Sure Partners Limited

ARKLOW BANK WIND PARK
PHASE 2
ONSHORE GRID INFRASTRUCTURE

VOLUME III
Chapter 9 APPENDICES

Appendix 9.1i GI Reports - GII Avoca River Park Phase 2 Environmental Assessment

Appendix 9.1i

Phase 2 Environmental Assessment

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

Catherinestown House,
Hazelhatch Road,
Newcastle,
Co. Dublin.
D22 YD52

Tel: 01 601 5175 / 5176
Email: info@gii.ie
Web: www.gii.ie

Ground Investigations Ireland

Avoca River Park

Phase 2 Environmental Assessment Avoca River Park

September 2020

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Newcastle,
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Tel: 01 601 5175 / 5176
Email: info@gii.ie
Web: www.gii.ie

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1.0 Preamble

On the instructions of FT Squared, Ground Investigations Ireland Limited (GII) completed a Phase I Environmental Site Assessment (ESA) and general compliance review of a site at Avoca River Park Industrial Estate, Arklow, County Wicklow. The findings of the Phase 1 report recommended that further assessment of the site was required to assess the potential for environmental liabilities associated with the site including subsoil, ground water and surface water quality.

GII undertook an intrusive site investigation to further assess potential liabilities identified in the Phase 1 report between December 2019 and June 2020.

2.0 Purpose & Scope

It is understood that as part of the proposed development there may be an excavation to accommodate foundations, services, roadways and pavements. An assessment was required to assess the potential environmental and human health exposure risk associated with any on site contamination as well as the potential disposal outlets for material excavated as part of any excavations. The environmental assessment was carried in parallel with a wider geotechnical site investigation. GII understand that the proposed end use of the site will be commercial.

The purpose of the environmental assessment was as follows.

- Assess the quality of the groundwater, subsoils and surface water at the site;

- Classification, in terms of waste management and final disposal outlets, of material that may require disposal following excavation during the construction phase; and

- Assessment of the suitability for any material left on site for the proposed use following development through comparison of data against generic assessment criteria.

The scope of the work undertaken to facilitate the environmental assessment exercise included the following:

- Excavation of thirty (30 No.) trial pits;
- Boring of sixteen (16 No.) cable percussion boreholes;
- Boring of seven (7 No.) rotary core boreholes;
- Installation of six (6 No.) groundwater wells;
- Collection of subsoil samples for chemical analysis;
- Collection of groundwater samples;
- Collection of surface water samples;
- Environmental laboratory testing;
- Waste classification; and
- Generic Environmental Risk Assessment.

3.0 Limitations

GII has prepared this report for the sole use of FT Squared. No other warranty, express or implied, is made as to the professional advice included in this report or other services provided by GII.

The conclusions and recommendations contained in this report are based upon information provided by others and the assumption that all relevant information has been provided by those bodies from whom it has been requested. Information obtained from third parties has not been independently verified by GII, unless otherwise stated in this report.

This report has been prepared in line with best industry standards and within the project’s budgetary and time constraints. The methodology adopted and the sources of information used by GII in providing its services are outlined in this report.

The work described was undertaken between December 2019 and June 2020, this report is based on the conditions encountered and the information available during that period. The scope of this Report and the services are accordingly factually limited by these circumstances.

Site investigations locations were selected by the consultant engineer.

GII disclaim any undertaking or obligation to advise any person of any change in any matter affecting the Report, which may come or be brought to GII’s attention after the date of the Report.

The conclusions presented in this report represent GII’s best professional judgement based on review of site conditions observed during any site visit and the relevant information available at the time of writing. The opinions and conclusions presented are valid only to the extent that the information provided was accurate and complete.

The investigation was focused on a broad assessment of the subsoil and groundwater quality across the site. There was no access to the electrical compound in the northern section of the site and also there was no access to the Harmony Timber Buildings.

The assessment is reflective of and applicable to the site’s ground conditions at the time of the site investigation and sampling. Alterations to the ground conditions or any further excavations carried out on site following the investigation are not reflected in this report.

4.0 Site Description

4.1. Site Location & Layout

The site, which is the subject of the Phase I ESA, is located at the Avoca River Park Industrial Estate, approximately 2.5km to the north west of Aughrim, County Wicklow (Figure 1 – Appendix 1). The area of the site is approximately 13.7 hectares. The site is divided by the “Shelton Abbey Canal” which runs from north west to south east across the site.

The northern section of the site is comprised of a large open asphalt paved area. There is a fenced off ESB compound located in the western section of this area. The compound houses various electrical supply infrastructure.

The southern section of the site is comprised of an open asphalt paved area with several industrial buildings located in its western section. The industrial units are in use by Harmony Timber Solutions. Harmony Timber Solutions manufacture various timber products for the construction industry including joists and roof trusses. The yard surrounding the industrial units, at the time of the inspection, was being used for the storage of various timber products.

The lands to the east of the site are made up of grassed fields which are closed landfills. The site is bounded to the south by an earth embankment/berm with the Avoca River immediately to the south of the embankment.

There was no visual evidence of waste deposited on site or the storage of any hazardous substances. There was no evidence of discoloration of any of the surface material at the time of inspection.

4.2. Site History

GII carried out a review of the on-line database of historical maps held by the (OSI). These included the 6-inch maps that were produced between 1829 and 1842, the 25-inch maps that were produced between 1888 and 1913 and the 6-inch Cassini Maps that were produced between the 1830's and 1930's (Figures 2 to 4). The site is farmland on all historical maps. The Shelton Abbey Canal is present on all historical maps viewed.

GII reviewed the aerial photograph record between 1995 and present day (OSI and Google Imagery). The aerial photographs show the site in industrial use on all available aerial images. The site appears to have been paved in asphalt or concrete since at least 1995. The Harmony Timber buildings are present all aerial images. There are a number of tanks located in the eastern and southern section of the site which appear to have been demolished and removed between 1995 and the present day.

GII also reviewed a 2011 Risk Assessment Report (Appendix 2) for the below summary of the site's history. [1] The site had previously been in the ownership of Irish Fertilizer Industries (IFI). IFI was a joint venture company formed by the state company Nitrigin Eireann Teoranta (NET) and ICI plc, which operated three manufacturing facilities in Cork, Belfast and Arklow. The main products manufactured at Arklow were Calcium Ammonium Nitrate (CAN) and blends. Other nutrients, which complemented the range of fertiliser products were imported and blended as required. Nitric acid was produced mainly as an intermediate, although there was a minor acid sales business. Facility operations required a typical range of services, including water treatment system generation, laboratory activities and storage of raw materials, intermediates, products and ancillary materials.

IFI was granted an IPC license in January 1997. A revised license was issued in March 2000 which approved significant process changes. In 2002 fertiliser manufacturing stopped and in 2005 following the purchase of the site the license was transferred to Holfeld Plastics. Following acquisition by Holfeld the final

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[1] OCM, Environmental Risk Assessment, Holfeld Plastics, Former Irish Fertilizer Industries Site, Arklow, County Wicklow, June 2011.

decommissioning of the fertiliser manufacturing area and general cleanup was completed. The former bulk storage sheds were refurbished. Environmental liabilities identified by IFI resulted in the following remedial actions being undertaken.

- Decommissioning and removal of production plant;
- Hazardous waste disposal;
- Refurbishment of bulk storage sheds;
- Removal of asbestos roofing;
- Excavation and removal of diesel oil contaminated soils;
- Excavation and removal of PCB contaminated soils; and
- General clean up, reinstatement and landscaping of the site.

In October 2011 an application was made to the EPA to amend the extent of the licence boundary area. At that stage the boundary was amended to remove the study site from the licenced area. The application was approved by the EPA in 2012 (Appendix 3).

As part of the application process an assessment was completed on the natural attenuation of the groundwater contamination which had been associated with the former production processes on site. The risk assessment concluded that “the environmental risk associate with the Production Area is insignificant”.[2]

Based on a review of the 2011 AER for the Holfeld Plastics site (Appendix 4) the lands immediately to the south east of the site are comprised of closed landfills. Historical landfill operations at the site can be separated into three main categories as follows:

1. Disposal of phosphogypsum wastes from the production of phosphoric acid;
2. Disposal of carbon from the ammonia plant; and
3. Disposal of general plant wastes.

A summary of the waste despotised at these landfills is summarised as follows:[3]

Phosphogypsum Wastes

Phosphogypsum wastes were produced during the manufacture of phosphoric acid. The phosphogypsum pond was constructed by the use of soil bunds around the perimeter of the pond and the natural alluvial clay and peat deposits formed the base of the pond. The phosphogypsum slurry was pumped to the pond where the phosphogypsum was allowed to settle with the water being drained from the pond by a series of drainage pipes through the bund and discharging into the drainage canal running through the landfill area.

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[2] OCM, Environmental Risk Assessment, Holfeld Plastics, Former Irish Fertilizer Industries Site, Arklow, County Wicklow, June 2011 - page 34.

[3] 2011 Annual Environmental Report, Holfeld Plastics Limited, P0031-02.

The gypsum pond was used for approximately 6 years (1967 - 1973) until the capacity was exhausted. At this time phosphogypsum wastes were diverted to the carbon pond which had been constructed by similar means immediately to the south of the phosphogypsum pond. The pond was covered with up to 0.6 metres of shale and topsoil and grassed.

Carbon Wastes

Carbon wastes, produced during the manufacture of ammonia, were diverted in slurry form to the carbon pond that had been constructed in the south-western corner of the landfill area. The carbon pond was constructed in a similar fashion to the phosphogypsum pond with soil embankments and the surface water was disposed of by drainage to the canal and by seepage into the ground. When exhausted the carbon pond was covered with up to 0.6 metres of shale and topsoil and grassed. Additional material made available during construction of the Arklow by-pass has been added bringing the total depth of cover material to 1 to 2 metres.

General Site Wastes

General solid wastes from the Site have been disposed of in two landfill areas immediately to the east of the phosphogypsum and carbon ponds, the Eastern Landfill, North and South. Wastes disposed of in these areas have historically included excavated clay, plastic bags, insulating materials, concrete blocks, bricks, canteen wastes, dredgings from the drainage canals and effluent lagoon. The Northern Section also includes quantities of iron oxide cinder arising from the manufacture of sulphuric acid from local iron pyrite from the Avoca mines during the period 1972 to 1980. The Eastern Landfill areas were constructed with either clay or shale embankments around the perimeters and the base being provided by the natural alluvial clay and peat deposits. The Northern Section was closed and capped with shale and topsoil in 1984, after which time waste disposal activities started in the Southern Section. The western half of the Southern Section was completed in 1994/95 to allow construction of the Arklow by-pass with the Eastern Section in use until May 2001 for disposal of inert Site wastes. Capping work on the Eastern Section was completed in September 2002.

A summary of the volumes of waste deposited at each of the landfill sections are: [4]

1. Phosphogypsum Pond - 55,847 m^3 of gypsum
2. Carbon/Phosphogypsum Pond - 137,801 m^3 of gypsum and approximately 19,080 m3 of carbon black
3. Northern Landfill - approximately 130,000 m^3 of waste
4. Southern Landfill – approximately 59,588 m^3
5. Western Landfill (Phase1) – approximately 2501 m^3

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[4] 2011 Annual Environmental Report, Holfeld Plastics Limited, P0031-02.

4.3. Geology & Hydrogeology

GII obtained information relating to the local and regional geology and hydrogeology as part of the desk study phase. GII reviewed the Geological Survey of Ireland (GSI) geology databases and the Eastern River Basin District (SRBD) Management Plan.

The local subsoil distribution is shown on Figure 5. The site is described in the GSI Quaternary mapping as being Alluvium (A). Based on previous site investigations and subsequent reports the alluvium is underlain by Gravels to a depth of up to 24m.[5] The bedrock underlying the site is the Kilmacrea Formation (Figure 6). The Kilmacrea Formation is comprised of dark grey slate with minor pale sandstone.

The GSI has developed a classification system for aquifers based on the value of the resource and their hydrogeological characteristics. The site is underlain by the Arklow Gravel Aquifer which is classified as a locally important gravel aquifer (Lg). The bedrock aquifer beneath the site (the Kilmacrea Formation) is classified as a Locally Important Bedrock Aquifer (Figure 7) which is moderately productive only in local zones (Ll).

The GSI have developed a system that ranks an aquifer is terms of the intrinsic geological and hydrogeological characteristics that determine the ease with which that aquifer may be contaminated by human activities. The GSI have through this system assigned a “vulnerability” category to each aquifer nationwide. The vulnerability of groundwater depends on:

- The time of travel of infiltrating water (and contaminants);
- The relative quantity of contaminants that can reach the groundwater; and
- The contaminant attenuation capacity of the geological materials through which the water and contaminants infiltrate.

The depth of subsoil and the subsoil type overlying the aquifer are directly linked to the vulnerability. The GSI vulnerability map indicates that aquifer vulnerability at the site is moderate (Figure 8).

The Eastern River Basin District (ERBD) Management Plan identifies that the groundwater body (GWB) beneath the site is part of the Dublin Urban Groundwater Body (IE_EA_10_1611). The GWB Report, which is in Appendix 5, indicates the status of the water body is ‘Good’.

A review of the GSI groundwater well database found no record of any public water supply or drinking water protection zones within 1km of the site. There are no recorded wells located downgradient of the site.

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[5] OCM, Environmental Risk Assessment, Holfeld Plastics, Former Irish Fertilizer Industries Site, Arklow, County Wicklow, June 2011 – page 10.

4.4. Hydrology

The closest surface water feature to the site is the Avoca River which is located adjacent to the southern site boundary. The Shelton Abbey Canal runs though the central section of the site towards the south east and the Avoca River. Surface water runoff from the site enters the canal.

The site lies within the Avoca Lower surface water body (SWB) catchment area (IE_EA_10_1611). The WFD SWB Report is in Appendix 5. The overall status of this waterbody is 'Good". The River Body section directly upstream of the site is the Upper Avoca River (IE_EA_10_1477). The GWB report for this section indicates that the status of the water body is Bad. This s related to the closed Avoca Mines acid mines discharge to the River.

4.5. Ecologically Sensitive/Designated Areas

GII completed a review of the National Parks and Wildlife Services (NPWS) databases. A summary of the surrounding protected areas is presented in Table 1 and Figures 9 & 10. There are no protected areas within 5km of the site. The Arklow Town marsh which is a proposed natural heritage area is located 600m to the east and downstream of the site.

Table 1 Protected Area Summary

Site ID	Type	Site Code	Distance (m)
Arklow Town Marsh	Proposed Natural Heritage Area	001931	600m to the east
Wicklow Head	Special Protection Area	004016	20km north east
Cahore Marshes	Special Protection Area	004006	28km south east
Buckroney-Brittas Dunes and Fen	Special Area of Conservation	000729	5.2km north east
Kilpatrick Sandhills	Special Area of Conservation	001742	8.2km south east

4.6. Radon

A review of the EPA national radon map was carried out. The radon map is broken into 10km^2 grids. Each grid is ranked based on the percentage of dwellings within that grid where radon is present at levels greater than 200 Becquerel per metre cubed (Bq/m^3). The radon map has five categories: less than 1 %, 1 to 5 %, 5 to 10 %, 10 to 20 % and greater than 20 %. The subject site is located within a grid where 1 to 5% of the residences will have radon levels greater than 200Bq/m^3, making it relatively low risk for radon (Figure 11).

4.7. Planning Data

GII carried out a review of the Wicklow County Council online planning system. There have been several planning applications and permissions recorded between 1989 and 2019. The most recent application was for the demolition of the existing buildings and construction of three data centre buildings. The planning applications recorded on the Council database are summarised in Table 2. GII reviewed a 2018 EIAR which was prepared by AECOM as part of the 2019 application for a data centre.

Table 2 Planning Applications

Applicant Name	Proposed Works or Change of Use	Decision Date	Decision
Irish Fertilizer Ind Ltd	Welfare facilities building and septic tank	21/07/1989	Decision not listed on records
Irish Fertilizer Ind Ltd	extension to switch and control room	17/12/1991	Decision not listed on records
Power & Energy Holdings (ROI) Ltd	The development of a Simple Cycle Gas Turbine peaking power station on a site of approx 4.25 hectares at the former Irish Fertilisers Industries Ltd site at the Avoca River Park, in the townland of Shelton, Arklow, Co. Wicklow.	09/11/2008	Granted with conditions
Crosbie Transcar Ltd	palisade fencing to site boundaries and the retention of 3 no buildings (port cabins) together with all associated site works	25/03/2009	Granted with conditions
Restwing Trading Ltd	change of use of existing industrial unit to plastic waste recycling facility	30/06/2015	Granted with conditions
Edmund Holfeld	extend the appropriate period of a permission - 08/468 - Simple Cycle Gas Turbine peaking power station on a site of approx 4.25 hectares at the former Irish Fertilisers Industries Ltd site at the Avoca River Park, in the townland of Shelton, Arklow, Co.	18/07/2018	Extension Granted
Crag Digital Avoca Ltd	demolition of buildings & structures on site & construction of Data Storage Facility comprising 3 data storage buildings & all associated site infrastructure: data storage facility 1 (6 Pod Data Centre) located to north of site served by 1 gas generator compo	20/02/2019	Granted with conditions

4.8. Flood Risk

The Office of Public Works (OPW) has produced flood risk maps that identify areas that may be susceptible to flooding during extreme events. The draft flood maps are predictive flood maps, as they provide predicted flood extent and other information for a design flood event that has an estimated probability of occurrence rather than information of floods that have occurred in the past. The maps identify the risk from fluvial and coastal flooding. The OPW rates risk in terms of %. These percentages are linked to return events or chance of occurrence in any given year:

- 10% - 1 in 10 chance in any given year;
- 1% - 1 in 100 chance in any given year; and
- 0.1% - 1 in 1,000 chance in any given year.

They are also commonly referred to in terms of a return period (e.g., the 100-year flood event), although it should be understood that this does not mean the length of time that will elapse between two such events occurring, as, although unlikely, two or more very severe events may occur within a very short space of time. GII reviewed these maps and it appears from the maps that the site is not at risk from flooding, this is likely due to the presence of a berm between the site and the Avoca River. The lands to the south east of the site which are comprised of the landfill sections appear to lie within an area at risk from both fluvial and coastal flooding (appendix 6).

The 2018 Aecom EIAR included a site-specific flood risk assessment. The report concluded that “the site is protected from flooding by the existing flood defense embankment up to an including the 0.1AEP event (1,000 year)”.[6]

The report as part of flood mitigation recommends a that the embankment is regularly inspected and maintained. The report does not include an assessment of the current condition or structural integrity of the embankment. GII did not encounter documentation in relation to the construction of the berm which is acting as a flood barrier for the site. GII did not encounter any report in relation to the stability of the berm.

4.9. Phosphogypsum Wastes

Landfilling of phosphogypsum waste occurred on the wider fertilizer site between 1967 and 1973 in the gypsum ponds until the pond’s capacity was exhausted. Further landfilling of the phosphogypsum waste was continued at the carbon pond. The cessation date for landfilling of phosphogypsum waste is not known. In this case the phosphogypsum was a by-product of the manufacture of phosphoric acid. Phosphogypsum contains naturally occurring radioactive material (NORM) in the form of uranium and thorium and their associated daughter products. GII have not found any record of any radioactivity survey completed at the site or any assessment of the potentially radioactivity of the material landfilled on site. The areas of

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[6] Avoca River Park, Environmental Impact Assessment Report, Volume 1: Non-technical Summary, August 2018.

landfilling are not located within the study site but is located within the lands immediately adjacent and to the east of the site. The areas where the phosphogypsum material has been landfilled are presented in Figure 13.[7]

5.0 Subsurface Exploration

5.1. General

During the ground investigation a programme of intrusive investigation specified by the Consulting Engineer was undertaken to determine the sub surface conditions at the proposed site. Regular sampling and in-situ testing was undertaken in the exploratory holes to facilitate the geotechnical descriptions and to enable laboratory testing to be carried out on the soil samples recovered during excavation and drilling.

The procedures used in this site investigation are in accordance with Eurocode 7 Part 2: Ground Investigation and testing (ISEN 1997 – 2:2007) and B.S. 5930:2015.

5.2. Trial Pits

The trial pits were excavated using either a 6T or 13T tracked excavator at the locations shown in Figure 14. The locations were checked using a CAT scan to minimise the potential for encountering services during the excavation. The trial pits were sampled, logged and photographed by a Geotechnical Engineer/Engineering Geologist prior to backfilling with arisings. Notes were made of any services, inclusions, pit stability, groundwater encountered and the characteristics of the strata encountered and are presented on the trial pit logs which are provided in Appendix 7 of this Report.

5.3. Cable Percussion Boreholes

The Cable Percussion Boreholes were drilled at the locations shown in Figure 15 using a Dando 2000 drilling rig with regular in-situ testing and sampling undertaken to facilitate the production of geotechnical logs and laboratory testing.

The standard method of boring in soil for site investigation is known as the Cable Percussion method. It consists of using a Shell in non-cohesive soils and a clay cutter in cohesive soils, both operated on a wire cable. Very hard soils, boulders and other hard obstructions are broken up by chiselling and the fragments removed with the Shell. Where ground conditions made it necessary, the borehole was lined with 200mm diameter steel casing. While the use of the Cable Percussion method of boring gives the maximum data on soil conditions, some mixing of laminated soil is inevitable. For this reason, thin lenses of granular material may not be noticed. Disturbed samples were taken from the boring tools at suitable depths, so that there is a representative sample at the top of each change in stratum and thereafter at regular intervals down the borehole until the next stratum was encountered. The disturbed samples were then sealed and sent to the laboratory where they were visually examined to confirm the description of the relevant strata.

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[7] As adopted from the Byrne Looby Report PH McCarthy Report - Irish Water & Wicklow County Council Arklow Wastewater Treatment Plant Site Assessment Report – Phase 2, May 2015

Standard Penetration Tests were carried out in the boreholes. The results of these tests, together with the depths at which the tests were taken are shown on the accompanying borehole records. The test consists of a thick wall sampler tube, 50mm external diameter, being driven into the soil by a monkey weighing 63.5kg and with a free drop of 760mm. For gravels and glacial till the driving shoe was replaced by a solid 60º cone. The Standard Penetration Test number referred to as the ‘N’ value is the number of blows required to drive the tube 300mm, after an initial penetration of 150mm. The number gives a guide to the consistency of the soil and can also be used to estimate the relative strength/density at the depth of the test and also to estimate the bearing capacity and compressibility of the soil. The cable percussion borehole logs are provided in Appendix 8 of this Report.

5.4. Rotary Boreholes

The rotary coring was carried out by a track mounted T44 Beretta rig at the locations shown in Figure 15. The rotary boreholes were completed from the ground surface or alternatively, where noted on the individual borehole log, from the base of the cable percussion borehole where a temporary liner was installed to facilitate follow-on rotary coring.

The T44 Beretta is equipped with rubber tracks which allow for short travel on pavement surfaces avoiding any damage to the surface. The T44 Beretta utilises a triple tube core barrel system operated using a wireline drilling process. The outer barrel is rotated by the drill rods and at its lower end, carries the coring bit. The inner barrel is mounted on a swivel so that it does not rotate during the process. The third barrel or liner is placed within the second one to retain the core intact and to preserve as much as possible the fabric of the drilling stratum. The core is cut by the coring bit and passes to the inner liner. The core is brought up to the surface within the inner barrel on a small diameter wire rope or line attached to the “overshoot” recovery tool which is then placed into a core box in order of recovery. A drilling fluid, typically air mist or water flush is passed from the surface through hollow drill rods to the drill bit, and is used to cool the drill bit. Temporary casing is used in some situations to support unstable ground or to seal off fissures or voids. It should be noted that the rotary coring can only achieve limited recovery in overburden, particularly granular or weakly cemented strata due to the flushing medium washing away the cohesive fraction during coring. The recovery achieved, where required is noted on the borehole logs and core photographs are provided to allow assessment of the core recovered. The rotary borehole logs are provided in Appendix 8 of this Report.

5.5. Surveying

The exploratory hole locations have been recorded using a Trimble R10 GNSS System which records the coordinates and elevation of the locations to ITM or Irish National Grid as required by the project specification. The coordinates and elevations are provided on the exploratory hole logs in the appendices of this Report.

5.6. Groundwater/Gas Monitoring Installations

Groundwater Monitoring Installation were installed upon the completion of the boreholes RC-02, 03, 06, 10, 12 and 14 to enable sampling and the determination of the equilibrium groundwater level. The groundwater wells were screened in the gravels to allow measurement of the groundwater head and assessment of the groundwater quality in the gravels. The material overlying the gravels in most cases was not significantly water bearing. The groundwater monitoring installation consists of a 50mm HDPE slotted pipe with a pea gravel response zone and bentonite seal installed to the Engineers specification. Where required the standpipe is sealed with a gas tap and finished with a durable steel cover fixed in place with a concrete surround. The installation details are provided on the exploratory hole logs in the appendices of this Report. Groundwater level monitoring has not been completed for the finished wells. Groundwater samples have not been collected from the groundwater wells.

6.0 Ground Conditions

6.1. General

The ground conditions encountered during the investigation are summarised below with reference to insitu and laboratory test results. The full details of the strata encountered during the ground investigation are provided in the exploratory hole logs included in the appendices of this report.

The sequence of strata encountered were consistent across the site and are generally comprised;

- Surfacing/Tarmacadam
- Cohesive Deposits
- Granular Deposits
- Weathered Bedrock
- Bedrock

SURFACING/TARMACADAM: Surfacing was generally comprised concrete or tarmacadam and was present to a maximum depth of 0.1m. This was encountered in the majority of exploratory holes. Tarmacadam was present typically to a depth of 0.07m to 0.09m BGL. In TP01, TP21, TP22, TP24 and TP25 a layer of tarmacadam was encountered within the made ground deposits.

MADE GROUND: Made Ground deposits were encountered beneath the Surfacing and were present to a depth of between 0.6m and 2.4m BGL. These deposits were described generally as *grey, slightly silty, sandy, GRAVEL with occasional fragments of concrete, red brick, glass and plastic.*

COHESIVE DEPOSITS: Cohesive deposits were encountered beneath the Made Ground and they can broadly be divided into an upper clay/silt layer and a lower layer containing peat. The deposits were described typically as a grey *brown CLAY/SILT* overlying a *lower layer containing PEAT/ CLAYEY PEAT*.

The peat encountered can generally be described as a brown to dark brown soft fibrous peat. The strength of the cohesive deposits was very soft to soft in the majority of the exploratory holes. There was occasional sand and gravel lenses present with in the upper cohesive deposits.

GRANULAR DEPOSITS: The granular deposits were encountered within and below the base of the cohesive deposits and were typically described as *Grey brown medium dense to dense sandy sub rounded to sub angular fine to very coarse GRAVEL with occasional cobbles and rare boulders.* The secondary sand/gravel and silt/clay constituents varied across the site and with depth while occasional or frequent cobble and boulder content also present where noted on the exploratory hole logs.

BEDROCK: The GSI Mapping Database indicates that the bedrock underlying the site is the Kilmacrea Formation. The Kilmacrea Formation is described as Ordovician Metasediments comprised dark grey slate and minor pale sandstone. The rotary core boreholes recovered consists of a weak to medium strong thinly laminated grey SLATE.

7.0 Subsoil Laboratory Testing

In order to assess materials, which may be excavated and removed from site, in terms of waste classification, a selection of samples collected were analysed for a suite of parameters which allows for the assessment of the soils in terms of total pollutant content for classification of materials as *hazardous* or *non-hazardous* (RILTA Suite). The suite also allows for the assessment of the soils in terms of suitability for placement at various categories of landfill. The parameter list for the RILTA suite includes analysis of the solid samples for arsenic, barium, cadmium, chromium, copper, cyanide, lead, nickel, mercury, zinc, speciated aliphatic and aromatic petroleum hydrocarbons, pH, sulphate, sulphide, moisture content, soil organic matter and an asbestos screen.

The total pollutant content analysis also provides analytical data which can be used to assess the quality of the subsoils underlying the site and allow an assessment of their suitability for a range of proposed uses against generic assessment criteria.

The RILTA suite also includes those parameters specified in the EU Council Decision establishing criteria for the acceptance of waste at Landfills (Council Decision 2003/33/EC), which for the solid samples are pH, total organic carbon (TOC), speciated aliphatic and aromatic petroleum hydrocarbons, BTEX, phenol, polychlorinated biphenyls (PCB) and PAH.

In line with the requirement of Council Decision 2003/33/EC a leachate was generated from the solid samples which was in turn analysed for antimony, arsenic, barium, cadmium, chromium, copper, lead, mercury, molybdenum, nickel, selenium, zinc, chloride, fluoride, soluble sulphate, sulphide, phenols, dissolved organic carbon (DOC) and total dissolved solids (TDS). The laboratory testing was competed by Element Materials Technology (EMT) in the UK; EMT is a UKAS accredited laboratory. The full laboratory reports are included in Appendix 9.

7.1. Hydrocarbons

Petroleum hydrocarbons were encountered in various locations across the site. Significantly elevated levels of hydrocarbons were detected in the samples TP-19 and 29.

7.2. PCBS

PCBs were detected in the made ground samples at TP-13, 16, 19, 20 and 29. The highest level detected was 3.715 mg/kg at TP-20.

7.3. Metals

Significantly elevated levels of the metals Arsenic, Copper, Lead and Zinc were detected in the "red Fertiliser by-product" material encountered at several trial pit including TP-08, 09 and 13. The highest level of arsenic detected was 1,658 mg/kg at TP-08. The highest level of lead detected was 1,633 mg/kg at TP-13, the highest level of copper detected was 6,327 mg/kg at TP-13. The highest level of zinc detected was 4,572 mg/kg at TP-08.

7.4. Asbestos

Asbestos fibres were detected in the samples TP-20 at 0.5m and 1.5m, TP-24 at 0.5m and TP-29 at 1.5m. The asbestos type in all cases was chrysotile and the levels detected were below the laboratory detection limit of <0.001%. The laboratory did **not** identify asbestos containing materials (ACMs) in the samples. The level detected in all cases was below the hazardous level of 0.1%[8].

8.0 Waste Classification

GII understands that any materials which may be excavated from site would meet the definition of waste under the Waste Framework Directive. This may not be the case at the time of excavation when all or some of the materials may have been declared a by-product in line with Article 27 of the European Communities (Waste Directive) Regulations 2011[9].

Excess soil and stone resulting from excavation works (the primary purpose of which is not the production of soil and stone) may be declared a by-product if all four by-product conditions are met.[10]

a) further use of the soil and stone is certain;

b) the soil and stone can be used directly without any further processing other than normal industrial practice;

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[8] Environment Agency (2018). Technical Guidance WM3 - Guidance on the classification and assessment of waste (1st Edition V1.1 May 2018) Technical Guidance WM3 – page 19.

[9] S.I. No. 126/2011 - European Communities (Waste Directive) Regulations 2011 (Article 27).

[10] Irish EPA (June 2019), Guidance on Soil and Stone By-Products.

c) the soil and stone is produced as an integral part of a production process; and

d) further use is lawful in that the soil and stone fulfils all relevant requirements for the specific use and will not lead to overall adverse environmental or human health impacts.

Due to the varying levels of anthropogenic materials encountered in the made ground there are potentially two sets of List of Waste (LoW)[11] codes with "mirror" entries which may be applied to excavated materials to be removed from site.

1. 17-05-03* (soil and stone containing dangerous substances, classified as hazardous) or 17-05-04 (soil and stone other than those mentioned in 17-05-03, not hazardous); or
2. 17-09-03* (other construction and demolition wastes (including mixed wastes) containing hazardous substances) or 17-09-04 (mixed construction and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03).

Where waste is a mirror entry in the LoW, it can be classified via a process of analysis against standard criteria set out in the Waste Framework Directive. The assessment process is described in detail in guidance published by the Irish (EPA Waste Classification, List of Waste & Determining if Waste is Hazardous or Non-Hazardous, June 2015) and UK regulatory authorities (Guidance on the Classification and Assessment of Waste: Technical Guidance WM3, 2015). The assessment involves comparison of the concentration of various parameters against defined threshold values.

The red material encountered at the site is, based on local anecdotal evidence, believed to be a by-product of the fertilizer production process which was historically carried out on site. GII assert that this material would be best categorised using the LoW Code 06 10 wastes from the MFSU of nitrogen chemicals, nitrogen chemical processes. Where this material have been shown to be hazardous the most appropriate LoW Code is 06 10 02*.

The specific LoW code which should be applied to the material at each sample location is summarised in Table 3 below. These codes are only applicable where the material is being removed for site as a waste.

GII use HazWasteOnline™, a web-based commercial waste classification software tool which assists in the classification of potentially hazardous materials. This tool was used to determine whether the materials sampled are classified as hazardous or non-hazardous. The use of the online tool is accepted by the EPA (EPA 2014).

The conclusions presented in the report are based on GII's professional opinion. **It should be noted that the environmental regulator (in this case the EPA) and the waste acceptor (in this case a landfill operator) shall decide whether a waste is hazardous or non-hazardous and suitable for disposal at their facility.**

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[11] Formerly European Waste Catalogue Codes (EWC Codes)

9.0 HazWasteOnLine^{TM} Results

In total, thirty (30 No.) samples were assessed using the HazWasteOnLine^{TM} Tool, five (5 No.) of which were classified as hazardous. The samples TP-08 at 1.5m and TP-13 at 1.5m were classified as hazardous due to elevated levels of several metals and the associated hazardous properties HP7[12] Carcinogenic and HP14[13] Ecotoxic. The sample TP-09 at 1.5m was classified as hazardous due to elevated levels of zinc and the associated hazardous property HP14 Ecotoxic. The samples TP-19 at 1.5m and TP-29 at 1.5m were classified as hazardous due to elevated levels of TPH and the associated hazardous properties HP7 Carcinogenic and HP11[14] Mutagenic. The remaining samples were classified as being not hazardous. The complete HazWasteOnLine^{TM} report for all samples is included in Appendix 10.

The samples of the "red Fertiliser by-product" sampled in TP-08 and TP-13 was classified as hazardous due to significantly elevated levels of arsenic, copper, lead and zinc.

The specific LoW code which should be applied to the material at each SI location is summarised in Table 3 below. The assigning of the LoW code is based on observations recorded in the trial pits an estimation of the % of anthropogenic material present and the results of the HazWasteOnline^{TM} output. The final LoW codes applied at the time of disposal may vary due to variations in % of anthropogenic material observed in the excavation phase. Where there is in excess of 2%[15] anthropogenic material observed the LoW code 17 09 04 may be applied.

Table 3 LoW Codes

SI Location	Depth (m)	Hazardous/Non-Hazardous	Asbestos Type if Present	LoW Code
TP02	0.50	Non-Hazardous	NAD[16]	17 05 04
TP03	0.50	Non-Hazardous	NAD	17 05 04
TP05	1.20	Non-Hazardous	NAD	17 05 04
TP06	1.50	Non-Hazardous	NAD	17 05 04
TP08	1.50	Hazardous	NAD	06 10 20
TP08	2.50	Non-Hazardous	NAD	17 05 04
TP09	0.50	Non-Hazardous	NAD	17 05 04
TP09	1.50	Hazardous	NAD	06 10 20
TP11	0.50	Non-Hazardous	NAD	17 05 04
TP11	1.50	Non-Hazardous	NAD	17 05 04
TP13	0.50	Non-Hazardous	NAD	17 05 04
TP13	1.50	Hazardous	NAD	06 10 20
TP16	0.50	Non-Hazardous	NAD	17 05 04
TP17	1.50	Non-Hazardous	NAD	17 05 04
TP19	0.50	Non-Hazardous	NAD	17 05 04
TP19	1.50	Hazardous	NAD	17 05 03

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[12] HP 7: Carcinogenic "waste which induces cancer or increases its incidence".
[13] HP14: Ecotoxic "waste which presents or may present immediate or delayed risks for one or more sectors of the environment".
[14] HP11: Mutagenic "waste which may cause a mutation, that is a permanent change in the amount or structure of the genetic material in a cell".
[15] EPA (2017) - Draft Guidance Note on Soil Recovery Waste Acceptance Criteria.
[16] NAD – no asbestos detected.

SI Location	Depth (m)	Hazardous/Non-Hazardous	Asbestos Type if Present	LoW Code
TP20	0.50	Non-Hazardous	Chrysotile <0.001%	17 05 04
TP20	1.50	Non-Hazardous	Chrysotile <0.001%	17 05 04
TP21	0.50	Non-Hazardous	NAD	17 05 04
TP21	1.50	Non-Hazardous	NAD	17 05 04
TP22	0.50	Non-Hazardous	NAD	17 05 04
TP24	0.50	Non-Hazardous	Chrysotile <0.001%	17 05 04
TP24	1.50	Non-Hazardous	NAD	17 05 04
TP25	0.50	Non-Hazardous	NAD	17 05 04
TP26	0.50	Non-Hazardous	NAD	17 05 04
TP27	0.50	Non-Hazardous	NAD	17 05 04
TP28	0.50	Non-Hazardous	NAD	17 05 04
TP28	1.50	Non-Hazardous	NAD	17 05 04
TP29	0.50	Non-Hazardous	NAD	17 05 04
TP29	1.50	Hazardous	Chrysotile <0.001%	17 05 03

10.0 Landfill Waste Acceptance Criteria

Waste Acceptance Criteria (WAC) have been agreed by the EU (Council Decision 2003/33/EC) and are only applicable to material if it is to be disposed of as a waste at a landfill facility. Each individual member state and licensed operators of landfills may apply more stringent WAC. WAC limits and the associated laboratory analysis are not suitable for use in the determination of whether a waste is hazardous or non-hazardous. The data have been compared to the WAC limits set out in Council Decision 2003/33/EC as well as the specific WAC which the EPA have applied to the Integrated Materials Solutions (IMS) Landfill in north County Dublin. The IMS landfill has higher limits for a range of parameters while still operating under an inert landfill licence. The WAC data considered in combination with the waste classification outlined in Section 12.0 allows the most suitable waste category to be applied to the material tested. The applicable waste categories are summarised in Table 4. A summary of the WAC data is presented in Appendix 11. The waste category assigned to each sample is summarised in Table 5.

Table 4 Waste Category for Disposal/Recovery

Waste Category	Classification Criteria
Category A Unlined Soil Recovery Facilities	Soil and Stone only which are free from[17] anthropogenic materials such as concrete, brock timber. Soil must be free from "contamination" e.g. PAHs, Hydrocarbons.
Category B1 Inert Landfill	Reported concentrations within inert waste limits, which are set out by the adopted EU Council Decision 2003/33/EC establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 and Annex II of Directive 1999/31/EC (2002).

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[17] Free from equates to less than 2%.

	Results also found to be non-hazardous using the HWOL[18] application.
Category B2 Inert Landfill	Reported concentrations greater than Category B1 criteria but less than IMS Hollywood Landfill acceptance criteria, as set out in their Waste Licence W0129-02. Results also found to be non-hazardous using the HWOL application.
Category C Non-Haz Landfill	Reported concentrations greater than Category B2 criteria but within non-haz landfill waste acceptance limits set out by the adopted EU Council Decision 2003/33/EC establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 and Annex II of Directive 1999/31/EC (2002). Results also found to be non-hazardous using the HWOL application.
Category C 1 Non-Haz Landfill	As Category C but containing < 0.001% w/w asbestos fibres.
Category C 2 Non-Haz Landfill	As Category C but containing >0.001% and <0.01% w/w asbestos fibres
Category C 3 Non-Haz Landfill	As Category C but containing >0.01% and <0.1% w/w asbestos fibres.
Category D Hazardous Treatment	Results found to be hazardous using HWOL Application.
Category D 1 Hazardous Disposal	Results found to be hazardous due to the presence of asbestos (>0.1%).

11.0 Final Waste Categorisation

All samples were assessed in terms of waste classification using the HazWasteOnLine™ tool and also the WAC set out in Council Decision 2003/33/EC and the IMS specific WAC to give a final waste categorisation to determine the most appropriate disposal route for any waste generated. The final and most applicable waste category for each sample is summarised in Table 5.

Table 5 Individual Sample Waste Category

Sample ID	Sample Depth (m)	Material Type	Waste Category	LoW Code
TP02	0.50	Made Ground	Category C	17 05 04
TP03	0.50	Made Ground	Category B1	17 05 04
TP05	1.20	Clay	Category A	17 05 04
TP06	1.50	Silt	Category A	17 05 04
TP08	1.50	Made Ground	Category D	06 10 20
TP08	2.50	Silt	Category C	17 05 04
TP09	0.50	Made Ground	Category B2	17 05 04
TP09	1.50	Clay	Category D	06 10 20

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[18] HazWasteOnLine™ Tool.

Sample ID	Sample Depth (m)	Material Type	Waste Category	LoW Code
TP11	0.50	Made Ground	Category B1	17 05 04
TP11	1.50	Made Ground	Category B1	17 05 04
TP13	0.50	Made Ground	Category B1	17 05 04
TP13	1.50	Made Ground	Category D	06 10 20
TP16	0.50	Made Ground	Category B1	17 05 04
TP17	1.50	Clay	Category C	17 05 04
TP19	0.50	Made Ground	Category B1	17 05 04
TP19	1.50	Made Ground	Category D	17 05 03
TP20	0.50	Made Ground	Category C1	17 05 04
TP20	1.50	Silt	Category C1	17 05 04
TP21	0.50	Made Ground	Category B1	17 05 04
TP21	1.50	Clay	Category A	17 05 04
TP22	0.50	Made Ground	Category B2	17 05 04
TP24	0.50	Made Ground	Category C1	17 05 04
TP24	1.50	Peat	Category C	17 05 04
TP25	0.50	Made Ground	Category B1	17 05 04
TP26	0.50	Made Ground	Category B1	17 05 04
TP27	0.50	Made Ground	Category B1	17 05 04
TP28	0.50	Made Ground	Category B1	17 05 04
TP28	1.50	Silt	Category B2	17 05 04
TP29	0.50	Made Ground	Category B1	17 05 04
TP29	1.50	Clay	Category D	17 05 03

12.0 Suitable for Use Assessment

GII assessed the soil data collected from the trial pits against the LQM/CIEH S4ULs for Human Health Risk Assessment (S4ULs)[19]. The S4ULs present soil assessment criteria for an extended range of 89 substances. For each substance, S4ULs have been derived for a range of generic land uses and Soil Organic Matter (%SOM) contents. All toxicological and physical-chemical inputs used in the derivation of the S4ULs are clearly identified and discussed. For each substance, S4ULs have been derived for six generic land uses (including the two Public Open Space land uses defined in C4SL guidance) and a range of Soil Organic Matter contents (organic contaminants only). All toxicological and physical-chemical data inputs used in the derivation of the S4ULs are presented and discussed in the publication. The proposed future use of the site is commercial.

The level of arsenic detected in the samples from TP-08 at 1.m ad TP-13 at 1.5m exceeded the commercial S4UL. The material sampled in these cases was the “red fertiliser by-product” material.

All remaining samples were all within the residential without homegrown produce S4ULs. A full summary of the S4UL data is presented in Appendix 12.

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[19] LQM/CIEH 'Suitable 4 Use Levels' (S4ULs). Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3746. All rights reserved.

13.0 Groundwater Quality

Groundwater samples were collected from the wells installed in BH02, BH03, BH06, BH10 and BH12 on the 26th May 2020 by a GII Geo-Environmental Engineer.
The groundwater level in each well was recorded using a Geotechnical Instruments water level probe after which, the well was purged to remove the stagnant water in the well and surrounding gravel pack. Purging is necessary to ensure that the groundwater parameters measured are representative of the formation and not the stagnant water in the monitoring well or surrounding gravel filter.

13.1. Field Observations

No evidence of contamination was noted during the sampling of the groundwater wells. Groundwater field parameters were measured in situ using calibrated hand probes. Measurement included pH, electrical conductivity, temperature and redox potential (ORP). The recorded field data are summarised in Table 6.

The field measurement show and elevated level of electrical conductivity at BH-12. The water temperature recorded ranged from 12.6 degrees in BH-02 to 16.0 degrees in BH-10.

Table 6 Groundwater Field Measurements

Sample ID	Sample Date	Water Level (mBGL)	pH (pH Units)	Electrical Conductivity (mS/cm)	Temperature (Celsius)	Redox Potential (mV)	Odour	Colour
BH-02	26-05-2020	1.7	6.50	0.39	12.6	-17	None	Clear
BH-03	26-05-2020	1.52	5.64	0.66	13.8	51	None	Clear
BH-06	26-05-2020	1.48	6.01	0.49	14.3	-48	None	Clear
BH-10	26-05-2020	1.54	6.30	0.47	16.0	-10	None	Clear
BH-12	26-05-2020	2.17	5.88	1.30	15.3	28	None	Clear

13.2. Laboratory Analysis

The laboratory analysis undertaken on the samples collected from the boreholes included dissolved arsenic, boron, cadmium, copper, chromium (III & VI), cyanide, lead, mercury, nickel, manganese and zinc, aliphatic and aromatic petroleum hydrocarbons, polycyclic aromatic hydrocarbons (PAH), methyl tert butyl ether (MTBE), benzene toluene ethylbenzene and toluene (BTEX), total phenols, pH, electrical conductivity, pesticides, volatile organic compounds (VOCs, nitrate, nitrite, chloride, sulphate, ammonia, calcium, sulphur, phosphorus and potassium. The parameter range was based on the site history and the need to establish a comprehensive environmental baseline for the groundwater quality for the site.

The laboratory testing was competed by Element Materials Technology in the UK; EMT is a UKAS accredited laboratory. The full laboratory reports are included in Appendix 9. The analytical methodologies are all ISO/CEN approved or equivalent.

13.3. Laboratory Results

The full laboratory test report is presented in Appendix 9 and the results are summarised in Tables 7 to 10 The tables include Interim Guideline Values (IGV) published by the EPA and the Groundwater Threshold Values (GTV) set out in the European Communities Environmental Objectives (Groundwater) Regulations (S.I. 9 of 2010).

The IGVs are not statutory but were developed to assist in the assessment of impacts on groundwater quality. The IGVs are based on, but are more conservative than, the Drinking Water quality standards. GTVs have only been established for core indicator parameters. To ensure a comprehensive assessment of the groundwater quality, the IGVs are presented for parameters for which there are no GTV.

The levels of arsenic detected in BH-06 and BH-12 exceeded the GTV.

The level of manganese detected in all boreholes were significantly higher than the IGV.

The level of nickel in BH-03 exceeded the GTV.

The level of potassium in BH-03 and BH-12 exceeded the IGV.

The level of sulphate detected in BH-03 and BH-12 exceeded the GTV.

There is no IGV or GTV established for sulphur however it was detected in all wells with the levels in BH-12 significantly higher than the remaining wells.

The level of ammonia in all wells exceeded the GTV. The level of ammonia detected in BH-12 was significantly higher than the other wells.

The electrical conductivity measured both in the field and by the laboratory at BH-12 exceeded the IGV and was significantly higher when compared with the other wells.

Low levels of Tetrachloroethene (PCE) were detected in the borehole BH-12. The dechlorination or degradation process for tetrachloroethene produces the daughter products trichloroethylene (TCE), 1,1-Dichloroethene, cis-1,2-dichloroethylene (cis-DCE), trans-1,2-dichloroethylene (trans-DCE), and vinyl chloride (VC) several of which were also detected at low levels in BH-12. The source of the PCE is not known. The level of vinyl chloride detected exceeded the GTV.

Table 7 Groundwater Metals and Inorganics

Parameter	BH-02	BH-03	BH-06	BH-10	BH-12	LOD	Unit	EPA IGV[20]	GTV[21]
Dissolved Arsenic	4.5	3.1	29.4	<2.5	16.2	<2.5	ug/l	-	7.5
Dissolved Boron	16	25	13	59	25	<12	ug/l	-	750
Dissolved Cadmium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	-	3.75
Total Dissolved Chromium	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5	ug/l	-	37.5
Hexavalent Chromium	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	mg/l	0.03	-
Dissolved Copper	<7	<7	8	<7	<7	<7	ug/l	-	1,500
Dissolved Lead	<5	<5	<5	<5	<5	<5	ug/l	-	18.75
Dissolved Manganese	7,372	7,291	13,850	5,962	14,480	<2	ug/l	50	ne[22]
Dissolved Mercury	<1	<1	<1	<1	<1	<1	ug/l	-	0.75
Dissolved Nickel	<2	15	5	9	9	<2	ug/l	-	15
Dissolved Potassium	1.5	7.6	2.2	4.4	13.0	<0.1	mg/l	5	ne
Dissolved Zinc	<3	48	21	5	18	<3	ug/l	100	ne
Sulphate	18.8	234.2	89.5	89.5	455.7	<0.5	mg/l	-	187.5
Chloride	25.0	22.2	25.9	26.4	30.5	<0.3	mg/l	-	187.5
Sulphur	**5,479**	**90,403**	**27,023**	**27,762**	**168,355**	<10	ug/l	-	-
Nitrate as NO_3	8.9	<0.2	<0.2	10.6	<0.2	<0.2	mg/l	-	37.5
Nitrite as NO_2	0.13	<0.02	<0.02	0.04	<0.02	<0.02	mg/l	0.1	375,000
Total Cyanide	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	-	0.0375
Ammoniacal Nitrogen as NH_3	1.20	8.53	6.28	5.26	98.36	<0.03	mg/l	-	0.175
Electrical Conductivity @25C #	386	646	390	427	1,353	<2	µS/cm	1,000	1,875
pH	7.38	6.47	6.64	6.98	6.67	<0.01	pH units	≥ 6.5 - ≤ 9.5	ne

Table 8 Groundwater PAHs

Parameter	BH-02	BH-03	BH-06	BH-10	BH-12	LOD	Unit	EPA IGV	GTV
Naphthalene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.013	µg/l	1	ne
Acenaphthylene	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013	µg/l	ne	ne
Acenaphthene	<0.013	<0.013	<0.013	<0.013	<0.013	<0.014	µg/l	ne	ne
Fluorene	<0.014	<0.014	<0.014	<0.014	<0.014	<0.011	µg/l	ne	ne
Phenanthrene	<0.011	<0.011	<0.011	<0.011	<0.011	<0.013	µg/l	ne	ne
Anthracene	<0.013	<0.013	<0.013	<0.013	<0.013	<0.012	µg/l	10,000	ne
Fluoranthene	<0.012	<0.012	<0.012	<0.012	<0.012	<0.013	µg/l	1	ne
Pyrene	<0.013	<0.013	<0.013	<0.013	<0.013	<0.015	µg/l	ne	ne
Benzo(a)anthracene	<0.015	<0.015	<0.015	<0.015	<0.015	<0.011	µg/l	ne	ne

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[20] EPA Report – Towards Setting Guideline Values for the Protection of Groundwater in Ireland, Interim Report, 2003.

[21] Groundwater Threshold Values as set out in S.I. 9 of 2010.

[22] ne – not established.

Parameter	BH-02	BH-03	BH-06	BH-10	BH-12	LOD	Unit	EPA IGV	GTV
Chrysene	<0.011	<0.011	<0.011	<0.011	<0.011	<0.018	µg/l	ne	ne
Benzo(bk)fluoranthene	<0.018	<0.018	<0.018	<0.018	<0.018	<0.016	µg/l	ne	ne
Benzo(a)pyrene	<0.016	<0.016	<0.016	<0.016	<0.016	<0.011	µg/l	0.01	0.0075
Indeno(123cd)pyrene	<0.011	<0.011	<0.011	<0.011	<0.011	<0.01	µg/l	0.05	ne
Dibenzo(ah)anthracene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.011	µg/l	ne	ne
Benzo(ghi)perylene	<0.011	<0.011	<0.011	<0.011	<0.011	<0.195	µg/l	0.05	ne
PAH 16 Total	<0.195	<0.195	<0.195	<0.195	<0.195	<0.01	µg/l	ne	0.075
Benzo(b)fluoranthene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	µg/l	0.5	ne
Benzo(k)fluoranthene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.1	µg/l	0.05	ne

Table 9 Groundwater Hydrocarbons

Parameter	BH-02	BH-03	BH-06	BH-10	BH-12	LOD	Unit	EPA IGV	GTV
TPH CWG									
Aliphatics									
>C5-C6	<10	<10	<10	<10	<10	<10	µg/l	ne	ne
>C6-C8	<10	<10	<10	<10	<10	<10	µg/l	ne	ne
>C8-C10	<10	<10	<10	<10	<10	<10	µg/l	ne	ne
>C10-C12	<5	<5	<5	<5	<5	<5	µg/l	ne	ne
>C12-C16	<10	<10	<10	<10	<10	<10	µg/l	ne	ne
>C16-C21	<10	<10	<10	<10	<10	<10	µg/l	ne	ne
>C21-C35	<10	<10	<10	<10	<10	<10	µg/l	ne	ne
Total aliphatics C5-35	<10	<10	<10	<10	<10	<10	µg/l	0.01	ne
Aromatics									
>C5-EC7	<10	<10	<10	<10	<10	<10	µg/l	ne	ne
>EC7-EC8	<10	<10	<10	<10	<10	<10	µg/l	ne	ne
>EC8-EC10	<10	<10	<10	<10	<10	<10	µg/l	ne	ne
>EC10-EC12	<5	<5	<5	<5	<5	<10	µg/l	ne	ne
>EC12-EC16	<10	<10	<10	<10	<10	<10	µg/l	ne	ne
>EC16-EC21	<10	<10	<10	<10	<10	<10	µg/l	ne	ne
>EC21-EC35	<10	<10	<10	<10	<10	<10	µg/l	ne	ne
Total aromatics C5-35	<10	<10	<10	<10	<10	<10	µg/l	0.01	ne
Total aliphatics and aromatics(C5-35)	<10	<10	<10	<10	<10	<10	µg/l	0.01	ne
Total Phenols HPLC	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	0.5	ne
MTBE	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	ug/l	30	ne
Benzene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	ug/l	ne	0.75
Toluene	<5	<5	<5	<5	<5	<5	ug/l	10	ne
Ethylbenzene	<1	<1	<1	<1	<1	<1	ug/l	10	ne
m/p-Xylene	<2	<2	<2	<2	<2	<2	ug/l	10	ne
o-Xylene	<1	<1	<1	<1	<1	<1	ug/l	10	ne

Table 10 Groundwater VOCs

Parameter	BH-02	BH-03	BH-06	BH-10	BH-12	LOD	Unit	EPA IGV	GTV
Tetrachloroethene (PCE)	<3	<3	<3	<3	5	<3	ug/l	40	7.5
Trichloroethene (TCE)	<3	<3	<3	<3	4	<3	ug/l	70	-
1,1-Dichloroethene (1,1 DCE)	<3	<3	<3	<3	4	<3	ug/l	30	-
1,1-Dichloroethane	<3	<3	<3	<3	28	<3	ug/l	30	-
cis-1-2-Dichloroethene	<3	<3	<3	<3	7	<3	ug/l	30	-
Vinyl Chloride	<0.1	<0.1	<0.1	<0.1	0.8	<0.1	ug/l	-	0.375
1,1,1-Trichloroethane	<2	<2	<2	<2	9	<2	ug/l	500	-

14.0 Surface water Quality

A surface water sample was collected from the Avoca River on the 26th May 2020 by a GII Geo-Environmental Engineer. An upstream sample (SW-01) was collected, it was not possible to collect a downstream sample due to access issues.

14.1. Field Observations

No evidence of contamination was noted during the sampling of the Avoca River. Surface water field parameters were measured in situ using calibrated hand probes. Measurement included pH, electrical conductivity, temperature and redox potential (ORP). The recorded field data are summarised in Table 11.

Table 11 Surface Water Field Measurements

Sample ID	Sample Date	pH (pH Units)	Electrical Conductivity (mS/cm)	Temperature (Celsius)	Redox Potential (mV)	Odour	Colour
SW-01	26-05-2020	7.67	0.14	19.8	54	None	Clear

14.2. Laboratory Analysis

The laboratory analysis undertaken on the samples collected from the river included dissolved arsenic, boron, cadmium, copper, chromium (III & VI), cyanide, lead, mercury, nickel, manganese and zinc, aliphatic and aromatic petroleum hydrocarbons, polycyclic aromatic hydrocarbons (PAH), methyl tert butyl ether (MTBE), benzene toluene ethylbenzene and toluene (BTEX), total phenols, pH, electrical conductivity, pesticides, volatile organic compounds (VOCs, nitrate, nitrite, chloride, sulphate, ammonia, calcium, sulphur, phosphorus and potassium. The parameter range was based on the site history and the need to establish a comprehensive environmental baseline for the groundwater quality for the site.

The laboratory testing was competed by Element Materials Technology in the UK; EMT is a UKAS accredited laboratory. The full laboratory reports are included in Appendix 9. The analytical methodologies are all ISO/CEN approved or equivalent.

14.3. Laboratory Results

The full laboratory test report is presented in Appendix 9 and the results are summarised in Tables 12 to 14. The tables include the EPA Environmental Quality Objectives and Environmental Quality Standards for the Aquatic Environment (1997).

Elevated levels of ammonia and zinc were detected in the upstream sample. Low levels of several PAHS were also detected.

It is not possible to comment on any impact the site may have on the Avoca River without a downstream sample.

Table 12 Surface Water Metals and Inorganics

Parameter	Upstream	LOD	Unit	EQS
Dissolved Arsenic	<2.5	<2.5	ug/l	25
Dissolved Boron	<12	<12	ug/l	2,000
Dissolved Cadmium	<0.5	<0.5	ug/l	5
Total Dissolved Chromium	<1.5	<1.5	ug/l	30
Hexavalent Chromium	<0.006	<0.006	mg/l	-
Dissolved Copper	16	<7	ug/l	30
Dissolved Lead	<5	<5	ug/l	10
Dissolved Manganese	118	<2	ug/l	300
Dissolved Mercury	<1	<1	ug/l	1
Dissolved Nickel	<2	<2	ug/l	50
Dissolved Potassium	1.1	<0.1	mg/l	-
Dissolved Zinc	160	<3	ug/l	100
Sulphate	21.1	<0.5	mg/l	200
Chloride	12.5	<0.3	mg/l	250
Sulphur	6,407	<10	ug/l	-
Nitrate as NO_3	6.6	<0.2	mg/l	50
Nitrite as NO_2	0.02	<0.02	mg/l	0.2
Total Cyanide	<0.01	<0.01	mg/l	0.01
Ammoniacal Nitrogen as NH_3	0.09	<0.03	mg/l	0.02
Electrical Conductivity @25C #	125	<2	µS/cm	1,000
pH	7.59	<0.01	pH units	-

Table 13 Surface Water PAHs

Parameter	Upstream	LOD	Unit	EQS
Naphthalene	<0.1	<0.013	µg/l	-
Acenaphthylene	<0.013	<0.013	µg/l	-
Acenaphthene	<0.013	<0.014	µg/l	-
Fluorene	<0.014	<0.011	µg/l	-
Phenanthrene	**0.023**	<0.013	µg/l	-
Anthracene	<0.013	<0.012	µg/l	-
Fluoranthene	**0.025**	<0.013	µg/l	-
Pyrene	**0.017**	<0.015	µg/l	-
Benzo(a)anthracene	<0.015	<0.011	µg/l	-
Chrysene	<0.011	<0.018	µg/l	-
Benzo(bk)fluoranthene	<0.018	<0.016	µg/l	-
Benzo(a)pyrene	<0.016	<0.011	µg/l	-
Indeno(123cd)pyrene	<0.011	<0.01	µg/l	-
Dibenzo(ah)anthracene	<0.01	<0.011	µg/l	-
Benzo(ghi)perylene	<0.011	<0.195	µg/l	-
PAH 16 Total	<0.195	<0.01	µg/l	0.0002
Benzo(b)fluoranthene	<0.01	<0.01	µg/l	-
Benzo(k)fluoranthene	<0.01	<0.1	µg/l	-

Table 14 Surface Water Hydrocarbons

Parameter	Upstream	LOD	Unit	EQS
TPH CWG				
Aliphatics				
>C5-C6	<10	<10	µg/l	-
>C6-C8	<10	<10	µg/l	-
>C8-C10	<10	<10	µg/l	-
>C10-C12	<5	<5	µg/l	-
>C12-C16	<10	<10	µg/l	-
>C16-C21	<10	<10	µg/l	-
>C21-C35	<10	<10	µg/l	-
Total aliphatics C5-35	<10	<10	µg/l	-
Aromatics				-
>C5-EC7	<10	<10	µg/l	-
>EC7-EC8	<10	<10	µg/l	-
>EC8-EC10	<10	<10	µg/l	-
>EC10-EC12	<5	<10	µg/l	-
>EC12-EC16	<10	<10	µg/l	-
>EC16-EC21	<10	<10	µg/l	-
>EC21-EC35	<10	<10	µg/l	-

Parameter	Upstream	LOD	Unit	EQS
Total aromatics C5-35	<10	<10	µg/l	-
Total aliphatics and aromatics(C5-35)	<10	<10	µg/l	10
Total Phenols HPLC	<0.01	<0.01	mg/l	0.005
MTBE	<0.1	<0.1	ug/l	-
Benzene	<0.5	<0.5	ug/l	10
Toluene	<5	<5	ug/l	10
Ethylbenzene	<1	<1	ug/l	10
m/p-Xylene	<2	<2	ug/l	10
o-Xylene	<1	<1	ug/l	10

15.0 Conceptual Site Model

A conceptual site model (CSM) has been completed based on the site investigation and environmental sampling works competed. The CSM includes a risk assessment which was completed by considering the sources, pathways and receptors (pollutant linkages), an assessment of the human health and environmental risks with reference to the significance and degree of the risk.

The rationale relating to the calculation of the risk based on severity of each hazard and the risk probability is outlined in Tables 15 to 17.

Table 15 Hazard Severity Matrix

Category	Definition
Severe	Acute risks to human health, catastrophic damage to buildings/property, major pollution of controlled waters.
Medium	Chronic risk to human health, pollution of sensitive controlled waters, significant effects on sensitive ecosystems or species, significant damage to buildings or structures.
Mild	Pollution of non-sensitive waters, minor damage to buildings or structures.
Minor	Requirement for protective equipment during site works to mitigate health effects, damage to non-sensitive ecosystems or species.

Table 16 Risk Probability Matrix

Category	Definition
High likelihood	Pollutant linkage may be present, and risk is almost certain to occur in long term, or there is evidence of harm to the receptor.
Likely	Pollutant linkage may be present, and it is probable that the risk will occur over the long term.

Low likelihood	Pollutant linkage may be present, and there is a possibility of the risk occurring, although there is no certainty that it will do so.
Unlikely	Pollutant linkage may be present, but the circumstances under which harm would occur are improbable.

Table 17 Risk Matrix

	Potential Severity			
Probability	Severe	Medium	Mild	Minor
High likelihood	Very High	High	Moderate	Low/Moderate
Likely	High	Moderate	Low/Moderate	Low
Low Likelihood	Moderate	Low/Moderate	Low	Very Low
Unlikely	Low/Moderate	Low	Very Low	Very Low

Table 18 Conceptual Site Model

Source	Pathway	Receptor	Severity	Likelihood	Potential Risk	Discussion
Elevated Levels of TPH, PCBs and Metals detected in the made ground deposits	• Ingestion of soil and dust • Dermal contact • Inhalation of fugitive dust	• Construction workers sin any future development scenario • Future site users in residential scenario • Future site users in a commercial scenario	Medium	Highly Likely	High	Elevated level of metals in mad ground deposits pose significant human health exposure risk during future development/construction works
Elevated Levels of TPH, PCBs and Metals detected in the made ground deposits	• Leaching from soil into underlying shallow groundwater • Leaching from soil into underlying bedrock aquifer • Leaching from soil and lateral discharge to surface water	• Shallow groundwater • Bedrock aquifer • Avoca River • Shelton Abbey Canal	Medium	Highly Likely	High	Elevated level of the metals present in the gravel aquifer. Arsenic detected at elevated concentrations at two locations adjacent to where “red material” had been detected in trial pitting.
Elevated Levels of Metals, Ammonia, Sulphates, Sulphur detected in groundwater.	• Groundwater discharging to surface water. • Lateral migration of shallow groundwater • Downward migration of impacted groundwater	• Avoca River. • Shelton Abbey Canal • Downgradient shallow groundwater • Bedrock aquifer • Arklow Town Marsh	Medium	Likely	Moderate	Collection of a downgradient surface water sample was no possible. Further attempts to collect surface water samples is recommended.

16.0 Conclusions & Recommendations

The conclusions and recommendations given and opinions expressed in this report are based on the findings of the site investigation works and laboratory testing undertaken. Where any opinion is expressed on the classification of material between site investigations locations, this is for guidance only and no liability can be accepted for its accuracy. No responsibility can be accepted for conditions which have not been revealed by the findings at the site investigation locations.

16.1. Conclusions

16.1.1. Waste Classification

Based on the results of the HazWasteOnLine^{TM} there are several locations across the site where the material has been impacted by hydrocarbons to a degree to classy the material if excavated for removal form site as hazardous waste.

The red material which is believed to be a by-product of the fertiliser production process has been shown to be classified ad a hazardous waste due to significantly elevated levels of the metals arsenic, copper, lead and zinc. This classification is only assigned if the material is to be removed from site a s a waste.

16.1.2. Waste Categories

The most applicable waste category for each of the samples has been presented in Table 5.

16.1.3. Asbestos

Asbestos was detected in several samples across the site. The asbestos type detected in all cases was chrysotile and was present at a level lower than the detection limit of <0.001%.

16.1.4. PCBs

PCBs were detected at several locations across the site. Based on the site history there had been a subsoil excavation programme at the site to remediate PCB contamination. These detections may be residual contamination associated with the original remediation programme as opposed to evidence of large-scale PCB contamination.

16.2. S4UL Assessment

The levels of arsenic detected at TP-08 and TP-13 exceeded the commercial S4UL.

16.2.1. Water Quality

Groundwater sampling indicates that the underlying gravel aquifer has been impacted by the site's historical use as a fertiliser factory with elevated levels of ammonia, potassium, sulphate and sulphur in the samples collected.

The groundwater sampling also indicates that the gravel aquifer has been impacted by heavy metals possibly associated with the red material encountered in the trial pitting.

Downstream sampling of the Avoca River should be completed to assess the impact if any from the site on the river.

16.2.2. Overall Risk

Based on the subsoil and groundwater sampling the underlying bedrock aquifer is at risk from historical contamination associated with the fertiliser production process. The historical landfilling of the "red material" across the site appears to have impacted the underlying gravel aquifer in terms of elevated levels of arsenic.

Groundwater downgradient of the site may also be impacted or at risk.

Based on the groundwater quality recorded there is a risk to the adjacent Avoca River as well as the underlying bedrock aquifer. The risk to the Avoca should be further assesses through additional surface water sampling.

There is a risk to future site users and construction workers during any redevelopment in terms of exposure to hazardous fugitive material releases related to the 'red material' buried on site.

16.3. Recommendations

16.4. Groundwater and Surface Water Sampling

It is recommended that groundwater and surface water sampling is carried out to assess any potential impacts from the site.

16.4.1. Waste Transfer

In the event that material is excavated for removal from site, any firm engaged to transport waste material from site and the operator of any waste facility that will accept subsoils excavated from this site should be furnished with, at a minimum, copies of the **full unabridged** laboratory reports and HazWasteOnLine^{TM} report for all samples presented in this report.

The material on site if excavated should be removed to the most appropriate facility under the waste categories and LoW codes identified in Table 3. Potential outlets for the various waste categories are presented in Appendix 13, this list is not exhaustive and applicable at the time of the writing this report.

The non-hazardous material across the site if excavated should be removed from site to an appropriate facility under either the LoW codes 17 05 04 or 17 09 04. Where during excavation there is noted to be in excess of 2% anthropogenic material the appropriate LoW code which should be applied is 17 09 04.

The material on site which has been classified as hazardous due to elevated levels of TPH if excavated should be removed from site to an appropriate facility under either the LoW codes 17 05 03 or 17 09 03. Where during excavation there is noted to be in excess of 2% anthropogenic material the appropriate LoW code which should be applied is 17 09 04.

The red fertiliser by-product material which has been classified as hazardous should be removed from site to an appropriate facility under the LoW code 06 10 02.

16.4.2. Excavations

The excavation and management of soils on site should take cognisance of the waste categories outlined in Table 5.

If the hazardous material on site is to be removed and disposed of it is recommended that the excavation is supervised and validated by a suitably qualified environmental engineer or scientist.

The hazardous material is recommended to be excavated in advance of the main excavation works to minimise the potential risk of cross contamination of other excavated soils.

16.4.3. Water Quality

Further groundwater and surface water sampling is recommended. The groundwater monitoring network should be expanded to include the EPA licence compliance monitoring points on site and off site where access can be arranged.

Surface water sampling where possible at several points along the site boundary and downstream of the site should be undertaken to assess the impact of the site on the Avoca River.

17.0 References

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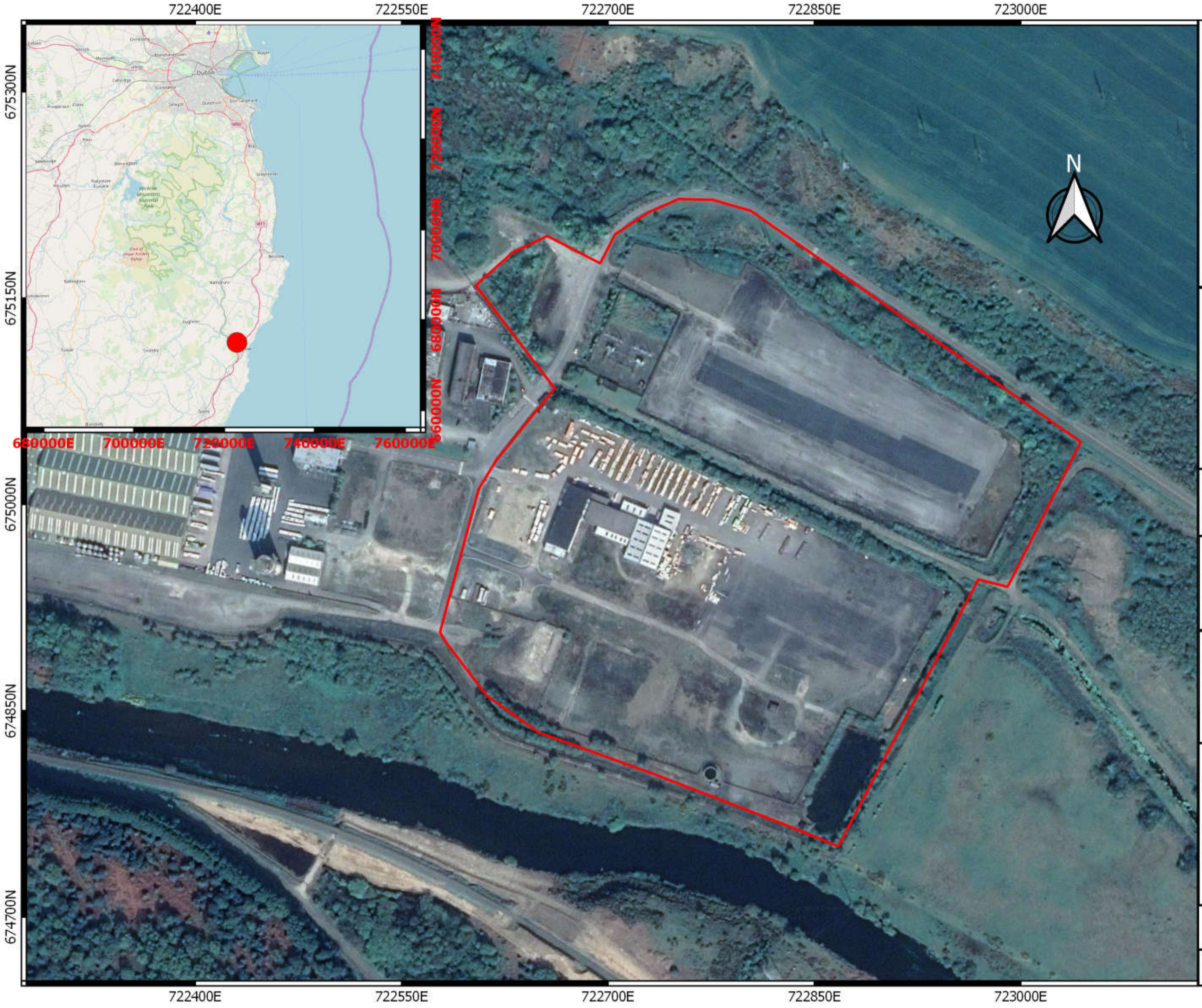
APPENDIX 1 - Figures



● Site Location

▭ Indicative Site Boundary

Client:

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FT 2

Project Code:

9230-11-19

Project Title:

Avoca River Park

Drawing Title:

Figure 1 Site Location

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0 30 60 90 120 150 m

Drawn By:
BS

Date:
20/11/2019

● Site Location

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Project Title:

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Figure 2 OSI 6-Inch Map

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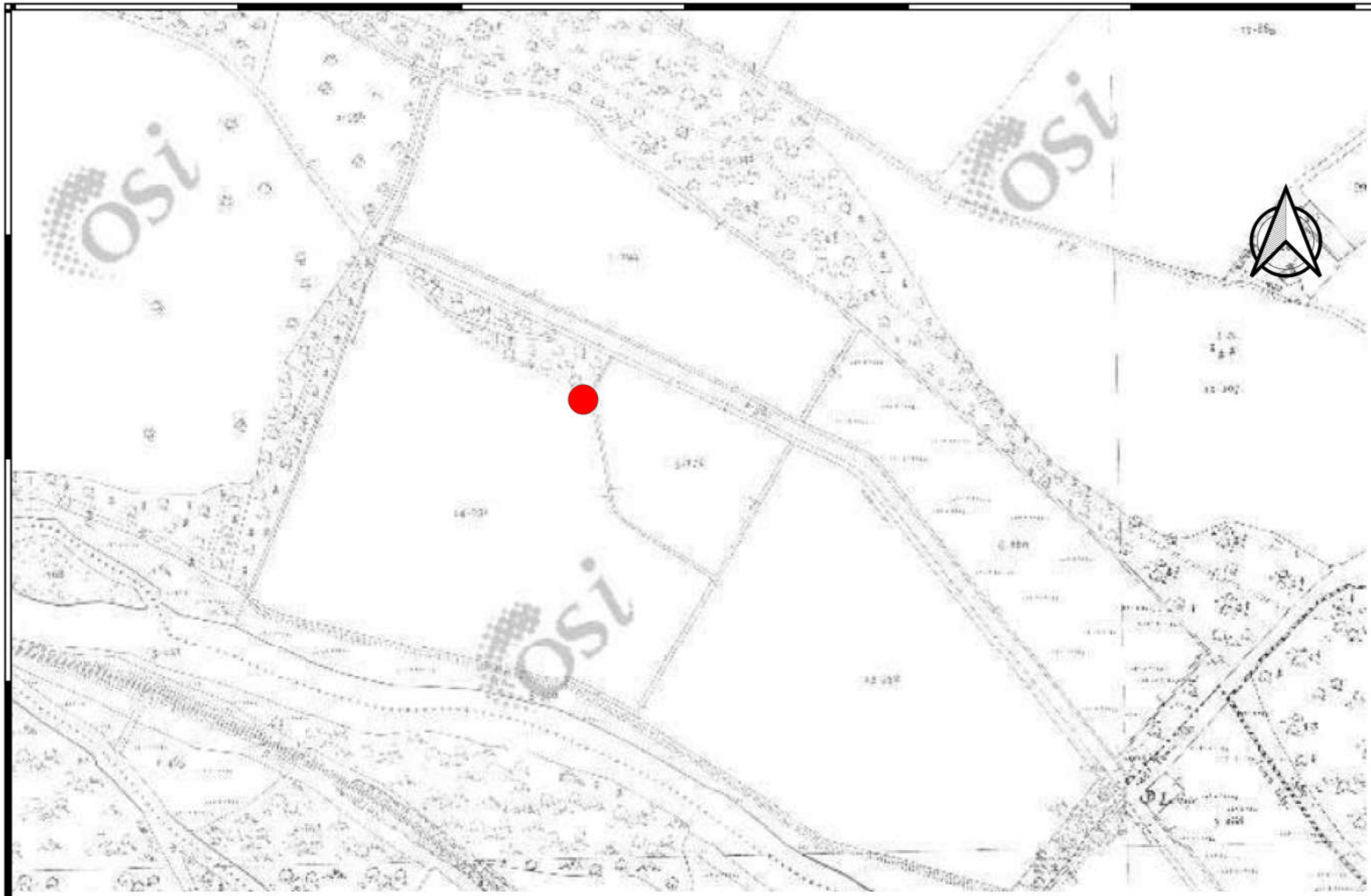

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Project Title:

Avoca River Park

Drawing Title:

Figure 3 OSI 25-Inch Map

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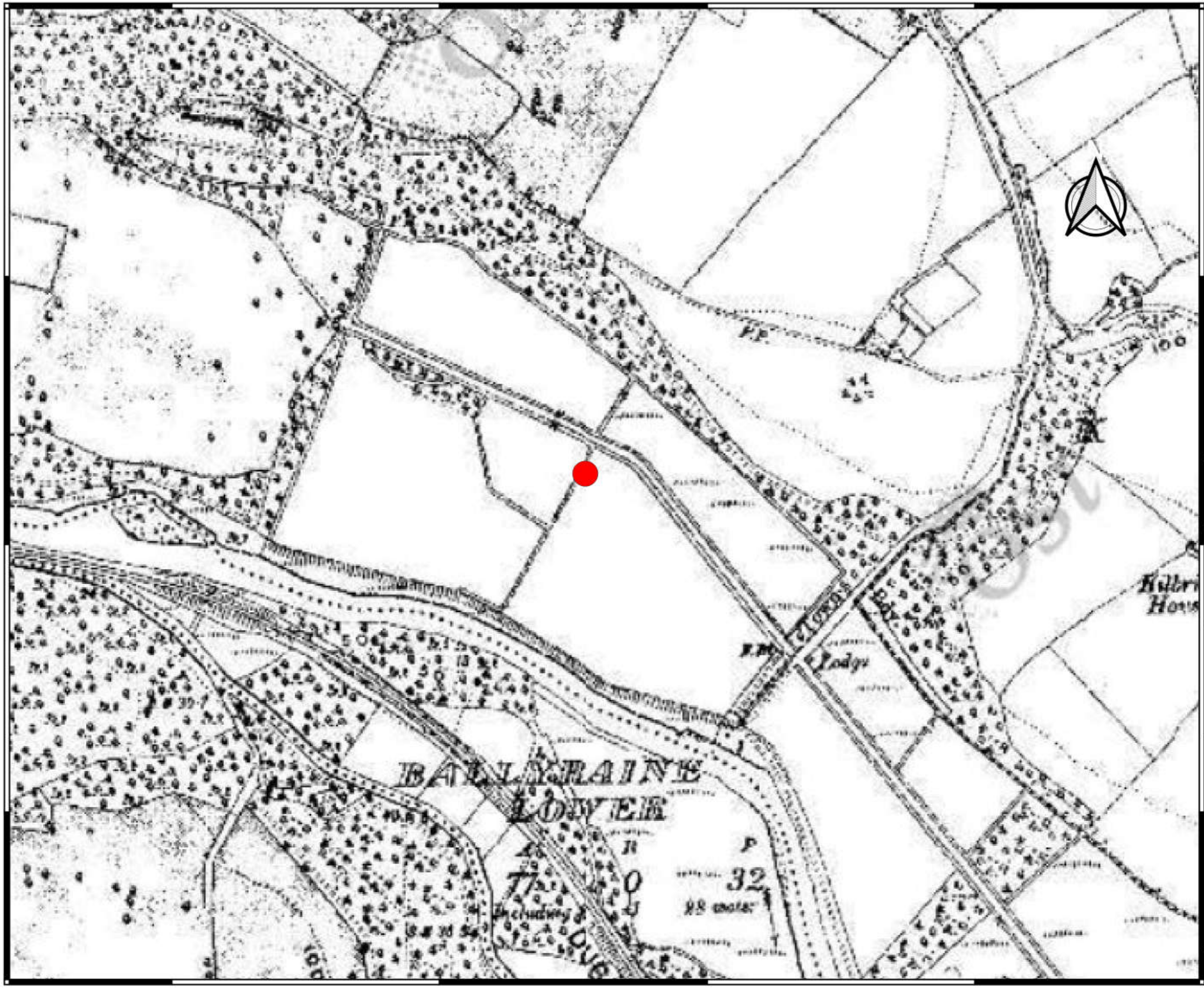
BS	23-01-2020



● Site Location

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Project Code:

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Project Title:

Avoca River Park

Drawing Title:

Figure 4 OSI Cassini Map

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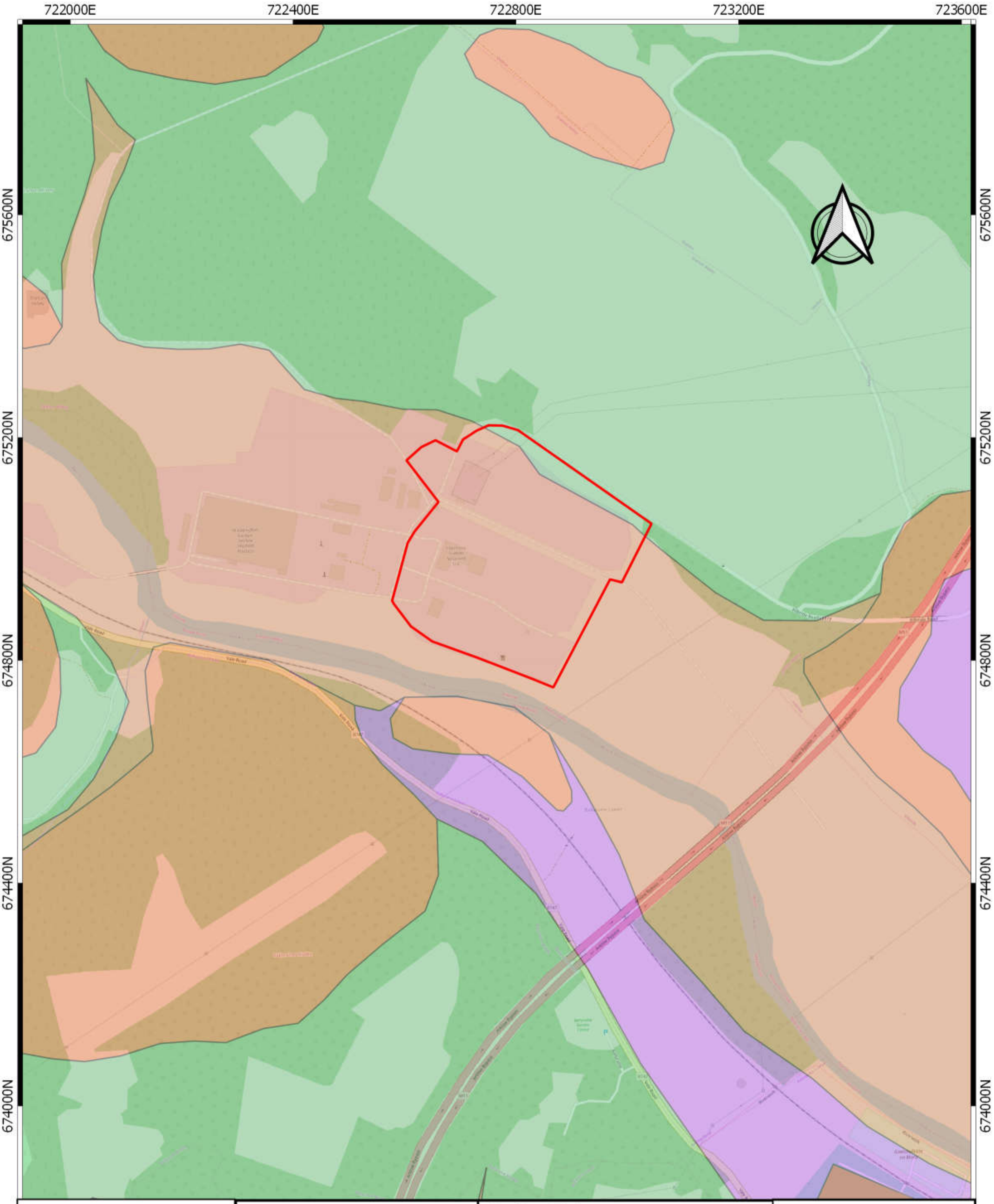

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0 100 200 300 m

Project Title:
Avoca River Park

Drawing Title:
Figure 5 Quaternary Geology

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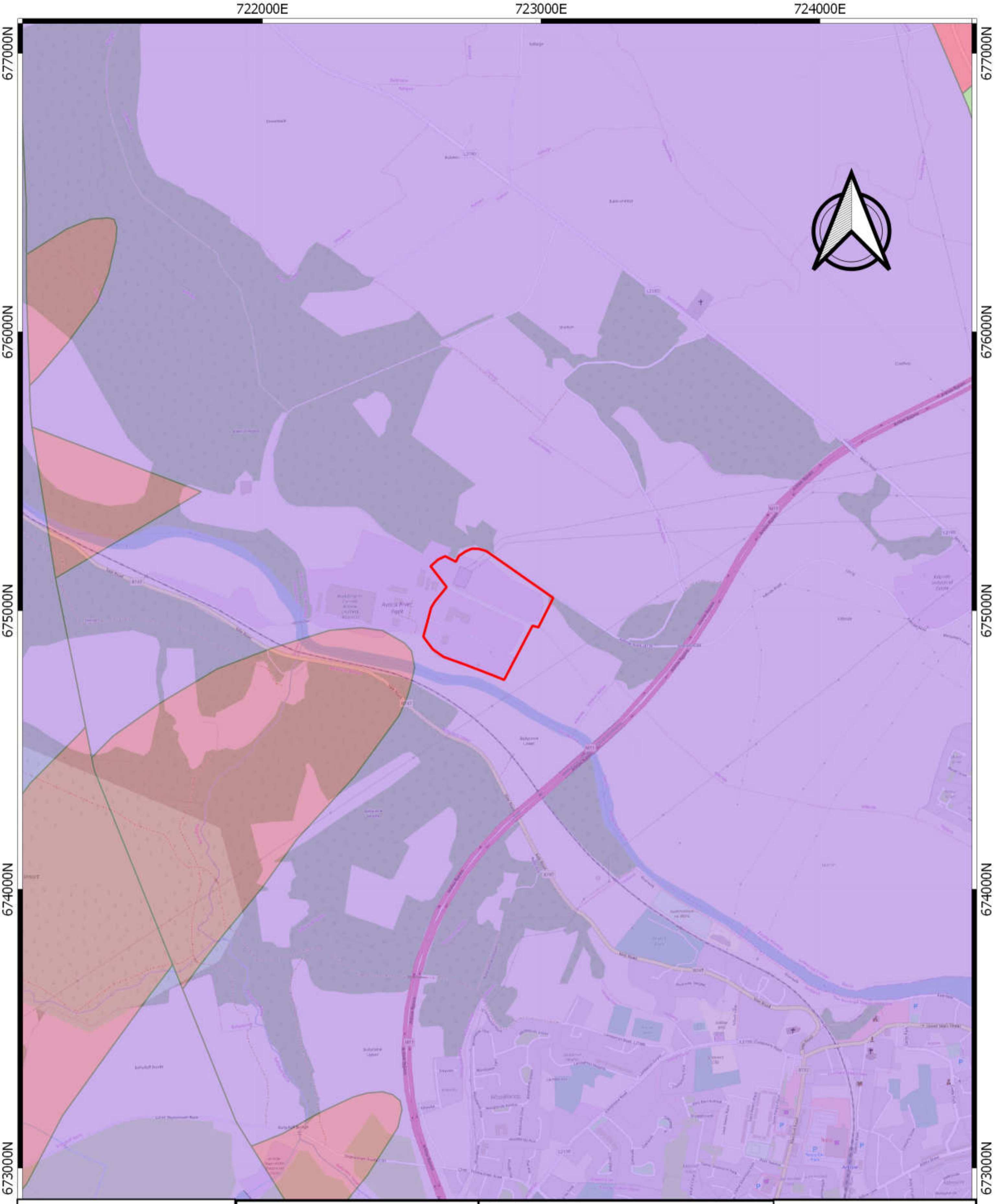
Date:
20/11/2019

☐ Site Boundary

Subsoil Type
🟫 A
🟪 IrSTLPSsS
🟧 Rck
🟩 TLPSsS
🟥 Urban



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Avoca River Park

Drawing Title:
Figure 6 Bedrock Geology

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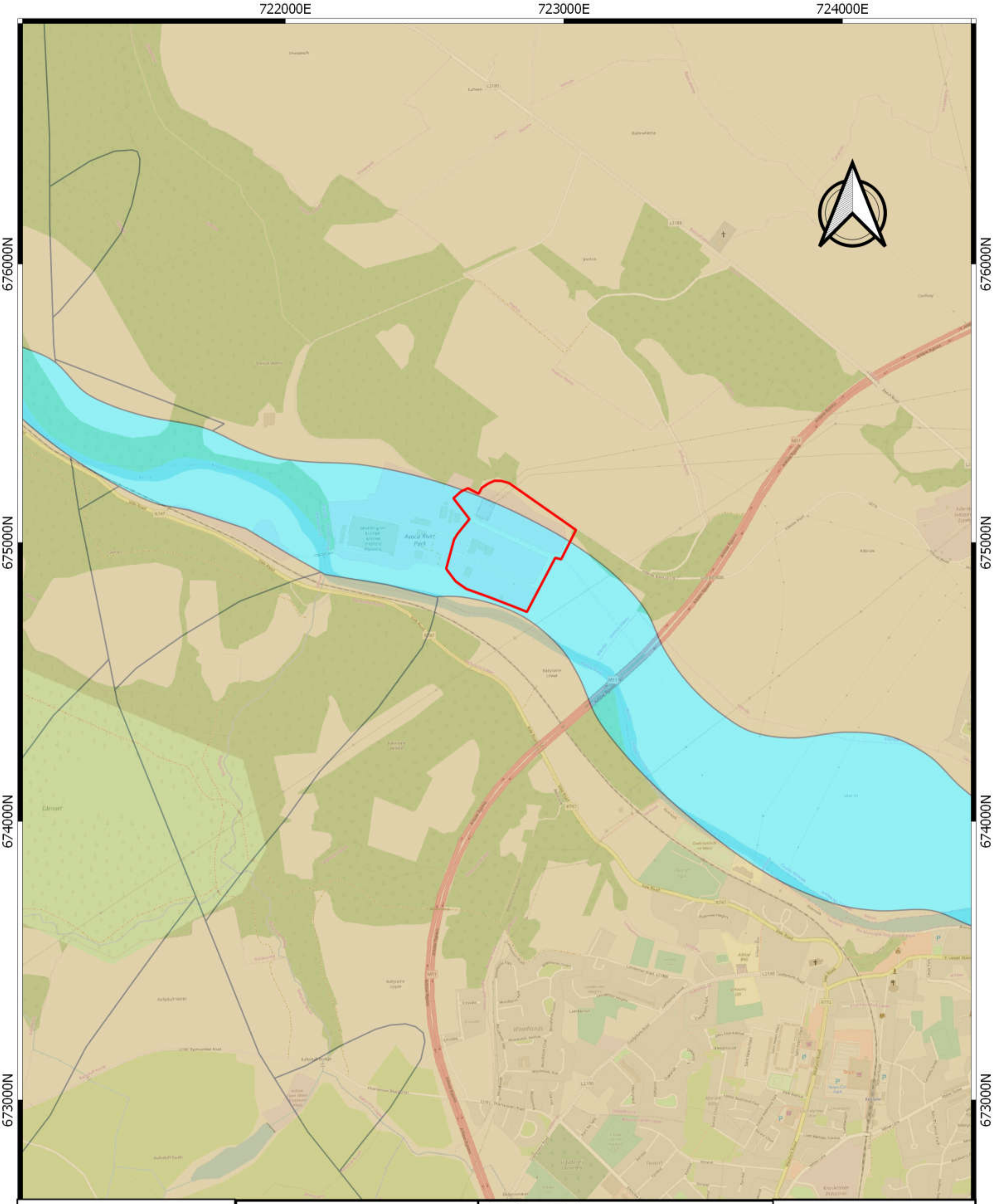
Drawn By:
BS

Date:
21/11/2019

☐ Site Boundary

Bedrock Geology
- 🟥 Ballymoyle Fm
- 🟩 in Ballymoyle Fm
- 🟪 Kilmacrea Fm
- 🟪 Oaklands Fm



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Project Title:
Avoca River Park

Drawing Title:
Figure 7 Aquifer Category

GII Project Reference:
9230-11-19

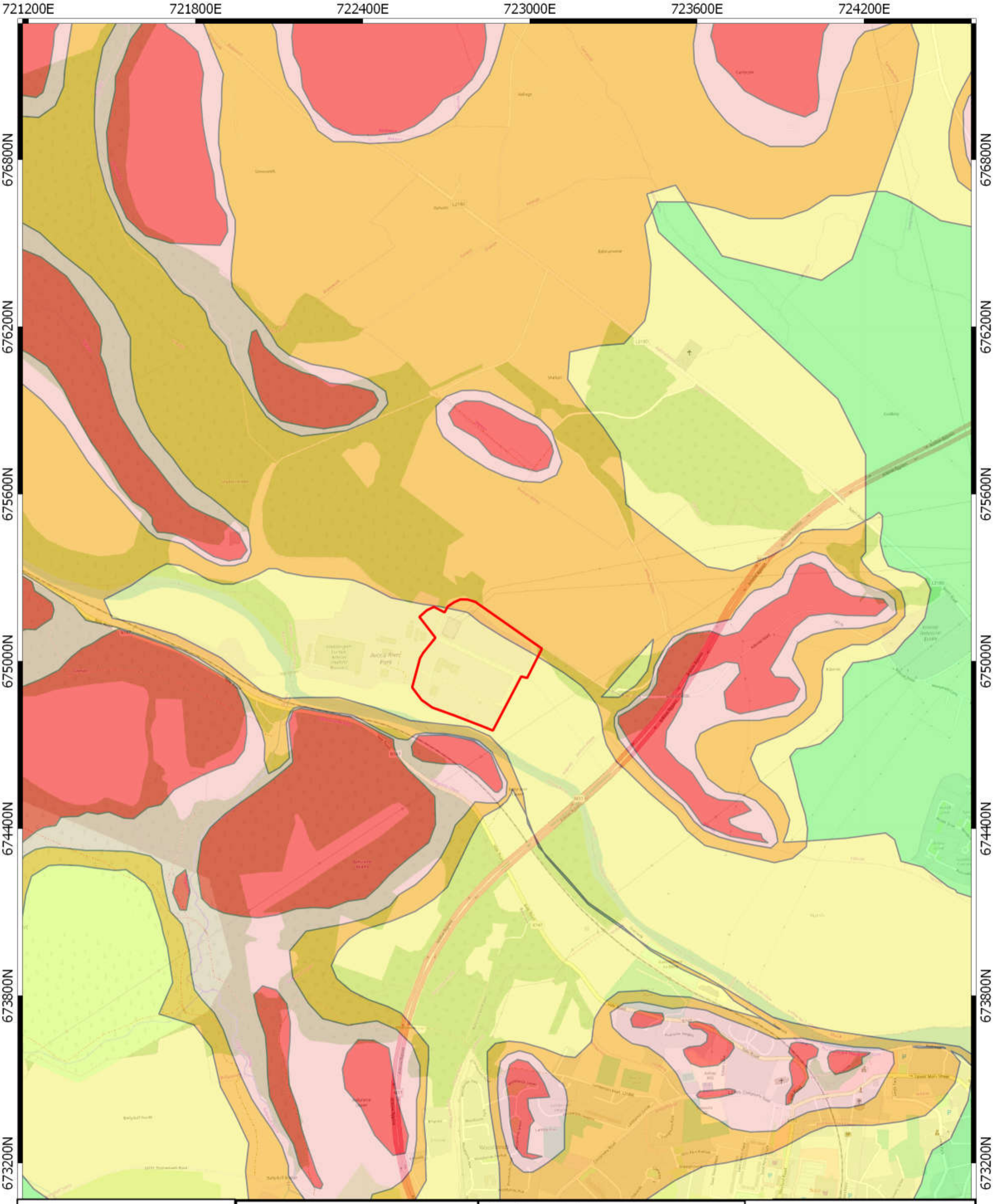
Drawn By:
BS

Date:
21/11/2019

🟥 Site Boundary

Bedrock Aquifer
🟫 Ll

Sand/Gravel Aquifer
🟦 Lg



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0 200 400 600 m

Project Title:
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Drawing Title:
Figure 8 Aquifer Vulnerability

