - C12		µg/l	10								< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10		
TPH-CWG - Aliphatic >C12 - C16		µg/l	10								< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10		
TPH-CWG - Aliphatic >C16 - C21		µg/l	10								< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10		
TPH-CWG - Aliphatic >C21 - C35		µg/l	10								< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10		
TPH-CWG - Aliphatic (C5 - C35)		µg/l	10								< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10		
				10		140		110		50		33		17									
TPH-CWG - Aromatic >C5 - C7		µg/l	10																				
TPH-CWG - Aromatic >C7 - C8		µg/l	10								28	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	
TPH-CWG - Aromatic >C8 - C10		µg/l	10								220	160	46	11	64								
TPH-CWG - Aromatic >C10 - C12		µg/l	10								88	200	210	150	48								
TPH-CWG - Aromatic >C12 - C16		µg/l	10								130	1300	410	210	110								
TPH-CWG - Aromatic >C16 - C21		µg/l	10								24	130	270	25	88								
TPH-CWG - Aromatic >C21 - C35		µg/l	10								< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10	
TPH-CWG - Aromatic (C5 - C35)		µg/l	10								630	1900	990	420	330								

Table 4: Groundwater Results from Monitoring Wells

Site Name: Rivulet Road, Wrexham

Project No: HC15016

Lab Sample Number Sample Reference Date Sampled Analytical Parameter			Post Groundwater Extraction Phase									
			Surface Water EQS	469784	474249	479866	485222	508675	517866	531633	540214	
				MW3	MW3	MW3	MW3	MW3	MW3	MW3	MW3	MW3
				23/07/2015	05/08/2015	26/08/2015	08/09/2015	12/11/2015	08/12/2015	28/01/2016	22/02/2016	07/04/2016
Units	LOD											
pH	pH Units	N/A		7.7	7.8	7.4	7.4	8.2	8.1	7.5	7.7	7.8
Total Cyanide	µg/l	10				63000	43000	230	140	27	21	18
Ammonium as NH ₄	µg/l	15	300 - 600	130000	88000	63	43	29000	19000	19000	20000	27000
Chemical Oxygen Demand (Total)	mg/l	2		400	220	130	100	72	47	54	46	71
BOD (Biochemical Oxygen Demand)	mg/l	1		330	59	42	29	8.5	4.0	7.9	14	29
Total Suspended Solids	mg/l	2		160	80	1000	32	28	3.0	6.0	7.0	8.0
Arsenic (dissolved)	µg/l	0.15	50	4.12	3.01	2.85	2.22	1.87	0.75	1.27	1.71	2.18
Beryllium (dissolved)	µg/l	0.1				< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Boron (dissolved)	µg/l	10	2000	390	320	250	190	92	82	70	76	56
Cadmium (dissolved)	µg/l	0.02	0.08	< 0.02	< 0.02	< 0.02	0.03	0.08	0.05	0.03	< 0.02	< 0.02
Chromium (hexavalent)	µg/l	5	3.4			< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chromium (dissolved)	µg/l	0.2		0.5	0.3	0.3	4.7	0.5	< 0.2	0.2	< 0.2	0.2
Copper (dissolved)	µg/l	0.5		2.8	3.5	6.9	4.8	5.8	3.0	2.8	1.8	1.9
Lead (dissolved)	µg/l	0.2	7.2	0.4	0.5	0.6	0.5	11	< 0.2	0.5	0.3	0.3
Manganese (dissolved)	µg/l	0.05	30	2100	1700	1900	960	690	490	630	760	1100
Mercury (dissolved)	µg/l	0.05	0.05	0.74	< 0.05	< 0.05	0.35	0.21	0.29	0.45	< 0.05	< 0.05
Nickel (dissolved)	µg/l	0.5	20	2.2	2.0	2.5	51	39	62	29	42	54
Selenium (dissolved)	µg/l	0.6		17	9.9	7.9	36	45	27	6.0	4.5	5.3
Zinc (dissolved)	µg/l	0.5		2.1	1.9	1.8	4.1	5.6	3.1	2.7	2.4	1.8
Naphthalene	µg/l	0.01	2.4	530	3100	360	4.7	470	89.1	406	4470	68.8
Acenaphthylene	µg/l	0.01		27	170	160	68	59	66.9	136	548	27.2
Acenaphthene	µg/l	0.01		4.3	32	39	20	14	12.8	24.2	105	5.08
Fluorene	µg/l	0.01		8.7	58	87	25	19	24.5	52.7	272	11.3
Phenanthrene	µg/l	0.01		12	76	100	< 0.01	0.74	< 0.01	27.6	169	6.83
Anthracene	µg/l	0.01	0.1	2.9	17	25	< 0.01	3.2	2.46	6.52	44.2	1.53
Fluoranthene	µg/l	0.01	0.1	1.9	17	23	3.5	2.9	2.09	6.33	31.3	0.95
Pyrene	µg/l	0.01		1.3	13	16	2.0	1.7	1.25	3.85	23.0	0.52
Benzo(a)anthracene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	0.03	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	0.05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	0.002	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01		< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Total EPA-16 PAHs	µg/l	0.2		585	3470	811	123	574	199	663	5660	122
Benzene	µg/l	1	10	3180	2990	2260	232	90.0	100	387	458	393
Toluene	µg/l	1	50	1950	1340	910	196	7.4	4.8	18.5	81.8	93.0
Ethylbenzene	µg/l	1	20	127	132	70.2	12.4	< 1.0	< 1.0	< 1.0	5.2	5.0
p & m-xylene	µg/l	1	30	1380	1230	389	163	131	35.2	24.5	35.1	27.0
o-xylene	µg/l	1		591	549	265	59.0	62.7	23.1	50.8	55.2	30.0
TPH1 (C10 - C40)	µg/l	10		2100	44000	810	590					
TPH-CWG - Aliphatic >C5 - C6	µg/l	10						< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C6 - C8	µg/l	10						< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C8 - C10	µg/l	10						< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C10 - C12	µg/l	10						< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C12 - C16	µg/l	10						< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C16 - C21	µg/l	10						< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C21 - C35	µg/l	10						< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10						< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C5 - C7	µg/l	10						90	100	390	460	390
TPH-CWG - Aromatic >C7 - C8	µg/l	10						< 10	< 10	19	82	93
TPH-CWG - Aromatic >C8 - C10	µg/l	10						300	110	110	180	110
TPH-CWG - Aromatic >C10 - C12	µg/l	10						800	150	580	10000	120
TPH-CWG - Aromatic >C12 - C16	µg/l	10						210	960	3000	6100	44
TPH-CWG - Aromatic >C16 - C21	µg/l	10						< 10	32	730	270	10
TPH-CWG - Aromatic >C21 - C35	µg/l	10						< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (C5 - C35)	µg/l	10						1400	1400	4800	17000	770

Table 4: Groundwater Results from Monitoring Wells

Site Name: Rivulet Road, Wrexham

Project No: HC15016

Lab Sample Number Sample Reference Date Sampled Analytical Parameter			Surface Water EQS		Post Groundwater Extraction Phase															
					469785		479867		474250		485223		508676		517867		531634		540215	
					MW4		MW4		MW4		MW4		MW4		MW4		MW4		MW4	
					23/07/2015		26/08/2015		05/08/2015		08/09/2015		12/11/2015		08/12/2015		28/01/2016		22/02/2016	
Units	LOD																			
pH	µH Units	N/A		7.7	7.4	7.8	7.4	7.9	7.9	7.7	7.8	7.8								
Total Cyanide	µg/l	10		1500	1500		760	11	14	12	12	11								
Ammonium as NH ₄	µg/l	15	300 - 600	2400	1.5	1300	0.76	220	480	620	530	340								
Chemical Oxygen Demand (Total)	mg/l	2		12	120	470	5300	42	13	34	18	10								
BOD (Biochemical Oxygen Demand)	mg/l	1		4.2	48	27	U/S	6.7	1.0	< 1.0	3.2	3.7								
Total Suspended Solids	mg/l	2		4.0	42	1700	860	6.0	< 2.0	7.0	7.0	3.0								
Arsenic (dissolved)	µg/l	0.15	50	0.48	1.54	2.56	6.13	2.20	0.43	1.29	0.50	0.69								
Beryllium (dissolved)	µg/l	0.1		< 0.1	< 0.1		< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1								
Boron (dissolved)	µg/l	10	2000	130	130	130	130	120	130	110	120	110								
Cadmium (dissolved)	µg/l	0.02	0.08	0.08	0.08	< 0.02	0.04	0.05	0.02	0.06	0.05	0.09								
Chromium (hexavalent)	µg/l	5	3.4		< 5.0		< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0								
Chromium (dissolved)	µg/l	0.2		< 0.2	< 0.2	0.3	5.4	0.3	< 0.2	1.7	2.3	1.0								
Copper (dissolved)	µg/l	0.5		5.2	4.1	1.8	8.0	3.9	2.8	1.7	5.2	5.2								
Lead (dissolved)	µg/l	0.2	7.2	0.3	1.0	0.5	2.3	0.3	< 0.2	< 0.2	0.4	0.4								
Manganese (dissolved)	µg/l	0.05	30	1700	1200	1600	980	710	830	700	690	600								
Mercury (dissolved)	µg/l	0.05	0.05	0.16	< 0.05	< 0.05	0.09	0.05	0.16	0.26	< 0.05	0.09								
Nickel (dissolved)	µg/l	0.5	20	1.2	2.0	1.2	3.5	4.1	2.3	0.8	1.4	1.6								
Selenium (dissolved)	µg/l	0.6		0.9	1.0	1.1	1.0	1.4	1.2	< 0.6	0.8	1.7								
Zinc (dissolved)	µg/l	0.5		4.9	6.1	< 0.5	7.5	1.8	0.8	1.6	1.4	1.9								
Naphthalene	µg/l	0.01	2.4	2.2	40	190	3000	5.3	< 0.01	20.6	59.9	0.25								
Acenaphthylene	µg/l	0.01		11	28	340	83	10	< 0.01	< 0.01	15.2	0.33								
Acenaphthene	µg/l	0.01		23	250	600	660	190	32.3	114	108	1.31								
Fluorene	µg/l	0.01		13	120	410	340	85	17.4	57.4	61.4	2.07								
Phenanthrene	µg/l	0.01		9.9	200	780	630	92	14.3	62.9	85.9	2.29								
Anthracene	µg/l	0.01	0.1	3.6	59	250	180	22	3.98	18.6	24.3	1.18								
Fluoranthene	µg/l	0.01	0.1	2.7	46	220	130	11	1.36	6.84	16.4	0.93								
Pyrene	µg/l	0.01		2.6	53	240	150	10	1.60	6.62	17.5	0.81								
Benzo(a)anthracene	µg/l	0.01		0.67	19	90	47	2.1	< 0.01	1.31	4.90	< 0.01								
Chrysene	µg/l	0.01		0.53	15	74	39	3.4	< 0.01	1.17	4.38	< 0.01								
Benzo(b)fluoranthene	µg/l	0.01		< 0.01	8.1	48	12	0.98	< 0.01	< 0.01	2.37	< 0.01								
Benzo(k)fluoranthene	µg/l	0.01	0.03	< 0.01	5.2	23	8.5	0.84	< 0.01	< 0.01	2.12	< 0.01								
Benzo(g,h,i)perylene	µg/l	0.01	0.05	< 0.01	0.94	13	0.94	< 0.01	0.41	2.24	< 0.01	< 0.01								
Indeno(1,2,3-cd)pyrene	µg/l	0.01		< 0.01	2.6	14	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01								
Benzo(ghi)perylene	µg/l	0.01	0.002	< 0.01	3.0	14	< 0.01	< 0.01	< 0.01	< 0.01	0.29	< 0.01								
Dibenz(a,h)anthracene	µg/l	0.01		< 0.01	< 0.01	0.85	< 0.01	< 0.01	< 0.01	< 0.01	0.90	< 0.01								
Total EPA-16 PAHs	µg/l	0.2		68.9	852	3330	5270	432	70.9	290	405	9.17								
Benzene	µg/l	1	10	6.3	2.7	7.3	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0								
Toluene	µg/l	1	50	2.3	3.1	6.2	7.7	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0								
Ethylbenzene	µg/l	1	20	< 1.0	< 1.0	< 1.0	49.9	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0								
p & m-xylene	µg/l	1		4.3	8.0	40.7	58.4	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0								
o-xylene	µg/l	1	30	4.6	4.6	24.5	32.0	< 1.0	< 1.0	2.3	< 1.0	< 1.0								
TPH1 (C10 - C40)																				
TPH-CWG - Aliphatic >C5 - C6	µg/l	10		600		5100	63000	40000												
TPH-CWG - Aliphatic >C6 - C8	µg/l	10							< 10	< 10	< 10	< 10								
TPH-CWG - Aliphatic >C8 - C10	µg/l	10							< 10	< 10	< 10	< 10								
TPH-CWG - Aliphatic >C10 - C12	µg/l	10							< 10	< 10	< 10	< 10								
TPH-CWG - Aliphatic >C12 - C16	µg/l	10							< 10	< 10	< 10	< 10								
TPH-CWG - Aliphatic >C16 - C21	µg/l	10							< 10	< 10	< 10	< 10								
TPH-CWG - Aliphatic >C21 - C35	µg/l	10							< 10	< 10	< 10	< 10								
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10							< 10	< 10	< 10	< 10								
TPH-CWG - Aromatic >C5 - C7																				
TPH-CWG - Aromatic >C7 - C8	µg/l	10							< 10	< 10	< 10	< 10								
TPH-CWG - Aromatic >C8 - C10	µg/l	10							< 10	< 10	< 10	< 10								
TPH-CWG - Aromatic >C10 - C12	µg/l	10							< 10	< 10	< 10	< 10								
TPH-CWG - Aromatic >C12 - C16	µg/l	10							1000	23	400	20								
TPH-CWG - Aromatic >C16 - C21	µg/l	10							2200	340	6100	820								
TPH-CWG - Aromatic >C21 - C35	µg/l	10							210	110	3600	720								
TPH-CWG - Aromatic (C5 - C35)	µg/l	10							< 10	< 10	180	220								
	µg/l	10							3400	470	10000	1800								
	µg/l	10										100								

Appendix C

Photographic Record



Photo (1): Site prior to start of works, looking east.



Photo (2): Site prior to start of works looking south towards electrical sub station.



Photo (3): Site prior to starting works, looking west



Photo (4): Crushing of site-won bricks to produce reusable aggregate for backfill.



Photo (5): Crushing for site-won bricks to produce reusable aggregate for backfill



Photo (6): Removal of concrete underground structures adjacent to retaining wall to facilitate excavations



Photo (7): Breaking concrete underground structures with pneumatic breaker.



Photo (8): Excavation Area 1 adjacent to retaining wall



Photo (9): Base of Excavation Area 1 – Visually unimpacted clay encountered at depth of 1.5m



Photo (10): Excavation Area 1 – clay used to seal under retaining wall



Photo (11): Base Excavation Area 2 – Visually unimpacted clay encountered at depth of 1.5m



Photo (12): Base Excavation Area 3 – Visually unimpacted clay encountered at depth of 1.75m



Photo (13): Backfilling of Excavation Area 3 with site-won material to 600mm below Final Finish Level



Photo (14): Base Excavation Area 4 – Visually unimpacted clay encountered at depth of 1.5m



Photo (15): Base Excavation Area 5 – Visually unimpacted clay encountered at depth of 1.5m



Photo (16): Backfilling of Excavation Area 5 with site-won material to 300mm below Final Finished Level



Photo (17): Compaction of backfill to Excavation Area 5



Photo (18): Excavation Area 6 adjacent to retaining wall



Photo (19): Base of Excavation Area 6 – visually unimpacted clay encountered at depth of 1.5m



Photo (20): Base of Excavation Area 6 – visually unimpacted clay encountered at 1.5m



Photo (21): Base of Excavation Area 7 – visually unimpacted clay encountered at depth of 3m



Photo (22): Base of Excavation Area 7 – visually unimpacted clay encountered at depth of 3m



Photo (23): Base of Excavation Area 8 – visually unimpacted clay encountered at 1.5m



Photo (24): Base of Excavation Area 8 – visually unimpacted clay encountered at depth of 1.5m



Photo (25): Loading eight wheel tipper lorry with hazardous material for offsite disposal.



Photo (26): Material excavated from Excavation Area 9

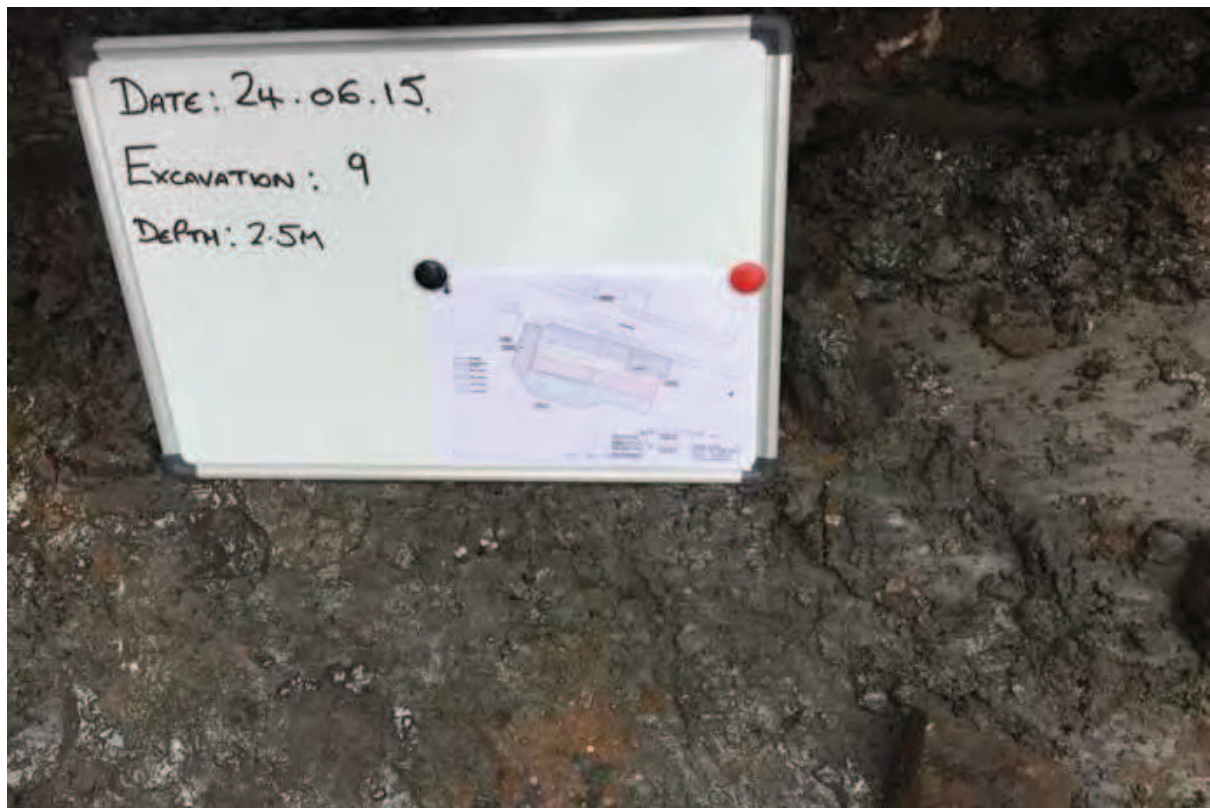


Photo (27): Base of Excavation Area 9 – visually unimpacted clay encountered at depth of 2.5m



Photo (28): Base of Excavation Area 9 – visually unimpacted clay encountered at 2.5m



Photo (29): Base of Excavation Area 9 – visually unimpacted clay encountered at 2.5m



Photo (30): Spraying excavated material with odour supressing foam prior to offsite disposal



Photo (31): Compaction of imported primary 6F5 used to backfill Excavation Area 9 to 300mm of Final Finished Levels



Photo (32): Compaction of imported primary 6F5 used to backfill Excavation Area 9 to 300mm of Final Finished Levels



Photo (33): Base of Excavation Area 10 – visually unimpacted clay encountered at depth of 2.5m



Photo (34): Base of Excavation Area 10 – visually unimpacted clay encountered at depth of 2.5m

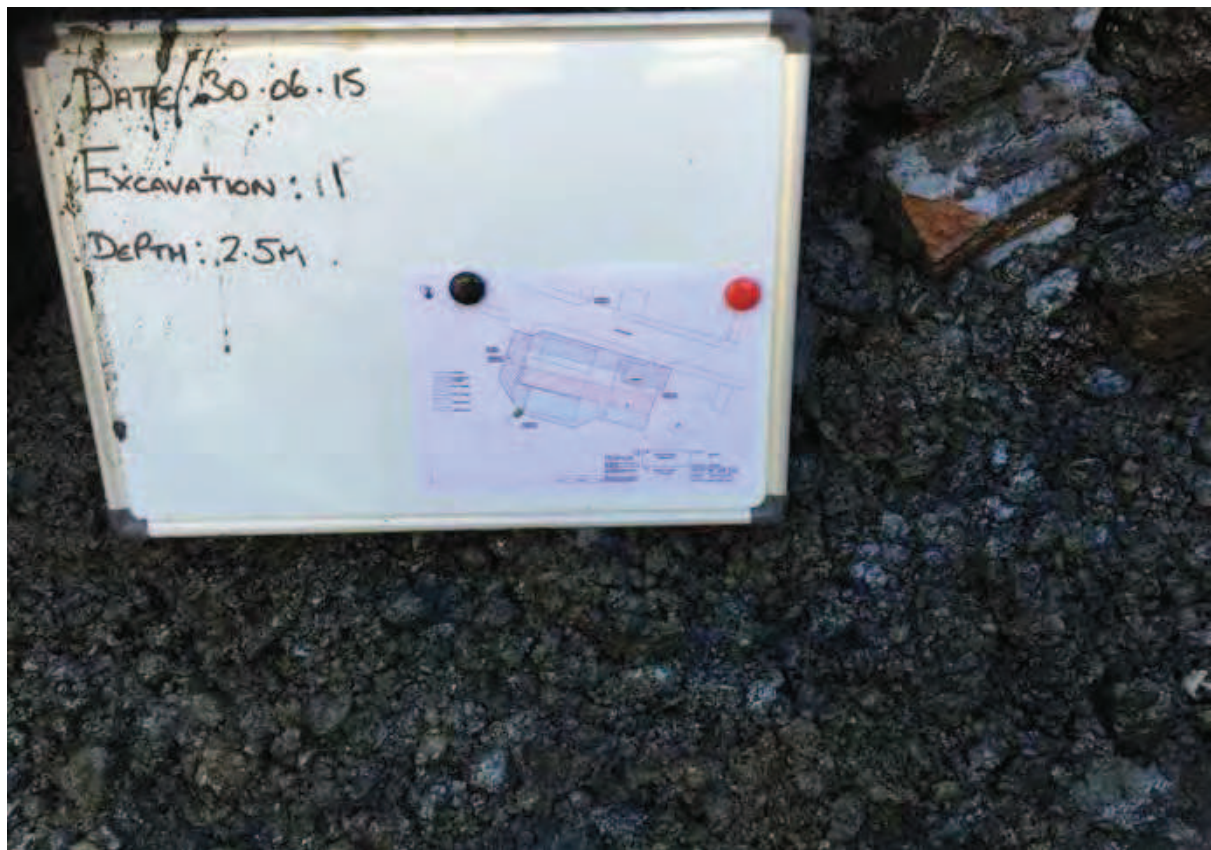


Photo (35): Base of Excavation Area 11 – no clay encountered straight on to sands and gravels, visual evidence of contamination to sands and gravels



Photo (36): Base of Excavation Area 11 – no clay encountered straight on to sands and gravels, visual evidence of contamination to sands and gravels



Photo (37): Base of Excavation Area 11 – visually unimpacted clay encountered at depth 2.5m



Photo (38): Brick archway extending from Excavation Area 11 off-site towards Rivulet Road



Photo (39): Excavation of Excavation Area 12 to expose tar tank



Photo (40): Tar tank backfilled with slate and asbestos cement debris



Photo (41): Excavation of tar tank under Notifiable Non Licensed Works



Photo (42): Excavation of tar tank under Notifiable Non Licensed Works



Photo (43): Western edge of tar tank following removal of asbestos cement debris and slate



Photo (44): Southern and eastern edges of tar tank following removal of asbestos cement debris and slate



Photo (45): Northern edge of tar tank following removal of asbestos cement debris and slate



Photo (46): Material excavated from Excavation Area 12 surrounding tar tank



Photo (47): Excavation of Excavation Area 12 surrounding tar tank



Photo (48): Base of Excavation Area 12 at 2.5m – minimal clay present straight on to sands and gravels with visual evidence of contamination



Photo (49): Imported clay being placed in base of Excavation Area 12 to act as a barrier above sands and gravels



Photo (50): Imported clay being placed in base of Excavation Area 12 to act as a barrier above sands and gravels



Photo (51): Excavation Area 12 – tar staining to brick work extending under Rivulet Road



Photo (52): Dewatering of hydrocarbon impacted perched water from Excavation Area 12



Photo (53): Imported clay being placed on the base of Excavation Area 12 to act as a barrier above the sands and gravels



Photo (54): Imported clay being placed in base of Excavation Area 12 to act as a barrier above the sands and gravels



Photo (55): Imported clay being placed in base of Excavation Area 12 to act as a barrier above the sands and gravels



Photo (56): Import of primary 6F5 to backfill Excavation Area 12



Photo (57): Backfilling and compaction of imported 6F5 to Excavation Area 12



Photo (58): Import of primary 6F5 to backfill Excavation Area 12 within 300mm of Final Finished Levels



Photo (59): Import of primary 6F5 to backfill Excavation Area 12 within 300mm of Final Finished Levels



Photo (60): Redundant gas pipe full of tar encountered with Excavation Area 14



Photo (61): 4No High Voltage electric cables wrapped round redundant gas pipe within Excavation Area 14



Photo (62): High Voltage cables following removal of tar impacted redundant gas pipe within excavation Area 14, by hand.



Photo (63): Placement of Terram and 300mm Type 1 capping layer across entire site



Photo (64): Placement of Terram and 300mm Type 1 capping layer across entire site



Photo (65): Compaction of 300mm Type 1 capping layer across entire site



Photo (66): Compaction of 300mm Type 1 capping layer across entire site



Photo (67): Drilling of groundwater extraction wells



Photo (68): Drilling of groundwater extraction wells



Photo (69): Installation of ground water treatment plant



Photo (70): Installation of ground water treatment plant



Photo (71): Site following completion of main site area works looking east



Photo (72): Site following completion of works looking west



Photo (73): Site following completion of main site works looking south



Photo (74): Newly installed WWU gas infrastructure and valves to the west of the substation



Photo (75): Works in progress to construct the WWU PRI slab



Photo (76): Completed PRI compound with fencing and capping layer in place

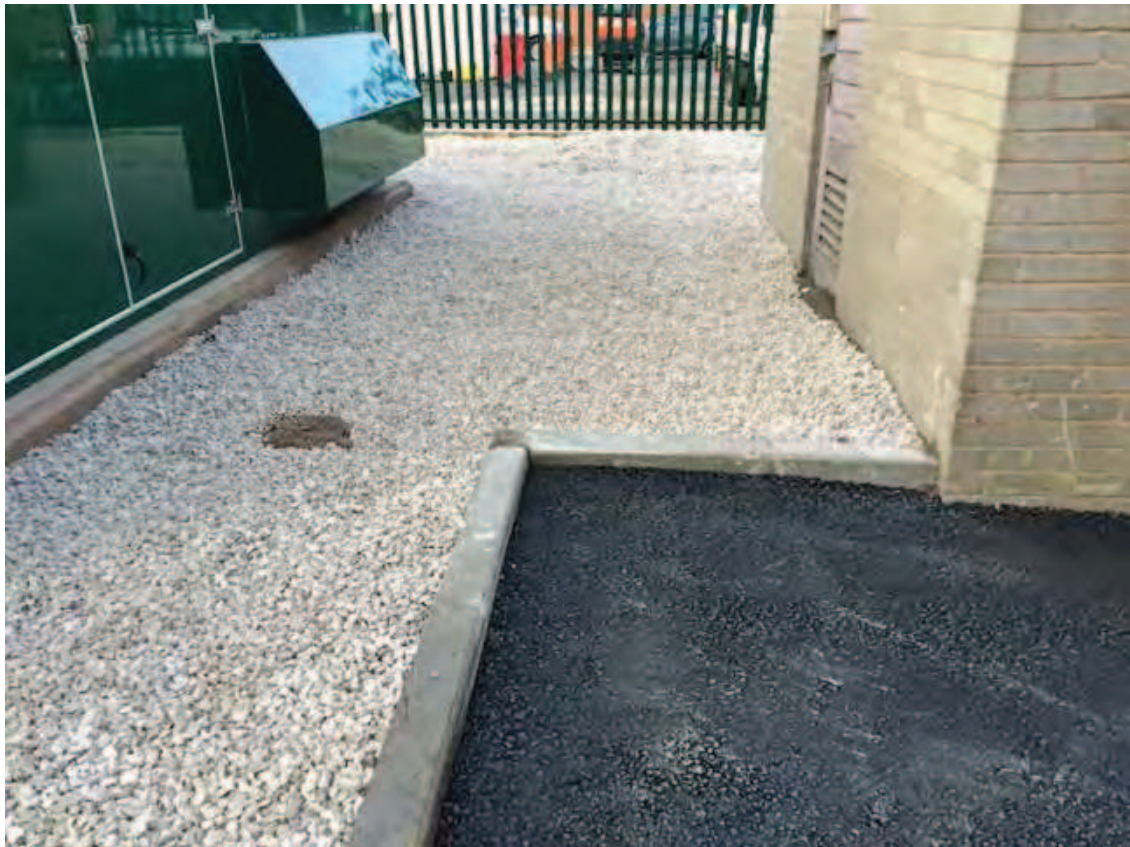


Photo (77): PRI compound with newly installed PRI tarmac access ramp



Photo (78): PRI compound pedestrian panic gate and access steps under construction



Photo (79): PRI compound newly installed palisade gate, tarmac ramp and aco drainage channel

Appendix D

Analytical Test Results – Laboratory Certificates



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Analytical Report Number : 15-83567

Project / Site name:	Wrexham	Samples received on:	01/12/2015
Your job number:	HC15016	Samples instructed on:	01/12/2015
Your order number:	HC15016/9780	Analysis completed by:	07/12/2015
Report Issue Number:	1	Report issued on:	07/12/2015
Samples Analysed:	2 soil samples		

Signed:

Rexona Rahman
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

Excel copies of reports are only valid when accompanied by this PDF certificate.

Signed:

Emma Winter
Assistant Reporting Manager
For & on behalf of i2 Analytical Ltd.

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Analytical Report Number: 15-83567

Project / Site name: Wrexham

Your Order No: HC15016/9780

Lab Sample Number				512464	512465			
Sample Reference				Type 1	20mm			
Sample Number				None Supplied	None Supplied			
Depth (m)				None Supplied	None Supplied			
Date Sampled				26/11/2015	26/11/2015			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1			
Moisture Content	%	N/A	NONE	3.0	0.36			
Total mass of sample received	kg	0.001	NONE	0.81	0.77			

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected			
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General Inorganics

Free Cyanide	mg/kg	1	NONE	< 1	< 1			
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Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0			
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Acenaphthylene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Fluorene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Phenanthrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Benzo(a)anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Benzo(a)pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10			
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	< 1.60	< 1.60			
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	3.8	5.9			
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	< 0.1	< 0.1			
Boron (water soluble)	mg/kg	0.2	MCERTS	0.3	0.3			
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.3	0.4			
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0			
Chromium (III)	mg/kg	1	NONE	6.0	4.4			
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	6.0	4.4			
Copper (aqua regia extractable)	mg/kg	1	MCERTS	9.3	5.0			
Lead (aqua regia extractable)	mg/kg	1	MCERTS	17	6.8			
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3			
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	9.0	2.0			
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0			
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	3.9	2.3			
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	19	11			

Monoaromatics

Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0			
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0			
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0			
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0			
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0			



Analytical Report Number : 15-83567

Project / Site name: Wrexham

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and topsoil/loam soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
512464	Type 1	None Supplied	None Supplied	Grey clay and loam with gravel.
512465	20mm	None Supplied	None Supplied	Non Soil **

** Non MCerts Matrix

Analytical Report Number : 15-83567

Project / Site name: Wrexham

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BTEX in soil	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
Cr (III) in soil	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
Free cyanide in soil	Determination of free cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	NONE
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

**Mark Dodd**

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Analytical Report Number : 15-75464

Replaces Analytical Report Number : 15-75464, issue no. 1

Project / Site name:	Wrexham	Samples received on:	16/07/2015
Your job number:	HC15016	Samples instructed on:	16/07/2015
Your order number:	HC15016/29180	Analysis completed by:	21/07/2015
Report Issue Number:	2	Report issued on:	21/07/2015
Samples Analysed:	8 soil samples		

Signed:

Rexona Rahman
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Signed:

Emma Winter
Assistant Reporting Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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Analytical Report Number: 15-75464

Project / Site name: Wrexham

Your Order No: HC15016/29180

Lab Sample Number				465826	465827	465828	465829	465830
Sample Reference				EX11 Base	Crush 5	Import 2	Import 3	Import 4
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				23/06/2015	01/07/2015	02/07/2015	02/07/2015	13/07/2015
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	18	1.9	1.6	1.8	0.16
Total mass of sample received	kg	0.001	NONE	0.51	0.46	0.47	0.29	0.46

General Inorganics

Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
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Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	2.0	< 1.0	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	1.8	< 0.05	< 0.05	0.88	< 0.05
Acenaphthylene	mg/kg	0.1	MCERTS	1.3	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	mg/kg	0.1	MCERTS	4.6	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	mg/kg	0.1	MCERTS	4.4	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	mg/kg	0.1	MCERTS	20	< 0.10	< 0.10	1.0	< 0.10
Anthracene	mg/kg	0.1	MCERTS	5.2	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	mg/kg	0.1	MCERTS	13	2.0	< 0.10	< 0.10	< 0.10
Pyrene	mg/kg	0.1	MCERTS	10	1.5	< 0.10	< 0.10	< 0.10
Benzo(a)anthracene	mg/kg	0.1	MCERTS	6.0	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene	mg/kg	0.05	MCERTS	4.7	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	1.5	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	2.4	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(a)pyrene	mg/kg	0.1	MCERTS	2.2	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	0.47	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.1	< 0.05	< 0.05	< 0.05	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	79.2	3.43	< 1.60	1.90	< 1.60
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	4.6	27	2.5	1.7	3.1
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.5	0.2	< 0.1	< 0.1	< 0.1
Boron (water soluble)	mg/kg	0.2	MCERTS	1.3	1.6	0.4	0.3	0.5
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	0.2	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (III)	mg/kg	1	NONE	11	18	4.6	4.1	3.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	11	18	4.6	4.0	3.2
Copper (aqua regia extractable)	mg/kg	1	MCERTS	7.9	31	4.7	6.9	4.1
Lead (aqua regia extractable)	mg/kg	1	MCERTS	27	25	7.3	6.0	5.8
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	0.5	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	16	17	7.7	10	5.8
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	12	18	3.8	3.8	3.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	38	150	4.2	9.4	4.2



Analytical Report Number: 15-75464

Project / Site name: Wrexham

Your Order No: HC15016/29180

Lab Sample Number				465826	465827	465828	465829	465830
Sample Reference				EX11 Base	Crush 5	Import 2	Import 3	Import 4
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				23/06/2015	01/07/2015	02/07/2015	02/07/2015	13/07/2015
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		

Monoaromatics

Benzene	µg/kg	1	MCERTS	23	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	76	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	18	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	160	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	78	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.1	MCERTS	0.8	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	14	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	130	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	330	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	330	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	810	< 10	< 10	< 10	< 10



Analytical Report Number: 15-75464

Project / Site name: Wrexham

Your Order No: HC15016/29180

Lab Sample Number				465831	465832	465833		
Sample Reference				Import 5	Clay 1	Import 6		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				None Supplied	None Supplied	None Supplied		
Date Sampled				13/07/2015	13/07/2015	13/07/2015		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1		
Moisture Content	%	N/A	NONE	0.21	2.6	0.79		
Total mass of sample received	kg	0.001	NONE	0.44	0.46	0.48		

General Inorganics

Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1		
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Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Acenaphthylene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10		
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10		
Fluorene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10		
Phenanthrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10		
Anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10		
Fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10		
Pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10		
Benzo(a)anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10		
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10		
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10		
Benzo(a)pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10		
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10		
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10		
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	< 1.60	< 1.60	< 1.60		
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	3.4	8.0	5.8		
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	< 0.1	0.7	0.4		
Boron (water soluble)	mg/kg	0.2	MCERTS	< 0.2	0.2	0.7		
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2		
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0		
Chromium (III)	mg/kg	1	NONE	5.1	29	14		
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	5.1	29	14		
Copper (aqua regia extractable)	mg/kg	1	MCERTS	5.0	15	12		
Lead (aqua regia extractable)	mg/kg	1	MCERTS	7.4	10	38		
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3		
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	8.1	30	9.3		
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	3.9	30	19		
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	9.1	41	41		



Analytical Report Number: 15-75464

Project / Site name: Wrexham

Your Order No: HC15016/29180

Lab Sample Number				465831	465832	465833		
Sample Reference				Import 5	Clay 1	Import 6		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				None Supplied	None Supplied	None Supplied		
Date Sampled				13/07/2015	13/07/2015	13/07/2015		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Monoaromatics								
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1		
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1		
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1		
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0		
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0		
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0		
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10		

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1		
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1		
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1		
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0		
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	< 10		
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	< 10	< 10		
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	< 10	< 10		



Analytical Report Number : 15-75464

Project / Site name: Wrexham

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and topsoil/loam soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
465826	EX11 Base	None Supplied	None Supplied	Brown sandy clay.
465827	Crush 5	None Supplied	None Supplied	Non Soil**
465828	Import 2	None Supplied	None Supplied	Non Soil**
465829	Import 3	None Supplied	None Supplied	Non Soil**
465830	Import 4	None Supplied	None Supplied	Non Soil**
465831	Import 5	None Supplied	None Supplied	Non Soil**
465832	Clay 1	None Supplied	None Supplied	Brown clay with vegetation.
465833	Import 6	None Supplied	None Supplied	Non Soil**

**Non MCerts Matrix



Analytical Report Number : 15-75464

Project / Site name: Wrexham

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BTEX and MTBE in soil	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073S-PL	W	MCERTS
Cr (III) in soil	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L076-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

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Analytical Report Number : 15-75457

Project / Site name: Wrexham

Samples received on: 16/07/2015

Your job number: HC15016

Samples instructed on: 16/07/2015

Your order number: HC15016/29180

Analysis completed by: 24/07/2015

Report Issue Number: 1

Report issued on: 24/07/2015

Samples Analysed: 2 water samples

Signed:

Rexona Rahman
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Signed:

Emma Winter
Assistant Reporting Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

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Analytical Report Number: 15-75457

Project / Site name: Wrexham

Your Order No: HC15016/29180

Lab Sample Number				465806	465807			
Sample Reference				Upstream	Downstream			
Sample Number				None Supplied	None Supplied			
Depth (m)				None Supplied	None Supplied			
Date Sampled				13/07/2015	13/07/2015			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

General Inorganics

pH	pH Units	N/A	ISO 17025	7.2	7.7			
Ammonium as NH ₄	µg/l	15	ISO 17025	30	25			
Chemical Oxygen Demand (Total)	mg/l	2	ISO 17025	26	22			
BOD (Biochemical Oxygen Demand)	mg/l	1	ISO 17025	1.2	1.0			
Total Suspended Solids	mg/l	2	NONE	3.0	< 2.0			

Speciated PAHs

Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			

Total PAH

Total EPA-16 PAHs	µg/l	0.2	ISO 17025	< 0.20	< 0.20			
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Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	0.15	ISO 17025	0.43	0.40			
Boron (dissolved)	µg/l	10	ISO 17025	59	58			
Cadmium (dissolved)	µg/l	0.02	ISO 17025	0.02	0.03			
Chromium (dissolved)	µg/l	0.2	ISO 17025	0.4	0.3			
Copper (dissolved)	µg/l	0.5	ISO 17025	11	9.8			
Lead (dissolved)	µg/l	0.2	ISO 17025	0.7	0.9			
Manganese (dissolved)	µg/l	0.05	ISO 17025	3.9	2.7			
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05	< 0.05			
Nickel (dissolved)	µg/l	0.5	ISO 17025	3.1	2.1			
Selenium (dissolved)	µg/l	0.6	ISO 17025	1.0	0.9			
Zinc (dissolved)	µg/l	0.5	ISO 17025	12	8.5			

Monoaromatics

Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0			
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0			

Petroleum Hydrocarbons

TPH1 (C10 - C40)	µg/l	10	NONE	< 10	< 10			
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Analytical Report Number: 15-75457

Project / Site name: Wrexham

Your Order No: HC15016/29180

Lab Sample Number				465806	465807			
Sample Reference				Upstream	Downstream			
Sample Number				None Supplied	None Supplied			
Depth (m)				None Supplied	None Supplied			
Date Sampled				13/07/2015	13/07/2015			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

VOCs

Chloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Chloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Bromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Vinyl Chloride	µg/l	1	NONE	< 1.0	< 1.0			
Trichlorofluoromethane	µg/l	1	NONE	< 1.0	< 1.0			
1,1-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Cis-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0			
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,1-dichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
2,2-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Trichloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,1,1-Trichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2-dichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,1-Dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Trans-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Tetrachloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2-dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Trichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Dibromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Bromodichloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Cis-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Trans-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,1,2-Trichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,3-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Dibromochloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Tetrachloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2-Dibromoethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Chlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,1,1,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Styrene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Tribromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,1,2,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Isopropylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Bromobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
N-Propylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
2-Chlorotoluene	µg/l	1	ISO 17025	< 1.0	< 1.0			
4-Chlorotoluene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,3,5-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Tert-Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2,4-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Sec-Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,3-dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
P-Isopropyltoluene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2-dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,4-dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2-Dibromo-3-chloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2,4-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Hexachlorobutadiene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2,3-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			

U/S = Unsuitable Sample I/S = Insufficient Sample



Analytical Report Number : 15-75457

Project / Site name: Wrexham

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Ammonium as NH ₄ in water	Determination of Ammonium/Ammonia/Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	ISO 17025
Biological oxygen demand of water	Determination of biochemical oxygen demand in water (5 days). Accredited matrices: SW, PW, GW.	In-house method based on standard method 5210B. Samples received > 24 hrs after sampling, data may not be valid and should be interpreted with care.	L086-PL	W	ISO 17025
Boron in water	Determination of boron by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM	L039-PL	W	ISO 17025
BTEX in water	Determination of BTEX in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073W-PL	W	ISO 17025
Chemical Oxygen Demand in Water (Total)	Determination of total COD in water by reflux oxidation with acidified K ₂ Cr ₂ O ₇ followed by colorimetry. Accredited matrices: SW, PW, GW.	HACH DR/890 Colorimeter Procedures Manual (48470-22) (Ref 0170.2)	L065-PL	W	ISO 17025
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 *for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Monohydric phenols in water	Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
pH in water	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	ISO 17025
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L070-UK	W	ISO 17025
Suspended solids in water	Determined gravimetrically with GFC filtration papers.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L004-PL	W	NONE
TPH1 (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS.	In-house method	L070-UK	W	NONE
Volatile organic compounds in water	Determination of volatile organic compounds in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073W-PL	W	ISO 17025

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30°C.

**Mark Dodd**

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Analytical Report Number : 15-74555

Project / Site name:	Wrexham	Samples received on:	02/07/2015
Your job number:	HC15016	Samples instructed on:	02/07/2015
Your order number:	HC15016/29180	Analysis completed by:	10/07/2015
Report Issue Number:	1	Report issued on:	10/07/2015
Samples Analysed:	2 water samples		

Signed:

Dr Irma Doyle
Assistant Quality Manager
For & on behalf of i2 Analytical Ltd.