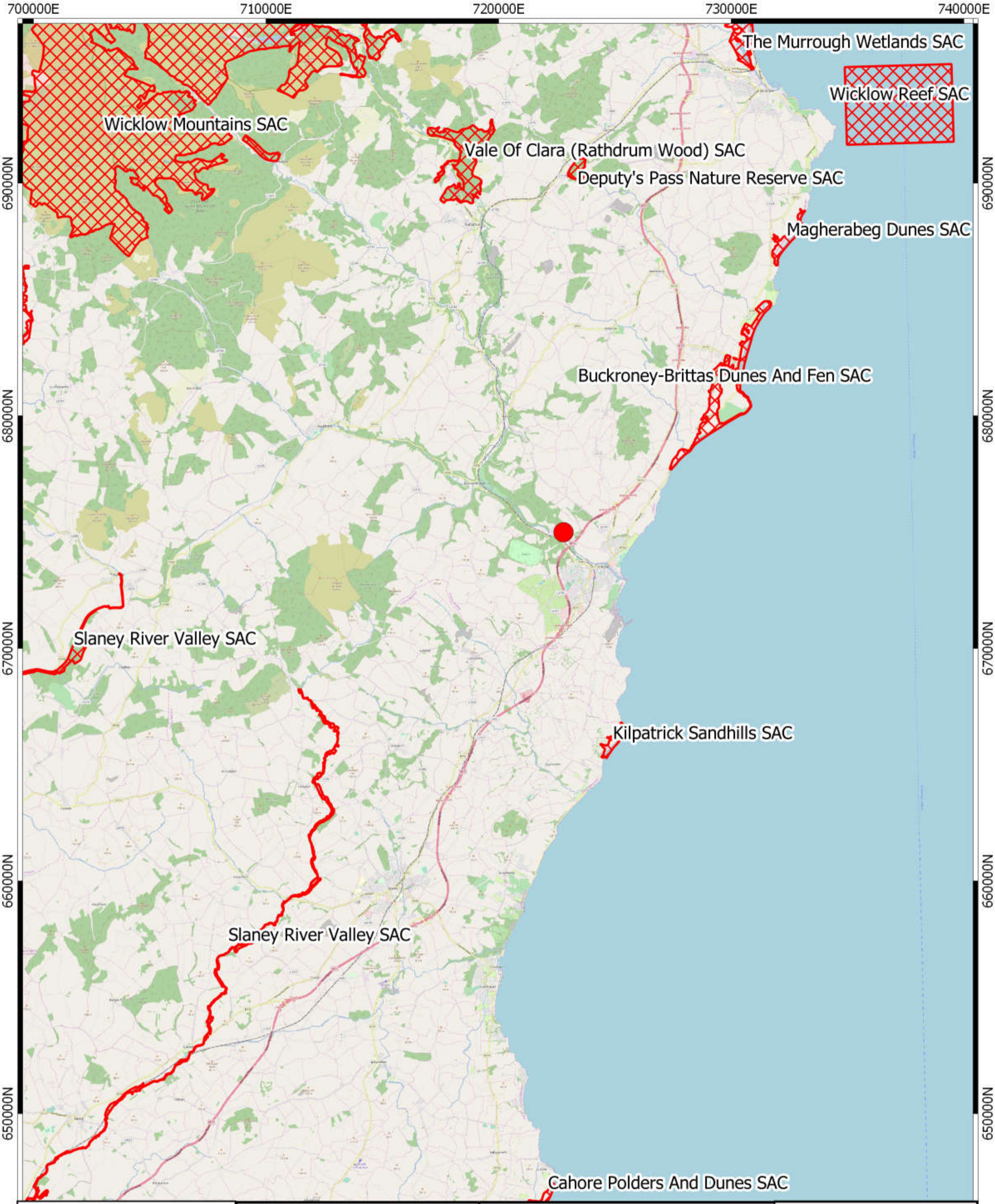
GII Project Reference:
9230-11-19

Drawn By:
BS

Date:
21/11/2019

Indicative Site Boundary

Vulnerability
- E
- H
- L
- M
- X



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FT2

0 2.5 5 7.5 km

Project Title:
Avoca River Park

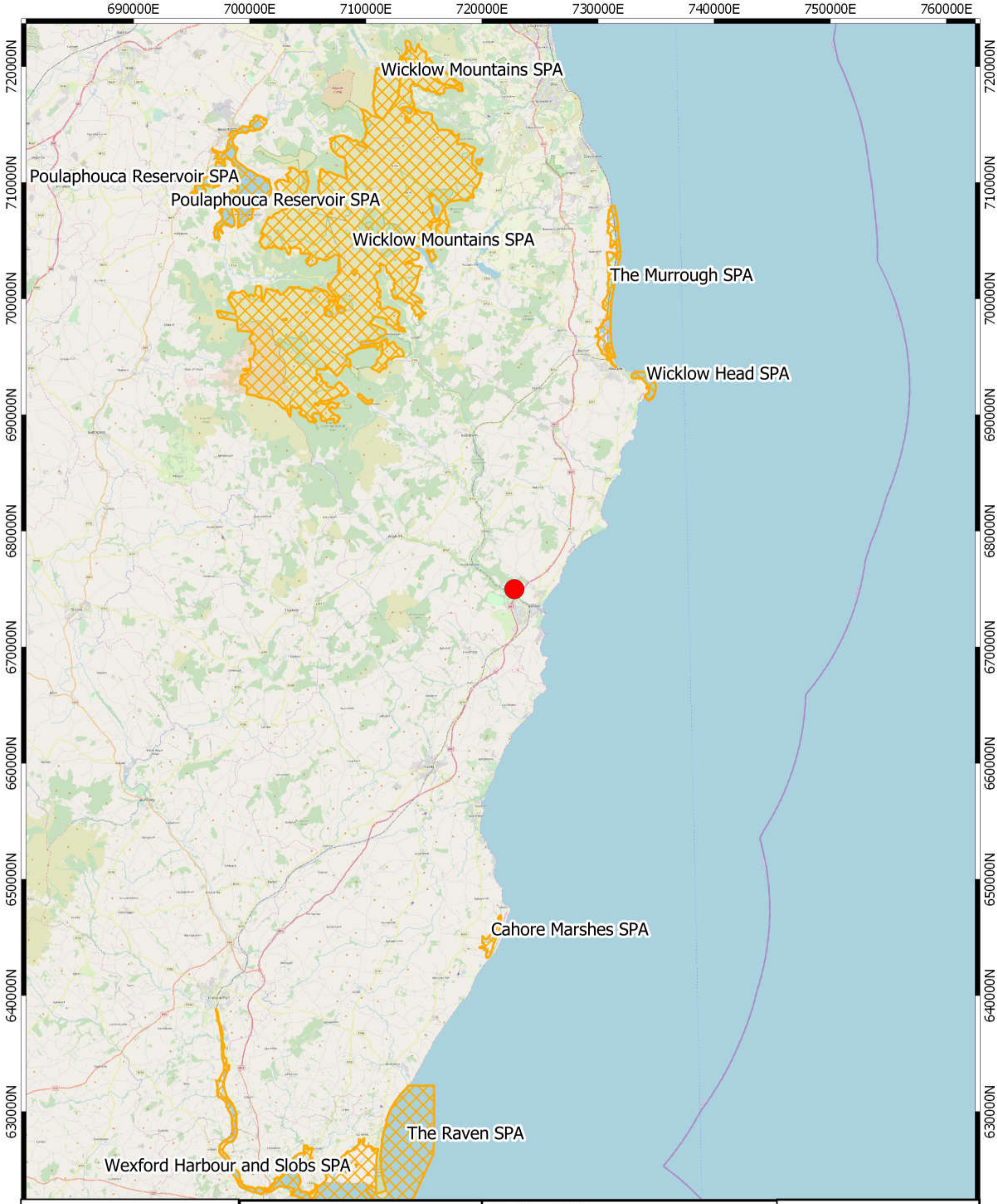
Drawing Title:
Figure 9 Special Area of Conservation

GII Project Reference:
9230-11-19

Drawn By:
BS

Date:
21/11/2019

● Site Location
▨ SAC



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0 1000 2000 3000 4000 m

Project Title:
Avoca River Park

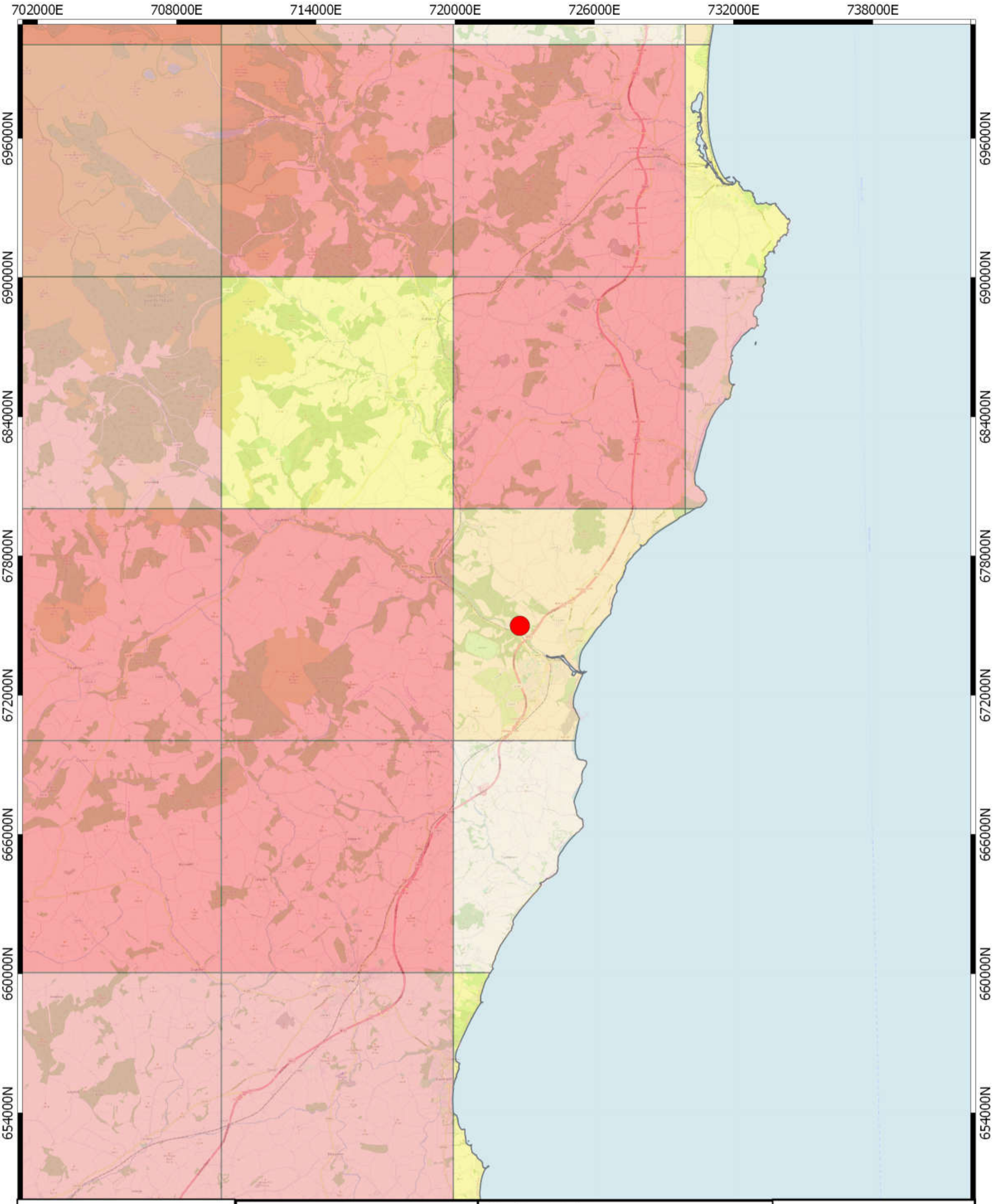
Drawing Title:
Figure 10 Special Protected

GII Project Reference:
9230-11-19

Drawn By:
BS

Date:
21/11/2019

● Site Location
▨ SPA



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Catherinstown House,
Hazelhatch Road,
Newcastle, Co. Dublin
www.gii.ie 01-6015175/5176

Client:

FTSQUARED
FT2

0 2.5 5 7.5 km

Project Title:
Avoca River Park

Drawing Title:
Figure 11 Radon

GII Project Reference:
9230-11-19

Drawn By:
BS

Date:
21/11/2019

● Site Location

Radon
⬜ <1%
🟧 1% - 5%
🟨 5% - 10%
🟥 10% - 20%
🟥 >20%

🟥 Indicative Site Boundary

▭ EPA Licence Boundary

Client:

FTSQUARED

Project Code:

9230-11-19

Project Title:

Avoca River Park

Drawing Title:

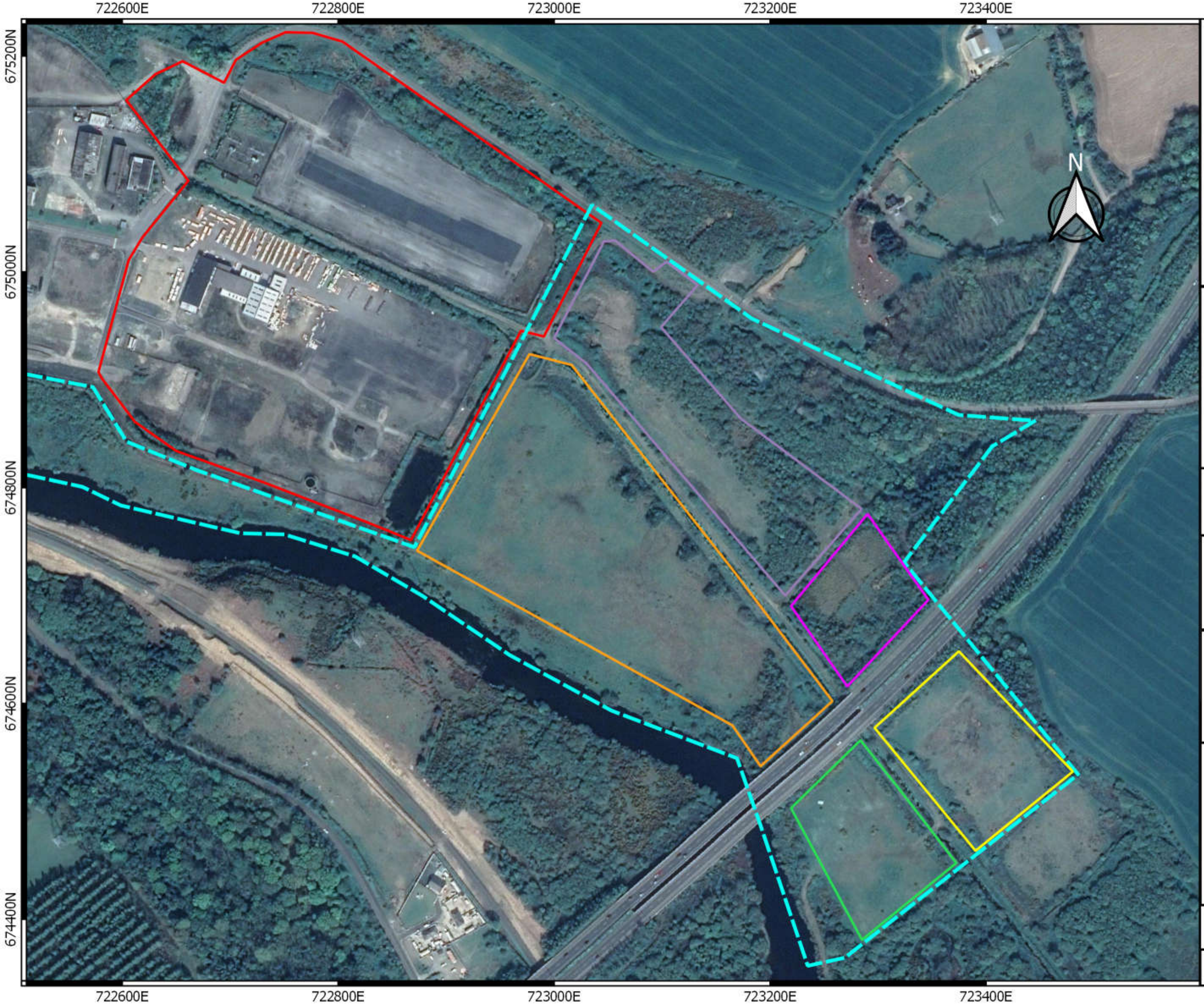
Figure 12 EPA Licence Boundary

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

Ground Investigations Ireland Ltd.
Catherinstown House,
Hazelhatch Road,
Newcastle, Co. Dublin
www.gii.ie 01-6015175/5176

0 30 60 90 120 150 m

Drawn By:	Date:
BS	20/11/2019



Indicative Site Boundary
EPA Licence Boundary
Phosphogypsum Pond
Carbon Black Phosphogypsum Pond
Eastern Landfill North
Eastern Landfill South
Western Landfill

Client:

FTSQUARED

Project Code:

9230-11-19

Project Title:

Avoca River Park
Ground Investigation

Drawing Title:

Figure13 Historical Landfill Cells

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Ground Investigations Ireland Ltd.
Catherinstown House,
Hazelhatch Road,
Newcastle, Co. Dublin
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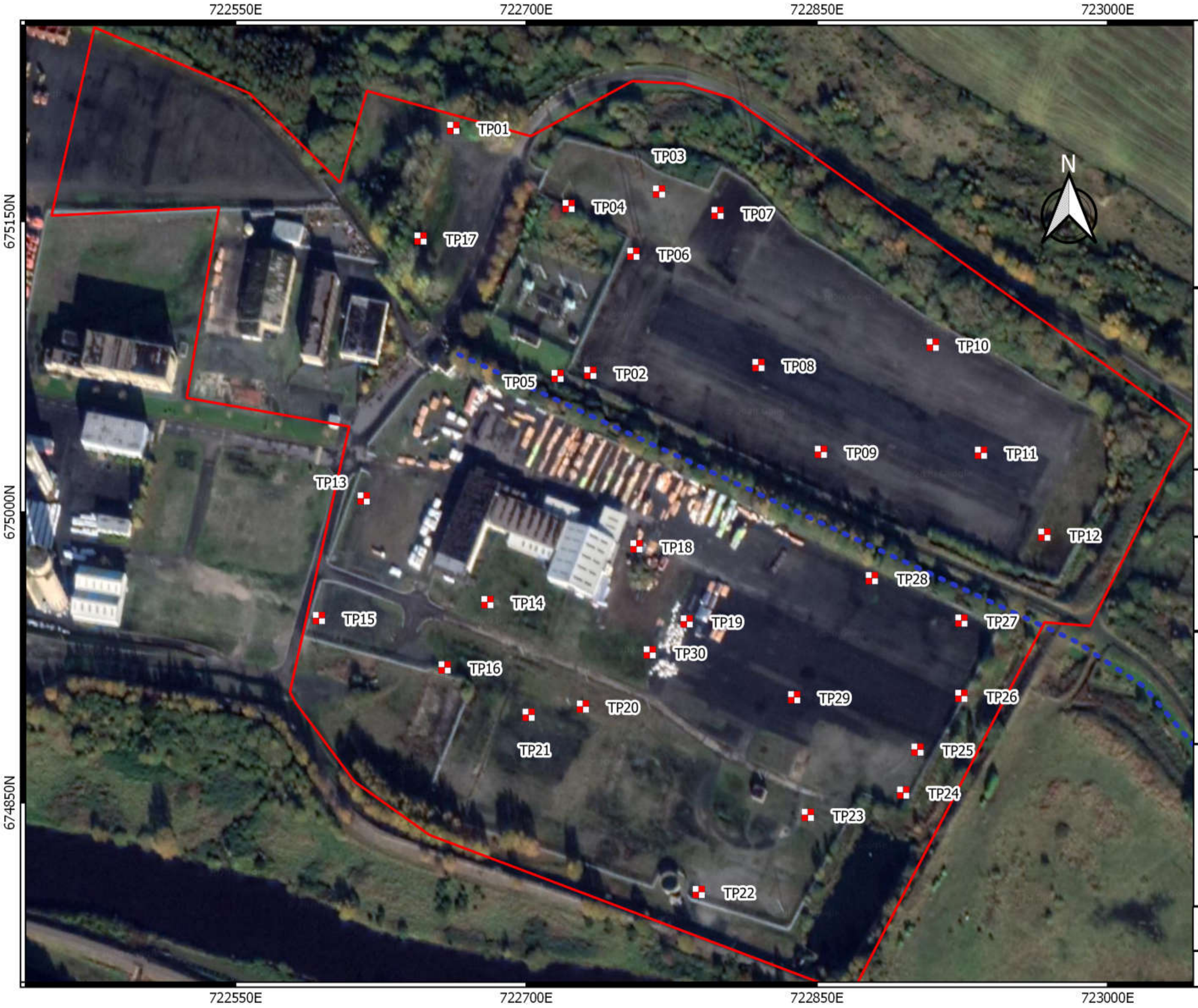
0 50 100 150 m

Drawn By:
BS

Date:
19-01-2020



🟥 Indicative Site Boundary

--- Canal

🟥 Trial Pit

Client:

FTSQUARED

FT2

Project Code:

9230-11-19

Project Title:

Avoca River Park

Drawing Title:

Figure 14 Trial Pit Locations

GROUND INVESTIGATIONS IRELAND
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Ground Investigations Ireland Ltd.
Catherinstown House,
Hazelhatch Road,
Newcastle, Co. Dublin
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Drawn By: BS	Date: 26/05/2020

🟥 Indicative Site Boundary

● Borehole

Client:

FTSQUARED

F T 2

Project Code:

9230-11-19

Project Title:

Avoca River Park

Drawing Title:

Figure 15 Borehole Locations

GROUND INVESTIGATIONS IRELAND
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Ground Investigations Ireland Ltd.
Catherinstown House,
Hazelhatch Road,
Newcastle, Co. Dublin
www.gii.ie 01-6015175/5176

0 30 60 90 120 150 m

Drawn By:
BS

Date:
25/06/2020

APPENDIX 2 – Previous Environmental Risk Assessment

PM
GROUP

ATTACHMENT 2

OMC ENVIRONMENTAL RISK ASSESSMENT

Granary House
Rutland Street
Cork

Tel. (021) 4321521
Fax. (021) 4321522

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ENVIRONMENTAL RISK ASSESSMENT

HOLFELD PLASTICS LIMITED

FORMER IRISH FERTILIZER INDUSTRIES SITE

ARKLOW

COUNTY WICKLOW

Prepared For: -

PM Group
Killakee House,
Belgard Square,
Tallaght,
Dublin 24

Prepared By: -

O' Callaghan Moran & Associates,
Granary House,
Rutland Street,
Cork

June 2011

TABLE OF CONTENTS

PAGE

1. INTRODUCTION

Irish Fertilisers Industries (IFI) operated its fertiliser manufacturing facility in Arklow County Wicklow under an Integrated Pollution and Control (IPC) License (Register No. 31) by the Environmental Protection Agency (Agency). In 2002, fertiliser manufacture stopped and in October 2005 the Licence was transferred to Holfeld Plastics Ltd (Holfeld).

Although fertiliser production ended in 2002, the environmental monitoring programme at the former fertiliser Production Area and adjacent Landfill Areas continued due to the presence of groundwater contamination beneath both areas. This was initially identified during site investigations undertaken in 1994 and subsequent investigations in 1997.

In 2004, Project Management Group (PM) completed an Environmental Risk Assessment that included groundwater modelling to predict long term levels of contaminants in groundwater beneath the former production area. An updated assessment was prepared in 2007, which tracked the progress of the monitored natural attenuation that had occurred.

Based on the reduction in the contaminant levels in the groundwater beneath the production area in line with the predictions of the groundwater modelling completed in 2004 and 2007, Holfeld intends to apply to the Agency to amend the IPPC Licence area to exclude the Production Area. The revised Licence area is shown on Figure 1.1

The Agency has indicated that an application for the revision of the License should include an assessment by an experienced hydrogeologist of the monitored natural attenuation programme from 2007 to date, which should be based on the updated groundwater model (2007) and the Water Framework Directive. The objective is to demonstrate that the groundwater beneath the former production area does not present an environmental or health risk.

PM requested O'Callaghan Moran & Associates (OCM) to undertake the environmental assessment and this report presents the findings. It is based on information on the site history and operations provide by Holfeld Plastics, a review of the reports on the previous site investigations and risk assessments and a site inspection carried out on the 23rd of May 2011.

1.1. Report Contents

Section 2 describes the site layout, site history and the geology and hydrogeology. Section 3 presents a Conceptual Site Model. Section 4 presents an updated risk assessment based on a the groundwater data collected between 2007 and 2011 and surface water monitoring data from the Avoca River collected by OCM in 2011. Section 5 sets out the conclusions and recommendations.

NOTES

LEGEND

REVISED BOUNDARY OF HOLFELD PLASTICS LTD

0 20m 100m

A	FOR INFORMATION						
ISSUE	DESCRIPTION	DRN	CHKD	AUTH CHK	APP	DATE	

CLIENT HOLFELD PLASTICS LTD

PM GROUP

PROJECT EPA SUBMISSION

TITLE REVISED IPPC SITE BOUNDARY FOR HOLFELD PLASTIC LTD.

CLIENT REF 11-131-01
CLIENT DRG No
Figure 1.1
PM DRG No 01258-22-SK-0004

2. SITE DESCRIPTION

2.1. Site Location & Layout

The site is located on the northern bank of the Avoca River approximately 2.5km to the northwest of Arklow (Figure 2.1). The site layout is shown on Figure 2.2. It covers an area of approximately 50 hectares (c.123 acres), of which the Production Area covers approximately 36.5 hectares. Holfeld Plastics occupies the southwest corner of the Production Area.

2.2. Site Activities

Holfeld manufactures rigid plastics packaging, supplying bespoke formings as well as an extensive range of standard trays and containers to customers throughout Europe in both food and non food sectors. The manufacturing activities do not belong to any of the prescribed processes that are subject to IPPC licensing.

2.3. Site History

IFI was a joint venture company formed by state company Nitrigin Eireann Teoranta (NET) and ICI plc, which operated three manufacturing facilities in Cork, Belfast and Arklow. The main products manufactured at Arklow were Calcium Ammonium Nitrate (CAN) and blends. Other nutrients, which complemented the range of fertiliser products were imported and blended as required. Nitric acid was produced mainly as an intermediate, although there was a minor acid sales business.

Facility operations required a typical range of services, including water treatment, steam generation, laboratory activities and storage of raw materials, intermediates, products and ancillary materials. .

IFI was granted the IPC Licence in January 1997. A revised Licence (Register No. 495) was issued in March 2000, which approved significant process changes. In 2002, fertiliser manufacturing stopped and in 2005, following the purchase of the site, the Licence was transferred to Holfeld.

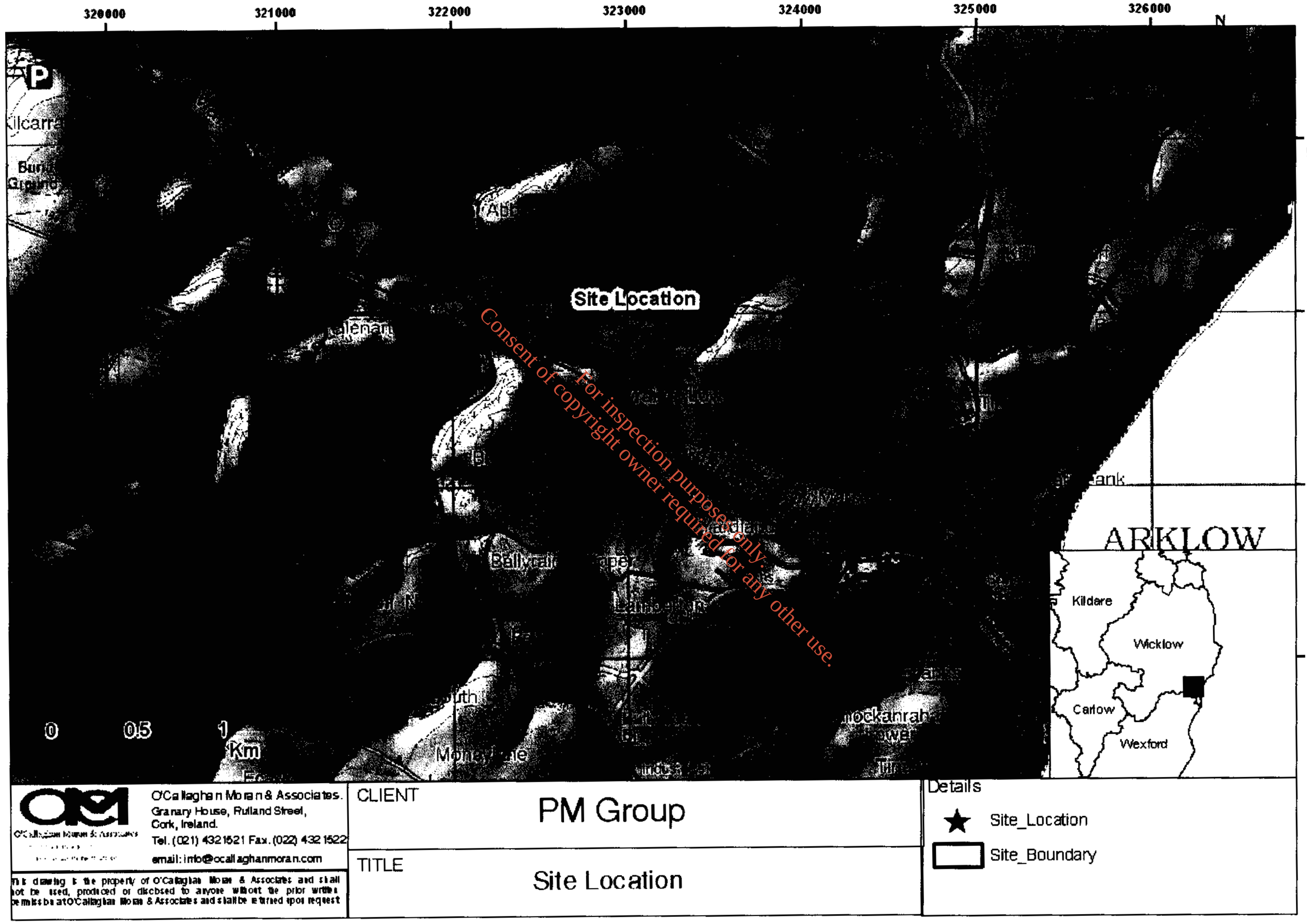
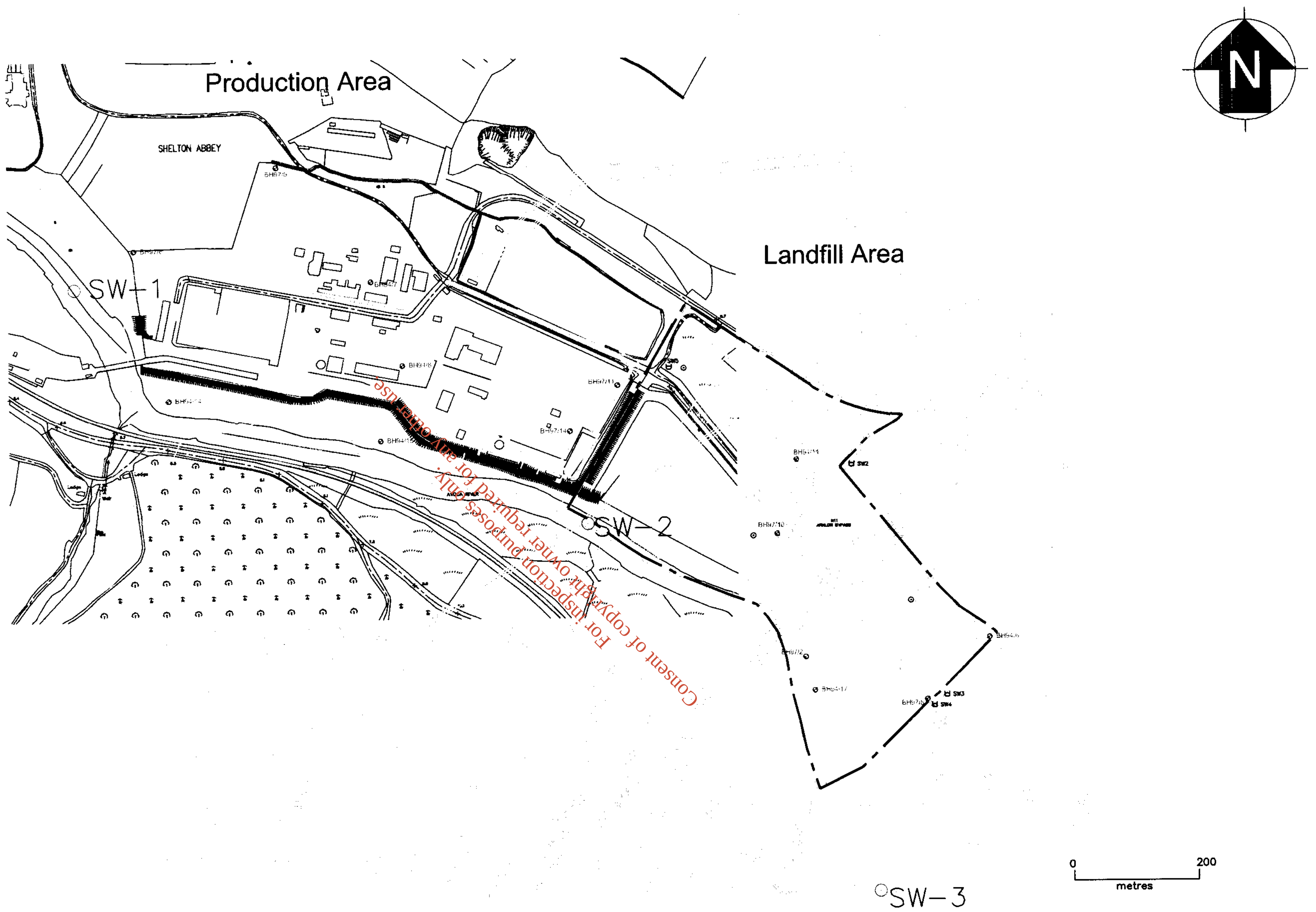


Figure 2.1 Site Location



O' Callaghan Moran & Associates.
Granary House, Rutland Street,
Cork, Ireland.
Tel. (021) 4321521 Fax. (021) 4321522
email : info@ocallaghanmoran.com

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CLIENT	PM Group
TITLE	Site Layout
DRAWING No.	2.2
SCALE	1:6500 A3
REV.	A

NOTES
- ▬ ▬ Revised Boundary of Holfield Plastics
- ○SW-1 Surface Water Monitoring Locations

DOS Filename : *********

Since Holfeld acquired the facility, the final decommissioning of the fertiliser manufacturing area and general site clean-up has been completed. The former bulk storage sheds have been fully refurbished and are now used for plastic product manufacturing.

Earlier studies by IFI had identified known liabilities that have resulted in multiple clean-up projects, these included;

- Decommissioning and removal of production plant
- Hazardous waste disposal
- Refurbishments of bulk storage sheds
- Removal and disposal of asbestos roofing
- Excavation and removal of diesel oil contaminated soils
- Excavation and removal of PCB oil contaminated soils
- General clean-up, reinstatement and landscaping of the site

All remediation projects have been completed and serve to remove all known liabilities from the former production and storage areas.

Table 2.1: Materials Used for Activities at the IFI Site

Material	Activities	Location	By-Products/Wastes
Amine and coating oils	Coating of calcium ammonium nitrate	Main production area	
Ammonia	Manufacture of ammonia	Main production area	Hydrogen sulphide, carbon, carbon dioxide
	Ammonia recovery	Fertilizer production area	
	Manufacture of ammonium sulphate	Fertilizer production area	Ammonium sulphate wastes
	Manufacture of fertilizers	Fertilizer production area	Process condensate containing ammonium nitrate and ammonia
Carbon black	Manufacture of carbon black	Carbon black plant	
Carbon dioxide	Manufacture of carbon dioxide	Ammonia production plant	
	Manufacture of dry ice	Ammonia production plant	
China clay	Coating of fertilizers	Fertilizer production area	China clay
Heavy fuel oil	Manufacture of ammonia, heating	Main production area, Boilers	
Iron pyrites	Manufacture of sulphuric acid	Acid production plant	Iron oxide cinder

Material	Activities	Location	By-Products/Wastes
Limestone /Dolomite	Manufacture of calcium ammonium nitrate	CAN1 granulating and CAN2 prilling plant	Limestone, dolomite
Oils (diesel, engine and hydraulic, transformer, compressor)	Various uses	Stored at western end of process area, garage and engineering workshops	PCB wastes, waste oils
Phosphate rock (crushed)	Manufacture of phosphoric acid	Phosphoric acid plant	Phosphogypsum
Phosphoric acid	Manufacture of phosphoric acid	Phosphoric acid plant	Phosphogypsum
	Manufacture of compound fertilizers	Fertilizer production area	
Potash	Manufacture of compound fertilizers	Fertilizer production area	
Nitric acid	Manufacture of fertilizers	Acid production area	Spent catalysts, filter elements
Solvents and cleaning chemicals	Maintenance and cleaning	All areas	Liquid wastes
Sulphur	Manufacture of sulphuric acid	Acid production area	
Sulphuric acid	Manufacture of ammonium sulphate		
	Manufacture of phosphoric acid	Phosphoric acid plant	Phosphogypsum
	Manufacture of calcium ammonium nitrate	Fertilizer production area	

2.4. Site Investigations

The first site investigations were undertaken in 1994 by ESB International as part of the application for the IPC license. The investigations identified the presence of elevated levels of ammonia, nitrate and sulphate in the subsoil and groundwater.

In 1995 Bord-na-Mona completed a review of the findings of the ESBI investigations, following which more detailed investigations were undertaken by Conestoga-Rovers and Associates (CRA) in 1997. This identified the presence of groundwater contamination (ammonia, sulphate and nitrate) plume and included an assessment of the impacts on the Avoca River.

In addition to the elevated inorganic parameters, localised hydrocarbon contamination was identified around oil storage areas and polychlorinated biphenyls (PCB) were detected in the subsoils at transformer stations. The hydrocarbons and PCB contaminated soils were removed in the 2006. The report on the 1994, 1995 and 1997 investigations are in the CD in Appendix 1

In 2004, PM completed an Environmental Risk Assessment incorporating a quantitative risk assessment using the Modflow groundwater modelling programme. The modelling predicted rates of attenuation of the nitrate and ammonia plume over a 10 year period. In 2007, the assessment was reviewed and revised to include an assessment of the nitrogen loadings to the Avoca River. Copies of the PM reports are included in Appendix 2

Since 2004, PM has conducted annual groundwater monitoring at the facility, with the results reported to the Agency in the Annual Environmental Report (AER). A copy of the 2010 AER is included in Appendix 2. This AER includes groundwater monitoring data from July 1997 to February 2011.

2.5. Hydrology

The site is on the floodplain of the Avoca River. Surface run-off from the high ground to the north drains to the floodplain and into the river. The poorly draining lands at the margins of the flood plain have been drained to improve the lands locally up and downstream of the site. The Shelton Abbey Canal runs through the site, parallel to the river and enters the Avoca River down stream in Arklow.

2.6. Geology and Hydrogeology

OCM established the site geology and hydrogeology from a review of databases maintained by Geological Survey of Ireland (GSI), Teagasc and the reports on the previous site investigations

2.6.1. Subsoils

According to the Teagasc soil maps (Figure 2.3), the majority of the site is covered by made ground. Closer to the river, the subsoils comprise alluvium as would be expected given the location of the site in the floodplain of the river.

The site investigation confirmed the presence of between 1 to 3m of fill comprising topsoil, coarse gravels and cobbles. . Beneath this is a clay layer containing sandy silt with intermittent peat ranging in thickness from 3-7m. The peat is thicker toward the southeastern end of the Production Area and increases in thickness moving further southeast under the Landfill Area.

The clay and peat is underlain by fine to coarse gravels with occasional large cobbles and bolder, probably indicating the presence of ancient river channels. The gravels range in thickness from 15- 18m and extend in depth to 24m below ground level and comprise an upper, middle and lower zone, separated by thin lenses of poorly permeable clays and silts. The total subsoil thickness ranges from at least 22m beneath the Production Area, to greater than 24m beneath the Landfill Area.

2.6.2. Bedrock

The bedrock beneath the majority of the site comprises Ordovician metasediments primarily dark, grey slate, with minor pale sandstone from the Kilmacrea Formation (Figure 2.4). A small portion of the Production Area is underlain by green, red-purple, buff slate, siltstone from the Oaklands Formation. The bedrock outcrops in the high ground to the north of the site and the bedrock surface slopes from the north to south beneath the river valley.

The bedrock is classified as a Locally Important Aquifer that is productive only in Local Zones (**Ll**) (Figure 2.5). These types of aquifers are generally described as poor aquifer that are only capable of supplying water to individual dwellings or farm holdings and typically are poorly yielding in drier periods of the year.

The GSI Vulnerability Map for Wicklow (Figure 2.6) indicates that the vulnerability of the bedrock aquifer is Low (**L**). However, it is considers that the gravel deposits overlying the bedrock are water bearing and provide bank storage for the Avoca River.

2.6.3. Groundwater Flow Direction

The groundwater flow direction beneath the Production Area was calculated using water levels data from the on-site monitoring wells (BH-97/10, 94/15, 94/14, 97/2, 94/11, 97/9, 97/6, 94/6, 97/14, 94/7 and 94/8) recorded on June 11th 2010 and the ordnance levels provided in the CRA 1997 Report.

In three of the wells (94/7, 94/14 and 94/15), the groundwater level is much higher (c. 0.4-1.2m) than in the other wells. Two of these wells (94/14 and 94/15) are located along the southern site boundary close to the river with the third well toward the centre of the site further north. The construction logs for these wells indicate the presence of much thicker sequences of silt and clay compared to the other wells. It is considered that high water levels in these wells is a result of increased pressure head levels backing up the groundwater due to more poorly permeable subsoils inhibiting discharge to the river.

The direction of flow, which is shown on Figure 2.7, is generally from north to south, with a possible localised slightly southeast component toward the Avoca River.

2.6.4. Nearby Wells

A search of GSI records did not identify any wells within 500m of the site. The closest known wells are at Shelton Abbey and are 750 northwest and up hydraulic gradient of the site.

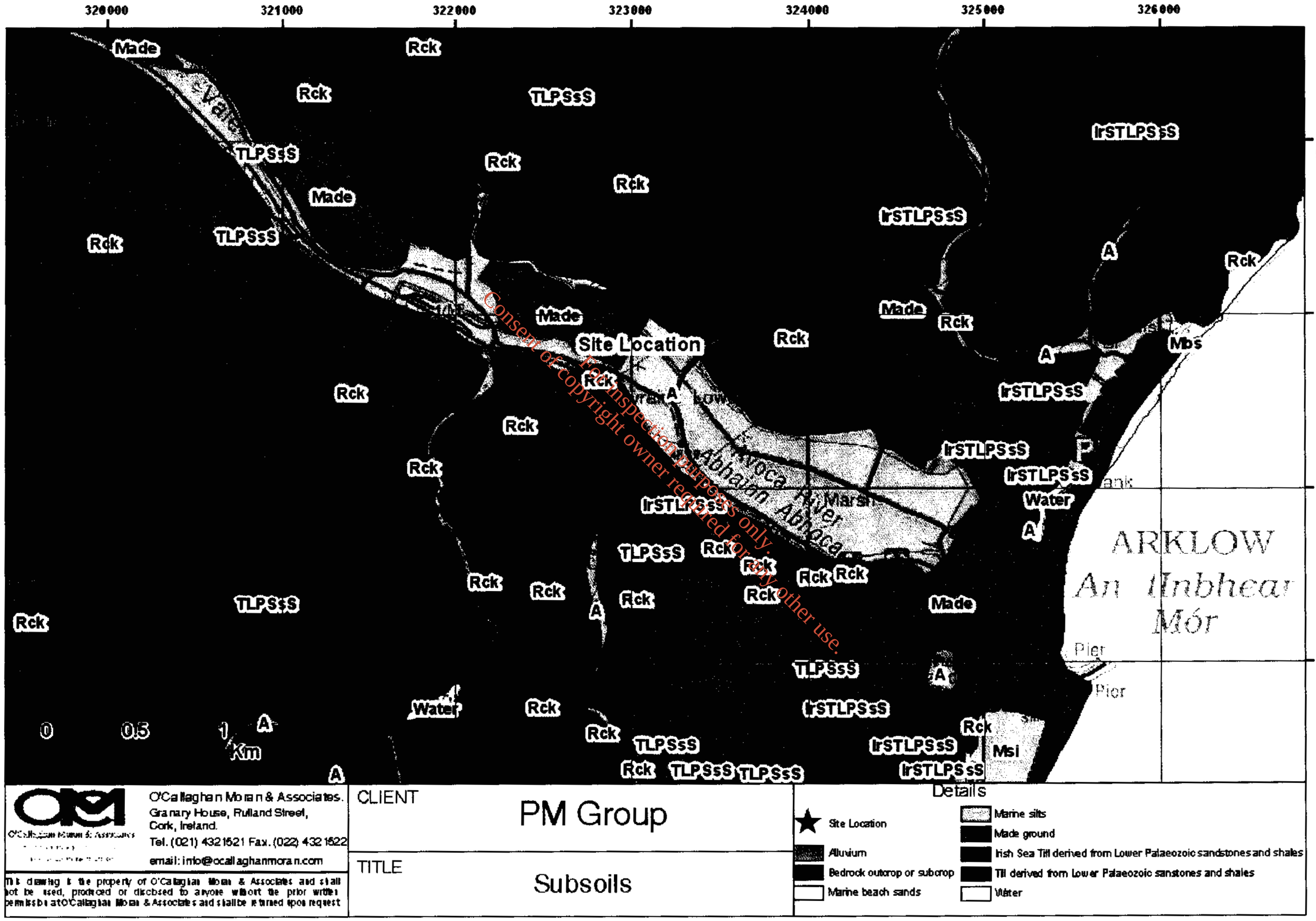

Figure 2.3 Subsoils

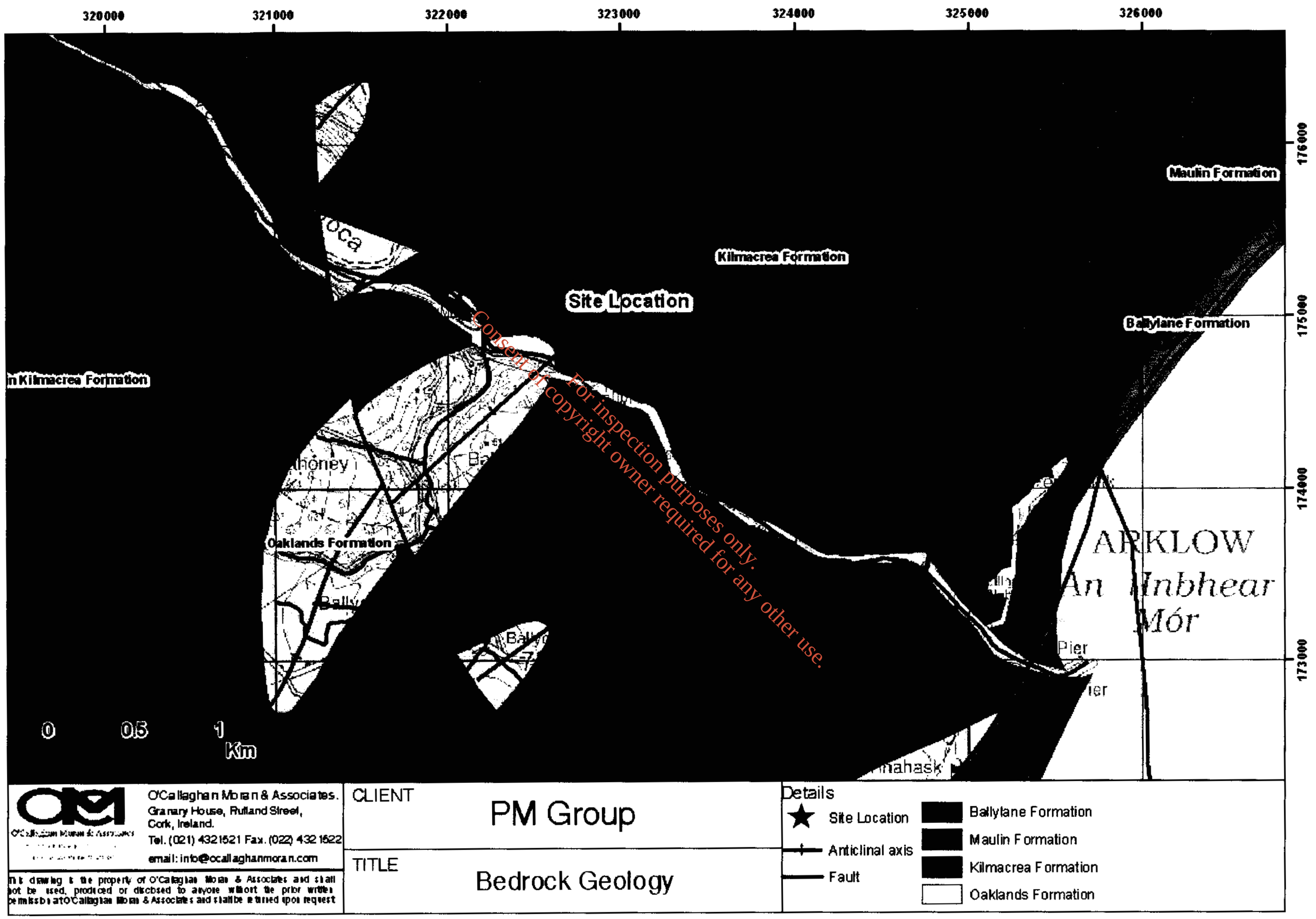

Figure 2.4 Bedrock Geology

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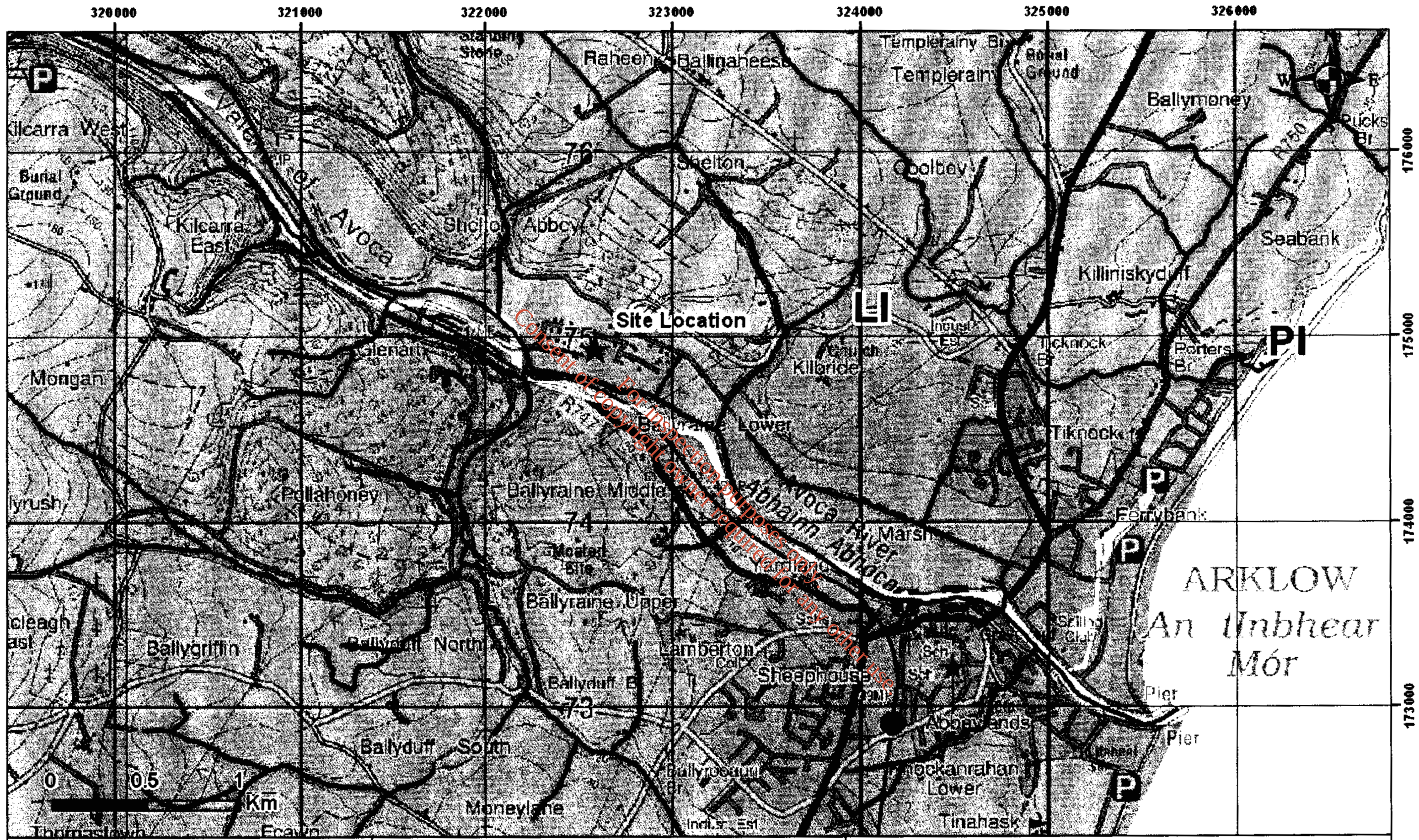

O'Callaghan Moran & Associates.
Granary House, Rutland Street,
Cork, Ireland.
Tel. (021) 4321521 Fax. (022) 432 1522
email: info@ocallaghanmoran.com

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CLIENT
PM Group

TITLE
Bedrock Aquifer

Details
★ Site Location ▨ LI ☐ PI

Figure 2.5 Bedrock Aquifer

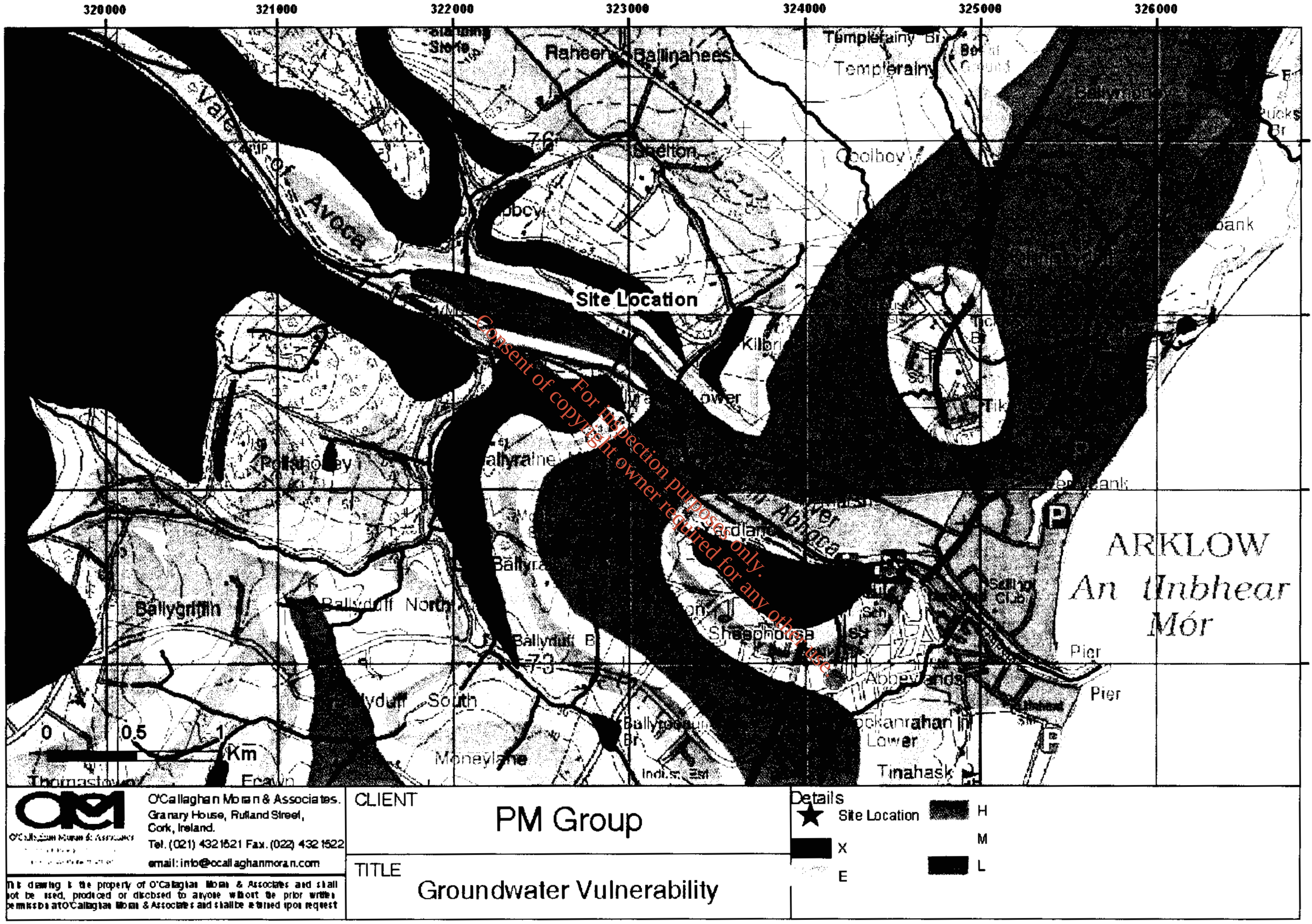
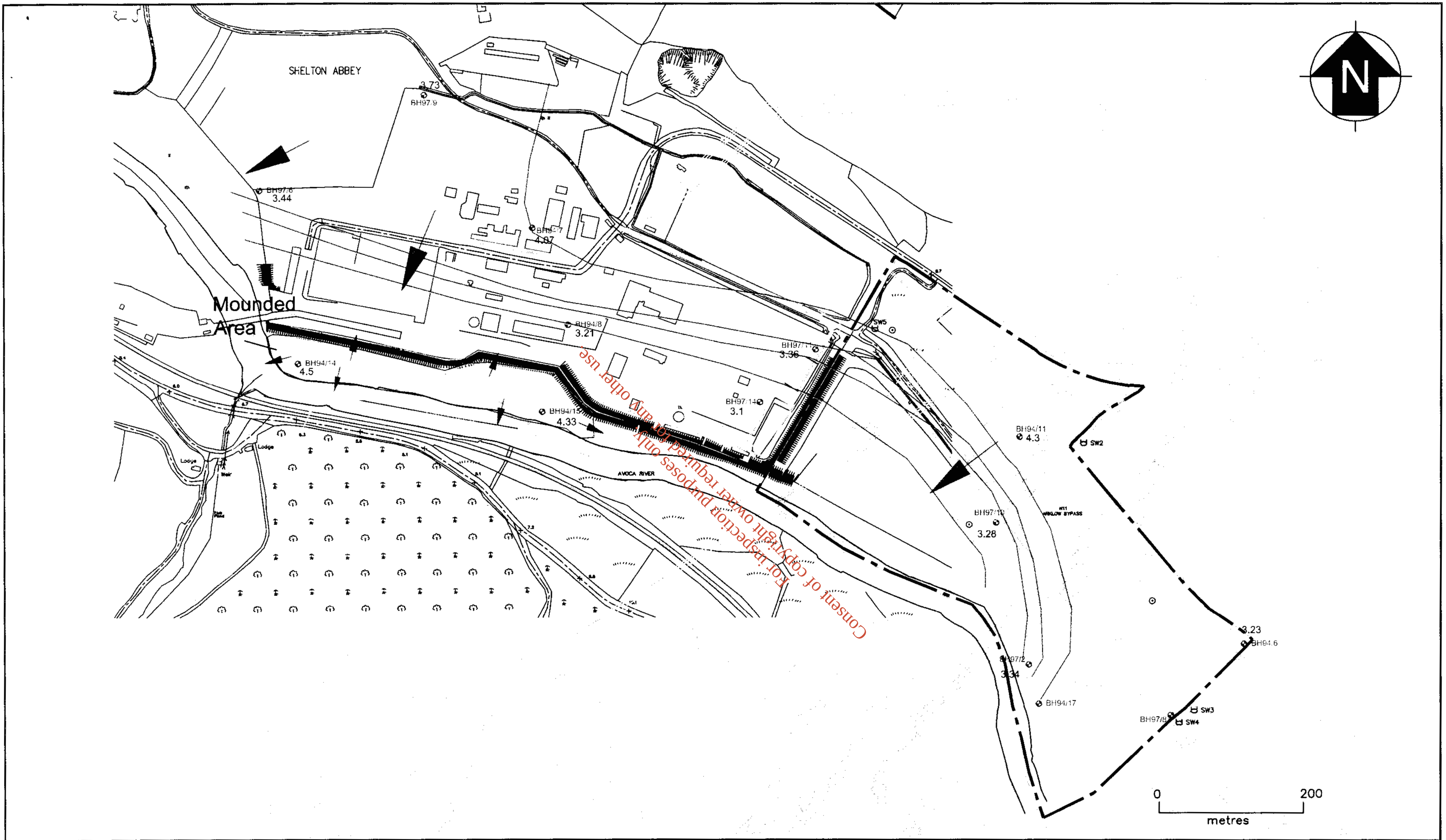


Figure 2.6 Aquifer Vulnerability



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O' Callaghan Moran & Associates.
Granary House, Rutland Street,
Cork, Ireland.
Tel. (021) 4321521 Fax. (021) 4321522
email : info@ocallaghanmoran.com

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PM Group

TITLE
Groundwater Flow Direction

DRAWING No.
2.7

SCALE
1:5,000
A3

REV.
A

NOTES

◄	Groundwater Flow Direction
︵	Groundwater Contour
︵︵	River Channel
▬ ▬	Revised Boundary of Holfield Plastics

DOS Filename : *********

3. CONCEPTUAL SITE MODEL

A Conceptual Site Model (CSM) was developed based on the findings of the various site investigations undertaken at the site between 1994 and 1997 and the site inspection undertaken by OCM in May 2011. This is shown on Figure 3.1.

This is based primarily on a long section, running west to east across the Production Area and was updated to reflect OCMs interpretation of the site hydrogeological information.

Most of the Production Area is covered by either, buildings, roads, tarmacadam, gravel hard core or asphalt paved former fertiliser storage areas. A small portion of the site along the river is landscaped with coniferous forestry and grassland.

The upper 1-3m of subsoils comprises topsoil, coarse gravels and cobbles. Beneath the fill, is a layer of silt/clay with peat along the southeast section, which increases in lateral and vertical thickness beneath the landfill area. The silt/clay layer ranges in thickness from 4 to 7 m moving from northwest to south east, but the layer is interspersed with gravel lenses toward the middle of the site. The silt/clay layer is underlain by a sequence of gravels with interspersed clay lenses which are up to 15m thick.

CSA delineated an upper, middle and lower gravel zone separated by thin extensive but discontinuous lenses of clay. Because these clay lenses are not continuous, there is some hydraulic connectivity between the gravel layers. Within the gravel layers, grain sizes range from fine to coarse, with occasionally very large cobbles and boulders. The underlying bedrock is classified as a Poor Aquifer with limited vertical groundwater movement.

Direct infiltration to the subsoils is limited to the small hard core covered or landscaped areas. It is possible the original construction of the fertiliser plant involved either piling through the silt/clay layers or excavation of the clay down to the gravels to foundation formation levels. This could have opened pathways from the ground surface through the silt/clay and into the gravels

The monitoring wells are exclusively screened in the gravel zones. The water levels recorded in June 2010 are all above the top of the gravel on average between 1.5 and 3m below ground level and c. 3-4.5m above the top of the upper gravel zone. The water levels indicate that the silt/clay layer is acting a confining layer above the gravel zone

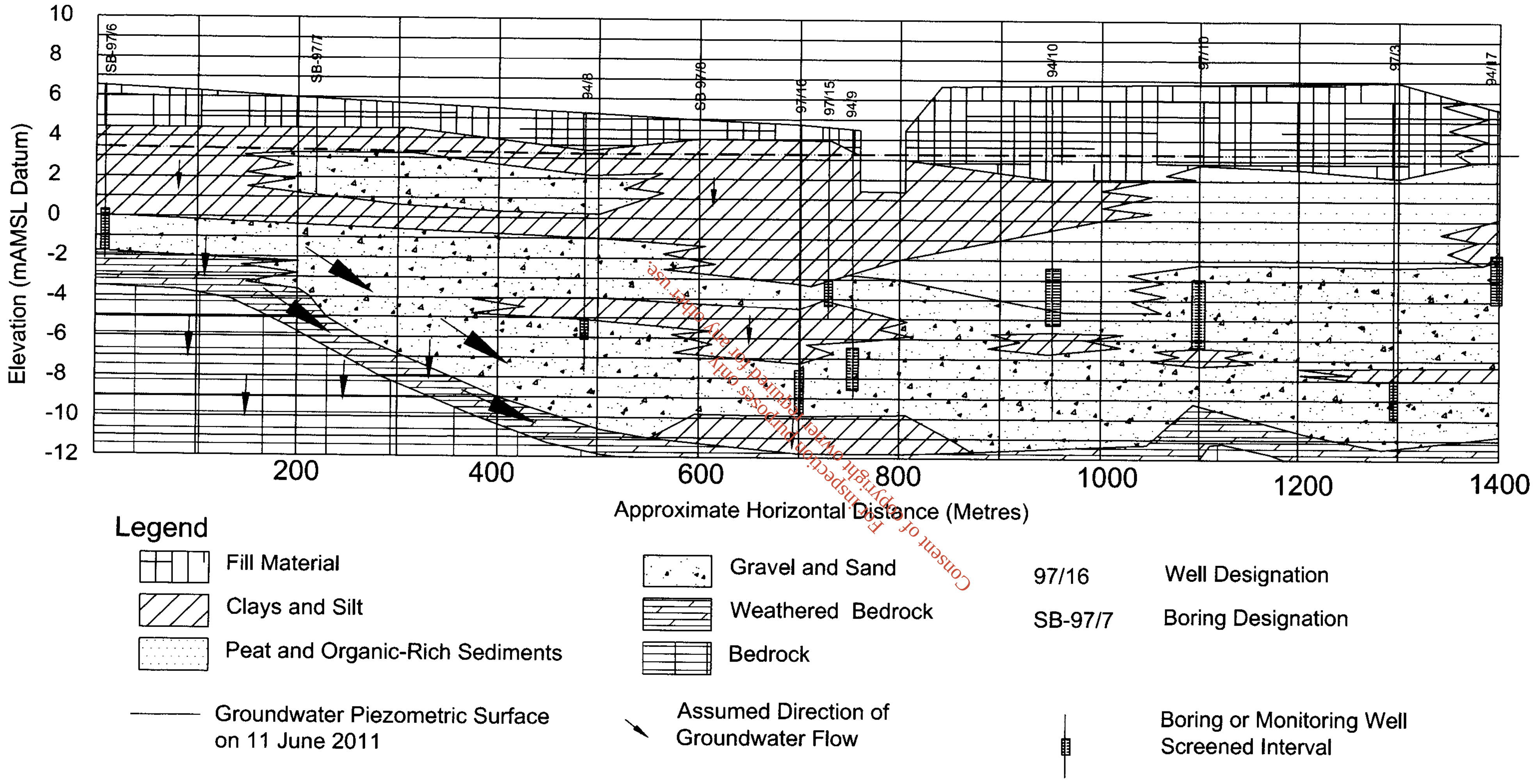
The ground water in the gravels is semi-confined, with some leakage between the upper, middle and lower gravel zones. This is based on CRA report of higher concentrations of contamination in the upper gravel zone with decreasing amounts in the lower gravel zones.

Much of the groundwater throughput originates in the high ground to the north of the site. In 1997, CSA considered that groundwater movement beneath the Production Area was to the west, south and southeast from a high point beneath the Production Area. They indicated a hydraulic gradient ranging form 0.05 -0.5% beneath the Production area, with a much shallower gradient beneath the Landfill Area.

The average hydraulic conductivity for the gravels was estimated at 35m/day, with an aquifer flow velocity of between 0.09 and 0.9m assuming a porosity of 20%. They also concluded that the fastest flow velocities occurred in the northwest of the Production Area, while the slowest flow velocities occur in the east.

The 2010 groundwater level data also indicates mounding or increased hydraulic head in the central and southern part of the Production Area with a gradient indicating flow to the east and west from the this mound area. Over the remainder of the site, the flow is from the northwest to the southeast toward the river.

Conceptual Site Model



O' Callaghan Moran & Associates.
Granary House, Rutland Street,
Cork, Ireland.
Tel. (021) 4321521 Fax. (021) 4321522
email : info@ocallaghanmoran.com

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CLIENT
PM Group

TITLE
Conceptual Site Model

DRAWING No.
3.1

SCALE
1:
A3

REV.
A

NOTES

DOS Filename : *********

4. ENVIRONMENTAL RISK ASSESSMENT

This assessment focuses on the groundwater quality beneath the Production Area and the surface water quality in the Avoca River, which is the closest sensitive off-site receptor for groundwater movement from the site.

4.1. Contaminant Sources

The primary contaminant sources included the handling and storage of the compounds used in the fertiliser manufacture (anhydrite, ammonia, dolomite and gypsum); oil storage, and PCB containing electrical equipment. The oil and PCB contaminated subsoils were removed from the site in 2006, which eliminated this source. All fertiliser manufacturing compounds and finished product were removed from the site during the decommissioning process, thereby eliminating this primary source.

4.2. PM 2004/2007 Risk assessment

The assessment modelled the decline in the concentrations of ammonia and nitrate in the groundwater due to natural attenuation over a 10 year period. PM also completed an assessment of the nitrogen and ammonia loading to the Avoca River and the potential risk posed to the aquatic resources downstream.

4.2.1. Groundwater Model Inputs

The predictive model used to calculate the predicted concentrations of ammonia and nitrate over time was the United States Geological Survey modelling Engine MODFLOW. This model requires a range of hydrological, hydrogeological and meteorological input criteria. Some of the criteria applied were site specific, based on data obtained from the site investigations, while others where based on desk study information. These are summarised in Table 4.1

Table 4.1: *Initial Model Inputs*

Parameter	Value*	Range (from texts)
SS (specific storage)	1 × 10^{-5} m^{-1}	N/A
Sy (specific yield)	0.2	0.12 to 0.35
Total Porosity	0.3	0.25 to 0.4
Effective Porosity	0.15	0.13 to 0.2
Recharge	1000 mm/yr	N/A
Evapotranspiration	No data available	N/A
K (layer 1)	K=0.0001 m/s (from ESB/CRA reports)	N/A
K (layer 2)	K=0.00042 m/s (from ESB/CRA reports)	0.01 to 0.0001

* Values used were based on model defaults, unless otherwise stated.

No value was entered for evapotranspiration, presumably as most of the Production Area is covered by paving and evapotranspiration is not significant.

The hydraulic conductivity (K) was assigned for the upper fill zone and the lower gravel zone. While the gravels comprise three units separated by partially confining silt and clay layers, the layers are not continuous and the assumption of treating them as a single unit is conservative. This may however affect the model predictions in those parts of the site underlain by greater thicknesses of peat or clay, for example the southern/south eastern section of the Production Area.

A Recharge Value of 1000mm/yr was applied. The main parameters involved in recharge rate estimation are annual rainfall, annual evapotranspiration and annual run-off. Since it was decided that evapotranspiration was negligible, the total potential recharge is assumed to infiltrate to the groundwater system.

This is an over estimate of the amount of recharge. Best practice guidance was developed by the Irish Groundwater Working Group (2005), as part of the implementation of the Water Framework Directive 2000 to assess the level of recharge through a range of different soil types in Ireland, indicates that for gravels the maximum amount of recharge that would occur is 90% of the Potential Recharge.

The inputs are considered to be within acceptable ranges and are generally conservative.

4.2.2. Predicted Ammonia Levels

Table 4.2 is from the 2007 PM Report and shows the maximum predicted concentration of ammonia in the groundwater beneath the site over a 10 year period, starting in 2007.

Table 4.2 Maximum Ammonia Concentrations 2007 - 2017

Time Period	Maximum Predicted Concentration (mg/l)*	Cumulative Reduction (%)
Today (Day 1)	467	
6 Months	286	38.8
1 Year	239	48.8
2 Years	133	71.5
3 Years	92	80.3
5 Years	19	95.9
7 Years	6	98.7
10 Years	1	99.8

*These values have been extrapolated from contour plots

The model predicts that by 2010, the concentration of ammonia in any of the on-site groundwater wells should not exceed 92mg/l.

4.2.3. Predicted Nitrate Levels

Table 4.3 shows the maximum predicted concentration of ammonia in the groundwater beneath the site over a 10 year period, starting in 2007.

Table 4.3 Maximum Nitrate Concentrations 2007 – 2017

Time Period	Maximum Predicted Concentration (mg/l)	Cumulative Reduction (%)
Today (Day 1)	1181	
6 Months	718	39.2
1 Year	571	51.7
2 Years	369	68.8
3 Years	231	80.4
5 Years	105	91.1
7 Years	50	95.8
10 Years	14	98.8

The model predicted that the concentration of nitrate in any of the groundwater wells on site by 2010 should not exceed 231mg/l.

4.2.4. Real Time Data

The ammonia and nitrate levels recorded in the annual groundwater monitoring conducted in the 12 on-site monitoring wells are presented in Tables 4.4 and 4.5, which includes data from July 1997 to February 2011. It was not possible to collect a sample from well 94/14 in 2010 as it was blocked during the monitoring event. OCM unblocked and sampled this well in June 2011.

With the exception of monitoring wells 94/14 (272mg/l) and 94/15 (220mg/l) located in the southwest and south east sections of the Production Area respectively, just before the Avoca River, all ammonia levels were below the predicted model outputs.

In the case of nitrate, with the exception of monitoring well 94/15, the levels in all wells in the Production Area show nitrate levels below the predicted model values.

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Table 4.4
Groundwater Analytical results for **Ammoniacal Nitrogen** (mg/l) Results
July 97 to February 2011

Borehole Number	Jul-97	Jan-98	Aug-98	Mar-99	Sep-99	Apr-00	Sep-00	Mar-01	Sep-01	Feb-02	Sep-02	Mar-03	Sep-03	Feb-04	Sep-04	Jun-06	Mar-07	Nov-07	EPA Mar 08	Nov-08	EPA Jun - 09	Oct-09	Jun-10	Aug-10	Feb-11	Jun-11
97/2	6.0	0.8	4.4	4.4	2.8	4.7	4.8	13.2	11	10	8.9	18	27	26	7	<0.1	20	90	2.4	21	28	50	39	26	24	
97/6	0.7	1.4	1.0	2.6	1.2	0.4	0.1	4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.09	0.1		0		<0.1	<0.1		0.12	
97/9	0.2						<0.1	<0.1					<0.1		<0.09	<0.1	0.6	0.1		0		<0.1	<0.1		<0.1	
97/10	116.0	44.8	34.0	41.7	33.5	30.7	29.8	38.5	37	39	26	37	25	17	18	8	16	9.5		10		11	9.3		8.7	
97/11	0.4						0.9						0.1					0.16		0.3		0.57	0.39		0.37	
97/14	507.0						328						487			55	237	7.2		4.3		5.6	5.6		4.7	
94/6	1.9	1.7	1.7	0.9	1.7	1.6	<0.1	1.6	1.3	1.8	0.8	1	3.5	1	9	1	1.4	1.2		1.4		1.2	1.5		1.4	
94/7	321.0						140						73			22	58	49		42		50	33		44	
94/8	437.0						156						262			3.7				79		102	91		89	
94/11	1.9						<0.1						0.2							/						
94/14	824.0	620.0	154.0	2.1	589	561	580	497	632	438	571	335	0.1	59	249	283	365	0.1	324	278	339	186				272
94/15	4230.0	3210.0	4600.0	4209.0	3420	3274	2544	2690	3140	639	516	42	2280	96	418	218	391	320	310	285	295	304	242	234	220	

Figures in Red represent EPA monitoring carried out

NR = No Result

mg/l = Milligrams per litre

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Table 4.5
Groundwater Analytical Results for **Nitrate** (mg/l)
July 97 to February 2011

Borehole Number	Jul-97	Jan-98	Aug-98	Mar-99	Sep-99	Apr-00	Sep-00	Mar-01	Sep-01	Feb-02	Sep-02	Mar-03	Sep-03	Feb-04	Sep-04	Jun-06	Mar-07	Nov-07	EPA Mar 08	Nov-08	EPA Jun 09	Oct-09	Jun-10	Aug-10	Feb-11	Jun-11
97/2	43	44	48	183	69	87	84	74	82	61	85	75	61	55	29	3	17	0.8	25	17	25	1	0.6	28	19	
97/6	6	25	23	17	<1	7	2	12	9	6.5	12	6	12	9	22	28	2	11		11		2	9		4	
97/9	99						59	81					60		48	35	39	35		31		33	33		32	
97/10	1	<5	<1	<1	36	2.4	1	<0.5	<0.5	<0.5	<0.5	0.6	<0.5	<0.5	0.68	<0.5	0.5	0.5		0.5		1	<0.5		<0.5	
97/11	14						<0.5						0.6					0.5		0.5		1	<0.5		<0.5	
97/14	86						96						101			108	41	88		73		77	50		62	
94/6	<1	<5	<1	7	<1	2.9	6	1	<0.5	<0.5	<0.5	0.8	0.6	<0.5	0.69	<0.5	0.5	0.5		0.5		1	0.6		<0.5	
94/7	929						312						242			101	186	196		133		66	46		22	
94/8	1281						403						298			47				140		88	85		54	
94/11	2						4						5													
94/14	1803	1004	1700	1270	1470	625	1815	1137	836	1244	1016	1033	0.6	236	660	258	597	319	416	270	338	104				85.6
94/15	/	7830	13120	9675	4685	7035	6348	5733	6049	1428	1739	123	3606	3033	1529	556	816	612	576	506	530	524	455	386	349	

Figures in Red represent EPA monitoring carried out

NR = No Result
mg/l = Milligrams per litre

4.2.5. OCM Assessment

The PM model predicts that within 10 years i.e. by 2017 there will have been a 99.8% reduction in ammonia and a 98.8% reduction in nitrate in the groundwater beneath the site as a result of natural attenuation.

The monitoring has confirmed that, in general, the decline predicted by the model has occurred. The actual concentrations of ammonia recorded in February 2011 are lower than predicted values for this year in all but two wells (94/14 and 94/15) and for nitrate the predicted level is only exceeded in one well (94/15).

There are up to 6m of clays and silts above the gravels at monitoring wells 94/14 and 94/15. Figure 4.1 shows a north south cross section compiled by CRA in 1997 across the production area indicating the presence of very thick clays in the vicinity of 94/15 just north of the river.

The 2010 groundwater level data shows that the water level in 94/14 and 94/15 is c.1-1.2m higher than the wells immediately to the north (97/6, 94/6, 97/11). This indicates that the water table in the vicinity of these wells is at least partially confined and that there is limited hydraulic connection with the Avoca River in this area.

The reduction of ammonia levels in groundwater is a primarily linked to the oxygen concentration, which controls the rate of transformation to nitrate. It is likely that the oxygen levels in the groundwater at wells 94/14 and 94/15 are lower than elsewhere across the site due to the presence of larger amounts of clay/silt and the reduction in flow rates to the river. Dissolved oxygen levels in 94/14 measured in June 2011 were only 5mg/l.

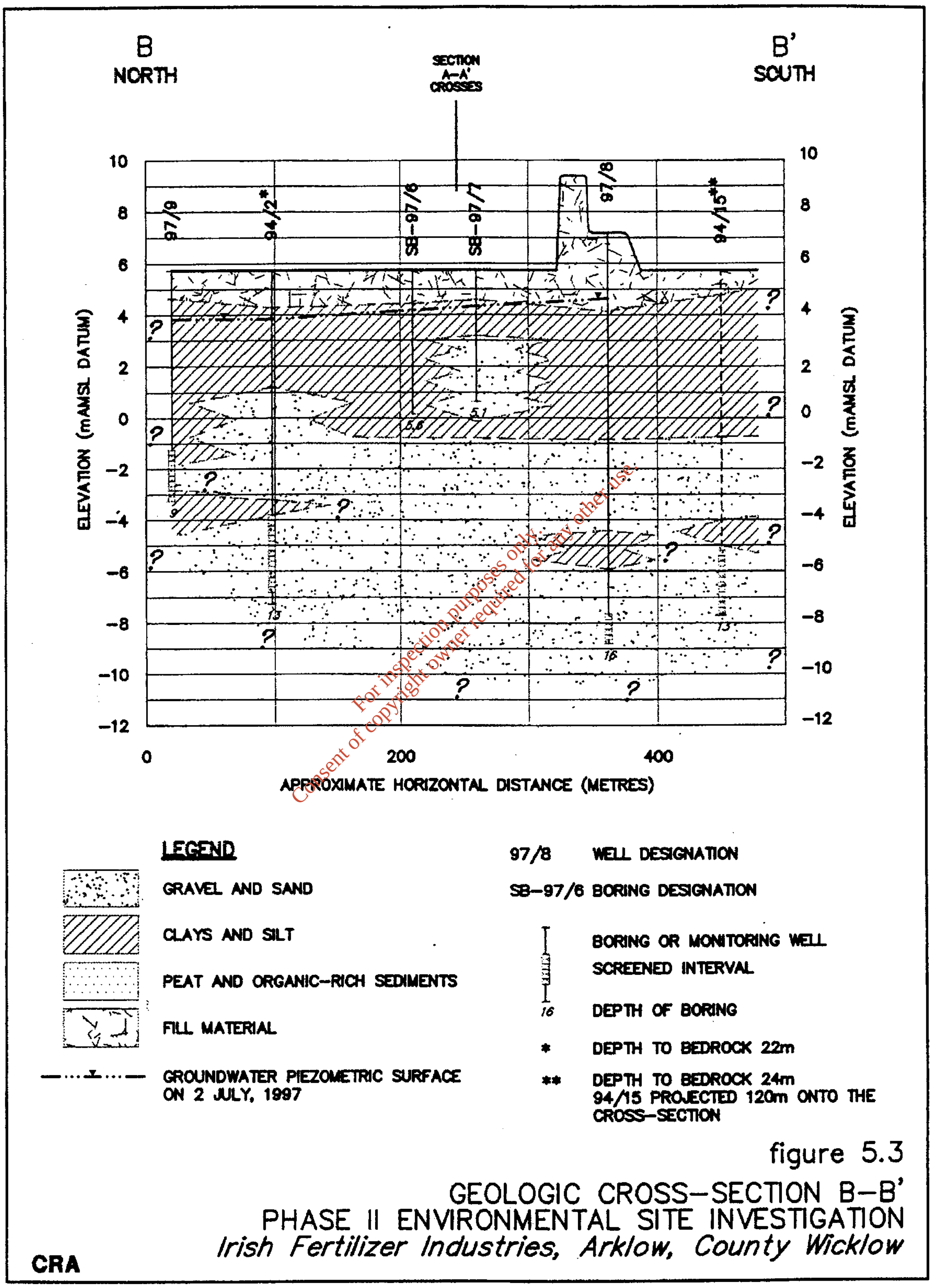
Such conditions will affect the rate of the natural attenuation of the ammonia, by conversion to nitrate, with consequent affects on the reduction of the nitrate level. The reduction of ammonia is primarily a function of dilution as generally it is not susceptible to significant transformation by chemical or biochemical reactions.

Therefore, it is considered that the elevated levels of ammonia in wells 94/14 and 94/15 and nitrate in well 94/25 is a function of the nature of the subsoils at these locations and, as such, are not inconsistent with the model predictions

It is noted that the model predicts a maximum nitrate concentration of 14mg/l after 10 years. While values lower than this have already been recorded in some of the monitoring wells, it is possible nitrate values will not decline to this level across the entire site, if the nitrate levels in the groundwater entering the site from up hydraulic off-site source areas are high. This is particularly relevant where farming activities are likely to be the predominant activity in the catchments up hydraulic gradient of the site to the north.

However, in general terms the monitoring results do show a trend of declining ammonia and nitrate concentrations over time even in monitoring wells 94/14 and 94/15 which indicates that natural attenuation is occurring across the site.

Figure 4.1 North to South Cross Section through the Production Area



4.3. Nitrogen Loading Study and Risk Assessment

In the revised 2007 Report, PM assessed the ammonia and nitrogen loading to the river associate with groundwater discharge. This was done using a groundwater and contaminant flux model to calculate the volume of groundwater reaching the river and the associated ammonia and nitrate load (kg/day) and contaminant flux (m^3/day).

The flux equation used was:

$$Contaminant\ Flux = K \times \frac{gwl_1 - gwl_2}{d} \times ws \times at \times conc$$

This is a standard equation applied for the calculation of contaminant flux and the following data obtained from the 1997 investigations were used:

The hydraulic conductivity value (k) was from the test results for the well closest to the river which was the highest value in the range of testing deemed reliable. This a conservative approach and most likely overestimates the contaminant flux, as it ignores the lower conductivity in areas where the subsoils comprises, silts, clays and gravels.

Aquifer Thickness (at) is the thickness of the entire gravel sequence, excluding silt and clay layers. It does not take into consideration groundwater flow in the weathered parts of the top of the bedrock aquifer. It was also assumed that the concentration of the contaminants in the aquifer unit was constant throughout, whereas the 1997 study indicated that the highest levels occur in the upper gravel zone, with very little contamination at depth. This again is a conservative and more than likely overestimates the contaminant flux to the river.

The hydraulic Gradient (gwl1-gwl2/d) is the gradient between the river and the nearest well used to provide the hydraulic conductivity and was more than 1 metre. This indicated a gradient of almost 0.05%, which PM did not consider realistic because the water in the gravels, particularly along the river, is semi-confined by a clay/silt layer. It is also possible that alluvium in the river bed restricts the flow of groundwater from the gravels to the river.

A gradient of 0.05 would over estimate the groundwater flux to the river. As an alternative, PM calculated the gradient based on the average groundwater gradient of the wells in the gravels across the site calculated at 0.001. This is on the basis that the groundwater flow in the aquifer will be equal to the groundwater discharge to the river when in equilibrium. This assumption does not take account of lower permeability conditions for example due to thick clays along the river at 94/14 and 94/15. But given the very flat topography of the site and the location of the site in the floodplain, the gradient used by PM reflects the actual position. Because of the above assumptions OCM considers that the flux model as applied is generally conservative.

4.3.1. Risk Assessment for Ammonia Toxicity

The ammonia loading to the river from the groundwater was estimated at 118kg/day based on the use of groundwater concentrations monitored in 2007. Applying the relevant dilution factors gave a total ammonia (as N) concentration ranging from 1.38 – 0.09mg/l at low and average flows in the river.

However as indicated in the PM Risk Assessment, it is un-ionised ammonia and not total ammonia that is toxic to aquatic species. Assuming a pH of 7.4 and a temperature of 25C, it was estimated that only 1.4% of the total ammonia is un-ionised, which equates to between 0.019 and 0.001mg/l at the low and average flow rates.

The risk assessment indicated that acute toxicity (48 hour or less exposure duration) to invertebrates occurs at between 0.53 to 22.8mg/l of un-ionised ammonia. It was concluded that aquatic species and in particular fish, which are most sensitive to ammonia toxicity, were not at risk from the groundwater discharge'

4.3.2. Risk Assessment for Oxygen Depletion from Ammonia

The first element of risk assessed by PM was oxygen depletion in the Avoca River. Because ammonia is oxidised to nitrate in the presence of oxygen, it has the potential to reduce the dissolved oxygen level in the river. PM concluded that the risk of oxygen depletion associated with ammonia in the groundwater was insignificant.

The concentrations of ammonia and associated Nitrous Biochemical Oxygen Demand (NBOD) predicted by PM are shown on Table 4.6.

Table 4.6

River Flow	Total Ammonia Concentrations (mg/l)	NBOD Concentrations (mg/l of O_2)
Low	1.38	6.31
95%ile	0.70	3.20
Average	0.09	0.41

4.3.3. OCM Surface Water Monitoring Programme 2011-06-30

OCM monitored surface water quality in the Avoca River at three locations in June 2011 to identify any impact on the water quality and to support the PM Risk Assessment findings.

The monitoring locations are illustrated on Figure 2.2. SW-1 is upstream of the entire site. SW-2 is downstream of the Production Area, while SW-3 is downstream of the entire site.

Prior to the collection of the samples, field parameters, including pH, electrical conductivity and temperature were taken. The field monitoring results are shown on Table 4.7.

Table 4.7 Surface Water Field Parameters

Location	Date	pH	Electrical Conductivity	Temperature
SW-1 Upstream	20/06/2011	8.57	92	14.2
SW-2 Mid stream	20/06/2011	8.61	102	14.4
SW-3 Downstream	20/06/2011	8.47	79	14.4

The samples were collected in accordance with OCM Surface Water Sampling Protocol, a copy of which is included in Appendix 3. All the samples were placed in laboratory prepared containers and stored in coolers to maintain sample temperature at approximately 4°C. Chain of custody (COC) documentation was completed and accompanied the samples to the Jones Environmental Forensics Ltd, a UKAS accredited laboratory for the analysed parameters. The laboratory method detection limits were below the comparative standards used for the assessment of the sediments and water samples.

The monitoring results are presented in Table 4.8, which includes for comparative purposes, the 2009 Surface Water Environmental Quality Standards (EQS) specified by the EPA. The full laboratory results are included in Appendix 4.

Table 4.8 Surface Water Quality Results

Parameter	**SW-1**	**SW-2**	**SW-3**	**EQS**
Sulphate $^{mg/l}$	7.90	8.21	8.24	[redacted]
Nitrate as NO_3 $^{mg/l}$	3.1	2.8	2.6	[redacted]
Total Ammonia as NH_3 mg/l & NH_4	[redacted]	[redacted]	[redacted]	[redacted]
UN-Ionised Ammonia (calculated)	0.0011	0.0025	0.0025	[redacted]
COD mg/l	12	12	13	[redacted]
Dissolved Oxygen mg/l	10	10	10	[redacted]

NAC denotes No Abnormal Change

* denotes mean threshold level for good status river water body

The nitrate and sulphate levels are significantly lower than the EQS, with no significant difference between the sample locations. The dissolved oxygen and COD are indicative of good water quality.

The ammonia (NH_3) concentrations are elevated upstream and downstream of the facility and exceed the EQS at all three sample locations. However there is a slight increase in levels downstream of the Production Area. The ammonia in the groundwater appears to be contributing to the increase in levels in the river downstream of the site.

Following consultation with the analytical laboratory an assessment of the proportion of the ammonia that is un-ionised was made based on the following conversation data provided by the laboratory.

Jones Analytical Laboratory indicate that the ammonium ion is largely predominant at neutral or slightly basic pH: the ratio of the ammonium to the ammonia concentration is equal to 100:1 at a pH of 7.4 and a temperature of 20°C.

Based on the likely percentage of un-ionised ammonia as indicated on Table 4.7 it is unlikely that the un-ionised ammonia concentrations downstream of the Production Area are affecting the river ecosystems.

4.3.4. Risk of Impact from Nitrate on Aquatic Biota

Because the most sensitive aquatic species are fish, the PM assessment was based on nitrate levels that are toxic to fish. The nitrate flux loading calculation it was estimated that the daily nitrate loading as N from groundwater was 59kg/day.

Allowing for dilution, the concentration of nitrate (as N) was calculated as 0.69mg/l for low flow and 0.04mg/l for the 95%ile flow. Toxic effects on fish are not noted until nitrate concentrations exceed 1000mg/l. Therefore it was assumed that the risk posed by nitrate to aquatic species sensitive to nitrate was low. The recent surface water monitoring results confirm the low levels of nitrate in the river downstream of the Production Area.

4.3.4.1. *Risk of Eutrophication*

PM deemed the risk of eutrophication, as low as the primary driver for this process is excess phosphorous and not nitrate. For this reason the risk posed was considered to be insignificant.

4.3.4.2. *Risk to Shelton Abbey Groundwater Wells*

There was and remains no risk of impact on these wells given their location 750m up hydraulic gradient of the facility.

4.3.5. OCM Assessment

The over all conclusion on the 2007 nitrogen loading risk assessment was that the ammonia and nitrate levels in the groundwater were not having a significant impact on the Avoca River. OCM concurs with this conclusion. It is acknowledged that the river was already impacted upstream by mine drainage, but this primarily related to pH and heavy metals. Based on the surface water sampling programme undertaken in June 2011, ammonia (as NH_3) concentrations while elevated upstream, do increase slightly downstream of the Production Area. However, the increase in unionised ammonia is considered to be low.

5. CONCLUSIONS & RECOMMENDATIONS

The primary sources of the groundwater contaminants of concern (ammonia and nitrate) have been removed. While elevated ammonia and nitrates are present in the groundwater, there has been a significant reduction in levels since 2007.

At 10 of the 12 groundwater monitoring wells the ammonia and nitrate levels are already below the concentrations predicted in the groundwater modelling completed in 2007, which demonstrates that natural attenuation is proving effective.

The attenuation rate has been slower than predicted by the model in the southern part of the Production area. OCM considers this is associated with the presence of very thick silt/clay subsoils in this area, which restricts the rate of groundwater through put to the river resulting in low oxygen levels and slowing down the rate of ammonia degradation in this area. .

The latest surface water monitoring results indicate that there is no significant difference in nitrate, sulphate or COD between the monitoring locations up and downstream of the Production Area. The ammonia concentrations do increase slightly downstream of the Production Area and may be associated with groundwater recharge, however the increases are not significant.

OCM considers therefore that the environmental risk associated with the Production Area is insignificant.

APPENDIX 1

1994, 1995 and 1997 Investigations Reports (CD)

APPENDIX 2

PM AER

PM 2007 Risk Assessment

APPENDIX 3

OCM Surface Water Sampling Protocol

environmental management for business

STANDARD OPERATING PROCEDURE

SURFACE WATER SAMPLING

The primary objective of surface water sampling is to evaluate the chemical quality of a water body. The purpose of this procedure is to ensure that representative samples of surface water are collected and documented using consistent methods to ensure sample integrity. Surface water grab samples may be collected from rivers, streams, lakes and wetlands. In cases where the depth of the surface water body prevents sampling from the banks of the water body, sampling from, a boat may be required.

1.0 SAMPLING PROCEDURES

1) 1.1 Equipment Needed

- Personal protective clothing and equipment as required in the site-specific risk assessment.
- Decontamination equipment and supplies if known contaminated site.
- Temperature probe EC meter, pH meter, dissolved oxygen meter.
- Appropriate sample containers (some will be pre-preserved), labels and chain of custody documentation.
- Field logbook.
- Hard plastic cooler with ice pack.

1.2 Field Parameter Measurement

Measurements of field parameters of pH, temperature and electrical conductivity are made during sampling. Note visual (colour, turbidity) and odour (e.g hydrocarbon, hydrogen sulphide) characteristics in the field logbook.

1.3 Collection of Water Samples

All samples for chemical analysis will be placed in laboratory prepared bottles. The types of sample containers and preservative required for each type of analysis are described in the workplan. If required, preservatives will be placed in the sample containers prior to collecting the samples.

The following procedure will be used -

1) Slowly submerge unpreserved one-liter amber glass or plastic-capped bottles completely into the water. Open and fill bottle from below the water surface. If wading is required, approach the sample site from downstream and do not enter the actual sample area. Do not disturb bottom sediments. Open-end of the bottle should be pointed at approximately 90° to the upstream direction, in undisturbed gently flowing water. This procedure will be performed to minimize the effects due to high turbulence and aeration, or if surface scum is prevalent.

2) Collect a sufficient volume of water to fill all sample containers.

3) For VOC analysis. Pour the samples slowly into the laboratory prepared 40 ml glass vial. Overfill each vial slightly to eliminate air bubbles, a convex meniscus should be present at the top of the vial. Ensure that the Teflon liner of the septum cap is facing inward and that no bubbles are entrapped. After capping securely, turn bottle upside-down, tap it against your other hand, and observe sample water for bubbles. If bubbles are observed, remove the cap, overfill the vial and reseal. Repeat this step for each vial until the samples with no bubbles are obtained.

4) Obtain the semi-volatile compound/pesticides/PCBs sample(s) by transferring the water to a laboratory prepared 1000 ml amber glass bottle with Teflon-lined cap. Fill the bottle to the bottom of the neck and follow steps 4, 5 and 6 above.

5) Dissolved metals (if necessary) may require filtering the sample water through a .45 micron filter. The water is collected in a 1 litre, unpreserved, plastic or glass bottle with HNO_3 preservative. Filtering must be done within 15 minutes of sample collection.

6) Obtain the total metals sample by directly transferring the water into a laboratory prepared 1000 ml plastic or glass bottle with HNO_3 preservative. Ensure the pH of the metals sampled is less than 2 by pouring off an aliquot in a clean jar and testing for pH using litmus paper.

7) Collect and prepare Field QA/QC samples in accordance with separate SOP.

8) Place a label on the container and enter the following information: -

    Client/Site Name
    Date Collected
    Time Collected
    Analysis

Preservative
Sample Identification Number

9) Place custody seals on the container caps. As soon as possible, place sample containers in a cooler with ice and maintain at 4°C. Surround the bottles with packaging.

10) Record pertinent information in the field logbook and on the Field Data Sheet for Sampling Location. Complete chain-of-custody form, place in cooler and seal and label the cooler.

11) Be sure to record all data required on the Field Data Sheet or Sampling Location and appropriate entries into the field logbook.

12) Decontaminate all sampling equipment according to procedure.

END.