Signed:

Emma Winter
Assistant Reporting Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 - 711 Ruda Śląska, Poland

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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Analytical Report Number: 15-74555

Project / Site name: Wrexham

Your Order No: HC15016/29180

Lab Sample Number				460741	460742			
Sample Reference				Upstream 4	Downstream 4			
Sample Number				None Supplied	None Supplied			
Depth (m)				None Supplied	None Supplied			
Date Sampled				01/06/2015	01/06/2015			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

General Inorganics

pH	pH Units	N/A	ISO 17025	7.9	7.9			
Total Cyanide	µg/l	10	ISO 17025	< 10	< 10			
Ammonium as NH ₄	µg/l	15	ISO 17025	46	43			
Chemical Oxygen Demand (Total)	mg/l	2	ISO 17025	5.4	5.3			
BOD (Biochemical Oxygen Demand)	mg/l	1	ISO 17025	< 1.0	1.5			
Total Suspended Solids	mg/l	2	NONE	2.0	2.0			

Speciated PAHs

Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01			

Total PAH

Total EPA-16 PAHs	µg/l	0.2	ISO 17025	< 0.20	< 0.20			
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Analytical Report Number: 15-74555

Project / Site name: Wrexham

Your Order No: HC15016/29180

Lab Sample Number				460741	460742			
Sample Reference				Upstream 4	Downstream 4			
Sample Number				None Supplied	None Supplied			
Depth (m)				None Supplied	None Supplied			
Date Sampled				01/06/2015	01/06/2015			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	0.15	ISO 17025	0.57	0.43			
Boron (dissolved)	µg/l	10	ISO 17025	72	71			
Cadmium (dissolved)	µg/l	0.02	ISO 17025	< 0.02	< 0.02			
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0			
Chromium (III)	µg/l	1	NONE	< 1.0	< 1.0			
Chromium (dissolved)	µg/l	0.2	ISO 17025	0.3	1.0			
Copper (dissolved)	µg/l	0.5	ISO 17025	4.9	4.6			
Lead (dissolved)	µg/l	0.2	ISO 17025	< 0.2	< 0.2			
Manganese (dissolved)	µg/l	0.05	ISO 17025	10	8.5			
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05	< 0.05			
Nickel (dissolved)	µg/l	0.5	ISO 17025	3.3	3.8			
Selenium (dissolved)	µg/l	0.6	ISO 17025	1.2	0.8			
Zinc (dissolved)	µg/l	0.5	ISO 17025	< 0.5	< 0.5			

Monoaromatics

Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0			
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0			
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0			

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >C5 - C6	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aliphatic >C6 - C8	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aliphatic >C8 - C10	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10	< 10			

TPH-CWG - Aromatic >C5 - C7	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aromatic >C7 - C8	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aromatic >C8 - C10	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10			
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	< 10	< 10			



Analytical Report Number: 15-74555

Project / Site name: Wrexham

Your Order No: HC15016/29180

Lab Sample Number				460741	460742			
Sample Reference				Upstream 4	Downstream 4			
Sample Number				None Supplied	None Supplied			
Depth (m)				None Supplied	None Supplied			
Date Sampled				01/06/2015	01/06/2015			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Water Analysis)				Units	Limit of detection	Accreditation Status		

VOCs

Chloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Chloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Bromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Vinyl Chloride	µg/l	1	NONE	< 1.0	< 1.0			
Trichlorofluoromethane	µg/l	1	NONE	< 1.0	< 1.0			
1,1-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Cis-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0			
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,1-dichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
2,2-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Trichloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,1,1-Trichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2-dichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,1-Dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Trans-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Tetrachloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2-dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Trichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Dibromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Bromodichloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Cis-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Trans-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,1,2-Trichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,3-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Dibromochloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Tetrachloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2-Dibromoethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Chlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,1,1,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Styrene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Tribromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,1,2,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0			
Isopropylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Bromobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
N-Propylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
2-Chlorotoluene	µg/l	1	ISO 17025	< 1.0	< 1.0			
4-Chlorotoluene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,3,5-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Tert-Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2,4-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Sec-Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,3-dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
P-Isopropyltoluene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2-dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,4-dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2-Dibromo-3-chloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2,4-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			
Hexachlorobutadiene	µg/l	1	ISO 17025	< 1.0	< 1.0			
1,2,3-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0			

U/S = Unsuitable Sample I/S = Insufficient Sample

Iss No 15-74555-1

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The results included within the report are representative of the samples submitted for analysis.

Page 4 of 5



Analytical Report Number : 15-74555

Project / Site name: Wrexham

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Ammonium as NH ₄ in water	Determination of Ammonium/Ammonia/Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	ISO 17025
Biological oxygen demand of water	Determination of biochemical oxygen demand in water (5 days). Accredited matrices: SW, PW, GW.	In-house method based on standard method 5210B. Samples received > 24 hrs after sampling, data may not be valid and should be interpreted with care.	L086-PL	W	ISO 17025
Boron in water	Determination of boron by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM	L039-PL	W	ISO 17025
BTEX and MTBE in water	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073W-PL	W	ISO 17025
Chemical Oxygen Demand in Water (Total)	Determination of total COD in water by reflux oxidation with acidified K ₂ Cr ₂ O ₇ followed by colorimetry. Accredited matrices: SW, PW, GW.	HACH DR/890 Colorimeter Procedures Manual (48470-22) (Ref 0170.2)	L065-PL	W	ISO 17025
Cr (III) in water	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	W	ISO 17025
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Monohydric phenols in water	Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
pH in water	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	ISO 17025
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L070-UK	W	ISO 17025
Suspended solids in water	Determined gravimetrically with GFC filtration papers.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L004-PL	W	NONE
Total cyanide in water	Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-UK	W	NONE
Volatile organic compounds in water	Determination of volatile organic compounds in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073W-PL	W	ISO 17025

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30°C.

**Mark Dodd**

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Analytical Report Number : 15-74543

Project / Site name:	Wrexham	Samples received on:	02/07/2015
Your job number:	HC15016	Samples instructed on:	02/07/2015
Your order number:	HC15016/29180	Analysis completed by:	06/07/2015
Report Issue Number:	1	Report issued on:	06/07/2015
Samples Analysed:	3 soil samples		

Signed:

Rexona Rahman
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Signed:

Dr Irma Doyle
Assistant Quality Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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Analytical Report Number: 15-74543

Project / Site name: Wrexham

Your Order No: HC15016/29180

Lab Sample Number				460683	460684	460685		
Sample Reference				EX8 Base	EX9 Base	EX10 Base		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				None Supplied	None Supplied	None Supplied		
Date Sampled				25/06/2015	01/07/2015	01/07/2015		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1		
Moisture Content	%	N/A	NONE	15	19	18		
Total mass of sample received	kg	0.001	NONE	0.54	0.56	0.54		

General Inorganics

Total Cyanide	mg/kg	1	MCERTS	< 1	1	1		
Ammonium as NH ₄	mg/kg	0.5	MCERTS	14	12	14		

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Acenaphthylene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10		
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10		
Fluorene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10		
Phenanthrene	mg/kg	0.1	MCERTS	0.95	0.47	0.34		
Anthracene	mg/kg	0.1	MCERTS	0.29	0.18	0.15		
Fluoranthene	mg/kg	0.1	MCERTS	1.6	1.5	0.90		
Pyrene	mg/kg	0.1	MCERTS	1.6	1.6	0.99		
Benzo(a)anthracene	mg/kg	0.1	MCERTS	0.92	0.74	0.51		
Chrysene	mg/kg	0.05	MCERTS	0.74	0.63	0.48		
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	0.79	0.58	0.51		
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	0.43	0.33	0.34		
Benzo(a)pyrene	mg/kg	0.1	MCERTS	0.67	0.50	0.54		
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	0.31	0.20	0.26		
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10		
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.32	0.30	0.28		

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	8.59	7.00	5.30		
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	11	14	15		
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.5	1.6	1.6		
Boron (water soluble)	mg/kg	0.2	MCERTS	1.6	1.9	1.5		
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2		
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0		
Chromium (III)	mg/kg	1	NONE	36	37	39		
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	36	37	39		
Copper (aqua regia extractable)	mg/kg	1	MCERTS	14	15	16		
Lead (aqua regia extractable)	mg/kg	1	MCERTS	38	38	35		
Manganese (aqua regia extractable)	mg/kg	1	MCERTS	400	410	430		
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3		
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	33	37	38		
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	40	45	43		
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	68	73	75		

Analytical Report Number: 15-74543

Project / Site name: Wrexham

Your Order No: HC15016/29180

Lab Sample Number	460683	460684	460685		
Sample Reference	EX8 Base	EX9 Base	EX10 Base		
Sample Number	None Supplied	None Supplied	None Supplied		
Depth (m)	None Supplied	None Supplied	None Supplied		
Date Sampled	25/06/2015	01/07/2015	01/07/2015		
Time Taken	None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		

Monoaromatics

Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1		
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1		
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1		
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	8.7		
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	44		
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	200	210	280		
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	200	210	330		

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1		
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1		
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1		
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	9.0	< 2.0	2.4		
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	63	25	39		
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	280	200	260		
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	350	230	300		



Analytical Report Number : 15-74543

Project / Site name: Wrexham

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and topsoil/loam soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
460683	EX8 Base	None Supplied	None Supplied	Brown clay.
460684	EX9 Base	None Supplied	None Supplied	Brown clay.
460685	EX10 Base	None Supplied	None Supplied	Brown clay.

Analytical Report Number : 15-74543

Project / Site name: Wrexham

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Ammonium as NH ₄ in soil	Determination of Ammonium/Ammonia/Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	MCERTS
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BTEX and MTBE in soil	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073S-PL	W	MCERTS
Cr (III) in soil	In-house method by calculation from total Cr and Cr VI.	In-house method by calculation	L080-PL	W	NONE
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazine followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L076-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

**Mark Dodd**

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Analytical Report Number : 15-74214

Project / Site name:	Wrexham	Samples received on:	25/06/2015
Your job number:	HC15016	Samples instructed on:	25/06/2015
Your order number:	HC15016/29180	Analysis completed by:	01/07/2015
Report Issue Number:	1	Report issued on:	02/07/2015
Samples Analysed:	1 soil sample - 3 water samples		

Signed:

Neil Donovan
Environmental Forensics Manager
For & on behalf of i2 Analytical Ltd.

Signed:

Dr Claire Stone
Quality Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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Analytical Report Number: 15-74214

Project / Site name: Wrexham

Your Order No: HC15016/29180

Lab Sample Number				458393				
Sample Reference				Import 1				
Sample Number				None Supplied				
Depth (m)				None Supplied				
Date Sampled				23/06/2015				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1				
Moisture Content	%	N/A	NONE	0.49				
Total mass of sample received	kg	0.001	NONE	0.47				

General Inorganics

Total Cyanide	mg/kg	1	MCERTS	< 1				
Ammonium as NH ₄	mg/kg	0.5	MCERTS	< 0.5				
Ammonium as NH ₄ (leachate equivalent)	mg/l	0.25	MCERTS	< 0.3				

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0				
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05				
Acenaphthylene	mg/kg	0.1	MCERTS	< 0.10				
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10				
Fluorene	mg/kg	0.1	MCERTS	< 0.10				
Phenanthrene	mg/kg	0.1	MCERTS	< 0.10				
Anthracene	mg/kg	0.1	MCERTS	< 0.10				
Fluoranthene	mg/kg	0.1	MCERTS	< 0.10				
Pyrene	mg/kg	0.1	MCERTS	< 0.10				
Benzo(a)anthracene	mg/kg	0.1	MCERTS	< 0.10				
Chrysene	mg/kg	0.05	MCERTS	< 0.05				
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	< 0.10				
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	< 0.10				
Benzo(a)pyrene	mg/kg	0.1	MCERTS	< 0.10				
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	< 0.10				
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	< 0.10				
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05				

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	< 1.60				
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0				
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	< 0.1				
Boron (water soluble)	mg/kg	0.2	MCERTS	0.2				
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.3				
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0				
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	5.6				
Copper (aqua regia extractable)	mg/kg	1	MCERTS	3.4				
Lead (aqua regia extractable)	mg/kg	1	MCERTS	8.8				
Manganese (aqua regia extractable)	mg/kg	1	MCERTS	91				
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3				
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	3.2				
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0				
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	2.9				
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	15				



Analytical Report Number: 15-74214

Project / Site name: Wrexham

Your Order No: HC15016/29180

Lab Sample Number				458393				
Sample Reference				Import 1				
Sample Number				None Supplied				
Depth (m)				None Supplied				
Date Sampled				23/06/2015				
Time Taken				None Supplied				
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					

Monoaromatics

Benzene	µg/kg	1	MCERTS	< 1.0				
Toluene	µg/kg	1	MCERTS	< 1.0				
Ethylbenzene	µg/kg	1	MCERTS	< 1.0				
p & m-xylene	µg/kg	1	MCERTS	< 1.0				
o-xylene	µg/kg	1	MCERTS	< 1.0				
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0				

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.1	MCERTS	< 0.1				
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.1	MCERTS	< 0.1				
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1				
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0				
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0				
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0				
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	13				
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	13				

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.1	MCERTS	< 0.1				
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.1	MCERTS	< 0.1				
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1				
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0				
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0				
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10				
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10				
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10				



Analytical Report Number: 15-74214

Project / Site name: Wrexham

Your Order No: HC15016/29180

Lab Sample Number	458394	458395	458396		
Sample Reference	Foul Sewer	Upstream	Downstream		
Sample Number	None Supplied	None Supplied	None Supplied		
Depth (m)	None Supplied	None Supplied	None Supplied		
Date Sampled	19/06/2015	19/06/2015	19/06/2015		
Time Taken	None Supplied	None Supplied	None Supplied		
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status		

General Inorganics

pH	pH Units	N/A	ISO 17025	6.8	7.8	7.9		
Total Cyanide	µg/l	10	ISO 17025	1800	< 10	< 10		
Ammonium as NH ₄	µg/l	15	ISO 17025	380	< 15	< 15		
Chemical Oxygen Demand (Total)	mg/l	2	ISO 17025	1100	11	7.6		
BOD (Biochemical Oxygen Demand)	mg/l	1	ISO 17025	68	< 1.0	1.1		
Total Suspended Solids	mg/l	2	NONE	1600	2.0	3.0		

Speciated PAHs

Naphthalene	µg/l	0.01	ISO 17025	3900	< 0.01	< 0.01		
Acenaphthylene	µg/l	0.01	ISO 17025	270	< 0.01	< 0.01		
Acenaphthene	µg/l	0.01	ISO 17025	220	< 0.01	< 0.01		
Fluorene	µg/l	0.01	ISO 17025	290	< 0.01	< 0.01		
Phenanthrene	µg/l	0.01	ISO 17025	890	< 0.01	< 0.01		
Anthracene	µg/l	0.01	ISO 17025	190	< 0.01	< 0.01		
Fluoranthene	µg/l	0.01	ISO 17025	430	< 0.01	< 0.01		
Pyrene	µg/l	0.01	ISO 17025	320	< 0.01	< 0.01		
Benzo(a)anthracene	µg/l	0.01	ISO 17025	120	< 0.01	< 0.01		
Chrysene	µg/l	0.01	ISO 17025	99	< 0.01	< 0.01		
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	92	< 0.01	< 0.01		
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	38	< 0.01	< 0.01		
Benzo(a)pyrene	µg/l	0.01	ISO 17025	80	< 0.01	< 0.01		
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	28	< 0.01	< 0.01		
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	5.0	< 0.01	< 0.01		
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	27	< 0.01	< 0.01		

Total PAH

Total EPA-16 PAHs	µg/l	0.2	ISO 17025	7020	< 0.20	< 0.20		
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Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	0.15	ISO 17025	4.45	0.34	0.39		
Boron (dissolved)	µg/l	10	ISO 17025	43	63	63		
Cadmium (dissolved)	µg/l	0.02	ISO 17025	0.06	0.03	< 0.02		
Chromium (dissolved)	µg/l	0.2	ISO 17025	0.4	0.2	0.3		
Copper (dissolved)	µg/l	0.5	ISO 17025	2.6	4.8	12		
Lead (dissolved)	µg/l	0.2	ISO 17025	5.8	0.5	0.4		
Manganese (dissolved)	µg/l	0.05	ISO 17025	1000	2.6	1.2		
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05	< 0.05	< 0.05		
Nickel (dissolved)	µg/l	0.5	ISO 17025	2.3	1.0	1.1		
Selenium (dissolved)	µg/l	0.6	ISO 17025	1.0	0.6	0.8		
Zinc (dissolved)	µg/l	0.5	ISO 17025	11	2.1	4.4		



Analytical Report Number: 15-74214

Project / Site name: Wrexham

Your Order No: HC15016/29180

Lab Sample Number				458394	458395	458396		
Sample Reference				Foul Sewer	Upstream	Downstream		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				None Supplied	None Supplied	None Supplied		
Date Sampled				19/06/2015	19/06/2015	19/06/2015		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Water Analysis)				Units	Limit of detection	Accreditation Status		

Monoaromatics

Benzene	µg/l	1	ISO 17025	88.4	< 1.0	< 1.0		
Toluene	µg/l	1	ISO 17025	295	< 1.0	< 1.0		
Ethylbenzene	µg/l	1	ISO 17025	72.5	< 1.0	< 1.0		
p & m-xylene	µg/l	1	ISO 17025	733	< 1.0	< 1.0		
o-xylene	µg/l	1	ISO 17025	308	< 1.0	< 1.0		
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >C5 - C6	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic >C6 - C8	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic >C8 - C10	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	< 10		

TPH-CWG - Aromatic >C5 - C7	µg/l	10	NONE	88	< 10	< 10		
TPH-CWG - Aromatic >C7 - C8	µg/l	10	NONE	300	< 10	< 10		
TPH-CWG - Aromatic >C8 - C10	µg/l	10	NONE	4500	< 10	< 10		
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	5600	< 10	< 10		
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	2500	< 10	< 10		
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	3200	< 10	< 10		
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	1000	< 10	< 10		
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	17000	< 10	< 10		



Analytical Report Number: 15-74214

Project / Site name: Wrexham

Your Order No: HC15016/29180

Lab Sample Number				458394	458395	458396		
Sample Reference				Foul Sewer	Upstream	Downstream		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				None Supplied	None Supplied	None Supplied		
Date Sampled				19/06/2015	19/06/2015	19/06/2015		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Water Analysis)				Units	Limit of detection	Accreditation Status		

VOCs

Chloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Chloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Bromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Vinyl Chloride	µg/l	1	NONE	< 1.0	< 1.0	< 1.0		
Trichlorofluoromethane	µg/l	1	NONE	< 1.0	< 1.0	< 1.0		
1,1-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Cis-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,1-dichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
2,2-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Trichloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,1,1-Trichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,2-dichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,1-Dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Trans-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Benzene	µg/l	1	ISO 17025	88.4	< 1.0	< 1.0		
Tetrachloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,2-dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Trichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Dibromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Bromodichloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Cis-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Trans-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Toluene	µg/l	1	ISO 17025	295	< 1.0	< 1.0		
1,1,2-Trichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,3-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Dibromochloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Tetrachloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,2-Dibromoethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Chlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,1,1,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Ethylbenzene	µg/l	1	ISO 17025	72.5	< 1.0	< 1.0		
p & m-xylene	µg/l	1	ISO 17025	733	< 1.0	< 1.0		
Styrene	µg/l	1	ISO 17025	71.2	< 1.0	< 1.0		
Tribromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
o-xylene	µg/l	1	ISO 17025	308	< 1.0	< 1.0		
1,1,2,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Isopropylbenzene	µg/l	1	ISO 17025	18.5	< 1.0	< 1.0		
Bromobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
N-Propylbenzene	µg/l	1	ISO 17025	8.2	< 1.0	< 1.0		
2-Chlorotoluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
4-Chlorotoluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,3,5-Trimethylbenzene	µg/l	1	ISO 17025	215	< 1.0	< 1.0		
Tert-Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,2,4-Trimethylbenzene	µg/l	1	ISO 17025	502	< 1.0	< 1.0		
Sec-Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,3-dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
P-Isopropyltoluene	µg/l	1	ISO 17025	20.0	< 1.0	< 1.0		
1,2-dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,4-dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,2-Dibromo-3-chloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,2,4-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Hexachlorobutadiene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,2,3-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		

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The results included within the report are representative of the samples submitted for analysis.

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Analytical Report Number: 15-74214

Project / Site name: Wrexham

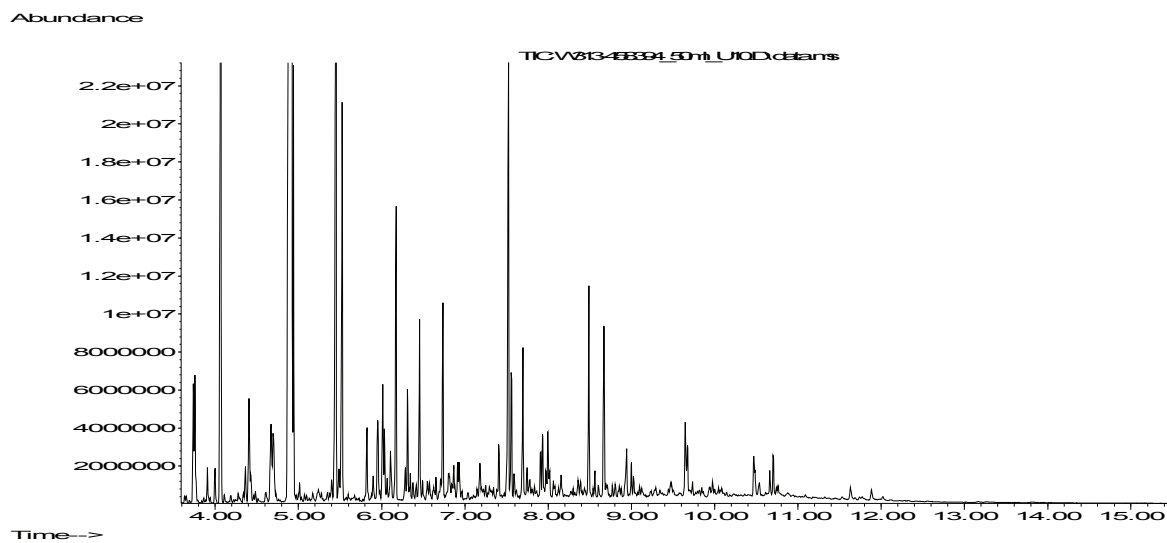
Your Order No: HC15016/29180

Lab Sample Number				458394	458395	458396		
Sample Reference				Foul Sewer	Upstream	Downstream		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				None Supplied	None Supplied	None Supplied		
Date Sampled				19/06/2015	19/06/2015	19/06/2015		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

Miscellaneous Organics

Product ID		N/A	NONE	See Attached	-	-		
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U/S = Unsuitable Sample I/S = Insufficient Sample



The sample shows a complex range of aromatic compounds with some potential aliphatics also present. The trace is not indicative of one source e.g. petrol or diesel but most likely multiple sources i.e. petrol and diesel or similar boiling point fraction like white spirit.



Analytical Report Number : 15-74214

Project / Site name: Wrexham

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and topsoil/loam soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
458393	Import 1	None Supplied	None Supplied	Non Soil **

** Unaccredited Matrix.



Analytical Report Number : 15-74214

Project / Site name: Wrexham

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Ammonium as NH ₄ in soil	Determination of Ammonium/Ammonia/Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	MCERTS
Ammonium as NH ₄ in water	Determination of Ammonium/Ammonia/Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	ISO 17025
Biological oxygen demand of water	Determination of biochemical oxygen demand in water (5 days). Accredited matrices: SW, PW, GW.	In-house method based on standard method 5210B. Samples received > 24 hrs after sampling, data may not be valid and should be interpreted with care.	L086-PL	W	ISO 17025
Boron in water	Determination of boron by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM	L039-PL	W	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BTEX and MTBE in soil	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073S-PL	W	MCERTS
BTEX and MTBE in water	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073W-PL	W	ISO 17025
Chemical Oxygen Demand in Water (Total)	Determination of total COD in water by reflux oxidation with acidified K ₂ Cr ₂ O ₇ followed by colorimetry. Accredited matrices: SW, PW, GW.	HACH DR/890 Colorimeter Procedures Manual (48470-22) (Ref 0170.2)	L065-PL	W	ISO 17025
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Monohydric phenols in water	Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
pH in water	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	ISO 17025
Product ID	Determination against standard chromatograms.	In-house method		W	NONE
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS



Analytical Report Number : 15-74214

Project / Site name: Wrexham

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L070-UK	W	ISO 17025
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Suspended solids in water	Determined gravimetrically with GFC filtration papers.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L004-PL	W	NONE
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total cyanide in water	Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L076-PL	W	MCERTS
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-UK	W	NONE
Volatile organic compounds in water	Determination of volatile organic compounds in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073W-PL	W	ISO 17025

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.



Mark Dodd
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Analytical Report Number : 15-73985

Replaces Analytical Report Number : 15-73985, issue no. 1

Project / Site name:	Wrexham	Samples received on:	19/06/2015
Your job number:	HC15016	Samples instructed on:	19/06/2015
Your order number:		Analysis completed by:	01/07/2015
Report Issue Number:	2	Report issued on:	01/07/2015
Samples Analysed:	17 soil samples - 3 water samples		

Signed: 

Dr Claire Stone
Quality Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

Excel copies of reports are only valid when accompanied by this PDF certificate.



Signed: _____

Rexona Rahman
Reporting Manager
For & on behalf of i2 Analytical Ltd.

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Analytical Report Number: 15-73985

Project / Site name: Wrexham

Lab Sample Number				457164	457165	457166	457167	457168
Sample Reference				DIGI EX1 B	DIGI EX1 E	DIGI EX1 N	DIGI EX1 S	DIGI EX1 W
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				17/06/2015	17/06/2015	17/06/2015	17/06/2015	17/06/2015
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	23	5.4	7.8	6.1	5.9
Total mass of sample received	kg	0.001	NONE	0.53	0.63	0.60	0.58	0.58

General Inorganics

Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Ammonium as NH ₄	mg/kg	0.5	MCERTS	110	< 0.5	< 0.5	< 0.5	< 0.5
Ammonium as NH ₄ (leachate equivalent)	mg/l	0.25	MCERTS	55	< 0.3	< 0.3	< 0.3	< 0.3

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	0.35	< 0.05	< 0.05	0.42
Acenaphthylene	mg/kg	0.1	MCERTS	< 0.10	1.4	0.45	0.39	1.2
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10	0.34	< 0.10	< 0.10	0.30
Fluorene	mg/kg	0.1	MCERTS	< 0.10	0.52	< 0.10	< 0.10	0.60
Phenanthrene	mg/kg	0.1	MCERTS	< 0.10	2.4	0.95	0.80	3.2
Anthracene	mg/kg	0.1	MCERTS	< 0.10	1.2	0.41	0.46	1.3
Fluoranthene	mg/kg	0.1	MCERTS	0.29	6.7	2.5	2.3	10
Pyrene	mg/kg	0.1	MCERTS	0.28	8.0	2.6	2.5	11
Benzo(a)anthracene	mg/kg	0.1	MCERTS	< 0.10	4.0	1.6	1.3	4.6
Chrysene	mg/kg	0.05	MCERTS	< 0.05	2.7	1.1	0.87	4.0
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	2.8	1.1	0.96	3.9
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	3.0	1.3	1.0	4.0
Benzo(a)pyrene	mg/kg	0.1	MCERTS	< 0.10	3.1	1.4	1.1	4.0
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	< 0.10	1.8	0.84	0.66	1.9
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	< 0.10	0.45	< 0.10	< 0.10	0.39
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	1.9	0.84	0.61	2.0

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	< 1.60	40.6	15.2	13.0	52.7
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	5.0	18	11	14	21
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.0	0.6	0.6	0.5	0.7
Boron (water soluble)	mg/kg	0.2	MCERTS	1.6	0.6	0.4	0.5	0.7
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.6	0.4	< 0.2	0.2	0.6
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	23	22	13	14	14
Copper (aqua regia extractable)	mg/kg	1	MCERTS	31	33	26	26	43
Lead (aqua regia extractable)	mg/kg	1	MCERTS	87	110	68	63	95
Manganese (aqua regia extractable)	mg/kg	1	MCERTS	300	370	400	350	340
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	3.3	< 0.3	0.4	3.9
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	20	19	17	16	19
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	29	20	18	16	18
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	53	120	84	77	160

Analytical Report Number: 15-73985

Project / Site name: Wrexham

Lab Sample Number	457164	457165	457166	457167	457168
Sample Reference	DIGI EX1 B	DIGI EX1 E	DIGI EX1 N	DIGI EX1 S	DIGI EX1 W
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled	17/06/2015	17/06/2015	17/06/2015	17/06/2015	17/06/2015
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		

Monoaromatics

Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	1.9
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	68	30	21	120
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	130	53	39	220
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	430	140	120	480
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	630	230	180	830

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	6.4
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	29	11	9.0	58
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	150	58	44	260
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	560	190	140	780
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	730	260	200	1100

Analytical Report Number: 15-73985

Project / Site name: Wrexham

Lab Sample Number				457169	457170	457171	457172	457173			
Sample Reference				DIGI EX2 B	DIGI EX2 N	DIGI EX2 S	DIGI EX2 W	DIGI EX2 E			
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied			
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied			
Date Sampled				17/06/2015	17/06/2015	17/06/2015	17/06/2015	17/06/2015			
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status								
Stone Content				%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content				%	N/A	NONE	29	11	12	9.6	9.4
Total mass of sample received				kg	0.001	NONE	0.60	0.62	0.63	0.58	0.57

General Inorganics

Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Ammonium as NH ₄	mg/kg	0.5	MCERTS	29	< 0.5	< 0.5	< 0.5	< 0.5
Ammonium as NH ₄ (leachate equivalent)	mg/l	0.25	MCERTS	14	< 0.3	< 0.3	< 0.3	< 0.3

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.1	MCERTS	< 0.10	0.39	< 0.10	0.60	0.23
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	mg/kg	0.1	MCERTS	< 0.10	1.8	0.61	2.5	1.1
Anthracene	mg/kg	0.1	MCERTS	< 0.10	0.61	0.30	1.3	0.41
Fluoranthene	mg/kg	0.1	MCERTS	0.42	3.4	2.5	7.7	3.2
Pyrene	mg/kg	0.1	MCERTS	0.37	3.4	2.6	7.3	3.4
Benzo(a)anthracene	mg/kg	0.1	MCERTS	0.21	2.3	1.5	4.5	1.5
Chrysene	mg/kg	0.05	MCERTS	0.14	1.6	1.1	4.0	1.6
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	1.8	0.89	3.5	1.5
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	1.6	1.0	3.3	1.4
Benzo(a)pyrene	mg/kg	0.1	MCERTS	0.13	1.8	1.0	3.5	1.4
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	< 0.10	0.90	0.59	1.7	0.62
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	0.42	< 0.10
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	1.1	0.64	1.6	0.65

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	< 1.60	20.8	12.6	41.8	16.9
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	4.8	9.7	13	8.6	11
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.5	0.6	0.6	0.6	0.5
Boron (water soluble)	mg/kg	0.2	MCERTS	3.4	0.6	0.4	0.4	0.5
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	1.5	0.3	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	28	15	17	21	13
Copper (aqua regia extractable)	mg/kg	1	MCERTS	66	27	28	25	24
Lead (aqua regia extractable)	mg/kg	1	MCERTS	95	65	76	52	52
Manganese (aqua regia extractable)	mg/kg	1	MCERTS	330	490	380	340	310
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	0.8	< 0.3	1.5	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	30	16	18	19	15
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	1.8	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	29	17	20	19	17
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	78	76	85	67	60

Analytical Report Number: 15-73985

Project / Site name: Wrexham

Lab Sample Number				457169	457170	457171	457172	457173
Sample Reference				DIGI EX2 B	DIGI EX2 N	DIGI EX2 S	DIGI EX2 W	DIGI EX2 E
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				17/06/2015	17/06/2015	17/06/2015	17/06/2015	17/06/2015
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Monoaromatics								
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	18	6.5	2.5	7.5	5.4
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	30	14	25	24
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	< 8.0	270	140	160	210
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	18	310	150	200	240
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	7.0	8.2	< 2.0	3.1	< 2.0
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	12	41	17	36	20
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	240	110	150	130
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	19	290	130	190	150

Analytical Report Number: 15-73985

Project / Site name: Wrexham

Lab Sample Number				457174	457175	457176	457177	457178
Sample Reference				DIGI EX3 B	DIGI EX4 B	DIGI EX5 B	DIGI EX6 B	DIGI EX7 B
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				17/06/2015	17/06/2015	17/06/2015	17/06/2015	17/06/2015
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	16	17	17	21	18
Total mass of sample received	kg	0.001	NONE	0.60	0.53	0.58	0.56	0.57

General Inorganics

Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Ammonium as NH ₄	mg/kg	0.5	MCERTS	7.4	5.5	21	26	< 0.5
Ammonium as NH ₄ (leachate equivalent)	mg/l	0.25	MCERTS	3.7	2.8	11	13	< 0.3

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	0.22	0.44	0.64
Anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	0.11	0.13
Fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	0.59	0.82	0.40
Pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	0.58	0.73	0.32
Benzo(a)anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	0.36	0.50	< 0.10
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.27	0.32	< 0.05
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	0.37	0.29	< 0.10
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	0.20	0.37	< 0.10
Benzo(a)pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	0.26	0.36	< 0.10
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	0.20	< 0.10
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	0.23	< 0.05

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	< 1.60	< 1.60	2.85	4.37	< 1.60
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	4.2	< 1.0	7.2	6.3	3.8
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	1.0	1.0	1.2	1.0	0.6
Boron (water soluble)	mg/kg	0.2	MCERTS	0.7	1.1	3.9	5.8	0.5
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.5	0.4	0.3	0.5	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	29	28	27	21	18
Copper (aqua regia extractable)	mg/kg	1	MCERTS	29	27	25	24	17
Lead (aqua regia extractable)	mg/kg	1	MCERTS	37	54	150	270	14
Manganese (aqua regia extractable)	mg/kg	1	MCERTS	220	240	390	240	200
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	0.5	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	30	28	27	26	20
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	29	26	32	25	19
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	69	73	87	120	40

Analytical Report Number: 15-73985

Project / Site name: Wrexham

Lab Sample Number				457174	457175	457176	457177	457178
Sample Reference				DIGI EX3 B	DIGI EX4 B	DIGI EX5 B	DIGI EX6 B	DIGI EX7 B
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				17/06/2015	17/06/2015	17/06/2015	17/06/2015	17/06/2015
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Monoaromatics								
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	6.1
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	8.4	25	79	< 8.0	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	25	79	< 10	< 10
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	4.3
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	3.8	5.3	< 2.0	5.2	13
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	< 10	< 10	12	15	17
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	< 10	25	150	46	< 10
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	< 10	31	160	66	34

Analytical Report Number: 15-73985

Project / Site name: Wrexham

Lab Sample Number				457179	457180			
Sample Reference				CRUSH 3	CRUSH 4			
Sample Number				None Supplied	None Supplied			
Depth (m)				None Supplied	None Supplied			
Date Sampled				17/06/2015	17/06/2015			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1			
Moisture Content	%	N/A	NONE	0.00	7.3			
Total mass of sample received	kg	0.001	NONE	0.58	0.60			

General Inorganics

Total Cyanide	mg/kg	1	MCERTS	< 1	< 1			
Ammonium as NH ₄	mg/kg	0.5	MCERTS	0.9	3.2			
Ammonium as NH ₄ (leachate equivalent)	mg/l	0.25	MCERTS	0.4	1.6			

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0			
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	0.21	< 0.05			
Acenaphthylene	mg/kg	0.1	MCERTS	0.45	0.28			
Acenaphthene	mg/kg	0.1	MCERTS	0.41	0.12			
Fluorene	mg/kg	0.1	MCERTS	0.65	0.24			
Phenanthrene	mg/kg	0.1	MCERTS	8.1	1.7			
Anthracene	mg/kg	0.1	MCERTS	2.3	0.75			
Fluoranthene	mg/kg	0.1	MCERTS	9.5	3.7			
Pyrene	mg/kg	0.1	MCERTS	8.3	3.5			
Benzo(a)anthracene	mg/kg	0.1	MCERTS	3.5	2.2			
Chrysene	mg/kg	0.05	MCERTS	3.1	2.0			
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	2.3	2.1			
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	2.0	1.9			
Benzo(a)pyrene	mg/kg	0.1	MCERTS	2.1	2.3			
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	0.88	1.3			
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	0.20	0.31			
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.95	1.4			

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	44.9	23.9			
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	14	7.1			
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.7	0.3			
Boron (water soluble)	mg/kg	0.2	MCERTS	2.8	2.0			
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2			
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0			
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	16	15			
Copper (aqua regia extractable)	mg/kg	1	MCERTS	20	12			
Lead (aqua regia extractable)	mg/kg	1	MCERTS	24	22			
Manganese (aqua regia extractable)	mg/kg	1	MCERTS	730	180			
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3			
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	14	8.1			
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0			
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	23	18			
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	60	27			

Analytical Report Number: 15-73985

Project / Site name: Wrexham

Lab Sample Number				457179	457180			
Sample Reference				CRUSH 3	CRUSH 4			
Sample Number				None Supplied	None Supplied			
Depth (m)				None Supplied	None Supplied			
Date Sampled				17/06/2015	17/06/2015			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Monoaromatics								
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0			
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0			
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0			
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0			
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0			
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0			

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0			
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	17	< 2.0			
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	82	11			
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	530	130			
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	630	140			
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	5.4	< 1.0			
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	27	9.0			
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	120	40			
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	480	190			
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	630	240			



Analytical Report Number: 15-73985

Project / Site name: Wrexham

Lab Sample Number	457181	457182	457183		
Sample Reference	Downstream 2	Upstream 2	DIGI EX 7 GW		
Sample Number	None Supplied	None Supplied	None Supplied		
Depth (m)	None Supplied	None Supplied	None Supplied		
Date Sampled	17/06/2015	17/06/2015	17/06/2015		
Time Taken	None Supplied	None Supplied	None Supplied		
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status		

General Inorganics

pH	pH Units	N/A	ISO 17025	7.5	7.9	7.7		
Total Cyanide	µg/l	10	ISO 17025	< 10	< 10	29		
Ammonium as NH ₄	µg/l	15	ISO 17025	< 15	< 15	2000		
Chemical Oxygen Demand (Total)	mg/l	2	ISO 17025	8.1	4.7	45		
BOD (Biochemical Oxygen Demand)	mg/l	1	ISO 17025	< 1.0	< 1.0	2.6		
Total Suspended Solids	mg/l	2	NONE	2.0	4.0	90		

Speciated PAHs

Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	0.64		
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	0.69		
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01		

Total PAH

Total EPA-16 PAHs	µg/l	0.2	ISO 17025	< 0.20	< 0.20	1.33		
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Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	0.15	ISO 17025	0.45	0.39	2.68		
Beryllium (dissolved)	µg/l	0.1	ISO 17025	< 0.1	< 0.1	< 0.1		
Boron (dissolved)	µg/l	10	ISO 17025	60	59	140		
Cadmium (dissolved)	µg/l	0.02	ISO 17025	0.03	0.02	0.08		
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0	< 5.0		
Chromium (dissolved)	µg/l	0.2	ISO 17025	0.6	0.4	2.4		
Copper (dissolved)	µg/l	0.5	ISO 17025	6.6	7.3	7.1		
Lead (dissolved)	µg/l	0.2	ISO 17025	1.0	0.8	0.7		
Manganese (dissolved)	µg/l	0.05	ISO 17025	2.8	3.7	650		
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05	< 0.05	< 0.05		
Nickel (dissolved)	µg/l	0.5	ISO 17025	1.6	1.4	2.1		
Selenium (dissolved)	µg/l	0.6	ISO 17025	1.3	1.4	2.9		
Vanadium (dissolved)	µg/l	0.2	ISO 17025	0.3	0.3	4.3		
Zinc (dissolved)	µg/l	0.5	ISO 17025	6.1	3.7	3.2		



Analytical Report Number: 15-73985

Project / Site name: Wrexham

Lab Sample Number				457181	457182	457183		
Sample Reference				Downstream 2	Upstream 2	DIGI EX 7 GW		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				None Supplied	None Supplied	None Supplied		
Date Sampled				17/06/2015	17/06/2015	17/06/2015		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Water Analysis)				Units	Limit of detection	Accreditation Status		

Monoaromatics

Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >C5 - C6	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic >C6 - C8	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic >C8 - C10	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	< 10		

TPH-CWG - Aromatic >C5 - C7	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aromatic >C7 - C8	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aromatic >C8 - C10	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10		
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	< 10		



Analytical Report Number: 15-73985

Project / Site name: Wrexham

Lab Sample Number				457181	457182	457183		
Sample Reference				Downstream 2	Upstream 2	DIGI EX 7 GW		
Sample Number				None Supplied	None Supplied	None Supplied		
Depth (m)				None Supplied	None Supplied	None Supplied		
Date Sampled				17/06/2015	17/06/2015	17/06/2015		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Water Analysis)								
	Units	Limit of detection	Accreditation Status					

VOCs

Chloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Chloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Bromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Vinyl Chloride	µg/l	1	NONE	< 1.0	< 1.0	< 1.0		
Trichlorofluoromethane	µg/l	1	NONE	< 1.0	< 1.0	< 1.0		
1,1-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Cis-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,1-dichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
2,2-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Trichloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,1,1-Trichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,2-dichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,1-Dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Trans-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Tetrachloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,2-dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Trichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Dibromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Bromodichloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Cis-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Trans-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,1,2-Trichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,3-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Dibromochloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Tetrachloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,2-Dibromoethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Chlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,1,1,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Styrene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Tribromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,1,2,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Isopropylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Bromobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
N-Propylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
2-Chlorotoluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
4-Chlorotoluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,3,5-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Tert-Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,2,4-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Sec-Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,3-dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
P-Isopropyltoluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,2-dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,4-dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,2-Dibromo-3-chloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,2,4-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
Hexachlorobutadiene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		
1,2,3-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0		

U/S = Unsuitable Sample I/S = Insufficient Sample

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The results included within the report are representative of the samples submitted for analysis.

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Analytical Report Number : 15-73985

Project / Site name: Wrexham

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and topsoil/loam soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
457164	DIGI EX1 B	None Supplied	None Supplied	Grey clay.
457165	DIGI EX1 E	None Supplied	None Supplied	Brown loam and sand with rubble.
457166	DIGI EX1 N	None Supplied	None Supplied	Brown loam and sand with rubble and brick.
457167	DIGI EX1 S	None Supplied	None Supplied	Brown loam and sand with rubble.
457168	DIGI EX1 W	None Supplied	None Supplied	Brown loam and sand with rubble.
457169	DIGI EX2 B	None Supplied	None Supplied	Black clay.
457170	DIGI EX2 N	None Supplied	None Supplied	Brown loam and sand with rubble.
457171	DIGI EX2 S	None Supplied	None Supplied	Brown loam and sand with rubble.
457172	DIGI EX2 W	None Supplied	None Supplied	Brown loam and sand with rubble.
457173	DIGI EX2 E	None Supplied	None Supplied	Brown loam and sand with rubble.
457174	DIGI EX3 B	None Supplied	None Supplied	Grey clay.
457175	DIGI EX4 B	None Supplied	None Supplied	Grey clay.
457176	DIGI EX5 B	None Supplied	None Supplied	Brown clay and sand.
457177	DIGI EX6 B	None Supplied	None Supplied	Brown clay and sand.
457178	DIGI EX7 B	None Supplied	None Supplied	Light brown clay and sand.
457179	CRUSH 3	None Supplied	None Supplied	Light grey rubble. **
457180	CRUSH 4	None Supplied	None Supplied	Brown loam and sand with brick.

** Non MCerts Matrix

Analytical Report Number : 15-73985

Project / Site name: Wrexham

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Ammonium as NH ₄ in soil	Determination of Ammonium/Ammonia/Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	MCERTS
Ammonium as NH ₄ in water	Determination of Ammonium/Ammonia/Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	ISO 17025
Biological oxygen demand of water	Determination of biochemical oxygen demand in water (5 days). Accredited matrices: SW, PW, GW.	In-house method based on standard method 5210B. Samples received > 24 hrs after sampling, data may not be valid and should be interpreted with care.	L086-PL	W	ISO 17025
Boron in water	Determination of boron by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM	L039-PL	W	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BTEX and MTBE in soil	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073S-PL	W	MCERTS
BTEX and MTBE in water	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073W-PL	W	ISO 17025
Chemical Oxygen Demand in Water (Total)	Determination of total COD in water by reflux oxidation with acidified K ₂ Cr ₂ O ₇ followed by colorimetry. Accredited matrices: SW, PW, GW.	HACH DR/890 Colorimeter Procedures Manual (48470-22) (Ref 0170.2)	L065-PL	W	ISO 17025
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	W	ISO 17025
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Monohydric phenols in water	Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
pH in water	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	ISO 17025
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS

Analytical Report Number : 15-73985

Project / Site name: Wrexham

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L070-UK	W	ISO 17025
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Suspended solids in water	Determined gravimetrically with GFC filtration papers.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L004-PL	W	NONE
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total cyanide in water	Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L076-PL	W	MCERTS
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-UK	W	NONE
Volatile organic compounds in water	Determination of volatile organic compounds in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073W-PL	W	ISO 17025

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

**Mark Dodd**

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Analytical Report Number : 15-73622

Project / Site name:	Wrexham	Samples received on:	16/06/2015
Your job number:	HC15016	Samples instructed on:	16/06/2015
Your order number:	HC15016-29180	Analysis completed by:	24/06/2015
Report Issue Number:	1	Report issued on:	24/06/2015
Samples Analysed:	7 soil samples - 1 water sample		

Signed:

Dr Claire Stone
Quality Manager
For & on behalf of i2 Analytical Ltd.