APPENDIX 4

Laboratory Results

Jones Environmental Laboratory

Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

Tel: +44 (0) 1244 833780
Fax: +44 (0) 1244 833781

O'Callaghan Moran & Associates
Granary House
Rutland Street
Cork
Ireland

No.4225

Attention :	Barry Sexton
Date :	27th June, 2011
Your reference :	IF1
Our reference :	Test Report 11/4807 Batch 1
Location :	HOLFELD PLASTICS ARKLOW
Date samples received :	21st June, 2011
Status :	Final report
Issue :	1

Four samples were received for analysis on 21st June, 2011 which was completed on 27th June, 2011 Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

J W Farrell- Jones CChem FRSC
Chartered Chemist

Jones Environmental Laboratory

Client Name: O'Callaghan Moran & Associates

Reference: IF1

Location: HOLFELD PLASTICS,ARKLOW

Contact: Barry Sexton

JE Job No.: 11/4807

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H_2SO_4, Z=ZnAc, N=NaOH, HN=$HN0_3$

Please see attached notes for all abbreviations and acronyms

J E Sample No.	1-5	6-10	11-15	16-20									
Sample ID	SW-1	SW-2	SW-3	BH94/14									
Depth													
COC No / misc													
Containers	VHPG	VHPG	VHPG	VHPG									
Sample Date	20/06/2011	20/06/2011	20/06/2011	20/06/2011									
Sample Type	Surface Water	Surface Water	Surface Water	Ground Water									
Batch Number	1	1	1	1									
Date of Receipt	21/06/2011	21/06/2011	21/06/2011	21/06/2011							**LOD**	**Units**	**Method No.**
Sulphate #	7.90	8.21	8.24	1116.75							<0.05	mg/l	TM38/PM0
Nitrate as NO3 #	3.1	2.8	2.6	85.6							<0.2	mg/l	TM38/PM0
Ammoniacal Nitrogen as NH3 #	0.11	0.25	0.25	272.45							<0.03	mg/l	TM38/PM0
COD	12	12	13	<7							<7	mg/l	TM57/PM0
Dissolved Oxygen	10	10	10	5							<1	mg/l	TM59/PM0

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

Jones Environmental Laboratory

Client Name: O'Callaghan Moran & Associates **VOC Report : Liquid**

Reference: IF1

Location: HOLFELD PLASTICS,ARKLOW

Contact: Barry Sexton

JE Job No.: 11/4807

Please see attached notes for all abbreviations and acronyms

J E Sample No.	1-5	6-10	11-15	16-20									
Sample ID	SW-1	SW-2	SW-3	BH94/14									
Depth													
COC No / misc													
Containers	V H P G	V H P G	V H P G	V H P G									
Sample Date	20/06/2011	20/06/2011	20/06/2011	20/06/2011									
Sample Type	Surface Water	Surface Water	Surface Water	Ground Water									
Batch Number	1	1	1	1									
Date of Receipt	21/06/2011	21/06/2011	21/06/2011	21/06/2011							LOD	Units	Method No.
VOC MS													
Dichlorodifluoromethane	<2	<2	<2	<2							<2	ug/l	TM15/PM10
Methyl Tertiary Butyl Ether $^{\#}$	<1	<1	<1	<1							<1	ug/l	TM15/PM10
Chloromethane $^{\#}$	<3	<3	<3	<3							<3	ug/l	TM15/PM10
Vinyl Chloride	<2	<2	<2	<2							<2	ug/l	TM15/PM10
Bromomethane	<1	<1	<1	<1							<1	ug/l	TM15/PM10
Chloroethane $^{\#}$	<3	<3	<3	<3							<3	ug/l	TM15/PM10
Trichlorofluoromethane $^{\#}$	<3	<3	<3	<3							<3	ug/l	TM15/PM10
1,1-Dichloroethene $^{\#}$	<3	<3	<3	<3							<3	ug/l	TM15/PM10
Dichloromethane $^{\#}$	<3	<3	<3	<3							<3	ug/l	TM15/PM10
trans-1-2-Dichloroethene $^{\#}$	<3	<3	<3	<3							<3	ug/l	TM15/PM10
1,1-Dichloroethane $^{\#}$	<3	<3	<3	<3							<3	ug/l	TM15/PM10
cis-1-2-Dichloroethene $^{\#}$	<3	<3	<3	<3							<3	ug/l	TM15/PM10
2,2-Dichloropropane	<1	<1	<1	<1							<1	ug/l	TM15/PM10
Bromochloromethane $^{\#}$	<2^{+}	<2^{+}	<2^{+}	<2^{+}							<2	ug/l	TM15/PM10
Chloroform $^{\#}$	<2^{+}	<2^{+}	<2^{+}	<2^{+}							<2	ug/l	TM15/PM10
1,1,1-Trichloroethane $^{\#}$	<2	<2	<2	<2							<2	ug/l	TM15/PM10
1,1-Dichloropropene $^{\#}$	<3	<3	<3	<3							<3	ug/l	TM15/PM10
Carbon tetrachloride $^{\#}$	<2	<2	<2	<2							<2	ug/l	TM15/PM10
1,2-Dichloroethane $^{\#}$	<2	<2	<2	<2							<2	ug/l	TM15/PM10
Benzene $^{\#}$	<1	<1	<1	<1							<1	ug/l	TM15/PM10
Trichloroethene $^{\#}$	<3	<3	<3	<3							<3	ug/l	TM15/PM10
1,2-Dichloropropane $^{\#}$	<2^{+}	<2^{+}	<2^{+}	<2^{+}							<2	ug/l	TM15/PM10
Dibromomethane $^{\#}$	<3	<3	<3	<3							<3	ug/l	TM15/PM10
Bromodichloromethane $^{\#}$	<2	<2	<2	<2							<2	ug/l	TM15/PM10
cis-1-3-Dichloropropene	<2	<2	<2	<2							<2	ug/l	TM15/PM10
Toluene $^{\#}$	<2	<2	<2	<2							<2	ug/l	TM15/PM10
trans-1-3-Dichloropropene	<2	<2	<2	<2							<2	ug/l	TM15/PM10
1,1,2-Trichloroethane $^{\#}$	<2	<2	<2	<2							<2	ug/l	TM15/PM10
Tetrachloroethene $^{\#}$	<3	<3	<3	<3							<3	ug/l	TM15/PM10
1,3-Dichloropropane $^{\#}$	<2	<2	<2	<2							<2	ug/l	TM15/PM10
Dibromochloromethane $^{\#}$	<2	<2	<2	<2							<2	ug/l	TM15/PM10
1,2-Dibromoethane $^{\#}$	<2	<2	<2	<2							<2	ug/l	TM15/PM10
Chlorobenzene $^{\#}$	<2	<2	<2	<2							<2	ug/l	TM15/PM10
1,1,1,2-Tetrachloroethane $^{\#}$	<2	<2	<2	<2							<2	ug/l	TM15/PM10
Ethylbenzene $^{\#}$	<2	<2	<2	<2							<2	ug/l	TM15/PM10
p/m-Xylene $^{\#}$	<3	<3	<3	<3							<3	ug/l	TM15/PM10
o-Xylene $^{\#}$	<2	<2	<2	<2							<2	ug/l	TM15/PM10
Styrene $^{\#}$	<2	<2	<2	<2							<2	ug/l	TM15/PM10
Bromoform $^{\#}$	<2	<2	<2	<2							<2	ug/l	TM15/PM10
Isopropylbenzene $^{\#}$	<3	<3	<3	<3							<3	ug/l	TM15/PM10
1,1,2,2-Tetrachloroethane	<4	<4	<4	<4							<4	ug/l	TM15/PM10
Bromobenzene $^{\#}$	<2	<2	<2	<2							<2	ug/l	TM15/PM10
1,2,3-Trichloropropane $^{\#}$	<3	<3	<3	<3							<3	ug/l	TM15/PM10
Propylbenzene $^{\#}$	<3	<3	<3	<3							<3	ug/l	TM15/PM10
2-Chlorotoluene $^{\#}$	<3	<3	<3	<3							<3	ug/l	TM15/PM10
1,3,5-Trimethylbenzene $^{\#}$	<3	<3	<3	<3							<3	ug/l	TM15/PM10
4-Chlorotoluene $^{\#}$	<3	<3	<3	<3							<3	ug/l	TM15/PM10
tert-Butylbenzene $^{\#}$	<3	<3	<3	<3							<3	ug/l	TM15/PM10
1,2,4-Trimethylbenzene $^{\#}$	<3	<3	<3	<3							<3	ug/l	TM15/PM10
sec-Butylbenzene $^{\#}$	<3	<3	<3	<3							<3	ug/l	TM15/PM10
4-Isopropyltoluene $^{\#}$	<3	<3	<3	<3							<3	ug/l	TM15/PM10
1,3-Dichlorobenzene $^{\#}$	<3	<3	<3	<3							<3	ug/l	TM15/PM10
1,4-Dichlorobenzene $^{\#}$	<3	<3	<3	<3							<3	ug/l	TM15/PM10
n-Butylbenzene $^{\#}$	<3	<3	<3	<3							<3	ug/l	TM15/PM10
1,2-Dichlorobenzene $^{\#}$	<3	<3	<3	<3							<3	ug/l	TM15/PM10
1,2-Dibromo-3-chloropropane	<2	<2	<2	<2							<2	ug/l	TM15/PM10
1,2,4-Trichlorobenzene	<3	<3	<3	<3							<3	ug/l	TM15/PM10
Hexachlorobutadiene	<3	<3	<3	<3							<3	ug/l	TM15/PM10
Naphthalene	<2	<2	<2	<2							<2	ug/l	TM15/PM10
1,2,3-Trichlorobenzene	<3	<3	<3	<3							<3	ug/l	TM15/PM10

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NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

SOILS

Please note we are only MCERTS accredited for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary. If we are instructed to keep samples, a storage charge of £1 (1.5 Euros) per sample per month will be applied until we are asked to dispose of them.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C

Asbestos screens where requested will be undertaken by a UKAS accredited laboratory.

WATERS

Please note we are not a Drinking Water Inspectorate (DWI) Approved Laboratory . It is important that detection limits are carefully considered when requesting water analysis.

UKAS accreditation applies to surface water and groundwater and one other matrix which is analysis specific, any other liquids are outside our scope of accreditation

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples. All samples are treated as groundwaters and analysis performed on settled samples unless we are instructed otherwise.

DEVIATING SAMPLES

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any analysis that may be compromised highlighted on your schedule/ report by the use of a symbol.

The use of any of the following symbols indicates that the sample was deviating and the test result may be unreliable:

$	Sample temperature on receipt considered inappropriate for analysis requested.
^	Samples exceeding recommended holding times.
&	Samples received in inappropriate containers (e.g. volatile samples not submitted in VOC jars/vials).
~	No sampling date given, unable to confirm if samples are with acceptable holding times.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130%. Results are not surrogate corrected.

AQCs

Where AQC's fall outside UKAS/MCERTS criteria analysis is repeated if possible.

NOTE

Data is only accredited when all the requirements of our Quality System have been met. In certain circumstances where the requirements have not been met, the laboratory may issue the data in its final report if it believes that the validity of the data has not been conpromised but will remove the accreditation. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

ABBREVIATIONS and ACRONYMS USED

#	UKAS accredited.
M	MCERTS accredited.
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
SS	Calibrated against a single substance.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
W	Results expressed on as received basis.
+	Accreditation has been removed from this result see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
DR	Dilution required.

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Method Code Appendix

Test Method No.	Description	Prep Method No. (if appropriate)	Description	UKAS	MCERTS (soils only)	Analysis done on As Received (AR) or Air Dried (AD)	Solid Results expressed on Dry/Wet basis
TM15	VOC - Target by GC-MS, modified USEPA 8260	PM10	VOC GC-MS				
TM15	VOC - Target by GC-MS, modified USEPA 8260	PM10	VOC GC-MS	Yes			
TM38	SO4,Cl,NO3,NO2,F,PO4, Amm N2,ThioCN by Aquakem	PM0	No Preparation	Yes			
TM57	COD by Colourimetric measurement	PM0	No Preparation				
TM59	Dissolved oxygen using DO meter	PM0	No Preparation				

BORDNAMONA
ENVIRONMENTAL PRODUCTS

An evaluation of the nature and extent of groundwater contamination at the IFI Industrial facility at Arklow, Co. Wicklow including an assessment of the natural protection afforded the various water bearing strata beneath the site.

CONFIDENTIAL

Report No.: ELS W825

Attention:
Ms. Niamh Healy
Process Engineer
IFI
Arklow
Co. Wicklow

Prepared by:
Dr. Hubert Henry
Head: Water and Wastewater Section

Date: 27 October 1994

CONTENTS

1.0 INTRODUCTION

The IFI industrial site is located in the Avoca river valley about two miles upstream of Arklow town. Production at the facility has continued since 1965 although major changes in the nature and volumes of products manufactured at the plant have occurred over the years, particularly in the 1980's.

The site is situated on an alluvium flood plain which is bounded on the north and south by steep tree lined slopes and is protected from flooding of the River Avoca by a series of earthen embankments. The site, which occupies an area of 50 hectares, is divided into two separate parts, the plant or production area (approximately 2 - 3m O.D.) to the west and the mainly disused landfill area (approximately 4m O.D.) to the east of the site.

As part of an ongoing environmental monitoring and control strategy at the plant and in response to a request by the local authority, the management of IFI commissioned a comprehensive hydrological/hydrogeological investigation at the site. The study, which was carried out by ESB International (in conjunction with IGSL and Bord na Móna Environmental Products) was completed in June 1994 and focused on the nature and degree of groundwater contamination in a series of shallow and deep monitoring boreholes across the entire site (plant and landfill areas). The findings of the investigation are presented in a detailed report "Irish Fertilizer Industries, Arklow Environmental Site Investigation" submitted to IFI in July 1994 (No. PA 514-R1).

In order to establish the present and predict the future state of the groundwaters at the site Bord na Móna Environmental Products have been requested to examine and interpret the ESBI report with a view to:

(i) Assessing the nature, extent and volumes of groundwater contamination beneath the IFI site, at the site boundaries and beyond the boundaries along a hydraulic gradient.

(ii) Describing the natural barrier which is afforded the middle and lower gravel aquifers against the subsurface migration of contaminants specific to the IFI industrial activity.

This report presents the results of the report interpretation and presents the discussion in the context of existing EC legislation. A short literature review on the fate and transport of contaminants (specific to the IFI site) in subsurface and groundwater systems is also presented.

2.0 THE FATE AND TRANSPORT OF CONTAMINANTS IN THE SUBSURFACE

When assessing the potential of groundwater contamination from an industrial process and associated landfill activity the fate and transport of the different contaminated leachate constituents must be considered. The characteristics of the leachates from the IFI plant and landfill areas are such that several components must be removed by soil/subsurface renovation or attenuation if groundwater pollution is to be avoided. These components include:

(i) Organic components yielding BOD and COD loads.

(ii) Compounds consisting of nitrogen, phosphorous and salts of varying solubilities.

(iii) Organic solvents and hydrocarbons.

(iv) Heavy metals.

The depth within a soil/subsurface profile at which removal or renovation of various contaminants is complete varies with the size of particles, the soil texture and the rate of water movement e.g. contaminants will move greater distances in coarse soils where inputs or application rates are high. It is well accepted that the most important factors which govern the removal efficiency in subsurface materials are:

(i) The presence of clays or other materials with a high specific surface area and ion exchange capacity.

(ii) The thickness of the unsaturated zone.

The properties of the subsurface media at the IFI site are such that a number of mechanisms are available to act on the waste components generated on the site, thereby, effecting at least some degree of attenuation. These mechanisms include filtration, sorption, preciption, chemical alteration and oxidation/biological transformations.

2.1 Migration of Specific Contaminants Beneath the IFI Site

2.1.1 Nitrogen

The two forms of nitrogen which are of most concern are ammonium ions (NH_4^+) and nitrates (NO_3^-). Movement of ammonium ions in the subsurface can be retarded by adsorption, cation exchange, incorporation into microbial biomass or released to the atmosphere in gaseous form. Adsorption mechanisms are generally considered to be the most effective and is directly related to the specific area of the subsurface material. Adsorption of NH_4^+ onto soil clay colloids has been shown to the a very effective attenuation process. However, adsorption is a finite process and once the adsorptive capacity of a soil or subsurface material is exceeded then, the NH_4^+ ion will migrate greater distances to "unoccupied" clay colloids.

Retardation of ammonium migration can also occur by ion exchange processes, however, this is also a finite process and, where a migrating leachate contains large amounts of NH_4^+, saturation of subsurface materials can quickly occur. The efficiency of the ion exchange process is directly related to the cation exchange capacity of the subsurface material i.e. the higher the CEC the greater the ion exchange attenuation process. Clayey/silty materials, for example, will have a CEC greater than 10 times that of a sand or gravel material (i.e. 100 meq/100g and 10 meq/100g respectively) therefore, the restriction of NH_4^+ movement in subsurface layers will be significantly more marked in clay materials.

Nitrate-Nitrogen may enter the subsurface directly from the IFI plant area and landfills or may be generated in the unsaturated zone beneath the site by the nitrification of NH_4^+ ions contained in the migrating leachate. Because nitrate is a negatively charged ion it is not attracted to negatively charged soil colloids and as such is more mobile than the ammonium. Nitrate is referred to as a "conservative" contaminant and, because of its mobility, is a good indication of the outer extremities of a migrating pollution plume. Nitrate may, however, be removed by denitrification in the saturated reducing zones of subsurface materials but this requires a ready source of carbon as the denitrification process requires a considerable energy supply.

2.1.2 Phosphorus

Phosphorus is very effectively restricted from moving in the subsurface by a combination of adsorption and precipitation processes. It is generally accepted that phosphate is not a significant cause for concern with respect to subsurface contamination because of the efficiency of the retardation reactions in soils. It is again the case that high clay content soils are more effective barriers to phosphate migration whereas highly permeable sand and gravel materials may result in the transport of PO_4^-P over considerably greater distances. Because of the presence of alluvial clays and subsurface laminated clays at the IFI site phosphate migration is not considered to be a significant problem.

2.1.3 Heavy Metals

Migration of heavy metals constituents in the subsurface is largely restricted by the adsorption and ion exchange reactions. The efficiency of the attenuation process is governed by the valency of the metal and the cation exchange capacity (and specific surface area) of the subsurface material. Preferential removal of certain metals have been consistently demonstrated in previous studies. Migration of heavy metal constituents in the saturated zone is generally along a local hydraulic gradient with attenuation in the saturated zone reduced due to a decrease in the ionic strength of the subsurface materials.

2.1.4 Organic Solvents and Hydrocarbons

Migration of organic contaminants in the unsaturated zone is governed by a number of factors relating to the nature of the organic compound itself (density, solubility, biodegradability etc.) and the subsoil through which it passes. The dominant restriction processes are absorption, adsorption and biological transformation.

Organic contaminants can reach the saturated zone either dissolved in water or as an immiscible organic liquid phase. The subsurface transport of these contaminants differ significantly and their ultimate hydrogeological migration patterns are governed by many different factors.

(i) Dissolved Organics

The migration of dissolved organics in groundwater systems is controlled by:

- Advection
- Dispersion
- Sorption (retardation)
- Chemical/biological transformations

Advection is the dominant factor controlling migration in a gravel aquifer such as that existing at the IFI site. Advection is the process by which solvents are transported by the bulk motion of flowing groundwater. Hydraulic gradient is the term used to describe the magnitude of this driving force. The gradient existing at the IFI site is generally low and complicated by many factors (tidal influences, alluvial and impermeable clay deposits, etc.), however, it is considered that migration along the northwest to southeast hydraulic gradient would be the general migration pattern for dissolved organic contaminants.

The influence of the other factors such as dispersion, sorption and chemical/biological transformations are difficult to estimate. However, it is likely that all these factors are involved to a greater or lesser degree. For example the gravel strata do not offer a significant opportunity of contaminant retardation due to adsorption since there is a low level of solid organic matter content in the aquifer. However restriction in the clay layers is likely to be much more significant.

(ii) Immiscible Organics

Organic compounds differ widely in their solubility from infinitely immiscible polar compounds such as methanol to extremely low solubility compounds such as Toluene. The migration of the immiscible organic liquids in the subsurface is governed by its:

- Density
- Viscosity

Density differences of about 1% are known to influence fluid movements significantly. With few exceptions, the densities of organic liquids differ from that of water by more than 10%.

In general it is usual to consider immiscible organic liquids as belonging to one of two groups:

- Those that have density greater than that of water (dense, non-aqueous - phase liquids or DNAPL's) and;

- Those which have a density less than that of water (light non-aqueous - phase liquids or LNAPL's).

NAPL's which are released into the subsurface will generally not migrate in the same pattern as other leachate constituents. There is evidence to suggest that the materials (e.g. toluene) may in fact migrate against a hydraulic gradient. Substances which are only slightly soluble may phase separate at the top (LNAPL) or the bottom (DNAPL) of a water bearing strata e.g. the upper gravels at the IFI site and slowly release soluble contaminants into the aqueous phase which may then migrate along the dominant hydraulic gradient.

3.0 SITE INVESTIGATIONS

3.1 Subsurface Strata

The geology of the site is made up of a complex mixture of older Ordoviaan sedimentary rocks comprising of shales and mudstones in association with younger Carboniferous limestones and Tertiary chalks. The younger rock formations have been removed by erosion forces (river and glacial) to expose the Ordoviaan shales at numerous locations around the 50 hectare site. The area has also been subjected to intense glacial activity which together with the hardrock geology has combined to give a complex subsurface succession of Alluvium, peaty, gravel and low permeability clays overlying mudstone and shale bedrock.

Investigations at the site have demonstrated that a number of discrete subsurface strata occur beneath most of the site. This section describes each of these separate layers with respect to the expected contaminant restriction or attenuation properties which they possess. A total of seven separate strata were identified beneath the site. The nature of each of these layers i.e. nominal pore size, cation exchange capacity, specific surface areas, permeabilities, and thickness or depth are such that they will permit or restrict contaminant migration to greatly varying degrees. The following table presents the seven separate water bearing layers identified at the site and details the nature of the materials contained therein. The assumed pollution restriction or attenuation properties of the various materials are based on descriptions and analytical results presented in the ESBI report.

Table 1: The nature of the subsurface material present beneath the IFI facility including details of the nominal pollution restriction properties of the industrial strata.

Strata	Constituent	Average thickness m	Comment on attenuation properties
1 Man made fill material	Landfill: Gypsum and carbon slurries rubble plastic and fill. Plant area: Hardcore fill comprising of rubble/shale mix	3.1	Poor attenuation by ion exchange or adsorption with rapid migration of contaminants along zones or "preferred pathways" due to the heterogenous nature of the material and the large nominal pore size.
2 Alluvium	Silty clay, peaty material	3.0 3.1	Very good contaminant restriction properties. The high surface area of the clay and peaty materials (up to .5m^2/g) can facilitate sorption processes. The cation exchange properties of both materials are very high : Clay silt (USDA classification) - 60 - 80 meq/100g Peaty material (Von post >5) - >100 meq/100g
3 Upper gravels	Dense medium to coarse gravels with some cobbles and boulders	2.5	Generally poor in contaminant restriction. The dense nature of the material may result in some contamination attenuation by filtration, however, the adsorption and ion exchange properties of this material would be very low.
4 Upper laminated clays	Stiff grey/brown laminated clay	1.3	Although the clay layer is generally very thin (1m or less in places) the nature of the material is such that it constitutes an excellent barrier to the migration of all the contaminants from the leachate plume. The high clay content provides an abundance of sites for ion exchange and sorptions processes to occur and the tight nature of the matrix (permeability 1.24 x 10^{-10}m/s) provides an efficient physical barrier.
5 Middle gravels	Dense coarse angular gravel	3.2	As for the upper gravel layer.
6 Lower glacial clays	Brown stiff clay/silt with some gravel	2.1	The presence of this layer cannot be fully substantiated throughout the site. However, as with the upper clay layer its presence is extremely important in that it constitutes an effective hydraulic division between the middle and lower water bearing gravels. From the limited information available it is suggested that the thickness of this layer is greater than that existing in the upper clay layer. It is, therefore, considered that the lower gravel layer is very well protected by this strata.
7 Lower gravels/bedrock	Same as middle gravels (also evidence of silty material)	5.8	Poor attenuation within gravels but the water bearing strata is well protected by layers above.

3.2 Hydrology/Hydrogeology

The surface water hydrology of the IFI site is dominated by the presence of the Avoca River. Surface water from the 50 hectare site is diverted into an array of on-site drains and canals which eventually drain to the Avoca River via the effluent settling pond. Assuming an average annual rainfall of 1000mm and a nominal evaporation rate of 40% it is estimated that the average yearly effective rainfall on the IFI site is in the region of 30 x 10^3 m^3 yr^{-1} (with over twice the monthly rainfall in December compared to June). When the average flow rate of the Shelton Abbey Canal and the drain flowing north south from the plant access road is considered then the quantities of rain water which directly recharge the groundwater bodies beneath the site in minimal.

Examination of the results presented in the site investigation (ref. geological cross sections A-A to F-F) present a complicated picture of the hydrogeological conditions beneath the site. There is insufficient evidence to establish conclusively that each of the identified strata are operating as separate or distinct hydrological entities. It is possible that there are interactions between the upper and middle gravels at locations where the dividing clays are at a minimum. However, direct hydrological links between the upper and lower gravels is significantly less likely due to a combination of the upper and lower clay boundaries. It is likely that the upper and possibly the middle gravel aquifers are recharged by diffuse flow from adjoining gravel areas to the north and west of the site. However, given the permeability readings recorded for these gravel layers (3.5 - 8.1 x 10^{-5} ms^{-1}) and the extremely low hydraulic gradients observed (0.001 - 0.002) it is likely that groundwater movement is very slow or static and consequently any contamination of these water bearing strata is likely to remain there for a considerable time. The relatively low permeabilities recorded in the gravels indicate that the area is very poor yielding and as such constitutes a groundwater resource of minor importance. A combined advantage of the low permeability and hydraulic gradients observed in the investigation is that contaminated groundwater is unlikely to "reach and contaminate other aquatic systems or eco-systems" (Article 4 of EU directive 80/68/EEC). A notable exception to this is that there is a distinct possibility of a hydrogeological connection between the upper gravel aquifer and the River Avoca at the western end of the site in the vicinity of borehole 94/14. Therefore, the possibility of surface water contamination from migrating contaminants cannot be discounted and may require further investigation.

It is highly probable that the presence of the low permeability clay/silt layers between the upper, middle, and lower gravel aquifers restrict or even eliminate any hydrological links between them. The extremely low permeability of the upper laminated clays (1.2 x 10^{-10} ms^{-1}) is put in perspective when it is considered that the recorded value is significantly less than that considered suitable in the substratum materials beneath a hazardous waste landfill (1.0 x 10^{-9} ms^{-1}) (Amended proposal for a council directive on the landfill of waste COM (93) 275). Apart from the upper, middle and lower gravels none of the other water bearing strata identified are considered to have any groundwater yielding potential.

3.3 Chemical Analysis of the Subsoil and Groundwater Samples

3.3.1 Soil and Subsurface Material Analysis

Surface soil, sediment and subsoil samples from various locations around the site were analysed for a range of contaminants in accordance with recognised standard methods. The results of the findings are presented in section 6.3 (Tables 6.1 - 6.3) of the ESBI report. The results presented are referenced to the Dutch contaminated land standards (which are likely to become the European standards within the next 12 - 18 months). The results generated show that attenuation of the heavy metals (Table 6.1) is largely complete in the man made fill material and underlying Alluvium layers (where elevated Zn, Cu, Pb, and Ni concentrations were recorded). The Dutch "C" values were not exceeded in any of the samples analysed. Elevated sulphur levels and decreased pH values were, however, recorded in many of the samples analysed although the significance of this can not be solely attributed to contamination from the site activities. Analysis of the subsurface materials for organic compounds and hydrocarbons (Table 6.3) again suggests that contaminant levels are minimal and largely restricted to the upper alluvium areas where it would appear that attenuation is largely complete.

3.3.2 Groundwater Analysis

A series of groundwater samples were collected from an array of monitoring boreholes around the site. The results of the analysis are presented in section 6.4 (Tables 6.4 - 6.8) of the ESBI report.

An important consideration in any groundwater monitoring investigation involving separate water bearing strata is the effective sealing of the separate layers during borehole advancement. This must be carefully controlled to ensure that no unnecessary hydrogeological link is inadvertently made from a contaminated upper layer to pristine lower aquifers. It is not clear from the information to hand if such precautions were taken during this investigation. Therefore, the following discussion is made on the assumption that all the necessary action to prevent this vertical short circuiting of contaminants was taken.

In summary, the results obtained demonstrate that the waters in the upper gravel aquifer beneath the production plant area and the landfills region is considerably contaminated by elevated conductivity values, heavy metals, nitrogen compounds (NH_3 and NO_3) and total hydrocarbon contents. This result is significant when the possible link with the River Avoca described in section 3.2 is considered and highlights the requirements for additional investigative work at the site. The apparent contamination of the middle gravel aquifer is cause for more concern. Elevated ammonia and nitrate levels in addition to phosphate, sulphate, chloride and conductivity values considerably above background values were recorded in the groundwater samples in the middle gravel layer at both the plant and landfill sampling locations. This may suggest that the adsorptive or contaminant restriction capacity of the upper laminated clay layer has been exceeded especially for the ammonium ion where values of up to $2800mgl^{-1}$ NH_3-N were recorded in sample 94/15A.

The ammonia values recorded beneath the landfill are were considerably lower in the upper gravels (up to 678mgl^{-1}) and barely above background levels in the middle gravel aquifer. High and variable nitrate values were recorded in the upper and middle gravels this is attributed to the "conservative" nature of the nitrate ion which is largely unimpeded in its migration in the saturated zone. It is also highly significant that elevated nitrate levels were recorded in one sample from the lower gravel/bedrock aquifer i.e. 52.1mgl^{-1} from 94/15B.

Therefore, a definite contamination link has been established between the upper gravels and the lower gravel/bedrock aquifer despite the presence of the clay protection strata detailed in 3.1 and 3.2. It is strongly recommended that IFI technical staff undertake an ongoing monitoring programme which will monitor the conservative indicator parameters in the various gravel aquifers and, thereby, track or predict the migration of the outer extremities of the contaminant plume. This could be accomplished with minimum cost and effort by including only the conservative parameters (i.e. NO_3-N, Cl^-, and Conductivity) in the monitoring programme.

Elevated Cu, Zn, Ni, and As levels recorded in the lower gravel aquifer may indicate a metal contaminant plume input from disused tailings or metal rich strata associated with the former Avoca mines.

4.0 GROUNDWATER VULNERABILITY AT THE IFI INDUSTRIAL SITE

There is insufficient information presented in the site investigation report to calculate the volumes of contaminated groundwater at or beyond the IFI boundaries. However, the survey has highlighted a number of factors which indicate that the nature and extent of the contamination recorded in the groundwaters beneath the site is largely restricted to the upper water bearing strata. Furthermore, and possibly of more importance, it would appear that the hydrological and hydrogeological conditions at the site are such that migration of a contamination plume either horizontally or vertically through the saturated zone is minimised due to:

(a) The presence of an upper and lower low permeability clay lens which act as effective hydraulic barriers and;

(b) The low hydraulic gradients recorded together with the medium - low permeability values (for both gravel and bedrock aquifers) would indicate that groundwater movement to adjacent water bodies is minimal. It is, therefore, considered that the general requirements of Article 4 in the EU groundwater protection directive (80/68/EEC) are been satisfied at the site.

On a less optimistic note there is evidence of contamination in the middle aquifer beneath the laminated clay layer. This may indicate that this protective layer is not continuous across the entire site and that a distinct hydraulic link exists between the upper and middle gravel layers. Alternatively, it may suggest that the attenuation capacity of the clay colloids have been exceeded and that migration of certain contaminants, particularly the conservative parameters, to the deeper hydrogeological strata is now occurring. It is recommended that this possible migration of contaminants is routinely monitored in the future by examining the NO_3-N, Cl^- and Conductivity levels in the existing array of monitoring wells. In addition, it is considered necessary to introduce a management plan at the site in order to reduce the infiltration of excess waters through the contaminated sections of the landfill and plant area. This management plan, which may consist of the installation of an effective array of surface drains in addition to appropriate surface slope management, will have an ultimate aim of reducing contaminant inputs to the saturated zone.

5.0 CONCLUSIONS

Hydrological movements at the IFI site occur in a complex series of subsurface strata. The three distinct gravel aquifers are the most significant water bearing bodies present. There is no concrete evidence of any direct hydrogeological link between the separate strata. The possibility that the upper, middle and lower gravels are operating as separate hydrological entities cannot, therefore, be discounted.

The presence of a number of low permeability alluvium and clay strata in the subsurface beneath the IFI site provides an effective barrier to the vertical migration of contaminants from the upper to the middle and lower gravel aquifers.

The possible hydraulic link between the contaminated upper gravels and the River Avoca is cause for concern and may warrant further investigations.

Groundwater analysis has demonstrated that middle gravel aquifer is contaminated to some degree by elevated Nitrogen (NO_3 and NH_3), phosphate, sulphate and chloride levels as well as increased specific conductivity values. It is possible that this is due to an exhaustion of the adsorptive or chemical attenuation capacities of the protective clay strata. The migration of the contaminant plume in the subsurface must therefore be routinely monitored by the IFI technical staff by measuring the "conservative" elements of the contaminant plume (i.e. NO_3 Cl^- conductivity).

It is considered that the vertical or lateral migration of contaminants in the subsurface to adjacent water bodies (surface water or groundwater) beyond the site boundaries is minimal. This is due to a combination of the low permeabilities of the various water bearing strata, the low hydraulic gradient observed and the attenuation properties of the alluvium and upper/lower clay layers. Therefore, the general requirements of the EU groundwater protection directive 80/68/EEC (Article 4) would appear to be satisfied at the site although further evaluation of the site boreholes would have to be undertaken in order to conclusively demonstrate with all aspects of the document.

Further investigative studies on the existing array of monitoring boreholes at the site should be initiated to validate some of the observations made in the previous surveys.

BORD NA MÓNA

ENVIRONMENTAL DIVISION

An Environmental Assessment of the Chemical and Biological Quality of the Avoca River Upstream and Downstream of the IFI Industrial Facility at Arklow, Co. Wicklow.

- An Interim Report -

Project Nos.: ELSW987/ELSWB25

Attention:

Ms. Niamh Healy
IFI
Arklow
Co. Wicklow

Prepared by:

Dr. Hubert Henry
Head of Water and Wastewater Section

Dr. Michael Henry
Environmental Consultant

Date: 23 May 1995

CONFIDENTIAL

MAIN STREET, NEWBRIDGE, CO. KILDARE, IRELAND
TELEPHONE: (045) 431201. INT: +353-45-431201. FAX: (045) 431647. INT: +353-45-431647

CONTENTS

SECTION

1.0 INTRODUCTION

The IFI fertiliser production plant is located in the Avoca river valley about two miles upstream from Arklow town. This factory has been in operation since 1965 and at the present time it is considered to be one of the largest fertiliser producing facilities in Ireland. However, over the last 10-15 years, major changes have occured in relation to the nature and volume of products manufactured at the plant.

The site occupies a total area of approximately 50 hectares and is divided into two separate parts, the IFI production/plant area to the west and a landfill area to the east. The site forms a flat flood plain in a rather steep valley bounded to the north and south by tree covered slopes and is protected from flooding of the River Avoca by a series of earthen embankments. The Avoca river runs parallel to the site in a south easterly direction.

As part of the local government water licence requirements, IFI Ltd. were requested to carry out a comprehensive study of the river water and sediment quality in the Avoca river upstream and downstream of the factory site. Bord na Mona, Environmental Division were commissioned by IFI Ltd. to undertake and complete this investigation. It was agreed with IFI to carry out a full assessment of the site on three separate occasions over a 12 month period: February 1995, June 1995 and December 1995/January 1996. In addition, two sampling events examining the general chemical quality of the river water and sediment were arranged for March/April 1995 and September 1995.

This report presents a preliminary account of the sampling events which took place on 8/2/95 and 4/4/95. This interim report preceeds a comprehensive final report which will be submitted on completion of a 12 month monitoring programme. The results of the chemical/biological river water and sediment analysis undertaken at the site are described in addition to a detailed discussion of the implications of such findings.

2.0 METHODOLOGY

2.1 Sampling

The site was visited by 2 technical staff from Bord na Mona Environmental Division on 8/2/95 and 4/4/95 and both investigations were undertaken with the assistance of Ms. Niamh Healy, Process Engineer, Irish Fertilisers Industries. Appendix 1 describes the general location of the IFI site.

In order to give a representative picture of the overall river water and sediment biological/chemical quality, a total of 13 stations at a range of locations were sampled upstream and downstream of the IFI facility. The sampling locations were chosen to help establish the upstream quality of the river and its tributaries as well as the mixing zone downstream of the factory discharge pipe. Table 3.1.1 and Appendix 2 demonstrate the approximate locations of the stations.

An 18 ft boat was used to gain access to the sampling stations. During the initial sampling event (8/2/95), a total of 2 water samples were collected at each location. The first sample was collected in a clean 2.5 l polypropylene plastic container and was used for chemical analysis. The second sample was collected in a presterilised 300ml sterilin plastic container and used for microbiological determinations. In addition, sediment samples were taken at each sampling station using a specialised piece of equipment called an Ekman grab and transferred directly to polythene sampling bags. During the second sampling occasion, which took place on 4/4/95, samples were collected to determine only the chemical quality of the river water and final effluent. In both cases, sampling was in strict accordance with recognised standard procedures.

2.2 Contaminant Plume Dispersion (Mixing Zone)

A number of electrical conductivity measurements were taken both laterally and vertically through the water column downstream of the discharge point to help assess the dilution plume at the factory outfall. In addition, a number of stations were sampled upstream of the factory in order to assess the direct effect of inputs from streams, river tributaries and the disused mine tailings pond adjacent to the River bank.

Three separate lateral transects, 5m from the North bank, the middle of the river and 5m from the South bank were established. Readings were taken equidistant along the transect upstream and downstream of the outfall using a portable WTW conductivity meter (calibrated on site using CRM standards). The results of the investigations were graphically represented in order to demonstrate the migration of the plume. While it is accepted that the containment plume from the IFI facility is multicomponent it is nonetheless considered that the total ion concentration (as measured by electrical conductivity) will yield an acceptable estimation of contaminant movement, dispersion and attenuation.

2.3 Analysis

All samples were returned to the laboratory for analysis. Subsequent analysis was carried out in strict accordance with recognised standard methods as detailed in Table 2.1.

TABLE 2.1: PROPOSED CHEMICAL AND BIOLOGICAL ANALYSIS OF WATER AND SEDIMENT SAMPLES

Parameter	Method of analysis
BOD	APHA 5210 B
pH	APHA 4500 H^+B
Suspended Solids	APHA 2540D
Conductivity	APHA 2510 B
Ammonia	APHA 4500 NH_3F
Nitrates	APHA 4500 NO_3
Total Kjeldahl Nitrogen	Automated Kjeldahl Method
Chlorophyll	Documented in house Method based on APHA 10200 H
Lead	ASTM D 3559-90
Copper	ASTM D 1688-90
Zinc	ASTM D 1691-90
Iron	ASTM D 1068-90
Biological indicators	FBA Identification System

2.4 Quality Control

The Environmental Products Laboratory complex is at present actively pursuing an ILAB accreditation status. When achieved, the Environmental Products Laboratories will have a wider accredited scope than any other laboratory in the country ranging from wet chemistry to analytical chemistry to microbiology. A stringent six point quality control approach is at present implemented in the laboratories.

(i) Controlled chain of custody.

(ii) Operator competence - all analysts must be suitably qualified to carry out required analysis.

(iii) Certified Reference Materials (CRM). The accuracy of a series of determinations is checked against known standards.

(iv) Duplicate - 10% duplication is normal.

(v) Quality Control Charts.

(vi) Inter Laboratory Testing - The Environmental Products Laboratories are members of the W.R.C. Aquacheck scheme.

3.0 RESULTS OF SAMPLING EVENT - 8/2/95

The results of the investigations carried out by Bord na Mona on 8/2/95 are presented as follows:

Table 3.1	Sample identification and locations.
Table 3.2	Results of general chemical analysis of river water and effluent samples.
Table 3.3	Results of metal analysis of water samples.
Table 3.4	Results of general chemical analysis of sediment samples.
Table 3.5	Summary list of macroinvertebrate species identified during the survey.
Table 3.6	Results of biological analysis of river water samples.

TABLE 3.1 LOCATION OF SAMPLING STATIONS		
Our reference	Your reference	Location
W987-1	S1	Aughrim River
W987-4	S2	Avoca River
W987-7	S3	Confluence of Avoca and Aughrim Rivers
W987-10	S4	Adjacent to start of tailings pond
W987-13	S5	Adjacent to middle of tailings pond
W987-16	S6	Adjacent to end of tailings pond
W987-19	S7	Downstream of IFI bridge
W987-22	S8	Adjacent to middle of site (opposite tower)
W987-25	S9	Adjacent to end of site (IFI outfall)
W987-28	S10	Downstream of rapid section after IFI outfall
W987-31	S11	Adjacent to start of IFI landfill
W987-34	S12	Upstream of Iropharm outfall
W987-37	S13	Stream entering Avoca River downstream from IFI bridge
W987-38	S14	IFI final effluent 8/2/95
W987-39	S15	IFI final effluent 9/2/95

TABLE 3.2 RESULTS OF CHEMICAL ANALYSIS OF RIVER WATER AND EFFLUENT SAMPLES

Sample	BOD mgl^{-1}	Conductivity µScm^{-1}	Suspended Solids mgl^{-1}	pH pH units	NH_3-N mgl^{-1}	NO_3-N mgl^{-1}	TKN mgl^{-1}	Chlorophyll mgm^{-3}
S1	<1	114	9	7.4	<0.05	3.2	2.8	<0.1
S2	<1	117	16	6.2	<0.05	1.9	2.0	<0.1
S3	<1	120	13	6.6	<0.05	2.7	2.9	<0.1
S4	<1	118	10	7.7	<0.05	2.7	2.0	<0.1
S5	<1	120	8	7.0	<0.05	2.6	1.6	<0.1
S6	<1	135	37	7.0	1.7	3.2	4.2	<0.1
S7	<1	132	5.5	7.1	1.2	3.1	3.3	<0.1
S8	<1	370	4	9.6	48	24.9	49.3	<0.1
S9	<1	1893	9	9.7	-	186	393	<0.1
S10	<1	253	5	9.5	26	14.3	28.3	<0.1
S11	<1	171	3	8.3	66	7.9	81	<0.1
S12	<1	115	10	7.2	<0.05	2.6	3.7	<0.1
S13	2	259	19	7.8	0.13	9.4	2.6	<0.1
S14	<2	3790	18	10.2	1650	259	1850	<0.1
S15	<2	2930	14	10.6	3375	272	3495	<0.1

TABLE 3.3 RESULTS OF METAL ANALYSIS OF RIVER WATER AND EFFLUENT SAMPLES

Sample	Pb mgl^{-1}	Cu mgl^{-1}	Zn mgl^{-1}	Fe mgl^{-1}
S1	<0.01	<0.02	<0.02	0.06
S2	<0.01	0.02	0.37	<0.05
S3	<0.01	<0.02	0.23	<0.05
S4	<0.01	<0.02	0.22	0.09
S5	<0.01	<0.02	0.21	0.14
S6	<0.01	<0.02	0.17	0.38
S7	<0.01	<0.02	0.20	0.40
S8	<0.01	0.03	0.09	0.26
S9	<0.01	0.03	0.15	0.55
S10	<0.01	<0.02	0.16	0.54
S11	<0.01	0.02	0.15	0.51
S12	<0.01	<0.02	0.20	0.16
S13	<0.01	<0.02	<0.02	0.13
S14	<0.01	0.03	0.13	<0.05
S15	<0.01	<0.02	0.06	<0.05

TABLE 3.4 RESULTS OF CHEMICAL ANALYSIS OF RIVER SEDIMENT SAMPLES

Sample	pH pH units	Pb µg/g	Cu µg/g	Zn µg/g	Fe µg/g
S1	7.4	15.6	25.5	85.7	30403
S2	6.2	82.6	78.2	99.8	30823
S3	4.9	63.9	97.0	88.9	34624
S4	4.7	52.5	80.5	113	37727
S6	8.8	53.3	56.8	119	28154
S7	4.2	566	973	292	51016
S8	7.6	109	112	219	33251
S9	6.1	30.2	89.1	269	36663
S10	5.7	42.5	44.5	60.6	16167
S11	4.9	207	189	185	41313
S12	6.6	50.8	76.0	106	23041

TABLE 3.5 SUMMARY LIST OF MACROINVERTEBRATE SPECIES IDENTIFIED DURING THE SURVEY

List of Macroinvertebratees Recorded

Phylum Uniramia

- Order Plecoptera
  - Family Perlodidae
  - Family Nemouridae
    - *Amphinemura*

- Order Diptera
  - Family Chironomidae
    - *Chironmous*

- Order Coleoptera
  - Family Chrysomelidae
  - Family Elminthidae
    - *Elmis aenia*
  - Family Dytiscidae
    - *Dytiscus*

- Order Trichoptera
  - Family Sericostomatidae
  - Family Psychomyidae
  - Family Rhyacophilidae
    - *Rhyacophila*

- Order Ephemerotera
  - Family Ecdyonurus
    - *Ecdonurus*

Phylum Annelida

- Class Clitellata
  - Subclass Oligochaeta
  - Family Tubificdae

TABLE 3.6 RESULTS OF BIOLOGICAL QUALITY OF RIVER SAMPLES

Organism	Sampling Stations											
	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12
Perlodidae	-	-	-	-	1	-	-	-	-	-	-	-
Amphinemura	-	-	-	-	1	-	-	-	-	-	-	-
Chironomus	-	-	-	-	1	-	8	-	-	-	1	-
Tubificidae	-	-	-	-	3	-	-	-	-	-	-	-
Elmis aenea	-	-	-	-	-	1	1	-	-	-	-	-
Chrysomelidae	-	-	-	-	-	1	-	-	-	-	-	-
Sericostomatidae	-	-	-	-	-	1	-	-	-	-	4	-
Dytiscus	-	-	-	-	-	-	1	-	-	-	-	-
Psychomyidae	-	-	-	-	-	-	1	-	-	-	-	-
Ecolyonurus	-	-	-	-	-	-	-	-	-	-	1	-
Rhyacophila	-	-	-	-	-	-	-	-	-	-	2	-

3.1 DESCRIPTION OF RESULTS

3.1.1 Chemical analysis of river water, effluent and sediment samples

The location of the various sampling stations are described in Appendix 2 and Table 3.1. The results of the chemical analysis of the river water, effluent and sediment samples taken upstream and downstream of the IFI site are presented in Tables 3.2, 3.3 and 3.4.

The chemical quality of the river water samples taken upstream of the factory site (S1-S7, S13) was generally good. These samples exhibited low levels of organic (BOD) content, nitrogen (NO_3-N, NH_3-N and TKN) content and suspended solids levels. No chlorophyll was detected in any of the samples analysed. The levels of lead and copper in the river water samples S1-S7 were low. However, significant quantities of zinc and iron were present in all samples. The results of this study highlight elevated levels of conductivity and NO_3-N in the sample taken from the water course entering the Avoca river downstream of the IFI bridge (S13). The elevated levels in this sample is significant in that they indicate nitrogen inputs to the river from sources other than the IFI facility. This may be from diffuse agricultural run-offs or onsite sewage disposal facilities adjacent to the stream. In particular, sample S8, taken from the river water course adjacent to the middle of the factory site, showed a marked increase in pH, conductivity, NO_3-N and TKN with respect to the upstream samples. This is a somewhat surprising result and may indicate the migration of the nitrogen plume against the river flow, possibly due to tidal action. Results of metal analysis of sample S8 was, however, similar to the levels of metals recorded in river water samples S1-S7 and S13.

Elevated levels of pH, conductivity, NO_3-N, NH_3-N, and TKN were recorded in the River water sample taken adjacent to the effluent discharge pipe (S9). The elevated nitrogen levels highlight the significance of the discharge from the IFI site.

The degree and extent of organic and inorganic contamination of the river water downstream of the factory effluent discharge pipe was also investigated (samples S10, S11 and S12). Sample S10, taken from the water course downstream of the rapid section of the river (Appendix 2) contained significant levels of nitrogen contamination and similarly high pH and conductivity values. The degree of contamination in the sample of river water taken adjacent to the landfill site (S11) was marginally lower than the corresponding values of sample S10. However, NH_3-N levels were higher than that observed in sample S10. The pH, conductivity, suspended solids, nitrogen and metal content of sample S12 were similiar to the levels recorded in the samples taken upstream of the factory discharge pipe. This indicates that the contaminat plume is adequately dispersed at this location (S12) and generally agrees with the results of the conductivity measurements (Appendices 3 and 4).

Two samples of effluent were also analysed prior to the discharge to the Avoca river (S14, S15). The pH and conductivity values recorded in samples S14 and S15 were extremely high. Elevated NH_3-N, NO_3-N, and TKN levels were also recorded. From our estimations on flow data for the Aughrim river and Avonmore river (January to March, 1990-1995) and assuming a typical average daily effluent flow of $4450m^3/d$, a 1:177 dilution factor is available in the water course adjacent to the IFI site. This is an extremely conservative estimation and the above calculation was made excluding the flow data for the Avonbeg river (no data available). Based on the concentration (Table 3.2) and volume ($4,450m^3/d$) of effluent being discharged the estimated loadings to the river are 11,182 $KgNH_3$-N/d (of which approximately 20% is in the unionised form) and 1,181 $KgNO_3$-N/d.

The contaminant plume is demonstrated to remain intact as a single entity at the North bank of the river at a lateral distance of approximately 250 m downstream of the discharge pipe (Appendices 3 and 4). The presence of a turbulent stretch (rapid section) immediately downstream of the discharge does not appear to facilitate good mixing. The horizontal migration of the plume across the river profile occurs at the first river meander adjacent to the landfill site.

Chemical analysis of river water sediment samples in the vicinity of the IFI site was also undertaken by Bord na Móna Environmental Division. Metal analysis of the sediment samples were shown to be extremely variable, with all samples displaying extremely high levels of iron. In particular, sample S7 showed a marked increase in iron content with respect to other sediment samples taken upstream and downstream of the site. The lead contents of the various samples were extremely variable ranging from 15.6µg/g (S1) to a maximum of 566.2µg/g for the sample taken downstream of the IFI bridge (S7). Sample S7 also exhibited markedly highly levels of copper and zinc than the corresponding values of other samples taken. In general, no pattern in the degree or extent of metal contamination was noted. The elevated copper and zinc recorded may be attributed to contamination from the adjacent disused Avoca mining site.

3.2.2 Biological analysis of river water samples

The results presented in Tables 3.5 and 3.6 summarise the main group of macroinvertebrates identified during the survey. A total of two taxonomic phyla were represented, namely, Phylum Uniramia and Phylum Annelida.

Macroinvertebrate species were only found at four of the twelve sampling stations. Sample S5 contained species from Family Perlodidae, Chironomidae and Tubificdae while representatives of Family Chrysomelidae, Elminthidae and Sericostomatidae were present in sample S6, taken adjacent to the end of the mine tailings pond. The sample taken downstream of the IFI bridge (sample S7) was shown to contain mainly *Chrionmous* species. Species from Family Sericostomatidae were predominant in sample S8 and members of Family Chironomidae, Ecdyonurus and Rhyacophilidae were also present.

The results demonstrate an extremely low score using species diversity indices (Trent Biotic Index, Simpsons Index). There is no evidence of biological difference in samples upstream and downstream of IFI outfall. It is, therefore, concluded that the poor biological quality of the river sediment may be due to toxic inputs from historic mining activity along the valley and in addition to possible on going leachates from the associated tailing ponds (both upstream and downstream of the IFI industrial site). The results of the biological survey suggest that the river is, at present, incapable of supporting any significant fish life (Salmonid or Cyprinid) due to the absence of a sustainable food source and the possible toxic of the river sediments.

4.0 RESULTS OF ANALYSIS OF SUB-SAMPLING EVENT (4/4/95)

As described earlier, a sub-sampling event was also undertaken by Bord na Móna Environmental Division on 4/4/95. The location of the various samples are similiar to those described in Appendix 2 and Table 3.1. However, in this case the final effluent samples were sampled on 4/4/95 (S14) and 5/4/95 (S15). The results of the investigations are presented as follows:

Table 4.1	Results of general chemical analysis of river and effluent samples.
Table 4.2	Results of metal analysis of water samples.

TABLE 4.1 RESULTS OF CHEMICAL ANALYSIS OF RIVER WATER AND EFFLUENT SAMPLES

Sample	BOD mgl^{-1}	Conductivity µScm^{-1}	Suspended Solids mgl^{-1}	pH pH units	NH_3-N mgl^{-1}	NO_3-N mgl^{-1}	TKN mgl^{-1}	Chlorophyll mgm^{-3}
S1	<1	113	2	7.4	0.1	2.8	0.1	1.3
S2	<1	114	9	6.0	0.1	1.8	0.9	1.0
S3	<1	112	9	6.4	0.1	2.1	2.2	2.0
S4	<1	112	9	7.0	0.1	2.1	0.5	1.5
S5	<1	112	8	6.6	0.1	2.2	1.8	2.5
S7	<1	-	8	6.5	0.1	2.2	2.7	3.8
S8	<1	134	5	7.3	3.8	13.4	5.3	3.4
S9	<1	345	4	9.7	83.4	20.9	110	3.3
S10	<1	125	9	7.1	1.2	2.6	2.2	2.5
S11	<1	126	9	7.4	0.9	2.7	2.7	1.9
S12	<1	124	6	6.7	0.8	2.5	1.8	2.3
S13	<1	240	10	7.7	<0.05	6.3	1.8	6.0
S14	10	3750	14	9.9	1076	323	1360	-
S15	<2	3660	18	9.9	1036	358	1340	-

TABLE 4.2 RESULTS OF METAL ANALYSIS OF RIVER WATER AND EFFLUENT SAMPLES

Sample	Pb mgl^{-1}	Cu mgl^{-1}	Zn mgl^{-1}	Fe mgl^{-1}
S1	<0.01	<0.02	<0.02	0.08
S2	<0.01	0.04	0.43	0.24
S3	<0.01	<0.02	0.28	0.05
S4	<0.01	<0.02	0.27	0.06
S5	<0.01	<0.02	0.26	0.08
S7	<0.01	<0.02	0.25	<0.04
S8	<0.01	<0.02	0.24	0.21
S9	<0.01	<0.02	0.13	0.27
S10	<0.01	<0.02	0.21	0.05
S11	<0.01	<0.02	0.22	<0.04
S12	<0.01	<0.02	0.21	<0.04
S13	<0.01	<0.02	<0.02	0.07
S14	<0.01	0.07	0.06	0.14
S15	<0.01	0.03	0.06	0.14

4.1 DESCRIPTION OF RESULTS

4.1.1 Chemical analysis of river water and effluent samples

The results of the chemical analysis of the river water and effluent samples taken upstream and downstream of the IFI site are presented in Tables 4.1 and 4.2.

Analysis of the river water samples taken upstream of the IFI facility (S1-S7, S13) highlighted the generally good chemical quality of the river water at these sampling stations. The levels of BOD, NO_3-N, NH_3-N, TKN and suspended solids were low. Samples S1-S7 exhibited low levels of lead and copper while zinc and iron were present in markedly higher quantities in these samples. Like the previous sampling occasion (8/2/95), the results also highlight elevated conductivity and NO_3-N levels in the sample from the stream entering the Avoca River downstream of the IFI bridge (S13). Sample S8, which was taken adjacent to the middle of the IFI site, exhibited increased levels of conductivity, NH_3-N, NO_3-N, and TKN. These results were similar to those recorded on the previous sampling occasion in that the NO_3-N (and on this occasion the NH_3-N and TKN levels) were significantly above the levels recorded at other sampling stations located upstream of the discharge pipe. This may again be attributed to tidal movements or currents in the vicinity of the outfall. The increased mobility of the nitrate ion is also demonstrated here.

The elevated levels of pH, conductivity and nitrogen (NO_3-N, NH_3-N, and TKN) in sample S9 highlights the signifigance of the discharge from the IFI facility. However, the results recorded in this sample are considerably lower than those recorded on the previous sampling occasion (8/2/95) despite the reduced dilution available in the river. This may be attributed to the decreased strength of the effluent on this sampling event or may be due to difficulty in obtaining similarly representative samples.

The chemical quality of the Avoca river downstream of the IFI discharge point was also examined (S10, S11, S12). The levels of conductivity and nitrogen (NO_3-N, NH_3-N, and TKN) were similar in samples S10, S11 and S12. However, the results of the inorganic analysis of these samples indicate that, while there was significant reductions in the contaminant levels recorded at sampling stations S10, S11 and S12, mixing was not quite complete (e.g. conductivity and NH_3-N levels remain slightly elevated).

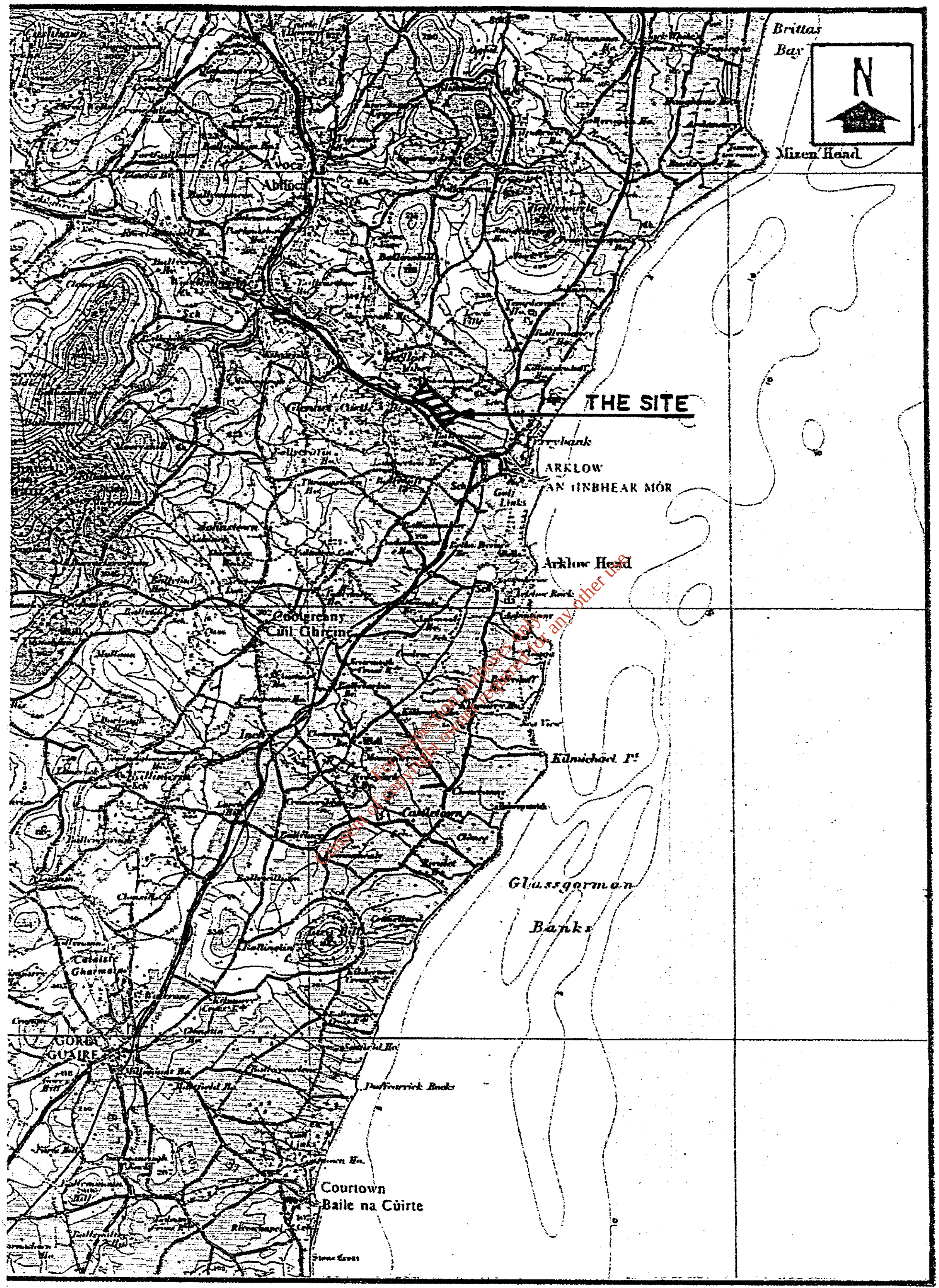
Samples S14 and S15 are representative of the IFI effluent prior to discharge to the nearby water course. The levels of pH, conductivity and nitrogen (NO_3-N, NH_3-N, and TKN) in both samples were extremely high and once again highlight the quality of the discharge.

The dilution available at the discharge, based on flow data for the Aughrim river and Avonmore river (April to June, 1990-1995) and assuming a typical average daily effluent flow of 4450m^3/d is 1:110. Once again, like the previous sampling occasion (8/2/95) this is an extremely conservative estimation and was made excluding the flow data for the Avonbeg river (no data available). The NH_3-N and NO_3-N loadings to the river on this sampling occasion were 4,699 kg/d (of which approximately 20% is in the unionised form) and 1,515 kg/d respectively. The contaminant plume is demonstrated in Appendix 4 and follows a similar pattern as in the previous sampling event. Migration of the plume occurs along the North bank and once again the presence of the rapid section downstream of the discharge point does not appear to facilitate good mixing. The final report will highlight in greater detail the mixing zone and assimilative capacity of the river.

It should be emphasised that the two sampling events described in previous sections indicate the initial situation at the site prior to the planned process upgradings at the factory. It is considered that the remaining evaluations (June, 1995, September 1995 and December 1995/January 1996) will demonstrate a significant improvement in the quality of the effluent and consequently the receiving water downstream of the discharge. An improvement in the biological status of the river is less likely.

APPENDIX 1

Location of site

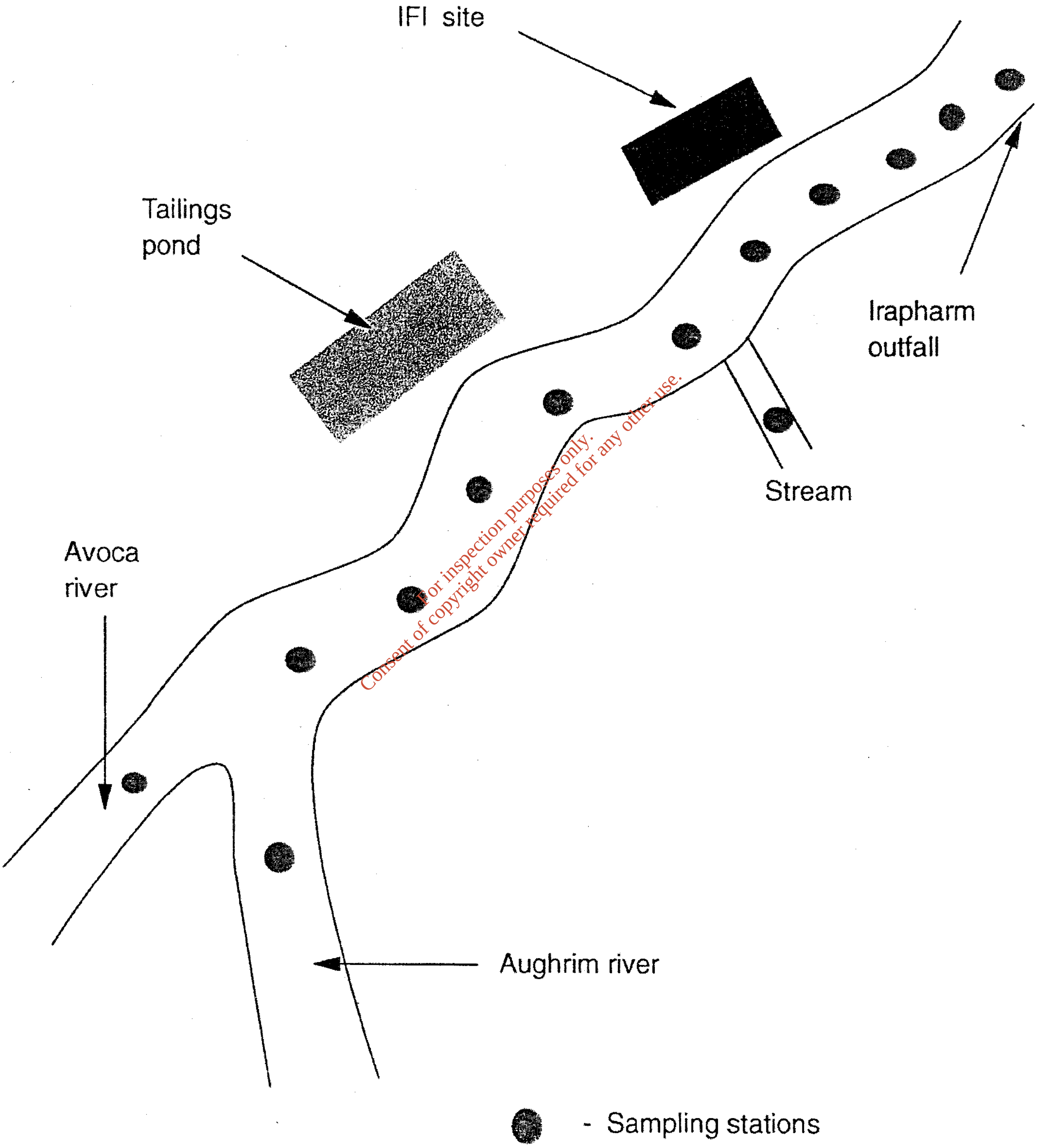


THE PERMISSION OF THE ORDNANCE SURVEY TO REPRODUCE MAPS IS ACKNOWLEDGED.

SCALE÷1:126,720 (1/2" TO 1 MILE)

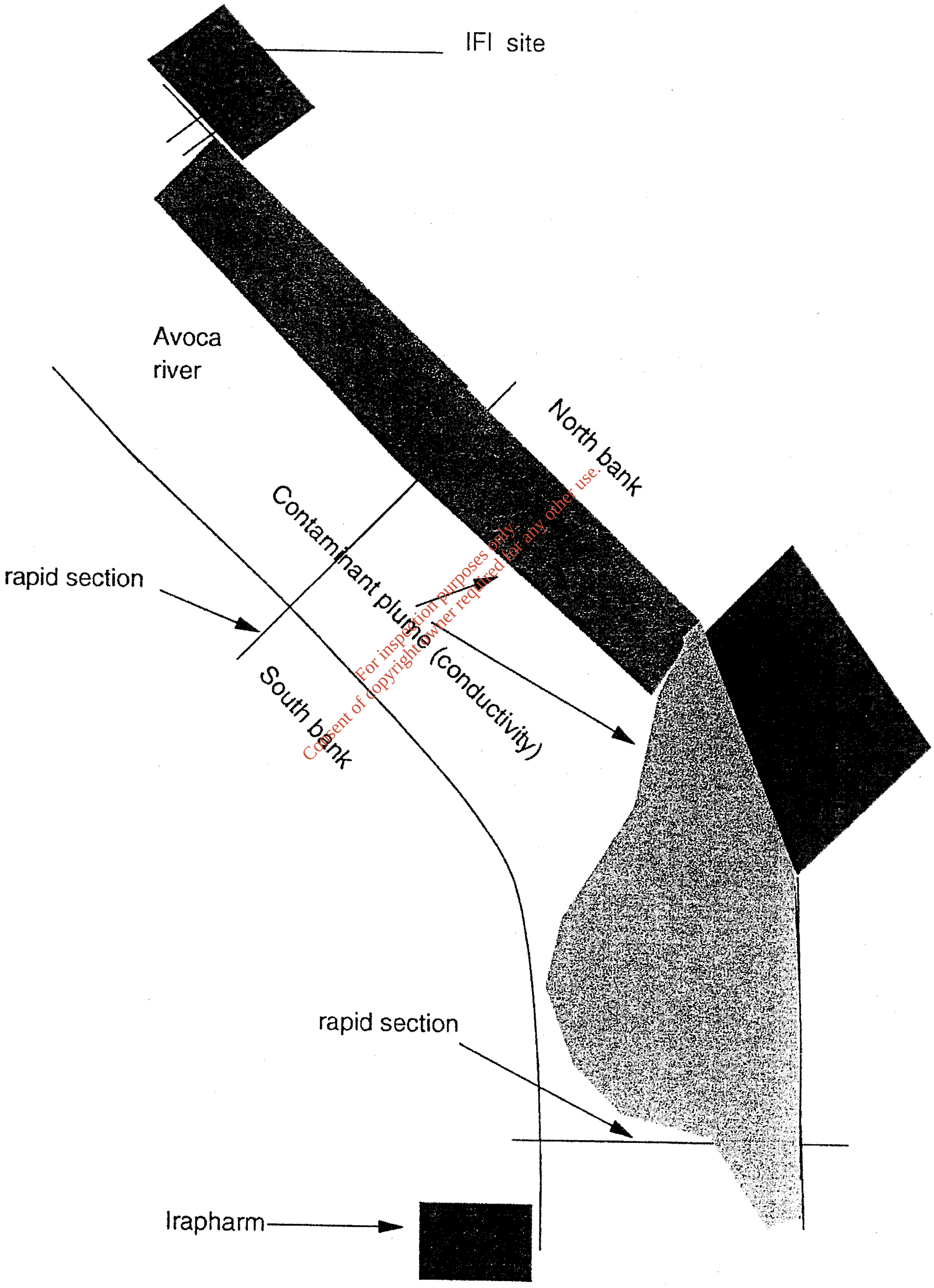
APPENDIX 2

Location of sampling stations


IFI site
Tailings pond
Irapharm outfall
Stream
Avoca river
Aughrim river
● - Sampling stations

APPENDIX 3

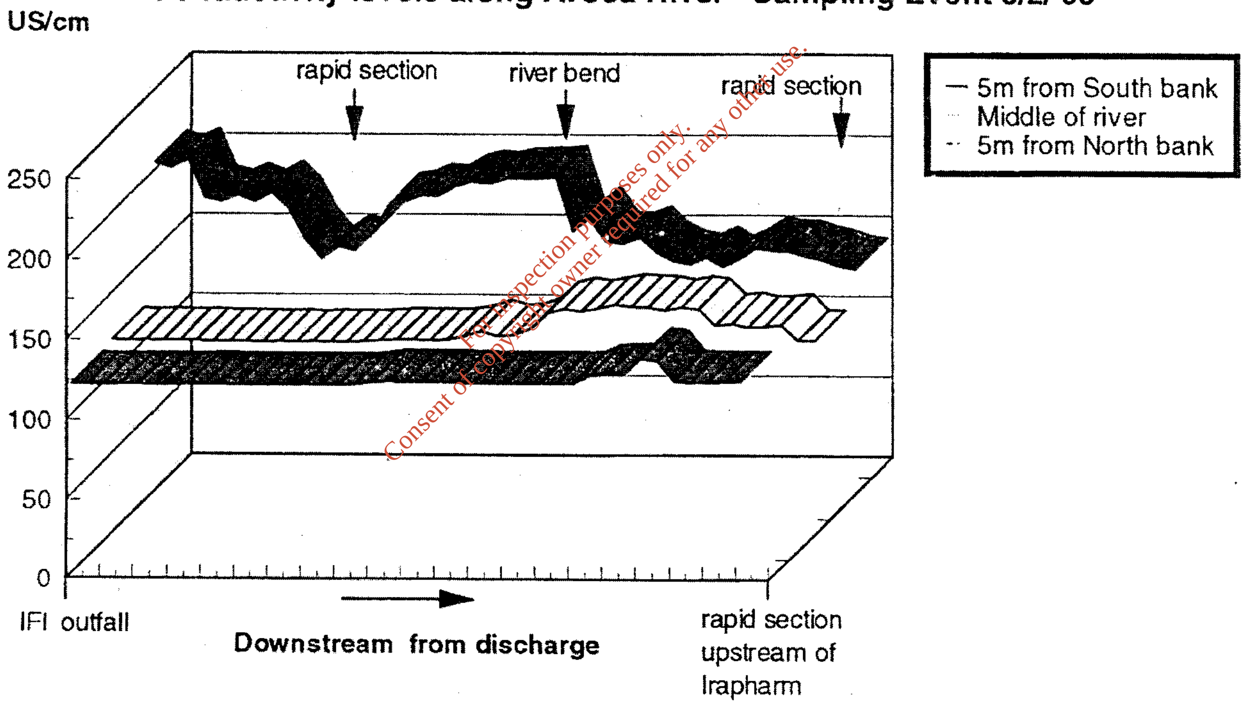
Schematic representation of conductivity plume along Avoca river


IFI site
Avoca
river
North bank
Contaminant plume (conductivity)
rapid section
South bank
rapid section
Irapharm

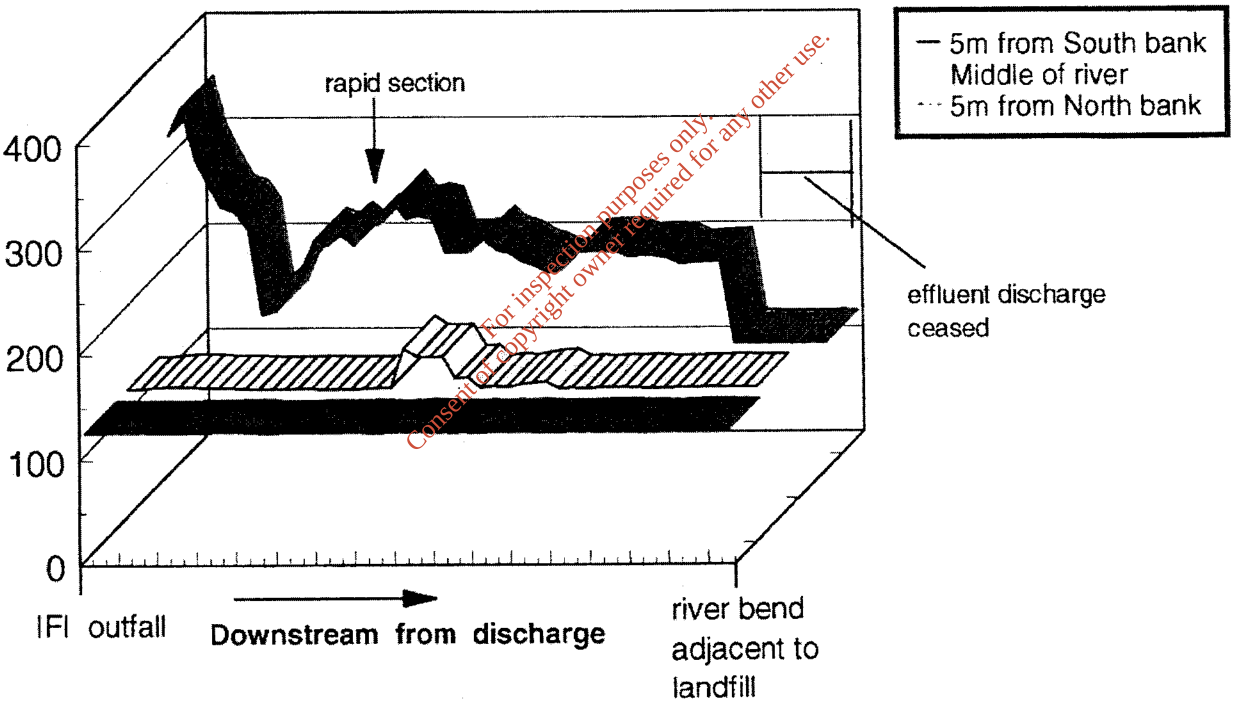
APPENDIX 4

Schematic representation of conductivity levels along Avoca River

Conductivity levels along Avoca River - Sampling Event 8/2/'95



Conductivity levels along Avoca River - Sampling Event 4/4/95



APPENDIX 3 – EPA Licence Technical Amendment Data

PM
GROUP

Killakee House
Belgard Square
Tallaght
Dublin 24
Ireland

T +353 1 404 0700
F +353 1 459 9785
E dublin@pmgroup-global.com
www.pmgroup-global.com

File: 011258.04.160
EPA Ref: P0031-02/gc37ma.docx

17 January 2012

Environmental Licensing Programme (ELP),
Environmental Protection Agency (EPA),
P.O. Box 3000,
Johnstown Castle Estate,
Co. Wexford

Re: Technical Amendment (Section 96(1) of the EPA Acts) Request – IPPC Licence Register No. P0031-02

To Whom It May Concern:

In relation to our previous letter regarding a technical amendment request dated 12 October 2011, and subsequent to a discussion with Dr Magnus Amajirionwu, Inspector of the Office of Environmental Enforcement on 03 January 2012, we would like to submit an amended drawing for the redrawing of the IPPC licensed site boundary. This request concerns a proposed change to the IPPC licence boundary at the facility in Avoca River Park near Arklow, Co. Wicklow. The proposed IPPC site boundary is outlined in Drawing No. 011258-22-SK-0004 Issue B.

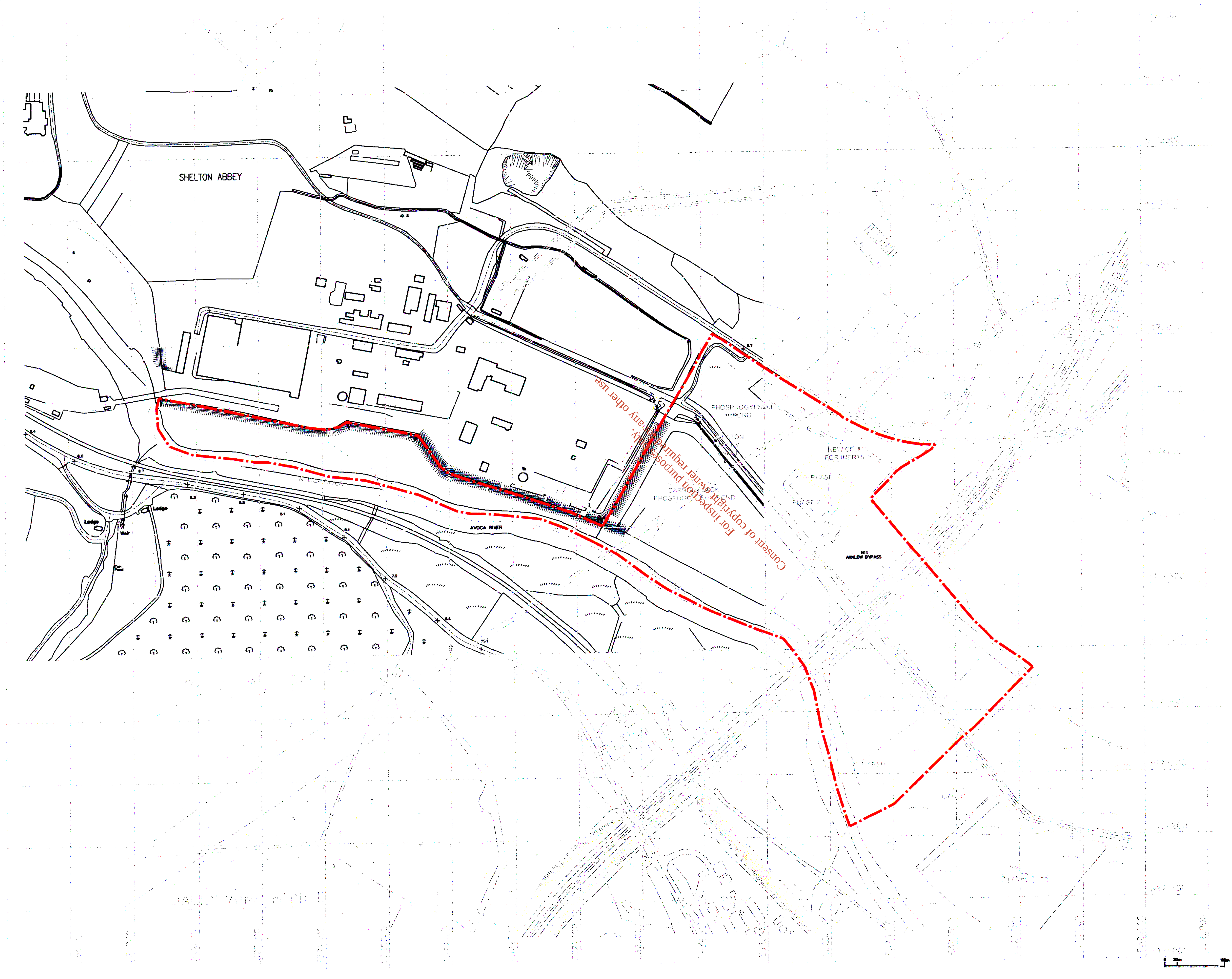
Please do not hesitate to contact me at 01 4040797 or by email at mags.dalton@pmgroup-global.com if you have any questions on the above or you wish to request additional information regarding. Alternatively we would be happy to meet to discuss, if required.

Yours sincerely,

Mags Dalton
EHS Manager
On behalf of Holfeld Plastics Limited

Cc Mr Edmund Holfeld (Holfeld Plastics Ltd.)
Mr Brian Kealy (Holfeld Plastics Ltd

ENVIRONMENTAL PROTECTION AGENCY
18 JAN 2012



NOTES

LEGEND

━ · ━ REVISED BOUNDARY OF HOLFELD PLASTICS LTD.

ENVIRONMENTAL PROTECTION AGENCY
18 JAN 2012

B	REISSUED FOR INFORMATION					18/01/
A	FOR INFORMATION	BD	FO'N	RO'D	FO'N	[illegible]
ISSUE	DESCRIPTION	DRN	ORIG	AUTH CHK	APP	DAT

CLIENT HOLFELD PLASTICS LTD

PM GROUP

PROJECT EPA SUBMISSION

TITLE REVISED IPPC SITE BOUNDARY FOR
HOLFELD PLASTIC LTD.

CLIENT REF.

CLIENT DRG No.

Headquarters
P.O. Box 3000
Johnstown Castle Estate
County Wexford
Ireland

TECHNICAL AMENDMENT B
TO
INTEGRATED POLLUTION PREVENTION & CONTROL LICENCE

Licence Register Number:	P0031-02
Licensee:	Holfeld Plastics Limited
Location of Installation:	Arklow County Wicklow

Reasons for the Decision

The Environmental Protection Agency is satisfied, on the basis of the information available, that subject to compliance with the conditions of Integrated Pollution Prevention and Control (IPPC) licence Reg. No. P0031-02 granted on the 10th March 2000, (and amended on 31st December 2008) as well as any amendments noted herein, any emissions from the activity will comply with and not contravene any of the requirements of Section 83(5) of the Environmental Protection Agency Acts, 1992 to 2011.

Technical Amendment

In pursuance of the powers conferred on it by Section 96(1)(c) of the Environmental Protection Agency Acts, 1992 to 2011, the Agency amends the licence, granted to Holfeld Plastics Limited, Avoca River Park, Arklow, County Wicklow.

Henceforth, the licence shall be read in conjunction with Amendment A issued on 31st December 2008, and the amendment set out below.

This technical amendment is limited to the following:

Amendments

Amend Condition 1.4 of the licence, to read as follows:

1.4 For the purposes of this licence, the installation authorised by this licence is the area of land outlined in broken red line on Drawing No. 011258-22-SK-0004 (Revision B) *'Revised IPPC Site Boundary for Holfeld Plastic Ltd.'*, received by the Agency on 18th January 2012.

Any reference in this licence to "installation" shall mean the area thus outlined in broken red line. The licensed activities shall be carried on only within the area outlined.

This technical amendment shall be cited as Amendment B to the licence.

Sealed by the Seal of the Agency on this the 18th day of May, 2012.

PRESENT when the seal of the Agency was affixed hereto

Mary Turner, Authorised Person

ENVIRONMENTAL PROTECTION AGENCY
19 OCT 2011

PM GROUP

File: 011258.04.160
EPA Ref: P0031-02/gc37ma.docx

Killakee House
Belgard Square
Tallaght
Dublin 24
Ireland

T +353 1 404 0700
F +353 1 459 9785
E dublin@pmgroup-global.com
www.pmgroup-global.com

12 October 2011

Environmental Licensing Programme (ELP),
Environmental Protection Agency (EPA),
P.O. Box 3000,
Johnstown Castle Estate,
Co. Wexford

Re: Technical Amendment (Section 96(1) of the EPA Acts) Request – IPPC Licence Register No. P0031-02

To Whom It May Concern:

Following a meeting with Dr Magnus Amajirionwu, Inspector of the Office of Environmental Enforcement on 13.9.2011 at the Holfeld Plastics Ltd. facility, PM Group on behalf of Holfeld Plastics Ltd. would like to make a request for a technical amendment in line with Section 96(1) of the EPA Acts. This request concerns a proposed change to the IPPC licence boundary at the facility in Avoca River Park near Arklow, Co. Wicklow.

The proposed IPPC site boundary is outlined in Drawing No. 011258-22-SK-0004 in **Attachment 1**. It is proposed that the old IFI production area and the area north of the landfills and gypsum ponds be removed from the domain of the current HPL site IPPC boundary. The following sections outline the site history, clean-up activities conducted to date, regulatory context, summary of risk assessment undertaken, proposed future clean-up, progress to date and conclusions.

1. SITE HISTORY

The fertiliser site was historically split in three distinct zones:

- Production and Storage (Production area) – Production and storage area for fertiliser
- Gypsum ponds – storage areas for dewatering of gypsum slurry produced as by-product in 1970's.
- Landfills – disposal of domestic and other wastes.

The IFI business was liquidated and the site sold to HPL in 2005 at which time the IPC licence was transferred.

2. CLEAN-UP ACTIVITIES

Earlier studies by IFI had identified known liabilities that have resulted in multiple clean-up projects over the last 6 years. These include:

- Decommissioning and removal of production plant;
- Hazardous waste disposal;
- Refurbishments of bulk storage sheds;
- Removal and disposal of asbestos roofing;
- Excavation and removal of diesel oil contaminated soils;
- Excavation and removal of PCB oil contaminated soils;
- General clean-up, reinstatement and landscaping of the site.

All remediation projects have been completed in good faith, at great expense, and serve to remove all known liabilities from the former production area.

3. IPPC DIRECTIVE

Article 3 Paragraph (f) of the IPPC directive (96/61/EC) requires "the necessary measures are taken upon definitive cessation of activities to avoid any pollution risk and return the site of operation to a satisfactory state".

The issue of risk is addressed below in Section 4.

Article 6 of the directive requires that the application for permit "include the conditions of the site of the installation". In the absence of guidance, it is accepted in other European jurisdictions that the site condition at the time of transition into IPPC represents the baseline for regulation. And indeed the premise of IPPC is generally seen to be the protection of the environment as demonstrated by no deterioration.

All monitoring surveys of the site have shown a consistent improvement in site quality. The site condition is now significantly improved on the baseline condition at the time of licensing.

4. RISK ASSESSMENT

As part of the site boundary re-drawing PM Group on behalf of Holfeld Plastics commissioned Sean Moran (qualified hydrogeologist) of O' Callaghan Moran & Associates (OCM) to undertake an independent Environmental Risk Assessment for the old IFI production area. The report is included in **Attachment 2**.

The report assesses the progress of the Monitored Natural Attenuation (MNA) approach, PM Group's Site Residuals Management, Modelling and Risk Assessment Report (011258-22-RP-0005, issued to the Office of Environmental Enforcement) and provides a quantitative assessment of the residual risk.

The findings of the OMC report show that at 10 of the 12 groundwater monitoring wells the ammonia and nitrate levels are already below the concentrations predicted in the groundwater modelling completed in 2007. This demonstrates that natural attenuation is proving effective.

As previously discussed with the EPA the attenuation rate has been slower than predicted in the southern part of the Production area. OCM considers this is associated with the presence of very thick silt/clay subsoils in this area, which restricts the rate of groundwater through put to the river resulting in low oxygen levels and slowing down the rate of ammonia degradation in this area.

Surface water monitoring carried out by OMC on the Avoca River indicates that there is no significant difference in nitrate, sulphate or COD between the monitoring locations up and downstream of the Production Area. The ammonia concentrations do increase slightly downstream of the Production Area but these increases are not considered significant. OCM considers therefore the environmental risk associated with the Production Area is considered insignificant.

Based on the findings from OMC's Risk Assessment the former production area should therefore be released from the licence.

As discussed, it is agreed that IPPC licence compliance monitoring of BH94/14 and BH94/15 (located within area proposed to be removed from IPPC licence boundary) will continue to be undertaken by Holfeld Plastics until such time as the EPA deem necessary. It is proposed that this requirement be reviewed annually as part of the Annual Environmental Report (AER).

Note: The area north of the landfills and gypsum ponds has been historically used for agricultural purposes only. Monitoring wells BH94/3 and BH97/7 are the closest bore holes in the area monitored in the last 8 years. In agreement with the EPA these bore holes are no longer monitored. Given that the hydraulic gradient of the site is towards the Avoca River and the areas historical use, the area north of the landfill presents no risk to the environment and therefore should be released from the licence.

5. FUTURE CLEAN-UP

Following from Meeting Record issued by Dr Magnus Amajirionwu, Inspector of the Office of Environmental Enforcement following a meeting on 13.9.2011 Holfeld Plastics Ltd and PM Group are currently preparing a proposal for:

- A quantified risk assessment of all on-site landfills and provide details of outstanding works required to restore the closed landfill sites to EPA specifications and a timeframe for their completion;
- The Licensee shall consider the potential financial implications resulting from the quantified risk assessment of all on-site landfills and submit details of responsibilities and financial arrangements put in place.

This proposal will be issued to the EPA by Friday 14 October for the EPA's consideration.

It should be noted that the original bond of €500,000 is still in place. This was determined prior to completed works discussed in Section 2. A revision of this will be undertaken in light of reduced construction costs, above mentioned works and outcome of quantified risk assessment.

Further east of the site, the southern landfill has been previously capped to a design agreed with the EPA however the northern landfill was not capped to the same specification. Capping of the northern landfill will commence in line with recommendations issued as part of the above quantified risk assessment. The capping will be designed and engineered to the highest international standards and will only be implemented with the approval of the EPA.

6. CONCLUSION

In summary, Holfeld Plastics Ltd proposes to re-draw the site boundary at Avoca River Park, Arklow, Co. Wicklow. The revised site boundary is presented in Drawing No. 011258-22-SK-0004. Please note that this request is accompanied by a review request fee of €126 in accordance with the EPA (Licensing Fees) Regulations 1994 to 2006.

We acknowledge and appreciate the time, effort and assistance of the EPA in progressing to our current position. The EPA has accepted that the priority zones are the southern zones, gypsum ponds and landfills, and has already agreed that the site monitoring be reduced to properly reflect risk posed by the site. We encourage the EPA to proceed with this pragmatic approach and its logical progression to release the requested fraction of the site.

Please do not hesitate to contact me at 01 4040797 or by email at mags.dalton@pmgroup-global.com if you have any questions on the above or you wish to request additional information regarding. Alternatively we would be happy to meet to discuss.

Yours sincerely,

Mags Dalton

EHS Manager

On behalf of Holfeld Plastics Limited

Cc	Mr Edmund Holfeld (Holfeld Plastics Ltd.)
	Mr Brian Kealy (Holfeld Plastics Ltd.)

APPENDIX 4 – 2011 Holfeld Plastics AER

PM
GROUP

Holfeld Plastics Ltd

Environmental Support
Project No.: IE0310761

ANNUAL ENVIRONMENTAL REPORT 2011

File No: IE0310761.22.040 **Document Number: IE0310761-22-RP-0001**

CURRENT ISSUE					
Issue No: A	Date: 13/04/2012	Reason for Issue: For EPA Submission			Customer Approval (if required)
Sign-Off	Originator	Checker	Reviewer	Approver	
Print Name	Rory O'Dwyer	Mags Dalton		Mags Dalton	
Signature	Rory O'Dwyer	M Dalton		M Dalton	
Date	13/04/2012	13/4/2012		13/4/2012	

PREVIOUS ISSUES (Type Names)							
Issue No.	Date	Originator	Checker	Reviewer	Approver	Customer	Reason for Issue

CONTENTS

1. INTRODUCTION

Licensee	Holfeld Plastics Limited
Licence Register Number	P0031-02

The original licensee (Irish Fertilizer Industries Limited) went into liquidation on 8 November 2002 and the fertilizer process plants have been out of operation since then. All process equipment has been subsequently decommissioned and exported.

1.1 Historical Activities of Site

Irish Fertilizer Industries (IFI) was a joint venture company involving the State Company Nitrigin Eireann Teoranta (NET) and ICI plc. The company was the only fertilizer manufacturer in Ireland and operated three sites located in Cork, Belfast and Arklow.

The IFI Arklow site occupies 50 hectares in the Avoca Valley on the east coast of Ireland approximately 2.5 km north west of the town of Arklow in the flood plain of the Avoca River. The river flows along the southern boundary of the site and supplied all of the site water requirements except for drinking water.

The main products manufactured by IFI at the Arklow site were Calcium Ammonium Nitrate (CAN) and blends. Nitric Acid was produced mainly as an intermediate although there was a minor acid sales business.

The entire factory operation required the usual site services of water treatment, steam generation, laboratory activities and storage of raw materials, intermediates, products and ancillary materials.

Other nutrients which complement the range of fertilizer products were imported and blended as required.

1.2 Site IPPC History

The Arklow Factory was first granted an Integrated Pollution Control (IPC) Licence (register no. 31) by the Environmental Protection Agency (EPA) on 30 January 1997. The company applied for a review of the licence in mid 1999 to cover proposed significant changes in the site processes. The revised licence, (register no. 495), was issued on 10th March 2000. An application to transfer the IPC licence number 495 to Holfeld Plastics was made in September 2005. The transfer was successfully transferred on the 26th October 2005. One of the requirements of both licences is to prepare an Annual Environmental Report for submission to the EPA. This report details environmental performance at the site for the calendar year 2011.

Although all of the process plants were shut down since 2002 and the activity has ceased for in excess of 8 years, site monitoring activities have continued.

An application for a technical amendment has since been submitted to the EPA on 12 October 2011 where it is proposed that the old IFI production area and the area north of the landfills and gypsum ponds be removed from the domain of the current HPL site IPPC boundary. This technical amendment is currently with the

Environmental Licensing Programme of the EPA for consideration and it is expected that a decision will be made in 2012.

1.3 Company Organisation for Environmental Management

The site licence was transferred to Holfeld Plastics Limited upon their purchase of the site in 2005. The main activities since then have been the final decommissioning of processes and general site clean-up. In addition, the former bulk storage sheds have been fully refurbished for the relocation of the Holfeld Plastics manufacturing business. These activities have been completed under the direction of Mr. Edmund Holfeld, Managing Director, who has full responsibility for all site activities. In addition expert environmental advice has been provided by PM Group who has been involved with site environmental management in Arklow since the mid 1990s.

2. ENVIRONMENTAL DATA SUMMARY INFORMATION

This report details environmental performance at the site for the calendar year 2011. The relevant worksheets from the AER Returns Workbook have been included in hard copy in Appendix D of this report.

2.1 Emissions to Waters

There was no liquid effluent discharged to the Avoca River in 2011.

2.2 Waste Management

All waste generated on site is managed within the remit of the licence. The following are the types and quantities of waste that were managed during 2011.

Holfeld Plastics:

Waste Type (EWC Code)	Quantity (kg unless stated otherwise)
Cardboard (20 01 01)	62,656
Plastics (20 01 39)	60,542
Mixed Municipal Waste (20 03 01)	6,600
Alum Swarf (20 01 40)	2,500
Alum Solids (20 01 40)	4,160
Mild Steel (20 01 40)	480
Waste Oil (13 02 06)	1,640L

2.3 Environmental Incidents and Complaints

There were no reported incidents or complaints in the calendar year 2011.

Table 2.1: Summary of Environmental Incidents 2011

Date	Incident Description	Actions Taken
NONE	NONE	NONE

3. ENVIRONMENTAL MANAGEMENT

3.1 Residual Management

A monitored natural attenuation programme with associated modelling was developed during 2004 for the soil and groundwater beneath the former process area of the site. This was been submitted to the Agency for agreement in 2004.

This groundwater model was updated in 2007 and was submitted as part of the Avoca River Park Site Residuals Management, Modelling and Risk Assessment report (PM report no. 011258-22-RP-0005).

3.1.1 Site Clean Up Activities

Earlier studies by IFI had identified known liabilities that have resulted in multiple clean-up projects over the last 6 years. These include:

- Decommissioning and removal of production plant;
- Hazardous waste disposal;
- Refurbishments of bulk storage sheds;
- Removal and disposal of asbestos roofing;
- Excavation and removal of diesel oil contaminated soils;
- Excavation and removal of PCB oil contaminated soils;
- General clean-up, reinstatement and landscaping of the site.

All remediation projects have been completed in good faith, at great expense, and serve to remove all known liabilities from the former production area.

3.1.2 Risk Assessment

As part of a recent request to the EPA for a site boundary re-drawing PM Group on behalf of Holfeld Plastics commissioned Sean Moran (qualified hydrogeologist) of O' Callaghan Moran & Associates (OCM) to undertake an independent Environmental Risk Assessment for the old IFI production area.

The report assesses the progress of the Monitored Natural Attenuation (MNA) approach, PM Group's Site Residuals Management, Modelling and Risk Assessment Report (011258-22-RP-0005, issued to the Office of Environmental Enforcement) and provides a quantitative assessment of the residual risk.

The findings of the OMC report show that at 10 of the 12 groundwater monitoring wells the ammonia and nitrate levels are already below the concentrations predicted in the groundwater modelling completed in 2007. This demonstrates that natural attenuation is proving effective.

As previously discussed with the EPA the attenuation rate has been slower than predicted in the southern part of the Production area. OCM considers this is associated with the presence of very thick silt/clay subsoils in this area, which restricts the rate of groundwater through put to the river resulting in low oxygen levels and slowing down the rate of ammonia degradation in this area.

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Note: The area north of the landfills and gypsum ponds has been historically used for agricultural purposes only. Monitoring wells BH94/3 and BH97/7 are the closest bore holes in the area monitored in the last 8 years. In agreement with the EPA these boreholes are no longer monitored. Given that the hydraulic gradient of the site is towards the Avoca River and the areas historical use, the area north of the landfill presents no risk to the environment and therefore should be released from the licence.

3.1.3 Future Clean Up Activities

Following from Meeting Record issued by Dr Magnus Amajirionwu, Inspector of the Office of Environmental Enforcement following a meeting on 13.9.2011 Holfeld Plastics Ltd and PM Group are currently progressing the following:

- A quantified risk assessment of all on-site landfills and provide details of outstanding works required to restore the closed landfill sites to EPA specifications and a timeframe for their completion;
- The Licensee shall consider the potential financial implications resulting from the quantified risk assessment of all on-site landfills and submit details of responsibilities and financial arrangements put in place.

It should be noted that the original bond of €500,000 is still in place. A revision of this will be undertaken in light of reduced construction costs, above mentioned works and outcome of quantified risk assessment.

Further east of the site, the southern landfill has been previously capped to a design agreed with the EPA however the northern landfill was not capped to the same specification. Capping of the northern landfill will commence in line with recommendations issued as part of the above quantified risk assessment. The capping will be designed and engineered to the highest international standards and will only be implemented with the approval of the EPA.

3.2 Contaminated Soil Removal

All contaminated soil has been removed from the site as previously reported. No removal of contaminated soil occurred during the calendar year 2011.

3.3 Sale of Property & Plant

There was no sale of property or plant in 2011.

3.4 Environmental Expenditure

The environmental expenditure in 2011 is shown in Table 3.1.

Table 3.1: Summary of Environmental Expenditure in 2011

Item	Cost (€)
TEL Labs Monitoring	1,862
PM Professional Services	16,690
EPA Annual Fee	8,318
PCB Testing	354
Other	224
Total	**27,448**

4. GROUNDWATER, LEACHATE AND SURFACE WATER MONITORING

This section provides the annual review of the groundwater, leachate and surface water quality (based on January 2012 results) at the Holfeld Plastics Site. It is submitted in support of the Annual Environmental Report (AER) and is an update to previous reports covering the period 1997 onwards. This update includes the data for key parameters of concern from one round of monitoring (Jan 2012). A second round of monitoring was conducted in February 2011 and was reported in last years AER.

Monitoring was carried out in accordance with the monitoring schedule agreed with the Environmental Protection Agency (EPA) (EPA letter ref: P0031-02/gc26pmd.doc).

A total of 11 groundwater monitoring wells, 4 leachate monitoring wells, and 4 surface water locations were sampled in 2011/12. It should be noted that monitoring was not carried out at certain borehole monitoring locations for reasons stated in Appendix B.

Samples were analysed for the parameters outlined in Table 4.1 below. All monitoring wells were purged prior to sampling. A schedule of the monitoring well sampling and purging information is provided in Appendix B.

The analytical results for all samples are given in the tables presented in Appendix A of this report. The location of all boreholes, leachate wells and surface water monitoring points are indicated on a drawing in Attachment 1.