Signed:

Rexona Rahman
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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Analytical Report Number: 15-73622
Project / Site name: Wrexham
Your Order No: HC15016-29180

Lab Sample Number				455011	455012	455013	455014	455015
Sample Reference				REUSE 1	REUSE 2	REUSE 3	REUSE 4	REUSE 5
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				11/06/2015	11/06/2015	11/06/2015	11/06/2015	11/06/2015
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	6.5	5.6	6.0	6.1	5.6
Total mass of sample received	kg	0.001	NONE	0.62	0.58	0.63	0.62	0.61

General Inorganics

Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Ammonium as NH ₄	mg/kg	0.5	MCERTS	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ammonium as NH ₄ (leachate equivalent)	mg/l	0.25	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	0.15	< 0.05	< 0.05	0.19	0.20
Acenaphthylene	mg/kg	0.1	MCERTS	0.25	0.26	0.28	0.43	0.40
Acenaphthene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	0.12	< 0.10
Fluorene	mg/kg	0.1	MCERTS	< 0.10	< 0.10	< 0.10	< 0.10	0.21
Phenanthrene	mg/kg	0.1	MCERTS	1.2	0.82	1.0	1.3	2.1
Anthracene	mg/kg	0.1	MCERTS	0.48	0.37	0.43	0.60	0.77
Fluoranthene	mg/kg	0.1	MCERTS	3.0	2.6	3.0	4.7	5.2
Pyrene	mg/kg	0.1	MCERTS	3.0	2.7	3.0	4.5	5.0
Benzo(a)anthracene	mg/kg	0.1	MCERTS	2.1	1.9	1.9	3.2	3.4
Chrysene	mg/kg	0.05	MCERTS	1.6	1.5	1.6	3.1	2.6
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	1.4	1.7	1.5	3.3	2.7
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	1.3	0.94	1.2	1.9	2.0
Benzo(a)pyrene	mg/kg	0.1	MCERTS	1.4	1.3	1.4	3.0	2.6
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	0.60	0.57	0.58	1.3	1.1
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	< 0.10	0.14	0.16	0.32	0.27
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.63	0.71	0.72	1.5	1.2

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	17.0	15.4	16.7	29.6	29.9
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	8.0	7.6	7.0	8.1	7.1
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.5	0.4	0.5	0.7	0.5
Boron (water soluble)	mg/kg	0.2	MCERTS	0.2	0.3	< 0.2	0.3	< 0.2
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.3	0.5	< 0.2	< 0.2	0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	13	17	16	18	13
Copper (aqua regia extractable)	mg/kg	1	MCERTS	33	32	28	47	24
Lead (aqua regia extractable)	mg/kg	1	MCERTS	49	58	53	76	49
Manganese (aqua regia extractable)	mg/kg	1	MCERTS	370	360	400	400	330
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	1.3	2.6	3.3	3.4	1.6
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	16	18	17	23	15
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	15	23	24	27	17
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	76	89	77	130	62

Analytical Report Number: 15-73622

Project / Site name: Wrexham

Your Order No: HC15016-29180

Lab Sample Number	455011	455012	455013	455014	455015
Sample Reference	REUSE 1	REUSE 2	REUSE 3	REUSE 4	REUSE 5
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled	11/06/2015	11/06/2015	11/06/2015	11/06/2015	11/06/2015
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		

Monoaromatics

Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	34	40	78	68	77
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	34	40	78	68	77

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	3.4	2.2
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	11	< 10	< 10	27	20
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	55	59	80	140	98
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	66	59	80	170	120

Analytical Report Number: 15-73622

Project / Site name: Wrexham

Your Order No: HC15016-29180

Lab Sample Number				455016	455017			
Sample Reference				CRUSH1	CRUSH2			
Sample Number				None Supplied	None Supplied			
Depth (m)				None Supplied	None Supplied			
Date Sampled				11/06/2015	15/06/2015			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1			
Moisture Content	%	N/A	NONE	1.4	1.5			
Total mass of sample received	kg	0.001	NONE	0.46	0.50			

General Inorganics

Total Cyanide	mg/kg	1	MCERTS	8	< 1			
Ammonium as NH ₄	mg/kg	0.5	MCERTS	15	< 0.5			
Ammonium as NH ₄ (leachate equivalent)	mg/l	0.25	MCERTS	7.3	< 0.3			

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	16	< 1.0			
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Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	850	0.59			
Acenaphthylene	mg/kg	0.1	MCERTS	150	0.38			
Acenaphthene	mg/kg	0.1	MCERTS	40	0.20			
Fluorene	mg/kg	0.1	MCERTS	170	0.53			
Phenanthrene	mg/kg	0.1	MCERTS	740	5.0			
Anthracene	mg/kg	0.1	MCERTS	240	1.0			
Fluoranthene	mg/kg	0.1	MCERTS	700	5.4			
Pyrene	mg/kg	0.1	MCERTS	490	4.6			
Benzo(a)anthracene	mg/kg	0.1	MCERTS	310	2.2			
Chrysene	mg/kg	0.05	MCERTS	240	2.2			
Benzo(b)fluoranthene	mg/kg	0.1	MCERTS	270	2.1			
Benzo(k)fluoranthene	mg/kg	0.1	MCERTS	140	1.3			
Benzo(a)pyrene	mg/kg	0.1	MCERTS	250	1.9			
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	MCERTS	98	0.95			
Dibenz(a,h)anthracene	mg/kg	0.1	MCERTS	28	0.19			
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	110	0.99			

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	1.6	MCERTS	4840	29.7			
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	12	4.1			
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	2.8	0.3			
Boron (water soluble)	mg/kg	0.2	MCERTS	0.6	0.8			
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	1.6	0.5			
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0			
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	20	15			
Copper (aqua regia extractable)	mg/kg	1	MCERTS	300	26			
Lead (aqua regia extractable)	mg/kg	1	MCERTS	190	64			
Manganese (aqua regia extractable)	mg/kg	1	MCERTS	420	310			
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	1.6			
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	53	12			
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0			
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	18	21			
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	790	94			

Analytical Report Number: 15-73622

Project / Site name: Wrexham

Your Order No: HC15016-29180

Lab Sample Number				455016	455017			
Sample Reference				CRUSH1	CRUSH2			
Sample Number				None Supplied	None Supplied			
Depth (m)				None Supplied	None Supplied			
Date Sampled				11/06/2015	15/06/2015			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Monoaromatics								
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0			
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0			
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0			
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0			
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0			
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0			

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	5.3	< 1.0			
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	35	10			
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	42	32			
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	150	270			
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	230	320			
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	140	< 1.0			
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	260	8.5			
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	560	41			
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	810	200			
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	1800	250			



Analytical Report Number: 15-73622

Project / Site name: Wrexham

Your Order No: HC15016-29180

Lab Sample Number				455018				
Sample Reference				BH1				
Sample Number				None Supplied				
Depth (m)				None Supplied				
Date Sampled				15/06/2015				
Time Taken				None Supplied				
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

General Inorganics

pH	pH Units	N/A	ISO 17025	7.8				
Total Cyanide	µg/l	10	ISO 17025	14				
Ammonium as NH ₄	µg/l	15	ISO 17025	1800				
Chemical Oxygen Demand (Settled)	mg/l	2	ISO 17025	28				
BOD (Biochemical Oxygen Demand)	mg/l	1	ISO 17025	< 1.0				
Total Suspended Solids	mg/l	2	NONE	8300				

Speciated PAHs

Naphthalene	µg/l	0.01	ISO 17025	< 0.01				
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01				
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01				
Fluorene	µg/l	0.01	ISO 17025	< 0.01				
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01				
Anthracene	µg/l	0.01	ISO 17025	< 0.01				
Fluoranthene	µg/l	0.01	ISO 17025	0.40				
Pyrene	µg/l	0.01	ISO 17025	0.74				
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01				
Chrysene	µg/l	0.01	ISO 17025	< 0.01				
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01				
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01				
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01				
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01				
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01				
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01				

Total PAH

Total EPA-16 PAHs	µg/l	0.2	ISO 17025	1.14				
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Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	0.15	ISO 17025	1.08				
Beryllium (dissolved)	µg/l	0.1	ISO 17025	< 0.1				
Boron (dissolved)	µg/l	10	ISO 17025	160				
Cadmium (dissolved)	µg/l	0.02	ISO 17025	< 0.02				
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0				
Chromium (dissolved)	µg/l	0.2	ISO 17025	1.0				
Copper (dissolved)	µg/l	0.5	ISO 17025	2.8				
Lead (dissolved)	µg/l	0.2	ISO 17025	2.5				
Manganese (dissolved)	µg/l	0.05	ISO 17025	670				
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05				
Nickel (dissolved)	µg/l	0.5	ISO 17025	3.2				
Selenium (dissolved)	µg/l	0.6	ISO 17025	12				
Vanadium (dissolved)	µg/l	0.2	ISO 17025	1.8				
Zinc (dissolved)	µg/l	0.5	ISO 17025	2.4				



Analytical Report Number: 15-73622

Project / Site name: Wrexham

Your Order No: HC15016-29180

Lab Sample Number				455018				
Sample Reference				BH1				
Sample Number				None Supplied				
Depth (m)				None Supplied				
Date Sampled				15/06/2015				
Time Taken				None Supplied				
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

Monoaromatics

Benzene	µg/l	1	ISO 17025	< 1.0				
Toluene	µg/l	1	ISO 17025	< 1.0				
Ethylbenzene	µg/l	1	ISO 17025	< 1.0				
p & m-xylene	µg/l	1	ISO 17025	< 1.0				
o-xylene	µg/l	1	ISO 17025	< 1.0				
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0				

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >C5 - C6	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C6 - C8	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C8 - C10	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10				

TPH-CWG - Aromatic >C5 - C7	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic >C7 - C8	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic >C8 - C10	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	< 10				



Analytical Report Number: 15-73622

Project / Site name: Wrexham

Your Order No: HC15016-29180

Lab Sample Number				455018				
Sample Reference				BH1				
Sample Number				None Supplied				
Depth (m)				None Supplied				
Date Sampled				15/06/2015				
Time Taken				None Supplied				
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

VOCs

Chloromethane	µg/l	1	ISO 17025	< 1.0				
Chloroethane	µg/l	1	ISO 17025	< 1.0				
Bromomethane	µg/l	1	ISO 17025	< 1.0				
Vinyl Chloride	µg/l	1	NONE	< 1.0				
Trichlorofluoromethane	µg/l	1	NONE	< 1.0				
1,1-dichloroethene	µg/l	1	ISO 17025	< 1.0				
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/l	1	ISO 17025	< 1.0				
Cis-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0				
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0				
1,1-dichloroethane	µg/l	1	ISO 17025	< 1.0				
2,2-Dichloropropane	µg/l	1	ISO 17025	< 1.0				
Trichloromethane	µg/l	1	ISO 17025	< 1.0				
1,1,1-Trichloroethane	µg/l	1	ISO 17025	< 1.0				
1,2-dichloroethane	µg/l	1	ISO 17025	< 1.0				
1,1-Dichloropropene	µg/l	1	ISO 17025	< 1.0				
Trans-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0				
Benzene	µg/l	1	ISO 17025	< 1.0				
Tetrachloromethane	µg/l	1	ISO 17025	< 1.0				
1,2-dichloropropane	µg/l	1	ISO 17025	< 1.0				
Trichloroethene	µg/l	1	ISO 17025	< 1.0				
Dibromomethane	µg/l	1	ISO 17025	< 1.0				
Bromodichloromethane	µg/l	1	ISO 17025	< 1.0				
Cis-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0				
Trans-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0				
Toluene	µg/l	1	ISO 17025	< 1.0				
1,1,2-Trichloroethane	µg/l	1	ISO 17025	< 1.0				
1,3-Dichloropropane	µg/l	1	ISO 17025	< 1.0				
Dibromochloromethane	µg/l	1	ISO 17025	< 1.0				
Tetrachloroethene	µg/l	1	ISO 17025	< 1.0				
1,2-Dibromoethane	µg/l	1	ISO 17025	< 1.0				
Chlorobenzene	µg/l	1	ISO 17025	< 1.0				
1,1,1,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0				
Ethylbenzene	µg/l	1	ISO 17025	< 1.0				
p & m-xylene	µg/l	1	ISO 17025	< 1.0				
Styrene	µg/l	1	ISO 17025	< 1.0				
Tribromomethane	µg/l	1	ISO 17025	< 1.0				
o-xylene	µg/l	1	ISO 17025	< 1.0				
1,1,2,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0				
Isopropylbenzene	µg/l	1	ISO 17025	< 1.0				
Bromobenzene	µg/l	1	ISO 17025	< 1.0				
N-Propylbenzene	µg/l	1	ISO 17025	< 1.0				
2-Chlorotoluene	µg/l	1	ISO 17025	< 1.0				
4-Chlorotoluene	µg/l	1	ISO 17025	< 1.0				
1,3,5-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0				
Tert-Butylbenzene	µg/l	1	ISO 17025	< 1.0				
1,2,4-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0				
Sec-Butylbenzene	µg/l	1	ISO 17025	< 1.0				
1,3-dichlorobenzene	µg/l	1	ISO 17025	< 1.0				
P-Isopropyltoluene	µg/l	1	ISO 17025	< 1.0				
1,2-dichlorobenzene	µg/l	1	ISO 17025	< 1.0				
1,4-dichlorobenzene	µg/l	1	ISO 17025	< 1.0				
Butylbenzene	µg/l	1	ISO 17025	< 1.0				
1,2-Dibromo-3-chloropropane	µg/l	1	ISO 17025	< 1.0				
1,2,4-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0				
Hexachlorobutadiene	µg/l	1	ISO 17025	< 1.0				
1,2,3-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0				

U/S = Unsuitable Sample I/S = Insufficient Sample



Analytical Report Number : 15-73622

Project / Site name: Wrexham

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and topsoil/loam soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
455011	REUSE 1	None Supplied	None Supplied	Brown sandy loam with rubble and brick.
455012	REUSE 2	None Supplied	None Supplied	Brown sandy loam with rubble and brick.
455013	REUSE 3	None Supplied	None Supplied	Brown sandy loam with rubble and brick.
455014	REUSE 4	None Supplied	None Supplied	Brown sandy loam with rubble and brick.
455015	REUSE 5	None Supplied	None Supplied	Brown sandy loam with rubble and brick.
455016	CRUSH1	None Supplied	None Supplied	Grey gravel with rubble.**
455017	CRUSH2	None Supplied	None Supplied	Grey gravel with rubble.**

**Non MCERTS Matrix

Analytical Report Number : 15-73622

Project / Site name: Wrexham

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Ammonium as NH ₄ in soil	Determination of Ammonium/Ammonia/Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	MCERTS
Ammonium as NH ₄ in water	Determination of Ammonium/Ammonia/Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	ISO 17025
Biological oxygen demand of water	Determination of biochemical oxygen demand in water (5 days). Accredited matrices: SW, PW, GW.	In-house method based on standard method 5210B. Samples received > 24 hrs after sampling, data may not be valid and should be interpreted with care.	L086-PL	W	ISO 17025
Boron in water	Determination of boron by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM	L039-PL	W	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BTEX and MTBE in soil	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073S-PL	W	MCERTS
BTEX and MTBE in water	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073W-PL	W	ISO 17025
Chemical Oxygen Demand in Water (Settled)	Determination of settled COD in water by reflux oxidation with acidified K ₂ Cr ₂ O ₇ followed by colorimetry. Accredited matrices: SW, PW, GW.	HACH DR/890 Colorimeter Procedures Manual (48470-22) (Ref 0170.2)	L065-PL	W	ISO 17025
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	W	ISO 17025
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Monohydric phenols in water	Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
pH in water	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	ISO 17025
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS

Analytical Report Number : 15-73622

Project / Site name: Wrexham

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L070-UK	W	ISO 17025
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Suspended solids in water	Determined gravimetrically with GFC filtration papers.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L004-PL	W	NONE
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total cyanide in water	Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method	L076-PL	W	MCERTS
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-UK	W	NONE
Volatile organic compounds in water	Determination of volatile organic compounds in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073W-PL	W	ISO 17025

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

**Harry Russell**

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Analytical Report Number : 16-15181

Project / Site name:	Wrexham	Samples received on:	12/04/2016
Your job number:	HC15016	Samples instructed on:	12/04/2016
Your order number:	HC-15016-29180	Analysis completed by:	19/04/2016
Report Issue Number:	1	Report issued on:	19/04/2016
Samples Analysed:	6 water samples		

Signed:

Rexona Rahman
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Signed:

Emma Winter
Assistant Reporting Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :	soils	- 4 weeks from reporting
	leachates	- 2 weeks from reporting
	waters	- 2 weeks from reporting
	asbestos	- 6 months from reporting

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Analytical Report Number: 16-15181

Project / Site name: Wrexham

Your Order No: HC-15016-29180

Lab Sample Number				559937	559938	559939	559940	559941
Sample Reference				Upstream	Downstream	MW1	MW2	MW3
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				07/04/2016	07/04/2016	07/04/2016	07/04/2016	07/04/2016
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

General Inorganics

pH	pH Units	N/A	ISO 17025	8.0	8.0	7.8	7.5	7.8
Total Cyanide	µg/l	10	ISO 17025	< 10	< 10	24	14	18
Ammonium as NH ₄	µg/l	15	ISO 17025	51	310	360	520	27000
Chemical Oxygen Demand (Total)	mg/l	2	ISO 17025	21	21	24	15	71
BOD (Biochemical Oxygen Demand)	mg/l	1	ISO 17025	1.4	1.2	1.5	2.7	29
Total Suspended Solids	mg/l	2	NONE	12	8.0	3.0	2.0	8.0

Speciated PAHs

Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	0.36	68.8
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	0.39	27.2
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	1.15	5.08
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	0.72	11.3
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	6.83
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	1.53
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	0.85	0.95
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	0.56	0.52
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Total PAH

Total EPA-16 PAHs	µg/l	0.16	NONE	< 0.16	< 0.16	< 0.16	4.03	122
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Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	0.15	ISO 17025	0.59	0.43	1.04	0.66	2.18
Beryllium (dissolved)	µg/l	0.1	ISO 17025	< 0.1	< 0.1	< 0.1	0.2	< 0.1
Boron (dissolved)	µg/l	10	ISO 17025	35	37	76	35	56
Cadmium (dissolved)	µg/l	0.02	ISO 17025	< 0.02	0.06	< 0.02	0.02	< 0.02
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chromium (dissolved)	µg/l	0.2	ISO 17025	1.1	1.3	0.5	0.2	0.2
Copper (dissolved)	µg/l	0.5	ISO 17025	4.7	6.4	5.8	3.8	1.9
Lead (dissolved)	µg/l	0.2	ISO 17025	2.3	3.3	0.2	0.2	0.3
Manganese (dissolved)	µg/l	0.05	ISO 17025	14	24	1.7	55	1100
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nickel (dissolved)	µg/l	0.5	ISO 17025	2.3	2.5	2.9	8.1	54
Selenium (dissolved)	µg/l	0.6	ISO 17025	< 0.6	0.8	2.8	4.4	5.3
Vanadium (dissolved)	µg/l	0.2	ISO 17025	0.7	0.7	1.1	0.4	< 0.2
Zinc (dissolved)	µg/l	0.5	ISO 17025	6.2	8.1	1.8	1.9	1.8



Analytical Report Number: 16-15181

Project / Site name: Wrexham

Your Order No: HC-15016-29180

Lab Sample Number				559937	559938	559939	559940	559941
Sample Reference				Upstream	Downstream	MW1	MW2	MW3
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				07/04/2016	07/04/2016	07/04/2016	07/04/2016	07/04/2016
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

Monoaromatics

Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	16.8	393
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	1.9	93.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	5.0
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	17.0	27.0
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	23.0	30.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >C5 - C6	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C6 - C8	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C8 - C10	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10

TPH-CWG - Aromatic >C5 - C7	µg/l	10	NONE	< 10	< 10	< 10	17	390
TPH-CWG - Aromatic >C7 - C8	µg/l	10	NONE	< 10	< 10	< 10	< 10	93
TPH-CWG - Aromatic >C8 - C10	µg/l	10	NONE	< 10	< 10	< 10	64	110
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10	48	120
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10	110	44
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10	88	10
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	< 10	330	770



Analytical Report Number: 16-15181

Project / Site name: Wrexham

Your Order No: HC-15016-29180

Lab Sample Number				559937	559938	559939	559940	559941
Sample Reference				Upstream	Downstream	MW1	MW2	MW3
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				07/04/2016	07/04/2016	07/04/2016	07/04/2016	07/04/2016
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

VOCs

Chloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichlorofluoromethane	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cis-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-dichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,2-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-dichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	16.8	393
Tetrachloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromodichloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cis-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	1.9	93.4
1,1,2-Trichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromoethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	5.8
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	17.0	27.7
Styrene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tribromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	23.0	30.9
1,1,2,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
N-Propylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chlorotoluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chlorotoluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	1.8	4.2
Tert-Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	1.7	10.7
Sec-Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
P-Isopropyltoluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-chloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

U/S = Unsuitable Sample I/S = Insufficient Sample

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The results included within the report are representative of the samples submitted for analysis.

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Analytical Report Number: 16-15181

Project / Site name: Wrexham

Your Order No: HC-15016-29180

Lab Sample Number				559942				
Sample Reference				MW4				
Sample Number				None Supplied				
Depth (m)				None Supplied				
Date Sampled				07/04/2016				
Time Taken				None Supplied				
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

General Inorganics

pH	pH Units	N/A	ISO 17025	7.8				
Total Cyanide	µg/l	10	ISO 17025	11				
Ammonium as NH ₄	µg/l	15	ISO 17025	340				
Chemical Oxygen Demand (Total)	mg/l	2	ISO 17025	10				
BOD (Biochemical Oxygen Demand)	mg/l	1	ISO 17025	3.7				
Total Suspended Solids	mg/l	2	NONE	3.0				

Speciated PAHs

Naphthalene	µg/l	0.01	ISO 17025	0.25				
Acenaphthylene	µg/l	0.01	ISO 17025	0.33				
Acenaphthene	µg/l	0.01	ISO 17025	1.31				
Fluorene	µg/l	0.01	ISO 17025	2.07				
Phenanthrene	µg/l	0.01	ISO 17025	2.29				
Anthracene	µg/l	0.01	ISO 17025	1.18				
Fluoranthene	µg/l	0.01	ISO 17025	0.93				
Pyrene	µg/l	0.01	ISO 17025	0.81				
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01				
Chrysene	µg/l	0.01	ISO 17025	< 0.01				
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01				
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01				
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01				
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01				
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01				
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01				

Total PAH

Total EPA-16 PAHs	µg/l	0.16	NONE	9.17				
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Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	0.15	ISO 17025	0.69				
Beryllium (dissolved)	µg/l	0.1	ISO 17025	< 0.1				
Boron (dissolved)	µg/l	10	ISO 17025	110				
Cadmium (dissolved)	µg/l	0.02	ISO 17025	0.09				
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0				
Chromium (dissolved)	µg/l	0.2	ISO 17025	1.0				
Copper (dissolved)	µg/l	0.5	ISO 17025	5.2				
Lead (dissolved)	µg/l	0.2	ISO 17025	0.4				
Manganese (dissolved)	µg/l	0.05	ISO 17025	600				
Mercury (dissolved)	µg/l	0.05	ISO 17025	0.09				
Nickel (dissolved)	µg/l	0.5	ISO 17025	1.6				
Selenium (dissolved)	µg/l	0.6	ISO 17025	1.7				
Vanadium (dissolved)	µg/l	0.2	ISO 17025	< 0.2				
Zinc (dissolved)	µg/l	0.5	ISO 17025	1.9				



Analytical Report Number: 16-15181

Project / Site name: Wrexham

Your Order No: HC-15016-29180

Lab Sample Number				559942				
Sample Reference				MW4				
Sample Number				None Supplied				
Depth (m)				None Supplied				
Date Sampled				07/04/2016				
Time Taken				None Supplied				
Analytical Parameter (Water Analysis)				Units	Limit of detection	Accreditation Status		

Monoaromatics

Benzene	µg/l	1	ISO 17025	< 1.0				
Toluene	µg/l	1	ISO 17025	< 1.0				
Ethylbenzene	µg/l	1	ISO 17025	< 1.0				
p & m-xylene	µg/l	1	ISO 17025	< 1.0				
o-xylene	µg/l	1	ISO 17025	< 1.0				
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0				

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >C5 - C6	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C6 - C8	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C8 - C10	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10				

TPH-CWG - Aromatic >C5 - C7	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic >C7 - C8	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic >C8 - C10	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	80				
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	20				
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	100				



Analytical Report Number: 16-15181

Project / Site name: Wrexham

Your Order No: HC-15016-29180

Lab Sample Number				559942				
Sample Reference				MW4				
Sample Number				None Supplied				
Depth (m)				None Supplied				
Date Sampled				07/04/2016				
Time Taken				None Supplied				
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

VOCs

Chloromethane	µg/l	1	ISO 17025	< 1.0				
Chloroethane	µg/l	1	ISO 17025	< 1.0				
Bromomethane	µg/l	1	ISO 17025	< 1.0				
Vinyl Chloride	µg/l	1	NONE	< 1.0				
Trichlorofluoromethane	µg/l	1	NONE	< 1.0				
1,1-dichloroethene	µg/l	1	ISO 17025	< 1.0				
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/l	1	ISO 17025	< 1.0				
Cis-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0				
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0				
1,1-dichloroethane	µg/l	1	ISO 17025	< 1.0				
2,2-Dichloropropane	µg/l	1	ISO 17025	< 1.0				
Trichloromethane	µg/l	1	ISO 17025	< 1.0				
1,1,1-Trichloroethane	µg/l	1	ISO 17025	< 1.0				
1,2-dichloroethane	µg/l	1	ISO 17025	< 1.0				
1,1-Dichloropropene	µg/l	1	ISO 17025	< 1.0				
Trans-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0				
Benzene	µg/l	1	ISO 17025	< 1.0				
Tetrachloromethane	µg/l	1	ISO 17025	< 1.0				
1,2-dichloropropane	µg/l	1	ISO 17025	< 1.0				
Trichloroethene	µg/l	1	ISO 17025	< 1.0				
Dibromomethane	µg/l	1	ISO 17025	< 1.0				
Bromodichloromethane	µg/l	1	ISO 17025	< 1.0				
Cis-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0				
Trans-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0				
Toluene	µg/l	1	ISO 17025	< 1.0				
1,1,2-Trichloroethane	µg/l	1	ISO 17025	< 1.0				
1,3-Dichloropropane	µg/l	1	ISO 17025	< 1.0				
Dibromochloromethane	µg/l	1	ISO 17025	< 1.0				
Tetrachloroethene	µg/l	1	ISO 17025	< 1.0				
1,2-Dibromoethane	µg/l	1	ISO 17025	< 1.0				
Chlorobenzene	µg/l	1	ISO 17025	< 1.0				
1,1,1,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0				
Ethylbenzene	µg/l	1	ISO 17025	< 1.0				
p & m-xylene	µg/l	1	ISO 17025	< 1.0				
Styrene	µg/l	1	ISO 17025	< 1.0				
Tribromomethane	µg/l	1	ISO 17025	< 1.0				
o-xylene	µg/l	1	ISO 17025	< 1.0				
1,1,2,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0				
Isopropylbenzene	µg/l	1	ISO 17025	< 1.0				
Bromobenzene	µg/l	1	ISO 17025	< 1.0				
N-Propylbenzene	µg/l	1	ISO 17025	< 1.0				
2-Chlorotoluene	µg/l	1	ISO 17025	< 1.0				
4-Chlorotoluene	µg/l	1	ISO 17025	< 1.0				
1,3,5-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0				
Tert-Butylbenzene	µg/l	1	ISO 17025	< 1.0				
1,2,4-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0				
Sec-Butylbenzene	µg/l	1	ISO 17025	< 1.0				
1,3-dichlorobenzene	µg/l	1	ISO 17025	< 1.0				
P-Isopropyltoluene	µg/l	1	ISO 17025	< 1.0				
1,2-dichlorobenzene	µg/l	1	ISO 17025	< 1.0				
1,4-dichlorobenzene	µg/l	1	ISO 17025	< 1.0				
Butylbenzene	µg/l	1	ISO 17025	< 1.0				
1,2-Dibromo-3-chloropropane	µg/l	1	ISO 17025	< 1.0				
1,2,4-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0				
Hexachlorobutadiene	µg/l	1	ISO 17025	< 1.0				
1,2,3-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0				

U/S = Unsuitable Sample I/S = Insufficient Sample

Iss No 16-15181-1 Wrexham HC15016

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The results included within the report are representative of the samples submitted for analysis.

Page 7 of 9



Analytical Report Number : 16-15181

Project / Site name: Wrexham

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Ammonium as NH ₄ in water	Determination of Ammonium/Ammonia/Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	ISO 17025
Biological oxygen demand of water	Determination of biochemical oxygen demand in water (5 days). Accredited matrices: SW, PW, GW.	In-house method based on standard method 5210B. Samples received > 24 hrs after sampling, data may not be valid and should be interpreted with care.	L086-PL	W	ISO 17025
Boron in water	Determination of boron in water by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM	L039-PL	W	ISO 17025
BTEX and MTBE in water (Monoaromatics)	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
Chemical Oxygen Demand in Water (Total)	Determination of total COD in water by reflux oxidation with acidified K ₂ Cr ₂ O ₇ followed by colorimetry. Accredited matrices: SW, PW, GW.	HACH DR/890 Colorimeter Procedures Manual (48470-22) (Ref 0170.2)	L065-PL	W	ISO 17025
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	W	ISO 17025
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Monohydric phenols in water	Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
pH in water	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	ISO 17025
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L0102B-PL	W	NONE
Suspended solids in water	Determined gravimetrically with GFC filtration papers.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L004-PL	W	NONE
Total cyanide in water	Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-PL	W	NONE
Volatile organic compounds in water	Determination of volatile organic compounds in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 300°C.

Sample ID	Other_ID	Sample Type	Job	Sample Number	Sample Deviation Code	test_name	test_ref	Test Deviation code
Downstream		W	16-15181	559938	c	Ammoniacal Nitrogen as N in water	L082-PL	c
Downstream		W	16-15181	559938	c	Ammonium as NH4 in water	L082-PL	c
Downstream		W	16-15181	559938	c	Biological oxygen demand of water	L086-PL	c
Downstream		W	16-15181	559938	c	Settleable Solids in water	L004-PL	c
Downstream		W	16-15181	559938	c	Suspended solids in water	L004-PL	c
Downstream		W	16-15181	559938	c	pH in water	L005-PL	c
MW1		W	16-15181	559939	c	Ammoniacal Nitrogen as N in water	L082-PL	c
MW1		W	16-15181	559939	c	Ammonium as NH4 in water	L082-PL	c
MW1		W	16-15181	559939	c	Biological oxygen demand of water	L086-PL	c
MW1		W	16-15181	559939	c	Settleable Solids in water	L004-PL	c
MW1		W	16-15181	559939	c	Suspended solids in water	L004-PL	c
MW1		W	16-15181	559939	c	pH in water	L005-PL	c
MW2		W	16-15181	559940	c	Ammoniacal Nitrogen as N in water	L082-PL	c
MW2		W	16-15181	559940	c	Ammonium as NH4 in water	L082-PL	c
MW2		W	16-15181	559940	c	Biological oxygen demand of water	L086-PL	c
MW2		W	16-15181	559940	c	Settleable Solids in water	L004-PL	c
MW2		W	16-15181	559940	c	Suspended solids in water	L004-PL	c
MW2		W	16-15181	559940	c	pH in water	L005-PL	c
MW3		W	16-15181	559941	c	Ammoniacal Nitrogen as N in water	L082-PL	c
MW3		W	16-15181	559941	c	Ammonium as NH4 in water	L082-PL	c
MW3		W	16-15181	559941	c	Biological oxygen demand of water	L086-PL	c
MW3		W	16-15181	559941	c	Settleable Solids in water	L004-PL	c
MW3		W	16-15181	559941	c	Suspended solids in water	L004-PL	c
MW3		W	16-15181	559941	c	pH in water	L005-PL	c
MW4		W	16-15181	559942	c	Ammoniacal Nitrogen as N in water	L082-PL	c
MW4		W	16-15181	559942	c	Ammonium as NH4 in water	L082-PL	c
MW4		W	16-15181	559942	c	Biological oxygen demand of water	L086-PL	c
MW4		W	16-15181	559942	c	Settleable Solids in water	L004-PL	c
MW4		W	16-15181	559942	c	Suspended solids in water	L004-PL	c
MW4		W	16-15181	559942	c	pH in water	L005-PL	c
Upstream		W	16-15181	559937	c	Ammoniacal Nitrogen as N in water	L082-PL	c
Upstream		W	16-15181	559937	c	Ammonium as NH4 in water	L082-PL	c
Upstream		W	16-15181	559937	c	Biological oxygen demand of water	L086-PL	c
Upstream		W	16-15181	559937	c	Settleable Solids in water	L004-PL	c
Upstream		W	16-15181	559937	c	Suspended solids in water	L004-PL	c
Upstream		W	16-15181	559937	c	pH in water	L005-PL	c

**Harry Russell**

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Analytical Report Number : 16-11753

Project / Site name:	Wrexham	Samples received on:	24/02/2016
Your job number:	HC15016	Samples instructed on:	24/02/2016
Your order number:	HC15016-29180	Analysis completed by:	01/03/2016
Report Issue Number:	1	Report issued on:	01/03/2016
Samples Analysed:	6 water samples		

Signed:

Rexona Rahman
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Signed:

Dr Irma Doyle
Assistant Quality Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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Analytical Report Number: 16-11753

Project / Site name: Wrexham

Your Order No: HC15016-29180

Lab Sample Number				540210	540211	540212	540213	540214
Sample Reference				Upstream	Downstream	MW1	MW2	MW3
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				22/02/2016	22/02/2016	22/02/2016	22/02/2016	22/02/2016
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

General Inorganics

pH	pH Units	N/A	ISO 17025	8.0	8.1	11.7	8.2	7.7
Total Cyanide	µg/l	10	ISO 17025	< 10	< 10	23	23	21
Ammonium as NH ₄	µg/l	15	ISO 17025	180	160	1100	1600	20000
Chemical Oxygen Demand (Total)	mg/l	2	ISO 17025	10	9.2	29	20	46
BOD (Biochemical Oxygen Demand)	mg/l	1	ISO 17025	2.0	1.6	2.4	2.8	14
Total Suspended Solids	mg/l	2	NONE	6.0	16	460	320	7.0

Speciated PAHs

Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	33.7	1.14	4470
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	4.78	11.3	548
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	5.40	6.88	105
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	5.29	18.9	272
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	5.60	11.8	169
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	1.80	4.23	44.2
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	3.02	5.10	31.3
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	2.43	4.00	23.0
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	0.68	1.32	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	0.87	1.16	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	0.37	0.84	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	0.21	0.38	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	0.33	0.67	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Total PAH

Total EPA-16 PAHs	µg/l	0.16	NONE	< 0.16	< 0.16	64.5	67.7	5660
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Analytical Report Number: 16-11753

Project / Site name: Wrexham

Your Order No: HC15016-29180

Lab Sample Number	540210	540211	540212	540213	540214
Sample Reference	Upstream	Downstream	MW1	MW2	MW3
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled	22/02/2016	22/02/2016	22/02/2016	22/02/2016	22/02/2016
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status		

Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	0.15	ISO 17025	0.30	0.20	1.38	0.60	1.71
Beryllium (dissolved)	µg/l	0.1	ISO 17025	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Boron (dissolved)	µg/l	10	ISO 17025	46	46	110	89	76
Cadmium (dissolved)	µg/l	0.02	ISO 17025	0.05	< 0.02	< 0.02	0.03	< 0.02
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chromium (dissolved)	µg/l	0.2	ISO 17025	0.9	0.6	0.6	< 0.2	< 0.2
Copper (dissolved)	µg/l	0.5	ISO 17025	4.5	3.1	5.0	1.5	1.8
Lead (dissolved)	µg/l	0.2	ISO 17025	5.5	0.9	2.4	0.2	0.3
Manganese (dissolved)	µg/l	0.05	ISO 17025	50	15	1.4	72	760
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nickel (dissolved)	µg/l	0.5	ISO 17025	4.0	2.1	7.1	9.7	42
Selenium (dissolved)	µg/l	0.6	ISO 17025	< 0.6	< 0.6	4.3	5.6	4.5
Vanadium (dissolved)	µg/l	0.2	ISO 17025	0.5	0.3	1.3	0.3	< 0.2
Zinc (dissolved)	µg/l	0.5	ISO 17025	9.8	2.9	0.8	3.2	2.4

Monoaromatics

Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	32.9	458
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	6.7	81.8
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	5.2
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	5.4	35.1
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	5.3	55.2
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >C5 - C6	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C6 - C8	µg/l	10	NONE	< 10	< 10	< 10	< 10	10
TPH-CWG - Aliphatic >C8 - C10	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	< 10	< 10	10

TPH-CWG - Aromatic >C5 - C7	µg/l	10	NONE	< 10	< 10	< 10	33	460
TPH-CWG - Aromatic >C7 - C8	µg/l	10	NONE	< 10	< 10	< 10	< 10	82
TPH-CWG - Aromatic >C8 - C10	µg/l	10	NONE	< 10	< 10	< 10	11	180
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	< 10	< 10	190	150	10000
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	< 10	< 10	160	210	6100
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	< 10	< 10	180	25	270
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	540	420	17000



Analytical Report Number: 16-11753

Project / Site name: Wrexham

Your Order No: HC15016-29180

Lab Sample Number				540210	540211	540212	540213	540214
Sample Reference				Upstream	Downstream	MW1	MW2	MW3
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				22/02/2016	22/02/2016	22/02/2016	22/02/2016	22/02/2016
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

VOCs

Chloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichlorofluoromethane	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cis-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-dichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,2-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-dichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	32.9	458
Tetrachloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromodichloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cis-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	6.7	81.8
1,1,2-Trichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromoethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	5.2
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	5.4	35.1
Styrene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tribromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	5.3	55.2
1,1,2,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	2.5
Bromobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
N-Propylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chlorotoluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chlorotoluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	5.9
Tert-Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	14.0
Sec-Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
P-Isopropyltoluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-chloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

U/S = Unsuitable Sample I/S = Insufficient Sample

Iss No 16-11753-1 Wrexham HC15016

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The results included within the report are representative of the samples submitted for analysis.

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Analytical Report Number: 16-11753

Project / Site name: Wrexham

Your Order No: HC15016-29180

Lab Sample Number				540215				
Sample Reference				MW4				
Sample Number				None Supplied				
Depth (m)				None Supplied				
Date Sampled				22/02/2016				
Time Taken				None Supplied				
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

General Inorganics

pH	pH Units	N/A	ISO 17025	7.8				
Total Cyanide	µg/l	10	ISO 17025	12				
Ammonium as NH ₄	µg/l	15	ISO 17025	530				
Chemical Oxygen Demand (Total)	mg/l	2	ISO 17025	18				
BOD (Biochemical Oxygen Demand)	mg/l	1	ISO 17025	3.2				
Total Suspended Solids	mg/l	2	NONE	7.0				

Speciated PAHs

Naphthalene	µg/l	0.01	ISO 17025	59.9				
Acenaphthylene	µg/l	0.01	ISO 17025	15.2				
Acenaphthene	µg/l	0.01	ISO 17025	108				
Fluorene	µg/l	0.01	ISO 17025	61.4				
Phenanthrene	µg/l	0.01	ISO 17025	85.9				
Anthracene	µg/l	0.01	ISO 17025	24.3				
Fluoranthene	µg/l	0.01	ISO 17025	16.4				
Pyrene	µg/l	0.01	ISO 17025	17.5				
Benzo(a)anthracene	µg/l	0.01	ISO 17025	4.90				
Chrysene	µg/l	0.01	ISO 17025	4.38				
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	2.37				
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	2.12				
Benzo(a)pyrene	µg/l	0.01	ISO 17025	2.24				
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01				
Dibenz(a,h)anthracene	µg/l	0.01	NONE	0.29				
Benzo(ghi)perylene	µg/l	0.01	NONE	0.90				

Total PAH

Total EPA-16 PAHs	µg/l	0.16	NONE	405				
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Analytical Report Number: 16-11753

Project / Site name: Wrexham

Your Order No: HC15016-29180

Lab Sample Number				540215				
Sample Reference				MW4				
Sample Number				None Supplied				
Depth (m)				None Supplied				
Date Sampled				22/02/2016				
Time Taken				None Supplied				
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	0.15	ISO 17025	0.50				
Beryllium (dissolved)	µg/l	0.1	ISO 17025	< 0.1				
Boron (dissolved)	µg/l	10	ISO 17025	120				
Cadmium (dissolved)	µg/l	0.02	ISO 17025	0.05				
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0				
Chromium (dissolved)	µg/l	0.2	ISO 17025	< 0.2				
Copper (dissolved)	µg/l	0.5	ISO 17025	2.3				
Lead (dissolved)	µg/l	0.2	ISO 17025	< 0.2				
Manganese (dissolved)	µg/l	0.05	ISO 17025	690				
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05				
Nickel (dissolved)	µg/l	0.5	ISO 17025	1.4				
Selenium (dissolved)	µg/l	0.6	ISO 17025	0.8				
Vanadium (dissolved)	µg/l	0.2	ISO 17025	< 0.2				
Zinc (dissolved)	µg/l	0.5	ISO 17025	1.4				

Monoaromatics

Benzene	µg/l	1	ISO 17025	< 1.0				
Toluene	µg/l	1	ISO 17025	< 1.0				
Ethylbenzene	µg/l	1	ISO 17025	< 1.0				
p & m-xylene	µg/l	1	ISO 17025	< 1.0				
o-xylene	µg/l	1	ISO 17025	< 1.0				
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0				

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >C5 - C6	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C6 - C8	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C8 - C10	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10				

TPH-CWG - Aromatic >C5 - C7	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic >C7 - C8	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic >C8 - C10	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	80				
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	820				
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	720				
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	220				
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	1800				



Analytical Report Number: 16-11753

Project / Site name: Wrexham

Your Order No: HC15016-29180

Lab Sample Number				540215				
Sample Reference				MW4				
Sample Number				None Supplied				
Depth (m)				None Supplied				
Date Sampled				22/02/2016				
Time Taken				None Supplied				
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

VOCs

Chloromethane	µg/l	1	ISO 17025	< 1.0				
Chloroethane	µg/l	1	ISO 17025	< 1.0				
Bromomethane	µg/l	1	ISO 17025	< 1.0				
Vinyl Chloride	µg/l	1	NONE	< 1.0				
Trichlorofluoromethane	µg/l	1	NONE	< 1.0				
1,1-dichloroethene	µg/l	1	ISO 17025	< 1.0				
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/l	1	ISO 17025	< 1.0				
Cis-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0				
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0				
1,1-dichloroethane	µg/l	1	ISO 17025	< 1.0				
2,2-Dichloropropane	µg/l	1	ISO 17025	< 1.0				
Trichloromethane	µg/l	1	ISO 17025	< 1.0				
1,1,1-Trichloroethane	µg/l	1	ISO 17025	< 1.0				
1,2-dichloroethane	µg/l	1	ISO 17025	< 1.0				
1,1-Dichloropropene	µg/l	1	ISO 17025	< 1.0				
Trans-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0				
Benzene	µg/l	1	ISO 17025	< 1.0				
Tetrachloromethane	µg/l	1	ISO 17025	< 1.0				
1,2-dichloropropane	µg/l	1	ISO 17025	< 1.0				
Trichloroethene	µg/l	1	ISO 17025	< 1.0				
Dibromomethane	µg/l	1	ISO 17025	< 1.0				
Bromodichloromethane	µg/l	1	ISO 17025	< 1.0				
Cis-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0				
Trans-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0				
Toluene	µg/l	1	ISO 17025	< 1.0				
1,1,2-Trichloroethane	µg/l	1	ISO 17025	< 1.0				
1,3-Dichloropropane	µg/l	1	ISO 17025	< 1.0				
Dibromochloromethane	µg/l	1	ISO 17025	< 1.0				
Tetrachloroethene	µg/l	1	ISO 17025	< 1.0				
1,2-Dibromoethane	µg/l	1	ISO 17025	< 1.0				
Chlorobenzene	µg/l	1	ISO 17025	< 1.0				
1,1,1,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0				
Ethylbenzene	µg/l	1	ISO 17025	< 1.0				
p & m-xylene	µg/l	1	ISO 17025	< 1.0				
Styrene	µg/l	1	ISO 17025	< 1.0				
Tribromomethane	µg/l	1	ISO 17025	< 1.0				
o-xylene	µg/l	1	ISO 17025	< 1.0				
1,1,2,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0				
Isopropylbenzene	µg/l	1	ISO 17025	< 1.0				
Bromobenzene	µg/l	1	ISO 17025	< 1.0				
N-Propylbenzene	µg/l	1	ISO 17025	< 1.0				
2-Chlorotoluene	µg/l	1	ISO 17025	< 1.0				
4-Chlorotoluene	µg/l	1	ISO 17025	< 1.0				
1,3,5-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0				
Tert-Butylbenzene	µg/l	1	ISO 17025	< 1.0				
1,2,4-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0				
Sec-Butylbenzene	µg/l	1	ISO 17025	< 1.0				
1,3-dichlorobenzene	µg/l	1	ISO 17025	< 1.0				
P-Isopropyltoluene	µg/l	1	ISO 17025	< 1.0				
1,2-dichlorobenzene	µg/l	1	ISO 17025	< 1.0				
1,4-dichlorobenzene	µg/l	1	ISO 17025	< 1.0				
Butylbenzene	µg/l	1	ISO 17025	< 1.0				
1,2-Dibromo-3-chloropropane	µg/l	1	ISO 17025	< 1.0				
1,2,4-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0				
Hexachlorobutadiene	µg/l	1	ISO 17025	< 1.0				
1,2,3-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0				

U/S = Unsuitable Sample I/S = Insufficient Sample

Iss No 16-11753-1 Wrexham HC15016

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The results included within the report are representative of the samples submitted for analysis.

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Analytical Report Number : 16-11753

Project / Site name: Wrexham

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Ammonium as NH ₄ in water	Determination of Ammonium/Ammonia/Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	ISO 17025
Biological oxygen demand of water	Determination of biochemical oxygen demand in water (5 days). Accredited matrices: SW, PW, GW.	In-house method based on standard method 5210B. Samples received > 24 hrs after sampling, data may not be valid and should be interpreted with care.	L086-PL	W	ISO 17025
Boron in water	Determination of boron by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM	L039-PL	W	ISO 17025
BTEX and MTBE in water (Monoaromatics)	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
Chemical Oxygen Demand in Water (Total)	Determination of total COD in water by reflux oxidation with acidified K ₂ Cr ₂ O ₇ followed by colorimetry. Accredited matrices: SW, PW, GW.	HACH DR/890 Colorimeter Procedures Manual (48470-22) (Ref 0170.2)	L065-PL	W	ISO 17025
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	W	ISO 17025
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Monohydric phenols in water	Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
pH in water	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	ISO 17025
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L0102B-PL	W	NONE
Suspended solids in water	Determined gravimetrically with GFC filtration papers.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L004-PL	W	NONE
Total cyanide in water	Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-UK	W	NONE
Volatile organic compounds in water	Determination of volatile organic compounds in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30°C.