Table 4.1: Monitoring Schedule

Number	Location	Description	Monitoring Parameters
BH 97/2	Southern Landfill	Groundwater downstream	Ammonia, Nitrate, VOC, COD
BH 97/6	West Boundary	Representative of Upstream conditions (West)	Ammonia & Nitrate
BH 97/9	NE Boundary	Representative of Upstream conditions (North)	Ammonia & Nitrate
BH 97/10	Carbongypsum Pond	Groundwater below Southern Pond	Ammonia, Nitrate, Sulphate, COD
BH 97/11	East Boundary	Representative of Downstream conditions (East)	Ammonia & Nitrate
BH 97/14	SE Boundary	Representative of Downstream conditions (SE)	Ammonia & Nitrate

Number	Location	Description	Monitoring Parameters
BH 94/6	Northern Landfill	Groundwater downstream	Ammonia, Nitrate, VOC, COD
BH 94/7	Production Area	Representative of Production site condition	Ammonia & Nitrate
BH94/8	Landfill Boundary	Representative of site boundary conditions	Ammonia & Nitrate
BH 94/14	Southern Boundary	Representative of Downstream conditions (South)	Ammonia & Nitrate
BH 94/15	Southern Boundary	Representative of Downstream conditions (South)	Ammonia & Nitrate
SW2	North of Landfill	Surface Water run-off from North of Site into Landfill area	Ammonia, Nitrate, COD, pH
SW3	East of Landfill	Surface Water run-off from northern boundary of North Landfill area	Ammonia, Nitrate, COD, pH
SW 4	Shelton Canal	Surface Water downstream of Landfills	Ammonia, Nitrate, COD, pH
SW5	East Boundary	Surface Water run-off from site	Ammonium, Nitrate, COD
L 97/1	Southern Landfill	Landfill Leachate	Ammonia, Nitrate, VOC
L 97-2	Phosphogypsum Pond	Pond Leachate	Sulphate, COD
L0 2/1	Carbongypsum Pond	Pond Leachate	Sulphate, COD
L 97/4	Northern Landfill	Landfill Leachate	Ammonia, Nitrate, VOC, COD

4.1 Analytical Results

All analytical data, in tabular form, are presented in Appendix A. Tables 1 to 4 present the groundwater monitoring data; Table 5 is surface water data and Table 6 presents leachate quality and Table 7 presents VOC (Volatile Organic Compounds) analysis carried out on 4 samples (2 groundwater & 2 leachate) for January 2012.

The sampling locations are presented in Attachment 1.

In addition to the analytical interpretation, graphs of concentration vs. time for each of the groundwater boreholes sampled, leachate wells and surface water sampling points are included.

4.1.1 Groundwater Data

Former Production Areas

Ammonia

Ammonia concentrations recorded from groundwater borehole sampling in the former production areas have shown a slight decrease on values recorded historically. Reductions can be seen in BH94/15 and BH94/7. These overall decreases through time can be explained by the continued natural attenuation on the site and the fact that there are no longer are any inputs from the former production areas. There was a slight increase on 2009 figures at BH 94/14, however this value was still within historical norms.

BH 97/6, BH 97/9, BH97/14 and BH97/11 also in this area, display low and stable concentrations of ammonia through time.

Nitrate

Nitrate concentrations in the former production areas have also all shown a decrease on their respective values recorded in 2009. Reductions in concentration can be seen in BH97/9, BH97/14, BH94/7, BH94/14, and BH94/15. The value recorded in at BH97/6 does show a slight increase on the respective value recorded February 2011 but this value is within historical norms for this monitoring location. This shows continued natural attenuation on the site.

BH97/11, also in this area, displays low and stable concentrations of nitrate through time.

Pond and Landfill Areas

Ammonia

Four boreholes in this area of the site were sampled in the January 2012 round of monitoring. BH97/2, BH97/10, BH94/6 and BH94/8 continue to display a general decrease or steady state in ammonia concentrations.

Nitrate

Nitrate concentrations in this area of the site are low. BH97/10, BH94/6 and BH94/8 showed a general decrease or steady state in nitrate concentration levels with BH97/2 showing a slight increase. Although BH97/2 does show a slight increase the concentration value does fall within the historical maximum and minimum.

Sulphate

One borehole was sampled and analysed for sulphate in this round of monitoring (BH97/10). BH97/10 showed an increase in sulphate concentration; however the value recorded is within the historical maximum and minimum.

Chemical Oxygen Demand (COD)

BH97/2 and BH94/6 continued to show very low levels of COD and remain stable over the monitoring period 1997 to present. BH97/10 shows an increase in COD concentration but is generally within historical norms for that monitoring location.

Volatile Organic Compounds (VOCs)

No significant VOCs were detected in the groundwater samples taken in January 2012.

Leachate Data

Leachate data, summarised in Tables 6 and 7 in Appendix A, are generally consistent with the historical data. All leachate monitoring points are located in the pond and landfill area of the site.

Ammonia

Ammonia levels at L97/1 and L97/4 were generally within the historical ranges in the January 2012, however with a slight increase on February 2011 at L97/4.

Nitrate

Nitrate levels at L97/1 and L97/4 were generally within the historical ranges in the January 2012 round of analysis.

Sulphate

The Sulphate level at L97/2 was within the historical ranges in the January 2012 and round of analysis. Sulphate levels in L02/1 show a significant decrease on recent years.

Chemical Oxygen Demand (COD)

COD levels at L97/2, L02/1 and L97/4 were generally within the historical ranges in the January 2012 round of analysis.

VOCs

Only one VOC was recorded in the leachate sample taken in January 2012 at L97/1, namely Benzene at a concentration of 1µg/l. L 97/4 showed several VOCs in January 2012 including 1,1-Dichloroethane (11µg/l), 1,2-dichloroethylene (15µg/l), Benzene (6µg/l), Toluene (11µg/l), Ethylbenzene (14µg/l), trichloroethylene (2µg/l), m+p-Xylene (16µg/l), o-Xylene (6µg/l), 1,3,5-trimethylbenzene (2µg/l), 1,3-dichlorobenzene (1µg/l), 1,4-dichlorobenzene (1µg/l), naphthalene (2µg/l) and 1,2,4-trimethylbenzene (5µg/l). These results are all in line with results from previous years.

4.1.2 Surface Water Data

The surface water data, summarised in Table 5, show that most of the concentrations have remained relatively constant. There has been continuing general trend of decrease in ammonia and nitrate concentrations in January 2012 which correlates with a cessation of production activities.

Ammonia

Ammonia concentrations continued a general decrease in 2012 in all monitoring locations.

Nitrate

Nitrate concentrations at all surface water monitoring points reduced in the latest round of monitoring except for SW3 and SW5 which shows a slight increase in levels from 2011.

Chemical Oxygen Demand (COD)

Reductions of COD concentration were observed in SW2 and SW3. A slight increase has been observed at SW4 and SW5 with the concentration falling within the respective historical maximum and minimum.

pH

The pH values recorded at all locations were within acceptable limits (7.3 – 7.5) and indicate water that is neutral, with the exception of SW2, which was slightly outside the limit at 7.6.

4.1.3 Tables and Graphs

All graphs are provided in Appendix A along with the tables of results.

Table 4.2: Tables in Appendix A

Table No.	**Sample; Parameter**
1	Groundwater; ammonia
2	Groundwater; nitrate
3	Groundwater; sulphate
4	Groundwater; COD
5	Surface water; all
6	Leachate; selected
7	VOCs, selected borehole and leachate points (January 2012)

The following graphs are also included in Appendix A:

- Groundwater: Graphs of concentration vs. time showing levels of ammonia, sulphate, nitrate and COD are provided in graphs 1-11.

- Surface Water: Graphs of concentration vs. time showing levels of ammonia, nitrate, COD and pH are provided in graphs 12-15.

Leachate: Graphs of concentration vs. time showing levels of ammonia, sulphate, nitrate and COD are provided in graphs 16-19.

4.2 Summary

4.2.1 Production Area

It can clearly be seen that all boreholes to the north of the production area (BH97/9 & BH97/6), in the production area (BH94/7), to the south of the production area along the Avoca River (BH94/14 & BH94/15) and to the south of the production area north of the Carbon Black pond (BH97/14 & BH97/11) have all continued to show a general decrease in concentrations levels through natural attenuation.

4.2.2 North Pond

Surface water concentration measured at SW5 show a decrease of Ammonia levels while showing slight increase in Nitrate and COD levels.

L97/2, Leachate concentrations are as expected and remain constant relative to the surrounding ground water samples.

4.2.3 South Pond

BH 97/10 continues to show a steady state in concentration levels in comparison to recent year with some slight increases.

L02/1, Leachate concentrations are as expected and remain constant relative to the surrounding ground water samples. L02/1 showed a significant decrease in Sulphate levels in comparisons to previous year and is more in line with the value recorded in November 2007.

4.2.4 North Landfill

Borehole BH94/6 located to the south east corner of the site continues to show low concentration levels indicating that no contaminate is egressing from site via ground water.

Again for L97/4, Leachate concentrations are as is expected and remain constantly high relative to the surrounding ground water samples.

Surface water samples at SW2 & SW3 have generally reduced in comparison to 2010 values with some small exceptions, e.g. nitrate concentrations at SW3. Again SW4 which measures the canal down stream of the site clearly shows that there is no impact on the local environment and levels of ammonia and nitrate here have reduced further.

VOC levels recorded at the north landfill area are consistent with the low levels recorded in previous years. VOC in leachate can lead to odour problems, however this is and has not been the case for the site.

4.2.5 South Land Fill

Borehole BH97/2 is showing a decrease in ammonia levels and slight increase in Nitrate levels. BH94/15 is continuing to show a general decrease in concentration levels through natural attenuation.

L97/1 has shown a decrease in ammonia levels but a very slight increase in nitrate levels, however, these levels are very consistent with historical norms.

VOC levels recorded at the south landfill area are consistent with the low levels recorded in previous years. VOC in leachate can lead to odour problems, however this is and has not been the case for the site.

5. LANDFILL STATUS

This section of the report provides the landfill status information for both active and closed areas of the site. This report covers the period of the calendar year 2011.

5.1 Landfill Name and Licence Number

The landfill is known as the Holfeld Plastics Landfill Site and is operated in accordance with the Site's IPC Licence No. P0031-02.

5.2 Landfill Location and Description

Historical landfill operations at the Site can be separated into three main categories as follows:

- Disposal of phosphogypsum wastes from the production of phosphoric acid;
- Disposal of carbon from the ammonia plant; and
- Disposal of general plant wastes.

5.2.1 Phosphogypsum Wastes

Phosphogypsum wastes were produced during the manufacture of phosphoric acid. The phosphogypsum pond was constructed by the use of soil bunds around the perimeter of the pond and the natural alluvial clay and peat deposits formed the base of the pond. The phosphogypsum slurry was pumped to the pond where the phosphogypsum was allowed to settle with the water being drained from the pond by a series of drainage pipes through the bund and discharging into the drainage canal running through the landfill area. The gypsum pond was used for approximately 6 years (1967 - 1973) until the capacity was exhausted. At this time phosphogypsum wastes were diverted to the carbon pond which had been constructed by similar means immediately to the south of the phosphogypsum pond. The pond was covered with up to 0.6 metres of shale and topsoil and grassed.

5.2.2 Carbon Wastes

Carbon wastes, produced during the manufacture of ammonia, were diverted in slurry form to the carbon pond that had been constructed in the south-western corner of the landfill area. The carbon pond was constructed in a similar fashion to the phosphogypsum pond with soil embankments and the surface water was disposed of by drainage to the canal and by seepage into the ground. When exhausted the carbon pond was covered with up to 0.6 metres of shale and topsoil and grassed. Additional material made available during construction of the Arklow by-pass has been added bringing the total depth of cover material to 1 to 2 metres.

5.2.3 General Site Wastes

General solid wastes from the Site have been disposed of in two landfill areas immediately to the east of the phosphogypsum and carbon ponds, the Eastern Landfill, North and South. Wastes disposed of in these areas have historically included excavated clay, plastic bags, insulating materials, concrete blocks, bricks, canteen wastes, dredgings from the drainage canals and effluent lagoon. The Northern Section also includes quantities of iron oxide cinder arising from the manufacture of sulphuric acid from local iron pyrite from the Avoca mines during the period 1972 to 1980.

The Eastern Landfill areas were constructed with either clay or shale embankments around the perimeters and the base being provided by the natural alluvial clay and peat deposits.

The Northern Section was closed and capped with shale and topsoil in 1984, after which time waste disposal activities started in the Southern Section. The western half of the Southern Section was completed in 1994/95 to allow construction of the Arklow by-pass with the Eastern Section in use until May 2001 for disposal of inert Site wastes. Capping work on the Eastern Section was completed in September 2002.

5.2.4 Western Landfill (Phase I)

The Eastern Landfill is located immediately alongside, and is visible from, the Bypass. IFI therefore submitted proposals to the EPA for the termination of disposal activities within the landfill and for re-location of landfill operations to a newly engineered cell within the (former) Phosphogypsum Pond, to be called the Western Landfill.

The Western Landfill (Phase I) was completed according to an agreed construction plan in May 2001. Landfill activities to the east of the Arklow Bypass then ceased and the active cell was closed off. Landfilling in the Western Landfill commenced on 27 May 2001.

5.3 Owner and/or Operator

The landfill site is owned and operated by Holfeld Plastics.

5.4 Area Occupied by Waste

The Landfill Areas occupy an area of approximately 13.5 hectares (34 acres).

5.5 Volume and Composition of Waste Deposited in 2011

There have been no wastes disposed of in the landfills in 2011.

5.6 Total Accumulated Quantities of Waste Deposited

At end of June 2006, the following are estimates of the extent of waste in the landfill area:

- Phosphogypsum Pond - 55,847 m^3 of gypsum
- Carbon/Phosphogypsum Pond - 137,801 m^3 of gypsum and approximately 19,080 m^3 of carbon black
- Northern Landfill - approximately 130,000 m^3 of waste

- Southern Landfill – approximately 59,588 m^3
- Western Landfill (Phase1) – approximately 2501 m^3

5.7 Results of Monitoring Programme

The results of monitoring undertaken in January 2012 are discussed in Section 4 above.

5.8 Landfill Operations Monitoring

Observational monitoring for odour and dust generation in the landfill area was recommended in the Landfill Operational and Closure Plan (LOCP). No noise monitoring was required at the landfill Site as all of the landfill have now been closed. No odours or excessive amounts of dust generation have been observed at the landfill site for the reporting period.

5.9 Summary of Development/Remedial Works Carried Out

There has been no further development of the landfill areas during 2011.

If monitoring shows that significant environmental pollution is occurring from the landfill areas, provisions are in place to provide remediation works if and when required.

Currently Holfeld Plastics is carrying out additional site investigations in relation to the Northern Landfill (East and West) with the aim of agreeing a final capping plan for the landfill cell with the EPA. This study is currently in progress and will be submitted to the EPA in due course.

5.10 Revisions to Landfill Operational Plan

A revised LOCP was developed in October 2001; this document incorporates the final details of the Western Landfill (Phase I).

5.11 Calculated Remaining Capacity

All of the site landfills have now ceased accepting waste.

5.12 Calculated Final Capacity of Site

All of the site landfills have now ceased accepting waste.

5.13 Progress on Restoration of Completed Cells

The restoration of the completed cells at the Holfeld Plastics landfill area has been progressing since June 1998. As part of the construction of the adjacent N-11 Arklow By-pass, IFI acquired significant volumes of excavated natural soils (predominantly clay) for use in the restoration of the completed landfill cells and for construction of the Western Landfill. This stockpiled material has been used for cell closure, screening mounds and construction of new landfill.

The cell closure included preliminary capping of the carbon pond, phosphogypsum pond and old landfill sections. Details have been included in the LOCP Update 2001. Capping work on the Eastern Section was completed in September 2002 as per the detailed proposals agreed with the Agency.

Trials with native tree and shrub species, for capping completion and screening, have also been undertaken at the Site.

As mentioned in Section 5.9 there is currently a project progressing with regard to the agreeing of the final capping plan for the remaining Northern Landfill (East and West). The outcome of this project will be submitted to the EPA in due course. Once this work has been agreed and in time the capping carried out, all landfill cells at the site will be capped as final.

6. UPDATE OF FINANCIAL PROVISIONS

6.1 Existing Finical Provisions

A summary of the existing Financial Provisions for the site, as provided in the Residual Management and Financial Provision (010911-22-RP-006) of 2005 is summarised in Table 6.1 below.

Table 6.1 Existing Financial provision

Environmental Liability	Likely Cost
Monitoring and Monitored Natural Attenuation Programme	€ 100,000
Hydrocarbon Contamination	€ 7,000
PCB Contamination	€ 7,000
Landfill Areas	€ 305,000
Asbestos Waste	€ 60,000
Oil Line in Arklow Harbour	€ 21,000
Totals	**€ 500,000**

The above 2005 costs were based on estimated costs, at 2005 prices, for identified risks and known liabilities.

6.2 Update of Financial Provisions

Based on the existing Financial Provisions and subsequent works carried out on site, it is considered that the below financial provisions will be required to deal with the items detailed below.

6.2.1 Site Monitoring (incl. Monitored Natural Attenuation Programme)

Monitoring of the groundwater on site will still be required to confirm the monitored natural attenuation is occurring. Monitoring of the ponds and landfill areas will be required for surface water and groundwater. The monitoring should continue at the current frequency (twice yearly) as long as necessary to confirm the natural attenuation of the pollutant plumes.

An updated Residuals Management and Financial Provision is currently being drafted by Holfeld Plastics and will be submitted to the EPA in due course. This report will outline the updated financial provision required for the site monitoring, incl. the Monitored Natural Attenuation Programme.

6.3 Removal of Hydrocarbon & PCB Contaminated Soils and

As previously stated all contaminated soil has been previous removed inline with the sites Residual Management Plan.

6.4 Pond and Landfill Maintenance

The monitoring of the ponds and landfills will continue. As previously stated currently the risk of significant environmental impacts from the landfill areas is considered to be low. If the monitoring shows that significant environmental pollution is occurring form the landfill areas, remedial works may be required.

As mentioned previously, an additional investigation is in progress in order to agree a final capping plan for the Northern Landfill (East and West) with the EPA. In addition, the Residuals Management and Financial Provision is being updated also to reflect the costs of this proposed capping plan. Both of these studies are currently in progress and will be submitted to the EPA in due course.

6.5 Asbestos Waste

As previously reported all asbestos has been appropriately removed and disposed of from site.

6.6 Oil Contaminated Culvert in Arklow Harbour

As previously reported cleaning and disposal of oil from the oil contaminated culvert in Arklow harbour has occurred inline with the site’s Residual Management Plan.

6.7 Financial Provision

As outlined above Holfeld Plastics are currently updating the Residuals Management and Financial Provisions. This will be submitted to the EPA in due course and will reflect the updated known risks and their associated costs. The environmental liabilities that will be costed are those outlined above, as follows:

Environmental Liability	Likely Cost
Monitoring and Monitored Natural Attenuation Programme	To be updated
Landfill Areas	To be updated
Total	To be updated

6.7.1 Proposed Financial Instruments

Holfeld Plastics have put in place a bank guarantee of €500,000 to cover for the known environmental liabilities on the site and this original bond is still in place. This bank guarantee should more than adequately cover known environmental liabilities on the site, but this will be confirmed on completion and submission of the updated Financial Provisions.

APPENDIX A

GROUNDWATER, LEACHATE AND SURFACE WATER MONITORING TABLES AND GRAPHS

Table 1

Groundwater Analytical results for Ammoniacal Nitrogen (mg/l) Results

July 97 to January 2012

Borehole Number	Jul-97	Jan-98	Aug-98	Mar-99	Sep-99	Apr-00	Sep-00	Mar-01	Sep-01	Feb-02	Sep-02	Mar-03	Sep-03	Feb-04	Sep-04	Jun-06	Mar-07	Nov-07	EPA Mar-08	Nov-08	EPA Jun 09	Oct-09	Jun-10	Aug-10	Feb-11	Jan-12
97/2	6.0	0.8	4.4	4.4	2.8	4.7	4.8	13.2	11	10	8.9	18	27	26	7	0.1	20	90	2.4	21	28	50	39	26	24	20
97/6	0.7	1.4	1.0	2.6	1.2	0.4	0.1	4	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.09	0.1		0		0.1	0.1		0.12	0.38
97/9	0.2						0.1	0.1					0.1		0.1	0.1	0.6	0.1		0		0.1	0.1		0.1	0.1
97/10	116.0	44.8	34.0	41.7	33.5	30.7	29.8	38.5	37	39	26	37	25	17	18	8	16	9.5		10		11	9.3		8.7	9
97/11	0.4						0.9						0.1					0.16		0.3		0.57	0.39		0.37	0.21
97/14	507.0						328						487			55	237	7.2		4.3		5.6	5.6		4.7	5
94/6	1.9	1.7	1.7	0.9	1.7	1.6	0.1	1.6	1.3	1.8	0.8	1	3.5	1	9	1	1.4	1.2		1.4		1.2	1.5		1.4	1.8
94/7	321.0						140						73			22	58	49		42		50	33		44	34
94/8	437.0						156						262			3.7				79		102	91		89	61
94/11	1.9						0.1						0.2							/						
94/14	824.0	620.0	154.0	2.1	589	561	580	497	632	438	571	335	0.1	59	249	283	365	0.1	324	278	339	186				240
94/15	4230.0	3210.0	4600.0	4209.0	3420	3274	2544	2690	3140	639	516	42	2280	96	418	218	391	320	310	285	295	304	242	234	220	197

Figures in Red represent EPA monitoring

NR = No Result

mg/l = Milligrams per litre

Table 2

Groundwater Analytical Results for **Nitrate** (mg/l)

July 97 to January 2012

Borehole Number	Jul-97	Jan-98	Aug-98	Mar-99	Sep-99	Apr-00	Sep-00	Mar-01	Sep-01	Feb-02	Sep-02	Mar-03	Sep-03	Feb-04	Sep-04	Jun-06	Mar-07	Nov-07	EPA Mar 08	Nov-08	EPA Jun 09	Oct-09	Jun-10	Aug-10	Feb-11	Jan-12
97/2	43	44	48	183	69	87	84	74	82	61	85	75	61	55	29	3	17	0.8	25	17	25	1	0.6	28	19	22
97/6	6	25	23	17	1	7	2	12	9	6.5	12	6	12	9	22	28	2	11		11		2	9		4	7
97/9	99						59	81					60		48	35	39	35		31		33	33		32	30
97/10	1	5	1	1	36	2.4	1	0.5	0.5	0.5	0.5	0.6	0.5	0.5	0.68	0.5	0.5	0.5		0.5		1	1		1	1
97/11	14						0.5						0.6					0.5		0.5		1	1		1	1
97/14	86						96						101			108	41	88		73		77	50		62	57
94/6	1	5	1	7	1	2.9	6	1	0.5	0.5	0.5	0.8	0.6	0.5	0.69	0.5	0.5	0.5		0.5		1	0.6		0.5	1
94/7	929						312						242			101	186	196		133		66	46		22	9
94/8	1281						403						298			47				140		88	85		54	25
94/11	2						4						5													
94/14	1803	1004	1700	1270	1470	625	1815	1137	836	1244	1016	1033	0.6	236	660	258	597	319	416	270	338	104				76
94/15	/	7830	13120	9675	4685	7035	6348	5733	6049	1428	1739	123	3606	3033	1529	556	816	612	576	506	530	524	455	386	349	323

Figures in Red represent EPA monitoring

NR = No Result

mg/l = Milligrams per litre

Table 3

Groundwater Analytical Results for **Sulphate** (mg/l)

July 97 to January 2012

Borehole Number	Jul-97	Jan-98	Aug-98	Mar-99	Sep-99	Apr-00	Sep-00	Mar-01	Sep-01	Feb-02	Sep-02	Mar-03	Sep-03	Feb-04	Sep-04	Jun-06	Mar-07	Nov-07	Nov-08	Oct-09	Jun-10	Aug-10	Feb-11	Jan-12
97/2																						119		
97/10	308	500	427	383	380	400	331	430	452	452	475	476	294	298	229	253	269	193	333	369	178		345	493
94/11	321						310						260											
94/6																				1				
94/15																						125		

Figures in Red represent EPA monitoring

NR = No Result

mg/l = Milligrams per litre

Table 4

Groundwater Analytical Results for **Chemical Oxygen Demand** (mg/l)

July 97 to January 2012

Borehole Number	Jul-97	Jan-98	Aug-98	Mar-99	Sep-99	Apr-00	Sep-00	Mar-01	Sep-01	Feb-02	Sep-02	Mar-03	Sep-03	Feb-04	Sep-04	Jun-06	Mar-07	Nov-07	Nov-08	Oct-09	Jun-10	Aug-10	Feb-11	Jan-12
97/2	4	8	4	5	5	5	4	4	4	4	4	4	5	4	12	17	37	191	4	89	59	4	4	4
97/10	4	8	4	5	6	5	4	11	8	9	4	11	4	5	33	9	26	4	5	4	4		4	12
94/6	4	10	4	5	5	7	9	5	4	19	4	9	4	272	13	4	29	4	4	4	4		4	4
94/11	4						4						17											
94/15																						21		

Figures in Red represent EPA monitoring

NR = No Result

mg/l = Milligrams per litre

Table 5
Surface Water Analytical Results (mg/l)
July 97 to January 2012

Sample Location	Jan-98	Aug-98	Mar-99	Sep-99	Apr-00	Sep-00	Mar-01	Sep-01	Feb-02	Sep-02	Mar-03	Sep-03	Mar-04	Sep-04	Feb-05	Jun-06	Mar-07	Nov-07	Nov-08	Oct-09	Jun-10	Feb-11	Jan-12
Ammonia																							
SW2	0.4	0.4	0.2	0.3	0.4	0.1	2.6		0.5	0.1	0.2	0.1	0.1	0.09	0.1	0.1	0.09	0.2	0.18	0.1	0.1	0.28	0.1
SW3	5.2	14.3	4.3	20.6	13.7	71	30.2		41	21	64	11	17	6	4.1		42	0.1	45	0.1		148	92
SW4	6.4	11.0	8.0	30.7	7.8	3.5	4.2	17	8	6.2	1.1	2	2.6	0.09	2	0.2	1	37	0.15	0.1	0.1	0.73	0.1
SW5																		0.1	0.27	0.1	0.1	0.34	0.12
Nitrate																							
SW2	63.0	40.0		0.5	41	31	51	34	42	34	34	35	40	30	35	38	39	24	21	15	28	31	25
SW3	65.0	37.0	50.0	10	30	124	69	11	161	53	86	33	46	54	11		65	34	29	24		104	183
SW4	80.0	115.0	81.0	11	91	91	57	31	56	53	45	38	53	35	41	41	43	188	29	17	25	37	29
SW5																		31	29	17	5	30	34
COD																							
SW2	10.0	7.0	5.0	5	9	6	29	4	7	4	12	8	4	8	10	10	4	34	68	33	5	11	8
SW3	4.0	26.0	5.0	5	31	53	18	25	233	24	26	34	19	49	16		21	28	421	48		31	30
SW4	9.0	9.0	40.0	5	17	11	9	25	9	10	14	14	4	12	4	7	4	653	16	28	9	5	8
SW5																		20	5	18	26	4	8
pH																							
SW2	7.9	7.5	-	7	6.7	6.9	6.3	7.5	7.2	7.5	7.4	7.3	7.4	7.6	7.5	7.1	7.2	7.8	7.5	7.3	7.8	7.4	7.6
SW3	6.8	7.3	6.9	6.7	6.5	6.8	6.9	7.2	7.1	7.3	7.2	7.3	7.2	7.4	7.2		7.2	7.4	7.3	6.7		7.3	7.3
SW4	7.2	6.8	5.9	6.8	6.5	6.3	7.3	7.2	6.9	7.1	7	7.2	7.3	7.3	7.4	7.2	7.1	7.4	7.3	6.8	7.5	7.1	7.3
SW5																		-	-	-			

Table 6
Holfeld Plastics Limited, Kilmacanogue, Co. Wicklow
Leachate Analytical results (mg/l) Results
July 97 to January 2012

Borehole Number	Jul-97	Jan-98	Aug-98	Mar-99	Sep-99	Apr-00	Sep-00	Mar-01	Sep-01	Feb-02	Sep-02	Mar-03	Sep-03	Mar-04	Sep-04	Jun-06	Mar-07	Nov-07	Nov-08	Oct-09	Jun-10	Feb-11	Jan-12
Ammonia																							
L97/1	444.0	90.9	51.0	34.2	36.1	33.4	0.1	16.9	8.4	15	21	31	25	19	22	14	1	20	20	20	19	17	14
L97/2	1.2	0.9	0.2	2.2	0.6	0.5	0.1	1.6	27	5	3	7.7	2	1.3	9	19	0.09	-	-	-	-	-	-
L97/3-L02/1	4.4	1.5					0.1			800	1.9	0.7	2.4	2.5	19	4.2	1.3	-	-	-	-	-	-
L97/4	849.0	1650.0	9.5	1128.0	1170	941	1205	469	3833	3350	1916	269	12	296	733	1012	428	390	543	599	653	357	500
Sulphate																							
L97/1	246.0	510.0	54.0	10.0	2	6.4	2	488	471	23	6	2	5	21	2	5	10	-	-	-	-	-	-
L97/2	600.0	1240.0	1425.0	1263.0	1306	1465	6128	1535	1647	1755	2872	1322	2252	1478	1996	261	1392	1570	1439	1372	1414	1368	1440
L97/3-L02/1	408.0	1221.0					731			6349	15476	4374	2413	3432	8157	1547	1615	620	1072	1379	1677	-	628
L97/4	315.0	3536.0	5000.0	2630.0	1170	2455	2976	1522	9017	1883	7250	1435	2753	1433	2268	4210	1443	-	-	-		-	-
Nitrate																							
L97/1	23.0	5.0	1.0	17.0	1	4.1	0.5	103	97	1.9	0.5	0.5	0.5	0.5	0.92	5	1.2	0.5	0.5	1	0.6	0.5	1
L97/2	63.0	84.0	36.0	77.0	36	38	23	29	16	19	21	111	10	20	47	23	11	-	-	-	-	-	-
L97/3-L02/1	20.0	40.0					195			1	2	3	1	0.9	10	15	1	-	-	-	-	-	-
L97/4	15.0	5.0	1.0	50.0	10	5	2.5	0.5	2.5	0.5	2.5	0.5	4	0.5	0.74	3	0.5	0.5	0.7	1	0.5	0.5	1
COD																							
L97/1	62.0	87.0	115.0	120.0	125	62	848	4	6	622	124	142	2310	41	145	128	106	-	-	-	-	-	-
L97/2	29.0	39.0	29.0	5.0	16	5	38	33	36	137	28	27	77	33	50	54	10	34	26	25	25	20	23
L97/3-L02/1	4.0	6.0					4			4375	820	303	272	407	7075	525	238	41	117	385	4160	-	264
L97/4	470.0	260.0	250.0	220.0	260	240	333	240	526	328	360	459	222	269	273	268	302	210	211	173	149	164	130

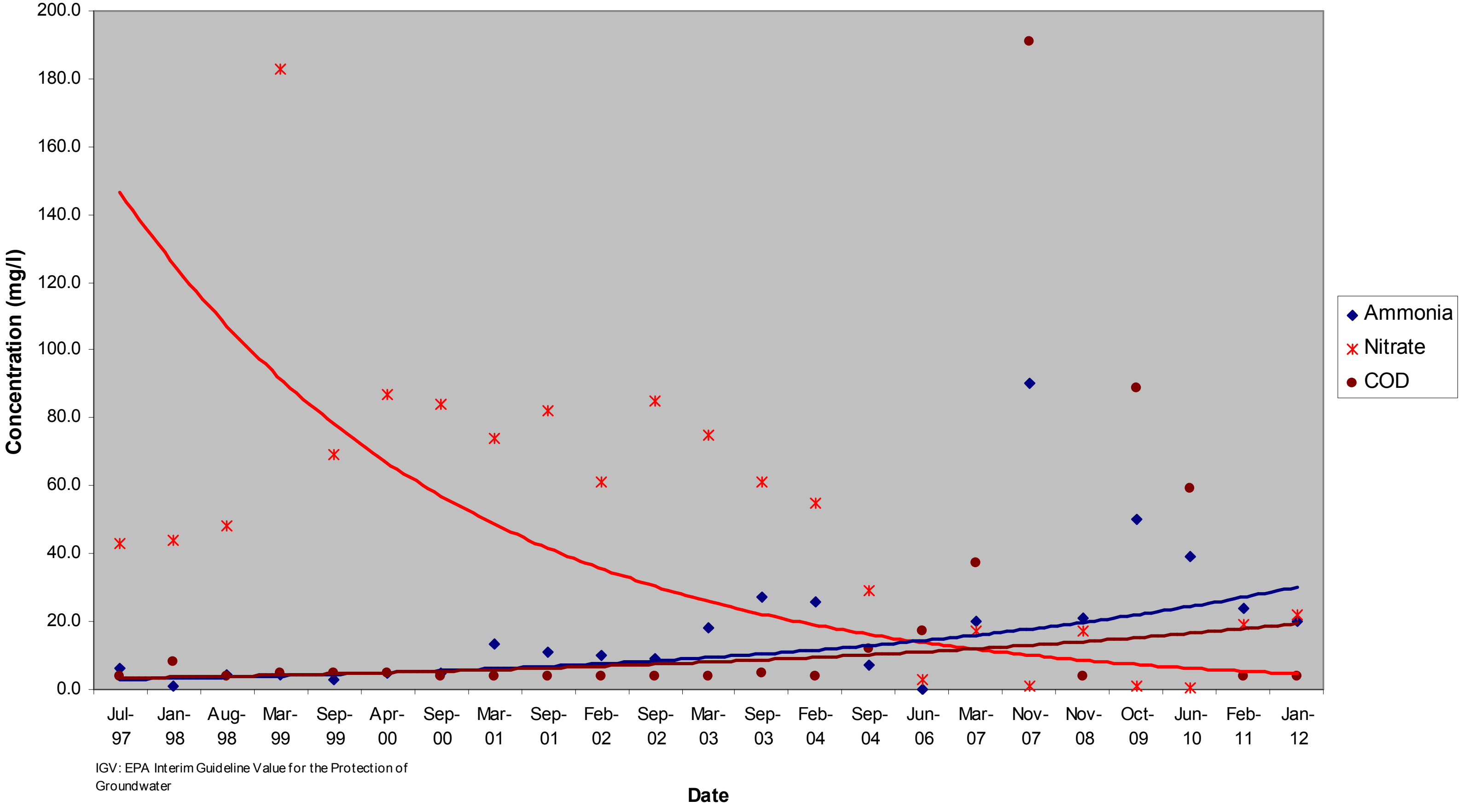
Table 7: VOC Levels January 2012

Determinand	Sample ID Lab ID	BH97/2 100093	BH94/6 100099	L97/4 100102	L97/1 100103
1,1 Dichloroethylene	ug/l	<1	<1	<1	<1
Methylene Chloride	ug/l	<1	<1	<1	<1
Trans-1,2-dichloroethylene	ug/l	<1	<1	<1	<1
1,1-dichloroethane	ug/l	<1	<1	11	<1
1,2-dichloroethylene	ug/l	<1	<1	15	<1
2,2-dichlororopane	ug/l	<1	<1	<1	<1
Bromochloromethane	ug/l	<1	<1	<1	<1
Chloroform	ug/l	<1	<1	<1	<1
1,1,1-trichloroethane	ug/l	<1	<1	<1	<1
1,1-dichloropropene	ug/l	<1	<1	<1	<1
Carbon tetrachloride	ug/l	<1	<1	<1	<1
Benzene	ug/l	1	1	6	1
1,2-dichloroethane	ug/l	<1	<1	<1	<1
Trichloroethylene	ug/l	<1	<1	2	<1
1,2-dichloropropane	ug/l	<1	<1	<1	<1
Dibromomethane	ug/l	<1	<1	<1	<1
Bromodichloromethane	ug/l	<1	<1	<1	<1
cis-1,3-dichloropropene	ug/l	<1	<1	<1	<1
Toluene	ug/l	<1	<1	11	<1
trans-1,3-dichloropropene	ug/l	<1	<1	<1	<1
1,1,2-trichloroethane	ug/l	<1	<1	<1	<1
Tetrachloroethylene	ug/l	<1	<1	<1	<1
1,3-dichloropropane	ug/l	<1	<1	<1	<1
Dibromochloromethane	ug/l	<1	<1	<1	<1
1,2-dibromoethane	ug/l	<1	<1	<1	<1
Chlorobenzene	ug/l	<1	<1	<1	<1
1,1,1,2-tetrachloroethane	ug/l	<1	<1	<1	<1
Ethylbenzene	ug/l	<1	<1	14	<1
m+p-Xylene	ug/l	<1	<1	16	<1
o-Xylene	ug/l	<1	<1	6	<1
Styrene	ug/l	<1	<1	<1	<1
Bromoform	ug/l	<1	<1	<1	<1
Isopropylbenzene	ug/l	<1	<1	<1	<1
Bromobenzene	ug/l	<1	<1	<1	<1
1,2,3-trichloropropane	ug/l	<1	<1	<1	<1
n-propylbenzene	ug/l	<1	<1	<1	<1
2-chlorotoluene	ug/l	<1	<1	<1	<1
1,3,5-trimethylbenzene	ug/l	<1	<1	2	<1
4-chlorotoluene	ug/l	<1	<1	<1	<1
Tert-butylbenzene	ug/l	<1	<1	<1	<1
1,2,4-trimethylbenzene	ug/l	<1	<1	5	<1
sec-butylbenzene	ug/l	<1	<1	<1	<1
p-isopropyltoluene	ug/l	<1	<1	<1	<1
1,3-dichlorobenzene	ug/l	<1	<1	1	<1
1,4-dichlorobenzene	ug/l	<1	<1	1	<1
n-butylbenzene	ug/l	<1	<1	<1	<1
1,2-dichlorobenzene	ug/l	<1	<1	<1	<1
1,2-dibromo-3-chloropropane	ug/l	<1	<1	<1	<1
1,2,4-trichlorobenzene	ug/l	<1	<1	<1	<1
Hexachlorobutadiene	ug/l	<1	<1	<1	<1
Naphthalene	ug/l	<1	<1	2	<1
1,2,3-trichlorobenzene	ug/l	<1	<1	<1	<1

Results expressed as ug/l (ppb)
unless stated otherwise

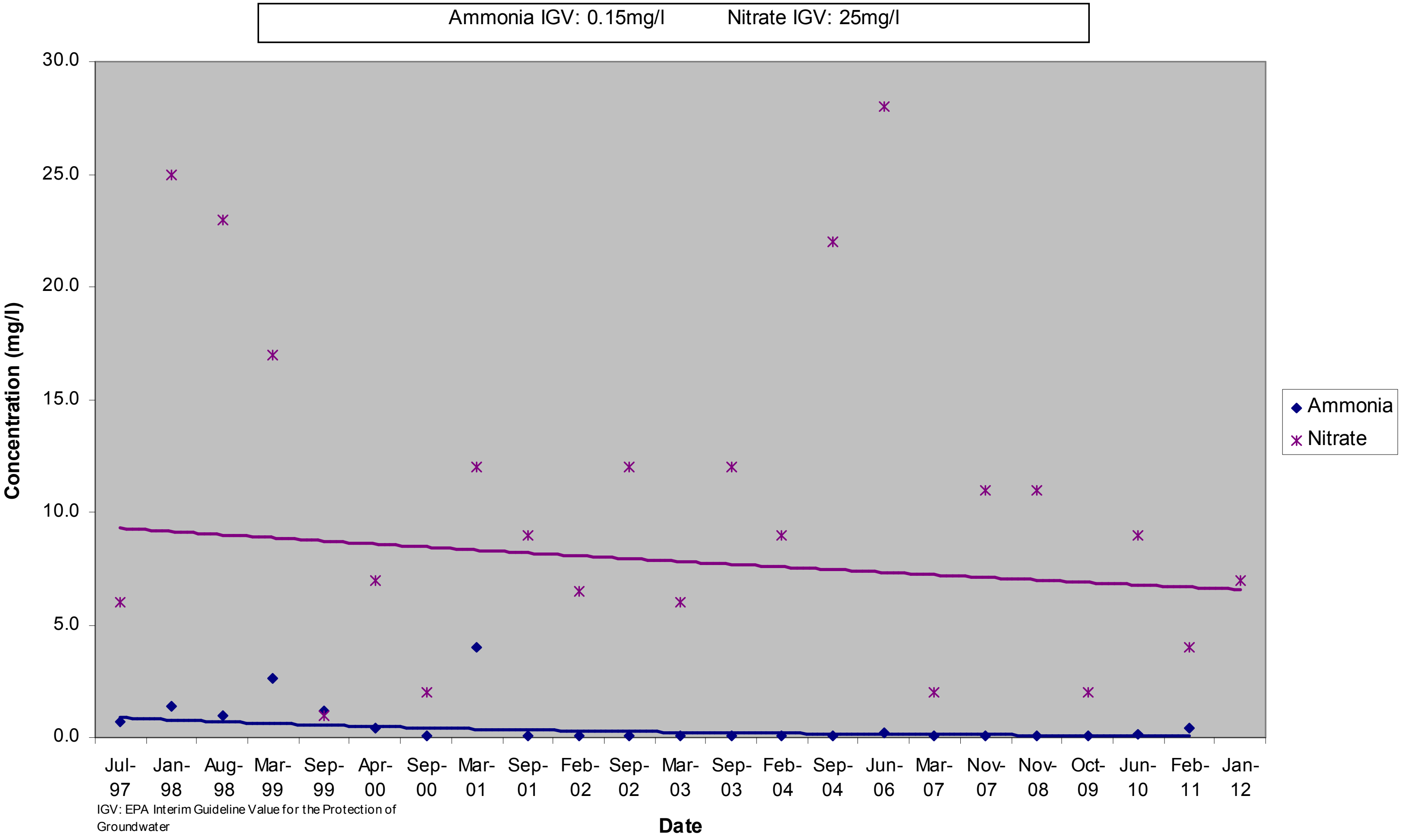
Graph 1
Analytical Results for Monitoring Well 97/2

Ammonia IGV: 0.15mg/l Nitrate IGV: 25mg/l COD IGV: None



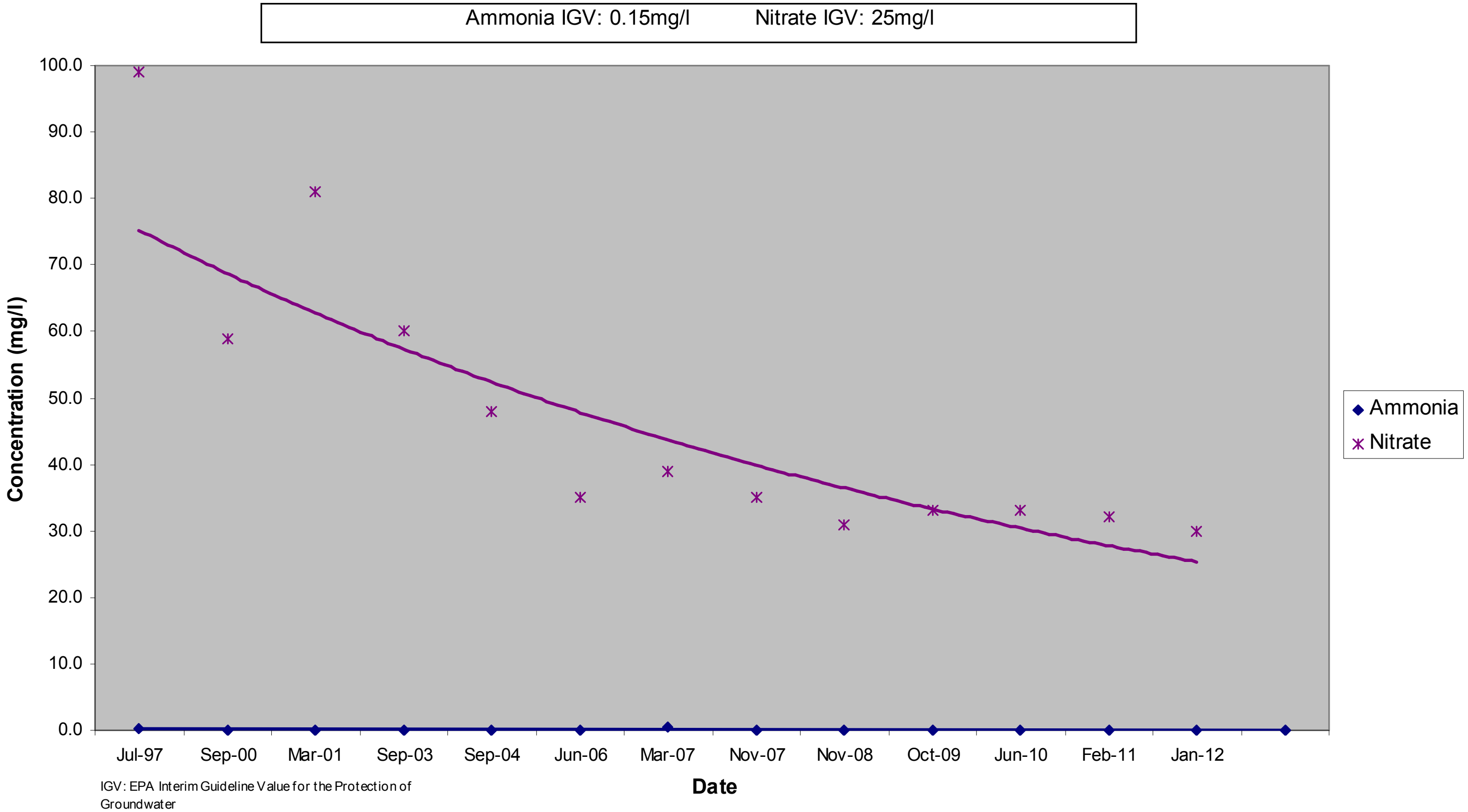
IGV: EPA Interim Guideline Value for the Protection of Groundwater

Graph 2
Analytical Results for Monitoring Well 97/6



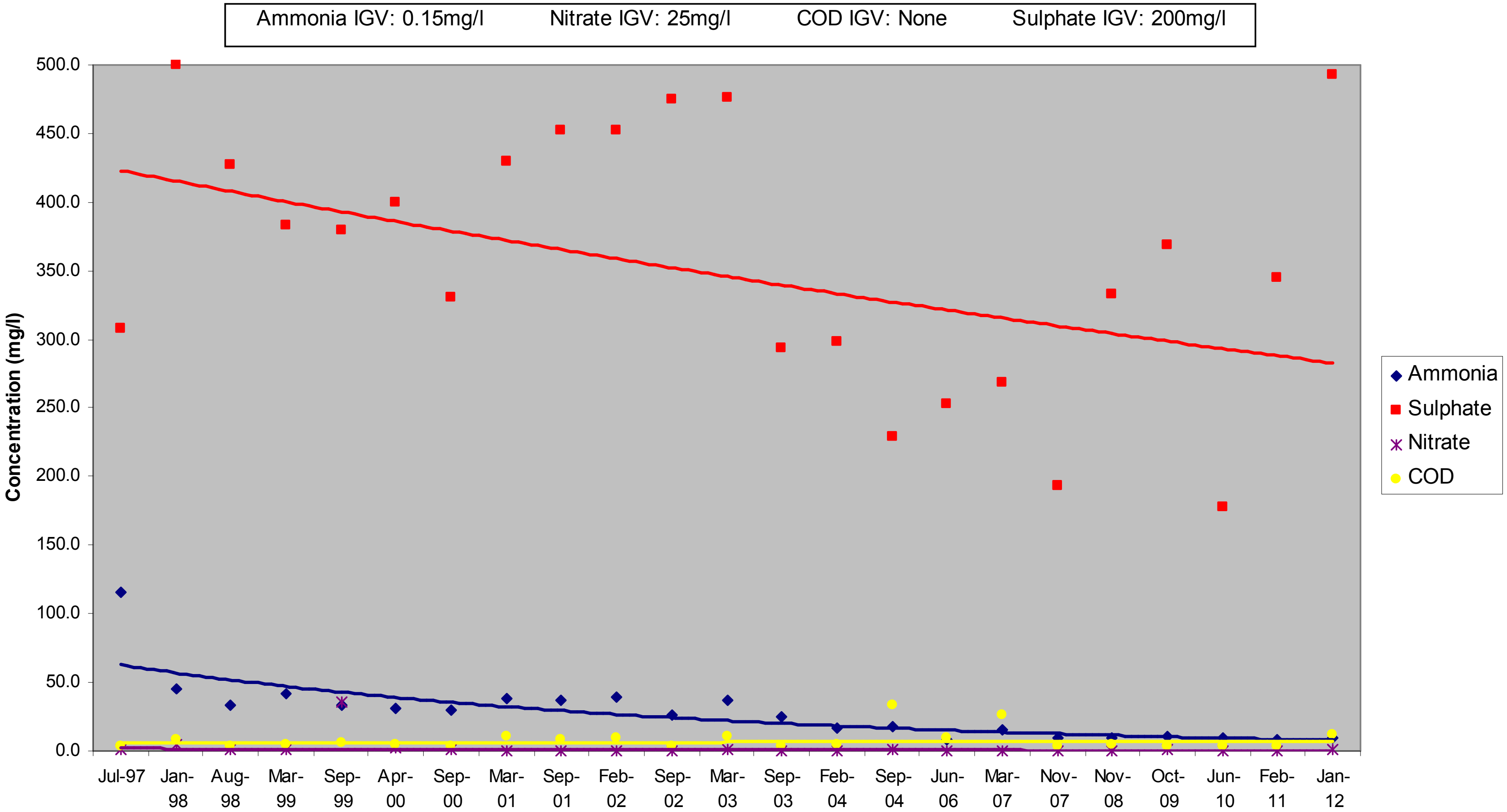
IGV: EPA Interim Guideline Value for the Protection of Groundwater

Graph 3
Analytical Results for Monitoring Well 97/9



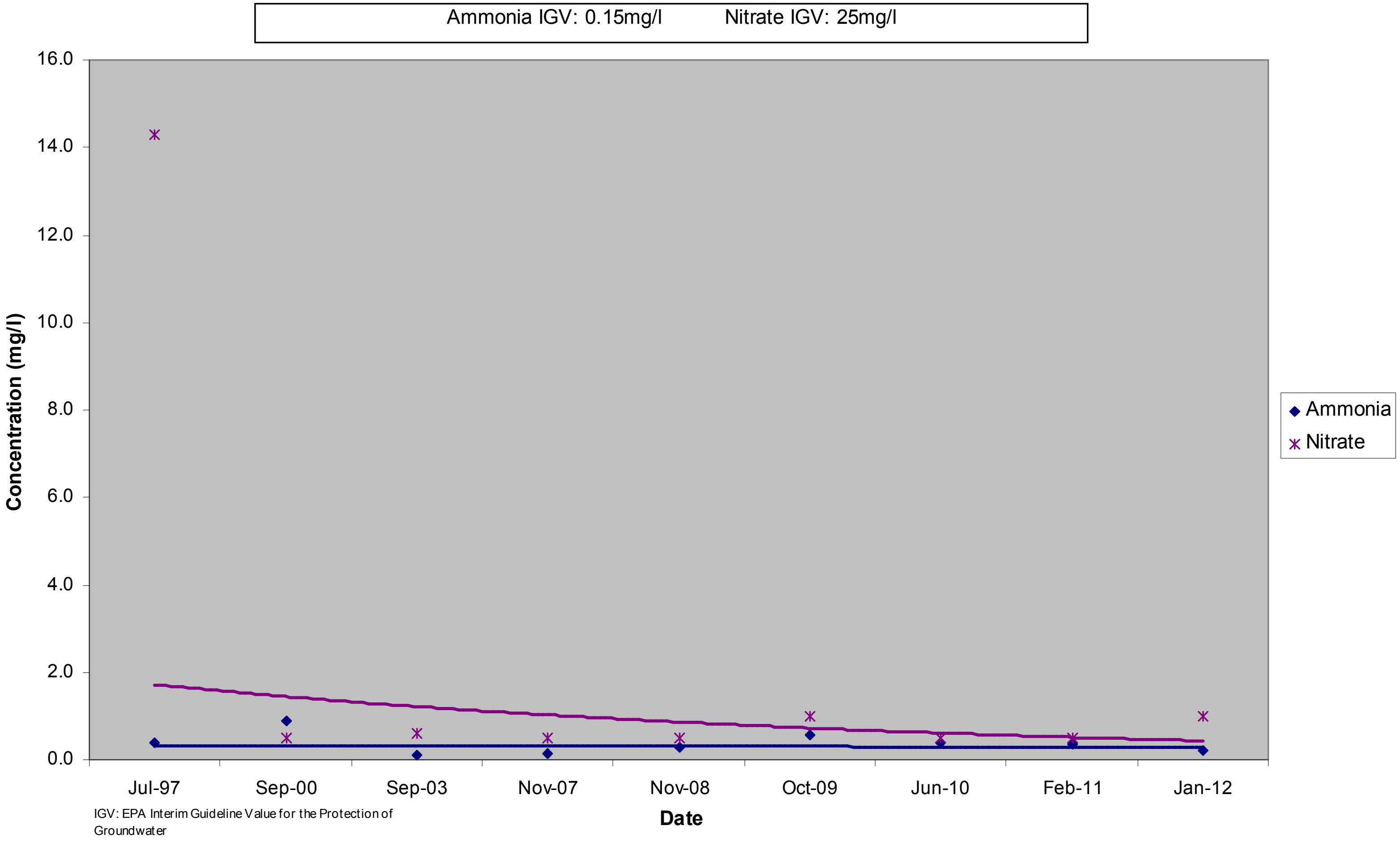
IGV: EPA Interim Guideline Value for the Protection of Groundwater

Graph 4
Analytical Results for Monitoring Well 97/10

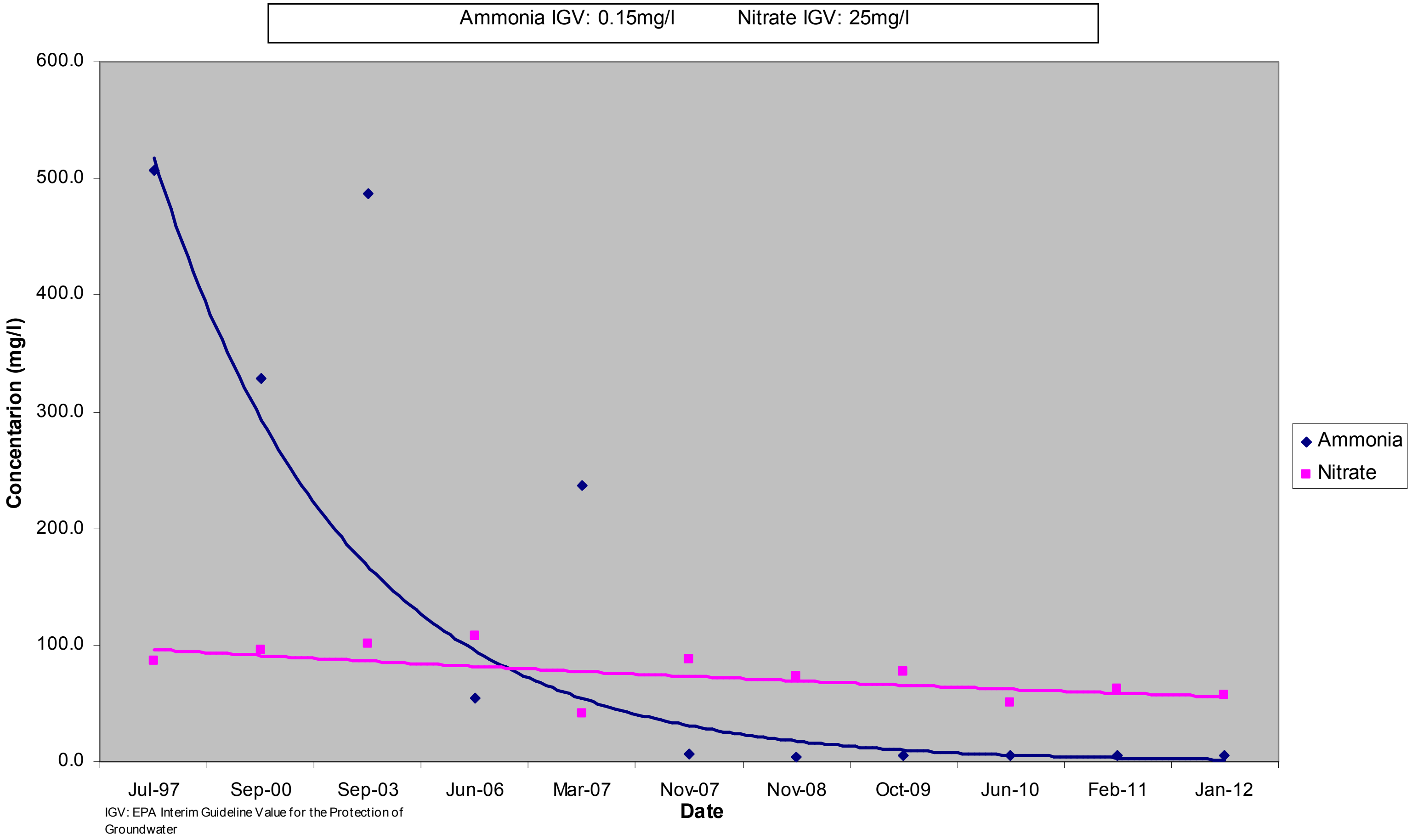


IGV: EPA Interim Guideline Value for the Protection of Groundwater

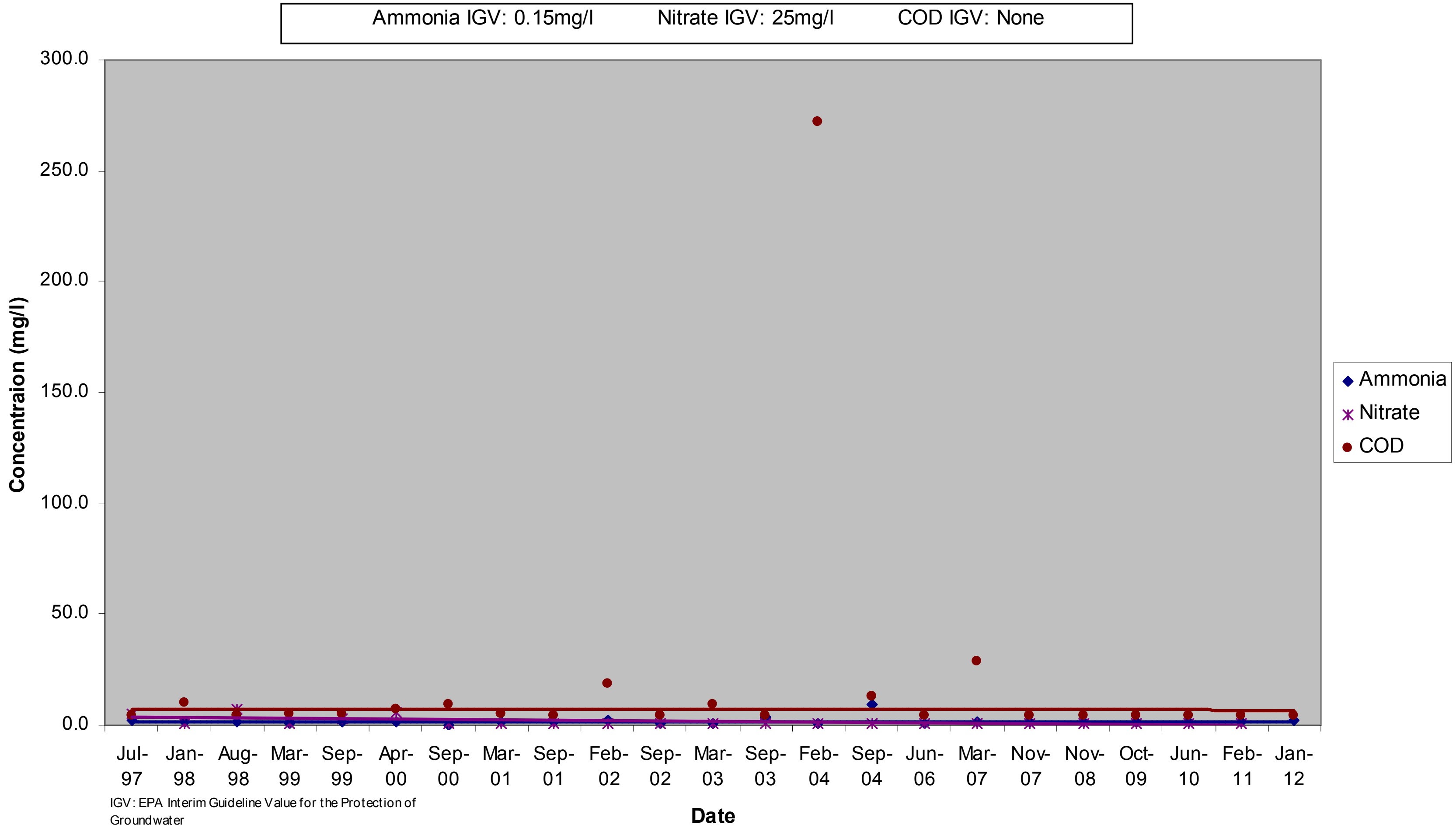
Graph 5
Analytical Results for Monitoring Well 97/11



Graph 6
Analytical Results for Monitoring Well 97/14

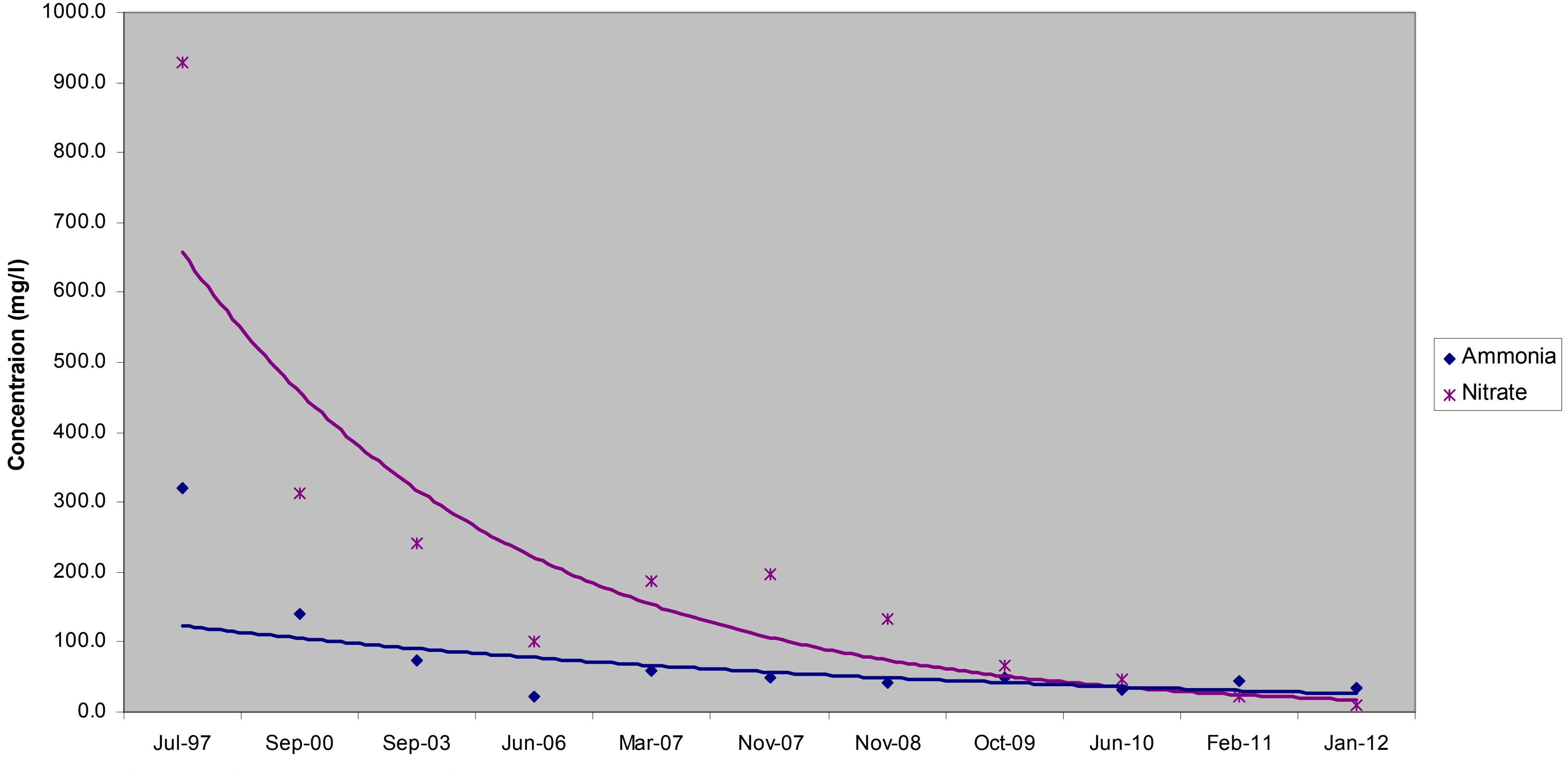


Graph 7
Analytical Results for Monitoring Well 94/6



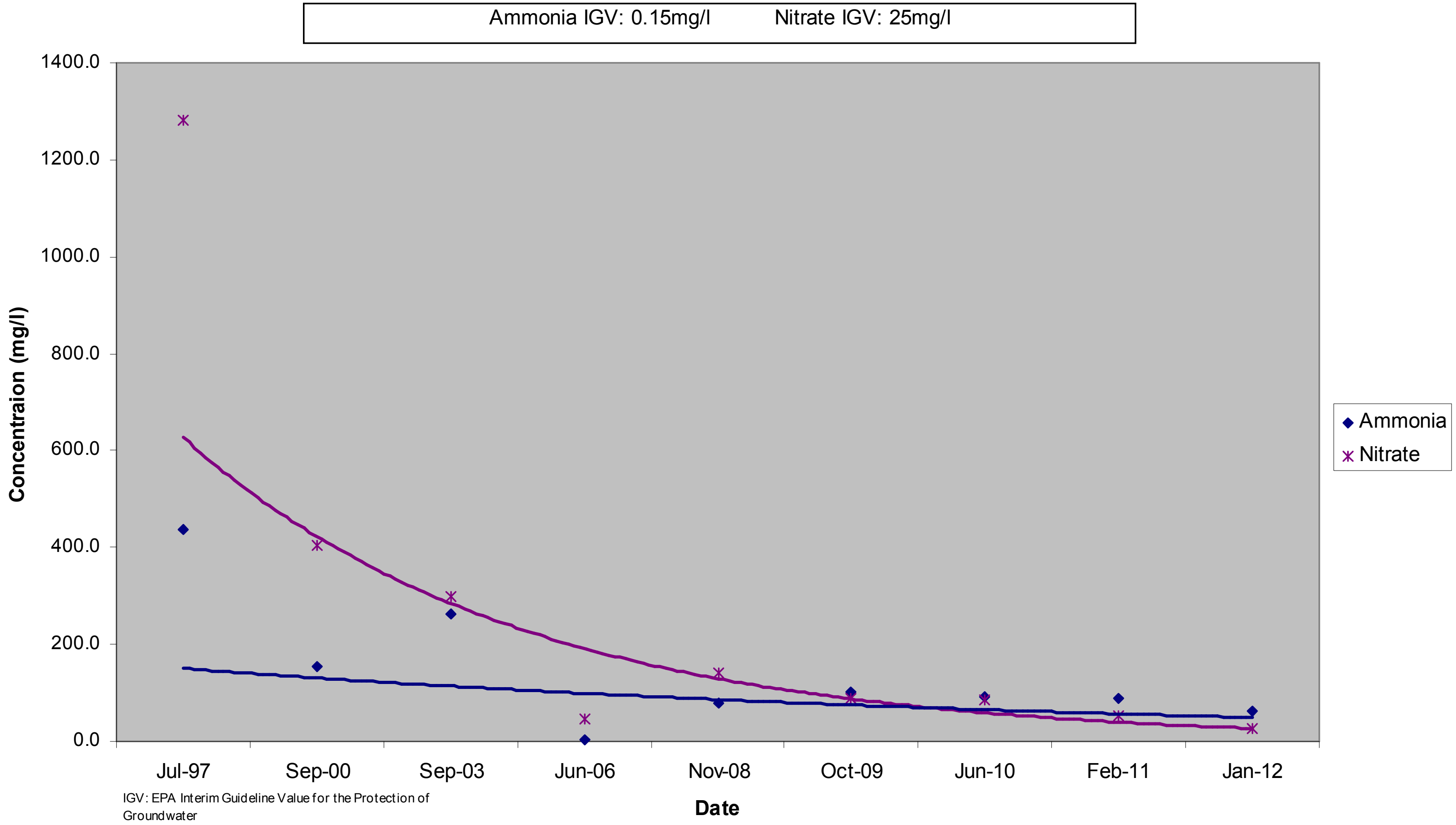
Graph 8
Analytical Results for Monitoring Well 94/7

Ammonia IGV: 0.15mg/l Nitrate IGV: 25mg/l

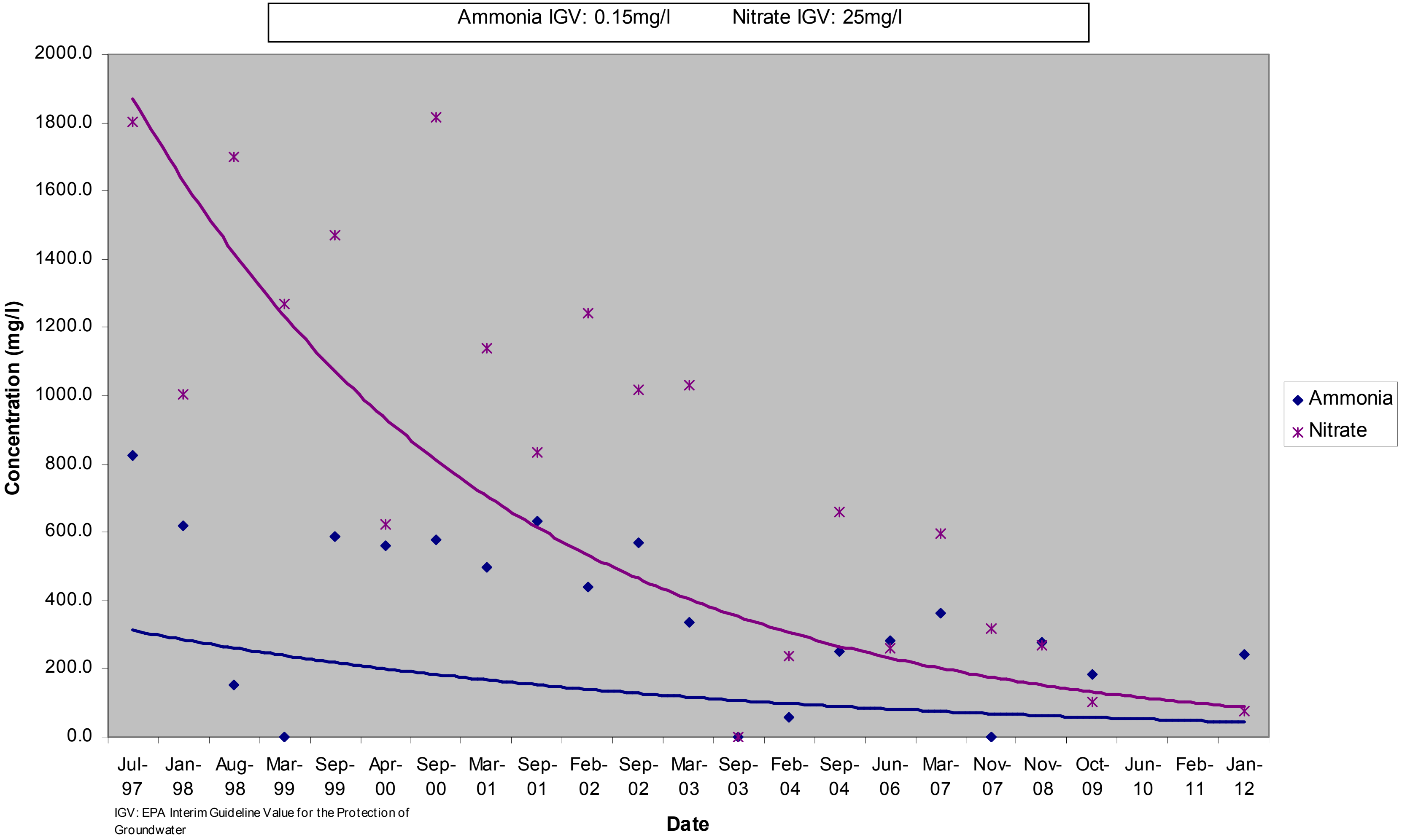


IGV: EPA Interim Guideline Value for the Protection of Groundwater

Graph 9
Analytical Results for Monitoring Well 94/8

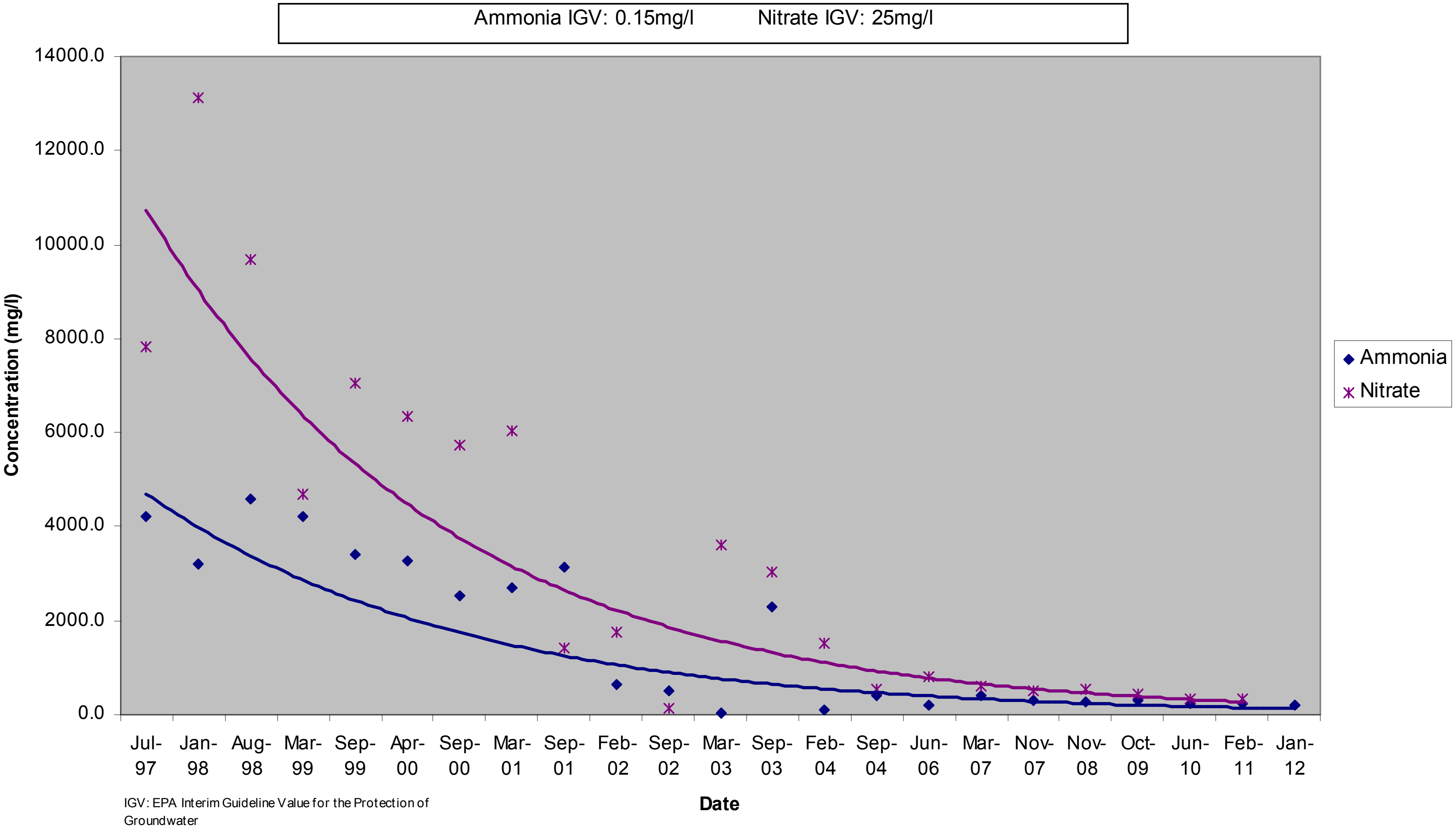


Graph 10
Analytical Results for Monitoring Well 94/14



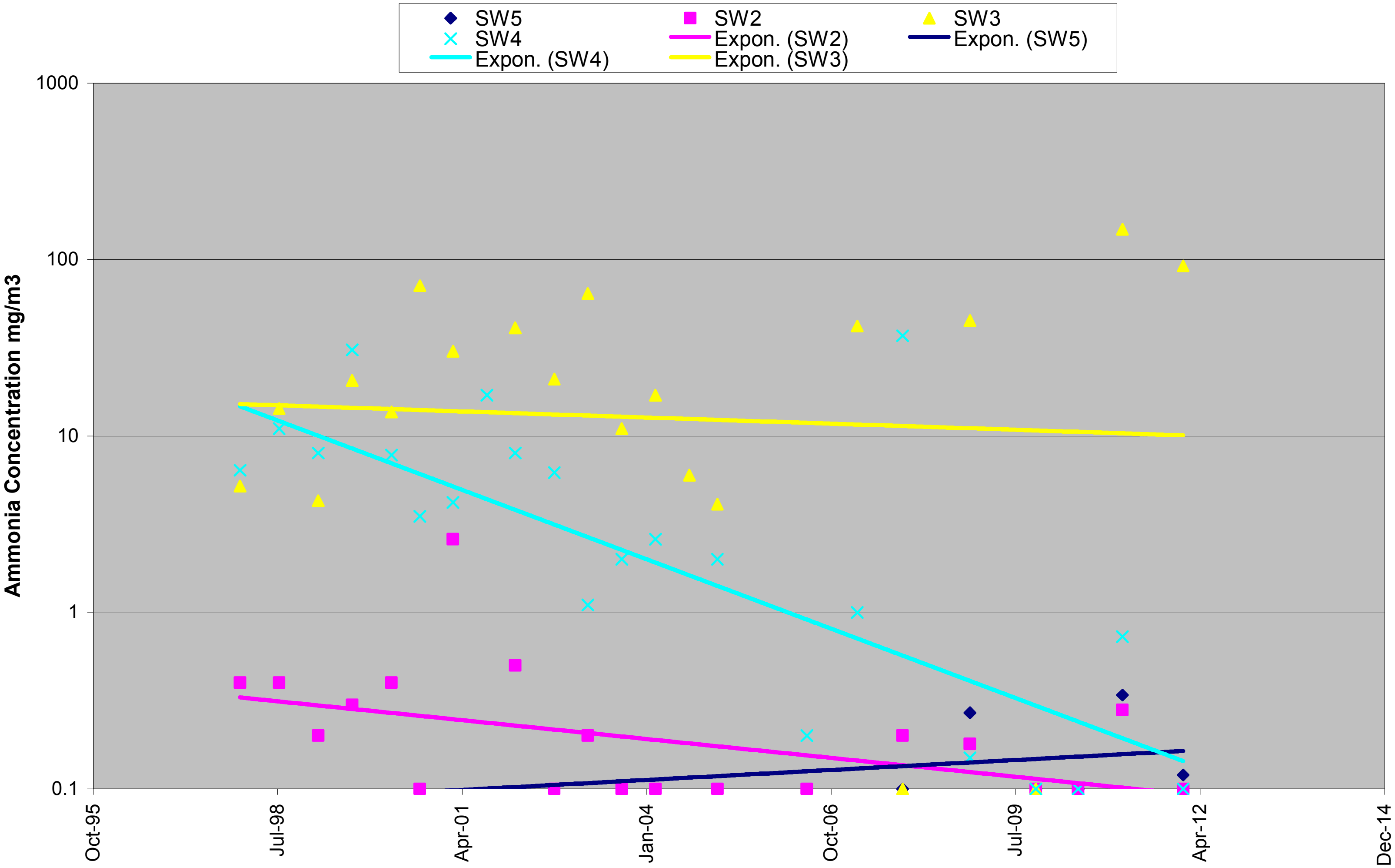
IGV: EPA Interim Guideline Value for the Protection of Groundwater

Graph 11
Analytical Results for Monitoring Well 94/15

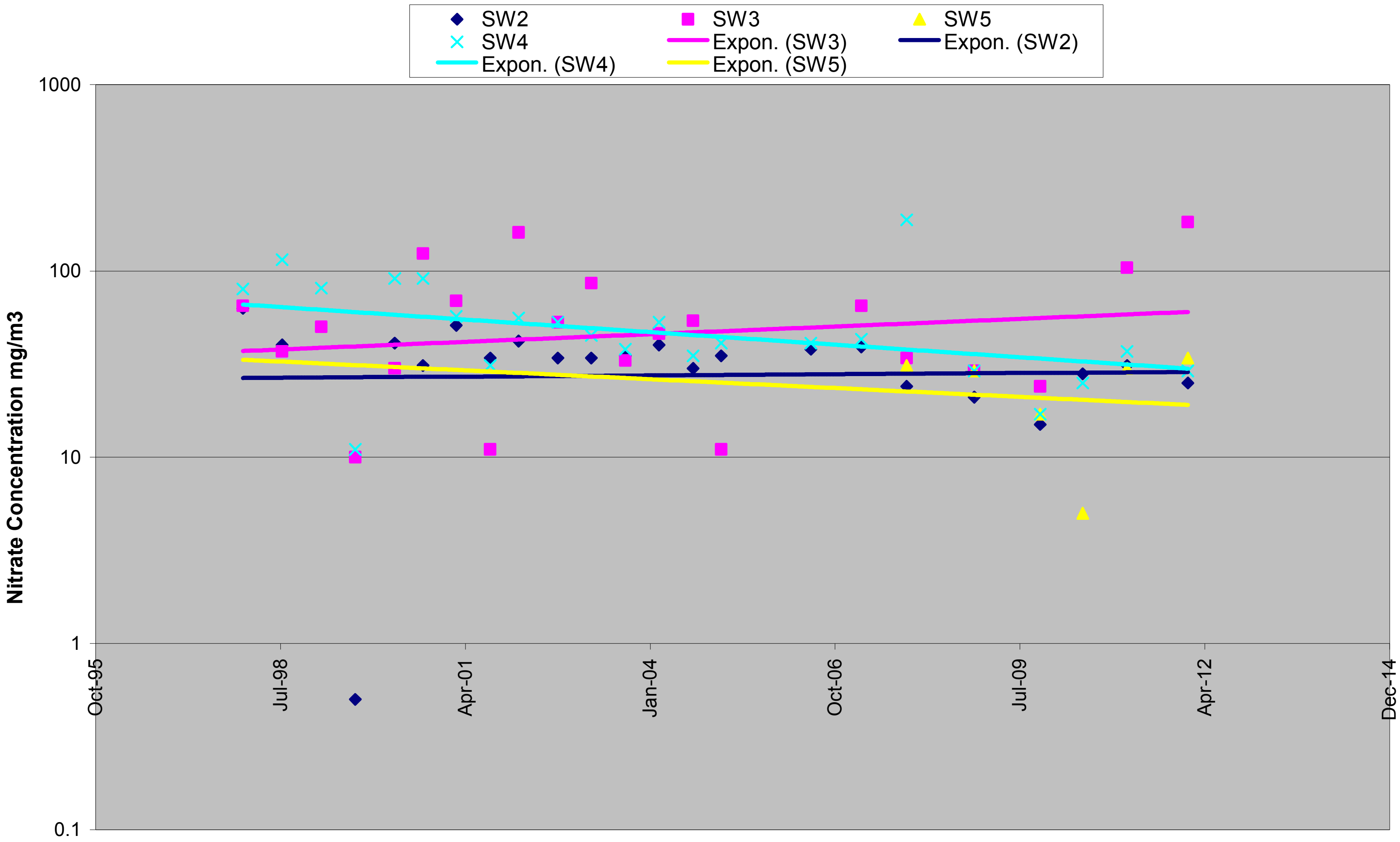


IGV: EPA Interim Guideline Value for the Protection of Groundwater

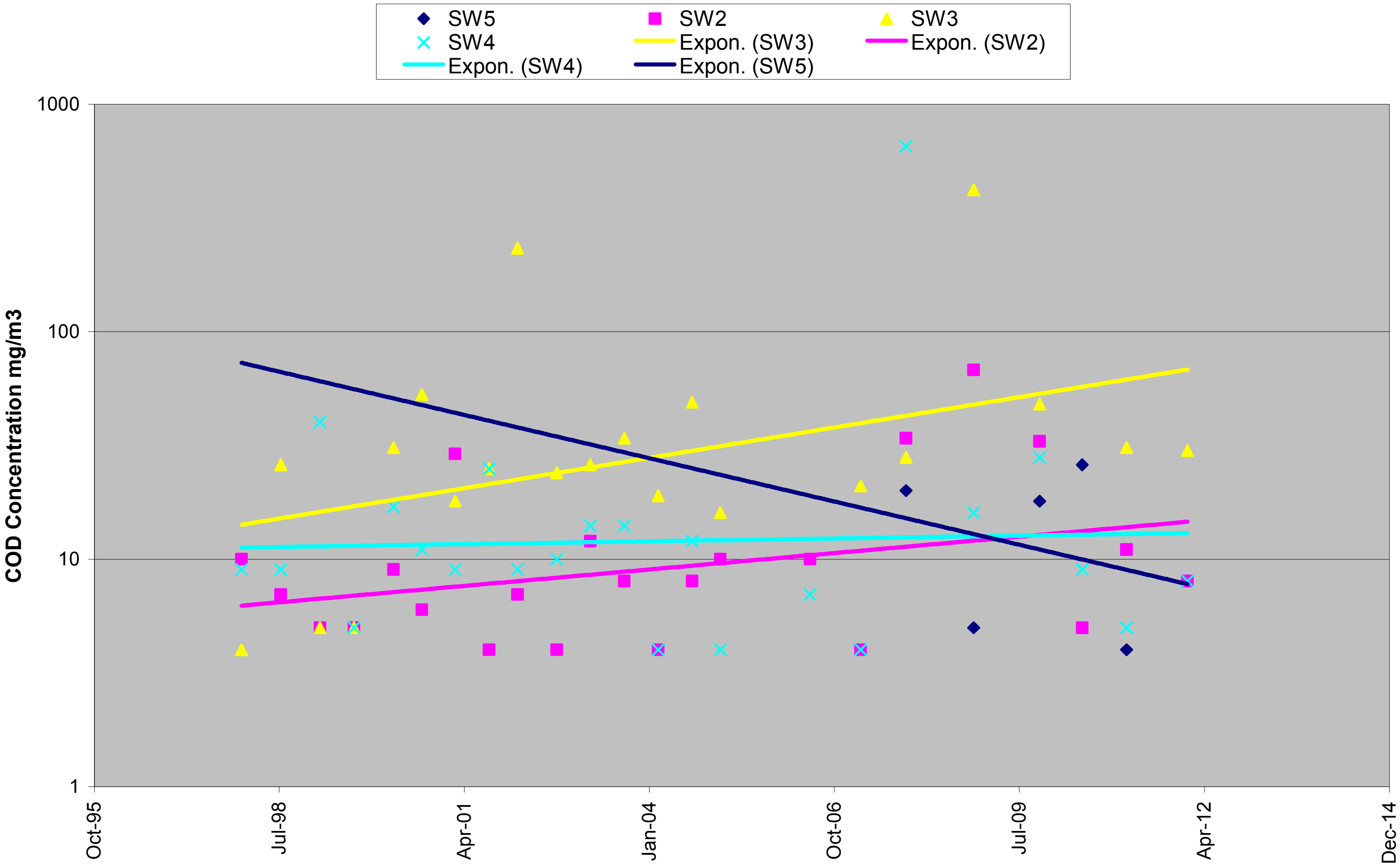
Graph 12
Surface Water Ammonia Concentrations 1997 - 2012



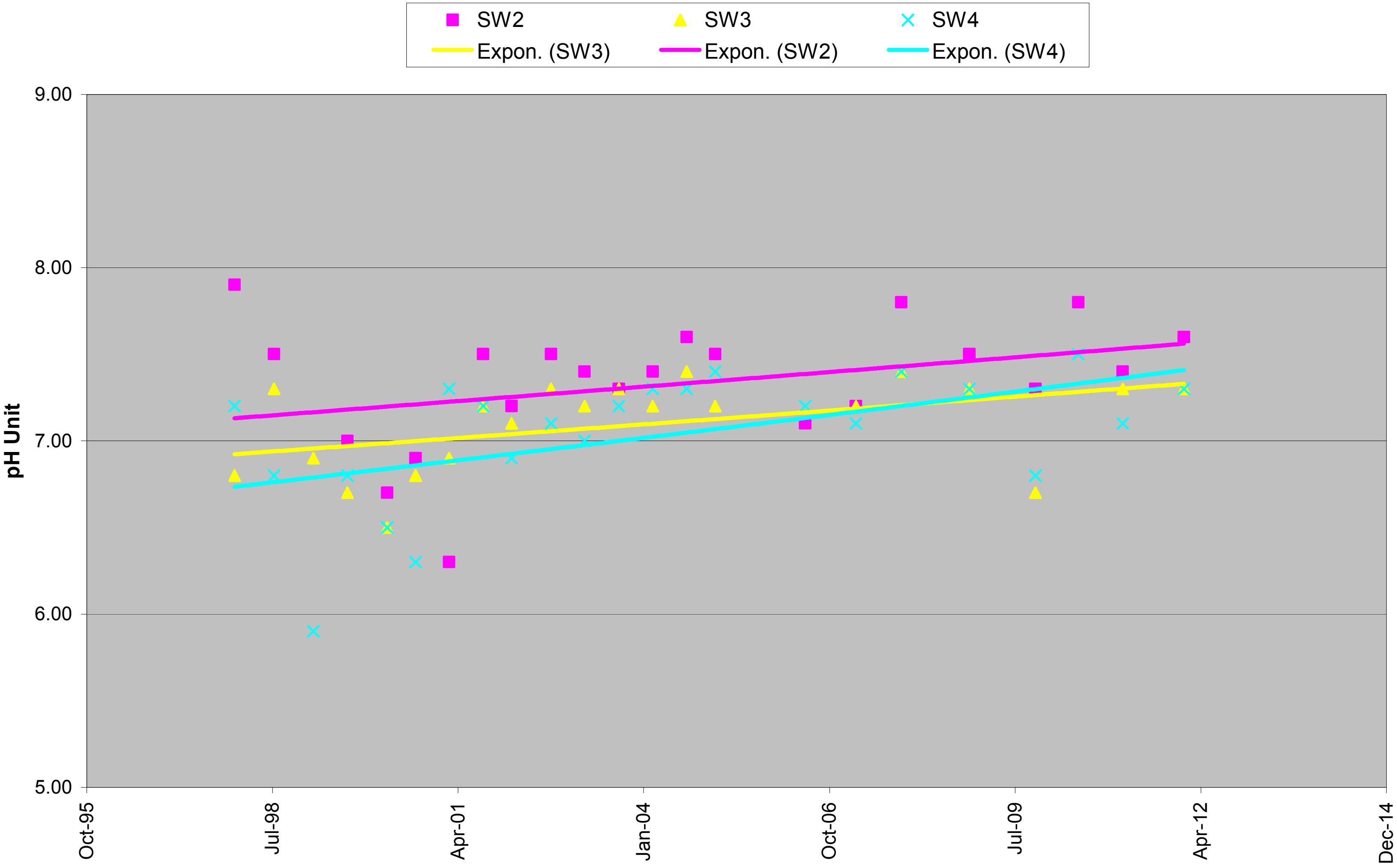
Graph 13
Surface Water Nitrate Concentrations 1997 - 2012



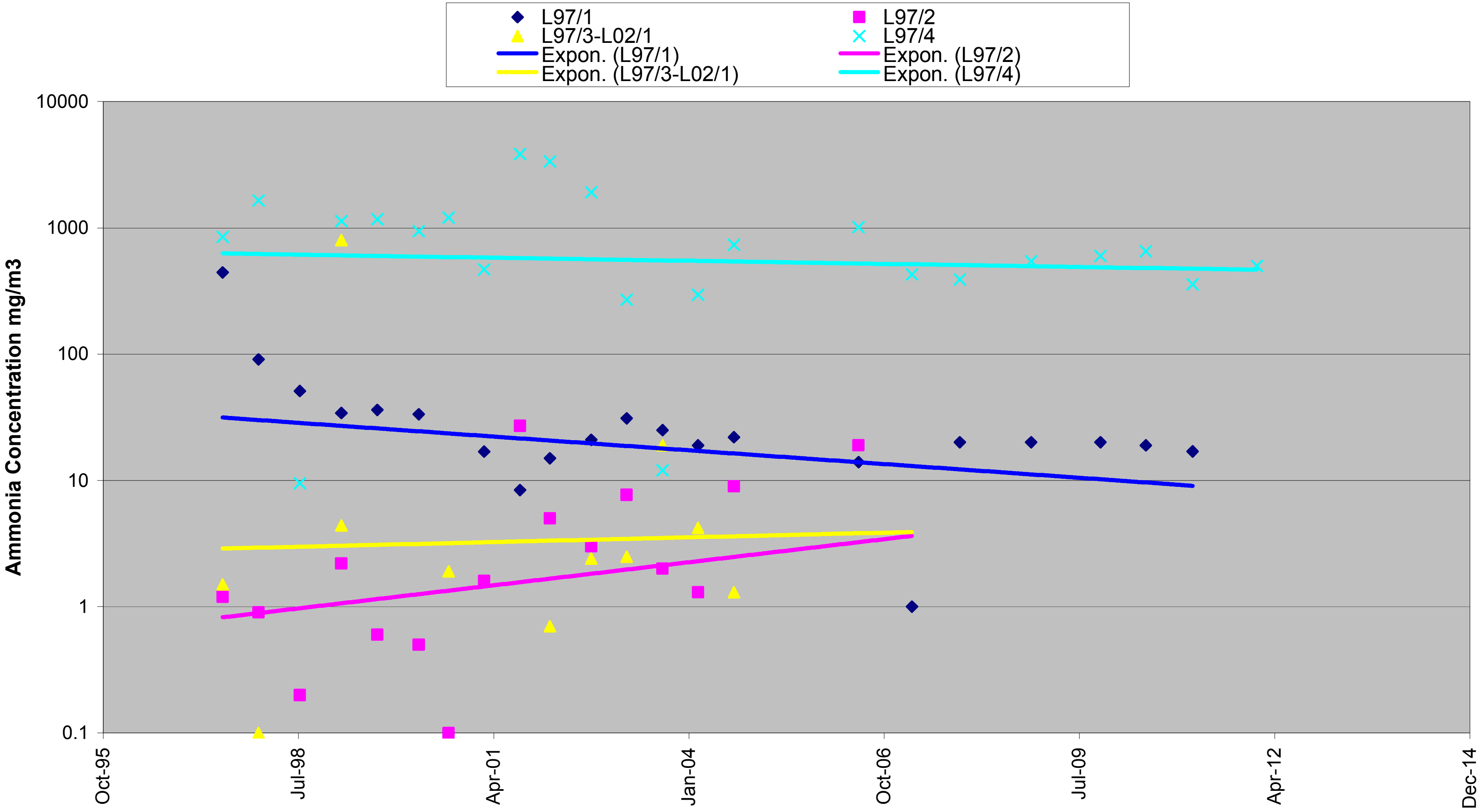
Graph 14
Surface Water Chemical Oxygen Demand 1997 - 2012



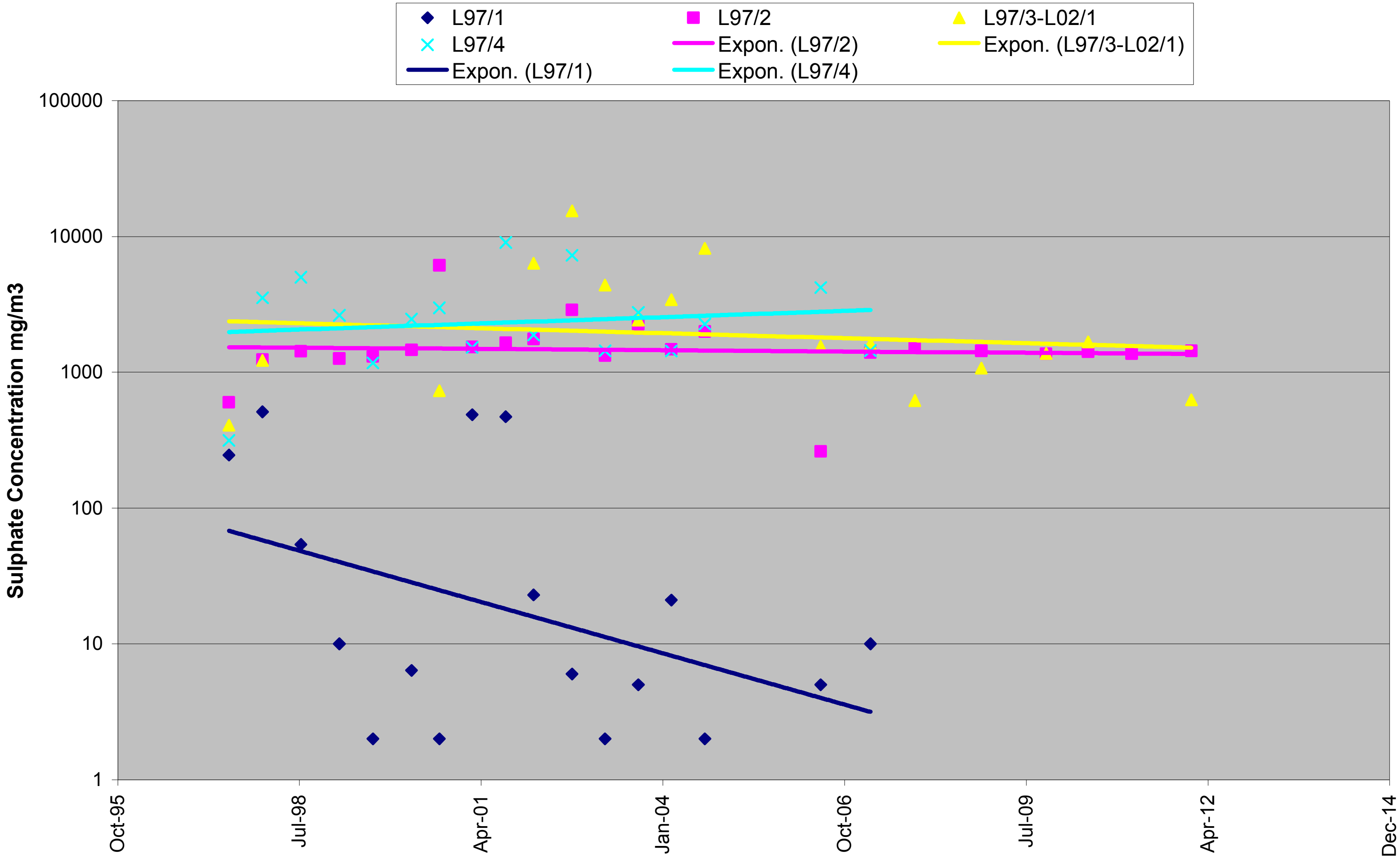
Graph 15
Surface Water pH 1997 - 2012



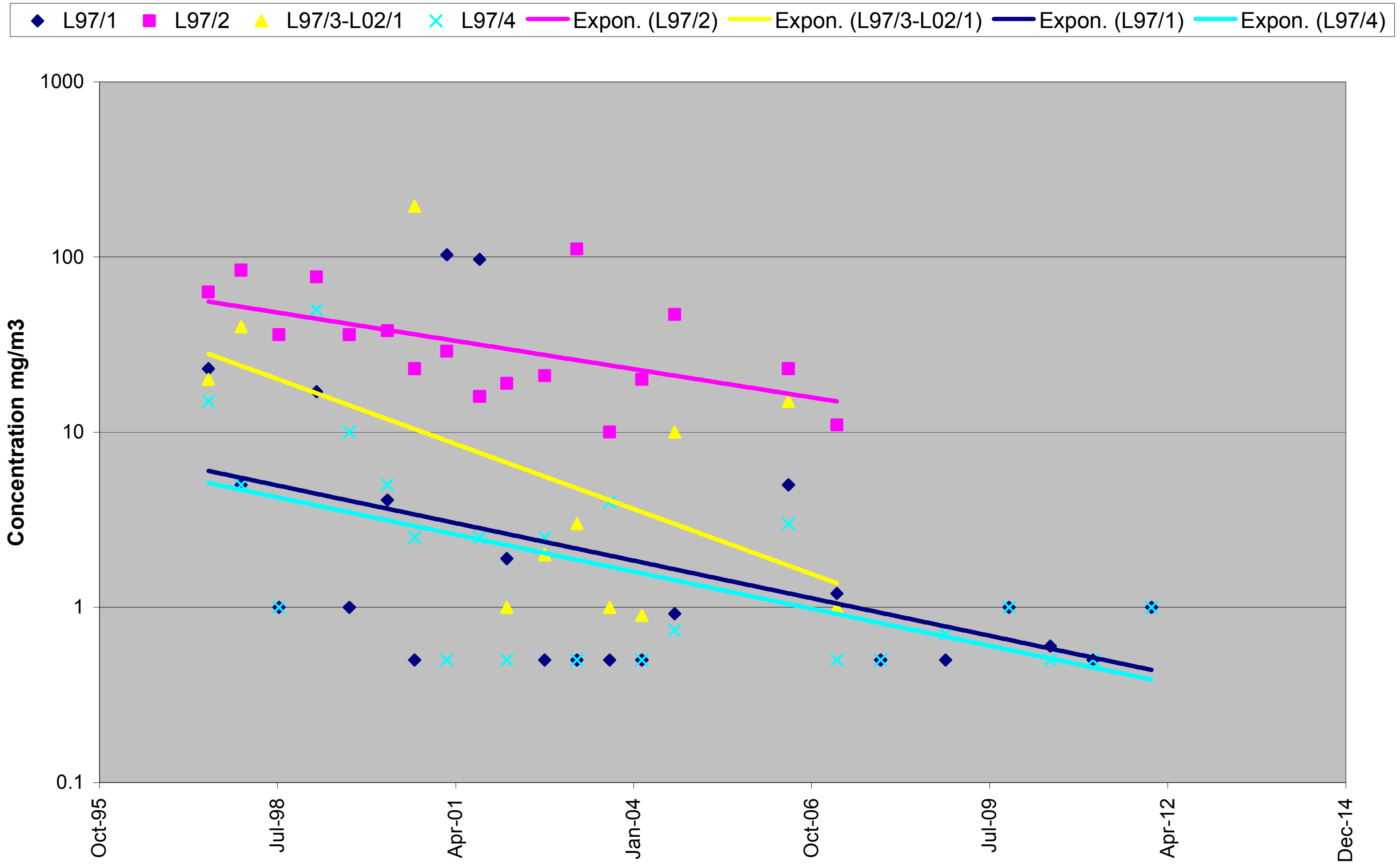
Graph 16
Leachate Ammonia Concentrations 1997 - 2012



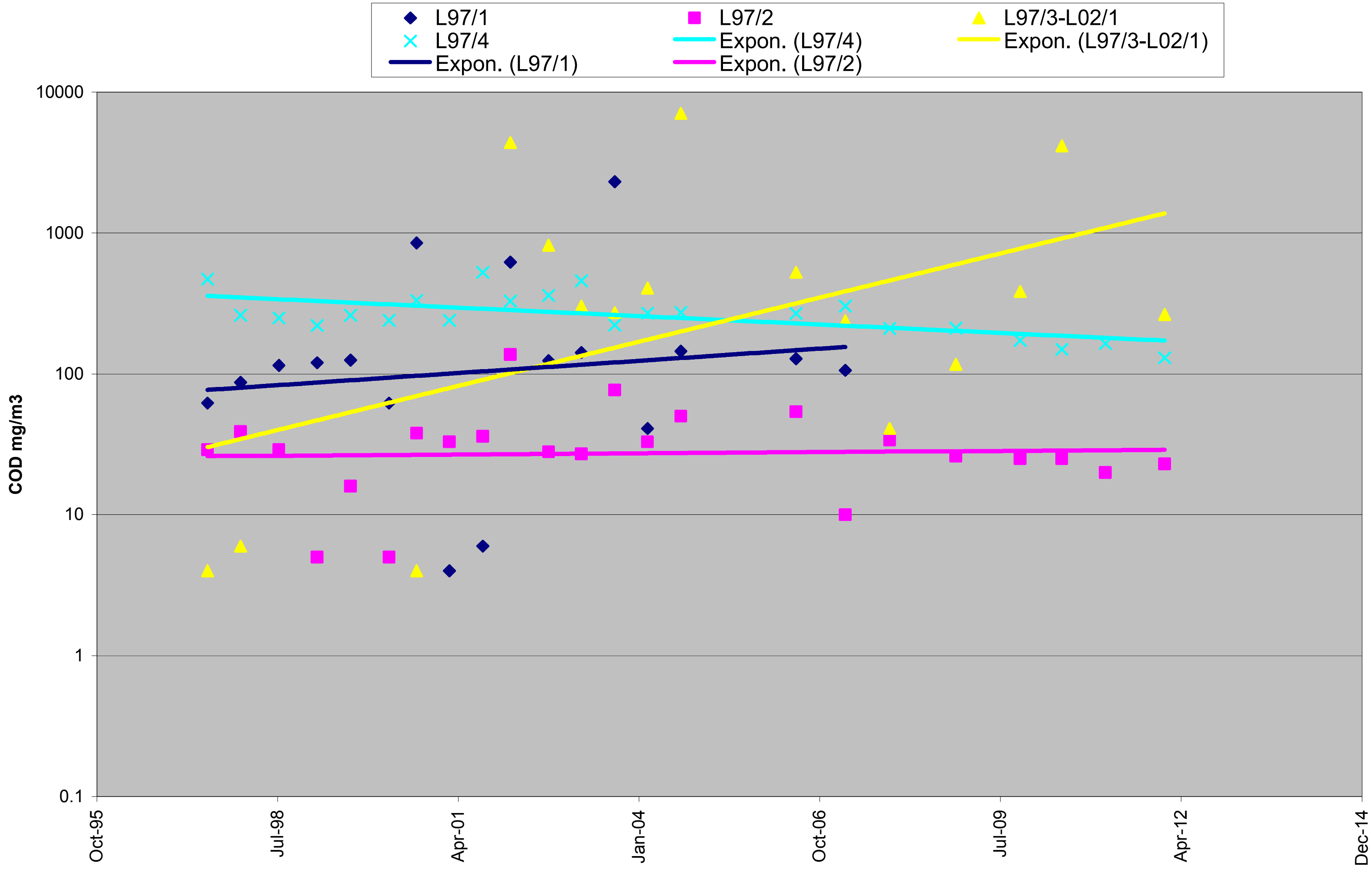
Graph 17
Leachate Sulphate Concentrations 1997 - 2012



Graph 18
Leachate Nitrate Concentrations 1997 - 2012



Graph 19
Leachate COD 1997 - 2012



APPENDIX B

MONITORING WELL SAMPLING AND PURGING INFORMATION (JANUARY 2012)

Holfeld Plastics 2012

Date Sampled	Borehole	Water Level (M)	BH Depth (M)	Head(M)	Borehole Diameter (M)	Well Volume (cu. M)	Total Well Volume to Purge (cu. M)	Time required to purge 3 well volumes (Min)	Actual time taken purging the borehole (Min)	Number of well volume purged (Approx.)
27 Jan. 2012	SW2	-	-	-	-	-	-	-	-	-
27 Jan. 2012	SW3	-	-	-	-	-	-	-	-	-
27 Jan. 2012	SW4	-	-	-	-	-	-	-	-	-
27 Jan. 2012	SW5	-	-	-	-	-	-	-	-	-
27 Jan. 2012	BH 97/10	3.64	13.33	9.69	0.05	0.0190	0.0571	0.95	10	30
27 Jan. 2012	BH 94/15	2.1	13.04	10.94	0.11	0.1040	0.3119	5.20	10	6
27 Jan. 2012	BH 94/14	2.2	10.59	8.39	0.11	0.0797	0.2392	3.99	**25	3
27 Jan. 2012	BH 97/2	5.15	14.9	9.75	0.05	0.0191	0.0574	0.96	10	31
27 Jan. 2012	BH 94/11++				0.02	0.0000	0.0000	D	R	Y
27 Jan. 2012	LO 2/1++	3.25	5.41	2.16	0.02	0.0007	0.0020	0.68	**10	3
27 Jan. 2012	L 97/4++	2.34	5.2	2.86	0.05	0.0056	0.0168	5.62	15	8
27 Jan. 2012	BH 97/11*	1.22	13.07	11.85	0.05	0.0233	0.0698	1.16	**15	5
27 Jan. 2012	L 97/2+	1.4	3.4	2	0.05	0.0039	0.0118	1.96	10	15
27 Jan. 2012	L 97/1+*	2.92	6.73	3.81	0.05	0.0075	0.0224	3.74	**25	4
27 Jan. 2012	BH 97/9	2.21	9.42	7.21	0.05	0.0142	0.0425	0.71	5	21
27 Jan. 2012	BH 97/6	3.02	9.48	6.46	0.05	0.0127	0.0381	0.63	5	24
27 Jan. 2012	BH 94/6	0.42	8.58	8.16	0.11	0.0775	0.2326	3.88	10	7
27 Jan. 2012	BH 97/14	1.16	11.87	10.71	0.11	0.1018	0.3053	5.09	15	9
27 Jan. 2012	BH 94/7	1.63	6.04	4.41	0.11	0.0419	0.1257	2.10	10	14
27 Jan. 2012	BH 94/8	1.81	11.12	9.31	0.11	0.0885	0.2654	4.42	10	7

**Waiting time included

NOTES

1. BH 94/11 went dry after purging just 1 well volume.

2.The pump provided by Holfeld Plastics was used in most of the boreholes where there is a steady flow while the pump was running.
The pump purges at least 1 litre per second (0.06cu.m per min).