**Harry Russell**

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Analytical Report Number : 16-10235

Project / Site name: Wrexham

Samples received on: 03/02/2016

Your job number: HC15016

Samples instructed on: 03/02/2016

Your order number: HC15016-29180

Analysis completed by: 09/02/2016

Report Issue Number: 1

Report issued on: 09/02/2016

Samples Analysed: 6 water samples

Signed:

Rexona Rahman
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Signed:

Emma Winter
Assistant Reporting Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

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Analytical Report Number: 16-10235

Project / Site name: Wrexham

Your Order No: HC15016-29180

Lab Sample Number	531629	531630	531631	531632	531633
Sample Reference	Upstream	Downstream	MW1	MW2	MW3
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled	28/01/2016	28/01/2016	28/01/2016	28/01/2016	28/01/2016
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status		

General Inorganics

pH	pH Units	N/A	ISO 17025	8.0	8.0	10.9	7.9	7.5
Total Cyanide	µg/l	10	ISO 17025	< 10	< 10	21	24	27
Ammonium as NH ₄	µg/l	15	ISO 17025	270	170	690	2600	19000
Chemical Oxygen Demand (Total)	mg/l	2	ISO 17025	16	11	21	23	54
BOD (Biochemical Oxygen Demand)	mg/l	1	ISO 17025	1.3	1.6	< 1.0	2.6	7.9
Total Suspended Solids	mg/l	2	NONE	15	6.0	7.0	5.0	6.0

Speciated PAHs

Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	406
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	1.04	17.2	136
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	1.51	5.22	24.2
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	0.63	12.5	52.7
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	8.54	27.6
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	1.89	6.52
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	0.43	1.63	6.33
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	0.39	1.14	3.85
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Total PAH

Total EPA-16 PAHs	µg/l	0.16	NONE	< 0.16	< 0.16	4.00	48.1	663
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Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	0.15	ISO 17025	0.40	0.20	0.89	0.57	1.27
Beryllium (dissolved)	µg/l	0.1	ISO 17025	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Boron (dissolved)	µg/l	10	ISO 17025	51	52	50	39	70
Cadmium (dissolved)	µg/l	0.02	ISO 17025	0.02	0.04	< 0.02	0.03	0.03
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chromium (dissolved)	µg/l	0.2	ISO 17025	1.2	0.9	0.5	< 0.2	0.2
Copper (dissolved)	µg/l	0.5	ISO 17025	3.1	4.6	3.4	2.6	2.8
Lead (dissolved)	µg/l	0.2	ISO 17025	1.3	0.5	0.4	0.2	0.5
Manganese (dissolved)	µg/l	0.05	ISO 17025	24	12	0.71	99	630
Mercury (dissolved)	µg/l	0.05	ISO 17025	0.30	0.22	0.21	0.15	0.45
Nickel (dissolved)	µg/l	0.5	ISO 17025	2.3	1.8	2.8	16	29
Selenium (dissolved)	µg/l	0.6	ISO 17025	0.7	1.1	4.8	5.3	6.0
Vanadium (dissolved)	µg/l	0.2	ISO 17025	0.4	0.4	1.2	0.3	< 0.2
Zinc (dissolved)	µg/l	0.5	ISO 17025	5.5	5.9	< 0.5	1.2	2.7



Analytical Report Number: 16-10235

Project / Site name: Wrexham

Your Order No: HC15016-29180

Lab Sample Number				531629	531630	531631	531632	531633
Sample Reference				Upstream	Downstream	MW1	MW2	MW3
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				28/01/2016	28/01/2016	28/01/2016	28/01/2016	28/01/2016
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)				Units	Limit of detection	Accreditation Status		

Monoaromatics

Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	50.0	387
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	6.4	18.5
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	18.6	24.5
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	23.6	50.8
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >C5 - C6	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C6 - C8	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C8 - C10	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10

TPH-CWG - Aromatic >C5 - C7	µg/l	10	NONE	< 10	< 10	< 10	50	390
TPH-CWG - Aromatic >C7 - C8	µg/l	10	NONE	< 10	< 10	< 10	< 10	19
TPH-CWG - Aromatic >C8 - C10	µg/l	10	NONE	< 10	< 10	< 10	46	110
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10	210	580
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10	410	3000
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10	270	730
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	< 10	990	4800



Analytical Report Number: 16-10235

Project / Site name: Wrexham

Your Order No: HC15016-29180

Lab Sample Number				531629	531630	531631	531632	531633
Sample Reference				Upstream	Downstream	MW1	MW2	MW3
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				28/01/2016	28/01/2016	28/01/2016	28/01/2016	28/01/2016
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

VOCs

Chloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichlorofluoromethane	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cis-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-dichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,2-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-dichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	50.0	387
Tetrachloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromodichloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cis-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	6.4	18.5
1,1,2-Trichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromoethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	18.6	24.5
Styrene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tribromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	23.6	50.8
1,1,2,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	2.7
Bromobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
N-Propylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chlorotoluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chlorotoluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	1.8	2.4
Tert-Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	2.2	5.2
Sec-Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
P-Isopropyltoluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-chloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

U/S = Unsuitable Sample I/S = Insufficient Sample

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The results included within the report are representative of the samples submitted for analysis.

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Analytical Report Number: 16-10235

Project / Site name: Wrexham

Your Order No: HC15016-29180

Lab Sample Number				531634				
Sample Reference				MW4				
Sample Number				None Supplied				
Depth (m)				None Supplied				
Date Sampled				28/01/2016				
Time Taken				None Supplied				
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

General Inorganics

pH	pH Units	N/A	ISO 17025	7.7				
Total Cyanide	µg/l	10	ISO 17025	12				
Ammonium as NH ₄	µg/l	15	ISO 17025	620				
Chemical Oxygen Demand (Total)	mg/l	2	ISO 17025	34				
BOD (Biochemical Oxygen Demand)	mg/l	1	ISO 17025	< 1.0				
Total Suspended Solids	mg/l	2	NONE	7.0				

Speciated PAHs

Naphthalene	µg/l	0.01	ISO 17025	20.6				
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01				
Acenaphthene	µg/l	0.01	ISO 17025	114				
Fluorene	µg/l	0.01	ISO 17025	57.4				
Phenanthrene	µg/l	0.01	ISO 17025	62.9				
Anthracene	µg/l	0.01	ISO 17025	18.6				
Fluoranthene	µg/l	0.01	ISO 17025	6.84				
Pyrene	µg/l	0.01	ISO 17025	6.62				
Benzo(a)anthracene	µg/l	0.01	ISO 17025	1.31				
Chrysene	µg/l	0.01	ISO 17025	1.17				
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01				
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01				
Benzo(a)pyrene	µg/l	0.01	ISO 17025	0.41				
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01				
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01				
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01				

Total PAH

Total EPA-16 PAHs	µg/l	0.16	NONE	290				
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Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	0.15	ISO 17025	1.29				
Beryllium (dissolved)	µg/l	0.1	ISO 17025	< 0.1				
Boron (dissolved)	µg/l	10	ISO 17025	110				
Cadmium (dissolved)	µg/l	0.02	ISO 17025	0.06				
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0				
Chromium (dissolved)	µg/l	0.2	ISO 17025	< 0.2				
Copper (dissolved)	µg/l	0.5	ISO 17025	1.7				
Lead (dissolved)	µg/l	0.2	ISO 17025	< 0.2				
Manganese (dissolved)	µg/l	0.05	ISO 17025	700				
Mercury (dissolved)	µg/l	0.05	ISO 17025	0.26				
Nickel (dissolved)	µg/l	0.5	ISO 17025	0.8				
Selenium (dissolved)	µg/l	0.6	ISO 17025	< 0.6				
Vanadium (dissolved)	µg/l	0.2	ISO 17025	< 0.2				
Zinc (dissolved)	µg/l	0.5	ISO 17025	1.6				



Analytical Report Number: 16-10235

Project / Site name: Wrexham

Your Order No: HC15016-29180

Lab Sample Number				531634				
Sample Reference				MW4				
Sample Number				None Supplied				
Depth (m)				None Supplied				
Date Sampled				28/01/2016				
Time Taken				None Supplied				
Analytical Parameter (Water Analysis)				Units	Limit of detection	Accreditation Status		

Monoaromatics

Benzene	µg/l	1	ISO 17025	< 1.0				
Toluene	µg/l	1	ISO 17025	< 1.0				
Ethylbenzene	µg/l	1	ISO 17025	< 1.0				
p & m-xylene	µg/l	1	ISO 17025	< 1.0				
o-xylene	µg/l	1	ISO 17025	2.3				
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0				

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >C5 - C6	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C6 - C8	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C8 - C10	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10				

TPH-CWG - Aromatic >C5 - C7	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic >C7 - C8	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic >C8 - C10	µg/l	10	NONE	18				
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	400				
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	6100				
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	3600				
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	180				
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	10000				



Analytical Report Number: 16-10235

Project / Site name: Wrexham

Your Order No: HC15016-29180

Lab Sample Number				531634				
Sample Reference				MW4				
Sample Number				None Supplied				
Depth (m)				None Supplied				
Date Sampled				28/01/2016				
Time Taken				None Supplied				
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

VOCs

Chloromethane	µg/l	1	ISO 17025	< 1.0				
Chloroethane	µg/l	1	ISO 17025	< 1.0				
Bromomethane	µg/l	1	ISO 17025	< 1.0				
Vinyl Chloride	µg/l	1	NONE	< 1.0				
Trichlorofluoromethane	µg/l	1	NONE	< 1.0				
1,1-dichloroethene	µg/l	1	ISO 17025	< 1.0				
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/l	1	ISO 17025	< 1.0				
Cis-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0				
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0				
1,1-dichloroethane	µg/l	1	ISO 17025	< 1.0				
2,2-Dichloropropane	µg/l	1	ISO 17025	< 1.0				
Trichloromethane	µg/l	1	ISO 17025	< 1.0				
1,1,1-Trichloroethane	µg/l	1	ISO 17025	< 1.0				
1,2-dichloroethane	µg/l	1	ISO 17025	< 1.0				
1,1-Dichloropropene	µg/l	1	ISO 17025	< 1.0				
Trans-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0				
Benzene	µg/l	1	ISO 17025	< 1.0				
Tetrachloromethane	µg/l	1	ISO 17025	< 1.0				
1,2-dichloropropane	µg/l	1	ISO 17025	< 1.0				
Trichloroethene	µg/l	1	ISO 17025	< 1.0				
Dibromomethane	µg/l	1	ISO 17025	< 1.0				
Bromodichloromethane	µg/l	1	ISO 17025	< 1.0				
Cis-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0				
Trans-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0				
Toluene	µg/l	1	ISO 17025	< 1.0				
1,1,2-Trichloroethane	µg/l	1	ISO 17025	< 1.0				
1,3-Dichloropropane	µg/l	1	ISO 17025	< 1.0				
Dibromochloromethane	µg/l	1	ISO 17025	< 1.0				
Tetrachloroethene	µg/l	1	ISO 17025	< 1.0				
1,2-Dibromoethane	µg/l	1	ISO 17025	< 1.0				
Chlorobenzene	µg/l	1	ISO 17025	< 1.0				
1,1,1,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0				
Ethylbenzene	µg/l	1	ISO 17025	< 1.0				
p & m-xylene	µg/l	1	ISO 17025	< 1.0				
Styrene	µg/l	1	ISO 17025	< 1.0				
Tribromomethane	µg/l	1	ISO 17025	< 1.0				
o-xylene	µg/l	1	ISO 17025	2.3				
1,1,2,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0				
Isopropylbenzene	µg/l	1	ISO 17025	< 1.0				
Bromobenzene	µg/l	1	ISO 17025	< 1.0				
N-Propylbenzene	µg/l	1	ISO 17025	< 1.0				
2-Chlorotoluene	µg/l	1	ISO 17025	< 1.0				
4-Chlorotoluene	µg/l	1	ISO 17025	< 1.0				
1,3,5-Trimethylbenzene	µg/l	1	ISO 17025	2.2				
Tert-Butylbenzene	µg/l	1	ISO 17025	< 1.0				
1,2,4-Trimethylbenzene	µg/l	1	ISO 17025	3.3				
Sec-Butylbenzene	µg/l	1	ISO 17025	< 1.0				
1,3-dichlorobenzene	µg/l	1	ISO 17025	< 1.0				
P-Isopropyltoluene	µg/l	1	ISO 17025	< 1.0				
1,2-dichlorobenzene	µg/l	1	ISO 17025	< 1.0				
1,4-dichlorobenzene	µg/l	1	ISO 17025	< 1.0				
Butylbenzene	µg/l	1	ISO 17025	< 1.0				
1,2-Dibromo-3-chloropropane	µg/l	1	ISO 17025	< 1.0				
1,2,4-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0				
Hexachlorobutadiene	µg/l	1	ISO 17025	< 1.0				
1,2,3-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0				

U/S = Unsuitable Sample I/S = Insufficient Sample

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The results included within the report are representative of the samples submitted for analysis.

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Analytical Report Number : 16-10235

Project / Site name: Wrexham

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Ammonium as NH ₄ in water	Determination of Ammonium/Ammonia/Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	ISO 17025
Biological oxygen demand of water	Determination of biochemical oxygen demand in water (5 days). Accredited matrices: SW, PW, GW.	In-house method based on standard method 5210B. Samples received > 24 hrs after sampling, data may not be valid and should be interpreted with care.	L086-PL	W	ISO 17025
Boron in water	Determination of boron by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM	L039-PL	W	ISO 17025
BTEX and MTBE in water	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
Chemical Oxygen Demand in Water (Total)	Determination of total COD in water by reflux oxidation with acidified K ₂ Cr ₂ O ₇ followed by colorimetry. Accredited matrices: SW, PW, GW.	HACH DR/890 Colorimeter Procedures Manual (48470-22) (Ref 0170.2)	L065-PL	W	ISO 17025
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	W	ISO 17025
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Monohydric phenols in water	Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
pH in water	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	ISO 17025
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L0102B-PL	W	NONE
Suspended solids in water	Determined gravimetrically with GFC filtration papers.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L004-PL	W	NONE
Total cyanide in water	Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-UK	W	NONE
Volatile organic compounds in water	Determination of volatile organic compounds in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

**Harry Russell**

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Analytical Report Number : 15-84550

Project / Site name:	Wrexham	Samples received on:	09/12/2015
Your job number:	HC15016	Samples instructed on:	15/12/2015
Your order number:	HC15016-29180	Analysis completed by:	22/12/2015
Report Issue Number:	1	Report issued on:	22/12/2015
Samples Analysed:	6 water samples		

Signed:

Rexona Rahman
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Signed:

Dr Irma Doyle
Assistant Quality Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.



Analytical Report Number: 15-84550

Project / Site name: Wrexham

Your Order No: HC15016-29180

Lab Sample Number				517862	517863	517864	517865	517866
Sample Reference				Upstream	Downstream	MW1	MW2	MW3
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				08/12/2015	08/12/2015	08/12/2015	08/12/2015	08/12/2015
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

General Inorganics

pH	pH Units	N/A	ISO 17025	7.4	7.7	11.2	8.5	8.1
Total Cyanide	µg/l	10	ISO 17025	< 10	< 10	49	120	140
Ammonium as NH ₄	µg/l	15	ISO 17025	230	140	940	7800	19000
Chemical Oxygen Demand (Total)	mg/l	2	ISO 17025	15	15	40	44	47
BOD (Biochemical Oxygen Demand)	mg/l	1	ISO 17025	1.1	4.8	< 1.0	6.3	4.0
Total Suspended Solids	mg/l	2	NONE	5.0	< 2.0	22	19	3.0

Speciated PAHs

Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	52.9	89.1
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	2.08	62.7	66.9
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	3.34	12.5	12.8
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	1.87	30.2	24.5
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	0.90	24.0	< 0.01
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	0.40	5.10	2.46
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	1.47	2.89	2.09
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	1.10	2.00	1.25
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Total PAH

Total EPA-16 PAHs	µg/l	0.16	NONE	< 0.16	< 0.16	11.2	192	199
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Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	0.15	ISO 17025	0.63	0.60	1.64	0.80	0.75
Beryllium (dissolved)	µg/l	0.1	ISO 17025	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Boron (dissolved)	µg/l	10	ISO 17025	49	48	49	49	82
Cadmium (dissolved)	µg/l	0.02	ISO 17025	0.03	0.05	< 0.02	< 0.02	0.05
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chromium (dissolved)	µg/l	0.2	ISO 17025	1.0	1.2	0.8	< 0.2	< 0.2
Copper (dissolved)	µg/l	0.5	ISO 17025	4.2	5.0	5.1	1.3	3.0
Lead (dissolved)	µg/l	0.2	ISO 17025	0.8	0.7	< 0.2	< 0.2	< 0.2
Manganese (dissolved)	µg/l	0.05	ISO 17025	6.8	6.1	0.46	280	490
Mercury (dissolved)	µg/l	0.05	ISO 17025	0.16	0.11	0.18	0.20	0.29
Nickel (dissolved)	µg/l	0.5	ISO 17025	2.2	2.6	6.1	19	62
Selenium (dissolved)	µg/l	0.6	ISO 17025	0.7	1.0	15	45	27
Vanadium (dissolved)	µg/l	0.2	ISO 17025	0.5	0.7	2.9	0.4	0.2
Zinc (dissolved)	µg/l	0.5	ISO 17025	6.7	3.8	0.7	2.8	3.1



Analytical Report Number: 15-84550

Project / Site name: Wrexham

Your Order No: HC15016-29180

Lab Sample Number				517862	517863	517864	517865	517866
Sample Reference				Upstream	Downstream	MW1	MW2	MW3
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				08/12/2015	08/12/2015	08/12/2015	08/12/2015	08/12/2015
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)				Units	Limit of detection	Accreditation Status		

Monoaromatics

Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	114	100
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	7.6	4.8
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	31.0	35.2
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	75.9	23.1
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >C5 - C6	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C6 - C8	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C8 - C10	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C5 - C7	µg/l	10	NONE	< 10	< 10	< 10	110	100
TPH-CWG - Aromatic >C7 - C8	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >C8 - C10	µg/l	10	NONE	< 10	< 10	< 10	160	110
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10	200	150
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	< 10	< 10	35	1300	960
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	< 10	< 10	61	130	32
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	96	1900	1400



Analytical Report Number: 15-84550

Project / Site name: Wrexham

Your Order No: HC15016-29180

Lab Sample Number				517862	517863	517864	517865	517866
Sample Reference				Upstream	Downstream	MW1	MW2	MW3
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				08/12/2015	08/12/2015	08/12/2015	08/12/2015	08/12/2015
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

VOCs

Chloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichlorofluoromethane	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cis-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-dichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,2-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-dichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	114	100
Tetrachloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromodichloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cis-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	7.6	4.8
1,1,2-Trichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromoethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	31.0	35.2
Styrene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tribromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	75.9	23.1
1,1,2,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	1.2
Bromobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
N-Propylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chlorotoluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chlorotoluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	14.5	5.9
Tert-Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	12.3
Sec-Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
P-Isopropyltoluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-chloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

U/S = Unsuitable Sample I/S = Insufficient Sample

Iss No 15-84550-1

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The results included within the report are representative of the samples submitted for analysis.