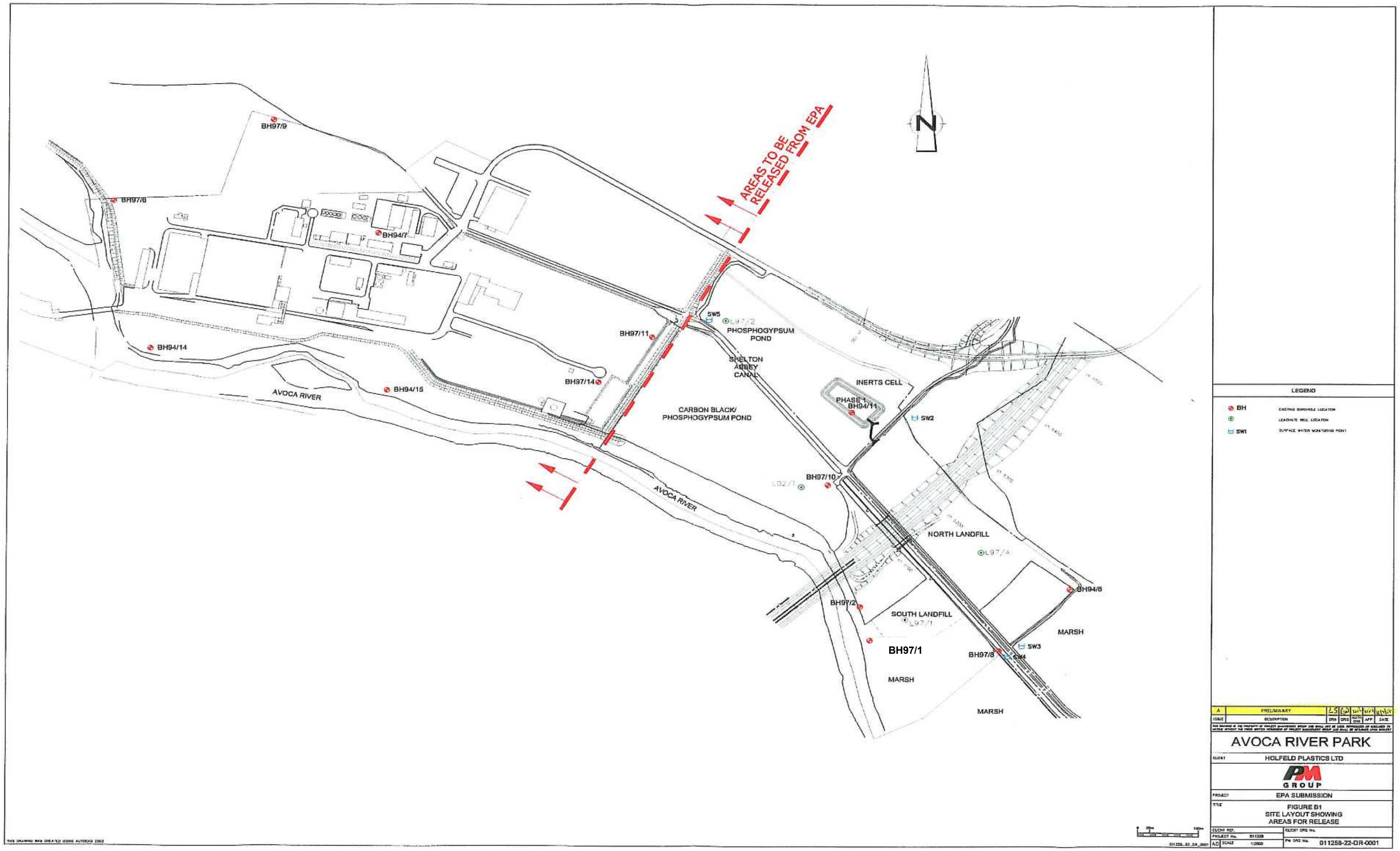
3. In cases where there is no steady flow, the pump was turned off, and boreholes were allowed to fill up before purging the boreholes again. This done at least 3 times to draw out 3 well volumes. These were boreholes(*) BH97/11, L97/1and L97/4.

4. A Watera Pump(+) which purges 1 litre every 10 seconds (0.006 cu.m per min.)was used on L97/1 and L97/2.

5. An ISCO D150(++) pump (1 litre per 20 seconds or 0.003cu.m per min.) was used on boreholes BH94/11 and LO2/1.

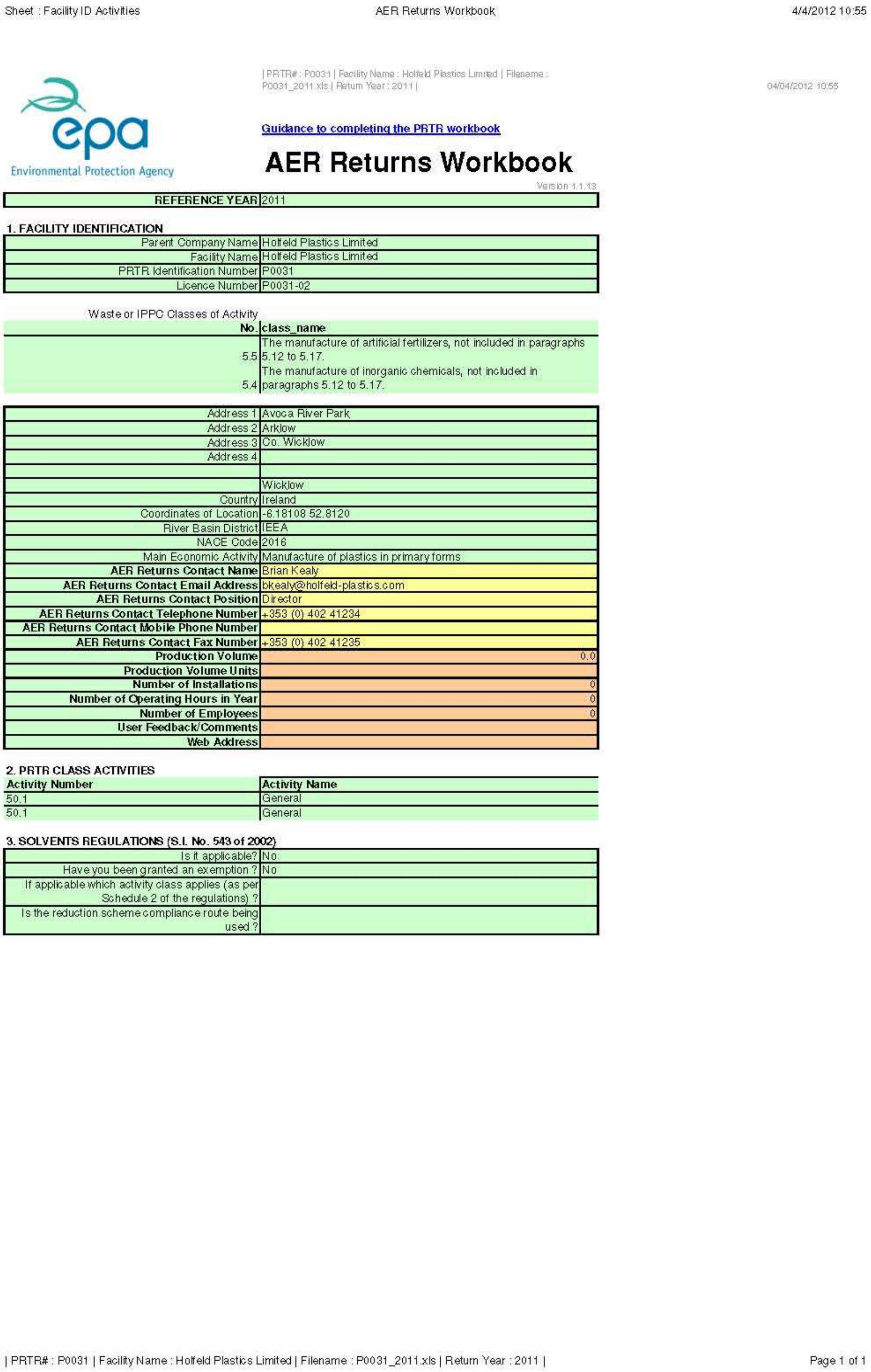
APPENDIX C

SITE MAP SHOWING SAMPLING LOCATIONS


N
AREAS TO BE RELEASED FROM EPA
BH97/9
BH97/8
BH94/7
BH94/14
BH94/15
AVOCA RIVER
BH97/11
BH97/14
SW5
L97/2
PHOSPHOGYPSUM POND
SHELTON ABBEY CANAL
INERTS CELL
PHASE 1
BH94/11
SW2
CARBON BLACK/ PHOSPHOGYPSUM POND
AVOCA RIVER
L02/1
BH97/10
NORTH LANDFILL
L97/4
BH94/6
BH97/2
SOUTH LANDFILL
L97/1
BH97/1
BH97/8
SW3
SW4
MARSH
MARSH
MARSH
LEGEND
BH EXISTING BOREHOLE LOCATION
LEACHATE WELL LOCATION
SW1 SURFACE WATER MONITORING POINT
A PRELIMINARY LS
ISSUE DESCRIPTION DRN DRG AUTH CHK APP DATE
AVOCA RIVER PARK
CLIENT HOLFELD PLASTICS LTD
PM GROUP
PROJECT EPA SUBMISSION
TITLE FIGURE B1 SITE LAYOUT SHOWING AREAS FOR RELEASE
CLIENT REF.
CLIENT DRG No.
PROJECT No. 011258
A0 SCALE 1:2500
PM DRG No. 011258-22-DR-0001
100m
THIS DRAWING WAS CREATED USING AUTOCAD 2002

APPENDIX D

AER RETURNS WORKBOOK (RELEVANT WORKSHEETS ONLY)



Sheet : Facility ID Activities | AER Returns Workbook | 4/4/2012 10:55

| PRTR# : P0031 | Facility Name : Holfeld Plastics Limited | Filename : P0031_2011.xls | Return Year : 2011 |

04/04/2012 10:55

Guidance to completing the PRTR workbook

AER Returns Workbook

Version 1.1.13

REFERENCE YEAR	2011

1. FACILITY IDENTIFICATION

Parent Company Name	Holfeld Plastics Limited
Facility Name	Holfeld Plastics Limited
PRTR Identification Number	P0031
Licence Number	P0031-02

Waste or IPPC Classes of Activity

No.	**class_name**
5.5	The manufacture of artificial fertilizers, not included in paragraphs 5.12 to 5.17.
5.4	The manufacture of inorganic chemicals, not included in paragraphs 5.12 to 5.17.

Address 1	Avoca River Park
Address 2	Arklow
Address 3	Co. Wicklow
Address 4	
	Wicklow
Country	Ireland
Coordinates of Location	-6.18108 52.8120
River Basin District	IEEA
NACE Code	2016
Main Economic Activity	Manufacture of plastics in primary forms
AER Returns Contact Name	Brian Kealy
AER Returns Contact Email Address	bkealy@holfeld-plastics.com
AER Returns Contact Position	Director
AER Returns Contact Telephone Number	+353 (0) 402 41234
AER Returns Contact Mobile Phone Number	
AER Returns Contact Fax Number	+353 (0) 402 41235
Production Volume	0.0
Production Volume Units	
Number of Installations	0
Number of Operating Hours in Year	0
Number of Employees	0
User Feedback/Comments	
Web Address	

2. PRTR CLASS ACTIVITIES

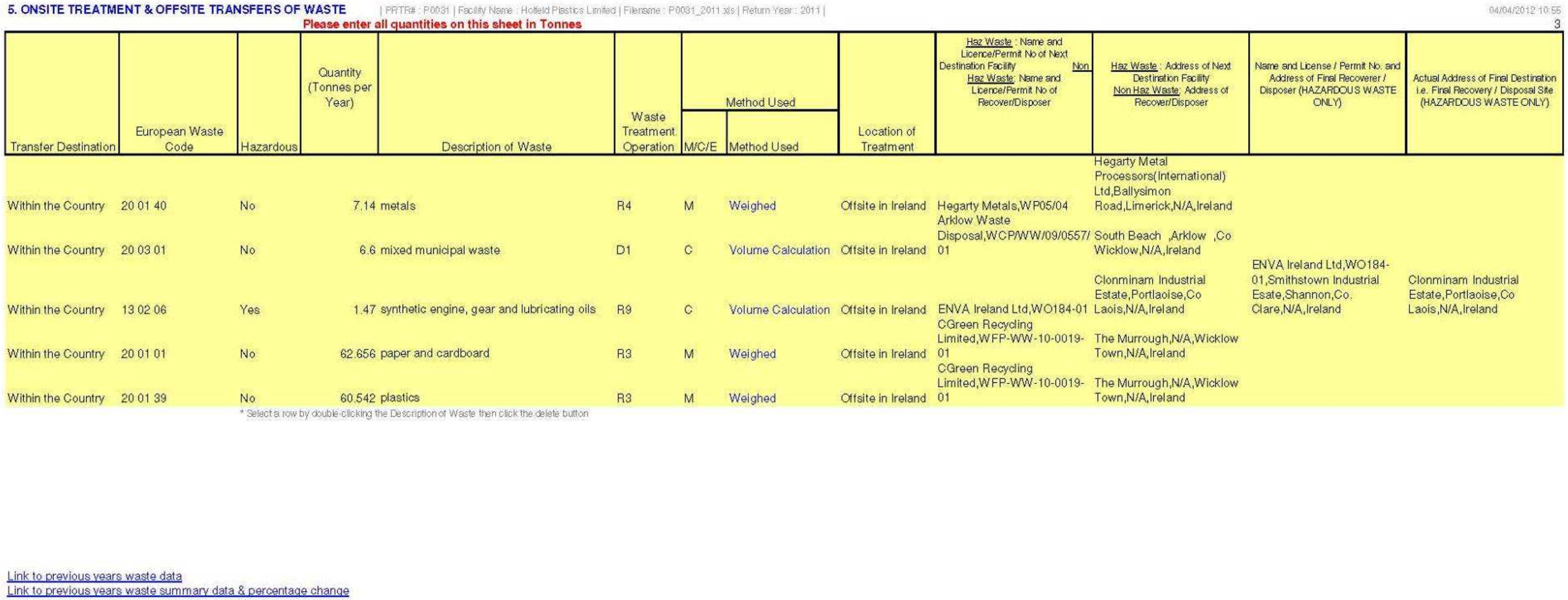
Activity Number	**Activity Name**
50.1	General
50.1	General

3. SOLVENTS REGULATIONS (S.I. No. 543 of 2002)

Is it applicable?	No
Have you been granted an exemption ?	No
If applicable which activity class applies (as per Schedule 2 of the regulations) ?	
Is the reduction scheme compliance route being used ?	

| PRTR# : P0031 | Facility Name : Holfeld Plastics Limited | Filename : P0031_2011.xls | Return Year : 2011 |

Page 1 of 1



5. ONSITE TREATMENT & OFFSITE TRANSFERS OF WASTE | PRTR# : P0031 | Facility Name : Holfeld Plastics Limited | Filename : P0031_2011.xls | Return Year : 2011 |

04/04/2012 10:55

3

Please enter all quantities on this sheet in Tonnes

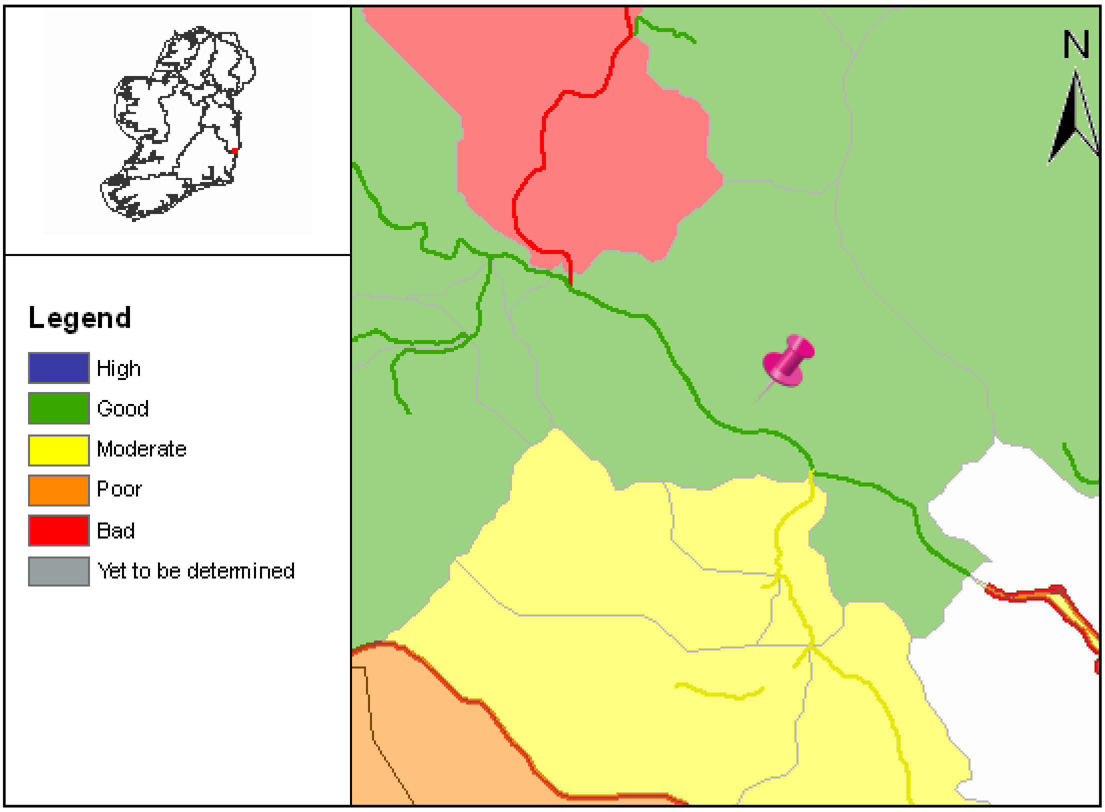
						Method Used						
Transfer Destination	European Waste Code	Hazardous	Quantity (Tonnes per Year)	Description of Waste	Waste Treatment Operation	M/C/E	Method Used	Location of Treatment	Haz Waste : Name and Licence/Permit No of Next Destination Facility Non Haz Waste: Name and Licence/Permit No of Recover/Disposer	Haz Waste : Address of Next Destination Facility Non Haz Waste: Address of Recover/Disposer	Name and License / Permit No. and Address of Final Recoverer / Disposer (HAZARDOUS WASTE ONLY)	Actual Address of Final Destination i.e. Final Recovery / Disposal Site (HAZARDOUS WASTE ONLY)
Within the Country	20 01 40	No	7.14	metals	R4	M	Weighed	Offsite in Ireland	Hegarty Metals,WP05/04	Hegarty Metal Processors(International) Ltd,Ballysimon Road,Limerick,N/A,Ireland		
Within the Country	20 03 01	No	6.6	mixed municipal waste	D1	C	Volume Calculation	Offsite in Ireland	Arklow Waste Disposal,WCP/WW/09/0557/01	South Beach ,Arklow ,Co Wicklow,N/A,Ireland		
Within the Country	13 02 06	Yes	1.47	synthetic engine, gear and lubricating oils	R9	C	Volume Calculation	Offsite in Ireland	ENVA Ireland Ltd,WO184-01	Clonminam Industrial Estate,Portlaoise,Co Laois,N/A,Ireland	ENVA Ireland Ltd,WO184-01,Smithstown Industrial Esate,Shannon,Co. Clare,N/A,Ireland	Clonminam Industrial Estate,Portlaoise,Co Laois,N/A,Ireland
Within the Country	20 01 01	No	62.656	paper and cardboard	R3	M	Weighed	Offsite in Ireland	CGreen Recycling Limited,WFP-WW-10-0019-01	The Murrough,N/A,Wicklow Town,N/A,Ireland		
Within the Country	20 01 39	No	60.542	plastics	R3	M	Weighed	Offsite in Ireland	CGreen Recycling Limited,WFP-WW-10-0019-01	The Murrough,N/A,Wicklow Town,N/A,Ireland		

* Select a row by double-clicking the Description of Waste then click the delete button

Link to previous years waste data
Link to previous years waste summary data & percentage change

APPENDIX 5 – WFD Water Body Reports

Full Report for Waterbody Avoca Lower



River Basin Management Plans (RBMPs) have been published for all River Basin Districts in Ireland in accordance with the requirements of the Water Framework Directive. The WaterMaps viewer is an integral part of the River Basin Management Plan and provides access to information at individual waterbody level and at Water Management Unit level for all the River Basin Districts in Ireland.

The following report provides summary plan information about the selected waterbody (indicated by the pin in the map above) relating to its status, risks, objectives, and measures proposed to retain status where this is adequate, or improve it where necessary. Waterbodies can relate to surface waters (these include rivers, lakes, estuaries [transitional waters], and coastal waters), or to groundwaters. Other relevant information not included in this report can be viewed using the WaterMaps viewer, including areas listed in the Register of Protected Areas.

You will find brief notes at the bottom of some of the individual report sheets that will help you in interpreting the information presented. More detailed information can be obtained in relation to all aspects of the RBMPs at www.wfdireland.ie.

Date Reported to Europe:July 2010

Date Report Created 21/11/2019

Summary Information:

Water Management Unit: IE_EA_Avoca

WaterBody Category: River Waterbody

WaterBody Name: Avoca Lower

WaterBody Code: IE_EA_10_1611

Overall Status: Good

Overall Objective: Protect

Overall Risk: 1a At Risk

Heavily Modified: No

Report data based upon final RBMP, 2009-2015.

The information provided above is a summary of the principal findings related to the selected waterbody. Further details and explanation of individual elements of the report are outlined in the following pages.

Date Reported to Europe:July 2010

Date Report Created 21/11/2019

Status Report

Water Management Unit:	IE_EA_Avoca
WaterBody Category:	River Waterbody
WaterBody Name:	Avoca Lower
WaterBody Code:	IE_EA_10_1611
Overall Status Result:	Good
Heavily Modified:	No

	Status Element Description	**Result**
	Status information	
Q	Macroinvertebrate status	N/A
PC	General physico-chemical status	Good
FPQ	Freshwater Pearl Mussel / Macroinvertebrate status	N/A
DIA	Diatoms status	N/A
HYM	Hydromorphology status	N/A
FIS	Fish status	N/A
SP	Specific Pollutants status (SP)	N/A
ES	Overall ecological status	Good
CS	Overall chemical status (PAS)	n/a
EXT	Extrapolated status	N/A
MON	Monitored water body	YES
DON	Donor water bodies	N/A

n/a - not assessed

Status
By 'Status' we mean the condition of the water in the waterbody. It is defined by its chemical status and its ecological status, whichever is worse. Waters are ranked in one of 5 status classes: High, Good, Moderate, Poor, Bad. However, not all waterbodies have been monitored, and in such cases the status of a similar nearby waterbody has been used (extrapolated) to assign status. If this has been done the first line of the status report shows the code of the waterbody used to extrapolate.

You can read more about status and how it is measured in our RBMP Document Library at www.wfdireland.ie (Directory 15 Status).

Date Reported to Europe:July 2010

Date Report Created 21/11/2019

water matters
'Our Plan'

Risk Report

Water Management Unit: IE_EA_Avoca

WaterBody Category: River Waterbody

WaterBody Name: Avoca Lower

WaterBody Code: IE_EA_10_1611

Overall Risk Result: 1a At Risk

Heavily Modified: No

	Risk Test Description		Risk
	Diffuse Risk Sources		
RD1	EPA diffuse model (2008)	2a	Probably Not At Risk
RD2a	Road Wash - Soluble Copper	2b	Not At Risk
RD2b	Road Wash - Total Zinc	2b	Not At Risk
RD2c	Road Wash - Total Hydrocarbons	2b	Not At Risk
RD3	Railways	2b	Not At Risk
RD4a	Forestry - Acidification (2008)	2b	Not At Risk
RD4b	Forestry - Suspended Solids (2008)	2b	Not At Risk
RD4c	Forestry - Eutrophication (2008)	2a	Probably Not At Risk
RD5	Overall Unsewered (2008)	2b	Not At Risk
RD5a	Unsewered Areas - Pathogens (2008)	2a	Probably Not At Risk
RD5b	Unsewered Phosphorus (2008)	2b	Not At Risk
RD6a	Arable	2a	Probably Not At Risk
RD6b	Sheep Dip	2b	Not At Risk
RD6c	Forestry - Dangerous Substances	2b	Not At Risk
RDO	Diffuse Overall -Worst Case (2008)	2a	Probably Not At Risk
	Hydrology		
RHY1	Water balance - Abstraction	2b	Not At Risk
	Morphological Risk Sources		
RM1	Channelisation (2008)	2b	Not At Risk
RM2	Embankments (2008)	2b	Not At Risk
RM3	Impoundments	2b	Not At Risk
RM4	Water Regulation	2b	Not At Risk
RM5	Intensive Landuse		N/A
RMO	Morphology Overall - Worst Case (2008)	2b	Not At Risk
	Overall Risk		
RA	Rivers Overall - Worst Case (2008)	1a	At Risk

Date Reported to Europe:July 2010

Date Report Created 21/11/2019

	Point Risk Sources		
RP1	WWTPs (2008)	2b	Not At Risk
RP2	CSOs	2b	Not At Risk
RP3	IPPCs (2008)	2b	Not At Risk
RP4	Section 4s (2008)	2b	Not At Risk
RP5	WTPs/Mines/Quarries/Landfills		N/A
RPO	Overall Risk from Point Sources - Worst Case (2008)	2b	Not At Risk
	Q Value		
Q	EPA Q rating and Margaritifera Assessment		N/A
	Q/RDI or Point/Diffuse		
QPD	Q class/EPA Diffuse Model or worst case of Point and Diffuse (2008)	1a	At Risk
	Rivers Direct Impacts		
RDI1	Rivers Direct Impacts - Dangerous Substances		N/A

Risk
By 'risk' we mean the risk that a waterbody will not achieve good ecological or good chemical status/potential at least by 2015. To examine risk the various pressures acting on the waterbody were identified along with any evidence of impact on water status. Depending on the extent of the pressure and its potential for impact, and the amount of information available, the risk to the water body was placed in one of four categories: 1a at risk; 1b probably at risk; 2a probably not at risk; 2b not at risk. Note that '2008' after the risk category means that the risk assessment was revised in 2008. All other risks were determined as part of an earlier risk assessment in 2005.

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Date Reported to Europe:July 2010

Date Report Created 21/11/2019

Objectives Report

Water Management Unit:	IE_EA_Avoca
WaterBody Category:	River Waterbody
WaterBody Name:	Avoca Lower
WaterBody Code:	IE_EA_10_1611
Overall Objective:	Protect
Heavily Modified:	No

	Objectives Description	**Result**
	Objectives information	
OB1	Prevent deterioration objective	No Status
OB2	Restore at least good status objective	No Status
OB3	Reduce chemical pollution objective	No Status
OB4	Protected areas objective	Protect
OB5	Northern Ireland Environment Agency objective	No Status
OBO	Overall objectives	Protect

Extended timescales
Extended timescales have been set for certain waters due to technical, economic, environmental or recovery constraints. Extended timescales are usually of one planning cycle (6 years, to 2021) but in some cases are two planning cycles (to 2027).

Objectives
In general, we are required to ensure that our waters achieve at least good status/potential by 2015, and that their status does not deteriorate. Having identified the status of waters (this is given earlier in this report), the next stage is to set objectives for waters. Objectives consider waters that require protection from deterioration as well as waters that require restoration and the timescales needed for recovery. Four default objectives have been set initially:-

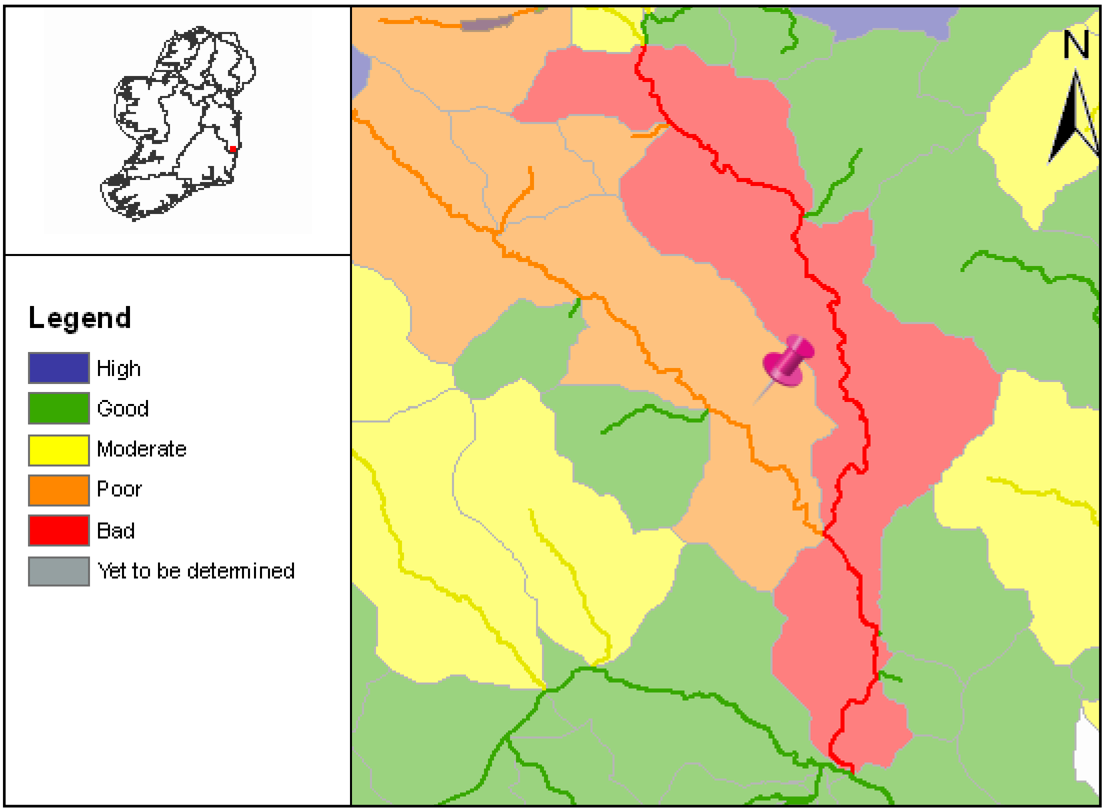
Prevent Deterioration
Restore Good Status
Reduce Chemical Pollution
Achieve Protected Areas Objectives

These objectives have been refined based on the measures available to achieve them, the latter's likely effectiveness, and consideration of cost-effective combinations of measures. Where it is considered necessary extended deadlines have been set for achieving objectives in 2021 or 2027.

Date Reported to Europe:July 2010

Date Report Created 21/11/2019

Full Report for Waterbody Avoca Upper



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The following report provides summary plan information about the selected waterbody (indicated by the pin in the map above) relating to its status, risks, objectives, and measures proposed to retain status where this is adequate, or improve it where necessary. Waterbodies can relate to surface waters (these include rivers, lakes, estuaries [transitional waters], and coastal waters), or to groundwaters. Other relevant information not included in this report can be viewed using the WaterMaps viewer, including areas listed in the Register of Protected Areas.

You will find brief notes at the bottom of some of the individual report sheets that will help you in interpreting the information presented. More detailed information can be obtained in relation to all aspects of the RBMPs at www.wfdireland.ie.

Date Reported to Europe:July 2010

Date Report Created 21/11/2019

Summary Information:

Water Management Unit:	IE_EA_Avoca
WaterBody Category:	River Waterbody
WaterBody Name:	Avoca Upper
WaterBody Code:	IE_EA_10_1477
Overall Status:	Bad
Overall Objective:	Restore_2027
Overall Risk:	1a At Risk
Heavily Modified:	No

Report data based upon final RBMP, 2009-2015.

The information provided above is a summary of the principal findings related to the selected waterbody. Further details and explanation of individual elements of the report are outlined in the following pages.

Date Reported to Europe:July 2010

Date Report Created 21/11/2019

Status Report

Water Management Unit: IE_EA_Avoca

WaterBody Category: River Waterbody

WaterBody Name: Avoca Upper

WaterBody Code: IE_EA_10_1477

Overall Status Result: Bad

Heavily Modified: No

	Status Element Description	Result
	Status information	
Q	Macroinvertebrate status	Bad
PC	General physico-chemical status	Good
FPQ	Freshwater Pearl Mussel / Macroinvertebrate status	N/A
DIA	Diatoms status	N/A
HYM	Hydromorphology status	N/A
FIS	Fish status	N/A
SP	Specific Pollutants status (SP)	N/A
ES	Overall ecological status	Bad
CS	Overall chemical status (PAS)	n/a
EXT	Extrapolated status	N/A
MON	Monitored water body	YES
DON	Donor water bodies	N/A

n/a - not assessed

Status
By 'Status' we mean the condition of the water in the waterbody. It is defined by its chemical status and its ecological status, whichever is worse. Waters are ranked in one of 5 status classes: High, Good, Moderate, Poor, Bad. However, not all waterbodies have been monitored, and in such cases the status of a similar nearby waterbody has been used (extrapolated) to assign status. If this has been done the first line of the status report shows the code of the waterbody used to extrapolate.

You can read more about status and how it is measured in our RBMP Document Library at www.wfdireland.ie (Directory 15 Status).

Date Reported to Europe:July 2010

Date Report Created 21/11/2019

water matters
'Our Plan'

Risk Report

Water Management Unit: IE_EA_Avoca

WaterBody Category: River Waterbody

WaterBody Name: Avoca Upper

WaterBody Code: IE_EA_10_1477

Overall Risk Result: 1a At Risk

Heavily Modified: No

	Risk Test Description		Risk
	Diffuse Risk Sources		
RD1	EPA diffuse model (2008)	2a	Probably Not At Risk
RD2a	Road Wash - Soluble Copper	2b	Not At Risk
RD2b	Road Wash - Total Zinc	2b	Not At Risk
RD2c	Road Wash - Total Hydrocarbons	2b	Not At Risk
RD3	Railways	2b	Not At Risk
RD4a	Forestry - Acidification (2008)	2b	Not At Risk
RD4b	Forestry - Suspended Solids (2008)	2b	Not At Risk
RD4c	Forestry - Eutrophication (2008)	2a	Probably Not At Risk
RD5	Overall Unsewered (2008)	2b	Not At Risk
RD5a	Unsewered Areas - Pathogens (2008)	2a	Probably Not At Risk
RD5b	Unsewered Phosphorus (2008)	2b	Not At Risk
RD6a	Arable	2a	Probably Not At Risk
RD6b	Sheep Dip	2b	Not At Risk
RD6c	Forestry - Dangerous Substances	2b	Not At Risk
RDO	Diffuse Overall -Worst Case (2008)	2a	Probably Not At Risk
	Hydrology		
RHY1	Water balance - Abstraction	2b	Not At Risk
	Morphological Risk Sources		
RM1	Channelisation (2008)	2b	Not At Risk
RM2	Embankments (2008)	2b	Not At Risk
RM3	Impoundments	2b	Not At Risk
RM4	Water Regulation	2b	Not At Risk
RM5	Intensive Landuse		N/A
RMO	Morphology Overall - Worst Case (2008)	2b	Not At Risk
	Overall Risk		
RA	Rivers Overall - Worst Case (2008)	1a	At Risk

Date Reported to Europe:July 2010

Date Report Created 21/11/2019

	Point Risk Sources		
RP1	WWTPs (2008)	1a	At Risk
RP2	CSOs	2b	Not At Risk
RP3	IPPCs (2008)	2b	Not At Risk
RP4	Section 4s (2008)	2b	Not At Risk
RP5	WTPs/Mines/Quarries/Landfills		N/A
RPO	Overall Risk from Point Sources - Worst Case (2008)	1a	At Risk
	Q Value		
Q	EPA Q rating and Margaritifera Assessment		N/A
	Q/RDI or Point/Diffuse		
QPD	Q class/EPA Diffuse Model or worst case of Point and Diffuse (2008)	1a	At Risk
	Rivers Direct Impacts		
RDI1	Rivers Direct Impacts - Dangerous Substances		N/A

Risk
By 'risk' we mean the risk that a waterbody will not achieve good ecological or good chemical status/potential at least by 2015. To examine risk the various pressures acting on the waterbody were identified along with any evidence of impact on water status. Depending on the extent of the pressure and its potential for impact, and the amount of information available, the risk to the water body was placed in one of four categories: 1a at risk; 1b probably at risk; 2a probably not at risk; 2b not at risk. Note that '2008' after the risk category means that the risk assessment was revised in 2008. All other risks were determined as part of an earlier risk assessment in 2005.

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Date Reported to Europe:July 2010

Date Report Created 21/11/2019

Objectives Report

Water Management Unit:	IE_EA_Avoca
WaterBody Category:	River Waterbody
WaterBody Name:	Avoca Upper
WaterBody Code:	IE_EA_10_1477
Overall Objective:	Restore_2027
Heavily Modified:	No

	Objectives Description	**Result**
	Objectives information	
OB1	Prevent deterioration objective	No Status
OB2	Restore at least good status objective	No Status
OB3	Reduce chemical pollution objective	No Status
OB4	Protected areas objective	Restore_2027
OB5	Northern Ireland Environment Agency objective	No Status
OBO	Overall objectives	Restore_2027

Extended timescales
Extended timescales have been set for certain waters due to technical, economic, environmental or recovery constraints. Extended timescales are usually of one planning cycle (6 years, to 2021) but in some cases are two planning cycles (to 2027).

Objectives
In general, we are required to ensure that our waters achieve at least good status/potential by 2015, and that their status does not deteriorate. Having identified the status of waters (this is given earlier in this report), the next stage is to set objectives for waters. Objectives consider waters that require protection from deterioration as well as waters that require restoration and the timescales needed for recovery. Four default objectives have been set initially:-

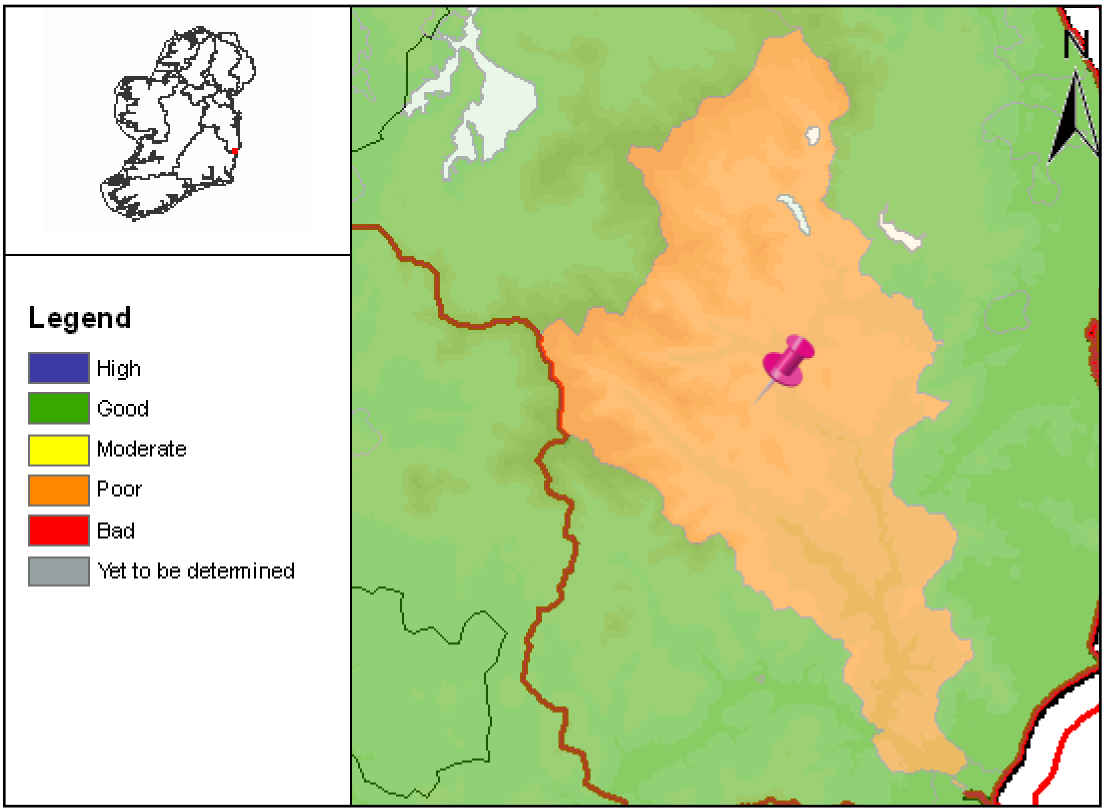
Prevent Deterioration
Restore Good Status
Reduce Chemical Pollution
Achieve Protected Areas Objectives

These objectives have been refined based on the measures available to achieve them, the latter's likely effectiveness, and consideration of cost-effective combinations of measures. Where it is considered necessary extended deadlines have been set for achieving objectives in 2021 or 2027.

Date Reported to Europe:July 2010

Date Report Created 21/11/2019

Full Report for Waterbody Wicklow Central (Avoca Mine)



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Date Reported to Europe:July 2010

Date Report Created 21/11/2019

Summary Information:

Water Management Unit:	N/A
WaterBody Category:	Groundwater Waterbody
WaterBody Name:	Wicklow Central (Avoca Mine)
WaterBody Code:	IE_EA_G_007
Overall Status:	Poor
Overall Objective:	LSO
Overall Risk:	1a At Risk
Heavily Modified:	No

Report data based upon final RBMP, 2009-2015.

The information provided above is a summary of the principal findings related to the selected waterbody. Further details and explanation of individual elements of the report are outlined in the following pages.

Date Reported to Europe:July 2010

Date Report Created 21/11/2019

Chemical and Quantitative Status Report

Water Management Unit: N/A

WaterBody Category: Groundwater Waterbody

WaterBody Name: Wicklow Central (Avoca Mine)

WaterBody Code: IE_EA_G_007

Overall Status Result: Poor

Heavily Modified: No

	Status Element Description	**Result**
	Status information	
INS	Status associated with saline intrusion into groundwater	N/A
DWS	Status associated with exceedances of water quality above specific standards	N/A
DS	Chemical status of groundwater due to pressure from diffuse sources of pollution	N/A
CLS	Chemical status of groundwater due to pressure from contaminated soil or land.	N/A
MS	Chemical status of groundwater due to pressure from mine sites (active or closed).	N/A
UAS	Chemical status of groundwater due to pressures from urban areas	N/A
GWS	General groundwater quality status	N/A
RPS	Status associated with MRP loading to rivers	N/A
TNS	Status associated with nitrate loading to transitional and coastal waters	N/A
SWS	Overall status associated with nutrient loadings to rivers and transitional and coastal waters	N/A
SQS	Status associated with dependant surface water quantitative status	N/A
GDS	Groundwater dependant terrestrial ecosystems status	N/A
QSO	Quantitative status overall	Good
CSO	Chemical status overall	Poor
OS	Overall status	Poor

GS -HC : Good status High Confidence
GS- LC : Good status Low Confidence
n/a - not assessed

Status
By 'Status' we mean the condition of the water in the waterbody. It is defined by its chemical status and quantitative status, whichever is worse. Groundwaters are ranked in one of 2 status classes: Good or Poor.

You can read more about status and how it is measured in our RBMP Document Library at www.wfdireland.ie (Directory 15 Status).

Date Reported to Europe:July 2010

Date Report Created 21/11/2019

water matters
'Our Plan'

Risk Report

Water Management Unit:	N/A
WaterBody Category:	Groundwater Waterbody
WaterBody Name:	Wicklow Central (Avoca Mine)
WaterBody Code:	IE_EA_G_007
Overall Risk Result:	1a At Risk
Heavily Modified:	No

	Risk Test Description	**Risk**
	Groundwater Dependent Terrestrial Ecosystems	
TE	GWDTE Risk	N/A
	Groundwater Quality	
DIF	Diffuse Elements (General) Risk	N/A
DW	Drinking Waters Risk	N/A
INT	Intrusions Risk	N/A
WB	Water Balance Risk	N/A
	Groundwater Quality (General)	
GQ	General Groundwater Quality Risk	N/A
	Groundwater Quality (Point Risk)	
CL	Contaminated Land Risk	N/A
LF	Landfill Risk	N/A
MI	Mine Risk	N/A
QY	Quarry Risk	N/A
UR	Urban Risk	N/A
UW	UWWT Risk	N/A
	GW Diffuse Risk Sources	
WB3	Mobile Nutrients (NO3)	N/A
WB4	Mobile Chemicals	N/A
WB5	Clustered OSWTSs and leaking urban sewerage systems	N/A
	GW Hydrology	
WB1	Water balance - Abstraction	N/A
WB2	Abstraction - Intrusion	N/A

Date Reported to Europe:July 2010

Date Report Created 21/11/2019

	GW Point Risk Sources		
WB10	Risk from Point sources of pollution - Contaminated Land		N/A
WB11	Risk from Point sources of pollution - Trade Effluent Discharges		N/A
WB12	Risk from Point sources of pollution - Urban Wastewater Discharges		N/A
WB6	Risk from Point sources of pollution - Mines		N/A
WB7	Risk from Point sources of pollution - Quarries		N/A
WB8	Risk from Point sources of pollution - Landfills		N/A
WB9	Risk from Point sources of pollution - Oil Industry Infrastructure		N/A
	Overall Risk		
RA	Groundwater Overall - Worst Case		N/A
	Risk information		
CLR	Contaminated land risk	2a	Probably Not At Risk
DR	Risk of groundwater due to pressure from diffuse sources of pollution	2a	Probably Not At Risk
DWR	Risk associated with exceedances of water quality above specific standards	2b	Not At Risk
GDR	Groundwater dependant terrestrial ecosystems risk	2b	Not At Risk
GWR	General groundwater quality risk	1a	At Risk
INR	Risk associated with saline intrusion into groundwater	2b	Not At Risk
LR	Risk due to landfills sites/old closed dump sites	2b	Not At Risk
MR	Mines risk	1a	At Risk
NULL	Diffuse nitrates from agriculture risk		N/A
QR	Risk due to quarries	2b	Not At Risk
RA	Revised risk assessment	1a	At Risk
RPR	Risk associated with MRP loading to rivers	2a	Probably Not At Risk
SQR	Risk associated with dependant surface water quantitative status	2b	Not At Risk
SWR	Overall risk associated with nutrient loadings to rivers and transitional and coastal waters	2a	Probably Not At Risk
TNR	Risk associated with nitrate loading to transitional and coastal waters	2b	Not At Risk
UAR	Risk of groundwater due to pressures from urban areas	2b	Not At Risk
UWR	Risk due to direct discharges of urban wastewater	2b	Not At Risk

Risk

By 'risk' we mean the risk that a waterbody will not achieve good ecological or good chemical status/potential at least by 2015. To examine risk the various pressures acting on the waterbody were identified along with any evidence of impact on water status. Depending on the extent of the pressure and its potential for impact, and the amount of information available, the risk to the water body was placed in one of four categories: 1a at risk; 1b probably at risk; 2a probably not at risk; 2b not at risk. Note that '2008' after the risk category means that the risk assessment was revised in 2008. All other risks were determined as part of an earlier risk assessment in 2005.

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Date Reported to Europe:July 2010

Date Report Created 21/11/2019

Objectives Report

Water Management Unit: N/A

WaterBody Category: Groundwater Waterbody

WaterBody Name: Wicklow Central (Avoca Mine)

WaterBody Code: IE_EA_G_007

Overall Objective: LSO

Heavily Modified: No

	Objectives Description	Result
	Objectives information	
OB1	Prevent deterioration objective	No Status
OB2	Restore at least good status objective	LSO
OB3	Reduce chemical pollution objective	No Status
OB4	Protected areas objective	No Status
OBO	Overall objectives - objective	LSO

Extended timescales
Extended timescales have been set for certain waters due to technical, economic, environmental or recovery constraints. Extended timescales are usually of one planning cycle (6 years, to 2021) but in some cases are two planning cycles (to 2027).

Objectives
In general, we are required to ensure that our waters achieve at least good status/potential by 2015, and that their status does not deteriorate. Having identified the status of waters (this is given earlier in this report), the next stage is to set objectives for waters. Objectives consider waters that require protection from deterioration as well as waters that require restoration and the timescales needed for recovery. Four default objectives have been set initially:-

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Achieve Protected Areas Objectives

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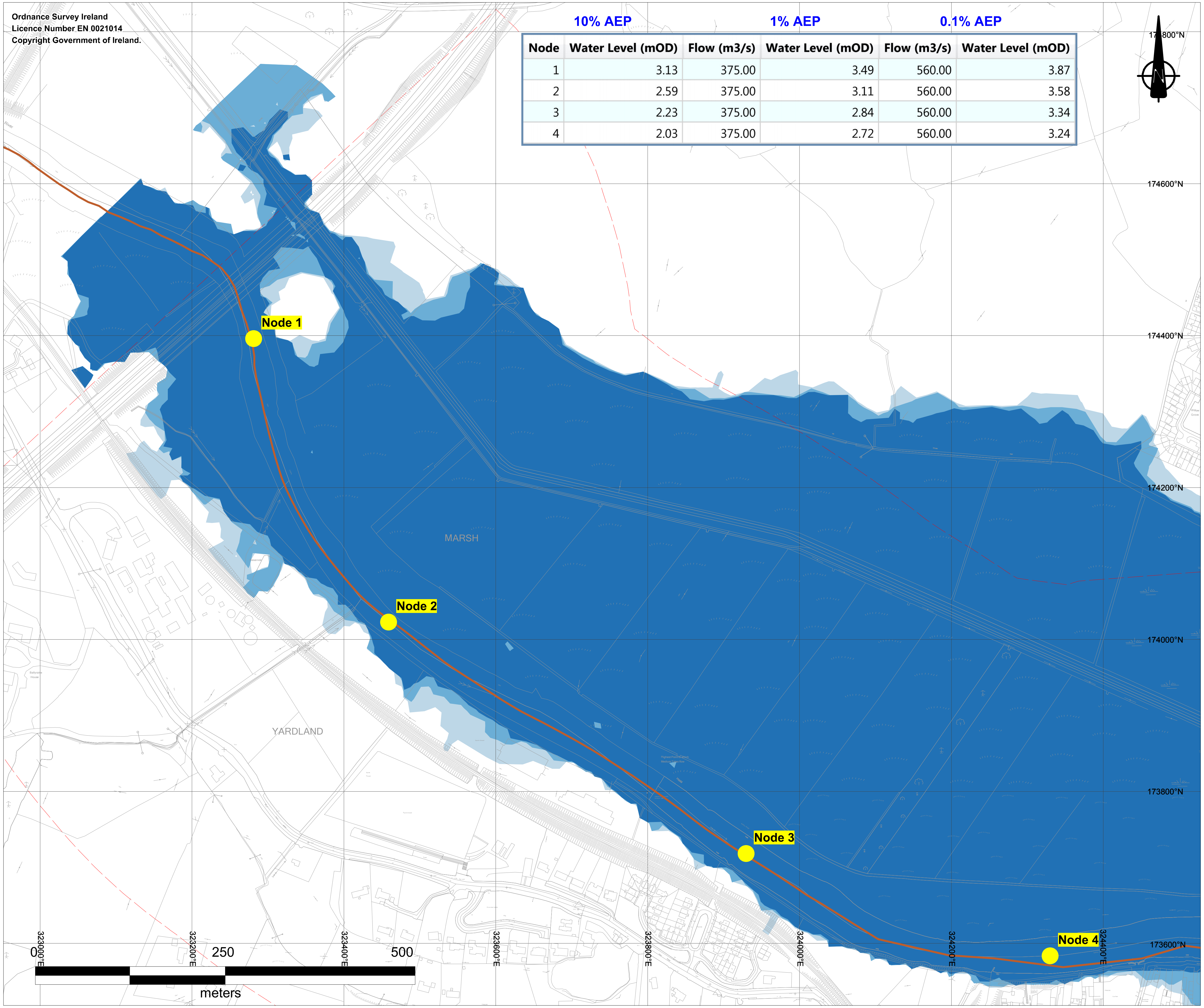
Date Reported to Europe:July 2010

Date Report Created 21/11/2019

APPENDIX 6 – Flood Maps

	10% AEP		1% AEP		0.1% AEP
Node	Water Level (mOD)	Flow (m3/s)	Water Level (mOD)	Flow (m3/s)	Water Level (mOD)
1	3.13	375.00	3.49	560.00	3.87
2	2.59	375.00	3.11	560.00	3.58
3	2.23	375.00	2.84	560.00	3.34
4	2.03	375.00	2.72	560.00	3.24



Legend

🟦	10% AEP Fluvial Extent
🟦	1% AEP Fluvial Extent
🟦	0.1% AEP Fluvial Extent
●	Node Point
—	Modelled River Centreline
▭	AFA Boundary

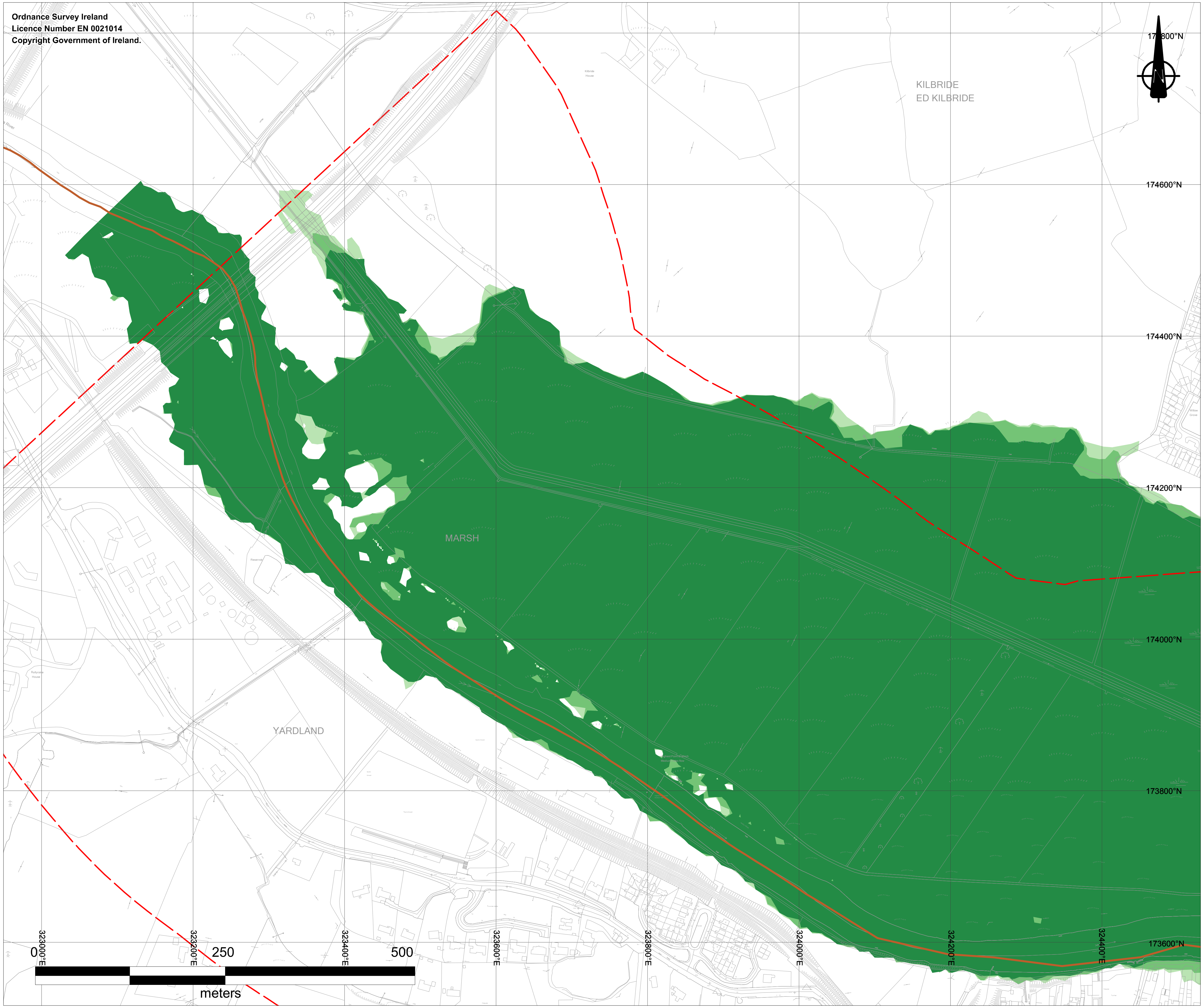
IMPORTANT USER NOTE:-
THE VIEWER OF THIS MAP SHOULD REFER TO THE DISCLAIMER, GUIDANCE NOTES AND CONDITIONS OF USE THAT ACCOMPANY THIS MAP.

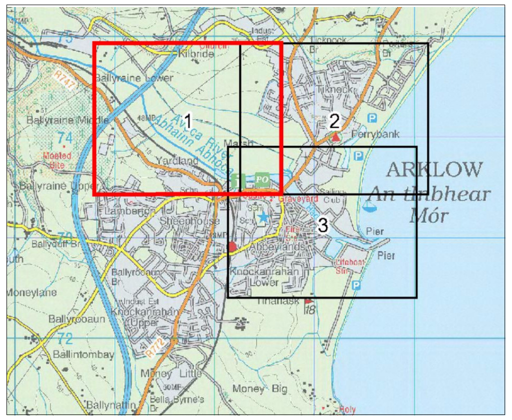
AVOCA RIVER (ARKLOW) FLOOD RELIEF SCHEME

BYRNELOOBY PHMcCARTHY
OPW
Oifig na nOibreacha Poiblí
The Office of Public Works

Map Title: ARKLOW FLUVIAL FLOOD EXTENT MAP
Type: EXTENT
Source: FLUVIAL
Scenario: CURRENT

Drawn NOB	Scale 1:5,000 @ A3	Map Number E10999_EXFCD_F0_01	Rev. F0
Chkd. SH	Date 27/07/16		
Apprd. KT	Status FINAL		





Legend

- 🟩 10% AEP Tidal Extent
- 🟩 0.5% AEP Tidal Extent
- 🟩 0.1% AEP Tidal Extent
- — Modelled River Centreline
- ▭ AFA Boundary

IMPORTANT USER NOTE:-
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AVOCA RIVER (ARKLOW) FLOOD RELIEF SCHEME

BYRNELOOBY PHMcCARTHY
OPW
Oifig na nOibreacha Poiblí
The Office of Public Works

Map Title: ARKLOW COASTAL FLOOD EXTENT MAP
Type: EXTENT
Source: COASTAL
Scenario: CURRENT

Drawn	NOB	Scale	1:5,000 @ A3	Map Number	Rev.
Chkd.	SH	Date	29/07/16	E10999_EXCCD_F0_01	F0
Apprd.	KT	Status	FINAL		

APPENDIX 7 – Trial Pit Records

Ground Investigations Ireland Ltd
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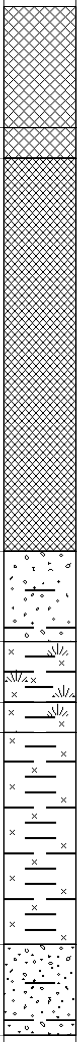
Site Avoca River Park, Arklow			**Trial Pit Number** **TP01**
Machine : 13 tonne excavator **Method :** Trial Pit	**Dimensions** 1.0 w X 3.0 L X 3.4	**Ground Level (mOD)** 3.12	**Client** FT Squared
	Location (dGPS) 722660.2 E 675189.8 N	**Dates** 04/12/2019	**Project Contractor** GII
Job Number 9230-11-19	**Sheet** 1/1		



Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.40)	MADE GROUND: Grey brown sandy gravel with occasional plastic and concrete.		
				2.72	0.40 (0.10)	TARMACADAM		
0.50 0.50-1.50	EN B			2.62	0.50 (1.30)	MADE GROUND: Blue grey gravel with plastic, concrete, wood and wires. Large cobbles and boulders present.		
1.50	EN							
			Slow(1) at 1.70m.					∇1
				1.32	1.80 (0.30)	Loose blue grey clayey GRAVEL.		
				1.02	2.10 (0.20)	Soft blue grey slightly silty CLAY with occasional decaying organic matter.		∇2
			Strong (2) at 2.30m.	0.82	2.30 (0.10)	Soft black brown silty CLAY with organic matter.		
2.40-3.10	B			0.72	2.40 (0.70)	Soft to firm grey blue silty CLAY.		
				0.02	3.10 (0.30)	Loose very sandy clayey GRAVEL.		
				-0.28	3.40	Complete at 3.40m		

Plan

Remarks

Difficult digging between 0.5-1.8m BGL.
Perched water encountered at 1.7m BGL. Slow ingress.
Perched water encountered at 2.3m BGL. strong ingress.
Trial pit unstable due to groundwater.
Trial pit terminated due to groundwater.
Trial pit backfilled on completion.
Shear vane failed - material too soft at 2.5m

Scale (approx)	Logged By	Figure No.
1:25	EOC	9230-11-19.TP01

Ground Investigations Ireland Ltd
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Site	Avoca River Park, Arklow			**Trial Pit Number** TP02
Machine : 13 Tonne excavator **Method :** Trial Pit	**Dimensions** 1.0 w X 3.0 L X 3.2m D	**Ground Level (mOD)** 2.17	**Client** FT Squared	**Job Number** 9230-11-19
	Location 722732.9 E 675071.3 N	**Dates** 10/12/2019	**Project Contractor** GII	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.10-0.70	B					MADE GROUND: Grey brown sandy Gravel with large angular cobbles.		
					(0.50)			
0.50	EN		Moderate (1) at 0.50m.	1.67	0.50	MADE GROUND: Medium dense brown clayey angular Gravel. Concrete, plastic and wire present.		∇1
1.00-1.70	B				(1.10)			
1.50	EN							
			Strong (2) at 1.60m.	0.57	1.60	Soft to firm grey clayey SILT.		∇2
1.70-2.50	B				(0.40)			
				0.17	2.00	Very soft to soft red brown grey mottled clayey SILT.		
					(0.50)			
				-0.33	2.50	Soft blue grey silty CLAY.		
					(0.70)			
3.00-3.80	B							
				-1.03	3.20	Complete at 3.20m		

Plan

Remarks

Water encountered at 0.5m BGL.Slow ingress
Water encountered at 1.6m BGL. Strong ingress.
Layer of plastic sheeting at 1.6m BGL.
Trial pit terminated at 3.0m BGL.
Trial pit backfilled on completion.
Shear vein failed - material too soft -2.0m

Scale (approx)	Logged By	Figure No.
1:25	EOC	9230-11-19.TP02

Ground Investigations Ireland Ltd
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Site Avoca River Park, Arklow				**Trial Pit Number** **TP03**
Machine : 13 tonne excavator **Method :** Trial Pit	**Dimensions** 1.0w X 3.0m L 3.7m	**Ground Level (mOD)** 2.30	**Client** FT Squared	**Job Number** 9230-11-19
	Location 722719.3 E 675071.4 N	**Dates** 10/12/2019	**Project Contractor** GII	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	B				(0.30)	MADE GROUND: Red brown gravelly Clay with red brick fragments.		
				2.00	0.30	MADE GROUND: Large angular cobbles and boulders fill with concrete, bricks, steal and wood.		
0.50	EN							
					(0.60)			
			Moderate (1) at 0.80m.					▽1
				1.40	0.90	Firm dark grey brown clayey SILT.		
1.00-2.00	B				(0.30)			
				1.10	1.20	Very soft to soft red orange grey mottled slightly silty CLAY.		
1.50	EN							
					(1.50)			
2.00-3.00	B							
2.50	EN							
				-0.40	2.70	Very soft to soft grey slightly silty CLAY.		
3.00-3.70	B							
					(1.00)			
						CLAY becoming very gravelly at 3.5m		
				-1.40	3.70	Complete at 3.70m		

Plan

Remarks

Perched water encountered at 0.8m BGL.
Trial pit stable.
Trial pit backfilled on completion.
Shear vane failed - material too soft at 3.0m

Scale (approx)	Logged By	Figure No.
1:25	EOC	9230-11-19.TP03

Ground Investigations Ireland Ltd
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Machine : 13 tonne excavator **Method :** Trial Pit	**Dimensions** 1.0m W x 3.0m L x 3.3m D	**Ground Level (mOD)** 2.44	**Client** FT Squared	**Job Number** 9230-11-19
	Location 722721.8 E 675157.4 N	**Dates** 10/12/2019	**Project Contractor** GII	**Sheet** 1/1

Site Avoca River Park, Arklow

Trial Pit Number TP04

Depth (m)	Sample / Tests	Water Depth (m)	Field Records
0.00-1.00	B		
0.50	EN		
			Moderate (1) at 0.80m.
1.00-2.00	B		
1.50	EN		
2.00-2.80	B		
2.50	EN		
2.80-3.30	B		

Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	(0.50)	MADE GROUND: Grey sandy Gravel with plastic and concrete.		
1.94	0.50 (0.40)	MADE GROUND: Grey sandy Gravel with large cobbles and boulders, plastic and concrete.		∇1
1.54	0.90 (0.20)	Very soft black silty CLAY.		
1.34	1.10 (0.90)	Very soft grey red brown mottled slightly silty CLAY.		
0.44	2.00 (0.80)	Very soft grey black slightly sandy slightly clayey SILT.		
-0.36	2.80 (0.50)	Very soft dark grey slightly sandy slightly silty CLAY with decaying organic matter.		
-0.86	3.30	Complete at 3.30m		

Plan

Remarks

Perched water encountered at 0.8m BGL.
Trial pit collapse at 3.0m BGL.
Trial pit backfilled on completion.
Shear vane failed - material too soft at 2.0m

Logged in accordance BS5930:2015

Scale (approx)	Logged By	Figure No.
1:25	EOC	9230-11-19.TP04

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Site
Avoca River Park, Arklow

Trial Pit Number
TP05

Machine : 13 Tonne excavator
Method :

Dimensions
1.0m W X 3.0m D X 3.0m L

Ground Level (mOD)
2.04

Client
FT Squared

Job Number
9230-11-19

Location
722716.1 E 675069.7 N

Dates
04/12/2019

Project Contractor
GII

Sheet
1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-1.00	B				(0.20)	TOPSOIL		
				1.84	0.20	MADE GROUND: Medium dense grey brown sandy gravel fill with plastic and tarmac fragments -moderate hydrocarbon odour		
0.50	EN				(0.70)			
				1.14	0.90	Firm to stiff black organic rich clayey SILT (Decaying vegetation present)		
					(0.20)			
				0.94	1.10	Very soft to soft grey brown clayey SILT (Hydrocarbon odour)		
1.10-1.40 1.20	B EN				(0.30)			
				0.64	1.40	Soft red brown mottled grey clayey SILT		
1.50-2.50	B							
					(1.30)			
2.50 2.50-3.00	EN B							
				-0.66	2.70	Very soft to soft grey slightly silty CLAY		
					(0.30)			
				-0.96	3.00	Complete at 3.00m		

Plan

Remarks

No water encountered
Shear vane failed material too soft at 1.2m
Trial Pit stable
Backfilled on compleetion

Logged in accordance BS5930:2015

Scale (approx)	Logged By	Figure No.
1:25	EOC	9230-11-19.TP05

Ground Investigations Ireland Ltd
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Site	Avoca River Park, Arklow			**Trial Pit Number** TP06
Machine : 13 tonne excavator **Method :** Trial Pit	**Dimensions** 1.0m W X 3.7m D X 3,0 L	**Ground Level (mOD)** 2.27	**Client** FT Squared	**Job Number** 9230-11-19
	Location 722755.2 E 675132.8 N	**Dates** 06/12/2019	**Project Contractor** GII	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				2.18	(0.09) 0.09	TARMAC		
0.10-1.10	B				(0.41)	MADE GROUND: Red grey sandy Gravel with red bricks, concrete and plastic fragments present.		
0.50	EN			1.77	0.50 (0.50)	MADE GROUND: Red clay- fertilizer by product		
				1.27	1.00 (0.20)	Very soft dark brown black organic silty CLAY.		
				1.07	1.20	Soft to firm red brown mottled grey clayey SILT.		
1.30-2.30	B							
1.50	EN				(1.30)			
2.50-3.50	B		Moderate (1) at 2.50m.	-0.23	2.50 (0.50)	Soft blue grey slightly silty CLAY.		∇1
				-0.73	3.00 (0.30)	Very soft grey brown organic slightly silty CLAY.		
				-1.03	3.30 (0.40)	Soft to firm grey brown organic slightly silty CLAY.		
				-1.43	3.70	Complete at 3.70m		

Plan

Remarks

Water encountered at 2.5m BGL.
Trial pit terminated at 3.7m BGL.
Trial pit backfilled on completion.
Shear vane - 48 kPa - residual 22 kPa

Scale (approx)	**Logged By**	**Figure No.**
1:25	EOC	9230-11-19.TP06

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Machine : 13 Tonne excavator **Method :** Trial Pit	**Dimensions** 1.0m W X 3.6m D X 3.0m L	**Ground Level (mOD)** 2.23	**Client** FT Squared	**Job Number** 9230-11-19
	Location 722798.6 E 675153.9 N	**Dates** 10/12/2019	**Project Contractor** GII	**Sheet** 1/1

Site: Avoca River Park, Arklow

Trial Pit Number: TP07

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Water
				2.14	(0.09) 0.09	TARMAC	
					(0.21)	MADE GROUND: Blue grey sandy Gravel with steel, concrete and plastic fragments.	
0.30-1.10	B			1.93	0.30 (0.20)	MADE GROUND: Red grey sandy Gravel with red bricks, concrete and plastic fragments present.	
0.50	EN			1.73	0.50	MADE GROUND: Red clay - fertilizer by product	∇1
			Moderate (1) at 0.60m.		(0.50)		
				1.23	1.00 (0.10)	MADE GROUND: Brown sandy Gravel with large cobbles and boulders. Fragments of plastic, red bricks, concrete and steel.	
				1.13	1.10 (0.10)		∇2
			Moderate (2) at 1.20m.	1.03 1.03	1.20 (0.10) 1.20	Very angular coarse cobbles.	
1.30-2.30	B			0.93	1.30	Soft dark brown black organic silty CLAY.	
1.50	EN				(0.30)	Soft dark grey black clayey SILT with decaying organic matter.	
				0.63	1.60	Soft red brown grey mottled slightly sandy clayey SILT.	
					(1.00)	Soft to firm grey mottled slightly sandy clayey SILT.	
2.50	EN						
2.60-3.60	B			-0.37	2.60 (1.00)	Soft grey slightly silty CLAY.	
				-1.37	3.60	Complete at 3.60m	

Plan

Remarks

Water encountered at 0.6m BGL.
Trial pit terminated at 3.6m BGL.
Trial pit backfilled on completion.
Shear vane failed -material too soft at 1.5m

Scale (approx)	**Logged By**	**Figure No.**
1:25	JS	9230-11-19.TP07

Ground Investigations Ireland Ltd
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Site	Avoca River Park, Arklow			**Trial Pit Number** TP08
Machine : 13 Tonne excavator **Method :** Trial Pit	**Dimensions**	**Ground Level (mOD)** 2.25	**Client** FT Squared	**Job Number** 9230-11-19
	Location 722819.8 E 675075.3 N	**Dates** 10/12/2019	**Project Contractor** GII	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				2.18	(0.07) 0.07	TARMACADAM		
0.10-0.90	B				(0.43)	MADE GROUND: Blue grey clayey sandy Gravel with large angular cobbles and boulders. Red bricks, concrete and plastic fragments present.		
0.50	EN		Slow (1) at 0.50m.	1.75	0.50 (0.40)	MADE GROUND: Grey brown clayey Gravel with large angular cobbles.		∇1
				1.35	0.90 (0.30)	MADE GROUND: Red clay with dark brown clayey sandy Gravel with large angular cobbles and boulders.		
1.20-1.90	B			1.05	1.20	MADE GROUND: Red clay- fertilizer by product		
1.50	EN				(0.70)			
			Moderate (2) at 1.90m.	0.35	1.90 (0.10)	Soft dark brown black slightly sandy silty CLAY with organic matter.		∇2
2.00-2.90	B			0.25	2.00 (0.90)	Soft brown mottled clayey SILT.		
2.50	EN							
				-0.65	2.90 (0.20)	Soft brown grey mottled silty CLAY.		
3.10-3.50	B			-0.85	3.10 (0.40)	Firm blue grey orange slightly silty CLAY.		
				-1.25	3.50	Complete at 3.50m		

Plan

Remarks

Water encountered at 0.5m BGL.
Water encountered at 1.9m BGL.
Trial pit terminated at 3.5m BGL.
Trial pit backfilled on completion.
Shear Vane - 55kPa - residual shear strength -27 kPa

Scale (approx)	Logged By	Figure No.
1:25	EOC	9230-11-19.TP08

Ground Investigations Ireland Ltd
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Site Avoca River Park, Arklow				**Trial Pit Number** TP09
Machine : 13 tonne excavator **Method :** Trial Pit	**Dimensions** 1.0m W x 2.9m D x 3.0m L	**Ground Level (mOD)** 1.76	**Client** FT Squared	**Job Number** 9230-11-19
	Location 722852 E 675030.6 N	**Dates** 10/12/2019	**Project Contractor** GII	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				1.69	(0.07) 0.07	TARMACADAM		
0.10-0.50	B			1.56	(0.13) 0.20	MADE GROUND: Blue grey sandy gravell with red brick and plastic fragments.		
				1.26	(0.30) 0.50	MADE GROUND: Red brown sandy clayey Gravel with large angular cobbles, red bricks, plastic and concrete.		
0.50 0.50-1.50	EN B		Slow (1) at 1.40m.	0.26	(1.00) 1.50	MADE GROUND: Red clay possible tailings from fertilizer by product		∇1
1.50	EN			0.16	(0.10) 1.60	Soft dark brown black sandy silty CLAY with rootlets.		
				0.06	(0.10) 1.70	Soft grey brown black sandy silty CLAY with rootlets.		
1.70-2.50	B			-0.64	(0.70) 2.40	Soft to firm dark grey clayey SILT.		
2.50 2.50-2.90	EN B		Moderate (2) at 2.90m.	-1.14	(0.50) 2.90	Loose grey brown silty SAND.		∇2
						Complete at 2.90m		

Plan

Remarks

Water encountered at 1.4m BGL.
Moderate water ingress at 2.9m BGL..
Trial pit terminated at 2.9m BGL.
Trial pit backfilled on completion.
Shear vane at 1.7m -30 kPa residual - 13 kPa

Scale (approx)	**Logged By**	**Figure No.**
1:25	JS	9230-11-19.TP09

Ground Investigations Ireland Ltd www.gii.ie			**Site** Avoca River Park, Arklow	**Trial Pit Number** **TP10**
Machine : 13 Tonne excavator **Method :** Trial Pit	**Dimensions** 1.2m W X 4.5m D X 3.0m L	**Ground Level (mOD)** 2.05	**Client** FT Squared	**Job Number** 9230-11-19
	Location 722909.8 E 675085.8 N	**Dates** 06/12/2019	**Project Contractor** GII	**Sheet** 1/2

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				1.98	0.07 (0.07)	TARMACADAM		
0.10-1.00	B				(0.23)	MADE GROUND: Blue grey sandy gravel with large angular cobbles		
				1.75	0.30	MADE GROUND: Brown red clayey sandy gravel fill with occasional red brick, plastic, concrete		
0.50	EN				(0.50)			∇1
			Fast (1) at 0.60m.					
				1.25	0.80 (0.50)	MADE GROUND: Brown red clayey sandy gravel fill with large angular cobbles and boulders with occasional red brick, plastic, concrete		
				0.75	1.30 (0.20)	Stiff dark brown organic rich clayey SILT		
1.50 1.50-2.50	EN B			0.55	1.50 (1.00)	Soft to firm grey clayey SILT		
2.50 2.50-3.00	EN B			-0.45	2.50 (0.50)	Very soft to soft grey clayey SILT		
3.00-4.00	B			-0.95	3.00 (0.30)	Firm dark brown organic rich clayey SILT.		
				-1.25	3.30 (0.10)	Soft to firm grey brown slightly organic silty CLAY		
				-1.35	3.40 (0.40)	Soft-firm grey brown organic silty CLAY		
				-1.75	3.80 (0.20)	Grey medium loose gravelly SAND		
				-1.95	4.00			

Plan

Remarks

Shear Vane 2.5m 32 kPa , residual shear strength 14 kPa

Logged in accordance BS5930:2015

Scale (approx)	**Logged By**	**Figure No.**
1:25	EOC	9230-11-19.TP10

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Site	Avoca River Park, Arklow			**Trial Pit Number**	TP10
Machine : 13 Tonne excavator **Method :** Trial Pit	**Dimensions** 1.2m W X 4.5m D X 3.0m L	**Ground Level (mOD)** 2.05	**Client** FT Squared	**Job Number**	9230-11-19
	Location 722909.8 E 675085.8 N	**Dates** 06/12/2019	**Project Contractor** GII	**Sheet**	2/2

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				-2.25	(0.30) 4.30	Brown soft-firm peaty CLAY		
				-2.45	(0.20) 4.50	Grey brown very gravelly SAND		
						Complete at 4.50m		

Plan

Remarks

Trial pit stable
Backfilled on compleetion

Logged in accordance BS5930:2015

Scale (approx)	**Logged By**	**Figure No.**
1:25	EOC	9230-11-19.TP10

Ground Investigations Ireland Ltd www.gii.ie		**Site** Avoca River Park, Arklow	**Trial Pit Number** **TP11**
Machine : 13 Tonne Excavator **Method :** Trial Pit	**Dimensions** 1.2m W x 3.2m D x 3.0m L	**Ground Level (mOD)** 1.93	**Client** FT Squared
	Location 722934.6 E 675030.1 N	**Dates** 10/12/2019	**Project Contractor** GII

Job Number	9230-11-19
Sheet	1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.50)	MADE GROUND: Grey brown sandy Gravel with large angular cobbles.	▨	
0.50 0.50-1.50	EN B			1.43	0.50 (1.10)	MADE GROUND: Medium dense brown clayey angular Gravel. Concrete, plastic and wire present.	▨	
1.50 1.50-2.50	EN B			0.33	1.60 (0.40)	Soft to firm grey clayey SILT.	×	
				-0.07	2.00 (0.50)	Very soft to soft red brown grey mottled clayey SILT.	×	
2.50 2.50-3.20	EN B			-0.57	2.50 (0.70)	Soft blue grey silty CLAY.	—	
				-1.27	3.20	Complete at 3.20m		

Plan

Remarks

Water encountered at 0.5m and 1.6m BGL.
Plastic sheeting layer at 1.6m BGL.
Trial pit terminated at 3.0m BGL.
Trial pit backfilled on completion.
Shear vane at 1.8m BGL - 70 kPa - residual shear strength - 33 kPa
Shear vane at 3.0m BGL - 50 kPa - residual is 24 kPa

Scale (approx)	Logged By	Figure No.
1:25	EOC	9230-11-19.TP11

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Site Avoca River Park, Arklow				**Trial Pit Number** TP12
Machine : 13 Tonne excavator **Method :** Trial Pit	**Dimensions** 1.0m W X 3.6m D X 3.0m L	**Ground Level (mOD)** 1.55	**Client** FT Squared	**Job Number** 9230-11-19
	Location 722967.3 E 674987.8 N	**Dates** 06/12/2019	**Project Contractor** GII	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
			Fast (1) at 0.20m.		(0.30)	MADE GROUND: Blue grey gravel with large angular cobbles and boulders		∇1
0.50 0.50-1.40	EN B			1.25	0.30 (0.50)	MADE GROUND: Mediun dense brown clayey sandy gravel with large angular cobbles and boulders, occasional plastic and red brick fragments.		
				0.75	0.80 (0.60)	MADE GROUND: Brown clayey sandy gravel with large angular cobbles and boulders.		
				0.15	1.40 (0.20)	Firm to stiff grey brown organic silty CLAY		
1.50 1.50-2.50	EN B			-0.05	1.60 (0.90)	Firm grey brown slightly organic silty CLAY		
2.50 2.50-3.20	EN B			-0.95	2.50 (0.70)	Firm brown grey brown organic rich silty CLAY large decaying tree roots present		
3.20-3.50	B			-1.65	3.20 (0.40)	Grey brown very coarse gravelly SAND.		
				-2.05	3.60	Complete at 3.60m		

Plan

Remarks

Unable to take shear vane due to water ingress
Major water ingress
TP terminated due to water ingress at 3.6m

Logged in accordance BS5930:2015

Scale (approx)	**Logged By**	**Figure No.**
1:25	EOC	9230-11-19.TP12

Ground Investigations Ireland Ltd
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Machine : 13 Tonne excavator **Method :** Trial Pit	**Dimensions** 1.0m W X 3.0m L X 4.5m W	**Ground Level (mOD)** 2.26	**Client** FT Squared	**Job Number** 9230-11-19
	Location 722616 E 675006.5 N	**Dates** 01/12/2019	**Project Contractor** GII	**Sheet** 1/2

Site Avoca River Park, Arklow

Trial Pit Number TP13

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.50	B				(0.50)	MADE GROUND: Grey brown gravelly sand with red brick plastic and metal		
0.50 0.50-1.50	EN B		Slow (1) at 0.50m.	1.76	0.50	MADE GROUND: Red clay - fertilizer by product.		∇1
1.50 1.50-2.30	EN B				(1.80)			
				-0.04	2.30	Soft Orange brown mottled clayey SILT		
2.50 2.50-3.50	EN B				(1.20)	Clay content increasing at 3.0m		
3.50-4.20	B			-1.24	3.50 (0.70)	Soft blue grey clayey SILT		

Plan

Remarks

Pit backfilled on completion
Shear vane failed at 3.5m ground too soft

Logged in accordance BS5930:2015

Scale (approx)	Logged By	Figure No.
1:25	EOC	9230-11-19.TP13

Ground Investigations Ireland Ltd
www.gii.ie

Machine : 13 Tonne excavator **Method :** Trial Pit	**Dimensions** 1.0m W X 3.0m L X 4.5m W	**Ground Level (mOD)** 2.26	**Site** Avoca River Park, Arklow	**Trial Pit Number** **TP13**
			Client FT Squared	**Job Number** 9230-11-19
	Location 722616 E 675006.5 N	**Dates** 01/12/2019	**Project Contractor** GII	**Sheet** 2/2

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				-1.94	4.20 (0.30)	Firm brown grey peaty CLAY with sand lenses		
				-2.24	4.50	Complete at 4.50m		

Plan

Remarks

Pit backfilled on completion
Shear vane at 4.2m - 46 kPa - residual shear strength - 21 kPa

Logged in accordance BS5930:2015

Scale (approx)	**Logged By**	**Figure No.**
1:25	EOC	9230-11-19.TP13

Ground Investigations Ireland Ltd
www.gii.ie

Site	Avoca River Park, Arklow			**Trial Pit Number** **TP14**
Machine : 13 tonne excavator **Method :**	**Dimensions** 1.0m W X 2.7m D X 3.0m L	**Ground Level (mOD)** 2.24	**Client** FT Squared	**Job Number** 9230-11-19
	Location 722679.9 E 674953 N	**Dates** 10/12/2019	**Project Contractor** GII	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	MADE GROUND: Blue grey dense blue grey sandy gravel fill		
				2.04	0.20 (0.10)	MADE GROUND: Concrete slab		
0.30-0.90	B			1.94	0.30 (0.60)	MADE GROUND: Medium dense red brown sandy gravel fill with large angular cobbles and boulders, wood brick, redundant services		
				1.34	0.90 (0.30)	Soft to firm grey brown slightly sandy clayey SILT with decaying organic mater		
1.20-2.30	B		Slow(1) at 1.20m.	1.04	1.20	Soft brown slightly silty organic CLAY		∇1
1.50	EN							
					(1.50)			
2.30-2.70	B							
				-0.46	2.70	Complete at 2.70m		

Plan

Remarks

TP backfilled on completion
Water ingress - minor at 1.2m
Shear vane at 1.5m - 35 kPa
Pit collapse at 2.7m

Logged in accordance BS5930:2015

Scale (approx)	**Logged By**	**Figure No.**
1:25	EOC	9230-11-19.TP14

Ground Investigations Ireland Ltd
www.gii.ie

Site Avoca River Park, Arklow				**Trial Pit Number** **TP15**
Machine : 13 Tonne Excavator **Method :** Trial Pit	**Dimensions** 1.0m W X 1.4m D X 3.0m L	**Ground Level (mOD)** 2.79	**Client** FT Squared	**Job Number** 9230-11-19
	Location 722592.9 E 674944.8 N	**Dates** 06/12/2019	**Project Contractor** GII	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.50)	MADE GROUND:Light red brown gravelly sand with occasional concrete and metal	▨	
0.50 0.50-1.40	EN B		Moderate (1) at 1.10m.	2.29	0.50 (0.90)	MADE GROUND: Dark grey brown very sandy gravel with metal, concrete and plastic (services encased in mass concrete)	▨	∇1
				1.39	1.40	Complete at 1.40m		

Plan

Remarks

TP backfilled on completion
Moderate water ingress at 1.1m
Pit terminated services encountered in concrete

Logged in accordance BS5930:2015

Scale (approx)	Logged By	Figure No.
1:25	EOC	9230-11-19.TP15

Ground Investigations Ireland Ltd
www.gii.ie

Site	Avoca River Park, Arklow			**Trial Pit Number** TP16
Excavation Method Trial Pit	**Dimensions** 1.0m W X 1.2m D X 3.0m L	**Ground Level (mOD)** 2.21	**Client** FT Squared	**Job Number** 9230-11-19
	Location 722657.8 E 674919.3 N	**Dates** 09/12/2019	**Project Contractor** GII	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						MADE GROUND: Grey sandy gravel with concrete blocks, plastic and tarmacadam	▨	
0.20-1.00	B				(0.50)			
0.50	EN		Moderate(1) at 0.50m.	1.71	0.50	MADE GROUND: Grey coarse sandy gravel with angular cobbles and bouldes	▨	∇1
					(0.50)			
1.00-1.20	B			1.21	1.00	Soft grey brown clayey organic SILT	※	
					(0.20)			
1.20	EN			1.01	1.20	Complete at 1.20m		

Plan

Remarks

TP backfilled on completion
Moderate GW influx at 0.5m
Pit stable
Pit terminated due to services encased in mass concrete
Shear vane at 1.2m - 55 kPa - residual - 25 kPa

Logged in accordance BS5930:2015

Scale (approx)	Logged By	Figure No.
1:25	EOC	9230-11-19.TP16

Ground Investigations Ireland Ltd
www.gii.ie

Machine : 13 Tonne excavator **Method :** Trial Pit	**Dimensions** 1.0m W X 1.8m D X 3.0m L	**Ground Level (mOD)** 2.39	**Client** FT Squared	**Job Number** 9230-11-19
	Location 722645.4 E 675140.7 N	**Dates** 12/12/2019	**Project Contractor** GII	**Sheet** 1/1

Site Avoca River Park, Arklow

Trial Pit Number **TP17**

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				2.32	(0.07) 0.07	TARMAC		
0.10-1.10	B				(0.23)	MADE GROUND: Blue grey sandy gravel		
				2.09	0.30	MADE GROUND: Red brown sandy gravel with metal, wires and plastic		
					(0.40)			
0.50	EN							
				1.69	0.70	Firm black grey organic rich clayey SILT		
					(0.40)			
				1.29	1.10	Soft to firm black grey organic clayey SILT		
1.10-1.60	B				(0.20)			
				1.09	1.30	Soft brown organic rich CLAY		
					(0.30)			
1.50	EN							
				0.79	1.60	Grey brown gravelly SAND (organic rich)		
1.60-1.80	B				(0.20)			
				0.59	1.80	Complete at 1.80m		

Plan

Remarks

TP backfilled on completion
No water encountered
Shear vane at 1.3m - 90 kPa - residual shear strength - 40 kPa
Pit unstable terminated at 1.8m due to collapse

Logged in accordance BS5930:2015

Scale (approx)	Logged By	Figure No.
1:25	EOC	9230-11-19.TP17

Ground Investigations Ireland Ltd www.gii.ie		**Site** Avoca River Park, Arklow	**Trial Pit Number** **TP18**
Excavation Method Trial Pit	**Dimensions** 1.0m W X 1.8m D X 3.0m L	**Ground Level (mOD)**	**Client** FT Squared	**Job Number** 9230-11-19
	Location 722757.6 E 674978.2 N	**Dates** 12/12/2019	**Project Contractor** GII	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.07) 0.07	TARMACADAM		
					(0.33)	MADE GROUND: Blue grey gravelly sand fill with large angular cobbles and boulders, plastic and metal		
0.40-0.80	B				0.40	MADE GROUND: Blue grey gravelly sand fill with plastic, wood and metal		
0.50	EN				(0.40)			
			Strong (1) at 0.80m.		0.80 (0.20)	Firm blue grey clayey SILT		∇1
1.00-1.80	B				1.00 (0.80)	Soft grey brown organic rich silty CLAY		
					1.80	Complete at 1.80m		

Plan

Remarks

TP backfilled on completion
Perched water at 0.8m
Shear vane at 1.5m - 45 kPa - residual shear strength 22 kPa
Pit terminated at 1.8m water ingress

Logged in accordance BS5930:2015

Scale (approx)	Logged By	Figure No.
1:25	EOC	9230-11-19.TP18

Ground Investigations Ireland Ltd www.gii.ie			**Site** Avoca River Park, Arklow	**Trial Pit Number** **TP19**
Machine : 13 TONNE EXCAVATOR **Method :**	**Dimensions** 1.0m W X 4.5m D X 3.0m L	**Ground Level (mOD)**	**Client** FT Squared	**Job Number** 9230-11-19
	Location 722782.8 E 674941.3 N	**Dates** 12/12/2019	**Project Contractor** GII	**Sheet** 1/2

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.07) 0.07	TARMACADAM		
					(0.20) 0.27	MADE GROUND: Blue grey gravelly sand fill with concrete, red brick, plastic and metal		
					(0.08) 0.35	TARMACADAM		
0.50 0.50-1.50	EN B				(0.65) 1.00	MADE GROUND: Grey brown sandy gravel fill with large angular cobbles and boulders, plastic, concrete and metal		∇1
1.50 1.50-2.40	EN B		Moderate (1) at 1.00m.		(1.40) 2.40	MADE GROUND: Black very soft silty clay fill with major plasiic, tree roots and metal present (strong odour like creosote)		
2.40-3.30 2.50	B EN				(0.90) 3.30	Soft red brown grey mottled silty CLAY		
3.30-4.20	B				(0.90)	Soft grey brown organic rich clayey SILT -becoming firm at 4.0m		

Plan

Remarks

Backfilled on completion
Perched water at 1.0m
Strong odour noted (possible creosote) at 2.4m
Shear vein at 2.5m - 32 kPa

Logged in accordance BS5930:2015

Scale (approx)	**Logged By**	**Figure No.**
1:25	EOC	9230-11-19.TP19

Ground Investigations Ireland Ltd
www.gii.ie

Site Avoca River Park, Arklow

Trial Pit Number TP19

Machine : 13 TONNE EXCAVATOR

Method :

Dimensions 1.0m W X 4.5m D X 3.0m L

Ground Level (mOD)

Client FT Squared

Job Number 9230-11-19

Location 722782.8 E 674941.3 N

Dates 12/12/2019

Project Contractor GII

Sheet 2/2

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					4.20 (0.30) 4.50	Firm brown clayey pseudo fibrous PEAT		
						Complete at 4.50m		

Plan

Remarks

Backfilled on completion
Perched water at 1.0m
Trial pit stable

Logged in accordance BS5930:2015

Scale (approx)	Logged By	Figure No.
1:25	EOC	9230-11-19.TP19

Ground Investigations Ireland Ltd
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Site Avoca River Park, Arklow

Trial Pit Number TP20

Machine : 13 Tonne excavator

Method :

Dimensions 1.0m W X 2.3m D X 3.0m L

Ground Level (mOD) 2.27

Client FT Squared

Job Number 9230-11-19

Location 722729.1 E 674899.1 N

Dates 09/12/2019

Project Contractor GII

Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.00-0.60	B					MADE GROUND: Grey brown clayey gravel with large angular cobbles and boulders, wood, concrete, plastic, metal.		
					(0.60)			
0.50	EN							
0.60-1.50	B			1.67	0.60	Very soft to soft grey brown slightly sandy clayey SILT (HC Odour noted)		
					(0.90)			
1.50 1.50-2.30	EN B			0.77	1.50	Very soft to soft grey brown slightly sandy clayey SILT becoming very wet		
					(0.80)			
				-0.03	2.30	Complete at 2.30m		

Plan

Remarks

Odour noted possible creosote
Shear vane failed - ground too soft
Side wall unstable -pit terminated at 2.3m due to collapse

Logged in accordance BS5930:2015

Scale (approx)	Logged By	Figure No.
1:25	EOC	9230-11-19.TP20

Ground Investigations Ireland Ltd
www.gii.ie

Machine : 13 Tonne excavator **Method :** Trial Pit	**Dimensions** 1.0m W X 4.5m D X 3.0m L	**Ground Level (mOD)** 2.21	**Site** Avoca River Park, Arklow	**Trial Pit Number** **TP21**
	Location 722701.1 E 674894.8 N	**Dates** 09/12/2019	**Client** FT Squared	**Job Number** 9230-11-19
			Project Contractor GII	**Sheet** 1/2

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.20)	MADE GROUND: Blue grey sandy gravel with concrete, plastic and wood		
				2.01	0.20 (0.07)	TARMACADAM		
0.25-0.80 0.50	B EN			1.94	0.27 (0.53)	MADE GROUND: Grey brown very gravelly sand with plastic, concrete and wood		
				1.41	0.80 (0.30)	Firm to stiff grey brown silty CLAY		
1.10-2.00 1.50	B EN			1.11	1.10 (1.40)	Very soft to soft grey brown silty CLAY		
2.50 2.50-3.50	EN B		Slow(1) at 2.70m.	-0.29	2.50 (0.40)	Very soft red brown mottled silty CLAY		∇1
3.50-4.30	B			-0.69	2.90 (0.80)	Soft blue grey clayey SILT with occasional sand lenses		
				-1.49	3.70 (0.40)	Soft blue grey silty CLAY with occasional sand lenses		

Plan

Remarks

Hydrocarbon odour in made ground
Slow water ingress
Shear vane at 3.9m - 52 kPa - residual shear strength - 38 kPa

Logged in accordance BS5930:2015

Scale (approx)	**Logged By**	**Figure No.**
1:25	EOC	9230-11-19.TP21

Ground Investigations Ireland Ltd
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Site Avoca River Park, Arklow

Trial Pit Number TP21

Machine : 13 Tonne excavator
Method : Trial Pit

Dimensions 1.0m W X 4.5m D X 3.0m L

Ground Level (mOD) 2.21

Client FT Squared

Job Number 9230-11-19

Location 722701.1 E 674894.8 N

Dates 09/12/2019

Project Contractor GII

Sheet 2/2

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				-1.89	4.10 (0.20)	Soft grey brown organic rich slightly clayey sandy SILT		
				-2.09	4.30 (0.20)	Soft to firm brown peaty CLAY with large tree rootlets		
				-2.29	4.50	Complete at 4.50m		

Plan

Remarks

Pit stable

Logged in accordance BS5930:2015

Scale (approx)	Logged By	Figure No.
1:25	EOC	9230-11-19.TP21

Ground Investigations Ireland Ltd www.gii.ie	**Site** Avoca River Park, Arklow		**Trial Pit Number** **TP22**
Machine : 13 Tonne excavator **Method :**	**Dimensions** 1.0m W X 2.9m D X 3.0m L	**Ground Level (mOD)** 2.26	**Client** FT Squared	**Job Number** 9230-11-19
	Location 722788.9 E 674803.4 N	**Dates** 09/12/2019	**Project Contractor** GII	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.10)	MADE GROUND: Blue grey gravelly sandy fill		
				2.16	0.10			
					(0.10)	TARMAC		
0.20-0.90	B			2.06	0.20			
					(0.30)	Dense grey brown sandy gravel fill with cobbles and boulders, plastic, concrete		
				1.76	0.50			
0.50	EN				(0.20)	CONCRETE		
				1.56	0.70			
					(0.20)	MADE GROUND: Dense grey brown clayey sandy gravel fill		
				1.36	0.90			
					(0.20)	Soft grey brown organic rich peaty clayey SILT		
				1.16	1.10			
1.10-2.10	B		Slow (1) at 1.20m.			Soft grey brown organic rich clayey SILT		∇1
1.50	EN				(1.30)			
				-0.14	2.40			
2.40-2.90	B					Soft grey clayey sandy SILT		
2.50	EN				(0.50)			
				-0.64	2.90			
						Complete at 2.90m		

Plan

Remarks

TP backfilled on completion
Shear vane failed at 2.0m - too soft
Perched water ta 1.2m
Pit terminated due to collapse at 2.9m

Logged in accordance BS5930:2015

Scale (approx)	Logged By	Figure No.
1:25	EOC	9230-11-19.TP22

Ground Investigations Ireland Ltd
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Site Avoca River Park, Arklow				**Trial Pit Number** TP23
Machine : 13 Tonne excavator **Method :**	**Dimensions** 1.0m W X 4.5m D X 3.0m L	**Ground Level (mOD)** 2.05	**Client** FT Squared	**Job Number** 9230-11-19
	Location 722845.3 E 674843.2 N	**Dates** 09/12/2019	**Project Contractor** GII	**Sheet** 1/2

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				1.98	(0.07) 0.07	TARMACADAM		
0.10-0.60	B					MADE GROUND: Blue grey sandy gravel with plastic and concrete		
					(0.53)			
0.50	EN							
				1.45	0.60	Stiff grey brown organic rich slightly sandy SILT		
					(0.20)			
				1.25	0.80	Soft to firm grey brown slightly sandy organic rich clayey SILT		
1.20-2.50	B							
1.50	EN							
					(1.90)			
2.50	EN							
2.70-3.50	B			-0.65	2.70	Spongy dark brown slightly silty slightly sandy PEAT		
					(0.90)			
3.50-4.50	B							
				-1.55	3.60	Spongy dark brown slightly silty PEAT		
					(0.70)			

Plan

Remarks

Shear vane at 1.5m - 35 kPa

Logged in accordance BS5930:2015

Scale (approx)	Logged By	Figure No.
1:25	EOC	9230-11-19.TP23

Ground Investigations Ireland Ltd
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Site
Avoca River Park, Arklow

Trial Pit Number
TP23

Machine : 13 Tonne excavator
Method :

Dimensions
1.0m W X 4.5m D X 3.0m L

Ground Level (mOD)
2.05

Client
FT Squared

Job Number
9230-11-19

Location
722845.3 E 674843.2 N

Dates
09/12/2019

Project Contractor
GII

Sheet
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Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				-2.25	4.30	Soft blue grey slightly sitly CLAY		
					(0.20)			
				-2.45	4.50	Complete at 4.50m		

Plan

Remarks

Pit stable
No water encountered in pit

Logged in accordance BS5930:2015

Scale (approx)	Logged By	Figure No.
1:25	EOC	9230-11-19.TP23

Ground Investigations Ireland Ltd
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Site	Avoca River Park, Arklow			**Trial Pit Number** TP24
Machine : 13 Tonne excavator **Method :**	**Dimensions** 1.0m W X 3.0m L X 2.5m D	**Ground Level (mOD)** 1.74	**Client** FT Squared	**Job Number** 9230-11-19
	Location 722894.4 E 674854.7 N	**Dates** 09/12/2019	**Project Contractor** GII	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				1.64	(0.10) 0.10	TOPSOIL		
0.20-0.60	B			1.54	(0.10) 0.20	TARMACADAM		
					(0.40)	MADE GROUND: Red brown clayey sandy gravel with wood, bitumen, plastic and concrete fragments.(Moderate hydrocarbon odor)		
0.50	EN							
				1.14	0.60	Firm to stiff grey brown peaty CLAY		
0.80-1.50	B				(0.60)			
			Very fast (1) at 1.20m.	0.54	1.20	Firm dark brown amorphous PEAT		∇1
					(0.40)			
1.50 1.50-2.50	EN B			0.14	1.60	Soft to firm grey brown peaty SILT		
					(0.60)			
				-0.46	2.20	Soft grey brown sandy peaty SILT		
					(0.30)			
				-0.76	2.50	Complete at 2.50m		
2.50	EN							

Plan

Remarks

Moderate hydrocarbon odour at 0.6m
Shear vane at 1.0m - 120 kPa - residual - 65 kPa
Heavy water ingress at 1.2m
Pit terminated due to obstruction (large tree) at 2.5m

Logged in accordance BS5930:2015

Scale (approx)	**Logged By**	**Figure No.**
1:25	EOC	9230-11-19.TP24

Ground Investigations Ireland Ltd www.gii.ie			Site Avoca River Park, Arklow	Trial Pit Number **TP25**
Machine : 13 Tonne excavator **Method :**	**Dimensions** 1.0m W X 4.3m D X 3.0m L	**Ground Level (mOD)** 1.81	**Client** FT Squared	**Job Number** 9230-11-19
	Location 722901.8 E 674876.9 N	**Dates** 10/12/2019	**Project Contractor** GII	**Sheet** 1/2

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				1.71	(0.10) 0.10	CONCRETE		
				1.66	0.15	MADE GROUND: Blue grey sandy gravel (804)		
				1.56	(0.10) 0.25	TARMACADAM		
0.30-0.80	B					MADE GROUND: Red brown clayey sandy gravel with large angular cobbles and boulders, cables and plastic		
0.50	EN				(0.55)			
0.80-1.70	B		Moderate (1) at 0.80m.	1.01	0.80	Soft dark grey black peaty SILT becoming sandy with depth		∇1
					(0.90)			
1.50	EN							
1.70-2.50	B			0.11	1.70	Soft blue grey slightly silty CLAY		
					(1.20)			
2.50	EN							
				-1.09	2.90	Soft grey brown peaty CLAY		
					(0.20)			
3.10-4.30	B			-1.29	3.10	Spongy dark brown fibrous PEAT large decaying tree fragmnnts also present		
					(0.50)			
				-1.79	3.60	Spongy dark brown clayey pseudo fibrous PEAT with large decaying tree fragments		
					(0.70)			

Plan

Remarks

Perched water at 0.8m and 4.3m
TP Backfilled on completion
Moderate water ingress at 0.8m

Logged in accordance BS5930:2015

Scale (approx)	Logged By	Figure No.
1:25	EOC	9230-11-19.TP25

Site Avoca River Park, Arklow

Trial Pit Number TP25

Machine : 13 Tonne excavator

Method :

Dimensions 1.0m W X 4.3m D X 3.0m L

Ground Level (mOD) 1.81

Client FT Squared

Job Number 9230-11-19

Location 722901.8 E 674876.9 N

Dates 10/12/2019

Project Contractor GII

Sheet 2/2

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
			Moderate (2) at 4.30m.	-2.49	4.30	Complete at 4.30m		∇2

Plan

Remarks

Perched water at 0.8m and 4.3m
TP Backfilled on completion
Pit terminated due to side wall collapse

Logged in accordance BS5930:2015

Scale (approx)	Logged By	Figure No.
1:25	EOC	9230-11-19.TP25

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Site Avoca River Park, Arklow				**Trial Pit Number** **TP26**
Machine : 13 Tonne excavator **Method :**	**Dimensions** 1.0m W X 1.8m D X 3.0m L	**Ground Level (mOD)** 1.76	**Client** FT Squared	**Job Number** 9230-11-19
	Location 722924.4 E 674904.6 N	**Dates** 12/12/2019	**Project Contractor** GII	**Sheet** 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				1.69	(0.07) 0.07	TARMACADAM		
0.10-0.90	B					MADE GROUND: Blue grey sandy gravel (804)		
0.50	EN				(0.93)			
			Heavy (1) at 0.90m.					∇1
				0.76	1.00	Soft to firm black organic rich clayey SILT		
					(0.20)			
1.10-1.50	B							
				0.56	1.20	Soft red brown grey mottled clayey SILT		
					(0.40)			
1.50	EN							
1.50-1.80	B							
				0.16	1.60	Soft grey brown organic rich peaty clayey SILT		
					(0.20)			
				-0.04	1.80			
1.80	EN					Complete at 1.80m		

Plan

Remarks

TP Backfilled on completion
Perched water at 0.9m
Pit unstable due to water -terminated at 1.8m

Logged in accordance BS5930:2015

Scale (approx)	Logged By	Figure No.
1:25	EOC	9230-11-19.TP26

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Site	Avoca River Park, Arklow		**Trial Pit Number**	**TP27**
Machine : 13 Tonne excavator **Method :**	**Dimensions** 1.0m W X 4.5m D X 3.0m L	**Ground Level (mOD)** 1.75	**Client** FT Squared	**Job Number** 9230-11-19
	Location 722924.5 E 674943.4 N	**Dates** 10/12/2019	**Project Contractor** GII	**Sheet** 1/2

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				1.68	(0.07) 0.07	TARMACADAM		
				1.60	(0.08) 0.15	MADE GROUND: Blue grey sandy gravel with concrete, plastic, red brick, steel.		
0.20-1.00	B		Moderate(1) at 0.20m.					∇1
						MADE GROUND: Red brown clayey sandy gravel with large angular cobbles and boulders, concrete and plastic.		
0.50	EN							
					(0.85)			
				0.75	1.00	Soft to firm grey brown clayey SILT		
1.50 1.50-2.50	EN B							
					(1.50)			
				-0.75	2.50	Soft red brown grey mottled clayey SILT		
2.50 2.50-3.50	EN B							
					(1.10)			
3.50-4.50	B							
				-1.85	3.60	Soft peaty CLAY		

Plan

Remarks

TP stable
TP backfilled on completion
Perched water at 0.2m
Shear vane at 3.0m - 42kPa

Logged in accordance BS5930:2015

Scale (approx)	**Logged By**	**Figure No.**
1:25	EOC	9230-11-19.TP27

Site Avoca River Park, Arklow				**Trial Pit Number** **TP27**
Machine : 13 Tonne excavator **Method :**	**Dimensions** 1.0m W X 4.5m D X 3.0m L	**Ground Level (mOD)** 1.75	**Client** FT Squared	**Job Number** 9230-11-19
	Location 722924.5 E 674943.4 N	**Dates** 10/12/2019	**Project Contractor** GII	**Sheet** 2/2

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(0.90)			
				-2.75	4.50			
						Complete at 4.50m		

Plan

Remarks

TP stable
TP backfilled on completion
Perched water at 0.2m

Logged in accordance BS5930:2015

Scale (approx)	Logged By	Figure No.
1:25	EOC	9230-11-19.TP27

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Site Avoca River Park, Arklow				**Trial Pit Number** TP28
Machine : 13 Tonne excavator **Method :**	**Dimensions** 1.0m W X 4.5m D X 3.0m L	**Ground Level (mOD)** 1.76	**Client** FT Squared	**Job Number** 9230-11-19
	Location 722878.3 E 674965.4 N	**Dates** 10/12/2019	**Project Contractor** GII	**Sheet** 1/2

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				1.69	(0.07) 0.07	TARMACADAM		
0.10-1.00	B		Moderate (1) at 0.15m.	1.61	(0.08) 0.15	MADE GROUND: Blue grey sandy gravel with wood, plastic and concrete fragments		∇1
						MADE GROUND: Red brown sandy gravel with red brick, plastic and steel		
0.50	EN				(0.85)			
1.00-2.00	B			0.76	1.00	Soft to firm grey brown organic rich clayey SILT		
1.50	EN				(1.30)			
2.30-3.50	B			-0.54	2.30	Soft black slightly silty pseudo fibrous PEAT		
2.50	EN				(1.20)			
3.50-4.50	B			-1.74	3.50	Grey brown peaty silty SAND		

Plan

Remarks

Water ingress - moderate at 0.15m
Shear vein at 2.0m - 55 kPa , residual shear strength - 22 kPa

Logged in accordance BS5930:2015

Scale (approx)	**Logged By**	**Figure No.**
1:25	EOC	9230-11-19.TP28

Site Avoca River Park, Arklow			**Trial Pit Number** **TP28**
Machine : 13 Tonne excavator **Method :**	**Dimensions** 1.0m W X 4.5m D X 3.0m L	**Ground Level (mOD)** 1.76	**Client** FT Squared
Job Number 9230-11-19			
Location 722878.3 E 674965.4 N	**Dates** 10/12/2019	**Project Contractor** GII	**Sheet** 2/2

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					(1.00)			
				-2.74	4.50	Complete at 4.50m		

Plan

Remarks

Pit unstable
TP Backfilled on completion

Logged in accordance BS5930:2015

Scale (approx)	**Logged By**	**Figure No.**
1:25	EOC	9230-11-19.TP28

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Site	Avoca River Park, Arklow			**Trial Pit Number**	**TP29**
Machine : 13 Tonne excavator **Method :**	**Dimensions** 1.0m W X 4.5m D X 3.0mm L	**Ground Level (mOD)** 2.43	**Client** FT Squared	**Job Number**	9230-11-19
	Location 722837.6 E 6674901 N	**Dates** 12/12/2019	**Project Contractor** GII	**Sheet**	1/2

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				2.36	(0.07) 0.07	TARMACADAM		
					(0.23)	MADE GROUND: Blue grey gravelly sand		
0.30-1.20	B			2.13	0.30	MADE GROUND: Red brown sandy gravel with large angular cobbles and boulders		
					(0.20)			∇1
0.50	EN		Heavy (1) at 0.50m.	1.93	0.50	MADE GROUND: Large angular cobbles and boulders		
					(0.30)			
				1.63	0.80	MADE GROUND: Sandy gravel - creosote odour noted		
					(0.40)			
1.20-2.10	B			1.23	1.20	Firm brown grey organic clayey SILT		
					(0.20)			
				1.03	1.40	Soft grey brown organic rich slightly sandy silty CLAY		
1.50	EN							
					(0.70)			
				0.33	2.10	Soft red brown grey mottled slightly sandy clayey SILT		
2.50 2.50-3.50	EN B							
					(1.40)			
				-1.07	3.50	Soft brown slightly silty peaty CLAY		
					(0.80)			
4.00-4.50	B							

Plan

Remarks

Shear vein failed at 3.5m
Perched water at 0.5m

Logged in accordance BS5930:2015

Scale (approx)	**Logged By**	**Figure No.**
1:25	EOC	9230-11-19.TP29

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Site	Avoca River Park, Arklow			**Trial Pit Number** TP29
Machine : 13 Tonne excavator **Method :**	**Dimensions** 1.0m W X 4.5m D X 3.0mm L	**Ground Level (mOD)** 2.43	**Client** FT Squared	**Job Number** 9230-11-19
	Location 722837.6 E 6674901 N	**Dates** 12/12/2019	**Project Contractor** GII	**Sheet** 2/2

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				-1.87	4.30	Soft black fibrous PEAT		
					(0.20)			
				-2.07	4.50	Complete at 4.50m		

Plan

Remarks

Shear vein failed at 3.5m
Pit stable
Iirridescent sheen noted on water in pit
Strong creosote odoUr noted at 0.8m

Logged in accordance BS5930:2015

Scale (approx)	Logged By	Figure No.
1:25	EOC	9230-11-19.TP29

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Site Avoca River Park, Arklow				**Trial Pit Number** **TP30**
Machine : 13 Tonne excavator **Method :**	**Dimensions** 1.0m W X 4.5m D X 3.0mm L	**Ground Level (mOD)** 2.30	**Client** FT Squared	**Job Number** 9230-11-19
	Location 722763.6 E 674927.1 N	**Dates** 12/12/2019	**Project Contractor** GII	**Sheet** 1/2

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.10-1.10	B		TP backfilled on compleetion Pit stable			MADE GROUND: Grey brown sandy gravelly with large angular cobbles and boulders, occasional plastic, concrete and wood		
					(0.90)			
0.50	EN							
				1.40	0.90	MADE GROUND: Firm to stiff Grey brown clayey silt (hydrocarbon odor)		
					(0.20)			
				1.20	1.10	Soft grey brown organic SILT		
1.10-2.00	B							
1.50	EN				(0.80)			
				0.40	1.90	Soft grey brown silty fibrous PEAT		
2.00-2.90	B							
					(0.50)			
				-0.10	2.40	Soft blue grey silty CLAY		
2.50	EN							
					(0.50)			
				-0.60	2.90	Soft blue grey sandy silty CLAY		
					(0.60)			
3.50-4.50	B		Slow(1) at 3.50m.	-1.20	3.50	Soft to firm silty peaty CLAY		∇1
					(0.80)			

Plan

Remarks

Perched water at 3.5m
TP backfilled on completion
Shear vein at 1.2m - 60 kPa - residual 28 kPa

Logged in accordance BS5930:2015

Scale (approx)	**Logged By**	**Figure No.**
1:25	EOC	9230-11-19.TP29

Ground Investigations Ireland Ltd
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Site	Avoca River Park, Arklow
Trial Pit Number	TP30
Machine :	13 Tonne excavator
Method :	
Dimensions	1.0m W X 4.5m D X 3.0mm L
Ground Level (mOD)	2.30
Client	FT Squared
Job Number	9230-11-19
Location	722763.6 E 674927.1 N
Dates	12/12/2019
Project Contractor	GII
Sheet	2/2

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				-2.00	4.30	Soft fibrous PEAT		
					(0.20)			
				-2.20	4.50	Complete at 4.50m		

Plan

Remarks

Perched water at 3.5m
TP backfilled on completion
Pit stable
Strong hydrocarbon odour noted at 0.9m

Logged in accordance BS5930:2015

Scale (approx)	Logged By	Figure No.
1:25	EOC	9230-11-19.TP29

APPENDIX 8 – Cable Percussion and Rotary Borehole Records

Ground Investigations Ireland Ltd
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Site	Avoca River Park, Arklow		**Borehole Number**	**BH01**
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 7.50m	**Ground Level (mOD)** 2.40	**Client** FT Squared	**Job Number** 9230-11-19
	Location (dGPS) 722653.9 E 675153.9 N	**Dates** 05/02/2020	**Project Contractor** GII	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(0.60)	MADE GROUND: Grey angular fine to coarse gravel (804 fill)	▨	
					1.80	0.60	MADE GROUND: Dark grey slightly sandy gravelly clay with plastic fragments. Gravel is angular to sub-angular, fine to coarse. Sand is fine to coarse	▨	
1.00-1.45 1.00	SPT(C) N=6 B			4,2/1,3,1,1		(1.10)			
					0.70	1.70	Very soft grey slightly sandy SILT with rootlets and decaying organic matter. Sand is fine to coarse	▨	
2.00-2.45 2.00	SPT(C) N=1 B			0,0/0,1,0,0					
						(2.10)			▼1
3.00-3.45 3.00 3.00	SPT(C) N=1 B UT Failed			1,0/1,0,0,0					
					-1.40	3.80	Medium dense grey slightly silty slightly gravelly fine to coarse SAND with occasional rootlets. Gravel is angular to sub-angular, fine to coarse.	▨	
4.00-4.45 4.00	SPT(C) N=15 B			2,1/1,13,1,0		(0.70)			
					-2.10	4.50	Soft black slightly sandy slightly silty fibrous PEAT with large wood fragments. Sand is fine to coarse	▨	
						(0.90)			
5.00-5.45 5.00	SPT(C) N=1 B			1,1/0,0,1,0					
					-3.00	5.40	Firm grey mottled black slightly sandy slightly gravelly peaty SILT. Gravel is angular to sub-angular, fine to coarse. Sand is fine to coarse. Peat is fibrous.	▨	
						(0.80)			
6.00-6.45 6.00	SPT(C) N=40 B			2,2/11,9,10,10 Water strike(1) at 6.20m, rose to 2.70m in 20 mins.					▽1
					-3.80	6.20	Medium dense grey brown slightly sandy sub-angular to sub-rounded fine to coarse GRAVEL of various lithologies with some sub-angular to sub-rounded cobbles. Sand is medium to coarse	▨	
						(1.30)			
7.00-7.45 7.00	SPT(C) N=50 B			13,17/17,25,8					
					-5.10	7.50	Complete at 7.50m		

Remarks
Borehole terminated at 7.50m BGL due to obstruction.
Borehole backfilled upon completion.
UT100 - Failed at 3.0m
Chiselling from 7.50m to 7.50m for 1 hour.

Scale (approx)	**Logged By**
1:50	D. Potter
Figure No.	9230-11-19.BH01

Ground Investigations Ireland Ltd
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Machine : Dando 2000 & Comacchio GEO305 **Method :** Cable Percussion with Roatry Core follow on	**Casing Diameter** 200mm cased to 7.00m 96mm cased to 19.30m	**Ground Level (mOD)** 2.01	**Site** Avoca River Park, Arklow **Client** FT Squared	**Borehole Number** **BH02** **Job Number** 9230-11-19
	Location (dGPS) 722749.8 E 675176.9 N	**Dates** 04/02/2020	**Project Contractor** GII	**Sheet** 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Water
						(1.00)	MADE GROUND: Black mottled brown slightly sandy gravelly Clay. Gravel is angular to sub-angular, fine to coarse. Sand is fine to coarse	
1.00 1.00-1.45	B SPT(C) N=9			3,2/2,2,2,3	1.01	1.00 (1.50)	Soft to firm grey slightly sandy SILT. Sand is fine to medium.	▼1
2.00 2.00-2.45	B SPT(C) N=6			1,2/2,2,1,1				
				Water strike(1) at 2.50m, rose to 1.30m in 20 mins.	-0.49	2.50 (1.20)	Soft dark grey slightly silty gravelly fine to coarse SAND. Gravel is angular to sub-angular, fine to medium.	∇1
3.00 3.00-3.45 3.00	B SPT(C) N=5 UT Failed			1,2/1,2,1,1				
					-1.69	3.70 (1.10)	Soft to firm light greyish brown slightly sandy SILT. Sand is fine to medium.	
4.00 4.00-4.45	B SPT(C) N=7			2,2/2,2,2,1				
					-2.79	4.80 (2.20)	Dense grey brown sandy GRAVEL. Gravel is fine to very coarse. Occasional sub-angular to sub-rounded cobbles and boulders	
5.00 5.00-5.44	B SPT(C) 50/285			10,10/11,39				
6.00 6.00-6.41	B SPT(C) 50/255			15,16/17,21,12				
7.00 7.00-7.13 7.00	TCR SCR	RQD	FI	21,24/50 B SPT(C) 45*/125 50/0	-4.99	7.00	OVERBURDEN: Driller notes Cobbles Sand and Gravel. Recovery consists of dense grey brown slightly sandy sub-angular to sub-rounded fine to coarse Gravel and Cobbles of various lithologies with many sub-angular to sub-rounded cobbles.	
	5 0	0						
8.60-9.05				5,6/7,7,6,9 SPT(C) N=29				
9.60								

Remarks
Borehole terminated at 7.00m BGL due to obstruction.
Rotary follow on from 7.00m to 19.30m BGL
UT100 Failed at 3.0m
50mm Standpipe installed in borehole upon completion, sloted from 19.30m BGL to 2.00m BGL, plain from 2.00m BGL to ground level, with bentonite seal and raised cover
Chiselling from 4.80m to 7.00m for 3 hours. Chiselling from 7.00m to 7.00m for 1 hour.

Scale (approx)	**Logged By**
1:50	D. Potter

Figure No.
9230-11-19.BH02

Ground Investigations Ireland Ltd www.gii.ie		Site Avoca River Park, Arklow	Borehole Number **BH02**
Machine : Dando 2000 & Comacchio GEO305 **Flush :** water **Core Dia :** 63.5 mm **Method :** Cable Percussion with Roatry Core follow on	**Casing Diameter** 200mm cased to 7.00m 96mm cased to 19.30m **Location** (dGPS) 722749.8 E 675176.9 N	**Ground Level (mOD)** 2.01 **Dates** 04/02/2020	**Client** FT Squared **Project Contractor** GII	**Job Number** 9230-11-19 **Sheet** 2/2

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
	3	0	0				(6.90)				
11.10-11.55 11.10	3	0	0		4,7/7,8,9,10 SPT(C) N=34						
12.70-13.15 12.70	5	0	0		4,4/6,7,9,10 SPT(C) N=32						
13.90	100	0	0	NI		-11.89	13.90 (1.10)	Weak thinly bedded grey to dark grey very fine grained SLATE. Sequence predominantly non intact. Recovery indicates 1 set of fractures. F1 - very closely spaced, dipping 70-90 degrees, planar smooth fracture surface with abundant Fe staining			
14.30	100	0	0			-12.99	15.00	Weak to medium strong thinly bedded grey to dark grey very fine grained SLATE.			
15.80	64	0	0				(2.90)	Sequence predominantly non intact. Recovery indicates 1 set of fractures. F1 - very closely spaced, dipping 70-90 degrees, planar smooth fracture surface with abundant Fe staining			
17.20	67	0	0			-15.89	17.90 (0.80)	Weak to medium strong thinly bedded grey to dark grey very fine grained SLATE. Sequence predominantly non intact. Recovery indicates 1 set of fractures. F1 - very closely spaced, dipping 70-90 degrees, planar smooth fracture surface			
18.70	100	0	0			-16.69	18.70 (0.60)	Weak to medium strong thinly bedded grey to dark grey very fine grained SLATE. Sequence predominantly non intact. Recovery indicates 1 set of fractures. F1 - very closely spaced, dipping 70-90 degrees, planar smooth foliated fracture surface			
19.30						-17.29	19.30	Complete at 19.30m			

Remarks	Scale (approx)	Logged By
	1:50	D. Potter
	Figure No. 9230-11-19.BH02	

Ground Investigations Ireland Ltd
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Site	Avoca River Park, Arklow			**Borehole Number** BH03
Machine : Dando 2000 & Comacchio GEO305 **Method :** Cable Percussion with Rotary Core follow on	**Casing Diameter** 200mm cased to 9.20m 96mm cased to 25.50m	**Ground Level (mOD)** 2.06	**Client** FT Squared	**Job Number** 9230-11-19
	Location (dGPS) 722719.3 E 675071.4 N	**Dates** 07/02/2020- 12/02/2020	**Project Contractor** GII	**Sheet** 1/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Water
						(1.20)	MADE GROUND: Grey slightly gravelly sandy Clay with occasional angular cobbles and brick fragments. Gravel is angular to sub-angular, fine to coarse. Sand is fine to coarse.	
1.00 1.00-1.45	B SPT(C) N=2			0,1/1,1,0,0				▼1
					0.86	1.20	Very soft brown mottled grey slightly sandy slightly peaty SILT. Sand is fine to medium.	
2.00 2.00-2.45	B SPT(C) N=1			1,0/1,0,0,0				
				Water strike(1) at 2.50m, rose to 1.00m in 20 mins.		(2.70)		∇1
3.00 3.00-3.45	B SPT(C) N=1			1,0/1,0,0,0				
					-1.84	3.90	Very soft grey slightly sandy SILT. Sand is fine to medium.	
4.00 4.00-4.45	B SPT(C) N=2			1,0/1,0,0,1				
						(1.10)		
					-2.94	5.00	Very soft grey slightly gravelly sandy SILT. Gravel is angular to sub-angular, fine to coarse. Sand is fine to coarse.	
5.00 5.00-5.45 5.00	B SPT(C) N=1 P Failed			1,0/1,0,0,0				
6.00 6.00-6.45	B SPT(C) N=1			1,0/1,0,0,0		(1.90)		
					-4.84	6.90	Soft black slightly silty fibrous PEAT with wood and rootlets.	
7.00 7.00-7.45	B SPT(C) N=4			0,0/1,1,1,1		(0.40)		
					-5.24	7.30 (0.30)	Soft brown slightly sandy SILT. Sand is fine to medium.	
					-5.54	7.60	Dense grey sandy sub-angular to sub-rounded fine to coarse GRAVEL of various lithologies with some subangular cobbles. Sand is medium to coarse.	
8.00 8.00-8.36	B SPT(C) 50/210			14,12/37,13				
						(1.60)		
9.00-9.14	50/0 SPT(C) 28*/135			28/50				
	TCR **SCR**	**RQD**	**FI**					
9.20 9.20				B	-7.14	9.20	OVERBURDEN: Driller notes Cobbles Sand and Gravel. Recovery consists of dense grey and brown slightly sandy sub-angular to sub-rounded medium to coarse Gravel with occasional cobbles of various lithologies.	

Remarks
Borehole terminated at 9.20m BGL due to obstruction.
Rotary follow on from 9.20m to 25.50m BGL
Piston sample attempted at 5.0m - No recovery
50mm Standpipe installed in borehole upon completino, slotted from 25.50m BGL to 2.00m BGL, plain from 2.00m BGL to ground level, with bentonite seal and raised cover.
Chiselling from 9.20m to 9.20m for 1 hour.

Scale (approx) 1:50	**Logged By** D. Potter
Figure No. 9230-11-19.BH03	

Ground Investigations Ireland Ltd
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Site	Avoca River Park, Arklow
Borehole Number	BH03
Machine	Dando 2000 & Comacchio GEO305
Flush	water
Core Dia	63.5 mm
Method	Cable Percussion with Rotary Core follow on
Casing Diameter	200mm cased to 9.20m 96mm cased to 25.50m
Ground Level (mOD)	2.06
Client	FT Squared
Job Number	9230-11-19
Location (dGPS)	722719.3 E 675071.4 N
Dates	07/02/2020- 12/02/2020
Project Contractor	GII
Sheet	2/3

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
	8	0	0								
11.20-11.65 11.20					10,10/15,16,15,4 SPT(C) N=50						
							(5.00)				
	9	0	0								
12.80-13.25 12.80					11,11/9,14,16,11 SPT(C) N=50						
	7	0	0								
14.20-14.43 14.20					13,22/50 SPT(C) 50/75	-12.14	14.20	OVERBURDEN: Driller notes Cobbles Sand and Gravel. Recovery consists of dense brown slightly gravelly fine to medium Sand.			
	13	0	0				(1.20)				
15.40-15.85 15.40					4,3/3,4,8,7 SPT(C) N=22	-13.34	15.40	OVERBURDEN: Driller notes Cobbles Sand and Gravel. Recovery consists of dense grey and brown slightly sandy sub-angular to sub-rounded Gravel with occasional cobbles of various lithologies.			
	6	0	0								
17.20-17.65 17.20					5,7/8,8,12,15 SPT(C) N=43						
	6	0	0								
18.80-19.73 18.80					9,9/12,13,25 SPT(C) 50/775		(6.70)				
	7	0	0								

Remarks

Scale (approx)	1:50
Logged By	D. Potter
Figure No.	9230-11-19.BH03

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Site Avoca River Park, Arklow	**Borehole Number** **BH03**		
Machine : Dando 2000 & Comacchio GEO305 **Flush :** water **Core Dia :** 63.5 mm **Method :** Cable Percussion with Rotary Core follow on	**Casing Diameter** 200mm cased to 9.20m 96mm cased to 25.50m	**Ground Level (mOD)** 2.06	**Client** FT Squared
Job Number 9230-11-19	**Location** (dGPS) 722719.3 E 675071.4 N	**Dates** 07/02/2020- 12/02/2020	**Project Contractor** GII
Sheet 3/3			

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
					50/50						
20.20-20.20 20.20	52	0	0		SPT(C) 50*/0 50/0						
22.10	100	70	7	NI		-20.04	22.10	Medium strong to strong fine grained thinly laminated grey SANDSTONE with quartz veins. Partially to distinctly weathered 22.10-23.80m BGL: Non Intact			
23.00	100	0	0								
23.80	100	41	41	10			(3.40)	23.80-25.50m BGL: Two fracture sets: F1: Very close to close spaced, 0-30 degree, undulating rough with clay smearing. F2: Close to medium spaced, 60-80 degree, undulating rough with clay smearing.			
25.50						-23.44	25.50	Complete at 25.50m			

Remarks

Scale (approx) 1:50

Logged By D. Potter

Figure No. 9230-11-19.BH03

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Site Avoca River Park, Arklow				**Borehole Number** **BH04**
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 8.00m	**Ground Level (mOD)** 1.95	**Client** FT Squared	**Job Number** 9230-11-19
	Location 722789.1 E 722789.1 N	**Dates** 30/01/2020	**Project Contractor** GII	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					1.85	0.10	TARMACADAM.		
						(0.50)	MADE GROUND: Grey angular fine to coarse Gravel.		
					1.35	0.60	MADE GROUND: Light red slightly sandy slightly gravelly SILT. Gravel is angular to sub-angular, fine to coarse. Sand is fine to coarse		
1.00-1.45 1.00	SPT(C) N=5 B			1,2/2,1,1,1					
						(1.10)			
									▼1
					0.25	1.70	Very soft grey slightly sandy SILT with rootlets. Sand is fine to medium.		
2.00-2.45 2.00	SPT(C) N=1 B			1,0/1,0,0,0					
2.50	UT Failed								
						(2.40)			
3.00-3.45 3.00	SPT(C) N=1 B			1,0/1,0,0,0					
4.00-4.45 4.00	SPT(C) N=1 B			1,0/1,0,0,0	-2.15	4.10	Very soft dark brown mottled grey slightly sandy slightly peaty SILT. Sand is fine to coarse.		
						(0.70)			
4.50	UT								
					-2.85	4.80	Very soft black slightly silty slightly sandy slightly gravelly fibrous PEAT with wood and rootlets. Gravel is angular to sub-angular, fine to coarse. Sand is fine to coarse		
5.00-5.45 5.00	SPT(C) N=0 B Failed			1,0/0,0,0,0					
						(1.20)			
6.00-6.45 6.00	SPT(C) N=9 B			2,2/1,1,7,0	-4.05	6.00	Firm black mottled grey slightly sandy slightly gravelly peaty SILT. Gravel is angular to sub-angular, fine to coarse. Sand is fine to coarse. Peat is fibrous.		
						(1.20)			
7.00-7.45 7.00	SPT(C) N=20 B			2,1/1,4,9,6					
				Water strike(1) at 7.20m, rose to 1.60m in 20 mins.	-5.25	7.20	Dense grey sandy sub-angular to rounded fine to coarse GRAVEL with some sub-angular to sub-rounded cobbles. Sand is fine to coarse.		∇1
						(0.80)			
8.00-8.42 8.00	SPT(C) 50/265 B			9,11/15,15,20	-6.05	8.00	Complete at 8.00m		

Remarks
Borehole terminated at 8.00m BGL due to obstruction.
Borehole backfilled upon completion.
UT100 at 2.5m - no recovery
UT100 at 4.5m- no recovery
Chiselling from 8.00m to 8.00m for 1 hour.

Scale (approx) 1:50	**Logged By** D. Potter
Figure No. 9230-11-19.BH04	

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Machine : Dando 2000/Berretta T44 **Method :** Cable Percussion with Rotary Core follow on	**Casing Diameter** 200mm cased to 7.00m 96mm cased to 16.30m	**Ground Level (mOD)** 1.57	**Site** Avoca River Park, Arklow **Client** FT Squared	**Borehole Number** **BH05** **Job Number** 9230-11-19
	Location (dGPS) 722837.9 E 675136.4 N	**Dates** 22/01/2020- 11/06/2020	**Project Contractor** GII	**Sheet** 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					1.47	0.10	TARMACADAM.		
						(0.70)	MADE GROUND: Grey angular fine to coarse Gravel.		
					0.77	0.80	Soft grey slightly peaty slightly sandy slightly gravelly CLAY with rootlets. Gravel is angular to sub-angular, fine to coarse. Sand is fine to coarse. Possible Made Ground.		
1.00 1.00-1.45	B SPT(C) N=3			1,1/1,0,1,1		(0.50)			
					0.27	1.30	Very soft grey slightly sandy SILT with rootlets. Sand is fine to medium.		▼1
2.00 2.00-2.45	B SPT(C) N=1			1,0/1,0,0,0		(1.70)			
2.50-3.00	UT Failed								
3.00 3.00-3.45	B SPT(C) N=1			1,0/1,0,0,0	-1.43	3.00	Very soft dark grey slightly sandy slightly peaty SILT. Sand is fine to coarse.		
						(1.00)			
4.00 4.00-4.45	B SPT(C) N=1			1,0/1,0,0,0	-2.43	4.00	Very soft black slightly silty slightly sandy slightly gravelly fibrous PEAT with wood and rootlets. Gravel is angular to sub-angular, fine to coarse. Sand is fine to coarse.		
4.50-5.00	UT 100% Recovery								
5.00 5.00-5.45 5.00-5.50	B SPT(C) N=1 UT 60% Recovery			1,0/1,0,0,0		(1.80)			
					-4.23	5.80	Soft grey slightly gravelly sandy SILT. Gravel is angular to sub-angular, fine to coarse. Sand is fine to coarse.		
6.00	B			Water strike(1) at 6.00m, rose to 1.70m in 20 mins.		(0.50)			∇1
					-4.73	6.30	Dense grey sandy sub-angular to rounded fine to coarse GRAVEL with some sub-angular to sub-rounded cobbles. Sand is fine to coarse.		
						(0.70)			
7.00 7.00-7.45 7.00	TCR SCR	RQD	FI	25/50 B SPT(C) 50/295	-5.43	7.00	OVERBURDEN: Driller notes Gravel and Sand. Recovery consists of brown gravelly fine to coarse Sand.		
	6 0	0				(3.00)			
10.00									

Remarks
Borehole terminated at 7.00m BGL due to obstruction.
Rotary follow on from 7.50 to 16.30m BGL.
Borehole backfilled upon completion.
Chiselling from 6.30m to 7.00m for 1.5 hours. Chiselling from 7.00m to 7.00m for 1 hour.

Scale (approx)	Logged By
1:50	NM

Figure No.
9230-11-19.BH05

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Site Avoca River Park, Arklow			**Borehole Number** **BH05**
Machine : Dando 2000/Berreta T44 **Flush :** Water **Core Dia :** 63.5 mm **Method :** Cable Percussion with Rotary Core follow on	**Casing Diameter** 200mm cased to 7.00m 96mm cased to 16.30m	**Ground Level (mOD)** 1.57	**Client** FT Squared
	Location (dGPS) 722837.9 E 675136.4 N	**Dates** 22/01/2020-11/06/2020	**Project Contractor** GII
Job Number 9230-11-19	**Sheet** 2/2		

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
	22	0	0			-8.43	10.00 (1.00)	OVERBURDEN: Driller notes Sand and Boulders. Recovery consists of grey angular to sub-angular fine to coarse Gravel of mixed lithologies.	⁘	
11.00	45	0	0			-9.43	11.00 (1.10)	OVERBURDEN: Driller notes Boulder Clay to rock. Recovery consists of very weak dark grey silty Shale. Residually weathered.	☰	
12.10	100	0	0	NI		-10.53	12.10 (1.20)	Weak grey fine grained thinly laminated SLATE. Distinctly weathered to destructured. 12.10m to 14.10m BGL: Non Intact	☰	
12.80	100	0	0							
13.30				NI		-11.73	13.30 (3.00)	Medium strong to strong dark grey fine grained foliated SLATE with quartz veins. Partially to distinctly weathered. 14.30m -16.30m BGL: Sequence predominantly non intact. Recovery indicates 1 set of fractures. F1 - Closely spaced, 70-90 degrees, planar smooth tight to open, silt infill and brown organge staining on fracture surfaces.	☰	
14.30	100	0	0							
14.80	100	0	0							
16.30						-14.73	16.30	Complete at 16.30m		

Remarks

Scale (approx) 1:50	**Logged By** NM
Figure No. 9230-11-19.BH05	

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Site Avoca River Park, Arklow

Borehole Number BH06

Machine : Dando 2000 & Comacchio GEO305

Method : Cable Percussion with Rotary Core follow on

Casing Diameter
200mm cased to 8.00m
96mm cased to 25.20m

Ground Level (mOD) 1.62

Client FT Squared

Job Number 9230-11-19

Location (dGPS) 722877.9 E 675036.4 N

Dates 31/01/2020-14/02/2020

Project Contractor GII

Sheet 1/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
					1.52	0.10	TARMACADAM.			
						(0.40)	MADE GROUND: Grey angular fine to coarse Gravel (804)			
					1.12	0.50	MADE GROUND: Soft grey mottled orange slightly gravelly sandy Clay. Gravel is angular to sub-angular, fine to coarse. Sand is fine to coarse.			
1.00 1.00-1.45	B SPT(C) N=4			0,0/1,1,1,1						
						(1.40)				
					-0.28	1.90	Soft grey slightly sandy SILT with rootlets. Sand is fine to medium.		▼2	
2.00 2.00-2.45	B SPT(C) N=3			1,0/0,1,1,1						
						(1.30)				
									▼1 ∇1	
3.00	B			Water strike(1) at 3.00m, rose to 2.90m in 20 mins, sealed at 4.30m.	-1.58	3.20	Soft grey silty CLAY.			
3.00-3.45	SPT(C) N=4			0,0/1,1,1,1						
						(1.10)				
4.00 4.00-4.45	B SPT(C) N=7			1,1/2,1,2,2						
					-2.68	4.30	Soft grey mottled reddish brown slightly sandy slightly peaty slightly gravelly SILT. Gravel is angular to sub-angular, fine to coarse. Sand is fine to coarse. Peat is fibrous.			
5.00 5.00-5.45	B SPT(C) N=1			1,0/1,0,0,0						
						(1.70)				
					-4.38	6.00	Loose grey slightly silty fine to coarse SAND.		∇2	
6.00	B			Water strike(2) at 6.00m, rose to 2.00m in 20 mins.						
6.00-6.45	SPT(C) N=6			0,1/1,2,1,2		(0.90)				
					-5.28	6.90	Dense grey sandy sub-angular to sub-rounded fine to coarse GRAVEL of various lithologies with some subangular cobbles. Sand is fine to coarse.			
7.00 7.00-7.45	B SPT(C) 50/295			2,5/10,11,15,14						
						(1.10)				
8.00 8.00-8.00 8.00	TCR SCR	RQD	FI	25/50 B SPT(C) 25*/0 50/0	-6.38	8.00	OVERBURDEN: Driller notes Cobbles Sand and Gravel. Recovery consists of dense grey and brown slightly sandy sub-angular to sub-rounded fine to coarse Gravel with occasional sub-rounded cobbles.			
9.00-9.45				9,10/10,12,11,11 SPT(C) N=44						
	3 0	0								

Remarks
Borehole terminated at 8.00m BGL due to obstruction or possible boulder.
Rotary follow on from 8.00m to 25.20m BGL.
50mm Standpipe installed in borehole upon completion, slotted from 25.20m BGL to 2.50m BGL, plain from 2.50m BGL to ground level, with bentonite seal and raised cover
Chiselling from 8.00m to 8.00m for 1 hour.

Scale (approx) 1:50

Logged By D. Potter

Figure No. 9230-11-19.BH06

Ground Investigations Ireland Ltd www.gii.ie		**Site** Avoca River Park, Arklow	**Borehole Number** **BH06**
Machine : Dando 2000 & Comacchio GEO305 **Flush :** water **Core Dia :** 63.5 mm **Method :** Cable Percussion with Rotary Core follow on	**Casing Diameter** 200mm cased to 8.00m 96mm cased to 25.20m **Location** (dGPS) 722877.9 E 675036.4 N	**Ground Level (mOD)** 1.62 **Dates** 31/01/2020-14/02/2020 **Client** FT Squared **Project Contractor** GII	**Job Number** 9230-11-19 **Sheet** 2/3

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
10.60-11.05 10.60					7,6/8,9,9,11 SPT(C) N=37						
	3	0	0								
11.90	20	0	0		10,8/10,11,11,13 SPT(C) N=45						
12.40-12.85 12.40							(9.20)				
	11	0	0								
14.20-14.65 14.20					10,19/20,14,15,1 SPT(C) N=50						
	9	0	0								
15.40-15.85 15.40					13,14/16,16,15,3 SPT(C) N=50						
	11	0	0								
17.20-17.58 17.20					10,19/20,21,9 SPT(C) 50/225	-15.58	17.20	OVERBURDEN: Driller notes Boulder Clay. Recovery consists of very stiff brown slightly sandy gravelly Clay.			
	41	0	0								
18.80-19.10 18.80					19,21/24,26 SPT(C) 50/150		(2.80)				
	83	0	0								
20.00											

Remarks	**Scale (approx)**	**Logged By**
	1:50	D. Potter
	Figure No. 9230-11-19.BH06	

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Site
Avoca River Park, Arklow

Borehole Number
BH06

Machine : Dando 2000 & Comacchio GEO305
Flush : water
Core Dia : 63.5 mm
Method : Cable Percussion with Rotary Core follow on

Casing Diameter
200mm cased to 8.00m
96mm cased to 25.20m

Ground Level (mOD)
1.62

Client
FT Squared

Job Number
9230-11-19

Location (dGPS)
722877.9 E 675036.4 N

Dates
31/01/2020-14/02/2020

Project Contractor
GII

Sheet
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Depth (m)	TCR	SCR	RQD	FI	Field Records
	100	0	0	NI	
21.30	30	0	0		
22.30	70	15	15		
23.30	85	23	23		
24.60	100	67	33	5	
25.20					

Level (mOD)	Depth (m) (Thickness)	Description
-18.38	20.00	Medium strong to strong fine grained thinly laminated grey SLATE with occasional quartz veins and brown staining. Partially to distinctly weathered 20.00-24.60m BGL: Non Intact 24.60-25.20m BGL: Two Fracture Sets. F1: Very close to close spaced, 40-60 degree, undulating rough with clay smearing. F2: Single fracture, 35 degrees, undulating rough with clay smearing
	(5.20)	
-23.58	25.20	Complete at 25.20m

Remarks

Scale (approx) 1:50

Logged By D. Potter

Figure No. 9230-11-19.BH06

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Machine : Dando 2000 & Comacchio GEO305 **Method :** Cable Percussion with Rotary Core follow on	**Casing Diameter** 200mm cased to 8.50m 96mm cased to 15.00m	**Ground Level (mOD)** 1.47	**Client** FT Squared	**Job Number** 9230-11-19
	Location (dGPS) 722980.2 E 675047.6 N	**Dates** 28/01/2020- 17/02/2020	**Project Contractor** GII	**Sheet** 1/2

Site: Avoca River Park, Arklow

Borehole Number: **BH07**

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					1.27	(0.20) 0.20	TARMACADAM.		
				Water strike(1) at 0.40m, no rise after 20 mins, sealed at 2.20m.		(1.20)	MADE GROUND: Grey mottled orange slightly gravelly sandy Clay. Gravel is angular to sub-angular, fine to coarse. Sand is fine to coarse.		▼1 ▽2
1.00 1.00-1.45	B SPT(C) N=0			1,1/0,0,0,0					
					0.07	1.40 (0.80)	Very soft dark grey slightly sandy slightly gravelly SILT with rootlets. Gravel is angular to sub-angular, fine to coarse. Sand is fine to coarse.		
2.00 2.00-2.45	B SPT(C) N=2			0,0/0,1,1,0					
					-0.73	2.20 (1.10)	Very soft grey slightly sandy SILT. Sand is fine to medium.		
2.50-3.00	UT								
3.00 3.00-3.45	B SPT(C) N=1			1,0/1,0,0,0					
					-1.83	3.30 (3.20)	Very soft black slightly silty slightly sandy fibrous PEAT with rootlets and wood fragments. Sand is fine to medium.		
3.50-4.00	UT								
4.00 4.00-4.45	B SPT(C) N=1			1,0/1,0,0,0					
5.00 5.00-5.45	B SPT(C) N=1			1,0/1,0,0,0					
6.00	B						Pushing large tree fragment from 5.80m BGL to 6.30m BGL - No SPT taken.		
				Water strike(2) at 6.50m, rose to 0.50m in 20 mins.	-5.03	6.50 (2.00)	Medium dense grey slightly sandy sub-angular to rounded fine to coarse GRAVEL of various lithologies with some subangular to subrounded cobbles. Sand is fine to coarse.		▽2
7.00 7.00-7.45	B SPT(C) N=32			2,1/8,8,7,9					
 8.00 8.00-8.00 8.20-8.65	SPT(C) N=46 B SPT(C) 25*/0 50/0			25/50 10,9/11,11,11,13					
	TCR SCR	RQD	FI						
8.50					-7.03	8.50 (1.30)	OVERBURDEN: Driller notes cobbly Clay. Recovery consists of dense brown slightly sandy slightly clayey angular to sub-angular fine to coarse Gravel.		
9.80-9.80 9.80	100 0	0		50/50 SPT(C) 50*/0 50/0	-8.33	9.80	Weak to medium strong fine grained thinly laminated dark		

Remarks
Borehole terminated at 8.50m BGL due to obstruction.
Rotary follow on from 8.50m to 15.0m BGL
Borehole backfilled upon completion
Chiselling from 7.20m to 8.50m for 2 hours. Chiselling from 8.50m to 8.50m for 1 hour.

Scale (approx) 1:50	**Logged By** D. Potter
Figure No. 9230-11-19.BH07	

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Site Avoca River Park, Arklow
Borehole Number BH07

Machine : Dando 2000 & Comacchio GEO305
Flush : water
Core Dia : 63.5 mm
Method : Cable Percussion with Rotary Core follow on

Casing Diameter 200mm cased to 8.50m
96mm cased to 15.00m
Ground Level (mOD) 1.47
Client FT Squared
Job Number 9230-11-19

Location (dGPS) 722980.2 E 675047.6 N
Dates 28/01/2020-17/02/2020
Project Contractor GII
Sheet 2/2

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
				NI				grey SLATE with occasional quartz veins and brown staining. Partially weathered to destructured		
10.70	100	8	8					9.80-12.00m BGL: Non Intact		
12.00	100	29	8	9			(5.20)			
13.20	100	25	6	5				13.20-14.30m BGL: 1 Fracture Set. Very close to close spaced, 45-60 degree, undulating rough with clay staining.		
14.30				NI				14.30-15.00m BGL: Non Intact		
15.00						-13.53	15.00	Complete at 15.00m		

Remarks

Scale (approx) 1:50
Logged By D. Potter
Figure No. 9230-11-19.BH07

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Site Avoca River Park, Arklow				**Borehole Number** **BH08**
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 13.00m	**Ground Level (mOD)** 1.95	**Client** FT Squared	**Job Number** 9230-11-19
	Location 722683.8 E 674961.9 N	**Dates** 22/01/2020- 23/01/2020	**Project Contractor** GII	**Sheet** 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							MADE GROUND: Grey angular fine to coarse Gravel with concrete.		▼1 ∇1
						(0.90)			
0.50	B			Water strike(1) at 0.50m, rose to 0.40m in 20 mins.					
					1.05	0.90	Very soft grey brown slightly sandy SILT		▼2
1.00-1.45 1.00	SPT(C) N=2 B			1,0/0,1,1,0					
						(0.70)			
					0.35	1.60	Very soft brown mottled grey slightly sandy slightly gravelly slightly peaty SILT. Gravel is angular to sub-angular, fine to coarse. Sand is fine to coarse		▼3
2.00-2.45 2.00	SPT(C) N=1 B			1,0/1,0,0,0					
						(1.90)			
3.00-3.45 3.00	SPT(C) N=1 B			1,0/1,0,0,0					
3.50-4.00	UT Failed				-1.55	3.50	Very soft blue grey silty CLAY		
4.00-4.45 4.00	SPT(C) N=1 B			1,0/1,0,0,0					
						(2.60)			
5.00-5.45 5.00	SPT(C) N=1 B			1,0/1,0,0,0					
									∇2
6.00 6.00-6.45	B SPT(C) N=39			Water strike(2) at 5.70m, rose to 1.00m in 20 mins. 0,2/6,10,11,12	-4.15	6.10	Medium dense to dense grey sandy sub-angular to rounded fine to coarse GRAVEL with occasional sub-angular cobbles. Sand is fine to coarse.		
7.00-7.45 7.00	SPT(C) N=48 B			6,9/11,11,12,14					
						(2.30)			
8.00-8.45 8.00	SPT(C) N=50 B			7,12/14,17,19					
					-6.45	8.40	Stiff brown slightly sandy SILT. Sand is fine to medium.		
9.00-9.40 9.00	SPT(C) 15/250 B			1,2/3,4,4,4					
						(1.40)			
				Water strike(3) at 9.80m, rose to 2.00m in 20 mins.					
					-7.85	9.80	Medium dense grey gravelly fine to coarse SAND. Gravel is		∇3
10.00-10.45	SPT(C) N=30			3,5/7,8,7,8					

Remarks
Borehole terminated at 13.00m BGL due to obstruction.
Borehole backfilled upon completion.
UT 100 failed at 3.5m - no recovery

Scale (approx) 1:50	**Logged By** D. Potter
Figure No. 9230-11-19.BH08	

			Site Avoca River Park, Arklow		**Borehole Number** **BH08**
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 13.00m	**Ground Level (mOD)** 1.95	**Client** FT Squared		**Job Number** 9230-11-19
	Location 722683.8 E 674961.9 N	**Dates** 22/01/2020- 23/01/2020	**Project Contractor** GII		**Sheet** 2/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
10.00	B					(0.80)	sub-angular to sub-rounded, fine to coarse.		
					-8.65	10.60	Dense grey sandy sub-angular to rounded fine to coarse GRAVEL. Sand is medium to coarse.		
11.00-11.40 11.00	SPT(C) 50/250 B			2,5/7,10,16,17					
						(2.40)			
12.00-12.38 12.00	SPT(C) 50/230 B			2,5/7,11,17,15					
13.00-13.00 13.00	SPT(C) 25*/0 50/0 B			25/50	-11.05	13.00	Complete at 13.00m		

Remarks
Chiselling from 10.80m to 10.90m for 1 hour. Chiselling from 13.00m to 13.00m for 1 hour.

Scale (approx) 1:50	**Logged By** D. Potter
Figure No. 9230-11-19.BH08	

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Site	Avoca River Park, Arklow			**Borehole Number**	BH09
Machine : Dando 2000/Berreta T44 **Method :** Cable Percussion with Rotary Core follow on	**Casing Diameter** 200mm cased to 7.00m 96mm cased to 29.00m	**Ground Level (mOD)** 1.56	**Client** FT Squared	**Job Number**	9230-11-19
	Location (dGPS) 722836.2 E 674981.9 N	**Dates** 06/02/2020- 16/06/2020	**Project Contractor** GII	**Sheet**	1/3

Depth (m)	Sample / Tests		Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						1.46	0.10	TARMACADAM.		
							(1.00)	MADE GROUND: Grey slightly clayey sandy angular to sub-angular Gravel. Sand is fine to coarse		
1.00	B				Water strike(1) at 1.00m, no rise after 20 mins, sealed at 2.50m.	0.46	1.10	Soft grey slightly gravelly sandy SILT. Gravel is angular to sub-angular, fine to coarse. Sand is fine to coarse.		▼*
1.00-1.45	SPT(C) N=5				6,9/2,1,1,1					
							(1.80)			
2.00	B									
2.00-2.45	SPT(C) N=7				1,1/2,2,2,1					
						-1.34	2.90	Loose grey slightly silty fine to coarse SAND.		
3.00	B									
3.00-3.45	SPT(C) N=2				0,0/0,1,1,0					
							(0.80)			
						-2.14	3.70	Very soft grey slightly sandy SILT. Sand is fine to medium.		
4.00	B									
4.00-5.00	P 70% Recovery									
							(2.20)			
5.00	B									
5.00-5.45	SPT(C) N=1				1,0/1,0,0,0					
5.00-6.00	P Failed									
					Water strike(2) at 5.50m, rose to 1.00m in 20 mins.					∇2
						-4.34	5.90	Dense grey brown sandy sub-angular to rounded fine to coarse GRAVEL of various lithologies with some sub-angular to sub-rounded cobbles. Sand is medium to coarse.		
6.00	B									
6.00-6.45	SPT(C) N=41				6,8/8,9,11,13					
							(1.10)			
					25/50					
7.00	**TCR**	**SCR**	**RQD**	**FI**	B					
7.00-7.15					SPT(C) 25*/145	-5.44	7.00	OVERBURDEN: Driller notes Boulder Clay with Sand. Recovery consists of green grey slightly sandy fine to coarse sub-angular to sub-rounded Gravel with occasional cobbles.		
7.00					50/0					
	5	0	0							
8.00-8.45					1,1/0,1,1,1					
8.00					SPT(C) N=3					
	14	6	0				(3.00)			
9.00-9.45					25/50					
9.00					SPT(C) N=50					
	27	0	0							
10.00										

Remarks
Borehole terminated at 7.0m BGL due to obstruction.
Rotary follow on from 7.0m to 29.0m BGL.
Borehole backfilled upon completion.
Piston at 4.0m - 70% recovery, piston at 5.0m - fail
Chiselling from 7.00m to 7.00m for 1 hour.

Scale (approx)	Logged By
1:50	NM

Figure No.
9230-11-19.BH09

Ground Investigations Ireland Ltd
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Site: Avoca River Park, Arklow

Borehole Number: BH09

Machine : Dando 2000/Berreta T44
Flush : Water
Core Dia : 63.5 mm
Method : Cable Percussion with Rotary Core follow on

Casing Diameter: 200mm cased to 7.00m
96mm cased to 29.00m

Ground Level (mOD): 1.56

Client: FT Squared

Job Number: 9230-11-19

Location (dGPS): 722836.2 E 674981.9 N

Dates: 06/02/2020-16/06/2020

Project Contractor: GII

Sheet: 2/3

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
10.00-10.45	80	0	0		SPT(C) N=63 11,13/16,19,15,13	-8.44	10.00 (3.00)	OVERBURDEN: Driller notes Boulder Clay with Sand. Recovery consists of dense brown slightly gravelly clayey fine to coarse Sand with occasional cobbles.		
11.00-11.45 11.00	82	0	0		12,14/14,17,16,14 SPT(C) N=61					
12.00-12.45 12.00	27	0	0		9,8/11,9,12,11 SPT(C) N=43					
13.00-13.45 13.00	57	0	0		8,8/10,9,11,9 SPT(C) N=39	-11.44	13.00 (1.00)	OVERBURDEN: Driller notes Sand with Boulder. Recovery consists of dense grey slightly gravelly clayey fine to coarse Sand with occasional cobbles.		
14.00-14.45 14.00	49	0	0		11,13/10,9,9,12 SPT(C) N=40	-12.44	14.00 (1.00)	OVERBURDEN: Driller notes Blowing Sand. Recovery consists of dense brown slightly clayey slightly gravelly fine to coarse Sand.		
15.00	34	0	0			-13.44	15.00 (3.00)	OVERBURDEN: Driller notes Boulder with Sand. Recovery consists of dense slightly sandy sub-angular to sub-rounded fine to coarse Gravel of mixed lithologies with occasional cobbles..		
16.00-16.45 16.00	44	6	0		11,13/10,14,13,16 SPT(C) N=53					
17.00-17.45 17.00	100	4	0		25/50 SPT(C) N=50					
18.00-18.45 18.00	57	0	0		25/50 SPT(C) N=50	-16.44	18.00 (2.00)	OVERBURDEN: Driller notes Boulder with Sand. Recovery consists of dense brown slightly clayey angular to sub-angular fine to coarse Gravel.		
19.00-19.45 19.00	70	0	0		25/50 SPT(C) N=50					
20.00										

Remarks

Scale (approx): 1:50

Logged By: NM

Figure No.: 9230-11-19.BH09

Ground Investigations Ireland Ltd
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Machine : Dando 2000/Berreta T44 **Flush :** Water **Core Dia :** 63.5 mm **Method :** Cable Percussion with Rotary Core follow on	**Casing Diameter** 200mm cased to 7.00m 96mm cased to 29.00m	**Ground Level (mOD)** 1.56	**Site** Avoca River Park, Arklow **Client** FT Squared	**Borehole Number** BH09 **Job Number** 9230-11-19
	Location (dGPS) 722836.2 E 674981.9 N	**Dates** 06/02/2020-16/06/2020	**Project Contractor** GII	**Sheet** 3/3

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
20.00-20.45	57	13	7		SPT(C) N=50 25/50	-18.44	20.00	OVERBURDEN: Driller notes Boulder with Sand. Recovery consists dense of angular to sub-rounded fine to coarse Gravel of mixed lithologies with occasional cobbles..		
21.40-21.85 21.40	28	0	0		10,9/12,12,26 SPT(C) N=50		(3.40)			
22.00	10	0	0							
23.60-24.05 23.60	100	0	0		9,11/23,27 SPT(C) N=50	-21.84	23.40 (0.70)	OVERBURDEN: Driller notes Rock at 24.1m BGL. Recovery consists of very weak to weak dark grey fine grained thinly laminated Slate. Partially weathered.		
24.10	100	0	0	NI		-22.54	24.10	Weak dark grey fine grained thinly laminated SLATE with some quartz veining. Partially weathered.		
24.80	100	0	0					24.10m -27.80m BGL: Sequence predominantly non intact. Recovery indicates one fractureset. F1 - Very close to closely spaced, 70-80 degrees, planar smooth, tight to open, some clay smearing on fracture surfaces.		
26.00	100	0	0				(3.70)			
27.00	100	0	0							
27.60 27.80	100	21	14	14		-26.24	27.80 (1.20)	Medium strong dark grey green fine grained foliated SLATE. Unweathered. 27.80m - 29.0m BGL - One fracture set. F1 - Very closely spaced, 70-90 degrees, planar smooth, tight to open, clean fracture surfaces.		
29.00						-27.44	29.00	Complete at 29.00m		

Remarks

Scale (approx) 1:50	**Logged By** NM
Figure No. 9230-11-19.BH09	

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Site	Avoca River Park, Arklow				**Borehole Number** **BH10**
Machine : Dando 2000 & Comacchio GEO305 **Method :** Cable Percussion with Rotary Core follow on	**Casing Diameter** 200mm cased to 11.00m 96mm cased to 29.00m	**Ground Level (mOD)** 1.60	**Client** FT Squared		**Job Number** 9230-11-19
	Location (dGPS) 722868.4 E 674925.6 N	**Dates** 09/01/2020- 06/02/2020	**Project Contractor** GII		**Sheet** 1/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
					1.50	0.10	TARMACADAM.			
						(0.20)				
					1.30	0.30	MADE GROUND: Black angular fine to coarse Gravel.			
							POSSIBLE MADE GROUND: Firm to stiff greyish brown slightly sandy gravelly CLAY. Gravel is angular to sub-angular, fine to coarse. Sand is fine to coarse.		▼1	
1.00-1.45 1.00	SPT(C) N=14 B			3,3/3,6,2,3		(1.40)				
					-0.10	1.70	Very soft dark grey mottled light brown sandy SILT. Sand is fine to medium.		▽1	
2.00 2.00-2.45	B SPT(C) N=1			Water strike(1) at 1.70m, rose to 0.90m in 20 mins. 1,1/0,0,0,1						
2.50-3.00	UT Failed									
3.00-3.45 3.00	SPT(C) N=1 B			1,0/1,0,0,0		(3.20)				
4.00-4.45 4.00	SPT(C) N=4 B			0,0/0,0,0,4						
					-3.30	4.90	Obstruction from 4.30 m BGL to 4.90m BGL, presumed wood.			
5.00-5.45 5.00	SPT(C) N=1 B 7 0	0		1,0/0,0,0,1		(0.40)	Very soft dark grey slightly sandy slightly gravelly slightly peaty SILT with rootlets and wood pieces. Gravel is angular to sub-angular, fine to coarse. Sand is fine to coarse. Peat is fibrous.			
					-3.70	5.30	Soft black slightly sandy slightly gravelly peaty SILT with rootlets, wood pieces and occasional sub-angular cobbles. Gravel is angular to sub-angular, fine to coarse. Sand is fine to coarse. Peat is fibrous.			
5.50-6.00	UT Failed									
6.00-6.45 6.00	SPT(C) N=2 B			2,3/1,0,0,1		(1.70)				
7.00-7.45 7.00	SPT(C) N=38 B			7,10/9,9,9,11	-5.40	7.00	Dense grey slightly sandy sub-angular to sub-rounded GRAVEL of varied lithology with occasional sub-angular to sub-rounded cobbles. Sand is medium to coarse.			
8.00-8.20 8.00	SPT(C) 50/50 B			12,12/19,31		(3.00)				
9.00-9.21 9.00	SPT(C) 50/60 B			16,23/50						
10.00										

Remarks

Borehole terminated at 10.00m BGL due to jammed casing.
Rotary follow on from 10.0m to 29.0m BGL
50mm Standpipe installed in borehole upon completion, slotted from 11.0m BGL to 2.50m BGL, plain from 2.50m BGL to ground level, with bentonite seal and raised cover
Chiselling from 4.30m to 4.90m for 1.5 hours. Chiselling from 10.00m to 10.00m for 1 hour.

Scale (approx)	**Logged By**
1:50	D. Potter

Figure No.
9230-11-19.BH10

Ground Investigations Ireland Ltd
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Site Avoca River Park, Arklow

Borehole Number BH10

Machine : Dando 2000 & Comacchio GEO305
Flush : water
Core Dia : 63.5 mm
Method : Cable Percussion with Rotary Core follow on

Casing Diameter
200mm cased to 11.00m
96mm cased to 29.00m

Ground Level (mOD) 1.60

Client FT Squared

Job Number 9230-11-19

Location (dGPS)
722868.4 E 674925.6 N

Dates
09/01/2020-
06/02/2020

Project Contractor GII

Sheet 2/3

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
10.00					B						
10.00-10.07					SPT(C) 25*/70 25/50 50/0	-8.40	10.00	OVERBURDEN: Driller notes Gravel with cobbles. Recovery consists of dense light grey brown sub-angular to sub-rounded medium to coarse Gravel with many sub-angular cobbles.			
11.00-11.38	16	0	0		13,13/17,19,14 SPT(C) 50/225						
12.60-12.98 12.60	19	0	0		21,2/5,28,17 SPT(C) 50/225						
14.20-14.58 14.20	7	0	0		14,17/17,22,11 SPT(C) 50/225						
15.70-16.15 15.70	3	0	0		9,2/1,7,3,5 SPT(C) N=16						
17.20	2	0	0				(14.50)				

Remarks
Chiselling from 10.00m to 10.00m for 1 hour.

Scale (approx) 1:50

Logged By D. Potter

Figure No. 9230-11-19.BH10

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Site: Avoca River Park, Arklow

Borehole Number: BH10

Machine : Dando 2000 & Comacchio GEO305
Flush : water
Core Dia : 63.5 mm
Method : Cable Percussion with Rotary Core follow on

Casing Diameter: 200mm cased to 11.00m
96mm cased to 29.00m

Ground Level (mOD): 1.60

Client: FT Squared

Job Number: 9230-11-19

Location (dGPS): 722868.4 E 674925.6 N

Dates: 09/01/2020-06/02/2020

Project Contractor: GII

Sheet: 3/3

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
20.20	3	0	0								
23.20	19	0	0								
24.50	50	0	0	NI		-22.90	24.50	Weak to medium strong fine grained thinly laminated grey SLATE with occasional brown staining, partially to distinctly weathered			
25.50	67	0	0					24.50-27.80m BGL: Non Intact			
26.10	100	18	18				(4.50)				
27.80	100	50	50	8				27.80-29.00m BGL: Two Fracture Sets: F1: Very close to close spaced, 0-20 degree, undulating rough with clay staining. F2: Very close to close, 70-90 degree, undulating rough with clay staining.			
29.00						-27.40	29.00	Complete at 29.00m			

Remarks

Scale (approx): 1:50

Logged By: D. Potter

Figure No.: 9230-11-19.BH10

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Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 12.30m	**Ground Level (mOD)** 1.30	**Client** FT Squared	**Job Number** 9230-11-19
	Location 722892.1 E 674856.1 N	**Dates** 06/01/2020- 07/01/2020	**Project Contractor** GII	**Sheet** 1/2

Site: Avoca River Park, Arklow

Borehole Number: BH11

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(1.10)	MADE GROUND: Black angular fine to coarse Gravel with occasional boulders.		
1.00-1.45 1.00	SPT(C) N=0 B			1,1/0,0,0,0	0.20	1.10 (0.70)	Very soft dark reddish grey slightly sandy SILT. Sand is fine to medium.		▼1
					-0.50	1.80 (0.20)	Very soft grey slightly sandy SILT. Sand is fine to medium.		
2.00-2.45 2.00	SPT(C) N=1 B			1,0/1,0,0,0	-0.70	2.00 (1.00)	Very soft grey mottled light brown sandy SILT. Sand is fine to medium.		
3.00-3.45 3.00	SPT(C) N=0 B			1,0/0,0,0,0	-1.70	3.00 (1.00)	Very soft grey mottled reddish brown sightly sandy slightly gravelly SILT with rootlets.Gravel is angular to sub-angular, fine to coarse. Sand is fine to coarse.		
4.00-4.45 4.00	SPT(C) N=2 B			1,1/1,0,0,1	-2.70	4.00 (1.80)	Very soft grey mottled reddish brown slightly sandy slightly peaty SILT with rootlets. Gravel is angular to sub-angular, fine to coarse. Sand is fine to coarse.		
5.00-5.45 5.00	SPT(C) N=1 B			1,0/1,0,0,0					
					-4.50	5.80 (0.70)	Very soft dark grey slightly sandy slightly gravelly peaty SILT with rootlets and wood pieces. Gravel is angular to sub-angular, fine to coarse. Sand is fine to coarse. Peat is fibrous.		
6.00-6.45 6.00	SPT(C) N=1 B			1,0/1,0,0,0					
					-5.20	6.50 (1.00)	Soft grey slightly sandy slightly gravelly SILT with occasional rootlets. Gravel is angular to sub-angular, fine to coarse. Sand is fine to coarse.		
7.00-7.45 7.00	SPT(C) N=7 B			0,0/0,0,3,4 Water strike(1) at 7.20m, rose to 1.70m in 20 mins.					∇1
					-6.20	7.50	Dense grey slightly sandy angular to sub-rounded fine to coarse GRAVEL with some sub-angular to sub-rounded cobbles. Sand is fine to coarse		
8.00-8.22 8.00	SPT(C) 50/70 B			13,24/50					
9.00-9.20 9.00	SPT(C) 50/50 B			11,25/50					
10.00-10.20	SPT(C) 50/50			11,22/50					

Remarks
Borehole terminated at 12.30m BGL due to obstruction.
Borehole backfilled upon completion.
Chiselling from 1.10m to 1.10m for 1 hour. Chiselling from 7.20m to 12.30m for 5 hours.

Scale (approx)	Logged By
1:50	D. Potter

Figure No.
9230-11-19.BH11

Site	Avoca River Park, Arklow
Borehole Number	**BH11**
Machine :	Dando 2000
Method :	Cable Percussion
Casing Diameter	200mm cased to 12.30m
Ground Level (mOD)	1.30
Client	FT Squared
Job Number	9230-11-19
Location	722892.1 E 674856.1 N
Dates	06/01/2020- 07/01/2020
Project Contractor	GII
Sheet	2/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(4.80)			
10.00	B								
11.00-11.15	SPT(C) 24*/145 50/0			24/50					
11.00	B								
12.00-12.00	SPT(C) 25*/0 50/0			25/50					
12.00	B				-11.00	12.30	Complete at 12.30m		

Remarks
Chiselling from 12.30m to 12.30m for 1 hour.

Scale (approx) 1:50

Logged By D. Potter

Figure No. 9230-11-19.BH11

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Site: Avoca River Park, Arklow
Borehole Number: BH11A

Machine : Dando 2000/Berreta T44
Method : Cable Percussion with Rotary Core follow on
Casing Diameter: 200mm cased to 8.00m
96mm cased to 33.00m
Ground Level (mOD): 1.38
Client: FT Squared
Job Number: 9230-11-19
Location (dGPS): 722922.6 E 674940 N
Dates: 08/01/2020-17/06/2020
Project Contractor: GII
Sheet: 1/4

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					1.28	0.10	TARMACADAM.		
						(0.30)	MADE GROUND: Dark grey angular fine to coarse Gravel.		
					0.98	0.40	MADE GROUND: Brownish grey angular to sub-angular fine to coarse Gravel with occasional boulders.		
						(0.90)			
1.00 1.00-1.45	B SPT(C) N=8			3,11/2,2,2,2					
					0.08	1.30	Very soft grey slightly sandy SILT. Sand is fine to medium.		▼1
						(0.60)			
					-0.52	1.90	Very soft grey mottled reddish brown sandy SILT. Sand is fine to coarse.		
2.00 2.30-2.80 2.00-2.45	B UT Failed SPT(C) N=1			UT-100: Test Failed. 1,0/1,0,0,0					
						(0.90)			
					-1.42	2.80	Soft grey slightly sandy SILT. Sand is fine to medium.		
3.00	B			UT-100: Test Failed.					
3.00-3.45	SPT(C) N=1			1,0/1,0,0,0					
						(1.40)			
4.00	B								
					-2.82	4.20	Firm black slightly sandy sandy gravelly silty fibrous PEAT with rootlets and wood fragments. Gravel is angular to sub-angular, fine to coarse. Sand is fine to coarse.		
4.20-4.70	UT Failed			UT-100: 100% Recovery.					
4.70-5.15	SPT(C) N=7			1,1/1,2,3,1					
5.00	B								
5.20-5.70	UT 100% Recovery			UT-100: 100% Recovery.		(2.30)			
5.70-6.15	SPT(C) N=14			2,2/5,5,3,1					
6.00	B								
6.20-7.20	UT Failed			UT-100: Test Failed. Water strike(1) at 6.50m, rose to 1.50m in 20 mins.					
					-5.12	6.50	Dense grey slightly sandy sub-angular to rounded fine to coarse GRAVEL of varied lithologies.Sand is medium to coarse.		▽1
7.00 7.00-7.45	B SPT(C) N=39			6,9/8,9,10,12					
						(1.50)			
				25/50					
8.00-8.04 8.00				SPT(C) 25*/40 50/0	-6.62	8.00	OVERBURDEN: Driller notes Boulder with Sand. Recovery consists of dense grey slightly sandy sub-angular to sub-rounded fine to coarse Gravel with occasional cobbles..		
9.00-9.45 9.00				10,9/7,11,11,13 SPT(C) N=42					
10.00									

Depth (m)	TCR	SCR	RQD	FI
8.00	0	0	0	
9.00	18	3	0	

Remarks
Borehole terminated at 8.0m BGL due to obstruction.
Rotary follow on from 8.0m to 33.0m BGL
Borehole backfilled upon completion.
UT100 Failed at 2.3m, 4.2m and 6.2m - UT100 at 5.2m -100% recovery
Chiselling from 7.00m to 8.00m for 1 hour. Chiselling from 8.00m to 8.00m for 1 hour.

Scale (approx): 1:50
Logged By: NM
Figure No.: 9230-11-19.BH11A

Site	Avoca River Park, Arklow		**Borehole Number**	**BH11A**
Machine : Dando 2000/Berreta T44 **Flush :** Water **Core Dia :** 63.5 mm **Method :** Cable Percussion with Rotary Core follow on	**Casing Diameter** 200mm cased to 8.00m 96mm cased to 33.00m	**Ground Level (mOD)** 1.38	**Client** FT Squared	**Job Number** 9230-11-19
	Location (dGPS) 722922.6 E 674940 N	**Dates** 08/01/2020- 17/06/2020	**Project Contractor** GII	**Sheet** 2/4

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
10.00-10.45					SPT(C) N=50 12,14/17,33		(4.00)			
	30	3	0							
11.00-11.45 11.00					10,9/11,13,17,9 SPT(C) N=50					
	25	0	0							
12.00-12.45 12.00					9,8/9,10,12,10 SPT(C) N=41	-10.62	12.00	OVERBURDEN: Driller notes Blowing Sand with Boulder. Recovery consists of dense brown slightly clayey gravelly fine to coarse Sand.		
	20	0	0							
13.00										
	25	0	0							
14.00										
	4	0	0				(8.00)			
17.00										
	15	0	0							
20.00										

Remarks

Scale (approx)	**Logged By**
1:50	NM

Figure No.
9230-11-19.BH11A

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Machine : Dando 2000/Berreta T44 **Flush :** Water **Core Dia :** 63.5 mm **Method :** Cable Percussion with Rotary Core follow on	**Casing Diameter** 200mm cased to 8.00m 96mm cased to 33.00m	**Ground Level (mOD)** 1.38	**Site** Avoca River Park, Arklow	**Borehole Number** **BH11A**
			Client FT Squared	**Job Number** 9230-11-19
	Location (dGPS) 722922.6 E 674940 N	**Dates** 08/01/2020- 17/06/2020	**Project Contractor** GII	**Sheet** 3/4

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
20.00-20.45	22	0	0		SPT(C) N=50 23,24/50	-18.62	20.00	OVERBURDEN: Driller notes Blowing Sand. Recovery consists of dense brown slightly clayey slightly gravelly fine to coarse Sand.		
23.00-23.45 23.00	14	0	0		19,22/22,18,10 SPT(C) N=50		(6.00)			
26.00-26.45 26.00	33	18	12		14,17/17,19,14 SPT(C) N=50	-24.62	26.00	OVERBURDEN: Driller notes Boulder. Recovery consists of grey Boulders with occasional sub-rounded gravels and cobbles.		
							(2.30)			
27.10	58	23	23							
28.30	100	19	19	6		-26.92	28.30	Strong pale grey fine grained thinly laminated SANDSTONE with quartz veining. Distinctly weathered.		
							(1.90)	28.30m-30.20m BGL - Two fracture sets: F1 - Close to medium spaced, 70-90 degrees, planar rough, tight to open, brown staining on fracture surfaces. F2 - Close to medium spaced, 30-45 degrees, stepped smooth, tight to open, clean fracture surfaces.		
29.30	100	19	19							
30.00										

Remarks	**Scale (approx)** 1:50	**Logged By** NM
	Figure No. 9230-11-19.BH11A	

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Site	Avoca River Park, Arklow			**Borehole Number**	**BH11A**
Machine : Dando 2000/Berreta T44 **Flush :** Water **Core Dia :** 63.5 mm	**Casing Diameter** 200mm cased to 8.00m 96mm cased to 33.00m	**Ground Level (mOD)** 1.38	**Client** FT Squared	**Job Number**	9230-11-19
Method : Cable Percussion with Rotary Core follow on	**Location** (dGPS) 722922.6 E 674940 N	**Dates** 08/01/2020- 17/06/2020	**Project Contractor** GII	**Sheet**	4/4

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
30.20	100	8	0	NI		-28.82	30.20 (1.40)	Weak to medium strong dark grey fine grained foliated SLATE. Distinctly weathered. 30.20m - 31.0m BGL - Non Intact.		
31.00				9						
31.60	100	26	16			-30.22	31.60 (1.40)	Medium strong to strong dark grey black fine grained foliated SLATE with quartz veining and pyrite mineralisation. Partially weathered to unweathered. 31.0m - 33.0m BGL - One fracture set: F1 - Very close to closely spaced, 45-60 degrees, planar smooth, tight to open, clay infill and pyrite mineralisation on fracture surfaces		
33.00						-31.62	33.00	Complete at 33.00m		

Remarks	**Scale (approx)** 1:50	**Logged By** NM
	Figure No. 9230-11-19.BH11A	

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Site Avoca River Park, Arklow				**Borehole Number** **BH12**
Machine : Dando 2000 & Comacchio GEO305 **Method :** Cable Percussion with Rotary Core follow on	**Casing Diameter** 200mm cased to 7.70m 96mm cased to 27.60m	**Ground Level (mOD)** 2.08	**Client** FT Squared	**Job Number** 9230-11-19
	Location (dGPS) 722609.5 E 674984.5 N	**Dates** 27/01/2020- 28/01/2020	**Project Contractor** GII	**Sheet** 1/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
						(0.80)	MADE GROUND: Grey angular fine to coarse Gravel.		▼1	
				Water strike(1) at 0.80m, rose to 0.30m in 20 mins.	1.28	0.80 (0.20)	MADE GROUND: Light red slightly clayey angular to sub-angular fine to coarse Gravel with occasional sub-angular cobbles.		▽1	
1.00 1.00-1.45	B SPT(C) N=21			4,9/5,5,7,4	1.08	1.00	Stiff light brown slightly sandy SILT. Sand is fine to medium.			
2.00 2.00-2.45	B SPT(C) N=23			2,5/5,5,6,7		(1.90)				
3.00 3.00-3.45	B SPT(C) N=22			2,2/4,5,6,7	-0.82	2.90	Medium dense grey sandy angular to sub-rounded fine to coarse GRAVEL of various lithologies with occasional sub-angular to sub-rounded cobbles. Sand is fine to coarse.			
4.00 4.00-4.45	B SPT(C) N=28			3,5/5,8,7,8		(3.10)				
5.00 5.00-5.45	B SPT(C) N=27			4,3/3,6,9,9						
6.00 6.00-6.45	B SPT(C) N=41			11,7/9,9,12,11	-3.92	6.00	Dense grey sandy angular to sub-rounded fine to coarse GRAVEL of various lithologies with occasional sub-angular to sub-rounded cobbles. Sand is fine to coarse.			
7.00 7.00-7.26	B SPT(C) 50/105			21,24/50		(1.70)				
	TCR	**SCR**	**RQD**	**FI**						
7.70	9	0	0		-5.62	7.70	OVERBURDEN: Driller notes Cobbles. Recovery consists of dense grey sub-angular to sub-rounded gravelly Cobbles of different lithologies comprising of limestone granite and quartzite.			
8.20-8.65 8.20	8	0	0	12,15/16,11,15,8 SPT(C) N=50		(2.30)				
10.00										

Remarks
Borehole terminated at 7.70m BGL due to obstruction.
Rotary follow on from 7.70m to 27.60m BGL
50mm Standpipe installed in borehole upon completion, slotted from 27.60m BGL to 2.00m BGL, plain from 2.00m BGL to ground level, with bentonite seal and raised cover.
No UT100 or Piston sample taken due to gravels
Chiselling from 7.70m to 7.70m for 1 hour.

Scale (approx)	Logged By
1:50	D. Potter

Figure No.
9230-11-19.BH12

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Site	Avoca River Park, Arklow		**Borehole Number**	BH12
Machine : Dando 2000 & Comacchio GEO305 **Flush :** water **Core Dia :** 63.5 mm **Method :** Cable Percussion with Rotary Core follow on	**Casing Diameter** 200mm cased to 7.70m 96mm cased to 27.60m	**Ground Level (mOD)** 2.08	**Client** FT Squared	**Job Number** 9230-11-19
	Location (dGPS) 722609.5 E 674984.5 N	**Dates** 27/01/2020- 28/01/2020	**Project Contractor** GII	**Sheet** 2/3

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
10.00-10.45					SPT(C) N=50 15,15/14,18,16,2	-7.92	10.00	OVERBURDEN: Driller notes Cobbles with Sand. Recovery consists of medium dense grey brown gravelly Cobbles of different lithologies comprising of limestone granite quartzite.			
	22	0	0								
11.60-12.05 11.60					10,9/9,11,12,14 SPT(C) N=46						
	6	0	0								
13.20-13.50 13.20					9,12/28,22 SPT(C) 50/150						
	7	0	0				(7.80)				
14.70-15.15 14.70					1,2/1,10,11,10 SPT(C) N=32						
	3	0	0								
16.20-16.65 16.20					8,9/9,10,10,12 SPT(C) N=41						
	3	0	0								
17.80-18.25 17.80					5,5/4,4,8,6 SPT(C) N=22	-15.72	17.80	OVERBURDEN: Driller notes Cobbles with Sand. Recovery consists of grey brown gravelly Cobbles of different lithologies comprising of limestone granite quartzite.			
	3	0	0				(2.20)				
19.40-19.85 19.40					2,2/3,2,10,5 SPT(C) N=20						

Remarks	**Scale (approx)** 1:50	**Logged By** D. Potter
	Figure No. 9230-11-19.BH12	

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Site	Avoca River Park, Arklow
Borehole Number	**BH12**
Machine	Dando 2000 & Comacchio GEO305
Flush	water
Core Dia	63.5 mm
Method	Cable Percussion with Rotary Core follow on
Casing Diameter	200mm cased to 7.70m 96mm cased to 27.60m
Ground Level (mOD)	2.08
Client	FT Squared
Job Number	9230-11-19
Location (dGPS)	722609.5 E 674984.5 N
Dates	27/01/2020- 28/01/2020
Project Contractor	GII
Sheet	3/3

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
	0	0	0			-17.92	20.00	OVERBURDEN: Driller notes Cobbles with Sand. Recovery consists of dense grey brown gravelly Cobbles of different lithologies comprising of limestone granite quartzite.			
21.90-22.35 21.90					6,7/6,9,11,9 SPT(C) N=35		(3.60)				
	6	0	0								
23.60	100	0	0			-21.52	23.60	Weak foliated very fine to fine grained dark grey SHALE. Non intact, brown staining present on fracture surfaces. Quartz veining present between 24.5m and 24.8			
24.30	100	42	42				(1.20)				
						-22.72	24.80	Very weak foliated very fine to fine grained dark grey SHALE. Non intact			
25.00	85	10	10	NI							
26.00	75	0	0				(2.80)				
26.90	100	0	0								
27.60						-25.52	27.60	Complete at 27.60m			

Remarks

Scale (approx)	**Logged By**
1:50	D. Potter

Figure No. 9230-11-19.BH12

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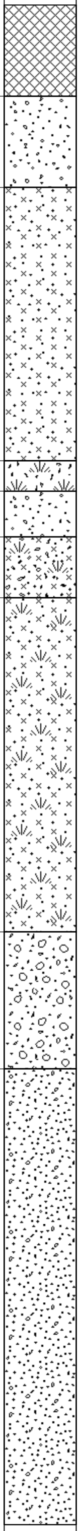
Site	Avoca River Park, Arklow		**Borehole Number**	**BH13**
Machine : Dando 2000/Berreta T44 **Method :** Cable Percussion with Rotary Core follow on	**Casing Diameter** 200mm cased to 7.00m 96mm cased to 27.70m	**Ground Level (mOD)** 1.71	**Client** FT Squared	**Job Number** 9230-11-19
	Location (dGPS) 722661.3 E 674927.7 N	**Dates** 24/01/2020- 18/06/2020	**Project Contractor** GII	**Sheet** 1/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Water
				Water strike(1) at 0.30m, fell to 0.40m in 20 mins, sealed at 1.20m.		(0.60)	MADE GROUND: Dark grey slightly sandy gravelly Clay. Gravel is angular to sub-angular, fine to coarse. Sand is fine to coarse.	▽1 ▼1
0.50	B				1.11	0.60	MADE GROUND: Firm multicoloured slightly sandy sub-angular to sub-rounded fine to coarse GRAVEL. Sand is medium to coarse.	
1.00 1.00-1.45	B SPT(C) N=8			1,2/2,2,3,1		(0.60)		
					0.51	1.20	Very soft grey sandy SILT. Sand is fine to medium.	
2.00 2.00-2.45	B SPT(C) N=2			0,1/1,1,0,0		(1.80)		▼3
2.50	UT 100% Recovery							
3.00 3.00-3.45	B SPT(C) N=1			1,0/1,0,0,0	-1.29	3.00 (0.20)	Very soft dark brown slightly sandy gravelly fibrous PEAT with many wood pieces and rootlets. Gravel is angular to sub-angular, fine to coarse. Sand is fine to coarse.	▼2
				Water strike(2) at 3.20m, rose to 3.00m in 20 mins, sealed at 3.50m.	-1.49	3.20 (0.30)	Very loose grey slightly sandy sub-angular to sub-rounded fine to coarse GRAVEL. Sand is fine to coarse	▽2
					-1.79	3.50 (0.40)	Very soft grey slightly sandy slightly gravelly SILT with rootlets. Gravel is angular to sub-angular, fine to coarse. Sand is fine to coarse	
4.00 4.00-4.45	B SPT(C) N=1			1,0/1,0,0,0	-2.19	3.90	Very soft dark grey slightly sandy slightly peaty SILT with some rootlets. Sand is fine to coarse. Peat is fibrous.	
5.00 5.00-5.45	B SPT(C) N=1			1,0/1,0,0,0		(2.20)		
6.00	B			Water strike(3) at 6.00m, rose to 2.00m in 20 mins.	-4.39	6.10	Dense grey slightly sandy slightly gravelly angular to sub-angular COBBLES. Gravel is angular to sub-angular, fine to coarse. Sand is medium to coarse.	▽3
6.00-6.45	SPT(C) N=43			2,6/10,10,11,12		(0.90)		
7.00 7.00-7.45 7.00				25/50 B SPT(C) N=50	-5.29	7.00	OVERBURDEN: Driller notes Blowing Sand. Recovery consists of brown gravelly fine to coarse Sand.	
						(4.30)		

TCR	SCR	RQD	FI
46	3	0	



Remarks
Borehole terminated at 7.0m BGL due to obstruction.
Rotary follow on from 7.0m to 27.70m BGL.
Borehole backfilled upon completion.
UT100 at 2.5m - 100% recovery
Chiselling from 7.00m to 7.00m for 1 hour.

Scale (approx) 1:50	**Logged By** NM
Figure No. 9230-11-19.BH13	

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Site	Avoca River Park, Arklow
Borehole Number	BH13
Machine	Dando 2000/Berreta T44
Flush	Water
Core Dia	63.5 mm
Method	Cable Percussion with Rotary Core follow on
Casing Diameter	200mm cased to 7.00m 96mm cased to 27.70m
Location (dGPS)	722661.3 E 674927.7 N
Ground Level (mOD)	1.71
Dates	24/01/2020-18/06/2020
Client	FT Squared
Project Contractor	GII
Job Number	9230-11-19
Sheet	2/3

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
11.30						-9.59	11.30	OVERBURDEN: Driller notes Boulder. Recovery consists of slightly sandy sub-angular to sub-rounded fine to coarse Gravels of mixed lithologies with occasional cobbles..		
	35	0	0				(2.70)			
13.00-13.45 13.00					11,14/14,16,20 SPT(C) N=50					
	43	0	0							
14.00-14.45 14.00					23,25/50 SPT(C) N=50	-12.29	14.00	OVERBURDEN: Driller notes Blowing Sand. No Recovery.		
	0	0	0				(3.00)			
17.00						-15.29	17.00	OVERBURDEN: Driller notes Boulder with Sand . Recovery consists of slightly sandy sub-angular to sub-rounded fine to coarse Gravels of mixed lithologies with occasional cobbles..		
	12	2	0							
20.00										

Remarks

Scale (approx)	1:50
Logged By	NM
Figure No.	9230-11-19.BH13

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Machine : Dando 2000/Berreta T44 **Flush :** Water **Core Dia :** 63.5 mm **Method :** Cable Percussion with Rotary Core follow on	**Casing Diameter** 200mm cased to 7.00m 96mm cased to 27.70m	**Ground Level (mOD)** 1.71	**Site** Avoca River Park, Arklow **Client** FT Squared	**Borehole Number** BH13 **Job Number** 9230-11-19
	Location (dGPS) 722661.3 E 674927.7 N	**Dates** 24/01/2020-18/06/2020	**Project Contractor** GII	**Sheet** 3/3

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
20.00-20.45	8	0	0		SPT(C) N=50 10,13/15,15,20		(6.00)			
21.50-21.95 21.50	17	0	0		11,13/14,11,15,10 SPT(C) N=50					
23.00	98	13	13	NI		-21.29	23.00	Weak to medium strong dark grey fine grained thinly laminated foliated SLATE with quartz veining and pyrite mineralisation. Partially weathered. 23.0m - 23.80m BGL - Non Intact.		
23.80	100	29	13	4		-22.99	(1.70) 24.70	23.80m- 25.20m BGL - One fracture set: F1 - Closely spaced, 45-60 degrees, stepped smooth, tight to open, silt infill and pyrite mineralisation on fracture surfaces.		
								Medium strong to strong dark grey fine grained thinly laminated foliated SLATE with quartz veining. Partially weathered.		
25.20	100	11	17	5			(2.00)	25.20m - 26.30m BGL - One fracture set: F1 - Closely spaced, 60-80 degrees, planar smooth, tight to open, silt infill on fracture surfaces.		
26.30				NI				26.30m - 26.70m BGL - Non Intact.		
26.70	100	45	40	2		-24.99	26.70 (1.00)	Strong to very strong dark grey fine grained thinly laminated foliated SLATE with abundant quartz veining. Partially weathered. 26.70m - 27.70m BGL - One fracture set: F1 - Close to medium spaced, 60-80 degrees, planar rough, tight to open, clean on fracture surfaces.		
27.70						-25.99	27.70	Complete at 27.70m		

Remarks	**Scale (approx)** 1:50	**Logged By** NM
	Figure No. 9230-11-19.BH13	

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Machine : Dando 2000 & Comacchio GEO305 **Method :** Cable Percussion with Rotary Core follow on	**Casing Diameter** 200mm cased to 7.00m 96mm cased to 29.60m	**Ground Level (mOD)** 1.96	**Site** Avoca River Park, Arklow **Client** FT Squared	**Borehole Number** BH14 **Job Number** 9230-11-19
	Location 722712.6 E 674860.4 N	**Dates** 10/01/2020- 22/06/2020	**Project Contractor** GII	**Sheet** 1/3

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
				Water strike(1) at 0.40m, no rise after 20 mins.		(0.90)	MADE GROUND: Grey angular fine to coarse Gravel with occasional angular cobbles.		▼1	
					1.06	0.90 (3.30)	NO RECOVERY. Driller notes pushing large piece of wood from 0.90m to 4.20m.			
					-2.24	4.20 (0.30)	Grey slightly sandy SILT. Sand is fine to medium.			
					-2.54	4.50 (2.50)	NO RECOVERY. Driller notes pushing large obstruction from 4.50m to 7.00m.			
	TCR / SCR	RQD	FI							
7.00					-5.04	7.00 (1.20)	OVERBURDEN: Driller notes sandy gravelly Clay. Recovery consists of stiff brown slightly sandy gravelly Clay with occasional boulders. Gravel is sub-angular to sub-rounded, fine to coarse.			
8.20-8.65	7 / 0	0		12,11/13,10,15,12 SPT(C) N=50	-6.24	8.20	OVERBURDEN: Driller notes Boulders. Recovery consists of dense grey slightly sandy sub-angular coarse Gravel with occasional sub-angular cobbles.			
9.60-10.05				15,18/1,2,12,18 SPT(C) N=33		(3.00)				
9.70										

Remarks
Borehole terminated at 7.0m BGL due to obstruction.
Rotary follow on from 7.0m to 29.60m BGL.
50mm Standpipe installed in borehole upon completion, slotted from 26.50m BGL to 2.0m BGL, plain from 2.0m BGL to ground level, with bentonite seal and raised cover
Chiselling from 6.30m to 6.30m for 1.5 hours.

Scale (approx)	Logged By
1:50	D. Potter

Figure No.
9230-11-19.BH14

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Machine : Dando 2000 & Comacchio GEO305 **Flush :** water **Core Dia :** 63.5 mm **Method :** Cable Percussion with Rotary Core follow on	**Casing Diameter** 200mm cased to 7.00m 96mm cased to 29.60m	**Ground Level (mOD)** 1.96	**Site** Avoca River Park, Arklow **Client** FT Squared	**Borehole Number** BH14 **Job Number** 9230-11-19
	Location 722712.6 E 674860.4 N	**Dates** 10/01/2020- 22/06/2020	**Project Contractor** GII	**Sheet** 2/3

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
	10	0	0								
11.20-11.65 11.20	73	0	0		10,7/8,7,7,9 SPT(C) N=31	-9.24	11.20 (2.10)	OVERBURDEN: Driller notes gravelly Sand with Boulders. Recovery consists of dense brown gravelly fine to coarse Sand with occasional cobbles. Gravel is fine to coarse, sub-angular to sub-rounded.			
12.70-13.15 12.70	100	0	0		15,6/6,8,12,1 SPT(C) N=27						
						-11.34	13.30 (0.30)	OVERBURDEN: Driller notes Boulders. Recovery consists of medium dense grey sub-rounded coarse Gravel with occasional cobbles.			
13.60	12	0	0			-11.64	13.60 (11.00)	OVERBURDEN: Driller notes gravelly Sand. Recovery consists of medium dense brown gravelly fine to coarse Sand with some cobbles. Gravel is fine to coarse, sub-angular to sub-rounded.			
16.60-17.05 16.60	4	0	0		2,3/3,4,5,6 SPT(C) N=18						

Remarks

Scale (approx) 1:50	**Logged By** D. Potter
Figure No. 9230-11-19.BH14	

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Site Avoca River Park, Arklow				**Borehole Number** **BH14**
Machine : Dando 2000 & Comacchio GEO305 **Flush :** water **Core Dia :** 63.5 mm **Method :** Cable Percussion with Rotary Core follow on	**Casing Diameter** 200mm cased to 7.00m 96mm cased to 29.60m	**Ground Level (mOD)** 1.96	**Client** FT Squared	**Job Number** 9230-11-19
	Location 722712.6 E 674860.4 N	**Dates** 10/01/2020- 22/06/2020	**Project Contractor** GII	**Sheet** 3/3

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
					1,5/3,4,6,7						
20.20-20.65 20.20	9	0	0		SPT(C) N=20						
21.80-22.25 21.80	4	0	0		5,3/3,3,5,6 SPT(C) N=17						
24.60	100	77	9	7		-22.64	24.60	Weak to medium strong fine grained thinly laminated grey SLATE with occasional quartzite veins, interbed with medium strong fine grained thinly laminated light grey SANDSTONE, partially to distinctly weathered. 24.60-26.30m BGL: F1: Very close to closely spaced, 40-60 degree, planar smooth with clay smearing. F2: Very close to medium spaced, 20-30 degree, undulating rough with clay smearing.			
25.70	100	50	25								
26.30				NI			(4.10)	26.30-27.10m BGL: Non Intact			
26.70	100	38	25								
27.10				9				27.10-28.70m BGL: F1: Very close to closely spaced, 40-60 degree, planar smooth, clean fracture surfaces..			
27.90	100	71	42								
28.70				NI		-26.74	28.70	Medium strong fine grained light grey SANDSTONE with occasional quartzite veins. 28.70-28.90m BGL: Non Intact			
28.90				6			(0.90)	28.90-29.60m BGL: F1: Closely spaced, 40-60 degree, planar smooth, clean fracture surfaces. F2: Closely spaced, 20-30 degree, undulating rough, clean fracture surfaces.			
29.10	100	100	60								
29.60						-27.64	29.60	Complete at 29.60m			

Remarks	**Scale (approx)** 1:50	**Logged By** D. Potter
	Figure No. 9230-11-19.BH14	

Ground Investigations Ireland Ltd www.gii.ie			**Site** Avoca River Park, Arklow	**Borehole Number** **BH14A**
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 8.50m	**Ground Level (mOD)** 1.91	**Client** FT Squared	**Job Number** 9230-11-19
	Location (dGPS) 722714.3 E 674858.3 N	**Dates** 13/01/2020	**Project Contractor** GII	**Sheet** 1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(0.70)	MADE GROUND: Grey angular fine to coarse Gravel with occasional angular cobbles.		▼1 ∇1
				Water strike(1) at 0.70m, rose to 0.40m in 20 mins.	1.21	0.70 (3.80)	NO RECOVERY. Driller notes pushing large piece of wood from 0.70m to 4.50m.		
					-2.59	4.50 (0.50)	Grey slightly sandy gravelly SILT. Gravel is angular to sub-angular, fine to medium. Sand is fine to coarse		
5.00	B				-3.09	5.00 (0.30)	Soft black slightly sandy slightly silty fibrous PEAT with wood and rootlets. Sand is fine to coarse		
					-3.39	5.30 (1.20)	Soft dark brown mottled grey slightly sandy peaty SILT with rootlets and wood pieces. Sand is fine to coarse. Peat is fibrous.		
5.50-6.00	UT Failed								
6.00-6.45 6.00	SPT(C) N=5 B			1,0/1,1,1,2					
					-4.59	6.50 (2.00)	Dense grey slightly sandy slightly gravelly sub-angular to sub-rounded COBBLES. Gravel is angular to sub-angular, fine to coarse. Sand is medium to coarse.		
7.00-7.40 7.00	SPT(C) 50/245 B			9,11/17,12,21					
8.00-8.35 8.00	SPT(C) 50/195 B			14,19/31,19					
					-6.59	8.50	Complete at 8.50m		

Remarks
Borehole terminated at 8.50m BGL due to obstruction.
Borehole backfilled upon completion.
UT100 failed at 5.5m
Chiselling from 6.50m to 8.50m for 2.5 hours. Chiselling from 8.50m to 8.50m for 1 hour.

Scale (approx) 1:50

Logged By D. Potter

Figure No. 9230-11-19.BH14A

Ground Investigations Ireland Ltd www.gii.ie			Site Avoca River Park, Arklow	Borehole Number **BH15**
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 13.20m	**Ground Level (mOD)** 1.90	**Client** FT Squared	**Job Number** 9230-11-19
	Location 722777.7 E 674859.8 N	**Dates** 11/12/2019- 16/12/2019	**Project Contractor** GII	**Sheet** 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							MADE GROUND: Greyish brown slightly sandy gravelly Clay. Gravel is angular to sub-angular, fine to coarse. Sand is fine to coarse.		∇1
0.50	B			Water strike(1) at 0.20m, rose to 0.00m in 20 mins.		(1.20)			
1.00-1.45 1.00	SPT(C) N=2 B			1,0/0,0,1,1					
					0.70	1.20	Very soft grey slightly sandy SILT. Gravel is angular to sub-angular, fine to coarse. Sand is fine to medium.		
2.00-2.45 2.00	SPT(C) N=2 B			0,1/1,0,0,1					
						(2.70)			
3.00 3.00	B UT Failed								
					-2.00	3.90	Very soft dark grey mottled reddish brown slightly sandy slightly gravelly slightly peaty SILT with rootlets. Gravel is angular to sub-angular, fine to coarse. Sand is fine to medium. Peat is fibrous.		
4.00-4.45 4.00	SPT(C) N=1 B			0,1/0,0,0,1					
						(1.70)			
5.00 5.00	B UT Failed								▼2
					-3.70	5.60	Soft grey slightly sandy SILT. Sand is fine to medium.		
						(0.80)			
6.00-6.45 6.00	SPT(C) N=5 B			1,2/1,2,1,1 Water strike(2) at 6.30m, rose to 5.10m in 20 mins.					∇2
					-4.50	6.40	Medium dense grey slightly sandy sub-angular to sub-rounded GRAVEL with occasional sub-angular cobbles. Sand is medium to coarse.		
7.00-7.45 7.00	SPT(C) N=16 B			2,3/4,5,4,3					
						(2.60)			
8.00-8.45 8.00	SPT(C) N=17 B			3,2/3,4,5,5					
					-7.10	9.00	Stiff dark reddish brown slightly sandy SILT. Sand is fine to medium.		
9.00-9.45 9.00	SPT(C) N=13 B			4,4/2,2,4,5					
10.00-10.45	SPT(C) N=27			3,5/5,7,8,7					

Remarks
Borehole terminated at 13.20m BGL due to obstruction.
Borehole backfilled upon completion.
UT100 Failed at 3.0m and 5.0m

Scale (approx)	Logged By
1:50	D. Potter

Figure No.
9230-11-19.BH15

Ground Investigations Ireland Ltd www.gii.ie			**Site** Avoca River Park, Arklow	**Borehole Number** **BH15**
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 13.20m	**Ground Level (mOD)** 1.90	**Client** FT Squared	**Job Number** 9230-11-19
	Location 722777.7 E 674859.8 N	**Dates** 11/12/2019- 16/12/2019	**Project Contractor** GII	**Sheet** 2/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
10.00	B					(2.60)			
11.00-11.45 11.00	SPT(C) N=33 B			4,6/7,8,8,10					
					-9.70	11.60	Dense grey sandy sub-angular to rounded GRAVEL with occasional sub-angular to sub-rounded cobbles. Sand is medium to coarse.		
12.00-12.45 12.00	SPT(C) N=25 B			5,11/5,8,5,7					
						(1.60)			
13.00-13.00 13.00	SPT(C) 25*/0 50/0 B			25/50					
					-11.30	13.20	Complete at 13.20m		

Remarks Chiselling from 11.50m to 12.00m for 0.5 hours. Chiselling from 13.00m to 13.20m for 1 hour.	**Scale (approx)** 1:50	**Logged By** D. Potter
	Figure No. 9230-11-19.BH15	

Ground Investigations Ireland Ltd www.gii.ie			Site Avoca River Park, Arklow	Borehole Number **BH16**
Machine : Dando 2000 **Method :** Cable Percussion	**Casing Diameter** 200mm cased to 12.00m	**Ground Level (mOD)** 1.79	**Client** FT Squared	**Job Number** 9230-11-19
	Location 722821.5 E 674794.3 N	**Dates** 17/12/2019- 20/12/2019	**Project Contractor** GII	**Sheet** 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						(0.80)	MADE GROUND: Grey sandy angular to sub-angular fine to coarse Gravel. Sand is medium to coarse.		
0.50	B								
					0.99	0.80	Very soft light greyish brown slightly sandy slightly gravelly CLAY.		
1.00-1.45 1.00	SPT(C) N=2 B			1,0/0,0,1,1					
						(0.80)			
					0.19	1.60	Very soft grey slightly sandy SILT. Sand is fine to coarse.		
						(0.40)			
					-0.21	2.00	Very soft dark grey mottled dark reddish brown slightly sandy SILT with occasional rootlets. Sand is fine to medium.		
2.00 2.00-3.00	B UT								▼1
						(2.00)			∇1
3.00	B			Water strike(1) at 3.00m, rose to 2.30m in 20 mins.					
3.00-3.45	SPT(C) N=1			1,0/0,0,1,0					
4.00-4.45 4.00	SPT(C) N=3 B			1,1/0,1,1,1	-2.21	4.00	Very soft grey slightly sandy SILT. Sand is fine to medium.		
						(1.00)			
5.00-5.45 5.00	SPT(C) N=3 B			1,2/1,0,1,1	-3.21	5.00	Soft dark grey mottled dark brown slightly sandy peaty SILT with rootlets and wood pieces. Sand is fine to medium. Peat is fibrous.		
						(1.10)			
6.00-6.45 6.00	SPT(C) N=4 B			1,1/1,1,1,1	-4.31	6.10	Soft grey slightly sandy SILT. Sand is fine to medium.		
						(1.40)			
7.00-7.45 7.00	SPT(C) N=5 B			1,2/1,2,1,1					
					-5.71	7.50	Medium dense grey slightly sandy sub-angular to sub-rounded fine to coarse GRAVEL of varied lithologies. Sand is medium to coarse.		
8.00-8.45 8.00	SPT(C) N=26 B			3,5/7,5,7,7					
						(1.70)			
9.00-9.45 9.00	SPT(C) N=20 B			3,5/4,5,5,6					
					-7.41	9.20	Stiff dark reddish brown slightly sandy slightly gravelly SILT. Gravel is angular to sub-angular, fine to coarse. Sand is fine to medium.		
10.00-10.45	SPT(C) N=24			4,5/6,5,7,6					

Remarks
Borehole terminated at 12.00m BGL due to obstruction.
Borehole backfilled upon completion.

Scale (approx)	Logged By
1:50	D. Potter

Figure No.
9230-11-19.BH16

Ground Investigations Ireland Ltd
www.gii.ie

Site
Avoca River Park, Arklow

Borehole Number
BH16

Machine : Dando 2000
Method : Cable Percussion

Casing Diameter
200mm cased to 12.00m

Ground Level (mOD)
1.79

Client
FT Squared

Job Number
9230-11-19

Location
722821.5 E 674794.3 N

Dates
17/12/2019-
20/12/2019

Project Contractor
GII

Sheet
2/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
10.00	B					(1.60)		▨	
					-9.01	10.80	Dense grey slightly silty gravelly fine to coarse SAND. Gravel is sub-angular to sub-rounded, fine to coarse.	▨	
11.00-11.45	SPT(C) N=26			5,3/6,6,7,7					
11.00	B								
						(1.20)			
12.00-12.00	SPT(C) 25*/0 50/0			25/50	-10.21	12.00	Complete at 12.00m		
12.00	B								

Remarks
Chiselling from 12.00m to 12.00m for 1 hour.

Scale (approx)
1:50

Logged By
D. Potter

Figure No.
9230-11-19.BH16

APPENDIX 9 – Laboratory Testing

Element Materials Technology
Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

P: +44 (0) 1244 833780
F: +44 (0) 1244 833781

W: www.element.com

Ground Investigations Ireland
Catherinestown House
Hazelhatch Road
Newcastle
Co. Dublin
Ireland

4225

Attention :	Barry Sexton
Date :	9th June, 2020
Your reference :	9230-11-19
Our reference :	Test Report 20/6773 Batch 1
Location :	Avoca River Park
Date samples received :	29th May, 2020
Status :	Final report
Issue :	1

Six samples were received for analysis on 29th May, 2020 of which six were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

Phil Sommerton BSc

Senior Project Manager

Please include all sections of this report if it is reproduced

Client Name: Ground Investigations Ireland
Reference: 9230-11-19
Location: Avoca River Park
Contact: Barry Sexton
EMT Job No: 20/6773

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H_2SO_4, Z=ZnAc, N=NaOH, HN=$HN0_3$

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-9	10-18	19-27	28-36	37-45	46-54							
Sample ID	BH-02	BH-03	BH-06	BH-10	BH-12	RIVER UPSTREAM							
Depth						0.00-0.10							
COC No / misc													
Containers	V H HN HCL Z P G	V H HN HCL Z BOD G	V H HN HCL Z P G	V H HN HCL Z BOD G	V H HN HCL Z BOD G	V H HN HCL Z BOD G							
Sample Date	26/05/2020	26/05/2020	26/05/2020	26/05/2020	26/05/2020	26/05/2020							
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water							
Batch Number	1	1	1	1	1	1					LOD/LOR	Units	Method No.
Date of Receipt	29/05/2020	29/05/2020	29/05/2020	29/05/2020	29/05/2020	29/05/2020							
Dissolved Arsenic #	4.5	3.1	29.4	<2.5	16.2	<2.5					<2.5	ug/l	TM30/PM14
Dissolved Boron	16	25	13	59	25	<12					<12	ug/l	TM30/PM14
Dissolved Cadmium #	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					<0.5	ug/l	TM30/PM14
Dissolved Calcium #	36.4	74.6	25.3	36.6	77.8	9.1					<0.2	mg/l	TM30/PM14
Total Dissolved Chromium #	<1.5	<1.5	<1.5	<1.5	<1.5	<1.5					<1.5	ug/l	TM30/PM14
Dissolved Copper #	<7	<7	8	<7	<7	16					<7	ug/l	TM30/PM14
Dissolved Lead #	<5	<5	<5	<5	<5	<5					<5	ug/l	TM30/PM14
Dissolved Manganese #	7372	7291	13850$_{AA}$	5962	14480$_{AA}$	118					<2	ug/l	TM30/PM14
Dissolved Mercury #	<1	<1	<1	<1	<1	<1					<1	ug/l	TM30/PM14
Dissolved Nickel #	<2	15	5	9	9	<2					<2	ug/l	TM30/PM14
Dissolved Phosphorus #	<5	<5	237	13	72	25					<5	ug/l	TM30/PM14
Dissolved Potassium #	1.5	7.6	2.2	4.4	13.0	1.1					<0.1	mg/l	TM30/PM14
Dissolved Zinc #	<3	48	21	5	18	160					<3	ug/l	TM30/PM14
Total Dissolved Sulphur as S	5479	90403$_{AB}$	27023	27762	168355$_{AB}$	6407					<10	ug/l	TM30/PM14
PAH MS													
Naphthalene #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM4/PM30
Acenaphthylene #	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013					<0.013	ug/l	TM4/PM30
Acenaphthene #	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013					<0.013	ug/l	TM4/PM30
Fluorene #	<0.014	<0.014	<0.014	<0.014	<0.014	<0.014					<0.014	ug/l	TM4/PM30
Phenanthrene #	<0.011	<0.011	<0.011	<0.011	<0.011	0.023					<0.011	ug/l	TM4/PM30
Anthracene #	<0.013	<0.013	<0.013	<0.013	<0.013	<0.013					<0.013	ug/l	TM4/PM30
Fluoranthene #	<0.012	<0.012	<0.012	<0.012	<0.012	0.025					<0.012	ug/l	TM4/PM30
Pyrene #	<0.013	<0.013	<0.013	<0.013	<0.013	0.017					<0.013	ug/l	TM4/PM30
Benzo(a)anthracene #	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015					<0.015	ug/l	TM4/PM30
Chrysene #	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011					<0.011	ug/l	TM4/PM30
Benzo(bk)fluoranthene #	<0.018	<0.018	<0.018	<0.018	<0.018	<0.018					<0.018	ug/l	TM4/PM30
Benzo(a)pyrene #	<0.016	<0.016	<0.016	<0.016	<0.016	<0.016					<0.016	ug/l	TM4/PM30
Indeno(123cd)pyrene #	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011					<0.011	ug/l	TM4/PM30
Dibenzo(ah)anthracene #	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM4/PM30
Benzo(ghi)perylene #	<0.011	<0.011	<0.011	<0.011	<0.011	<0.011					<0.011	ug/l	TM4/PM30
PAH 16 Total #	<0.195	<0.195	<0.195	<0.195	<0.195	<0.195					<0.195	ug/l	TM4/PM30
Benzo(b)fluoranthene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM4/PM30
Benzo(k)fluoranthene	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM4/PM30
PAH Surrogate % Recovery	80	77	85	81	85	79					<0	%	TM4/PM30
Methyl Tertiary Butyl Ether #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM15/PM10
Benzene #	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					<0.5	ug/l	TM15/PM10
Toluene #	<5	<5	<5	<5	<5	<5					<5	ug/l	TM15/PM10
Ethylbenzene #	<1	<1	<1	<1	<1	<1					<1	ug/l	TM15/PM10
m/p-Xylene #	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
o-Xylene #	<1	<1	<1	<1	<1	<1					<1	ug/l	TM15/PM10
Surrogate Recovery Toluene D8	89	93	91	79	107	73					<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	101	107	108	104	113	94					<0	%	TM15/PM10

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: Ground Investigations Ireland
Reference: 9230-11-19
Location: Avoca River Park
Contact: Barry Sexton
EMT Job No: 20/6773

Report : **Liquid**

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H_2SO_4, Z=ZnAc, N=NaOH, HN=$HN0_3$

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-9	10-18	19-27	28-36	37-45	46-54							
Sample ID	BH-02	BH-03	BH-06	BH-10	BH-12	RIVER UPSTREAM							
Depth						0.00-0.10							
COC No / misc													
Containers	V H HN HCL Z P G	V H HN HCL Z BOD G	V H HN HCL Z P G	V H HN HCL Z BOD G	V H HN HCL Z BOD G	V H HN HCL Z BOD G							
Sample Date	26/05/2020	26/05/2020	26/05/2020	26/05/2020	26/05/2020	26/05/2020							
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water							
Batch Number	1	1	1	1	1	1							
Date of Receipt	29/05/2020	29/05/2020	29/05/2020	29/05/2020	29/05/2020	29/05/2020					LOD/LOR	Units	Method No.
Pesticides													
Organochlorine Pesticides													
Aldrin	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Alpha-HCH (BHC)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Beta-HCH (BHC)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Delta-HCH (BHC)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Dieldrin	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Endosulphan I	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Endosulphan II	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Endosulphan sulphate	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Endrin	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Gamma-HCH (BHC)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Heptachlor	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Heptachlor Epoxide	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
o,p'-Methoxychlor	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
p,p'-DDE	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
p,p'-DDT	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
p,p'-Methoxychlor	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
p,p'-TDE	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Organophosphorus Pesticides													
Azinphos methyl	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Diazinon	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Dichlorvos	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Disulfoton	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Ethion	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Ethyl Parathion (Parathion)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Fenitrothion	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Malathion	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Methyl Parathion	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
Mevinphos	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	ug/l	TM149/PM30
TPH CWG													
Aliphatics													
>C5-C6$^{\#}$	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>C6-C8$^{\#}$	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>C8-C10$^{\#}$	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>C10-C12$^{\#}$	<5	<5	<5	<5	<5	<5					<5	ug/l	TM5/PM16/PM30
>C12-C16$^{\#}$	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
>C16-C21$^{\#}$	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
>C21-C35$^{\#}$	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
Total aliphatics C5-35$^{\#}$	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/TM36/PM12/PM16/PM30

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: Ground Investigations Ireland
Reference: 9230-11-19
Location: Avoca River Park
Contact: Barry Sexton
EMT Job No: 20/6773

Report : **Liquid**

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H_2SO_4, Z=ZnAc, N=NaOH, HN=$HN0_3$

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-9	10-18	19-27	28-36	37-45	46-54					LOD/LOR	Units	Method No.
Sample ID	BH-02	BH-03	BH-06	BH-10	BH-12	RIVER UPSTREAM							
Depth						0.00-0.10							
COC No / misc													
Containers	V H HN HCL Z P G	V H HN HCL Z BOD G	V H HN HCL Z P G	V H HN HCL Z BOD G	V H HN HCL Z BOD G	V H HN HCL Z BOD G							
Sample Date	26/05/2020	26/05/2020	26/05/2020	26/05/2020	26/05/2020	26/05/2020							
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water							
Batch Number	1	1	1	1	1	1							
Date of Receipt	29/05/2020	29/05/2020	29/05/2020	29/05/2020	29/05/2020	29/05/2020							
TPH CWG													
Aromatics													
>C5-EC7 #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>EC7-EC8 #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>EC8-EC10 #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM36/PM12
>EC10-EC12 #	<5	<5	<5	<5	<5	<5					<5	ug/l	TM5/PM16/PM30
>EC12-EC16 #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
>EC16-EC21 #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
>EC21-EC35 #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/PM16/PM30
Total aromatics C5-35 #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/TM36/PM12/PM16/PM30
Total aliphatics and aromatics(C5-35) #	<10	<10	<10	<10	<10	<10					<10	ug/l	TM5/TM36/PM12/PM16/PM30
Phenol #	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	mg/l	TM26/PM0
Sulphate as SO4 #	18.8	234.2	89.5	89.5	455.7	21.1					<0.5	mg/l	TM38/PM0
Chloride #	25.0	22.2	25.9	26.4	30.5	12.5					<0.3	mg/l	TM38/PM0
Nitrate as NO3 #	8.9	<0.2	<0.2	10.6	<0.2	6.6					<0.2	mg/l	TM38/PM0
Nitrite as NO2 #	0.13	<0.02	<0.02	0.04	<0.02	0.02					<0.02	mg/l	TM38/PM0
Total Cyanide #	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01					<0.01	mg/l	TM89/PM0
Ammoniacal Nitrogen as NH3 #	1.20	8.53	6.28	5.26	98.36	0.09					<0.03	mg/l	TM38/PM0
Hexavalent Chromium	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006					<0.006	mg/l	TM38/PM0
Electrical Conductivity @25C #	386	646	390	427	1353	125					<2	uS/cm	TM76/PM0
pH #	7.38	6.47	6.64	6.98	6.67	7.59					<0.01	pH units	TM73/PM0

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name:	Ground Investigations Ireland	**VOC Report :**	**Liquid**
Reference:	9230-11-19		
Location:	Avoca River Park		
Contact:	Barry Sexton		
EMT Job No:	20/6773		

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	1-9	10-18	19-27	28-36	37-45	46-54							
Sample ID	BH-02	BH-03	BH-06	BH-10	BH-12	RIVER UPSTREAM							
Depth						0.00-0.10							
COC No / misc													
Containers	V H HN HCL Z P G	V H HN HCL Z BOD G	V H HN HCL Z P G	V H HN HCL Z BOD G	V H HN HCL Z BOD G	V H HN HCL Z BOD G							
Sample Date	26/05/2020	26/05/2020	26/05/2020	26/05/2020	26/05/2020	26/05/2020							
Sample Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water							
Batch Number	1	1	1	1	1	1					LOD/LOR	Units	Method No.
Date of Receipt	29/05/2020	29/05/2020	29/05/2020	29/05/2020	29/05/2020	29/05/2020							
VOC MS													
Dichlorodifluoromethane	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
Methyl Tertiary Butyl Ether #	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1					<0.1	ug/l	TM15/PM10
Chloromethane #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
Vinyl Chloride #	<0.1	<0.1	<0.1	<0.1	0.8	<0.1					<0.1	ug/l	TM15/PM10
Bromomethane	<1	<1	<1	<1	<1	<1					<1	ug/l	TM15/PM10
Chloroethane #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
Trichlorofluoromethane #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
1,1-Dichloroethene (1,1 DCE) #	<3	<3	<3	<3	4	<3					<3	ug/l	TM15/PM10
Dichloromethane (DCM) #	<5	<5	<5	<5	<5	<5					<5	ug/l	TM15/PM10
trans-1-2-Dichloroethene #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
1,1-Dichloroethane #	<3	<3	<3	<3	28	<3					<3	ug/l	TM15/PM10
cis-1-2-Dichloroethene #	<3	<3	<3	<3	7	<3					<3	ug/l	TM15/PM10
2,2-Dichloropropane	<1	<1	<1	<1	<1	<1					<1	ug/l	TM15/PM10
Bromochloromethane #	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
Chloroform #	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
1,1,1-Trichloroethane #	<2	<2	<2	<2	9	<2					<2	ug/l	TM15/PM10
1,1-Dichloropropene #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
Carbon tetrachloride #	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
1,2-Dichloroethane #	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
Benzene #	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5					<0.5	ug/l	TM15/PM10
Trichloroethene (TCE) #	<3	<3	<3	<3	4	<3					<3	ug/l	TM15/PM10
1,2-Dichloropropane #	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
Dibromomethane #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
Bromodichloromethane #	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
cis-1-3-Dichloropropene	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
Toluene #	<5	<5	<5	<5	<5	<5					<5	ug/l	TM15/PM10
trans-1-3-Dichloropropene	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
1,1,2-Trichloroethane #	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
Tetrachloroethene (PCE) #	<3	<3	<3	<3	5	<3					<3	ug/l	TM15/PM10
1,3-Dichloropropane #	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
Dibromochloromethane #	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
1,2-Dibromoethane #	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
Chlorobenzene #	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
1,1,1,2-Tetrachloroethane #	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
Ethylbenzene #	<1	<1	<1	<1	<1	<1					<1	ug/l	TM15/PM10
m/p-Xylene #	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
o-Xylene #	<1	<1	<1	<1	<1	<1					<1	ug/l	TM15/PM10
Styrene	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
Bromoform #	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
Isopropylbenzene #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
1,1,2,2-Tetrachloroethane	<4	<4	<4	<4	<4	<4					<4	ug/l	TM15/PM10
Bromobenzene #	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
1,2,3-Trichloropropane #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
Propylbenzene #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
2-Chlorotoluene #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
1,3,5-Trimethylbenzene #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
4-Chlorotoluene #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
tert-Butylbenzene #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
1,2,4-Trimethylbenzene #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
sec-Butylbenzene #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
4-Isopropyltoluene #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
1,3-Dichlorobenzene #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
1,4-Dichlorobenzene #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
n-Butylbenzene #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
1,2-Dichlorobenzene #	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
1,2-Dibromo-3-chloropropane	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
1,2,4-Trichlorobenzene	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
Hexachlorobutadiene	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
Naphthalene	<2	<2	<2	<2	<2	<2					<2	ug/l	TM15/PM10
1,2,3-Trichlorobenzene	<3	<3	<3	<3	<3	<3					<3	ug/l	TM15/PM10
Surrogate Recovery Toluene D8	89	93	91	79	107	73					<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	101	107	108	104	113	94					<0	%	TM15/PM10

Client Name: Ground Investigations Ireland
Reference: 9230-11-19
Location: Avoca River Park
Contact: Barry Sexton

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
No deviating sample report results for job 20/6773						

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 20/6773

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher, this result is not accredited.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x5 Dilution

AB	x10 Dilution

EMT Job No: 20/6773

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM4	Modified USEPA 8270D v5:2014 method for the solvent extraction and determination of PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5	Modified 8015B v2:1996 method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16/PM30	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE/Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5/TM36	please refer to TM5 and TM36 for method details	PM12/PM16/PM30	please refer to PM16/PM30 and PM12 for method details	Yes			
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.				
TM15	Modified USEPA 8260B v2:1996. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.	Yes			
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified				
TM30	Determination of Trace Metals by ICP-OES (Inductively Coupled Plasma – Optical Emission Spectrometry): WATERS by Modified USEPA Method 200.7, Rev. 4.4, 1994; Modified EPA Method 6010B, Rev.2, Dec 1996; Modified BS EN ISO 11885:2009: SOILS by Modified USEP	PM14	Preparation of waters and leachates for metals by ICP OES/ICP MS. Samples are filtered for Dissolved metals, and remain unfiltered for Total metals then acidified	Yes			
TM36	Modified US EPA method 8015B v2:1996. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE re	PM12	Modified US EPA method 5021A v2:2014. Preparation of solid and liquid samples for GC headspace analysis.	Yes			

EMT Job No: 20/6773

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993 (comparabl	PM0	No preparation is required.				
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods: Chloride 325.2 (1978), Sulphate 375.4 (Rev.2 1993), o-Phosphate 365.2 (Rev.2 1993), TON 353.1 (Rev.2 1993), Nitrite 354.1 (1971), Hex Cr 7196A (1992), NH4+ 350.1 (Rev.2 1993 (comparabl	PM0	No preparation is required.	Yes			
TM73	Modified US EPA methods 150.1 (1982) and 9045D Rev. 4 - 2004) and BS1377-3:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			
TM76	Modified US EPA method 120.1 (1982). Determination of Specific Conductance by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			
TM89	Modified USEPA method OIA-1667 (1999). Determination of cyanide by Flow Injection Analyser. Where WAD cyanides are required a Ligand displacement step is carried out before analysis.	PM0	No preparation is required.	Yes			
TM149	Determination of Pesticides by Large Volume Injection on GC Triple Quad MS, based upon USEPA method 8270D v5:2014	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				

Element Materials Technology
Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

P: +44 (0) 1244 833780
F: +44 (0) 1244 833781

W: www.element.com

Ground Investigations Ireland
Catherinestown House
Hazelhatch Road
Newcastle
Co. Dublin
Ireland

4225

Attention :	Emer O'Connor
Date :	28th January, 2020
Your reference :	19/11/9230
Our reference :	Test Report 19/20618 Batch 1
Location :	Avoca River Park
Date samples received :	16th December, 2019
Status :	Final report
Issue :	2

Sixty nine samples were received for analysis on 16th December, 2019 of which forty five were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Authorised By:

Phil Sommerton BSc
Senior Project Manager

Please include all sections of this report if it is reproduced

Client Name: Ground Investigations Ireland
Reference: 19/11/9230
Location: Avoca River Park
Contact: Emer O'Connor
EMT Job No: 19/20618

Report : **Solid**

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	4-6	7-9	13-15	16-18	19-21	34-36	40-42	46-48	52-54	55-57			
Sample ID	TP01	TP02	TP02	TP03	TP03	TP05	TP06	TP07	TP08	TP08			
Depth	1.80	0.50	2.50	0.50	1.50	1.20	1.50	1.50	1.50	2.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	04/12/2019	05/12/2019	05/12/2019	04/12/2019	04/12/2019	04/12/2019	06/12/2019	06/12/2019	05/12/2019	05/12/2019			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1	LOD/LOR	Units	Method No.
Date of Receipt	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019			
Antimony	-	1	-	2	-	2	2	-	104_{AC}	2	<1	mg/kg	TM30/PM15
Arsenic$^{\#}$	-	4.5	-	19.6	-	54.5	58.0	-	1658.0_{AE}	61.5	<0.5	mg/kg	TM30/PM15
Barium$^{\#}$	-	114	-	42	-	50	55	-	50	67	<1	mg/kg	TM30/PM15
Cadmium$^{\#}$	-	1.0	-	<0.1	-	<0.1	4.8	-	11.3	0.9	<0.1	mg/kg	TM30/PM15
Chromium$^{\#}$	-	86.1	-	41.0	-	46.8	35.8	-	<0.5	34.8	<0.5	mg/kg	TM30/PM15
Copper$^{\#}$	-	47	-	49	-	34	1508_{AE}	-	4010_{AF}	236	<1	mg/kg	TM30/PM15
Lead$^{\#}$	-	41	-	24	-	51	74	-	1617	45	<5	mg/kg	TM30/PM15
Mercury$^{\#}$	-	<0.1	-	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	<0.1	mg/kg	TM30/PM15
Molybdenum$^{\#}$	-	3.0	-	0.1	-	0.9	1.0	-	83.9_{AC}	0.4	<0.1	mg/kg	TM30/PM15
Nickel$^{\#}$	-	2.0	-	41.3	-	21.9	21.8	-	<0.7	17.5	<0.7	mg/kg	TM30/PM15
Selenium$^{\#}$	-	2	-	1	-	3	3	-	<1	5	<1	mg/kg	TM30/PM15
Zinc$^{\#}$	-	6	-	125	-	114	1141	-	4572_{AC}	892	<5	mg/kg	TM30/PM15
Antimony	-	-	-	-	-	-	-	-	-	-	<1	mg/kg	TM30/PM62
Arsenic	-	-	-	-	-	-	-	-	-	-	<0.5	mg/kg	TM30/PM62
Barium	-	-	-	-	-	-	-	-	-	-	<1	mg/kg	TM30/PM62
Cadmium	-	-	-	-	-	-	-	-	-	-	<0.1	mg/kg	TM30/PM62
Chromium	-	-	-	-	-	-	-	-	-	-	<0.5	mg/kg	TM30/PM62
Copper	-	-	-	-	-	-	-	-	-	-	<1	mg/kg	TM30/PM62
Lead	-	-	-	-	-	-	-	-	-	-	<5	mg/kg	TM30/PM62
Mercury	-	-	-	-	-	-	-	-	-	-	<0.1	mg/kg	TM30/PM62
Molybdenum	-	-	-	-	-	-	-	-	-	-	<0.1	mg/kg	TM30/PM62
Nickel	-	-	-	-	-	-	-	-	-	-	<0.7	mg/kg	TM30/PM62
Selenium	-	-	-	-	-	-	-	-	-	-	<1	mg/kg	TM30/PM62
Zinc	-	-	-	-	-	-	-	-	-	-	<5	mg/kg	TM30/PM62

Client Name: Ground Investigations Ireland
Reference: 19/11/9230
Location: Avoca River Park
Contact: Emer O'Connor
EMT Job No: 19/20618

Report : **Solid**

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	4-6	7-9	13-15	16-18	19-21	34-36	40-42	46-48	52-54	55-57			
Sample ID	TP01	TP02	TP02	TP03	TP03	TP05	TP06	TP07	TP08	TP08			
Depth	1.80	0.50	2.50	0.50	1.50	1.20	1.50	1.50	1.50	2.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	04/12/2019	05/12/2019	05/12/2019	04/12/2019	04/12/2019	04/12/2019	06/12/2019	06/12/2019	05/12/2019	05/12/2019			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1	LOD/LOR	Units	Method No.
Date of Receipt	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019			
PAH MS													
Naphthalene #	-	<0.04	-	<0.04	-	<0.04	<0.04	-	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	-	<0.03	-	<0.03	-	<0.03	<0.03	-	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene #	-	<0.05	-	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene #	-	<0.04	-	<0.04	-	<0.04	<0.04	-	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene #	-	<0.03	-	<0.03	-	<0.03	<0.03	-	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Anthracene #	-	<0.04	-	<0.04	-	<0.04	<0.04	-	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene #	-	<0.03	-	<0.03	-	<0.03	<0.03	-	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Pyrene #	-	<0.03	-	<0.03	-	<0.03	<0.03	-	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	-	<0.06	-	<0.06	-	<0.06	<0.06	-	<0.06	<0.06	<0.06	mg/kg	TM4/PM8
Chrysene #	-	<0.02	-	<0.02	-	<0.02	<0.02	-	<0.02	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	-	<0.07	-	<0.07	-	<0.07	<0.07	-	<0.07	<0.07	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	-	<0.04	-	<0.04	-	<0.04	<0.04	-	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene	-	<0.04	-	<0.04	-	<0.04	<0.04	-	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	-	<0.04	-	<0.04	-	<0.04	<0.04	-	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	-	<0.04	-	<0.04	-	<0.04	<0.04	-	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Coronene	-	<0.04	-	<0.04	-	<0.04	<0.04	-	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
PAH 6 Total #	-	<0.22	-	<0.22	-	<0.22	<0.22	-	<0.22	<0.22	<0.22	mg/kg	TM4/PM8
PAH 17 Total	-	<0.64	-	<0.64	-	<0.64	<0.64	-	<0.64	<0.64	<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	-	<0.05	-	<0.05	-	<0.05	<0.05	-	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	-	<0.02	-	<0.02	-	<0.02	<0.02	-	<0.02	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(j)fluoranthene	-	<1	-	<1	-	<1	<1	-	<1	<1	<1	mg/kg	TM4/PM8
PAH Surrogate % Recovery	-	93	-	92	-	88	95	-	92	77	<0	%	TM4/PM8
Mineral Oil (C10-C40)	-	136	-	<30	-	<30	<30	-	<30	<30	<30	mg/kg	TM5/PM8/PM16
TPH CWG													
Aliphatics													
>C5-C6 #	-	<0.1	-	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C6-C8 #	-	<0.1	-	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C8-C10	-	<0.1	-	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C12 #	-	<0.2	-	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 #	-	9	-	<4	-	<4	<4	-	<4	<4	<4	mg/kg	TM5/PM8/PM16
>C16-C21 #	-	23	-	<7	-	<7	<7	-	<7	<7	<7	mg/kg	TM5/PM8/PM16
>C21-C35 #	-	86	-	22	-	<7	<7	-	<7	<7	<7	mg/kg	TM5/PM8/PM16
>C35-C40	-	18	-	<7	-	<7	<7	-	<7	<7	<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40	-	136	-	<26	-	<26	<26	-	<26	<26	<26	mg/kg	TM5/TM36/PM8/PM12/PM16
>C6-C10	-	<0.1	-	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C25	-	54	-	<10	-	<10	<10	-	<10	<10	<10	mg/kg	TM5/PM8/PM16
>C25-C35	-	63	-	24	-	<10	<10	-	<10	<10	<10	mg/kg	TM5/PM8/PM16

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All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: Ground Investigations Ireland
Reference: 19/11/9230
Location: Avoca River Park
Contact: Emer O'Connor
EMT Job No: 19/20618

Report : **Solid**

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	4-6	7-9	13-15	16-18	19-21	34-36	40-42	46-48	52-54	55-57			
Sample ID	TP01	TP02	TP02	TP03	TP03	TP05	TP06	TP07	TP08	TP08			
Depth	1.80	0.50	2.50	0.50	1.50	1.20	1.50	1.50	1.50	2.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	04/12/2019	05/12/2019	05/12/2019	04/12/2019	04/12/2019	04/12/2019	06/12/2019	06/12/2019	05/12/2019	05/12/2019			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1	LOD/LOR	Units	Method No.
Date of Receipt	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019			
TPH CWG													
Aromatics													
>C5-EC7 #	-	<0.1	-	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC7-EC8 #	-	<0.1	-	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC8-EC10 #	-	<0.1	-	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC12 #	-	<0.2	-	<0.2	-	<0.2	<0.2	-	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 #	-	<4	-	<4	-	<4	<4	-	<4	<4	<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 #	-	<7	-	<7	-	<7	<7	-	<7	<7	<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 #	-	50	-	31	-	<7	<7	-	<7	<7	<7	mg/kg	TM5/PM8/PM16
>EC35-EC40	-	15	-	32	-	<7	<7	-	<7	<7	<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40	-	65	-	63	-	<26	<26	-	<26	<26	<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-40)	-	201	-	63	-	<52	<52	-	<52	<52	<52	mg/kg	TM5/TM36/PM8/PM12/PM16
>EC6-EC10 #	-	<0.1	-	<0.1	-	<0.1	<0.1	-	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC25	-	<10	-	<10	-	<10	<10	-	<10	<10	<10	mg/kg	TM5/PM8/PM16
>EC25-EC35	-	53	-	31	-	<10	<10	-	<10	<10	<10	mg/kg	TM5/PM8/PM16
MTBE #	-	<5	-	<5	-	<5	<5	-	<5	<5	<5	ug/kg	TM31/PM12
Benzene #	-	<5	-	<5	-	<5	<5	-	<5	<5	<5	ug/kg	TM31/PM12
Toluene #	-	<5	-	<5	-	<5	<5	-	<5	<5	<5	ug/kg	TM31/PM12
Ethylbenzene #	-	<5	-	<5	-	<5	<5	-	<5	<5	<5	ug/kg	TM31/PM12
m/p-Xylene #	-	<5	-	<5	-	<5	<5	-	<5	<5	<5	ug/kg	TM31/PM12
o-Xylene #	-	<5	-	<5	-	<5	<5	-	<5	<5	<5	ug/kg	TM31/PM12
PCB 28 #	-	<5	-	<5	-	<5	<5	-	<5	<5	<5	ug/kg	TM17/PM8
PCB 52 #	-	<5	-	<5	-	<5	<5	-	<5	<5	<5	ug/kg	TM17/PM8
PCB 101 #	-	<5	-	<5	-	<5	<5	-	<5	<5	<5	ug/kg	TM17/PM8
PCB 118 #	-	<5	-	<5	-	<5	<5	-	<5	<5	<5	ug/kg	TM17/PM8
PCB 138 #	-	<5	-	<5	-	<5	<5	-	<5	<5	<5	ug/kg	TM17/PM8
PCB 153 #	-	<5	-	<5	-	<5	<5	-	<5	<5	<5	ug/kg	TM17/PM8
PCB 180 #	-	<5	-	<5	-	<5	<5	-	<5	<5	<5	ug/kg	TM17/PM8
Total 7 PCBs #	-	<35	-	<35	-	<35	<35	-	<35	<35	<35	ug/kg	TM17/PM8
Natural Moisture Content	-	50.7	-	9.9	-	44.1	47.5	-	63.1	47.2	<0.1	%	PM4/PM0
Moisture Content (% Wet Weight)	-	33.6	-	9.0	-	30.6	32.2	-	38.7	32.0	<0.1	%	PM4/PM0
Hexavalent Chromium #	-	<0.3	-	<0.3	-	<0.3	<0.3	-	<0.3	<0.3	<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	0.0637	1.4368	0.3995	-	0.8708	-	0.0390	0.5428	-	-	<0.0015	g/l	TM38/PM20
Sulphate as SO4 (2:1 Ext)	-	-	-	-	-	-	-	-	-	-	<0.0015	g/l	TM38/PM60
Chromium III	-	86.1	-	41.0	-	46.8	35.8	-	<0.5	34.8	<0.5	mg/kg	NONE/NONE
Chromium III	-	-	-	-	-	-	-	-	-	-	<0.5	mg/kg	NONE/NONE
Total Organic Carbon #	-	0.40	-	0.33	-	0.61	1.38	-	0.38	0.28	<0.02	%	TM21/PM24
Organic Matter	-	-	1.9	-	6.8	-	-	-	-	-	<0.2	%	TM21/PM24

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Client Name: Ground Investigations Ireland
Reference: 19/11/9230
Location: Avoca River Park
Contact: Emer O'Connor
EMT Job No: 19/20618

Report : **Solid**

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	4-6	7-9	13-15	16-18	19-21	34-36	40-42	46-48	52-54	55-57			
Sample ID	TP01	TP02	TP02	TP03	TP03	TP05	TP06	TP07	TP08	TP08			
Depth	1.80	0.50	2.50	0.50	1.50	1.20	1.50	1.50	1.50	2.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	04/12/2019	05/12/2019	05/12/2019	04/12/2019	04/12/2019	04/12/2019	06/12/2019	06/12/2019	05/12/2019	05/12/2019			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1	LOD/LOR	Units	Method No.
Date of Receipt	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019			
pH #	8.34	4.64	6.37	8.16	4.96	7.08	7.03	6.53	6.74	5.82	<0.01	pH units	TM73/PM11
Mass of raw test portion	-	0.151	-	0.1003	-	0.1395	0.1219	-	0.1316	0.1232		kg	NONE/PM17
Mass of dried test portion	-	0.09	-	0.09	-	0.09	0.09	-	0.09	0.09		kg	NONE/PM17

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Client Name: Ground Investigations Ireland
Reference: 19/11/9230
Location: Avoca River Park
Contact: Emer O'Connor
EMT Job No: 19/20618

Report : **Solid**

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	58-60	61-63	76-78	79-81	82-84	88-90	91-93	94-96	100-102	106-108			
Sample ID	TP09	TP09	TP11	TP11	TP11	TP12	TP13	TP13	TP14	TP16			
Depth	0.50	1.50	0.50	1.50	2.50	1.50	0.50	1.50	1.50	0.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	05/12/2019	05/12/2019	05/12/2019	05/12/2019	05/12/2019	06/12/2019	11/12/2019	11/12/2019	11/12/2019	09/12/2019			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1	LOD/LOR	Units	Method No.
Date of Receipt	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019			
Antimony	15	3	1	3	-	-	2	102_{AC}	-	3	<1	mg/kg	TM30/PM15
Arsenic$^{\#}$	414.2_{AC}	78.4	2.6	31.6	-	-	25.2	1603.0_{AE}	-	7.6	<0.5	mg/kg	TM30/PM15
Barium$^{\#}$	32	80	24	49	-	-	27	20	-	23	<1	mg/kg	TM30/PM15
Cadmium$^{\#}$	2.7	<0.1	<0.1	0.4	-	-	0.1	4.6	-	0.2	<0.1	mg/kg	TM30/PM15
Chromium$^{\#}$	16.2	44.3	17.5	50.6	-	-	31.5	<0.5	-	205.3	<0.5	mg/kg	TM30/PM15
Copper$^{\#}$	762_{AC}	172	18	65	-	-	42	6327_{AG}	-	56	<1	mg/kg	TM30/PM15
Lead$^{\#}$	532	113	39	63	-	-	19	1633	-	40	<5	mg/kg	TM30/PM15
Mercury$^{\#}$	<0.1	<0.1	<0.1	<0.1	-	-	<0.1	0.8	-	<0.1	<0.1	mg/kg	TM30/PM15
Molybdenum$^{\#}$	15.5	0.5	0.5	0.8	-	-	0.4	110.8_{AC}	-	1.4	<0.1	mg/kg	TM30/PM15
Nickel$^{\#}$	16.9	32.3	10.0	32.8	-	-	29.3	<0.7	-	20.4	<0.7	mg/kg	TM30/PM15
Selenium$^{\#}$	2	3	<1	2	-	-	1	<1	-	1	<1	mg/kg	TM30/PM15
Zinc$^{\#}$	927	4693_{AC}	109	191	-	-	217	1830	-	258	<5	mg/kg	TM30/PM15
Antimony	-	-	-	-	-	-	-	-	-	-	<1	mg/kg	TM30/PM62
Arsenic	-	-	-	-	-	-	-	-	-	-	<0.5	mg/kg	TM30/PM62
Barium	-	-	-	-	-	-	-	-	-	-	<1	mg/kg	TM30/PM62
Cadmium	-	-	-	-	-	-	-	-	-	-	<0.1	mg/kg	TM30/PM62
Chromium	-	-	-	-	-	-	-	-	-	-	<0.5	mg/kg	TM30/PM62
Copper	-	-	-	-	-	-	-	-	-	-	<1	mg/kg	TM30/PM62
Lead	-	-	-	-	-	-	-	-	-	-	<5	mg/kg	TM30/PM62
Mercury	-	-	-	-	-	-	-	-	-	-	<0.1	mg/kg	TM30/PM62
Molybdenum	-	-	-	-	-	-	-	-	-	-	<0.1	mg/kg	TM30/PM62
Nickel	-	-	-	-	-	-	-	-	-	-	<0.7	mg/kg	TM30/PM62
Selenium	-	-	-	-	-	-	-	-	-	-	<1	mg/kg	TM30/PM62
Zinc	-	-	-	-	-	-	-	-	-	-	<5	mg/kg	TM30/PM62

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Client Name: Ground Investigations Ireland
Reference: 19/11/9230
Location: Avoca River Park
Contact: Emer O'Connor
EMT Job No: 19/20618

Report : **Solid**

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	58-60	61-63	76-78	79-81	82-84	88-90	91-93	94-96	100-102	106-108			
Sample ID	TP09	TP09	TP11	TP11	TP11	TP12	TP13	TP13	TP14	TP16			
Depth	0.50	1.50	0.50	1.50	2.50	1.50	0.50	1.50	1.50	0.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	05/12/2019	05/12/2019	05/12/2019	05/12/2019	05/12/2019	06/12/2019	11/12/2019	11/12/2019	11/12/2019	09/12/2019			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1	LOD/LOR	Units	Method No.
Date of Receipt	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019			
PAH MS													
Naphthalene #	<0.04	<0.04	<0.04	<0.04	-	-	<0.04	<0.04	-	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	-	-	<0.03	<0.03	-	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	<0.05	<0.05	0.14	-	-	<0.05	<0.05	-	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	<0.04	<0.04	0.08	-	-	<0.04	<0.04	-	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene #	<0.03	<0.03	<0.03	0.15	-	-	<0.03	<0.03	-	<0.03	<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	<0.04	<0.04	<0.04	-	-	<0.04	<0.04	-	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene #	<0.03	<0.03	<0.03	0.06	-	-	<0.03	<0.03	-	<0.03	<0.03	mg/kg	TM4/PM8
Pyrene #	<0.03	<0.03	<0.03	0.06	-	-	<0.03	<0.03	-	<0.03	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06	<0.06	<0.06	<0.06	-	-	<0.06	<0.06	-	<0.06	<0.06	mg/kg	TM4/PM8
Chrysene #	<0.02	<0.02	<0.02	<0.02	-	-	<0.02	<0.02	-	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	<0.07	<0.07	<0.07	<0.07	-	-	<0.07	<0.07	-	<0.07	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04	<0.04	<0.04	<0.04	-	-	<0.04	<0.04	-	<0.04	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene	<0.04	<0.04	<0.04	<0.04	-	-	<0.04	<0.04	-	<0.04	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	<0.04	<0.04	<0.04	-	-	<0.04	<0.04	-	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04	<0.04	<0.04	<0.04	-	-	<0.04	<0.04	-	<0.04	<0.04	mg/kg	TM4/PM8
Coronene	<0.04	<0.04	<0.04	<0.04	-	-	<0.04	<0.04	-	<0.04	<0.04	mg/kg	TM4/PM8
PAH 6 Total #	<0.22	<0.22	<0.22	<0.22	-	-	<0.22	<0.22	-	<0.22	<0.22	mg/kg	TM4/PM8
PAH 17 Total	<0.64	<0.64	<0.64	<0.64	-	-	<0.64	<0.64	-	<0.64	<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05	<0.05	<0.05	<0.05	-	-	<0.05	<0.05	-	<0.05	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02	<0.02	<0.02	<0.02	-	-	<0.02	<0.02	-	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(j)fluoranthene	<1	<1	<1	<1	-	-	<1	<1	-	<1	<1	mg/kg	TM4/PM8
PAH Surrogate % Recovery	97	96	91	94	-	-	92	94	-	94	<0	%	TM4/PM8
Mineral Oil (C10-C40)	<30	<30	<30	249_{AA}	-	-	31	<30	-	61_{AA}	<30	mg/kg	TM5/PM8/PM16
TPH CWG													
Aliphatics													
>C5-C6 #	<0.1	<0.1	<0.1	$<0.1^{SV}$	-	-	<0.1	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>C6-C8 #	<0.1	<0.1	<0.1	$<0.1^{SV}$	-	-	<0.1	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1	<0.1	<0.1	$<0.1^{SV}$	-	-	<0.1	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C12 #	<0.2	<0.2	<0.2	$<0.4_{AA}$	-	-	<0.2	<0.2	-	$<0.4_{AA}$	<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 #	<4	<4	<4	47_{AA}	-	-	<4	<4	-	$<8_{AA}$	<4	mg/kg	TM5/PM8/PM16
>C16-C21 #	<7	<7	<7	53_{AA}	-	-	<7	<7	-	$<14_{AA}$	<7	mg/kg	TM5/PM8/PM16
>C21-C35 #	<7	<7	<7	120_{AA}	-	-	31	<7	-	61_{AA}	<7	mg/kg	TM5/PM8/PM16
>C35-C40	<7	<7	<7	29_{AA}	-	-	<7	<7	-	$<14_{AA}$	<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40	<26	<26	<26	249_{AA}	-	-	31	<26	-	61_{AA}	<26	mg/kg	TM5/TM36/PM8/PM12/PM16
>C6-C10	<0.1	<0.1	<0.1	$<0.1^{SV}$	-	-	<0.1	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C25	<10	<10	<10	140_{AA}	-	-	<10	<10	-	$<20_{AA}$	<10	mg/kg	TM5/PM8/PM16
>C25-C35	<10	<10	<10	90_{AA}	-	-	32	<10	-	60_{AA}	<10	mg/kg	TM5/PM8/PM16

Client Name: Ground Investigations Ireland
Reference: 19/11/9230
Location: Avoca River Park
Contact: Emer O'Connor
EMT Job No: 19/20618

Report : **Solid**

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	58-60	61-63	76-78	79-81	82-84	88-90	91-93	94-96	100-102	106-108			
Sample ID	TP09	TP09	TP11	TP11	TP11	TP12	TP13	TP13	TP14	TP16			
Depth	0.50	1.50	0.50	1.50	2.50	1.50	0.50	1.50	1.50	0.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	05/12/2019	05/12/2019	05/12/2019	05/12/2019	05/12/2019	06/12/2019	11/12/2019	11/12/2019	11/12/2019	09/12/2019			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1	LOD/LOR	Units	Method No.
Date of Receipt	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019			
TPH CWG													
Aromatics													
>C5-EC7#	<0.1	<0.1	<0.1	$<0.1^{SV}$	-	-	<0.1	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>EC7-EC8#	<0.1	<0.1	<0.1	$<0.1^{SV}$	-	-	<0.1	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>EC8-EC10#	<0.1	<0.1	<0.1	$<0.1^{SV}$	-	-	<0.1	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC12#	<0.2	<0.2	<0.2	$<0.4_{AA}$	-	-	<0.2	<0.2	-	$<0.4_{AA}$	<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16#	<4	<4	<4	93_{AA}	-	-	<4	<4	-	$<8_{AA}$	<4	mg/kg	TM5/PM8/PM16
>EC16-EC21#	<7	<7	<7	55_{AA}	-	-	<7	<7	-	$<14_{AA}$	<7	mg/kg	TM5/PM8/PM16
>EC21-EC35#	<7	<7	<7	196_{AA}	-	-	<7	<7	-	30_{AA}	<7	mg/kg	TM5/PM8/PM16
>EC35-EC40	<7	<7	<7	65_{AA}	-	-	<7	<7	-	36_{AA}	<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40	<26	<26	<26	409_{AA}	-	-	<26	<26	-	66_{AA}	<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-40)	<52	<52	<52	658_{AA}	-	-	<52	<52	-	127_{AA}	<52	mg/kg	TM5/TM36/PM8/PM12/PM16
>EC6-EC10#	<0.1	<0.1	<0.1	$<0.1^{SV}$	-	-	<0.1	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC25	<10	<10	<10	143_{AA}	-	-	<10	<10	-	$<20_{AA}$	<10	mg/kg	TM5/PM8/PM16
>EC25-EC35	<10	<10	<10	173_{AA}	-	-	<10	<10	-	33_{AA}	<10	mg/kg	TM5/PM8/PM16
MTBE#	<5	<5	<5	$<5^{SV}$	-	-	<5	<5	-	<5	<5	ug/kg	TM31/PM12
Benzene#	<5	<5	<5	$<5^{SV}$	-	-	<5	<5	-	<5	<5	ug/kg	TM31/PM12
Toluene#	<5	<5	<5	$<5^{SV}$	-	-	<5	<5	-	<5	<5	ug/kg	TM31/PM12
Ethylbenzene#	<5	<5	<5	$<5^{SV}$	-	-	<5	<5	-	<5	<5	ug/kg	TM31/PM12
m/p-Xylene#	<5	<5	<5	$<5^{SV}$	-	-	<5	<5	-	<5	<5	ug/kg	TM31/PM12
o-Xylene#	<5	<5	<5	$<5^{SV}$	-	-	<5	<5	-	<5	<5	ug/kg	TM31/PM12
PCB 28#	<5	<5	<5	<5	-	-	<5	<5	-	<5	<5	ug/kg	TM17/PM8
PCB 52#	<5	<5	<5	<5	-	-	37	<5	-	<5	<5	ug/kg	TM17/PM8
PCB 101#	<5	<5	<5	<5	-	-	110	<5	-	17	<5	ug/kg	TM17/PM8
PCB 118#	<5	<5	<5	<5	-	-	101	<5	-	8	<5	ug/kg	TM17/PM8
PCB 138#	<5	<5	<5	<5	-	-	115	<5	-	29	<5	ug/kg	TM17/PM8
PCB 153#	<5	<5	<5	<5	-	-	85	<5	-	26	<5	ug/kg	TM17/PM8
PCB 180#	<5	<5	<5	<5	-	-	16	<5	-	13	<5	ug/kg	TM17/PM8
Total 7 PCBs#	<35	<35	<35	<35	-	-	464	<35	-	93	<35	ug/kg	TM17/PM8
Natural Moisture Content	22.7	66.1	7.5	51.9	-	-	7.1	46.4	-	7.7	<0.1	%	PM4/PM0
Moisture Content (% Wet Weight)	18.5	39.8	7.0	34.2	-	-	6.6	31.7	-	7.1	<0.1	%	PM4/PM0
Hexavalent Chromium#	<0.3	<0.3	<0.3	<0.3	-	-	<0.3	<0.3	-	<0.3	<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext)#	0.3013	-	-	0.2096	-	-	-	-	0.0914	0.0049	<0.0015	g/l	TM38/PM20
Sulphate as SO4 (2:1 Ext)	-	-	-	-	-	-	-	-	-	-	<0.0015	g/l	TM38/PM60
Chromium III	16.2	44.3	17.5	50.6	-	-	31.5	<0.5	-	205.3	<0.5	mg/kg	NONE/NONE
Chromium III	-	-	-	-	-	-	-	-	-	-	<0.5	mg/kg	NONE/NONE
Total Organic Carbon#	0.24	2.47	0.10	2.30	-	-	0.32	0.11	-	0.70	<0.02	%	TM21/PM24
Organic Matter	-	-	-	-	1.1	9.9	-	-	0.3	-	<0.2	%	TM21/PM24

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Client Name: Ground Investigations Ireland
Reference: 19/11/9230
Location: Avoca River Park
Contact: Emer O'Connor
EMT Job No: 19/20618

Report : **Solid**

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	58-60	61-63	76-78	79-81	82-84	88-90	91-93	94-96	100-102	106-108	LOD/LOR	Units	Method No.
Sample ID	TP09	TP09	TP11	TP11	TP11	TP12	TP13	TP13	TP14	TP16			
Depth	0.50	1.50	0.50	1.50	2.50	1.50	0.50	1.50	1.50	0.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	05/12/2019	05/12/2019	05/12/2019	05/12/2019	05/12/2019	06/12/2019	11/12/2019	11/12/2019	11/12/2019	09/12/2019			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019			
pH $^{\#}$	6.21	7.12	8.56	7.17	-	-	7.19	4.55	7.28	8.33	<0.01	pH units	TM73/PM11
Mass of raw test portion	0.1157	0.1496	0.0997	0.1189	-	-	0.0981	0.1313	-	0.1002		kg	NONE/PM17
Mass of dried test portion	0.09	0.09	0.09	0.09	-	-	0.09	0.09	-	0.09		kg	NONE/PM17

Client Name: Ground Investigations Ireland
Reference: 19/11/9230
Location: Avoca River Park
Contact: Emer O'Connor
EMT Job No: 19/20618

Report : **Solid**

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	109-111	115-117	118-119	123-125	126-128	129-131	135-137	138-140	144-146	147-149			
Sample ID	TP16	TP17	TP17	TP18	TP19	TP19	TP20	TP20	TP21	TP21			
Depth	1.20	1.50	1.80	1.50	0.50	1.50	0.50	1.50	0.50	1.50			
COC No / misc													
Containers	V J T	V J T	J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	09/12/2019	12/12/2019	12/12/2019	12/12/2019	11/12/2019	11/12/2019	09/12/2019	09/12/2019	09/12/2019	09/12/2019			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1	LOD/LOR	Units	Method No.
Date of Receipt	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019			
Antimony	-	2	-	-	2	2	-	-	1	1	<1	mg/kg	TM30/PM15
Arsenic#	-	55.2	-	-	18.6	28.3	-	-	14.6	48.8	<0.5	mg/kg	TM30/PM15
Barium#	-	178	-	-	60	52	-	-	21	52	<1	mg/kg	TM30/PM15
Cadmium#	-	0.4	-	-	<0.1	0.2	-	-	0.1	<0.1	<0.1	mg/kg	TM30/PM15
Chromium#	-	39.3	-	-	36.9	48.3	-	-	46.3	40.4	<0.5	mg/kg	TM30/PM15
Copper#	-	98	-	-	37	93	-	-	86	28	<1	mg/kg	TM30/PM15
Lead#	-	100	-	-	17	145	-	-	53	46	<5	mg/kg	TM30/PM15
Mercury#	-	<0.1	-	-	<0.1	<0.1	-	-	<0.1	<0.1	<0.1	mg/kg	TM30/PM15
Molybdenum#	-	0.9	-	-	1.2	1.8	-	-	1.4	0.8	<0.1	mg/kg	TM30/PM15
Nickel#	-	23.4	-	-	25.0	29.0	-	-	22.1	21.0	<0.7	mg/kg	TM30/PM15
Selenium#	-	2	-	-	1	2	-	-	<1	5	<1	mg/kg	TM30/PM15
Zinc#	-	428	-	-	134	162	-	-	357	103	<5	mg/kg	TM30/PM15
Antimony	-	-	-	-	-	-	2	13	-	-	<1	mg/kg	TM30/PM62
Arsenic	-	-	-	-	-	-	18.1	18.7	-	-	<0.5	mg/kg	TM30/PM62
Barium	-	-	-	-	-	-	45	35	-	-	<1	mg/kg	TM30/PM62
Cadmium	-	-	-	-	-	-	0.7	0.4	-	-	<0.1	mg/kg	TM30/PM62
Chromium	-	-	-	-	-	-	90.6	DR	-	-	<0.5	mg/kg	TM30/PM62
Copper	-	-	-	-	-	-	129	124	-	-	<1	mg/kg	TM30/PM62
Lead	-	-	-	-	-	-	77	71	-	-	<5	mg/kg	TM30/PM62
Mercury	-	-	-	-	-	-	<0.1	<0.1	-	-	<0.1	mg/kg	TM30/PM62
Molybdenum	-	-	-	-	-	-	2.7	1.3	-	-	<0.1	mg/kg	TM30/PM62
Nickel	-	-	-	-	-	-	25.4	104.9	-	-	<0.7	mg/kg	TM30/PM62
Selenium	-	-	-	-	-	-	<1	<1	-	-	<1	mg/kg	TM30/PM62
Zinc	-	-	-	-	-	-	331	182	-	-	<5	mg/kg	TM30/PM62

Client Name: Ground Investigations Ireland
Reference: 19/11/9230
Location: Avoca River Park
Contact: Emer O'Connor
EMT Job No: 19/20618

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	109-111	115-117	118-119	123-125	126-128	129-131	135-137	138-140	144-146	147-149			
Sample ID	TP16	TP17	TP17	TP18	TP19	TP19	TP20	TP20	TP21	TP21			
Depth	1.20	1.50	1.80	1.50	0.50	1.50	0.50	1.50	0.50	1.50			
COC No / misc													
Containers	V J T	V J T	J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	09/12/2019	12/12/2019	12/12/2019	12/12/2019	11/12/2019	11/12/2019	09/12/2019	09/12/2019	09/12/2019	09/12/2019			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1	LOD/LOR	Units	Method No.
Date of Receipt	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019			
PAH MS													
Naphthalene $^{\#}$	-	0.18	-	-	<0.04	0.84	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	-	<0.03	-	-	<0.03	0.08	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene $^{\#}$	-	<0.05	-	-	<0.05	0.09	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene $^{\#}$	-	<0.04	-	-	<0.04	0.32	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene $^{\#}$	-	<0.03	-	-	<0.03	1.50	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Anthracene $^{\#}$	-	<0.04	-	-	<0.04	0.11	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene $^{\#}$	-	<0.03	-	-	<0.03	0.09	0.05	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Pyrene $^{\#}$	-	<0.03	-	-	<0.03	0.81	0.05	<0.03	<0.03	<0.03	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene $^{\#}$	-	<0.06	-	-	<0.06	0.18	<0.06	<0.06	<0.06	<0.06	<0.06	mg/kg	TM4/PM8
Chrysene $^{\#}$	-	<0.02	-	-	<0.02	0.88	0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene $^{\#}$	-	<0.07	-	-	<0.07	0.15	<0.07	<0.07	<0.07	<0.07	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene $^{\#}$	-	<0.04	-	-	<0.04	0.23	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene	-	<0.04	-	-	<0.04	<0.40$_{AE}$	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene $^{\#}$	-	<0.04	-	-	<0.04	<0.40$_{AE}$	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene $^{\#}$	-	<0.04	-	-	<0.04	<0.40$_{AE}$	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
Coronene	-	<0.04	-	-	<0.04	<0.40$_{AE}$	<0.04	<0.04	<0.04	<0.04	<0.04	mg/kg	TM4/PM8
PAH 6 Total $^{\#}$	-	<0.22	-	-	<0.22	0.47	<0.22	<0.22	<0.22	<0.22	<0.22	mg/kg	TM4/PM8
PAH 17 Total	-	<0.64	-	-	<0.64	5.28	<0.64	<0.64	<0.64	<0.64	<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	-	<0.05	-	-	<0.05	0.11	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	-	<0.02	-	-	<0.02	0.04	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(j)fluoranthene	-	<1	-	-	<1	<1	<1	<1	<1	<1	<1	mg/kg	TM4/PM8
PAH Surrogate % Recovery	-	95	-	-	83	92	97	95	100	95	<0	%	TM4/PM8
Mineral Oil (C10-C40)	-	<30	-	-	82	576$_{AD}$	60	93	168	<30	<30	mg/kg	TM5/PM8/PM16
TPH CWG													
Aliphatics													
>C5-C6 $^{\#}$	-	<0.1	-	-	<0.1	<0.1^{SV}	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C6-C8 $^{\#}$	-	<0.1	-	-	<0.1	<0.1^{SV}	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C8-C10	-	<0.1	-	-	<0.1	0.5^{SV}	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C12 $^{\#}$	-	<0.2	-	-	<0.2	3.4$_{AD}$	<0.2	1.6	1.9	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 $^{\#}$	-	<4	-	-	<4	<36$_{AD}$	<4	12	13	<4	<4	mg/kg	TM5/PM8/PM16
>C16-C21 $^{\#}$	-	<7	-	-	<7	<63$_{AD}$	8	17	23	<7	<7	mg/kg	TM5/PM8/PM16
>C21-C35 $^{\#}$	-	<7	-	-	73	573$_{AD}$	42	49	103	<7	<7	mg/kg	TM5/PM8/PM16
>C35-C40	-	<7	-	-	9	<63$_{AD}$	10	13	27	<7	<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40	-	<26	-	-	82	577$_{AD}$	60	93	168	<26	<26	mg/kg	TM5/TM36/PM8/PM12/PM16
>C6-C10	-	<0.1	-	-	<0.1	0.5^{SV}	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C25	-	<10	-	-	17	250$_{AD}$	<10	33	58	<10	<10	mg/kg	TM5/PM8/PM16
>C25-C35	-	<10	-	-	60	414$_{AD}$	24	36	79	<10	<10	mg/kg	TM5/PM8/PM16

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All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name:	Ground Investigations Ireland	**Report :**	**Solid**
Reference:	19/11/9230		
Location:	Avoca River Park	**Solids:**	V=60g VOC jar, J=250g glass jar, T=plastic tub
Contact:	Emer O'Connor		
EMT Job No:	19/20618		

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	109-111	115-117	118-119	123-125	126-128	129-131	135-137	138-140	144-146	147-149			
Sample ID	TP16	TP17	TP17	TP18	TP19	TP19	TP20	TP20	TP21	TP21			
Depth	1.20	1.50	1.80	1.50	0.50	1.50	0.50	1.50	0.50	1.50			
COC No / misc													
Containers	V J T	V J T	J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	09/12/2019	12/12/2019	12/12/2019	12/12/2019	11/12/2019	11/12/2019	09/12/2019	09/12/2019	09/12/2019	09/12/2019			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1	LOD/LOR	Units	Method No.
Date of Receipt	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019			
TPH CWG													
Aromatics													
>C5-EC7$^{\#}$	-	<0.1	-	-	<0.1	$<0.1^{SV}$	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC7-EC8$^{\#}$	-	<0.1	-	-	<0.1	$<0.1^{SV}$	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC8-EC10$^{\#}$	-	<0.1	-	-	<0.1	$<0.1^{SV}$	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC12$^{\#}$	-	<0.2	-	-	<0.2	$<1.8^{SV}_{AD}$	$<0.2^{SV}$	<0.2	<0.2	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16$^{\#}$	-	<4	-	-	<4	$<36^{SV}_{AD}$	$<4^{SV}$	<4	<4	<4	<4	mg/kg	TM5/PM8/PM16
>EC16-EC21$^{\#}$	-	<7	-	-	<7	98^{SV}_{AD}	$<7^{SV}$	12	11	<7	<7	mg/kg	TM5/PM8/PM16
>EC21-EC35$^{\#}$	-	<7	-	-	70	724^{SV}_{AD}	63^{SV}	68	59	<7	<7	mg/kg	TM5/PM8/PM16
>EC35-EC40	-	<7	-	-	17	125^{SV}_{AD}	28^{SV}	24	25	<7	<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40	-	<26	-	-	87	947^{SV}_{AD}	91^{SV}	104	95	<26	<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-40)	-	<52	-	-	169	1524^{SV}_{AD}	151^{SV}	197	263	<52	<52	mg/kg	TM5/TM36/PM8/PM12/PM16
>EC6-EC10$^{\#}$	-	<0.1	-	-	<0.1	$<0.1^{SV}$	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC25	-	<10	-	-	12	289^{SV}_{AD}	19^{SV}	24	16	<10	<10	mg/kg	TM5/PM8/PM16
>EC25-EC35	-	<10	-	-	58	526^{SV}_{AD}	46^{SV}	57	46	<10	<10	mg/kg	TM5/PM8/PM16
MTBE$^{\#}$	-	<5	-	-	<5	$<5^{SV}$	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
Benzene$^{\#}$	-	<5	-	-	<5	$<5^{SV}$	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
Toluene$^{\#}$	-	<5	-	-	<5	$<5^{SV}$	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
Ethylbenzene$^{\#}$	-	<5	-	-	<5	$<5^{SV}$	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
m/p-Xylene$^{\#}$	-	<5	-	-	<5	26^{SV}	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
o-Xylene$^{\#}$	-	<5	-	-	<5	22^{SV}	<5	<5	<5	<5	<5	ug/kg	TM31/PM12
PCB 28$^{\#}$	-	<5	-	-	<5	$<25_{AC}$	13	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 52$^{\#}$	-	<5	-	-	7	$<25_{AC}$	396	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 101$^{\#}$	-	<5	-	-	15	$<25_{AC}$	812	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 118$^{\#}$	-	<5	-	-	10	$<25_{AC}$	638	<5	<5	<5	<5	ug/kg	TM17/PM8
PCB 138$^{\#}$	-	<5	-	-	16	61_{AC}	806	7	<5	<5	<5	ug/kg	TM17/PM8
PCB 153$^{\#}$	-	<5	-	-	14	80_{AC}	723	6	<5	<5	<5	ug/kg	TM17/PM8
PCB 180$^{\#}$	-	<5	-	-	7	65_{AC}	327	<5	<5	<5	<5	ug/kg	TM17/PM8
Total 7 PCBs$^{\#}$	-	<35	-	-	69	206_{AC}	3715	<35	<35	<35	<35	ug/kg	TM17/PM8
Natural Moisture Content	-	64.9	-	-	6.3	34.9	16.2	20.6	7.3	51.4	<0.1	%	PM4/PM0
Moisture Content (% Wet Weight)	-	39.4	-	-	6.0	25.9	14.0	17.1	6.8	33.9	<0.1	%	PM4/PM0
Hexavalent Chromium$^{\#}$	-	<0.3	-	-	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext)$^{\#}$	-	-	-	-	-	-	-	-	0.0170	-	<0.0015	g/l	TM38/PM20
Sulphate as SO4 (2:1 Ext)	-	-	-	-	-	-	0.0178	-	-	-	<0.0015	g/l	TM38/PM60
Chromium III	-	39.3	-	-	36.9	48.3	-	-	46.3	40.4	<0.5	mg/kg	NONE/NONE
Chromium III	-	-	-	-	-	-	90.6	1194.5_{AC}	-	-	<0.5	mg/kg	NONE/NONE
Total Organic Carbon$^{\#}$	-	7.23	-	-	0.42	3.94	NDP	NDP	0.22	0.40	<0.02	%	TM21/PM24
Organic Matter	0.8	12.5	0.3	2.0	-	-	-	-	-	-	<0.2	%	TM21/PM24

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Client Name:	Ground Investigations Ireland
Reference:	19/11/9230
Location:	Avoca River Park
Contact:	Emer O'Connor
EMT Job No:	19/20618

Report : **Solid**

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	109-111	115-117	118-119	123-125	126-128	129-131	135-137	138-140	144-146	147-149			
Sample ID	TP16	TP17	TP17	TP18	TP19	TP19	TP20	TP20	TP21	TP21			
Depth	1.20	1.50	1.80	1.50	0.50	1.50	0.50	1.50	0.50	1.50			
COC No / misc													
Containers	V J T	V J T	J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	09/12/2019	12/12/2019	12/12/2019	12/12/2019	11/12/2019	11/12/2019	09/12/2019	09/12/2019	09/12/2019	09/12/2019			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1	LOD/LOR	Units	Method No.
Date of Receipt	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019			
pH #	-	7.56	-	-	8.33	8.04	8.34	7.82	8.34	7.12	<0.01	pH units	TM73/PM11
Mass of raw test portion	-	0.1696	-	-	0.0969	0.1173	0.1109	0.1087	0.0986	0.1278		kg	NONE/PM17
Mass of dried test portion	-	0.09	-	-	0.09	0.09	0.09	0.09	0.09	0.09		kg	NONE/PM17

Client Name: Ground Investigations Ireland
Reference: 19/11/9230
Location: Avoca River Park
Contact: Emer O'Connor
EMT Job No: 19/20618

Report : **Solid**

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	153-155	156-158	162-164	165-167	168-170	171-173	174-176	177-179	180-182	183-185			
Sample ID	TP22	TP22	TP23	TP24	TP24	TP25	TP25	TP26	TP26	TP27			
Depth	0.50	1.50	1.50	0.50	1.50	0.50	1.50	0.50	1.50	0.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	09/12/2019	09/12/2019	09/12/2019	09/12/2019	09/12/2019	10/12/2019	10/12/2019	12/12/2019	12/12/2019	10/12/2019			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1	LOD/LOR	Units	Method No.
Date of Receipt	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019			
Antimony	4	-	-	-	3	2	-	2	-	3	<1	mg/kg	TM30/PM15
Arsenic #	30.4	-	-	-	55.8	8.3	-	16.7	-	19.6	<0.5	mg/kg	TM30/PM15
Barium #	34	-	-	-	92	38	-	38	-	70	<1	mg/kg	TM30/PM15
Cadmium #	0.3	-	-	-	0.7	<0.1	-	<0.1	-	<0.1	<0.1	mg/kg	TM30/PM15
Chromium #	23.6	-	-	-	75.8	49.7	-	38.4	-	46.2	<0.5	mg/kg	TM30/PM15
Copper #	99	-	-	-	118	44	-	34	-	48	<1	mg/kg	TM30/PM15
Lead #	244	-	-	-	364	17	-	19	-	42	<5	mg/kg	TM30/PM15
Mercury #	<0.1	-	-	-	<0.1	<0.1	-	<0.1	-	<0.1	<0.1	mg/kg	TM30/PM15
Molybdenum #	1.2	-	-	-	4.8	0.5	-	<0.1	-	<0.1	<0.1	mg/kg	TM30/PM15
Nickel #	14.0	-	-	-	27.6	28.1	-	37.0	-	58.5	<0.7	mg/kg	TM30/PM15
Selenium #	1	-	-	-	2	1	-	1	-	2	<1	mg/kg	TM30/PM15
Zinc #	132	-	-	-	260	119	-	122	-	149	<5	mg/kg	TM30/PM15
Antimony	-	-	-	1	-	-	-	-	-	-	<1	mg/kg	TM30/PM62
Arsenic	-	-	-	20.9	-	-	-	-	-	-	<0.5	mg/kg	TM30/PM62
Barium	-	-	-	36	-	-	-	-	-	-	<1	mg/kg	TM30/PM62
Cadmium	-	-	-	0.2	-	-	-	-	-	-	<0.1	mg/kg	TM30/PM62
Chromium	-	-	-	28.2	-	-	-	-	-	-	<0.5	mg/kg	TM30/PM62
Copper	-	-	-	75	-	-	-	-	-	-	<1	mg/kg	TM30/PM62
Lead	-	-	-	98	-	-	-	-	-	-	<5	mg/kg	TM30/PM62
Mercury	-	-	-	<0.1	-	-	-	-	-	-	<0.1	mg/kg	TM30/PM62
Molybdenum	-	-	-	0.9	-	-	-	-	-	-	<0.1	mg/kg	TM30/PM62
Nickel	-	-	-	20.7	-	-	-	-	-	-	<0.7	mg/kg	TM30/PM62
Selenium	-	-	-	<1	-	-	-	-	-	-	<1	mg/kg	TM30/PM62
Zinc	-	-	-	235	-	-	-	-	-	-	<5	mg/kg	TM30/PM62

Client Name: Ground Investigations Ireland
Reference: 19/11/9230
Location: Avoca River Park
Contact: Emer O'Connor
EMT Job No: 19/20618

Report : **Solid**

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	153-155	156-158	162-164	165-167	168-170	171-173	174-176	177-179	180-182	183-185	LOD/LOR	Units	Method No.
Sample ID	TP22	TP22	TP23	TP24	TP24	TP25	TP25	TP26	TP26	TP27			
Depth	0.50	1.50	1.50	0.50	1.50	0.50	1.50	0.50	1.50	0.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	09/12/2019	09/12/2019	09/12/2019	09/12/2019	09/12/2019	10/12/2019	10/12/2019	12/12/2019	12/12/2019	10/12/2019			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1			
Date of Receipt	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019			
PAH MS													
Naphthalene #	<0.04	-	-	<0.04	<0.04	<0.04	-	<0.04	-	<0.04	<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	-	-	<0.03	<0.03	<0.03	-	<0.03	-	<0.03	<0.03	mg/kg	TM4/PM8
Acenaphthene #	<0.05	-	-	<0.05	<0.05	<0.05	-	<0.05	-	<0.05	<0.05	mg/kg	TM4/PM8
Fluorene #	<0.04	-	-	<0.04	<0.04	<0.04	-	<0.04	-	<0.04	<0.04	mg/kg	TM4/PM8
Phenanthrene #	<0.03	-	-	<0.03	<0.03	<0.03	-	<0.03	-	<0.03	<0.03	mg/kg	TM4/PM8
Anthracene #	<0.04	-	-	<0.04	<0.04	<0.04	-	<0.04	-	<0.04	<0.04	mg/kg	TM4/PM8
Fluoranthene #	<0.03	-	-	<0.03	<0.03	<0.03	-	<0.03	-	<0.03	<0.03	mg/kg	TM4/PM8
Pyrene #	<0.03	-	-	<0.03	<0.03	<0.03	-	<0.03	-	<0.03	<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene #	<0.06	-	-	<0.06	<0.06	<0.06	-	<0.06	-	<0.06	<0.06	mg/kg	TM4/PM8
Chrysene #	<0.02	-	-	<0.02	<0.02	<0.02	-	<0.02	-	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene #	<0.07	-	-	<0.07	<0.07	<0.07	-	<0.07	-	<0.07	<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene #	<0.04	-	-	<0.04	<0.04	<0.04	-	<0.04	-	<0.04	<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene	<0.04	-	-	<0.04	<0.04	<0.04	-	<0.04	-	<0.04	<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene #	<0.04	-	-	<0.04	<0.04	<0.04	-	<0.04	-	<0.04	<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene #	<0.04	-	-	<0.04	<0.04	<0.04	-	<0.04	-	<0.04	<0.04	mg/kg	TM4/PM8
Coronene	<0.04	-	-	<0.04	<0.04	<0.04	-	<0.04	-	<0.04	<0.04	mg/kg	TM4/PM8
PAH 6 Total #	<0.22	-	-	<0.22	<0.22	<0.22	-	<0.22	-	<0.22	<0.22	mg/kg	TM4/PM8
PAH 17 Total	<0.64	-	-	<0.64	<0.64	<0.64	-	<0.64	-	<0.64	<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05	-	-	<0.05	<0.05	<0.05	-	<0.05	-	<0.05	<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02	-	-	<0.02	<0.02	<0.02	-	<0.02	-	<0.02	<0.02	mg/kg	TM4/PM8
Benzo(j)fluoranthene	<1	-	-	<1	<1	<1	-	<1	-	<1	<1	mg/kg	TM4/PM8
PAH Surrogate % Recovery	89	-	-	93	96	96	-	95	-	102	<0	%	TM4/PM8
Mineral Oil (C10-C40)	90	-	-	67	<30	<30	-	<30	-	<30	<30	mg/kg	TM5/PM8/PM16
TPH CWG													
Aliphatics													
>C5-C6 #	<0.1	-	-	<0.1	<0.1 SV	<0.1 SV	-	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>C6-C8 #	<0.1	-	-	<0.1	<0.1 SV	<0.1 SV	-	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1	-	-	<0.1	<0.1 SV	<0.1 SV	-	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C12 #	1.2	-	-	4.3	<0.2	<0.2	-	<0.2	-	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 #	10	-	-	16	<4	<4	-	<4	-	<4	<4	mg/kg	TM5/PM8/PM16
>C16-C21 #	15	-	-	20	<7	<7	-	<7	-	<7	<7	mg/kg	TM5/PM8/PM16
>C21-C35 #	55	-	-	27	<7	<7	-	15	-	<7	<7	mg/kg	TM5/PM8/PM16
>C35-C40	9	-	-	<7	<7	<7	-	<7	-	<7	<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40	90	-	-	67	<26	<26	-	<26	-	<26	<26	mg/kg	TM5/TM36/PM8/PM12/PM16
>C6-C10	<0.1	-	-	<0.1	<0.1 SV	<0.1 SV	-	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>C10-C25	35	-	-	45	<10	<10	-	<10	-	<10	<10	mg/kg	TM5/PM8/PM16
>C25-C35	36	-	-	18	<10	13	-	15	-	<10	<10	mg/kg	TM5/PM8/PM16

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

Element Materials Technology

Client Name:	Ground Investigations Ireland	**Report :**	**Solid**
Reference:	19/11/9230		
Location:	Avoca River Park	**Solids:**	V=60g VOC jar, J=250g glass jar, T=plastic tub
Contact:	Emer O'Connor		
EMT Job No:	19/20618		

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	153-155	156-158	162-164	165-167	168-170	171-173	174-176	177-179	180-182	183-185			
Sample ID	TP22	TP22	TP23	TP24	TP24	TP25	TP25	TP26	TP26	TP27			
Depth	0.50	1.50	1.50	0.50	1.50	0.50	1.50	0.50	1.50	0.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	09/12/2019	09/12/2019	09/12/2019	09/12/2019	09/12/2019	10/12/2019	10/12/2019	12/12/2019	12/12/2019	10/12/2019			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1	LOD/LOR	Units	Method No.
Date of Receipt	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019			
TPH CWG													
Aromatics													
>C5-EC7$^{\#}$	<0.1	-	-	<0.1	<0.1^{SV}	<0.1^{SV}	-	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>EC7-EC8$^{\#}$	<0.1	-	-	<0.1	<0.1^{SV}	<0.1^{SV}	-	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>EC8-EC10$^{\#}$	<0.1	-	-	<0.1	<0.1^{SV}	<0.1^{SV}	-	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC12$^{\#}$	<0.2^{SV}	-	-	<0.2^{SV}	<0.2^{SV}	<0.2	-	<0.2	-	<0.2	<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16$^{\#}$	<4^{SV}	-	-	7^{SV}	<4^{SV}	<4	-	<4	-	<4	<4	mg/kg	TM5/PM8/PM16
>EC16-EC21$^{\#}$	<7^{SV}	-	-	14^{SV}	<7^{SV}	<7	-	<7	-	<7	<7	mg/kg	TM5/PM8/PM16
>EC21-EC35$^{\#}$	40^{SV}	-	-	49^{SV}	55^{SV}	<7	-	43	-	<7	<7	mg/kg	TM5/PM8/PM16
>EC35-EC40	13^{SV}	-	-	12^{SV}	15^{SV}	<7	-	12	-	<7	<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40	53^{SV}	-	-	82^{SV}	70^{SV}	<26	-	55	-	<26	<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-40)	143^{SV}	-	-	149^{SV}	70^{SV}	<52	-	55	-	<52	<52	mg/kg	TM5/TM36/PM8/PM12/PM16
>EC6-EC10$^{\#}$	<0.1	-	-	<0.1	<0.1^{SV}	<0.1^{SV}	-	<0.1	-	<0.1	<0.1	mg/kg	TM36/PM12
>EC10-EC25	<10^{SV}	-	-	28^{SV}	<10^{SV}	<10	-	<10	-	<10	<10	mg/kg	TM5/PM8/PM16
>EC25-EC35	33^{SV}	-	-	30^{SV}	46^{SV}	<10	-	43	-	<10	<10	mg/kg	TM5/PM8/PM16
MTBE$^{\#}$	<5	-	-	<5	<5^{SV}	<5^{SV}	-	<5	-	<5	<5	ug/kg	TM31/PM12
Benzene$^{\#}$	<5	-	-	<5	<5^{SV}	<5^{SV}	-	<5	-	<5	<5	ug/kg	TM31/PM12
Toluene$^{\#}$	<5	-	-	<5	<5^{SV}	18^{SV}	-	<5	-	<5	<5	ug/kg	TM31/PM12
Ethylbenzene$^{\#}$	<5	-	-	<5	<5^{SV}	<5^{SV}	-	<5	-	<5	<5	ug/kg	TM31/PM12
m/p-Xylene$^{\#}$	<5	-	-	<5	<5^{SV}	<5^{SV}	-	<5	-	<5	<5	ug/kg	TM31/PM12
o-Xylene$^{\#}$	<5	-	-	<5	<5^{SV}	<5^{SV}	-	<5	-	<5	<5	ug/kg	TM31/PM12
PCB 28$^{\#}$	<5	-	-	<5	<5	<5	-	<5	-	<5	<5	ug/kg	TM17/PM8
PCB 52$^{\#}$	<5	-	-	<5	<5	<5	-	<5	-	<5	<5	ug/kg	TM17/PM8
PCB 101$^{\#}$	<5	-	-	<5	<5	<5	-	<5	-	<5	<5	ug/kg	TM17/PM8
PCB 118$^{\#}$	<5	-	-	<5	<5	<5	-	<5	-	<5	<5	ug/kg	TM17/PM8
PCB 138$^{\#}$	<5	-	-	<5	<5	<5	-	<5	-	<5	<5	ug/kg	TM17/PM8
PCB 153$^{\#}$	<5	-	-	<5	<5	<5	-	<5	-	<5	<5	ug/kg	TM17/PM8
PCB 180$^{\#}$	<5	-	-	<5	<5	<5	-	<5	-	<5	<5	ug/kg	TM17/PM8
Total 7 PCBs$^{\#}$	<35	-	-	<35	<35	<35	-	<35	-	<35	<35	ug/kg	TM17/PM8
Natural Moisture Content	28.5	-	-	9.4	84.2	12.4	-	17.2	-	14.2	<0.1	%	PM4/PM0
Moisture Content (% Wet Weight)	22.2	-	-	8.6	45.7	11.1	-	14.6	-	12.4	<0.1	%	PM4/PM0
Hexavalent Chromium$^{\#}$	<0.3	-	-	<0.3	<0.3	<0.3	-	<0.3	-	<0.3	<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext)$^{\#}$	-	-	-	-	-	-	-	0.0059	-	-	<0.0015	g/l	TM38/PM20
Sulphate as SO4 (2:1 Ext)	-	-	-	0.0130	-	-	-	-	-	-	<0.0015	g/l	TM38/PM60
Chromium III	23.6	-	-	-	75.8	49.7	-	38.4	-	46.2	<0.5	mg/kg	NONE/NONE
Chromium III	-	-	-	28.2	-	-	-	-	-	-	<0.5	mg/kg	NONE/NONE
Total Organic Carbon$^{\#}$	1.65	-	-	NDP	3.43	0.14	-	0.45	-	0.21	<0.02	%	TM21/PM24
Organic Matter	-	1.2	1.7	-	-	-	4.4	-	0.6	-	<0.2	%	TM21/PM24

Client Name: Ground Investigations Ireland
Reference: 19/11/9230
Location: Avoca River Park
Contact: Emer O'Connor
EMT Job No: 19/20618

Report : **Solid**

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	153-155	156-158	162-164	165-167	168-170	171-173	174-176	177-179	180-182	183-185			
Sample ID	TP22	TP22	TP23	TP24	TP24	TP25	TP25	TP26	TP26	TP27			
Depth	0.50	1.50	1.50	0.50	1.50	0.50	1.50	0.50	1.50	0.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	09/12/2019	09/12/2019	09/12/2019	09/12/2019	09/12/2019	10/12/2019	10/12/2019	12/12/2019	12/12/2019	10/12/2019			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1	LOD/LOR	Units	Method No.
Date of Receipt	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019			
pH $^{\#}$	9.59	-	-	8.04	6.69	7.08	-	7.17	-	7.12	<0.01	pH units	TM73/PM11
Mass of raw test portion	0.1161	-	-	0.0985	0.1339	0.1075	-	0.1165	-	0.1012		kg	NONE/PM17
Mass of dried test portion	0.09	-	-	0.09	0.09	0.09	-	0.09	-	0.09		kg	NONE/PM17

Client Name: Ground Investigations Ireland
Reference: 19/11/9230
Location: Avoca River Park
Contact: Emer O'Connor
EMT Job No: 19/20618

Report : Solid

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	189-191	192-194	195-197	198-200	204-206								
Sample ID	TP28	TP28	TP29	TP29	TP30								
Depth	0.50	1.50	0.50	1.50	1.50								
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T								
Sample Date	10/12/2019	10/12/2019	12/12/2019	12/12/2019	11/12/2019								
Sample Type	Soil	Soil	Soil	Soil	Soil								
Batch Number	1	1	1	1	1						LOD/LOR	Units	Method No.
Date of Receipt	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019								
Antimony	3	1	1	-	-						<1	mg/kg	TM30/PM15
Arsenic #	12.0	50.3	<0.5	-	-						<0.5	mg/kg	TM30/PM15
Barium #	54	67	15	-	-						<1	mg/kg	TM30/PM15
Cadmium #	<0.1	1.7	<0.1	-	-						<0.1	mg/kg	TM30/PM15
Chromium #	38.1	37.4	41.4	-	-						<0.5	mg/kg	TM30/PM15
Copper #	35	132	35	-	-						<1	mg/kg	TM30/PM15
Lead #	20	210	10	-	-						<5	mg/kg	TM30/PM15
Mercury #	<0.1	<0.1	<0.1	-	-						<0.1	mg/kg	TM30/PM15
Molybdenum #	<0.1	1.1	0.8	-	-						<0.1	mg/kg	TM30/PM15
Nickel #	41.8	26.8	10.1	-	-						<0.7	mg/kg	TM30/PM15
Selenium #	2	2	<1	-	-						<1	mg/kg	TM30/PM15
Zinc #	133	263	169	-	-						<5	mg/kg	TM30/PM15
Antimony	-	-	-	6	-						<1	mg/kg	TM30/PM62
Arsenic	-	-	-	24.1	-						<0.5	mg/kg	TM30/PM62
Barium	-	-	-	40	-						<1	mg/kg	TM30/PM62
Cadmium	-	-	-	0.6	-						<0.1	mg/kg	TM30/PM62
Chromium	-	-	-	DR	-						<0.5	mg/kg	TM30/PM62
Copper	-	-	-	98	-						<1	mg/kg	TM30/PM62
Lead	-	-	-	67	-						<5	mg/kg	TM30/PM62
Mercury	-	-	-	<0.1	-						<0.1	mg/kg	TM30/PM62
Molybdenum	-	-	-	1.7	-						<0.1	mg/kg	TM30/PM62
Nickel	-	-	-	31.7	-						<0.7	mg/kg	TM30/PM62
Selenium	-	-	-	1	-						<1	mg/kg	TM30/PM62
Zinc	-	-	-	134	-						<5	mg/kg	TM30/PM62

Client Name: Ground Investigations Ireland
Reference: 19/11/9230
Location: Avoca River Park
Contact: Emer O'Connor
EMT Job No: 19/20618

Report : **Solid**

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	189-191	192-194	195-197	198-200	204-206						LOD/LOR	Units	Method No.
Sample ID	TP28	TP28	TP29	TP29	TP30								
Depth	0.50	1.50	0.50	1.50	1.50								
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T								
Sample Date	10/12/2019	10/12/2019	12/12/2019	12/12/2019	11/12/2019								
Sample Type	Soil	Soil	Soil	Soil	Soil								
Batch Number	1	1	1	1	1								
Date of Receipt	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019								
PAH MS													
Naphthalene $^{\#}$	<0.04	<0.04	<0.04	0.12	-						<0.04	mg/kg	TM4/PM8
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	-						<0.03	mg/kg	TM4/PM8
Acenaphthene $^{\#}$	<0.05	<0.05	<0.05	<0.05	-						<0.05	mg/kg	TM4/PM8
Fluorene $^{\#}$	<0.04	<0.04	<0.04	<0.04	-						<0.04	mg/kg	TM4/PM8
Phenanthrene $^{\#}$	<0.03	<0.03	<0.03	0.13	-						<0.03	mg/kg	TM4/PM8
Anthracene $^{\#}$	<0.04	<0.04	<0.04	<0.04	-						<0.04	mg/kg	TM4/PM8
Fluoranthene $^{\#}$	<0.03	<0.03	<0.03	0.09	-						<0.03	mg/kg	TM4/PM8
Pyrene $^{\#}$	<0.03	<0.03	<0.03	0.14	-						<0.03	mg/kg	TM4/PM8
Benzo(a)anthracene $^{\#}$	<0.06	<0.06	<0.06	<0.06	-						<0.06	mg/kg	TM4/PM8
Chrysene $^{\#}$	<0.02	<0.02	<0.02	0.13	-						<0.02	mg/kg	TM4/PM8
Benzo(bk)fluoranthene $^{\#}$	<0.07	<0.07	<0.07	<0.07	-						<0.07	mg/kg	TM4/PM8
Benzo(a)pyrene $^{\#}$	<0.04	<0.04	<0.04	<0.04	-						<0.04	mg/kg	TM4/PM8
Indeno(123cd)pyrene	<0.04	<0.04	<0.04	<0.04	-						<0.04	mg/kg	TM4/PM8
Dibenzo(ah)anthracene $^{\#}$	<0.04	<0.04	<0.04	<0.04	-						<0.04	mg/kg	TM4/PM8
Benzo(ghi)perylene $^{\#}$	<0.04	<0.04	<0.04	<0.04	-						<0.04	mg/kg	TM4/PM8
Coronene	<0.04	<0.04	<0.04	<0.04	-						<0.04	mg/kg	TM4/PM8
PAH 6 Total $^{\#}$	<0.22	<0.22	<0.22	<0.22	-						<0.22	mg/kg	TM4/PM8
PAH 17 Total	<0.64	<0.64	<0.64	<0.64	-						<0.64	mg/kg	TM4/PM8
Benzo(b)fluoranthene	<0.05	<0.05	<0.05	<0.05	-						<0.05	mg/kg	TM4/PM8
Benzo(k)fluoranthene	<0.02	<0.02	<0.02	<0.02	-						<0.02	mg/kg	TM4/PM8
Benzo(j)fluoranthene	<1	<1	<1	<1	-						<1	mg/kg	TM4/PM8
PAH Surrogate % Recovery	96	97	96	95	-						<0	%	TM4/PM8
Mineral Oil (C10-C40)	44	-	-	542$_{AB}$	-						<30	mg/kg	TM5/PM8/PM16
TPH CWG													
Aliphatics													
>C5-C6 $^{\#}$	<0.1	<0.1	<0.1	<0.1	-						<0.1	mg/kg	TM36/PM12
>C6-C8 $^{\#}$	<0.1	<0.1	<0.1	<0.1	-						<0.1	mg/kg	TM36/PM12
>C8-C10	<0.1	<0.1	<0.1	1.2	-						<0.1	mg/kg	TM36/PM12
>C10-C12 $^{\#}$	<0.2	<0.2	<0.2	<0.6$_{AB}$	-						<0.2	mg/kg	TM5/PM8/PM16
>C12-C16 $^{\#}$	<4	<4	<4	<12$_{AB}$	-						<4	mg/kg	TM5/PM8/PM16
>C16-C21 $^{\#}$	<7	<7	<7	<21$_{AB}$	-						<7	mg/kg	TM5/PM8/PM16
>C21-C35 $^{\#}$	44	<7	83	438$_{AB}$	-						<7	mg/kg	TM5/PM8/PM16
>C35-C40	<7	<7	12	104$_{AB}$	-						<7	mg/kg	TM5/PM8/PM16
Total aliphatics C5-40	44	<26	95	543$_{AB}$	-						<26	mg/kg	TM5/TM36/PM8/PM12/PM16
>C6-C10	<0.1	<0.1	<0.1	1.2	-						<0.1	mg/kg	TM36/PM12
>C10-C25	<10	<10	21	91$_{AB}$	-						<10	mg/kg	TM5/PM8/PM16
>C25-C35	44	<10	72	355$_{AB}$	-						<10	mg/kg	TM5/PM8/PM16

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All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: Ground Investigations Ireland
Reference: 19/11/9230
Location: Avoca River Park
Contact: Emer O'Connor
EMT Job No: 19/20618

Report : **Solid**

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	189-191	192-194	195-197	198-200	204-206						LOD/LOR	Units	Method No.
Sample ID	TP28	TP28	TP29	TP29	TP30								
Depth	0.50	1.50	0.50	1.50	1.50								
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T								
Sample Date	10/12/2019	10/12/2019	12/12/2019	12/12/2019	11/12/2019								
Sample Type	Soil	Soil	Soil	Soil	Soil								
Batch Number	1	1	1	1	1								
Date of Receipt	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019								
TPH CWG													
Aromatics													
>C5-EC7 #	<0.1	<0.1	<0.1	<0.1	-						<0.1	mg/kg	TM36/PM12
>EC7-EC8 #	<0.1	<0.1	<0.1	<0.1	-						<0.1	mg/kg	TM36/PM12
>EC8-EC10 #	<0.1	<0.1	<0.1	1.2	-						<0.1	mg/kg	TM36/PM12
>EC10-EC12 #	<0.2	<0.2	<0.2	<0.6$_{AB}$	-						<0.2	mg/kg	TM5/PM8/PM16
>EC12-EC16 #	<4	<4	<4	<12$_{AB}$	-						<4	mg/kg	TM5/PM8/PM16
>EC16-EC21 #	<7	<7	<7	52$_{AB}$	-						<7	mg/kg	TM5/PM8/PM16
>EC21-EC35 #	41	<7	63	777$_{AB}$	-						<7	mg/kg	TM5/PM8/PM16
>EC35-EC40	<7	<7	18	214$_{AB}$	-						<7	mg/kg	TM5/PM8/PM16
Total aromatics C5-40	41	<26	81	1044$_{AB}$	-						<26	mg/kg	TM5/TM36/PM8/PM12/PM16
Total aliphatics and aromatics(C5-40)	85	<52	176	1587$_{AB}$	-						<52	mg/kg	TM5/TM36/PM8/PM12/PM16
>EC6-EC10 #	<0.1	<0.1	<0.1	1.2	-						<0.1	mg/kg	TM36/PM12
>EC10-EC25	<10	<10	<10	207$_{AB}$	-						<10	mg/kg	TM5/PM8/PM16
>EC25-EC35	41	<10	64	627$_{AB}$	-						<10	mg/kg	TM5/PM8/PM16
MTBE #	<5	<5	<5	<5	-						<5	ug/kg	TM31/PM12
Benzene #	<5	<5	<5	<5	-						<5	ug/kg	TM31/PM12
Toluene #	<5	<5	<5	<5	-						<5	ug/kg	TM31/PM12
Ethylbenzene #	<5	<5	<5	108	-						<5	ug/kg	TM31/PM12
m/p-Xylene #	<5	<5	<5	859	-						<5	ug/kg	TM31/PM12
o-Xylene #	<5	<5	<5	148	-						<5	ug/kg	TM31/PM12
PCB 28 #	<5	<5	<5	<25$_{AC}$	-						<5	ug/kg	TM17/PM8
PCB 52 #	<5	<5	17	<25$_{AC}$	-						<5	ug/kg	TM17/PM8
PCB 101 #	6	<5	66	<25$_{AC}$	-						<5	ug/kg	TM17/PM8
PCB 118 #	<5	<5	37	<25$_{AC}$	-						<5	ug/kg	TM17/PM8
PCB 138 #	7	<5	105	<25$_{AC}$	-						<5	ug/kg	TM17/PM8
PCB 153 #	6	<5	90	<25$_{AC}$	-						<5	ug/kg	TM17/PM8
PCB 180 #	<5	<5	45	<25$_{AC}$	-						<5	ug/kg	TM17/PM8
Total 7 PCBs #	<35	<35	360	<175$_{AC}$	-						<35	ug/kg	TM17/PM8
Natural Moisture Content	15.2	65.3	8.2	28.8	-						<0.1	%	PM4/PM0
Moisture Content (% Wet Weight)	13.2	39.5	7.6	22.3	-						<0.1	%	PM4/PM0
Hexavalent Chromium #	<0.3	<0.3	<0.3	<0.3	-						<0.3	mg/kg	TM38/PM20
Sulphate as SO4 (2:1 Ext) #	-	0.0246	-	-	-						<0.0015	g/l	TM38/PM20
Sulphate as SO4 (2:1 Ext)	-	-	-	-	-						<0.0015	g/l	TM38/PM60
Chromium III	38.1	37.4	41.4	-	-						<0.5	mg/kg	NONE/NONE
Chromium III	-	-	-	530.3$_{AC}$	-						<0.5	mg/kg	NONE/NONE
Total Organic Carbon #	0.14	2.15	0.07	NDP	-						<0.02	%	TM21/PM24
Organic Matter	-	-	-	-	1.9						<0.2	%	TM21/PM24

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Client Name: Ground Investigations Ireland
Reference: 19/11/9230
Location: Avoca River Park
Contact: Emer O'Connor
EMT Job No: 19/20618

Report : **Solid**

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	189-191	192-194	195-197	198-200	204-206						LOD/LOR	Units	Method No.
Sample ID	TP28	TP28	TP29	TP29	TP30								
Depth	0.50	1.50	0.50	1.50	1.50								
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T								
Sample Date	10/12/2019	10/12/2019	12/12/2019	12/12/2019	11/12/2019								
Sample Type	Soil	Soil	Soil	Soil	Soil								
Batch Number	1	1	1	1	1								
Date of Receipt	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019								
pH #	6.28	7.40	8.43	7.44	-						<0.01	pH units	TM73/PM11
Mass of raw test portion	0.101	0.1199	0.0964	0.1273	-							kg	NONE/PM17
Mass of dried test portion	0.09	0.09	0.09	0.09	-							kg	NONE/PM17

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All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name: Ground Investigations Ireland
Reference: 19/11/9230
Location: Avoca River Park
Contact: Emer O'Connor
EMT Job No: 19/20618

Report : **CEN 10:1 1 Batch**

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

EMT Sample No.	7-9	16-18	34-36	40-42	52-54	55-57	58-60	61-63	76-78	79-81			
Sample ID	TP02	TP03	TP05	TP06	TP08	TP08	TP09	TP09	TP11	TP11			
Depth	0.50	0.50	1.20	1.50	1.50	2.50	0.50	1.50	0.50	1.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	05/12/2019	04/12/2019	04/12/2019	06/12/2019	05/12/2019	05/12/2019	05/12/2019	05/12/2019	05/12/2019	05/12/2019			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1	LOD/LOR	Units	Method No.
Date of Receipt	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019			
Dissolved Antimony #	0.007	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.005	<0.002	<0.002	<0.002	mg/l	TM30/PM17
Dissolved Antimony (A10) #	0.07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.05	<0.02	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Arsenic #	0.1130	<0.0025	0.0165	0.0165	0.0995	<0.0025	0.0580	0.0773	<0.0025	<0.0025	<0.0025	mg/l	TM30/PM17
Dissolved Arsenic (A10) #	1.129	<0.025	0.165	0.165	0.995	<0.025	0.580	0.773	<0.025	<0.025	<0.025	mg/kg	TM30/PM17
Dissolved Barium #	0.018	<0.003	0.007	0.007	0.010	0.016	<0.003	0.006	<0.003	<0.003	<0.003	mg/l	TM30/PM17
Dissolved Barium (A10) #	0.18	<0.03	0.07	0.07	0.10	0.16	<0.03	0.06	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Dissolved Cadmium #	0.0039	<0.0005	<0.0005	0.0007	0.0020	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	mg/l	TM30/PM17
Dissolved Cadmium (A10) #	0.039	<0.005	<0.005	0.007	0.020	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/kg	TM30/PM17
Dissolved Chromium #	0.0059	<0.0015	<0.0015	<0.0015	<0.0015	0.0100	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	mg/l	TM30/PM17
Dissolved Chromium (A10) #	0.059	<0.015	<0.015	<0.015	<0.015	0.100	<0.015	<0.015	<0.015	<0.015	<0.015	mg/kg	TM30/PM17
Dissolved Copper #	0.009	<0.007	<0.007	0.043	0.060	<0.007	<0.007	0.014	<0.007	<0.007	<0.007	mg/l	TM30/PM17
Dissolved Copper (A10) #	0.09	<0.07	<0.07	0.43	0.60	<0.07	<0.07	0.14	<0.07	<0.07	<0.07	mg/kg	TM30/PM17
Dissolved Lead #	0.013	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.014	<0.005	<0.005	<0.005	mg/l	TM30/PM17
Dissolved Lead (A10) #	0.13	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.14	<0.05	<0.05	<0.05	mg/kg	TM30/PM17
Dissolved Molybdenum #	0.004	0.006	<0.002	<0.002	0.043	<0.002	0.084	0.007	0.003	<0.002	<0.002	mg/l	TM30/PM17
Dissolved Molybdenum (A10) #	0.04	0.06	<0.02	<0.02	0.43	<0.02	0.84	0.07	0.03	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Nickel #	0.009	<0.002	<0.002	<0.002	0.002	0.005	<0.002	0.004	<0.002	<0.002	<0.002	mg/l	TM30/PM17
Dissolved Nickel (A10) #	0.09	<0.02	<0.02	<0.02	<0.02	0.05	<0.02	0.04	<0.02	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Selenium #	<0.003	<0.003	<0.003	<0.003	<0.003	0.028	<0.003	<0.003	<0.003	<0.003	<0.003	mg/l	TM30/PM17
Dissolved Selenium (A10) #	<0.03	<0.03	<0.03	<0.03	<0.03	0.28	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Dissolved Zinc #	0.070	0.004	0.007	0.044	0.504	0.465	0.018	0.420	0.004	0.006	<0.003	mg/l	TM30/PM17
Dissolved Zinc (A10) #	0.70	0.04	0.07	0.44	5.04	4.65	0.18	4.20	0.04	0.06	<0.03	mg/kg	TM30/PM17
Mercury Dissolved by CVAF #	<0.00001	<0.00001	<0.00001	0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	mg/l	TM61/PM0
Mercury Dissolved by CVAF #	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	mg/kg	TM61/PM0
Phenol	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	TM26/PM0
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM26/PM0
Fluoride	47.0$_{AC}$	<1.5$_{AC}$	<1.5$_{AC}$	<0.3	<0.3	<0.3	<0.3	1.7	<1.5$_{AC}$	8.4$_{AC}$	<0.3	mg/l	TM173/PM0
Fluoride	470$_{AC}$	<15$_{AC}$	<15$_{AC}$	<3	<3	<3	<3	17	<15$_{AC}$	84$_{AC}$	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	1333.7	1.9	13.6	<0.5	72.4	188.5	74.3	<0.5	10.4	40.5	<0.5	mg/l	TM38/PM0
Sulphate as SO4 #	13331	19	136	<5	724	1885	743	<5	104	405	<5	mg/kg	TM38/PM0
Chloride #	<0.3	<0.3	0.6	<0.3	1.6	1.8	0.6	7.9	1.2	0.6	<0.3	mg/l	TM38/PM0
Chloride #	<3	<3	6	<3	16	18	6	79	12	6	<3	mg/kg	TM38/PM0
Dissolved Organic Carbon	6	<2	11	16	5	<2	3	25	<2	4	<2	mg/l	TM60/PM0
Dissolved Organic Carbon	60	<20	110	160	50	<20	30	250	<20	40	<20	mg/kg	TM60/PM0
pH	4.62	7.44	7.52	7.24	6.66	6.49	7.75	7.43	7.92	7.54	<0.01	pH units	TM73/PM0
Total Dissolved Solids #	2357	48	104	65	119	331	168	99	62	88	<35	mg/l	TM20/PM0
Total Dissolved Solids #	23559	480	1040	650	1190	3311	1680	990	620	880	<350	mg/kg	TM20/PM0

Please see attached notes for all abbreviations and acronyms

Client Name: Ground Investigations Ireland
Reference: 19/11/9230
Location: Avoca River Park
Contact: Emer O'Connor
EMT Job No: 19/20618

Report : CEN 10:1 1 Batch

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	91-93	94-96	106-108	115-117	126-128	129-131	135-137	138-140	144-146	147-149			
Sample ID	TP13	TP13	TP16	TP17	TP19	TP19	TP20	TP20	TP21	TP21			
Depth	0.50	1.50	0.50	1.50	0.50	1.50	0.50	1.50	0.50	1.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	11/12/2019	11/12/2019	09/12/2019	12/12/2019	11/12/2019	11/12/2019	09/12/2019	09/12/2019	09/12/2019	09/12/2019			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1	LOD/LOR	Units	Method No.
Date of Receipt	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019			
Dissolved Antimony $^{\#}$	<0.002	<0.002	<0.002	0.002	<0.002	0.006	<0.002	<0.002	<0.002	<0.002	<0.002	mg/l	TM30/PM17
Dissolved Antimony (A10) $^{\#}$	<0.02	<0.02	<0.02	0.02	<0.02	0.06	<0.02	<0.02	<0.02	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Arsenic $^{\#}$	<0.0025	0.0265	<0.0025	0.0267	<0.0025	0.0203	0.0038	0.0035	0.0078	0.0294	<0.0025	mg/l	TM30/PM17
Dissolved Arsenic (A10) $^{\#}$	<0.025	0.265	<0.025	0.267	<0.025	0.203	0.038	0.035	0.078	0.294	<0.025	mg/kg	TM30/PM17
Dissolved Barium $^{\#}$	<0.003	<0.003	<0.003	0.023	<0.003	0.006	0.003	0.004	<0.003	<0.003	<0.003	mg/l	TM30/PM17
Dissolved Barium (A10) $^{\#}$	<0.03	<0.03	<0.03	0.23	<0.03	0.06	0.03	0.04	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Dissolved Cadmium $^{\#}$	<0.0005	0.0021	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	mg/l	TM30/PM17
Dissolved Cadmium (A10) $^{\#}$	<0.005	0.021	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/kg	TM30/PM17
Dissolved Chromium $^{\#}$	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	0.0033	0.0024	<0.0015	<0.0015	<0.0015	<0.0015	mg/l	TM30/PM17
Dissolved Chromium (A10) $^{\#}$	<0.015	<0.015	<0.015	<0.015	<0.015	0.033	0.024	<0.015	<0.015	<0.015	<0.015	mg/kg	TM30/PM17
Dissolved Copper $^{\#}$	<0.007	0.028	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	0.008	<0.007	<0.007	mg/l	TM30/PM17
Dissolved Copper (A10) $^{\#}$	<0.07	0.28	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	0.08	<0.07	<0.07	mg/kg	TM30/PM17
Dissolved Lead $^{\#}$	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/l	TM30/PM17
Dissolved Lead (A10) $^{\#}$	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	mg/kg	TM30/PM17
Dissolved Molybdenum $^{\#}$	<0.002	0.013	0.006	0.015	0.003	0.026	0.013	0.014	0.006	0.004	<0.002	mg/l	TM30/PM17
Dissolved Molybdenum (A10) $^{\#}$	<0.02	0.13	0.06	0.15	0.03	0.26	0.13	0.14	0.06	0.04	<0.02	mg/kg	TM30/PM17
Dissolved Nickel $^{\#}$	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.003	<0.002	<0.002	<0.002	mg/l	TM30/PM17
Dissolved Nickel (A10) $^{\#}$	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	<0.02	mg/kg	TM30/PM17
Dissolved Selenium $^{\#}$	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	mg/l	TM30/PM17
Dissolved Selenium (A10) $^{\#}$	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Dissolved Zinc $^{\#}$	0.018	0.381	0.004	0.004	0.005	0.007	0.003	0.005	0.006	0.007	<0.003	mg/l	TM30/PM17
Dissolved Zinc (A10) $^{\#}$	0.18	3.81	0.04	0.04	0.05	0.07	0.03	0.05	0.06	0.07	<0.03	mg/kg	TM30/PM17
Mercury Dissolved by CVAF $^{\#}$	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.00001	<0.00001	mg/l	TM61/PM0
Mercury Dissolved by CVAF $^{\#}$	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	mg/kg	TM61/PM0
Phenol	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	TM26/PM0
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM26/PM0
Fluoride	<0.3	<1.5$_{AC}$	<1.5$_{AC}$	<1.5$_{AC}$	<1.5$_{AC}$	<1.5$_{AC}$	0.6	0.5	<0.3	<0.3	<0.3	mg/l	TM173/PM0
Fluoride	<3	<15$_{AC}$	<15$_{AC}$	<15$_{AC}$	<15$_{AC}$	<15$_{AC}$	6	5	<3	<3	<3	mg/kg	TM173/PM0
Sulphate as SO4 $^{\#}$	42.5	121.6	<0.5	190.4	1.1	24.0	8.9	15.5	5.1	<0.5	<0.5	mg/l	TM38/PM0
Sulphate as SO4 $^{\#}$	425	1216	<5	1904	11	240	89	155	51	<5	<5	mg/kg	TM38/PM0
Chloride $^{\#}$	<0.3	0.7	<0.3	2.1	<0.3	9.5	<0.3	<0.3	2.4	2.3	<0.3	mg/l	TM38/PM0
Chloride $^{\#}$	<3	7	<3	21	<3	95	<3	<3	24	23	<3	mg/kg	TM38/PM0
Dissolved Organic Carbon	3	<2	<2	17	<2	30	<2	5	6	15	<2	mg/l	TM60/PM0
Dissolved Organic Carbon	30	<20	<20	170	<20	300	<20	50	60	150	<20	mg/kg	TM60/PM0
pH	7.32	6.97	7.85	8.00	8.18	8.80	8.23	8.24	8.61	7.70	<0.01	pH units	TM73/PM0
Total Dissolved Solids $^{\#}$	139	282	<35	456	43	133	77	131	84	62	<35	mg/l	TM20/PM0
Total Dissolved Solids $^{\#}$	1390	2820	<350	4561	430	1330	770	1310	840	620	<350	mg/kg	TM20/PM0

Client Name: Ground Investigations Ireland
Reference: 19/11/9230
Location: Avoca River Park
Contact: Emer O'Connor
EMT Job No: 19/20618

Report : CEN 10:1 1 Batch

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	153-155	165-167	168-170	171-173	177-179	183-185	189-191	192-194	195-197	198-200			
Sample ID	TP22	TP24	TP24	TP25	TP26	TP27	TP28	TP28	TP29	TP29			
Depth	0.50	0.50	1.50	0.50	0.50	0.50	0.50	1.50	0.50	1.50			
COC No / misc													
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T			
Sample Date	09/12/2019	09/12/2019	09/12/2019	10/12/2019	12/12/2019	10/12/2019	10/12/2019	10/12/2019	12/12/2019	12/12/2019			
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil			
Batch Number	1	1	1	1	1	1	1	1	1	1	LOD/LOR	Units	Method No.
Date of Receipt	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019			
Dissolved Antimony #	0.009	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	0.004	<0.002	0.003	<0.002	mg/l	TM30/PM17
Dissolved Antimony (A10) #	0.09	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	0.04	<0.02	0.03	<0.02	mg/kg	TM30/PM17
Dissolved Arsenic #	0.0148	0.0058	0.0477	<0.0025	<0.0025	<0.0025	0.0028	0.0882	0.0073	0.0115	<0.0025	mg/l	TM30/PM17
Dissolved Arsenic (A10) #	0.148	0.058	0.477	<0.025	<0.025	<0.025	0.028	0.882	0.073	0.115	<0.025	mg/kg	TM30/PM17
Dissolved Barium #	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.012	<0.003	0.006	<0.003	mg/l	TM30/PM17
Dissolved Barium (A10) #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.12	<0.03	0.06	<0.03	mg/kg	TM30/PM17
Dissolved Cadmium #	<0.0005	<0.0005	0.0006	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	mg/l	TM30/PM17
Dissolved Cadmium (A10) #	<0.005	<0.005	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	mg/kg	TM30/PM17
Dissolved Chromium #	0.0043	<0.0015	0.0017	<0.0015	<0.0015	<0.0015	<0.0015	0.0051	<0.0015	<0.0015	<0.0015	mg/l	TM30/PM17
Dissolved Chromium (A10) #	0.043	<0.015	0.017	<0.015	<0.015	<0.015	<0.015	0.051	<0.015	<0.015	<0.015	mg/kg	TM30/PM17
Dissolved Copper #	0.104	<0.007	0.101	<0.007	<0.007	<0.007	<0.007	0.027	<0.007	<0.007	<0.007	mg/l	TM30/PM17
Dissolved Copper (A10) #	1.04	<0.07	1.01	<0.07	<0.07	<0.07	<0.07	0.27	<0.07	<0.07	<0.07	mg/kg	TM30/PM17
Dissolved Lead #	<0.005	<0.005	0.097	<0.005	<0.005	<0.005	<0.005	0.042	<0.005	<0.005	<0.005	mg/l	TM30/PM17
Dissolved Lead (A10) #	<0.05	<0.05	0.97	<0.05	<0.05	<0.05	<0.05	0.42	<0.05	<0.05	<0.05	mg/kg	TM30/PM17
Dissolved Molybdenum #	0.010	0.006	0.006	0.005	0.003	<0.002	<0.002	0.009	0.003	0.021	<0.002	mg/l	TM30/PM17
Dissolved Molybdenum (A10) #	0.10	0.06	0.06	0.05	0.03	<0.02	<0.02	0.09	0.03	0.21	<0.02	mg/kg	TM30/PM17
Dissolved Nickel #	0.005	<0.002	0.004	<0.002	<0.002	<0.002	<0.002	0.007	<0.002	0.007	<0.002	mg/l	TM30/PM17
Dissolved Nickel (A10) #	0.05	<0.02	0.04	<0.02	<0.02	<0.02	<0.02	0.07	<0.02	0.07	<0.02	mg/kg	TM30/PM17
Dissolved Selenium #	0.007	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	mg/l	TM30/PM17
Dissolved Selenium (A10) #	0.07	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	mg/kg	TM30/PM17
Dissolved Zinc #	0.003	0.003	0.024	0.003	0.003	0.003	0.004	0.022	0.003	0.004	<0.003	mg/l	TM30/PM17
Dissolved Zinc (A10) #	<0.03	<0.03	0.24	<0.03	<0.03	0.03	0.04	0.22	0.03	0.04	<0.03	mg/kg	TM30/PM17
Mercury Dissolved by CVAF #	<0.00001	<0.00001	0.00002	<0.00001	<0.00001	<0.00001	<0.00001	0.00001	<0.00001	<0.00001	<0.00001	mg/l	TM61/PM0
Mercury Dissolved by CVAF #	<0.0001	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	mg/kg	TM61/PM0
Phenol	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	mg/l	TM26/PM0
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	mg/kg	TM26/PM0
Fluoride	0.4	1.2	<0.3	0.5	0.6	0.4	<0.3	<0.3	0.4	2.4	<0.3	mg/l	TM173/PM0
Fluoride	4	12	<3	5	6	4	<3	<3	4	24	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	21.7	3.7	<0.5	4.3	3.7	3.2	7.4	<0.5	0.8	229.5	<0.5	mg/l	TM38/PM0
Sulphate as SO4 #	217	37	<5	43	37	32	74	<5	8	2294	<5	mg/kg	TM38/PM0
Chloride #	4.8	<0.3	8.4	<0.3	0.4	<0.3	<0.3	10.1	<0.3	5.6	<0.3	mg/l	TM38/PM0
Chloride #	48	<3	84	<3	4	<3	<3	101	<3	56	<3	mg/kg	TM38/PM0
Dissolved Organic Carbon	27	2	36	<2	3	<2	<2	48	<2	14	<2	mg/l	TM60/PM0
Dissolved Organic Carbon	270	<20	360	<20	30	<20	<20	480	<20	140	<20	mg/kg	TM60/PM0
pH	11.69	7.87	7.44	7.60	7.90	7.60	7.28	7.63	8.19	7.99	<0.01	pH units	TM73/PM0
Total Dissolved Solids #	357	<35	<35	42	67	<35	42	74	45	373	<35	mg/l	TM20/PM0
Total Dissolved Solids #	3570	<350	<350	420	670	<350	420	740	450	3728	<350	mg/kg	TM20/PM0

Please include all sections of this report if it is reproduced
All solid results are expressed on a dry weight basis unless stated otherwise.

Client Name:	Ground Investigations Ireland	**Report :**	**EN12457_2**
Reference:	19/11/9230		
Location:	Avoca River Park	**Solids:** V=60g VOC jar, J=250g glass jar, T=plastic tub	
Contact:	Emer O'Connor		
EMT Job No:	19/20618		

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	7-9	16-18	34-36	40-42	52-54	55-57	58-60	61-63	76-78	79-81						
Sample ID	TP02	TP03	TP05	TP06	TP08	TP08	TP09	TP09	TP11	TP11						
Depth	0.50	0.50	1.20	1.50	1.50	2.50	0.50	1.50	0.50	1.50						
COC No / misc																
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T						
Sample Date	05/12/2019	04/12/2019	04/12/2019	06/12/2019	05/12/2019	05/12/2019	05/12/2019	05/12/2019	05/12/2019	05/12/2019						
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil						
Batch Number	1	1	1	1	1	1	1	1	1	1	Inert	Stable Non-reactive	Hazardous	LOD LOR	Units	Method No.
Date of Receipt	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019						
Solid Waste Analysis																
Total Organic Carbon #	0.40	0.33	0.61	1.38	0.38	0.28	0.24	2.47	0.10	2.30	3	5	6	<0.02	%	TM21/PM24
Sum of BTEX	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025^{SV}	6	-	-	<0.025	mg/kg	TM31/PM12
Sum of 7 PCBs #	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	1	-	-	<0.035	mg/kg	TM17/PM8
Mineral Oil	136	<30	<30	<30	<30	<30	<30	<30	<30	249$_{BA}$	500	-	-	<30	mg/kg	TM5/PM8/PM16
PAH Sum of 6 #	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	-	-	-	<0.22	mg/kg	TM4/PM8
PAH Sum of 17	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	100	-	-	<0.64	mg/kg	TM4/PM8
CEN 10:1 Leachate																
Arsenic #	1.129	<0.025	0.165	0.165	0.995	<0.025	0.580	0.773	<0.025	<0.025	0.5	2	25	<0.025	mg/kg	TM30/PM17
Barium #	0.18	<0.03	0.07	0.07	0.10	0.16	<0.03	0.06	<0.03	<0.03	20	100	300	<0.03	mg/kg	TM30/PM17
Cadmium #	0.039	<0.005	<0.005	0.007	0.020	<0.005	<0.005	<0.005	<0.005	<0.005	0.04	1	5	<0.005	mg/kg	TM30/PM17
Chromium #	0.059	<0.015	<0.015	<0.015	<0.015	0.100	<0.015	<0.015	<0.015	<0.015	0.5	10	70	<0.015	mg/kg	TM30/PM17
Copper #	0.09	<0.07	<0.07	0.43	0.60	<0.07	<0.07	0.14	<0.07	<0.07	2	50	100	<0.07	mg/kg	TM30/PM17
Mercury #	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.01	0.2	2	<0.0001	mg/kg	TM61/PM0
Molybdenum #	0.04	0.06	<0.02	<0.02	0.43	<0.02	0.84	0.07	0.03	<0.02	0.5	10	30	<0.02	mg/kg	TM30/PM17
Nickel #	0.09	<0.02	<0.02	<0.02	<0.02	0.05	<0.02	0.04	<0.02	<0.02	0.4	10	40	<0.02	mg/kg	TM30/PM17
Lead #	0.13	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.14	<0.05	<0.05	0.5	10	50	<0.05	mg/kg	TM30/PM17
Antimony #	0.07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.05	<0.02	<0.02	0.06	0.7	5	<0.02	mg/kg	TM30/PM17
Selenium #	<0.03	<0.03	<0.03	<0.03	<0.03	0.28	<0.03	<0.03	<0.03	<0.03	0.1	0.5	7	<0.03	mg/kg	TM30/PM17
Zinc #	0.70	0.04	0.07	0.44	5.04	4.65	0.18	4.20	0.04	0.06	4	50	200	<0.03	mg/kg	TM30/PM17
Total Dissolved Solids #	23559	480	1040	650	1190	3311	1680	990	620	880	4000	60000	100000	<350	mg/kg	TM20/PM0
Dissolved Organic Carbon	60	<20	110	160	50	<20	30	250	<20	40	500	800	1000	<20	mg/kg	TM60/PM0
Mass of raw test portion	0.151	0.1003	0.1395	0.1219	0.1316	0.1232	0.1157	0.1496	0.0997	0.1189	-	-	-		kg	NONE/PM17
Dry Matter Content Ratio	59.8	89.6	64.4	73.8	68.2	73.1	77.8	60.1	89.9	76.0	-	-	-	<0.1	%	NONE/PM4
Leachant Volume	0.839	0.89	0.85	0.868	0.858	0.867	0.874	0.84	0.89	0.871	-	-	-		l	NONE/PM17
Eluate Volume	0.8	0.6	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	-	-	-		l	NONE/PM17
pH #	4.64	8.16	7.08	7.03	6.74	5.82	6.21	7.12	8.56	7.17	-	-	-	<0.01	pH units	TM73/PM11
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1	-	-	<0.1	mg/kg	TM26/PM0
Fluoride	470$_{BC}$	<15$_{BC}$	<15$_{BC}$	<3	<3	<3	<3	17	<15$_{BC}$	84$_{BC}$	-	-	-	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	13331	19	136	<5	724	1885	743	<5	104	405	1000	20000	50000	<5	mg/kg	TM38/PM0
Chloride #	<3	<3	6	<3	16	18	6	79	12	6	800	15000	25000	<3	mg/kg	TM38/PM0

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Client Name: Ground Investigations Ireland
Reference: 19/11/9230
Location: Avoca River Park
Contact: Emer O'Connor
EMT Job No: 19/20618

Report : **EN12457_2**

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	91-93	94-96	106-108	115-117	126-128	129-131	135-137	138-140	144-146	147-149						
Sample ID	TP13	TP13	TP16	TP17	TP19	TP19	TP20	TP20	TP21	TP21						
Depth	0.50	1.50	0.50	1.50	0.50	1.50	0.50	1.50	0.50	1.50						
COC No / misc																
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T						
Sample Date	11/12/2019	11/12/2019	09/12/2019	12/12/2019	11/12/2019	11/12/2019	09/12/2019	09/12/2019	09/12/2019	09/12/2019						
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil						
Batch Number	1	1	1	1	1	1	1	1	1	1	Inert	Stable Non-reactive	Hazardous	LOD LOR	Units	Method No.
Date of Receipt	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019						
Solid Waste Analysis																
Total Organic Carbon #	0.32	0.11	0.70	7.23	0.42	3.94	NDP	NDP	0.22	0.40	3	5	6	<0.02	%	TM21/PM24
Sum of BTEX	<0.025	<0.025	<0.025	<0.025	<0.025	0.048^{SV}	<0.025	<0.025	<0.025	<0.025	6	-	-	<0.025	mg/kg	TM31/PM12
Sum of 7 PCBs #	0.464	<0.035	0.093	<0.035	0.069	0.206$_{BC}$	3.715	<0.035	<0.035	<0.035	1	-	-	<0.035	mg/kg	TM17/PM8
Mineral Oil	31	<30	61$_{BA}$	<30	82	576$_{BD}$	60	93	168	<30	500	-	-	<30	mg/kg	TM5/PM8/PM16
PAH Sum of 6 #	<0.22	<0.22	<0.22	<0.22	<0.22	0.47	<0.22	<0.22	<0.22	<0.22	-	-	-	<0.22	mg/kg	TM4/PM8
PAH Sum of 17	<0.64	<0.64	<0.64	<0.64	<0.64	5.28	<0.64	<0.64	<0.64	<0.64	100	-	-	<0.64	mg/kg	TM4/PM8
CEN 10:1 Leachate																
Arsenic #	<0.025	0.265	<0.025	0.267	<0.025	0.203	0.038	0.035	0.078	0.294	0.5	2	25	<0.025	mg/kg	TM30/PM17
Barium #	<0.03	<0.03	<0.03	0.23	<0.03	0.06	0.03	0.04	<0.03	<0.03	20	100	300	<0.03	mg/kg	TM30/PM17
Cadmium #	<0.005	0.021	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.04	1	5	<0.005	mg/kg	TM30/PM17
Chromium #	<0.015	<0.015	<0.015	<0.015	<0.015	0.033	0.024	<0.015	<0.015	<0.015	0.5	10	70	<0.015	mg/kg	TM30/PM17
Copper #	<0.07	0.28	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	0.08	<0.07	2	50	100	<0.07	mg/kg	TM30/PM17
Mercury #	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.01	0.2	2	<0.0001	mg/kg	TM61/PM0
Molybdenum #	<0.02	0.13	0.06	0.15	0.03	0.26	0.13	0.14	0.06	0.04	0.5	10	30	<0.02	mg/kg	TM30/PM17
Nickel #	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.03	<0.02	<0.02	0.4	10	40	<0.02	mg/kg	TM30/PM17
Lead #	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.5	10	50	<0.05	mg/kg	TM30/PM17
Antimony #	<0.02	<0.02	<0.02	0.02	<0.02	0.06	<0.02	<0.02	<0.02	<0.02	0.06	0.7	5	<0.02	mg/kg	TM30/PM17
Selenium #	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.1	0.5	7	<0.03	mg/kg	TM30/PM17
Zinc #	0.18	3.81	0.04	0.04	0.05	0.07	0.03	0.05	0.06	0.07	4	50	200	<0.03	mg/kg	TM30/PM17
Total Dissolved Solids #	1390	2820	<350	4561	430	1330	770	1310	840	620	4000	60000	100000	<350	mg/kg	TM20/PM0
Dissolved Organic Carbon	30	<20	<20	170	<20	300	<20	50	60	150	500	800	1000	<20	mg/kg	TM60/PM0
Mass of raw test portion	0.0981	0.1313	0.1002	0.1696	0.0969	0.1173	0.1109	0.1087	0.0986	0.1278	-	-	-		kg	NONE/PM17
Dry Matter Content Ratio	92.0	68.7	90.2	52.9	92.4	76.9	81.0	82.5	91.0	70.6	-	-	-	<0.1	%	NONE/PM4
Leachant Volume	0.892	0.859	0.89	0.82	0.893	0.873	0.879	0.881	0.891	0.862	-	-	-		l	NONE/PM17
Eluate Volume	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.08	-	-	-		l	NONE/PM17
pH #	7.19	4.55	8.33	7.56	8.33	8.04	8.34	7.82	8.34	7.12	-	-	-	<0.01	pH units	TM73/PM11
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1	-	-	<0.1	mg/kg	TM26/PM0
Fluoride	<3	<15$_{BC}$	<15$_{BC}$	<15$_{BC}$	<15$_{BC}$	<15$_{BC}$	6	5	<3	<3	-	-	-	<3	mg/kg	TM173/PM0
Sulphate as SO4 #	425	1216	<5	1904	11	240	89	155	51	<5	1000	20000	50000	<5	mg/kg	TM38/PM0
Chloride #	<3	7	<3	21	<3	95	<3	<3	24	23	800	15000	25000	<3	mg/kg	TM38/PM0

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Client Name: Ground Investigations Ireland
Reference: 19/11/9230
Location: Avoca River Park
Contact: Emer O'Connor
EMT Job No: 19/20618

Report : **EN12457_2**

Solids: V=60g VOC jar, J=250g glass jar, T=plastic tub

Please see attached notes for all abbreviations and acronyms

EMT Sample No.	153-155	165-167	168-170	171-173	177-179	183-185	189-191	192-194	195-197	198-200						
Sample ID	TP22	TP24	TP24	TP25	TP26	TP27	TP28	TP28	TP29	TP29						
Depth	0.50	0.50	1.50	0.50	0.50	0.50	0.50	1.50	0.50	1.50						
COC No / misc																
Containers	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T	V J T						
Sample Date	09/12/2019	09/12/2019	09/12/2019	10/12/2019	12/12/2019	10/12/2019	10/12/2019	10/12/2019	12/12/2019	12/12/2019						
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil						
Batch Number	1	1	1	1	1	1	1	1	1	1	Inert	Stable Non-reactive	Hazardous	LOD LOR	Units	Method No.
Date of Receipt	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019	16/12/2019						
Solid Waste Analysis																
Total Organic Carbon $^{\#}$	1.65	NDP	3.43	0.14	0.45	0.21	0.14	2.15	0.07	NDP	3	5	6	<0.02	%	TM21/PM24
Sum of BTEX	<0.025	<0.025	<0.025^{SV}	<0.025^{SV}	<0.025	<0.025	<0.025	<0.025	<0.025	1.115	6	-	-	<0.025	mg/kg	TM31/PM12
Sum of 7 PCBs $^{\#}$	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	0.360	<0.175$_{BC}$	1	-	-	<0.035	mg/kg	TM17/PM8
Mineral Oil	90	67	<30	<30	<30	<30	44	-	-	542$_{BB}$	500	-	-	<30	mg/kg	TM5/PM8/PM16
PAH Sum of 6 $^{\#}$	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	-	-	-	<0.22	mg/kg	TM4/PM8
PAH Sum of 17	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	100	-	-	<0.64	mg/kg	TM4/PM8
CEN 10:1 Leachate																
Arsenic $^{\#}$	0.148	0.058	0.477	<0.025	<0.025	<0.025	0.028	0.882	0.073	0.115	0.5	2	25	<0.025	mg/kg	TM30/PM17
Barium $^{\#}$	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.12	<0.03	0.06	20	100	300	<0.03	mg/kg	TM30/PM17
Cadmium $^{\#}$	<0.005	<0.005	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.04	1	5	<0.005	mg/kg	TM30/PM17
Chromium $^{\#}$	0.043	<0.015	0.017	<0.015	<0.015	<0.015	<0.015	0.051	<0.015	<0.015	0.5	10	70	<0.015	mg/kg	TM30/PM17
Copper $^{\#}$	1.04	<0.07	1.01	<0.07	<0.07	<0.07	<0.07	0.27	<0.07	<0.07	2	50	100	<0.07	mg/kg	TM30/PM17
Mercury $^{\#}$	<0.0001	<0.0001	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.01	0.2	2	<0.0001	mg/kg	TM61/PM0
Molybdenum $^{\#}$	0.10	0.06	0.06	0.05	0.03	<0.02	<0.02	0.09	0.03	0.21	0.5	10	30	<0.02	mg/kg	TM30/PM17
Nickel $^{\#}$	0.05	<0.02	0.04	<0.02	<0.02	<0.02	<0.02	0.07	<0.02	0.07	0.4	10	40	<0.02	mg/kg	TM30/PM17
Lead $^{\#}$	<0.05	<0.05	0.97	<0.05	<0.05	<0.05	<0.05	0.42	<0.05	<0.05	0.5	10	50	<0.05	mg/kg	TM30/PM17
Antimony $^{\#}$	0.09	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	0.04	<0.02	0.03	0.06	0.7	5	<0.02	mg/kg	TM30/PM17
Selenium $^{\#}$	0.07	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.1	0.5	7	<0.03	mg/kg	TM30/PM17
Zinc $^{\#}$	<0.03	<0.03	0.24	<0.03	<0.03	0.03	0.04	0.22	0.03	0.04	4	50	200	<0.03	mg/kg	TM30/PM17
Total Dissolved Solids $^{\#}$	3570	<350	<350	420	670	<350	420	740	450	3728	4000	60000	100000	<350	mg/kg	TM20/PM0
Dissolved Organic Carbon	270	<20	360	<20	30	<20	<20	480	<20	140	500	800	1000	<20	mg/kg	TM60/PM0
Mass of raw test portion	0.1161	0.0985	0.1339	0.1075	0.1165	0.1012	0.101	0.1199	0.0964	0.1273	-	-	-		kg	NONE/PM17
Dry Matter Content Ratio	77.6	91.2	67.0	83.5	77.2	89.0	89.0	75.2	93.8	70.5	-	-	-	<0.1	%	NONE/PM4
Leachant Volume	0.874	0.891	0.856	0.882	0.873	0.889	0.889	0.87	0.894	0.862	-	-	-		l	NONE/PM17
Eluate Volume	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	-	-	-		l	NONE/PM17
pH $^{\#}$	9.59	8.04	6.69	7.08	7.17	7.12	6.28	7.40	8.43	7.44	-	-	-	<0.01	pH units	TM73/PM11
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1	-	-	<0.1	mg/kg	TM26/PM0
Fluoride	4	12	<3	5	6	4	<3	<3	4	24	-	-	-	<3	mg/kg	TM173/PM0
Sulphate as SO4 $^{\#}$	217	37	<5	43	37	32	74	<5	8	2294	1000	20000	50000	<5	mg/kg	TM38/PM0
Chloride $^{\#}$	48	<3	84	<3	4	<3	<3	101	<3	56	800	15000	25000	<3	mg/kg	TM38/PM0

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Client Name: Ground Investigations Ireland
Reference: 19/11/9230
Location: Avoca River Park
Contact: Emer O'Connor

Matrix : Solid

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	EPH Interpretation
19/20618	1	TP02	0.50	7-9	Naturally occurring compounds
19/20618	1	TP03	0.50	16-18	Trace of lubricating oil & Possible tarmac/bitumen
19/20618	1	TP05	1.20	34-36	No interpretation possible
19/20618	1	TP06	1.50	40-42	No interpretation possible
19/20618	1	TP08	1.50	52-54	No interpretation possible
19/20618	1	TP08	2.50	55-57	No interpretation possible
19/20618	1	TP09	0.50	58-60	No interpretation possible
19/20618	1	TP09	1.50	61-63	No interpretation possible
19/20618	1	TP11	0.50	76-78	No interpretation possible
19/20618	1	TP11	1.50	79-81	Degraded diesel & Naturally occurring compounds
19/20618	1	TP13	0.50	91-93	No interpretation possible
19/20618	1	TP13	1.50	94-96	No interpretation possible
19/20618	1	TP16	0.50	106-108	Lubricatign ol & Possible tarmac/bitumen
19/20618	1	TP17	1.50	115-117	No interpretation possible
19/20618	1	TP19	0.50	126-128	Lubricating oil
19/20618	1	TP19	1.50	129-131	lubricating oil & Possible tarmac/bitumen
19/20618	1	TP20	0.50	135-137	Trace of lubricating oil
19/20618	1	TP20	1.50	138-140	Trace of lubricating oil & Possible trace of degraded diesel
19/20618	1	TP21	0.50	144-146	Lubricating oil & Degraded diesel
19/20618	1	TP21	1.50	147-149	No interpretation possible
19/20618	1	TP22	0.50	153-155	Trace of degraded diesel
19/20618	1	TP24	0.50	165-167	Degraded diesel
19/20618	1	TP24	1.50	168-170	Naturally occurring compounds
19/20618	1	TP25	0.50	171-173	No interpretation possible
19/20618	1	TP26	0.50	177-179	Lubricating oil
19/20618	1	TP27	0.50	183-185	No interpretation possible
19/20618	1	TP28	0.50	189-191	Lubricating oil
19/20618	1	TP28	1.50	192-194	No interpretation possible
19/20618	1	TP29	0.50	195-197	Trace of lubricating oil
19/20618	1	TP29	1.50	198-200	Lubricating oil & Naturally occuring compounds

Client Name:	Ground Investigations Ireland
Reference:	19/11/9230
Location:	Avoca River Park
Contact:	Emer O'Connor

Note:

Asbestos Screen analysis is carried out in accordance with our documented in-house methods PM042 and TM065 and HSG 248 by Stereo and Polarised Light Microscopy using Dispersion Staining Techniques and is covered by our UKAS accreditation. Detailed Gravimetric Quantification and PCOM Fibre Analysis is carried out in accordance with our documented in-house methods PM042 and TM131 and HSG 248 using Stereo and Polarised Light Microscopy and Phase Contrast Optical Microscopy (PCOM). Samples are retained for not less than 6 months from the date of analysis unless specifically requested.

Opinions, including ACM type and Asbestos level less than 0.1%, lie outside the scope of our UKAS accreditation.

Where the sample is not taken by a Element Materials Technology consultant, Element Materials Technology cannot be responsible for inaccurate or unrepresentative sampling.

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
19/20618	1	TP02	0.50	8	19/12/2019	**General Description (Bulk Analysis)**	soil.stones
					19/12/2019	**Asbestos Fibres**	NAD
					19/12/2019	**Asbestos ACM**	NAD
					19/12/2019	**Asbestos Type**	NAD
					19/12/2019	**Asbestos Level Screen**	NAD
19/20618	1	TP03	0.50	17	19/12/2019	**General Description (Bulk Analysis)**	soil.stones
					19/12/2019	**Asbestos Fibres**	NAD
					19/12/2019	**Asbestos ACM**	NAD
					19/12/2019	**Asbestos Type**	NAD
					19/12/2019	**Asbestos Level Screen**	NAD
19/20618	1	TP05	1.20	35	19/12/2019	**General Description (Bulk Analysis)**	soil.stones
					19/12/2019	**Asbestos Fibres**	NAD
					19/12/2019	**Asbestos ACM**	NAD
					19/12/2019	**Asbestos Type**	NAD
					19/12/2019	**Asbestos Level Screen**	NAD
19/20618	1	TP06	1.50	41	19/12/2019	**General Description (Bulk Analysis)**	soil/stones
					19/12/2019	**Asbestos Fibres**	NAD
					19/12/2019	**Asbestos ACM**	NAD
					19/12/2019	**Asbestos Type**	NAD
					19/12/2019	**Asbestos Level Screen**	NAD
19/20618	1	TP08	1.50	53	19/12/2019	**General Description (Bulk Analysis)**	soil/stones
					19/12/2019	**Asbestos Fibres**	NAD
					19/12/2019	**Asbestos ACM**	NAD
					19/12/2019	**Asbestos Type**	NAD
					19/12/2019	**Asbestos Level Screen**	NAD
19/20618	1	TP08	2.50	56	19/12/2019	**General Description (Bulk Analysis)**	soil/stones
					19/12/2019	**Asbestos Fibres**	NAD
					19/12/2019	**Asbestos ACM**	NAD
					19/12/2019	**Asbestos Type**	NAD
					19/12/2019	**Asbestos Level Screen**	NAD
19/20618	1	TP09	0.50	59	19/12/2019	**General Description (Bulk Analysis)**	Soil/Stones
					19/12/2019	**Asbestos Fibres**	NAD
					19/12/2019	**Asbestos ACM**	NAD

Client Name: Ground Investigations Ireland
Reference: 19/11/9230
Location: Avoca River Park
Contact: Emer O'Connor

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
19/20618	1	TP09	0.50	59	19/12/2019	**Asbestos Type**	NAD
					19/12/2019	**Asbestos Level Screen**	NAD
19/20618	1	TP09	1.50	62	19/12/2019	**General Description (Bulk Analysis)**	soil-stones
					19/12/2019	**Asbestos Fibres**	NAD
					19/12/2019	**Asbestos ACM**	NAD
					19/12/2019	**Asbestos Type**	NAD
					19/12/2019	**Asbestos Level Screen**	NAD
19/20618	1	TP11	0.50	77	19/12/2019	**General Description (Bulk Analysis)**	soil-stones
					19/12/2019	**Asbestos Fibres**	NAD
					19/12/2019	**Asbestos ACM**	NAD
					19/12/2019	**Asbestos Type**	NAD
					19/12/2019	**Asbestos Level Screen**	NAD
19/20618	1	TP11	1.50	80	19/12/2019	**General Description (Bulk Analysis)**	soil-stones
					19/12/2019	**Asbestos Fibres**	NAD
					19/12/2019	**Asbestos ACM**	NAD
					19/12/2019	**Asbestos Type**	NAD
					19/12/2019	**Asbestos Level Screen**	NAD
19/20618	1	TP13	0.50	92	19/12/2019	**General Description (Bulk Analysis)**	Soil/Stones
					19/12/2019	**Asbestos Fibres**	NAD
					19/12/2019	**Asbestos ACM**	NAD
					19/12/2019	**Asbestos Type**	NAD
					19/12/2019	**Asbestos Level Screen**	NAD
19/20618	1	TP13	1.50	95	19/12/2019	**General Description (Bulk Analysis)**	Soil/Stones
					19/12/2019	**Asbestos Fibres**	NAD
					19/12/2019	**Asbestos ACM**	NAD
					19/12/2019	**Asbestos Type**	NAD
					19/12/2019	**Asbestos Level Screen**	NAD
19/20618	1	TP16	0.50	107	19/12/2019	**General Description (Bulk Analysis)**	Soil/Stones
					19/12/2019	**Asbestos Fibres**	NAD
					19/12/2019	**Asbestos ACM**	NAD
					19/12/2019	**Asbestos Type**	NAD
					19/12/2019	**Asbestos Level Screen**	NAD
19/20618	1	TP17	1.50	116	19/12/2019	**General Description (Bulk Analysis)**	soil.stones
					19/12/2019	**Asbestos Fibres**	NAD
					19/12/2019	**Asbestos ACM**	NAD
					19/12/2019	**Asbestos Type**	NAD
					19/12/2019	**Asbestos Level Screen**	NAD
19/20618	1	TP19	0.50	127	19/12/2019	**General Description (Bulk Analysis)**	Soil/Stone
					19/12/2019	**Asbestos Fibres**	NAD
					19/12/2019	**Asbestos ACM**	NAD
					19/12/2019	**Asbestos Type**	NAD
					19/12/2019	**Asbestos Level Screen**	NAD
19/20618	1	TP19	1.50	130	19/12/2019	**General Description (Bulk Analysis)**	soil-stones
					19/12/2019	**Asbestos Fibres**	NAD

Client Name: Ground Investigations Ireland
Reference: 19/11/9230
Location: Avoca River Park
Contact: Emer O'Connor

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
19/20618	1	TP19	1.50	130	19/12/2019	**Asbestos ACM**	NAD
					19/12/2019	**Asbestos Type**	NAD
					19/12/2019	**Asbestos Level Screen**	NAD
19/20618	1	TP20	0.50	136	19/12/2019	**General Description (Bulk Analysis)**	soil/stones
					19/12/2019	**Asbestos Fibres**	Fibre Bundles
					19/12/2019	**Asbestos ACM**	NAD
					19/12/2019	**Asbestos Type**	Chrysotile
					19/12/2019	**Asbestos Level Screen**	less than 0.1%
					30/12/2019	**Total ACM Gravimetric Quantification (% Asb)**	<0.001 (mass %)
					30/12/2019	**Total Detailed Gravimetric Quantification (% Asb)**	<0.001 (mass %)
					30/12/2019	**Total Gravimetric Quantification (ACM + Detailed) (% Asb)**	<0.001 (mass %)
19/20618	1	TP20	1.50	139	19/12/2019	**General Description (Bulk Analysis)**	soil/stones
					19/12/2019	**Asbestos Fibres**	Fibre Bundles
					19/12/2019	**Asbestos ACM**	NAD
					19/12/2019	**Asbestos Type**	Chrysotile
					19/12/2019	**Asbestos Level Screen**	less than 0.1%
					30/12/2019	**Total ACM Gravimetric Quantification (% Asb)**	<0.001 (mass %)
					30/12/2019	**Total Detailed Gravimetric Quantification (% Asb)**	<0.001 (mass %)
					30/12/2019	**Total Gravimetric Quantification (ACM + Detailed) (% Asb)**	<0.001 (mass %)
19/20618	1	TP21	0.50	145	19/12/2019	**General Description (Bulk Analysis)**	soil-stones
					19/12/2019	**Asbestos Fibres**	NAD
					19/12/2019	**Asbestos ACM**	NAD
					19/12/2019	**Asbestos Type**	NAD
					19/12/2019	**Asbestos Level Screen**	NAD
19/20618	1	TP21	1.50	148	19/12/2019	**General Description (Bulk Analysis)**	soil/stones
					19/12/2019	**Asbestos Fibres**	NAD
					19/12/2019	**Asbestos ACM**	NAD
					19/12/2019	**Asbestos Type**	NAD
					19/12/2019	**Asbestos Level Screen**	NAD
19/20618	1	TP22	0.50	154	19/12/2019	**General Description (Bulk Analysis)**	soil.stones
					19/12/2019	**Asbestos Fibres**	NAD
					19/12/2019	**Asbestos ACM**	NAD
					19/12/2019	**Asbestos Type**	NAD
					19/12/2019	**Asbestos Level Screen**	NAD
19/20618	1	TP24	0.50	166	19/12/2019	**General Description (Bulk Analysis)**	Soil/Stones
					19/12/2019	**Asbestos Fibres**	Fibre Bundles
					19/12/2019	**Asbestos ACM**	NAD
					19/12/2019	**Asbestos Type**	Chrysotile
					19/12/2019	**Asbestos Level Screen**	less than 0.1%
					30/12/2019	**Total ACM Gravimetric Quantification (% Asb)**	<0.001 (mass %)
					30/12/2019	**Total Detailed Gravimetric Quantification (% Asb)**	<0.001 (mass %)
					30/12/2019	**Total Gravimetric Quantification (ACM + Detailed) (% Asb)**	<0.001 (mass %)
19/20618	1	TP24	1.50	169	23/12/2019	**General Description (Bulk Analysis)**	soil-stones
					23/12/2019	**Asbestos Fibres**	NAD
					23/12/2019	**Asbestos ACM**	NAD
					23/12/2019	**Asbestos Type**	NAD

Client Name:	Ground Investigations Ireland
Reference:	19/11/9230
Location:	Avoca River Park
Contact:	Emer O'Connor

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Date Of Analysis	Analysis	Result
19/20618	1	TP24	1.50	169	23/12/2019	**Asbestos Level Screen**	NAD
19/20618	1	TP25	0.50	172	19/12/2019	**General Description (Bulk Analysis)**	Soil/Stone
					19/12/2019	**Asbestos Fibres**	NAD
					19/12/2019	**Asbestos ACM**	NAD
					19/12/2019	**Asbestos Type**	NAD
					19/12/2019	**Asbestos Level Screen**	NAD
19/20618	1	TP26	0.50	178	19/12/2019	**General Description (Bulk Analysis)**	soil/stones
					19/12/2019	**Asbestos Fibres**	NAD
					19/12/2019	**Asbestos ACM**	NAD
					19/12/2019	**Asbestos Type**	NAD
					19/12/2019	**Asbestos Level Screen**	NAD
19/20618	1	TP27	0.50	184	19/12/2019	**General Description (Bulk Analysis)**	Soil/Stone
					19/12/2019	**Asbestos Fibres**	NAD
					19/12/2019	**Asbestos ACM**	NAD
					19/12/2019	**Asbestos Type**	NAD
					19/12/2019	**Asbestos Level Screen**	NAD
19/20618	1	TP28	0.50	190	19/12/2019	**General Description (Bulk Analysis)**	soil/stones
					19/12/2019	**Asbestos Fibres**	NAD
					19/12/2019	**Asbestos ACM**	NAD
					19/12/2019	**Asbestos Type**	NAD
					19/12/2019	**Asbestos Level Screen**	NAD
19/20618	1	TP28	1.50	193	19/12/2019	**General Description (Bulk Analysis)**	soil.stones
					19/12/2019	**Asbestos Fibres**	NAD
					19/12/2019	**Asbestos ACM**	NAD
					19/12/2019	**Asbestos Type**	NAD
					19/12/2019	**Asbestos Level Screen**	NAD
19/20618	1	TP29	0.50	196	19/12/2019	**General Description (Bulk Analysis)**	soil/stones
					19/12/2019	**Asbestos Fibres**	NAD
					19/12/2019	**Asbestos ACM**	NAD
					19/12/2019	**Asbestos Type**	NAD
					19/12/2019	**Asbestos Level Screen**	NAD
19/20618	1	TP29	1.50	199	19/12/2019	**General Description (Bulk Analysis)**	soil/stones
					19/12/2019	**Asbestos Fibres**	Fibre Bundles
					19/12/2019	**Asbestos ACM**	NAD
					19/12/2019	**Asbestos Type**	Chrysotile
					19/12/2019	**Asbestos Level Screen**	less than 0.1%
					30/12/2019	**Total ACM Gravimetric Quantification (% Asb)**	<0.001 (mass %)
					30/12/2019	**Total Detailed Gravimetric Quantification (% Asb)**	<0.001 (mass %)
					30/12/2019	**Total Gravimetric Quantification (ACM + Detailed) (% Asb)**	<0.001 (mass %)

Client Name: Ground Investigations Ireland
Reference: 19/11/9230
Location: Avoca River Park
Contact: Emer O'Connor

Matrix : Solid

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Method No.	NDP Reason
19/20618	1	TP20	0.50	135-137	TM21/PM24	Asbestos detected in sample
19/20618	1	TP20	1.50	138-140	TM21/PM24	Asbestos detected in sample
19/20618	1	TP24	0.50	165-167	TM21/PM24	Asbestos detected in sample
19/20618	1	TP29	1.50	198-200	TM21/PM24	Asbestos detected in sample

Client Name: Ground Investigations Ireland
Reference: 19/11/9230
Location: Avoca River Park
Contact: Emer O'Connor

Matrix : Solid

EMT Job No.	Batch	Sample ID	Depth	EMT Sample No.	Analysis	Reason
19/20618	1	TP01	1.80	4-6	pH, Sulphate	Sample holding time exceeded
19/20618	1	TP02	2.50	13-15	pH, Sulphate	Sample holding time exceeded
19/20618	1	TP03	1.50	19-21	pH, Sulphate	Sample holding time exceeded
19/20618	1	TP07	1.50	46-48	pH, Sulphate	Sample holding time exceeded
19/20618	1	TP14	1.50	100-102	pH, Sulphate	Sample holding time exceeded

Please note that only samples that are deviating are mentioned in this report. If no samples are listed it is because none were deviating.
Only analyses which are accredited are recorded as deviating if set criteria are not met.

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

EMT Job No.: 19/20618

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Limits of detection for analyses carried out on as received samples are not moisture content corrected. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

Sufficient amount of sample must be received to carry out the testing specified. Where an insufficient amount of sample has been received the testing may not meet the requirements of our accredited methods, as such accreditation may be removed.

Negative Neutralization Potential (NP) values are obtained when the volume of NaOH (0.1N) titrated (pH 8.3) is greater than the volume of HCl (1N) to reduce the pH of the sample to 2.0 - 2.5. Any negative NP values are corrected to 0.

The calculation of Pyrite content assumes that all oxidisable sulphides present in the sample are pyrite. This may not be the case. The calculation may be an overesitimate when other sulphides such as Barite (Barium Sulphate) are present.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 accreditation applies to surface water and groundwater and usually one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. The temperature of sample receipt is recorded on the confirmation schedules in order that the client can make an informed decision as to whether testing should still be undertaken.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

BLANKS

Where analytes have been found in the blank, the sample will be treated in accordance with our laboratory procedure for dealing with contaminated blanks.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

REPORTS FROM THE SOUTH AFRICA LABORATORY

Any method number not prefixed with SA has been undertaken in our UK laboratory unless reported as subcontracted.

Measurement Uncertainty

Measurement uncertainty defines the range of values that could reasonably be attributed to the measured quantity. This range of values has not been included within the reported results. Uncertainty expressed as a percentage can be provided upon request.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS Ref No. 4225) accredited - UK.
SA	ISO17025 (SANAS Ref No.T0729) accredited - South Africa
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
>>	Results above calibration range, the result should be considered the minimum value. The actual result could be significantly higher, this result is not accredited.
*	Analysis subcontracted to an Element Materials Technology approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range
AA	x2 Dilution

AB	x3 Dilution
AC	x5 Dilution
AD	x9 Dilution
AE	x10 Dilution
AF	x50 Dilution
AG	x100 Dilution
BA	x2 Dilution
BB	x3 Dilution
BC	x5 Dilution
BD	x9 Dilution

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.	PM0	No preparation is required.			AR	
TM4	Modified USEPA 8270 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.			AR	Yes
TM4	Modified USEPA 8270 method for the solvent extraction and determination of PAHs by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM16	Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.			AR	Yes
TM5	Modified 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) within the range C8-C40 by GCFID. For waters the solvent extracts dissolved phase plus a sheen if present.	PM8/PM16	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required/Fractionation into aliphatic and aromatic fractions using a Rapid Trace SPE.	Yes		AR	Yes
TM5/TM36	please refer to TM5 and TM36 for method details	PM8/PM12/PM16	please refer to PM8/PM16 and PM12 for method details			AR	Yes
TM17	Modified US EPA method 8270. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	PM8	End over end extraction of solid samples for organic analysis. The solvent mix varies depending on analysis required.	Yes		AR	Yes
TM20	Modified BS 1377-3: 1990/USEPA 160.3 Gravimetric determination of Total Dissolved Solids/Total Solids	PM0	No preparation is required.	Yes		AR	Yes
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.			AD	Yes

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM21	Modified BS 7755-3:1995, ISO10694:1995 Determination of Total Organic Carbon or Total Carbon by combustion in an Eltra TOC furnace/analyser in the presence of oxygen. The CO2 generated is quantified using infra-red detection. Organic Matter (SOM) calculated as per EA MCERTS Chemical Testing of Soil, March 2012 v4.	PM24	Dried and ground solid samples are washed with hydrochloric acid, then rinsed with deionised water to remove the mineral carbon before TOC analysis.	Yes		AD	Yes
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.			AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.			AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM15	Acid digestion of dried and ground solid samples using Aqua Regia refluxed at 112.5 °C. Samples containing asbestos are not dried and ground.	Yes		AD	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.	Yes		AR	Yes
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7, 6010B and BS EN ISO 11885 2009	PM62	Acid digestion of as received solid samples using Aqua Regia refluxed at 112.5 °C.			AR	Yes
TM31	Modified USEPA 8015B. Determination of Methyltertbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM31	Modified USEPA 8015B. Determination of Methyltertbutylether, Benzene, Toluene, Ethylbenzene and Xylene by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.			AR	Yes
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID. MTBE by GCFID co-elutes with 3-methylpentane if present and therefore can give a false positive. Positive MTBE results can be confirmed using GCMS.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes		AR	Yes

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Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM0	No preparation is required.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AD	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM20	Extraction of dried and ground or as received samples with deionised water in a 2:1 water to solid ratio using a reciprocal shaker for all analytes except hexavalent chromium. Extraction of as received sample using 10:1 ratio of 0.2M sodium hydroxide to soil for hexavalent chromium using a reciprocal shaker.	Yes		AR	Yes
TM38	Soluble Ion analysis using Discrete Analyser. Modified US EPA methods 325.2 (Chloride), 375.4 (Sulphate), 365.2 (o-Phosphate), 353.1 (TON), 354.1 (Nitrite), 350.1 (NH4+) comparable to BS ISO 15923-1, 7196A (Hex Cr)	PM60	As received solid samples are extracted with deionised water in a 2:1 ratio of water to solid.			AR	Yes
TM60	TC/TOC analysis of Waters by High Temperature Combustion followed by NDIR detection. Based on the following modified standard methods: USEPA 9060, APHA Standard Methods for Examination of Water and Wastewater 5310B, ASTM D 7573, and USEPA 415.1.	PM0	No preparation is required.			AR	Yes
TM61	Modified US EPA methods 245.7 and 200.7. Determination of Mercury by Cold Vapour Atomic Fluorescence.	PM0	No preparation is required.	Yes		AR	Yes
TM65	Asbestos Bulk Identification method based on HSG 248.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.			AR	Yes
TM73	Modified US EPA methods 150.1 and 9045D and BS1377:1990. Determination of pH by Metrohm automated probe analyser.	PM11	Extraction of as received solid samples using one part solid to 2.5 parts deionised water.	Yes		AR	No
TM131	Quantification of Asbestos Fibres and ACM, based on HSG248 and SCA method.	PM42	Solid samples undergo a thorough visual inspection for asbestos fibres prior to asbestos identification using TM065.	Yes		AR	Yes

EMT Job No: 19/20618

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS/SANAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM173	Analysis of fluoride by ISE (Ion Selective Electrode) using modified ISE method 340.2	PM0	No preparation is required.			AR	Yes
NONE	No Method Code	NONE	No Method Code			AD	Yes
NONE	No Method Code	NONE	No Method Code			AR	Yes
NONE	No Method Code	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.				
NONE	No Method Code	PM17	Modified method BS EN12457-2 As received solid samples are leached with water in a 10:1 water to soil ratio for 24 hours, the moisture content of the sample is included in the ratio.			AR	
NONE	No Method Code	PM4	Gravimetric measurement of Natural Moisture Content and % Moisture Content at either 35°C or 105°C. Calculation based on ISO 11465 and BS1377.			AR	

APPENDIX 10 – HazWasteOnLine^{TM} Report

Waste Classification Report

2NE4L-T3VUP-HTTSZ

Job name

Avoca River Park Data 06 10 02

Description/Comments

Analytical data associated with samples collected from Trial Pits Excavated at Avoca River Business Park in December 2019.

Project

9230-11-19

Site

Avoca River Park

Related Documents

#	Name	Description
1	Avoca River Park Trial Pit Data 2019.HWOL	.hwol file used to create the Job
2	Classification Report-Avoca River Park Trial Pit Data 2019.pdf	Classification for Job: Avoca River Park Trial Pit Data 2019

Waste Stream Template

Example waste stream template for contaminated soils

Classified by

Name:
Barry Sexton
Date:
30 Sep 2020 12:49 GMT
Telephone:
353 (01) 601 5175 / 5176

Company:
Ground Investigations Ireland Ltd
Catherinestown House, Hazelhatch Road,
Newcastle, Co. Dublin.

HazWasteOnline™ Training Record:

Course	**Date**
Hazardous Waste Classification	09 Apr 2019
Advanced Hazardous Waste Classification	10 Apr 2019

Report

Created by: Barry Sexton
Created date: 30 Sep 2020 12:49 GMT

Job summary

#	Sample Name	Depth [m]	Classification Result	Hazard properties	Page
1	TP08-05/12/2019-1.50m		Hazardous	HP 7, HP 14	2
2	TP09-05/12/2019-1.50m		Hazardous	HP 14	5
3	TP13-11/12/2019-1.50m		Hazardous	HP 7, HP 14	8

Classification of sample: TP08-05/12/2019-1.50m

⚠ **Hazardous Waste**
Classified as **06 10 02 ***
in the List of Waste

Sample details

Sample Name:		LoW Code:	
TP08-05/12/2019-1.50m		Chapter:	6: Wastes from Inorganic Chemical Processes
Moisture content:		Entry:	06 10 02 * (wastes containing hazardous substances)
38.7% (wet weight correction)			

Hazard properties

HP 7: Carcinogenic "waste which induces cancer or increases its incidence"

Hazard Statements hit:

Carc. 1A; H350 "May cause cancer [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

arsenic pentoxide: (compound conc.: 0.156%)

HP 14: Ecotoxic "waste which presents or may present immediate or delayed risks for one or more sectors of the environment"

Hazard Statements hit:

Aquatic Chronic 1; H410 "Very toxic to aquatic life with long lasting effects."

Because of determinands:

arsenic pentoxide: (compound conc.: 0.156%)
dicopper oxide; copper (I) oxide: (compound conc.: 0.277%)
zinc oxide: (compound conc.: 0.349%)

Determinands

Moisture content: 38.7% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	**User entered data**		Conv. Factor	Compound conc.		**Classification value**	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		antimony { antimony trioxide }				104	mg/kg	1.197	76.318	mg/kg	0.00763 %	✓	
		051-005-00-X	215-175-0	1309-64-4									
2		arsenic { arsenic pentoxide }				1658	mg/kg	1.534	1558.961	mg/kg	0.156 %	✓	
		033-004-00-6	215-116-9	1303-28-2									
3		cadmium { cadmium oxide }				11.3	mg/kg	1.142	7.913	mg/kg	0.000791 %	✓	
		048-002-00-0	215-146-2	1306-19-0									
4		chromium in chromium(III) compounds { ● chromium(III) oxide }				<0.5	mg/kg	1.462	<0.731	mg/kg	<0.0000731 %		<LOD
			215-160-9	1308-38-9									
5		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD
		024-001-00-0	215-607-8	1333-82-0									
6		copper { dicopper oxide; copper (I) oxide }				4010	mg/kg	1.126	2767.58	mg/kg	0.277 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
7		lead { ● lead compounds with the exception of those specified elsewhere in this Annex }			1	1617	mg/kg		991.221	mg/kg	0.0991 %	✓	
		082-001-00-6											

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
8		mercury { mercury dichloride }				<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
		080-010-00-X	231-299-8	7487-94-7									
9		molybdenum { molybdenum(VI) oxide }				83.9	mg/kg	1.5	77.156	mg/kg	0.00772 %	✓	
		042-001-00-9	215-204-7	1313-27-5									
10		nickel { nickel chromate }				<0.7	mg/kg	2.976	<2.083	mg/kg	<0.000208 %		<LOD
		028-035-00-7	238-766-5	14721-18-7									
11		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
		034-002-00-8											
12		zinc { zinc oxide }				4572	mg/kg	1.245	3488.48	mg/kg	0.349 %	✓	
		030-013-00-7	215-222-5	1314-13-2									
13	●	TPH (C6 to C40) petroleum group				<52	mg/kg		<52	mg/kg	<0.0052 %		<LOD
				TPH									
14		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		603-181-00-X	216-653-1	1634-04-4									
15		benzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
16		toluene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-021-00-3	203-625-9	108-88-3									
17	●	ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
18		xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
19	●	pH				6.74	pH		6.74	pH	6.74 pH		
				PH									
20		naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
21	●	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-917-1	208-96-8									
22	●	acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
			201-469-6	83-32-9									
23	●	fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			201-695-5	86-73-7									
24	●	phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-581-5	85-01-8									
25	●	anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			204-371-1	120-12-7									
26	●	fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-912-4	206-44-0									
27	●	pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			204-927-3	129-00-0									
28		benzo[a]anthracene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
29		chrysene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
30		benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
31		benzo[k]fluoranthene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
32		benzo[a]pyrene; benzo[def]chrysene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-032-00-3	200-028-5	50-32-8									
33	●	indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-893-2	193-39-5									
34		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-041-00-2	200-181-8	53-70-3									

<table>
<tr><th rowspan="2">#</th><th rowspan="2"></th><th colspan="3">Determinand</th><th rowspan="2">CLP Note</th><th rowspan="2" colspan="2">User entered data</th><th rowspan="2">Conv. Factor</th><th rowspan="2" colspan="2">Compound conc.</th><th rowspan="2">Classification value</th><th rowspan="2">MC Applied</th><th rowspan="2">Conc. Not Used</th></tr>
<tr><th>CLP index number</th><th>EC Number</th><th>CAS Number</th></tr>
<tr><td rowspan="2">35</td><td rowspan="2">●</td><td colspan="3">benzo[ghi]perylene</td><td rowspan="2"></td><td rowspan="2"><0.04</td><td rowspan="2">mg/kg</td><td rowspan="2"></td><td rowspan="2"><0.04</td><td rowspan="2">mg/kg</td><td rowspan="2"><0.000004 %</td><td rowspan="2"></td><td rowspan="2"><LOD</td></tr>
<tr><td></td><td>205-883-8</td><td>191-24-2</td></tr>
<tr><td rowspan="2">36</td><td rowspan="2">●</td><td colspan="3">polychlorobiphenyls; PCB</td><td rowspan="2"></td><td rowspan="2"><0.035</td><td rowspan="2">mg/kg</td><td rowspan="2"></td><td rowspan="2"><0.035</td><td rowspan="2">mg/kg</td><td rowspan="2"><0.0000035 %</td><td rowspan="2"></td><td rowspan="2"><LOD</td></tr>
<tr><td>602-039-00-4</td><td>215-648-1</td><td>1336-36-3</td></tr>
<tr><td rowspan="2">37</td><td rowspan="2">⚛</td><td colspan="3">barium { ● barium oxide }</td><td rowspan="2"></td><td rowspan="2">50</td><td rowspan="2">mg/kg</td><td rowspan="2">1.117</td><td rowspan="2">34.221</td><td rowspan="2">mg/kg</td><td rowspan="2">0.00342 %</td><td rowspan="2">✓</td><td rowspan="2"></td></tr>
<tr><td></td><td>215-127-9</td><td>1304-28-5</td></tr>
<tr><td rowspan="2">38</td><td rowspan="2">●</td><td colspan="3">coronene</td><td rowspan="2"></td><td rowspan="2"><0.04</td><td rowspan="2">mg/kg</td><td rowspan="2"></td><td rowspan="2"><0.04</td><td rowspan="2">mg/kg</td><td rowspan="2"><0.000004 %</td><td rowspan="2"></td><td rowspan="2"><LOD</td></tr>
<tr><td></td><td>205-881-7</td><td>191-07-1</td></tr>
<tr><td rowspan="2">39</td><td rowspan="2"></td><td colspan="3">benzo[j]fluoranthene</td><td rowspan="2"></td><td rowspan="2"><1</td><td rowspan="2">mg/kg</td><td rowspan="2"></td><td rowspan="2"><1</td><td rowspan="2">mg/kg</td><td rowspan="2"><0.0001 %</td><td rowspan="2"></td><td rowspan="2"><LOD</td></tr>
<tr><td>601-035-00-X</td><td>205-910-3</td><td>205-82-3</td></tr>
<tr><td colspan="11">Total:</td><td>0.906 %</td><td colspan="2"></td></tr>
</table>

Key

🟨	User supplied data
▒	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
🟥	Hazardous result
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
⚛	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP09-05/12/2019-1.50m

Hazardous Waste
Classified as **06 10 02 ***
in the List of Waste

Sample details

Sample Name:		LoW Code:	
TP09-05/12/2019-1.50m		Chapter:	6: Wastes from Inorganic Chemical Processes
Moisture content:		Entry:	06 10 02 * (wastes containing hazardous substances)
39.8% (wet weight correction)			

Hazard properties

HP 14: Ecotoxic "waste which presents or may present immediate or delayed risks for one or more sectors of the environment"

Hazard Statements hit:

Aquatic Chronic 1; H410 "Very toxic to aquatic life with long lasting effects."

Because of determinand:

zinc oxide: (compound conc.: 0.352%)

Determinands

Moisture content: 39.8% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
1	antimony { antimony trioxide }				3	mg/kg	1.197	2.162	mg/kg	0.000216 %	✓	
	051-005-00-X	215-175-0	1309-64-4									
2	arsenic { arsenic pentoxide }				78.4	mg/kg	1.534	72.394	mg/kg	0.00724 %	✓	
	033-004-00-6	215-116-9	1303-28-2									
3	cadmium { cadmium oxide }				<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<LOD
	048-002-00-0	215-146-2	1306-19-0									
4	chromium in chromium(III) compounds { • chromium(III) oxide }				44.3	mg/kg	1.462	38.978	mg/kg	0.0039 %	✓	
		215-160-9	1308-38-9									
5	chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD
	024-001-00-0	215-607-8	1333-82-0									
6	copper { dicopper oxide; copper (I) oxide }				172	mg/kg	1.126	116.579	mg/kg	0.0117 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
7	lead { • lead compounds with the exception of those specified elsewhere in this Annex }			1	113	mg/kg		68.026	mg/kg	0.0068 %	✓	
	082-001-00-6											
8	mercury { mercury dichloride }				<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7									
9	molybdenum { molybdenum(VI) oxide }				0.5	mg/kg	1.5	0.452	mg/kg	0.0000452 %	✓	
	042-001-00-9	215-204-7	1313-27-5									
10	nickel { nickel chromate }				32.3	mg/kg	2.976	57.872	mg/kg	0.00579 %	✓	
	028-035-00-7	238-766-5	14721-18-7									
11	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				3	mg/kg	2.554	4.612	mg/kg	0.000461 %	✓	
	034-002-00-8											

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
12		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		4693	mg/kg	1.245	3516.549	mg/kg	0.352 %	✓	
13	●	TPH (C6 to C40) petroleum group			TPH		<52	mg/kg		<52	mg/kg	<0.0052 %		<LOD
14		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
15		benzene	601-020-00-8	200-753-7	71-43-2		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
16		toluene	601-021-00-3	203-625-9	108-88-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
17	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
18		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
19	●	pH			PH		7.12	pH		7.12	pH	7.12 pH		
20		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
21	●	acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
22	●	acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
23	●	fluorene		201-695-5	86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
24	●	phenanthrene		201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
25	●	anthracene		204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
26	●	fluoranthene		205-912-4	206-44-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
27	●	pyrene		204-927-3	129-00-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
28		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
29		chrysene	601-048-00-0	205-923-4	218-01-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
30		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
31		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
32		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
33	●	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
34		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
35	●	benzo[ghi]perylene		205-883-8	191-24-2		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
36	●	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.035	mg/kg		<0.035	mg/kg	<0.0000035 %		<LOD
37		barium { ● barium oxide }		215-127-9	1304-28-5		80	mg/kg	1.117	53.771	mg/kg	0.00538 %	✓	
38	●	coronene		205-881-7	191-07-1		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
39		benzo[j]fluoranthene	601-035-00-X	205-910-3	205-82-3		<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD

#		Determinand			CLP Note	**User entered data**	Conv. Factor	Compound conc.	**Classification value**	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
								Total:	0.399 %		

Key

🟨	User supplied data
▨	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
🟥	Hazardous result
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
⚛	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP13-11/12/2019-1.50m

⚠ **Hazardous Waste**
Classified as **06 10 02 ***
in the List of Waste

Sample details

Sample Name:		LoW Code:	
TP13-11/12/2019-1.50m		Chapter:	6: Wastes from Inorganic Chemical Processes
Moisture content:		Entry:	06 10 02 * (wastes containing hazardous substances)
31.7% (wet weight correction)			

Hazard properties

HP 7: Carcinogenic "waste which induces cancer or increases its incidence"

Hazard Statements hit:

Carc. 1A; H350 "May cause cancer [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

arsenic pentoxide: (compound conc.: 0.168%)

HP 14: Ecotoxic "waste which presents or may present immediate or delayed risks for one or more sectors of the environment"

Hazard Statements hit:

Aquatic Chronic 1; H410 "Very toxic to aquatic life with long lasting effects."

Because of determinands:

arsenic pentoxide: (compound conc.: 0.168%)
dicopper oxide; copper (I) oxide: (compound conc.: 0.487%)
lead compounds with the exception of those specified elsewhere in this Annex: (Note 1 conc.: 0.112%)
zinc oxide: (compound conc.: 0.156%)

Determinands

Moisture content: 31.7% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	**User entered data**		Conv. Factor	Compound conc.		**Classification value**	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		antimony { antimony trioxide }				102	mg/kg	1.197	83.397	mg/kg	0.00834 %	✓	
		051-005-00-X	215-175-0	1309-64-4									
2		arsenic { arsenic pentoxide }				1603	mg/kg	1.534	1679.362	mg/kg	0.168 %	✓	
		033-004-00-6	215-116-9	1303-28-2									
3		cadmium { cadmium oxide }				4.6	mg/kg	1.142	3.589	mg/kg	0.000359 %	✓	
		048-002-00-0	215-146-2	1306-19-0									
4		chromium in chromium(III) compounds { chromium(III) oxide }				<0.5	mg/kg	1.462	<0.731	mg/kg	<0.0000731 %		<LOD
			215-160-9	1308-38-9									
5		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD
		024-001-00-0	215-607-8	1333-82-0									
6		copper { dicopper oxide; copper (I) oxide }				6327	mg/kg	1.126	4865.347	mg/kg	0.487 %	✓	
		029-002-00-X	215-270-7	1317-39-1									

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
7		lead { ● lead compounds with the exception of those specified elsewhere in this Annex }											
		082-001-00-6			1	1633	mg/kg		1115.339	mg/kg	0.112 %	✓	
8		mercury { mercury dichloride }											
		080-010-00-X	231-299-8	7487-94-7		0.8	mg/kg	1.353	0.74	mg/kg	0.000074 %	✓	
9		molybdenum { molybdenum(VI) oxide }											
		042-001-00-9	215-204-7	1313-27-5		110.8	mg/kg	1.5	113.529	mg/kg	0.0114 %	✓	
10		nickel { nickel chromate }											
		028-035-00-7	238-766-5	14721-18-7		<0.7	mg/kg	2.976	<2.083	mg/kg	<0.000208 %		<LOD
11		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }											
		034-002-00-8				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
12		zinc { zinc oxide }											
		030-013-00-7	215-222-5	1314-13-2		1830	mg/kg	1.245	1555.756	mg/kg	0.156 %	✓	
13	●	TPH (C6 to C40) petroleum group											
				TPH		<52	mg/kg		<52	mg/kg	<0.0052 %		<LOD
14		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane											
		603-181-00-X	216-653-1	1634-04-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
15		benzene											
		601-020-00-8	200-753-7	71-43-2		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
16		toluene											
		601-021-00-3	203-625-9	108-88-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
17	●	ethylbenzene											
		601-023-00-4	202-849-4	100-41-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
18		xylene											
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
19	●	pH											
				PH		4.55	pH		4.55	pH	4.55 pH		
20		naphthalene											
		601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
21	●	acenaphthylene											
			205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
22	●	acenaphthene											
			201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
23	●	fluorene											
			201-695-5	86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
24	●	phenanthrene											
			201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
25	●	anthracene											
			204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
26	●	fluoranthene											
			205-912-4	206-44-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
27	●	pyrene											
			204-927-3	129-00-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
28		benzo[a]anthracene											
		601-033-00-9	200-280-6	56-55-3		<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
29		chrysene											
		601-048-00-0	205-923-4	218-01-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
30		benzo[b]fluoranthene											
		601-034-00-4	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
31		benzo[k]fluoranthene											
		601-036-00-5	205-916-6	207-08-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
32		benzo[a]pyrene; benzo[def]chrysene											
		601-032-00-3	200-028-5	50-32-8		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
33	●	indeno[123-cd]pyrene											
			205-893-2	193-39-5		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD

#		Determinand CLP index number	 EC Number	 CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
34		dibenz[a,h]anthracene 601-041-00-2	 200-181-8	 53-70-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
35	●	benzo[ghi]perylene	 205-883-8	 191-24-2		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
36	●	polychlorobiphenyls; PCB 602-039-00-4	 215-648-1	 1336-36-3		<0.035	mg/kg		<0.035	mg/kg	<0.0000035 %		**<LOD**
37	⚛	barium { ● barium oxide }	 215-127-9	 1304-28-5		20	mg/kg	1.117	15.251	mg/kg	0.00153 %	✓	
38	●	coronene	 205-881-7	 191-07-1		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
39		benzo[j]fluoranthene 601-035-00-X	 205-910-3	 205-82-3		<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
										Total:	0.949 %		

Key

🟨	User supplied data
▨	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
🟥	Hazardous result
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
⚛	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Appendix A: Classifier defined and non CLP determinands

chromium(III) oxide (EC Number: 215-160-9, CAS Number: 1308-38-9)

Conversion factor: 1.462
Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4 H332 , Acute Tox. 4 H302 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Skin Irrit. 2 H315 , Resp. Sens. 1 H334 , Skin Sens. 1 H317 , Repr. 1B H360FD , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

lead compounds with the exception of those specified elsewhere in this Annex

CLP index number: 082-001-00-6
Description/Comments: Least-worst case: Lead REACH Consortium considers some lead compounds Carcinogenic category 2B
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): Carc. 2 H351
Reason for additional Hazards Statement(s):
03 Jun 2015 - Carc. 2 H351 hazard statement sourced from: IARC Group 2A (Sup 7, 87) 2006; Lead REACH Consortium www.reach-lead.eu/substanceinformation.html. Review date 29/09/2015

TPH (C6 to C40) petroleum group (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: Flam. Liq. 3 H226 , Asp. Tox. 1 H304 , STOT RE 2 H373 , Muta. 1B H340 , Carc. 1B H350 , Repr. 2 H361d , Aquatic Chronic 2 H411

ethylbenzene (EC Number: 202-849-4, CAS Number: 100-41-4)

CLP index number: 601-023-00-4
Description/Comments:
Data source: Commission Regulation (EU) No 605/2014 – 6th Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP6)
Additional Hazard Statement(s): Carc. 2 H351
Reason for additional Hazards Statement(s):
03 Jun 2015 - Carc. 2 H351 hazard statement sourced from: IARC Group 2B (77) 2000

pH (CAS Number: PH)

Description/Comments: Appendix C4
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

acenaphthylene (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4 H302 , Acute Tox. 1 H330 , Acute Tox. 1 H310 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Skin Irrit. 2 H315

acenaphthene (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2 H319 , STOT SE 3 H335 , Skin Irrit. 2 H315 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410 , Aquatic Chronic 2 H411

fluorene (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

phenanthrene (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Acute Tox. 4 H302 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Carc. 2 H351 , Skin Sens. 1 H317 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410 , Skin Irrit. 2 H315

● **anthracene** (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2 H319 , STOT SE 3 H335 , Skin Irrit. 2 H315 , Skin Sens. 1 H317 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

● **fluoranthene** (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Acute Tox. 4 H302 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

● **pyrene** (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Skin Irrit. 2 H315 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

● **indeno[123-cd]pyrene** (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Carc. 2 H351

● **benzo[ghi]perylene** (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 23 Jul 2015
Hazard Statements: Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

● **polychlorobiphenyls; PCB** (EC Number: 215-648-1, CAS Number: 1336-36-3)

CLP index number: 602-039-00-4
Description/Comments: Worst Case: IARC considers PCB Group 1; Carcinogenic to humans; POP specific threshold from ATP1 (Regulation 756/2010/EU) to POPs Regulation (Regulation 850/2004/EC). Where applicable, the calculation method laid down in European standards EN 12766-1 and EN 12766-2 shall be applied.
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): Carc. 1A H350
Reason for additional Hazards Statement(s):
29 Sep 2015 - Carc. 1A H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

● **barium oxide** (EC Number: 215-127-9, CAS Number: 1304-28-5)

Conversion factor: 1.117
Description/Comments: Data from ECHA's C&L Inventory Database, Sigma Aldrich SDS dated 6/2/20
Data source: https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/88825
Data source date: 02 Apr 2020
Hazard Statements: Acute Tox. 1 H332 , Eye Dam. 1 H318 , Skin Corr. 1B H314 , Acute Tox. 3 H301

● **coronene** (EC Number: 205-881-7, CAS Number: 191-07-1)

Description/Comments: Data from C&L Inventory Database; no entries in Registered Substances or Pesticides Properties databases; SDS: Sigma Aldrich, 1907/2006 compliant, dated 2012 - no entries; IARC – Group 3, not carcinogenic.
Data source:
http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=17010&HarmOnly=no?fc=true&lang=en
Data source date: 16 Jun 2014
Hazard Statements: STOT SE 2 H371

Appendix B: Rationale for selection of metal species

antimony {antimony trioxide}

Worst case CLP species based on hazard statements/molecular weight and low solubility. Industrial sources include: flame retardants in electrical apparatus, textiles and coatings (edit as required)

arsenic {arsenic pentoxide}

worst case

cadmium {cadmium oxide}

Reasonable case CLP species based on hazard statements/molecular weight, very low solubility in water. Industrial sources include: electroplating baths, electrodes for storage batteries, catalysts, ceramic glazes, phosphors, pigments and nematocides. (edit as required) Worst case compounds in CLP: cadmium sulphate, chloride, fluoride & iodide not expected as either very soluble and/or compound's industrial usage not related to site history (edit as required)

chromium in chromium(III) compounds {chromium(III) oxide}

Reasonable case species based on hazard statements/molecular weight. Industrial sources include: tanning, pigment in paint, inks and glass (edit as required)

chromium in chromium(VI) compounds {chromium(VI) oxide}

Worst case CLP species based on hazard statements/molecular weight. Industrial sources include: production stainless steel, electroplating, wood preservation, anti-corrosion agents or coatings, pigments (edit as required)

copper {dicopper oxide; copper (I) oxide}

Reasonable case CLP species based on hazard statements/molecular weight and insolubility in water. Industrial sources include: oxidised copper metal, brake pads, pigments, antifouling paints, fungicide. (edit as required) Worse case copper sulphate is very soluble and likely to have been leached away if ever present and/or not enough soluble sulphate detected. (edit as required)

lead {lead compounds with the exception of those specified elsewhere in this Annex}

Cr VI not detected

mercury {mercury dichloride}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

molybdenum {molybdenum(VI) oxide}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

nickel {nickel chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

selenium {selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex}

Harmonised group entry used as most reasonable case. Pigment cadmium sulphoselenide not likely to be present in this soil. No evidence for the other CLP entries: sodium selenite, nickel II selenite and nickel selenide, to be present in this soil. (edit as required)

zinc {zinc oxide}

Cr Vi not detected

barium {barium oxide}

Cr VI not detected

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.1, May 2018
HazWasteOnline Classification Engine Version: 2020.270.4480.8732 (26 Sep 2020)
HazWasteOnline Database: 2020.270.4480.8732 (26 Sep 2020)

This classification utilises the following guidance and legislation:
WM3 v1.1 - Waste Classification - 1st Edition v1.1 - May 2018
CLP Regulation - Regulation 1272/2008/EC of 16 December 2008
1st ATP - Regulation 790/2009/EC of 10 August 2009
2nd ATP - Regulation 286/2011/EC of 10 March 2011
3rd ATP - Regulation 618/2012/EU of 10 July 2012
4th ATP - Regulation 487/2013/EU of 8 May 2013
Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013
5th ATP - Regulation 944/2013/EU of 2 October 2013
6th ATP - Regulation 605/2014/EU of 5 June 2014
WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014
Revised List of Wastes 2014 - Decision 2014/955/EU of 18 December 2014
7th ATP - Regulation 2015/1221/EU of 24 July 2015
8th ATP - Regulation (EU) 2016/918 of 19 May 2016
9th ATP - Regulation (EU) 2016/1179 of 19 July 2016
10th ATP - Regulation (EU) 2017/776 of 4 May 2017
HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017
13th ATP - Regulation (EU) 2018/1480 of 4 October 2018
14th ATP - Regulation (EU) 2020/217 of 4 October 2019
15th ATP - Regulation (EU) 2020/1182 of 19 May 2020
POPs Regulation 2004 - Regulation 850/2004/EC of 29 April 2004
1st ATP to POPs Regulation - Regulation 756/2010/EU of 24 August 2010
2nd ATP to POPs Regulation - Regulation 757/2010/EU of 24 August 2010

Waste Classification Report

QQCUD-5VE8X-G9NMU

Job name

Avoca River Park Data 17 05 04

Description/Comments

Analytical data associated with samples collected from Trial Pits Excavated at Avoca River Business Park in December 2019.

Project

9230-11-19

Site

Avoca River Park

Related Documents

#	Name	Description
1	Avoca River Park Trial Pit Data 2019.HWOL	.hwol file used to create the Job
2	Classification Report-Avoca River Park Trial Pit Data 2019.pdf	Classification for Job: Avoca River Park Trial Pit Data 2019

Waste Stream Template

Example waste stream template for contaminated soils

Classified by

Name:
Barry Sexton
Date:
30 Sep 2020 12:50 GMT
Telephone:
353 (01) 601 5175 / 5176

Company:
Ground Investigations Ireland Ltd
Catherinestown House, Hazelhatch Road,
Newcastle, Co. Dublin.

HazWasteOnline™ Training Record:

Course	**Date**
Hazardous Waste Classification	09 Apr 2019
Advanced Hazardous Waste Classification	10 Apr 2019

Report

Created by: Barry Sexton
Created date: 30 Sep 2020 12:50 GMT

Job summary

#	Sample Name	Depth [m]	Classification Result	Hazard properties	Page
1	TP02-05/12/2019-0.50m		Non Hazardous		3
2	TP03-04/12/2019-0.50m		Non Hazardous		6
3	TP05-04/12/2019-1.20m		Non Hazardous		9
4	TP06-06/12/2019-1.50m		Non Hazardous		12
5	TP08-05/12/2019-2.50m		Non Hazardous		15
6	TP09-05/12/2019-0.50m		Non Hazardous		18
7	TP11-05/12/2019-0.50m		Non Hazardous		21
8	TP11-05/12/2019-1.50m		Non Hazardous		24
9	TP13-11/12/2019-0.50m		Non Hazardous		27
10	TP16-09/12/2019-0.50m		Non Hazardous		30

#	Sample Name	Depth [m]	Classification Result	Hazard properties	Page
11	TP17-12/12/2019-1.50m		Non Hazardous		33
12	TP19-11/12/2019-0.50m		Non Hazardous		36
13	TP19-11/12/2019-1.50m		Hazardous	HP 7, HP 11	39
14	TP20-09/12/2019-0.50m		Non Hazardous		42
15	TP20-09/12/2019-1.50m		Non Hazardous		45
16	TP21-09/12/2019-0.50m		Non Hazardous		48
17	TP21-09/12/2019-1.50m		Non Hazardous		51
18	TP22-09/12/2019-0.50m		Non Hazardous		54
19	TP24-09/12/2019-0.50m		Non Hazardous		57
20	TP24-09/12/2019-1.50m		Non Hazardous		60
21	TP25-10/12/2019-0.50m		Non Hazardous		63
22	TP26-12/12/2019-0.50m		Non Hazardous		66
23	TP27-10/12/2019-0.50m		Non Hazardous		69
24	TP28-10/12/2019-0.50m		Non Hazardous		72
25	TP28-10/12/2019-1.50m		Non Hazardous		75
26	TP29-12/12/2019-0.50m		Non Hazardous		78
27	TP29-12/12/2019-1.50m		Hazardous	HP 7, HP 11	81

Classification of sample: TP02-05/12/2019-0.50m

✓ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:		LoW Code:	
TP02-05/12/2019-0.50m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
33.6% (wet weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 33.6% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		antimony { antimony trioxide }				1	mg/kg	1.197	0.795	mg/kg	0.0000795 %	✓	
		051-005-00-X	215-175-0	1309-64-4									
2		arsenic { arsenic pentoxide }				4.5	mg/kg	1.534	4.583	mg/kg	0.000458 %	✓	
		033-004-00-6	215-116-9	1303-28-2									
3		cadmium { cadmium oxide }				1	mg/kg	1.142	0.759	mg/kg	0.0000759 %	✓	