Page 4 of 8



Analytical Report Number: 15-84550

Project / Site name: Wrexham

Your Order No: HC15016-29180

Lab Sample Number				517867				
Sample Reference				MW4				
Sample Number				None Supplied				
Depth (m)				None Supplied				
Date Sampled				08/12/2015				
Time Taken				None Supplied				
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

General Inorganics

pH	pH Units	N/A	ISO 17025	7.9				
Total Cyanide	µg/l	10	ISO 17025	14				
Ammonium as NH ₄	µg/l	15	ISO 17025	480				
Chemical Oxygen Demand (Total)	mg/l	2	ISO 17025	13				
BOD (Biochemical Oxygen Demand)	mg/l	1	ISO 17025	1.0				
Total Suspended Solids	mg/l	2	NONE	< 2.0				

Speciated PAHs

Naphthalene	µg/l	0.01	ISO 17025	< 0.01				
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01				
Acenaphthene	µg/l	0.01	ISO 17025	32.3				
Fluorene	µg/l	0.01	ISO 17025	17.4				
Phenanthrene	µg/l	0.01	ISO 17025	14.3				
Anthracene	µg/l	0.01	ISO 17025	3.98				
Fluoranthene	µg/l	0.01	ISO 17025	1.36				
Pyrene	µg/l	0.01	ISO 17025	1.60				
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01				
Chrysene	µg/l	0.01	ISO 17025	< 0.01				
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01				
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01				
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01				
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE	< 0.01				
Dibenz(a,h)anthracene	µg/l	0.01	NONE	< 0.01				
Benzo(ghi)perylene	µg/l	0.01	NONE	< 0.01				

Total PAH

Total EPA-16 PAHs	µg/l	0.16	NONE	70.9				
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Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	0.15	ISO 17025	0.43				
Beryllium (dissolved)	µg/l	0.1	ISO 17025	< 0.1				
Boron (dissolved)	µg/l	10	ISO 17025	130				
Cadmium (dissolved)	µg/l	0.02	ISO 17025	0.02				
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0				
Chromium (dissolved)	µg/l	0.2	ISO 17025	< 0.2				
Copper (dissolved)	µg/l	0.5	ISO 17025	2.8				
Lead (dissolved)	µg/l	0.2	ISO 17025	< 0.2				
Manganese (dissolved)	µg/l	0.05	ISO 17025	830				
Mercury (dissolved)	µg/l	0.05	ISO 17025	0.16				
Nickel (dissolved)	µg/l	0.5	ISO 17025	2.3				
Selenium (dissolved)	µg/l	0.6	ISO 17025	1.2				
Vanadium (dissolved)	µg/l	0.2	ISO 17025	< 0.2				
Zinc (dissolved)	µg/l	0.5	ISO 17025	0.8				



Analytical Report Number: 15-84550

Project / Site name: Wrexham

Your Order No: HC15016-29180

Lab Sample Number				517867				
Sample Reference				MW4				
Sample Number				None Supplied				
Depth (m)				None Supplied				
Date Sampled				08/12/2015				
Time Taken				None Supplied				
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

Monoaromatics

Benzene	µg/l	1	ISO 17025	< 1.0				
Toluene	µg/l	1	ISO 17025	< 1.0				
Ethylbenzene	µg/l	1	ISO 17025	< 1.0				
p & m-xylene	µg/l	1	ISO 17025	< 1.0				
o-xylene	µg/l	1	ISO 17025	< 1.0				
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0				

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >C5 - C6	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C6 - C8	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C8 - C10	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic >C5 - C7	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic >C7 - C8	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic >C8 - C10	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	23				
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	340				
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	110				
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	470				



Analytical Report Number: 15-84550

Project / Site name: Wrexham

Your Order No: HC15016-29180

Lab Sample Number				517867				
Sample Reference				MW4				
Sample Number				None Supplied				
Depth (m)				None Supplied				
Date Sampled				08/12/2015				
Time Taken				None Supplied				
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

VOCs

Chloromethane	µg/l	1	ISO 17025	< 1.0				
Chloroethane	µg/l	1	ISO 17025	< 1.0				
Bromomethane	µg/l	1	ISO 17025	< 1.0				
Vinyl Chloride	µg/l	1	NONE	< 1.0				
Trichlorofluoromethane	µg/l	1	NONE	< 1.0				
1,1-dichloroethene	µg/l	1	ISO 17025	< 1.0				
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/l	1	ISO 17025	< 1.0				
Cis-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0				
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0				
1,1-dichloroethane	µg/l	1	ISO 17025	< 1.0				
2,2-Dichloropropane	µg/l	1	ISO 17025	< 1.0				
Trichloromethane	µg/l	1	ISO 17025	< 1.0				
1,1,1-Trichloroethane	µg/l	1	ISO 17025	< 1.0				
1,2-dichloroethane	µg/l	1	ISO 17025	< 1.0				
1,1-Dichloropropene	µg/l	1	ISO 17025	< 1.0				
Trans-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0				
Benzene	µg/l	1	ISO 17025	< 1.0				
Tetrachloromethane	µg/l	1	ISO 17025	< 1.0				
1,2-dichloropropane	µg/l	1	ISO 17025	< 1.0				
Trichloroethene	µg/l	1	ISO 17025	< 1.0				
Dibromomethane	µg/l	1	ISO 17025	< 1.0				
Bromodichloromethane	µg/l	1	ISO 17025	< 1.0				
Cis-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0				
Trans-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0				
Toluene	µg/l	1	ISO 17025	< 1.0				
1,1,2-Trichloroethane	µg/l	1	ISO 17025	< 1.0				
1,3-Dichloropropane	µg/l	1	ISO 17025	< 1.0				
Dibromochloromethane	µg/l	1	ISO 17025	< 1.0				
Tetrachloroethene	µg/l	1	ISO 17025	< 1.0				
1,2-Dibromoethane	µg/l	1	ISO 17025	< 1.0				
Chlorobenzene	µg/l	1	ISO 17025	< 1.0				
1,1,1,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0				
Ethylbenzene	µg/l	1	ISO 17025	< 1.0				
p & m-xylene	µg/l	1	ISO 17025	< 1.0				
Styrene	µg/l	1	ISO 17025	< 1.0				
Tribromomethane	µg/l	1	ISO 17025	< 1.0				
o-xylene	µg/l	1	ISO 17025	< 1.0				
1,1,2,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0				
Isopropylbenzene	µg/l	1	ISO 17025	< 1.0				
Bromobenzene	µg/l	1	ISO 17025	< 1.0				
N-Propylbenzene	µg/l	1	ISO 17025	< 1.0				
2-Chlorotoluene	µg/l	1	ISO 17025	< 1.0				
4-Chlorotoluene	µg/l	1	ISO 17025	< 1.0				
1,3,5-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0				
Tert-Butylbenzene	µg/l	1	ISO 17025	< 1.0				
1,2,4-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0				
Sec-Butylbenzene	µg/l	1	ISO 17025	< 1.0				
1,3-dichlorobenzene	µg/l	1	ISO 17025	< 1.0				
P-Isopropyltoluene	µg/l	1	ISO 17025	< 1.0				
1,2-dichlorobenzene	µg/l	1	ISO 17025	< 1.0				
1,4-dichlorobenzene	µg/l	1	ISO 17025	< 1.0				
Butylbenzene	µg/l	1	ISO 17025	< 1.0				
1,2-Dibromo-3-chloropropane	µg/l	1	ISO 17025	< 1.0				
1,2,4-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0				
Hexachlorobutadiene	µg/l	1	ISO 17025	< 1.0				
1,2,3-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0				

U/S = Unsuitable Sample I/S = Insufficient Sample

Iss No 15-84550-1

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The results included within the report are representative of the samples submitted for analysis.

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Analytical Report Number : 15-84550

Project / Site name: Wrexham

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Ammonium as NH ₄ in water	Determination of Ammonium/Ammonia/Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	ISO 17025
Biological oxygen demand of water	Determination of biochemical oxygen demand in water (5 days). Accredited matrices: SW, PW, GW.	In-house method based on standard method 5210B. Samples received > 24 hrs after sampling, data may not be valid and should be interpreted with care.	L086-PL	W	ISO 17025
Boron in water	Determination of boron by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM	L039-PL	W	ISO 17025
BTEX and MTBE in water	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
Chemical Oxygen Demand in Water (Total)	Determination of total COD in water by reflux oxidation with acidified K ₂ Cr ₂ O ₇ followed by colorimetry. Accredited matrices: SW, PW, GW.	HACH DR/890 Colorimeter Procedures Manual (48470-22) (Ref 0170.2)	L065-PL	W	ISO 17025
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	W	ISO 17025
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Monohydric phenols in water	Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
pH in water	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	ISO 17025
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L0102B-PL	W	NONE
Suspended solids in water	Determined gravimetrically with GFC filtration papers.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L004-PL	W	NONE
Total cyanide in water	Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-UK	W	NONE
Volatile organic compounds in water	Determination of volatile organic compounds in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073B-PL	W	ISO 17025

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

**Harry Russell**

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Analytical Report Number : 15-82881

Project / Site name:	Wrexham	Samples received on:	19/11/2015
Your job number:	HC15016	Samples instructed on:	20/11/2015
Your order number:	HC15016/29180	Analysis completed by:	Not complete
Report Issue Number:	1	Report issued on:	27/11/2015
Samples Analysed:	6 water samples		

Signed:

Rexona Rahman
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Signed:

Emma Winter
Assistant Reporting Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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Analytical Report Number: 15-82881

Project / Site name: Wrexham

Your Order No: HC15016/29180

Lab Sample Number				508671	508672	508673	508674	508675
Sample Reference				Upstream	Downstream	MW1	MW2	MW3
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				12/11/2015	12/11/2015	12/11/2015	12/11/2015	12/11/2015
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

General Inorganics

pH	pH Units	N/A	ISO 17025	8.9	8.6	11.2	8.5	8.2
Total Cyanide	µg/l	10	ISO 17025	< 10	< 10	64	85	230
Ammonium as NH ₄	µg/l	15	ISO 17025	< 15	< 15	1300	11000	29000
Chemical Oxygen Demand (Total)	mg/l	2	ISO 17025	15	16	33	40	72
BOD (Biochemical Oxygen Demand)	mg/l	1	ISO 17025	< 1.0	1.4	< 1.0	2.9	8.5
Total Suspended Solids	mg/l	2	NONE	4.0	2.0	18	22	28

Speciated PAHs

Naphthalene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	0.40	2.6	470
Acenaphthylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	1.5	32	59
Acenaphthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	4.1	9.5	14
Fluorene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	2.8	20	19
Phenanthrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	0.69	13	0.74
Anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	0.39	3.3	3.2
Fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	2.1	4.3	2.9
Pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	1.7	3.1	1.7
Benzo(a)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	1.1	< 0.01
Chrysene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	1.2	< 0.01
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	0.57	< 0.01
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	0.21	< 0.01
Benzo(a)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	0.45	< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Total PAH

Total EPA-16 PAHs	µg/l	0.2	ISO 17025	< 0.20	< 0.20	13.6	92.3	574
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Analytical Report Number: 15-82881

Project / Site name: Wrexham

Your Order No: HC15016/29180

Lab Sample Number				508671	508672	508673	508674	508675
Sample Reference				Upstream	Downstream	MW1	MW2	MW3
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				12/11/2015	12/11/2015	12/11/2015	12/11/2015	12/11/2015
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)				Units	Limit of detection	Accreditation Status		

Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	0.15	ISO 17025	0.51	0.57	1.88	1.00	1.87
Beryllium (dissolved)	µg/l	0.1	ISO 17025	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Boron (dissolved)	µg/l	10	ISO 17025	58	56	37	70	92
Cadmium (dissolved)	µg/l	0.02	ISO 17025	< 0.02	0.03	0.03	0.05	0.08
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Chromium (dissolved)	µg/l	0.2	ISO 17025	0.4	0.4	1.3	0.3	0.5
Copper (dissolved)	µg/l	0.5	ISO 17025	6.4	5.7	6.0	3.6	5.8
Lead (dissolved)	µg/l	0.2	ISO 17025	0.6	0.4	5.0	0.9	11
Manganese (dissolved)	µg/l	0.05	ISO 17025	14	10	1.4	450	690
Mercury (dissolved)	µg/l	0.05	ISO 17025	< 0.05	< 0.05	0.10	0.15	0.21
Nickel (dissolved)	µg/l	0.5	ISO 17025	4.4	4.5	13	27	39
Selenium (dissolved)	µg/l	0.6	ISO 17025	1.1	1.0	36	68	45
Vanadium (dissolved)	µg/l	0.2	ISO 17025	0.4	0.4	1.9	0.4	0.5
Zinc (dissolved)	µg/l	0.5	ISO 17025	4.1	5.7	0.9	3.5	5.6

Monoaromatics

Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	142	90.0
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	27.7	7.4
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	50.7	131
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	81.0	62.7
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >C5 - C6	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C6 - C8	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C8 - C10	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10

TPH-CWG - Aromatic >C5 - C7	µg/l	10	NONE	< 10	< 10	< 10	140	90
TPH-CWG - Aromatic >C7 - C8	µg/l	10	NONE	< 10	< 10	< 10	28	< 10
TPH-CWG - Aromatic >C8 - C10	µg/l	10	NONE	< 10	< 10	< 10	220	300
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	< 10	< 10	< 10	88	800
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	< 10	< 10	33	130	210
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	< 10	< 10	< 10	24	< 10
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	< 10	< 10	33	630	1400



Analytical Report Number: 15-82881

Project / Site name: Wrexham

Your Order No: HC15016/29180

Lab Sample Number				508671	508672	508673	508674	508675
Sample Reference				Upstream	Downstream	MW1	MW2	MW3
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Date Sampled				12/11/2015	12/11/2015	12/11/2015	12/11/2015	12/11/2015
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Water Analysis)				Units	Limit of detection	Accreditation Status		

VOCs

Chloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichlorofluoromethane	µg/l	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cis-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-dichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,2-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-dichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	142	90.0
Tetrachloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromodichloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cis-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	27.7	7.4
1,1,2-Trichloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromoethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	50.7	131
Styrene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tribromomethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	81.0	62.7
1,1,2,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
N-Propylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chlorotoluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chlorotoluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	20.7	13.6
Tert-Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	2.0	28.8
Sec-Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
P-Isopropyltoluene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-dichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Butylbenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-chloropropane	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

U/S = Unsuitable Sample I/S = Insufficient Sample

Iss No 15-82881-1

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The results included within the report are representative of the samples submitted for analysis.

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Analytical Report Number: 15-82881

Project / Site name: Wrexham

Your Order No: HC15016/29180

Lab Sample Number				508676				
Sample Reference				MW4				
Sample Number				None Supplied				
Depth (m)				None Supplied				
Date Sampled				12/11/2015				
Time Taken				None Supplied				
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

General Inorganics

pH	pH Units	N/A	ISO 17025	7.9				
Total Cyanide	µg/l	10	ISO 17025	11				
Ammonium as NH ₄	µg/l	15	ISO 17025	220				
Chemical Oxygen Demand (Total)	mg/l	2	ISO 17025	42				
BOD (Biochemical Oxygen Demand)	mg/l	1	ISO 17025	6.7				
Total Suspended Solids	mg/l	2	NONE	6.0				

Speciated PAHs

Naphthalene	µg/l	0.01	ISO 17025	5.3				
Acenaphthylene	µg/l	0.01	ISO 17025	10				
Acenaphthene	µg/l	0.01	ISO 17025	190				
Fluorene	µg/l	0.01	ISO 17025	85				
Phenanthrene	µg/l	0.01	ISO 17025	92				
Anthracene	µg/l	0.01	ISO 17025	22				
Fluoranthene	µg/l	0.01	ISO 17025	11				
Pyrene	µg/l	0.01	ISO 17025	10				
Benzo(a)anthracene	µg/l	0.01	ISO 17025	2.1				
Chrysene	µg/l	0.01	ISO 17025	3.4				
Benzo(b)fluoranthene	µg/l	0.01	ISO 17025	0.98				
Benzo(k)fluoranthene	µg/l	0.01	ISO 17025	0.84				
Benzo(a)pyrene	µg/l	0.01	ISO 17025	0.94				
Indeno(1,2,3-cd)pyrene	µg/l	0.01	ISO 17025	< 0.01				
Dibenz(a,h)anthracene	µg/l	0.01	ISO 17025	< 0.01				
Benzo(ghi)perylene	µg/l	0.01	ISO 17025	< 0.01				

Total PAH

Total EPA-16 PAHs	µg/l	0.2	ISO 17025	432				
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Analytical Report Number: 15-82881

Project / Site name: Wrexham

Your Order No: HC15016/29180

Lab Sample Number				508676				
Sample Reference				MW4				
Sample Number				None Supplied				
Depth (m)				None Supplied				
Date Sampled				12/11/2015				
Time Taken				None Supplied				
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	0.15	ISO 17025	2.20				
Beryllium (dissolved)	µg/l	0.1	ISO 17025	< 0.1				
Boron (dissolved)	µg/l	10	ISO 17025	120				
Cadmium (dissolved)	µg/l	0.02	ISO 17025	0.05				
Chromium (hexavalent)	µg/l	5	ISO 17025	< 5.0				
Chromium (dissolved)	µg/l	0.2	ISO 17025	0.3				
Copper (dissolved)	µg/l	0.5	ISO 17025	3.9				
Lead (dissolved)	µg/l	0.2	ISO 17025	0.3				
Manganese (dissolved)	µg/l	0.05	ISO 17025	710				
Mercury (dissolved)	µg/l	0.05	ISO 17025	0.05				
Nickel (dissolved)	µg/l	0.5	ISO 17025	4.1				
Selenium (dissolved)	µg/l	0.6	ISO 17025	1.4				
Vanadium (dissolved)	µg/l	0.2	ISO 17025	< 0.2				
Zinc (dissolved)	µg/l	0.5	ISO 17025	1.8				

Monoaromatics

Benzene	µg/l	1	ISO 17025	< 1.0				
Toluene	µg/l	1	ISO 17025	< 1.0				
Ethylbenzene	µg/l	1	ISO 17025	< 1.0				
p & m-xylene	µg/l	1	ISO 17025	< 1.0				
o-xylene	µg/l	1	ISO 17025	< 1.0				
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0				

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >C5 - C6	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C6 - C8	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C8 - C10	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10				
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10				

TPH-CWG - Aromatic >C5 - C7	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic >C7 - C8	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic >C8 - C10	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	1000				
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	2200				
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	210				
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10				
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	3400				



Analytical Report Number: 15-82881

Project / Site name: Wrexham

Your Order No: HC15016/29180

Lab Sample Number				508676				
Sample Reference				MW4				
Sample Number				None Supplied				
Depth (m)				None Supplied				
Date Sampled				12/11/2015				
Time Taken				None Supplied				
Analytical Parameter (Water Analysis)	Units	Limit of detection	Accreditation Status					

VOCs

Chloromethane	µg/l	1	ISO 17025	< 1.0				
Chloroethane	µg/l	1	ISO 17025	< 1.0				
Bromomethane	µg/l	1	ISO 17025	< 1.0				
Vinyl Chloride	µg/l	1	NONE	< 1.0				
Trichlorofluoromethane	µg/l	1	NONE	< 1.0				
1,1-dichloroethene	µg/l	1	ISO 17025	< 1.0				
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/l	1	ISO 17025	< 1.0				
Cis-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0				
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	ISO 17025	< 1.0				
1,1-dichloroethane	µg/l	1	ISO 17025	< 1.0				
2,2-Dichloropropane	µg/l	1	ISO 17025	< 1.0				
Trichloromethane	µg/l	1	ISO 17025	< 1.0				
1,1,1-Trichloroethane	µg/l	1	ISO 17025	< 1.0				
1,2-dichloroethane	µg/l	1	ISO 17025	< 1.0				
1,1-Dichloropropene	µg/l	1	ISO 17025	< 1.0				
Trans-1,2-dichloroethene	µg/l	1	ISO 17025	< 1.0				
Benzene	µg/l	1	ISO 17025	< 1.0				
Tetrachloromethane	µg/l	1	ISO 17025	< 1.0				
1,2-dichloropropane	µg/l	1	ISO 17025	< 1.0				
Trichloroethene	µg/l	1	ISO 17025	< 1.0				
Dibromomethane	µg/l	1	ISO 17025	< 1.0				
Bromodichloromethane	µg/l	1	ISO 17025	< 1.0				
Cis-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0				
Trans-1,3-dichloropropene	µg/l	1	ISO 17025	< 1.0				
Toluene	µg/l	1	ISO 17025	< 1.0				
1,1,2-Trichloroethane	µg/l	1	ISO 17025	< 1.0				
1,3-Dichloropropane	µg/l	1	ISO 17025	< 1.0				
Dibromochloromethane	µg/l	1	ISO 17025	< 1.0				
Tetrachloroethene	µg/l	1	ISO 17025	< 1.0				
1,2-Dibromoethane	µg/l	1	ISO 17025	< 1.0				
Chlorobenzene	µg/l	1	ISO 17025	< 1.0				
1,1,1,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0				
Ethylbenzene	µg/l	1	ISO 17025	< 1.0				
p & m-xylene	µg/l	1	ISO 17025	< 1.0				
Styrene	µg/l	1	ISO 17025	< 1.0				
Tribromomethane	µg/l	1	ISO 17025	< 1.0				
o-xylene	µg/l	1	ISO 17025	< 1.0				
1,1,2,2-Tetrachloroethane	µg/l	1	ISO 17025	< 1.0				
Isopropylbenzene	µg/l	1	ISO 17025	< 1.0				
Bromobenzene	µg/l	1	ISO 17025	< 1.0				
N-Propylbenzene	µg/l	1	ISO 17025	< 1.0				
2-Chlorotoluene	µg/l	1	ISO 17025	< 1.0				
4-Chlorotoluene	µg/l	1	ISO 17025	< 1.0				
1,3,5-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0				
Tert-Butylbenzene	µg/l	1	ISO 17025	< 1.0				
1,2,4-Trimethylbenzene	µg/l	1	ISO 17025	< 1.0				
Sec-Butylbenzene	µg/l	1	ISO 17025	< 1.0				
1,3-dichlorobenzene	µg/l	1	ISO 17025	< 1.0				
P-Isopropyltoluene	µg/l	1	ISO 17025	< 1.0				
1,2-dichlorobenzene	µg/l	1	ISO 17025	< 1.0				
1,4-dichlorobenzene	µg/l	1	ISO 17025	< 1.0				
Butylbenzene	µg/l	1	ISO 17025	< 1.0				
1,2-Dibromo-3-chloropropane	µg/l	1	ISO 17025	< 1.0				
1,2,4-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0				
Hexachlorobutadiene	µg/l	1	ISO 17025	< 1.0				
1,2,3-Trichlorobenzene	µg/l	1	ISO 17025	< 1.0				

U/S = Unsuitable Sample I/S = Insufficient Sample

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Analytical Report Number : 15-82881

Project / Site name: Wrexham

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Ammonium as NH ₄ in water	Determination of Ammonium/Ammonia/Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method. Accredited matrices SW, GW, PW.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	ISO 17025
Biological oxygen demand of water	Determination of biochemical oxygen demand in water (5 days). Accredited matrices: SW, PW, GW.	In-house method based on standard method 5210B. Samples received > 24 hrs after sampling, data may not be valid and should be interpreted with care.	L086-PL	W	ISO 17025
Boron in water	Determination of boron by acidification followed by ICP-OES. Accredited matrices: SW PW GW	In-house method based on MEWAM	L039-PL	W	ISO 17025
BTEX and MTBE in water	Determination of BTEX and MTBE in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073W-PL	W	ISO 17025
BTEX in water	Determination of BTEX in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073W-PL	W	ISO 17025
Chemical Oxygen Demand in Water (Total)	Determination of total COD in water by reflux oxidation with acidified K ₂ Cr ₂ O ₇ followed by colorimetry. Accredited matrices: SW, PW, GW.	HACH DR/890 Colorimeter Procedures Manual (48470-22) (Ref 0170.2)	L065-PL	W	ISO 17025
Hexavalent chromium in water	Determination of hexavalent chromium in water by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method by continuous flow analyser. Accredited Matrices SW, GW, PW.	L080-PL	W	ISO 17025
Metals in water by ICP-MS (dissolved)	Determination of metals in water by acidification followed by ICP-MS. Accredited Matrices: SW, GW, PW except B=SW,GW, Hg=SW,PW, Al=SW,PW.	In-house method based on USEPA Method 6020 & 200.8 "for the determination of trace elements in water by ICP-MS.	L012-PL	W	ISO 17025
Monohydric phenols in water	Determination of phenols in water by continuous flow analyser. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
pH in water	Determination of pH in water by electrometric measurement. Accredited matrices: SW PW GW	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L005-PL	W	ISO 17025
Speciated EPA-16 PAHs in water	Determination of PAH compounds in water by extraction in dichloromethane followed by GC-MS with the use of surrogate and internal standards. Accredited matrices: SW PW GW	In-house method based on USEPA 8270	L070-UK	W	ISO 17025
Suspended solids in water	Determined gravimetrically with GFC filtration papers.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L004-PL	W	NONE
Total cyanide in water	Determination of total cyanide by distillation followed by colorimetry. Accredited matrices: SW PW GW	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	ISO 17025
TPHCWG (Waters)	Determination of dichloromethane extractable hydrocarbons in water by GC-MS, speciation by interpretation.	In-house method	L070-UK	W	NONE
Volatile organic compounds in water	Determination of volatile organic compounds in water by headspace GC-MS. Accredited matrices: SW PW GW	In-house method based on USEPA8260	L073W-PL	W	ISO 17025

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

**Mark Dodd**

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Analytical Report Number : 15-78732

Project / Site name:	Wrexham	Samples received on:	11/09/2015
Your job number:	HC15016	Samples instructed on:	11/09/2015
Your order number:	HC15016/29180	Analysis completed by:	21/09/2015
Report Issue Number:	1	Report issued on:	21/09/2015
Samples Analysed:	6 water samples		

Signed:

Rexona Rahman
Reporting Manager
For & on behalf of i2 Analytical Ltd.

Other office located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

Excel copies of reports are only valid when accompanied by this PDF certificate.

Signed:

Emma Winter
Assistant Reporting Manager
For & on behalf of i2 Analytical Ltd.

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting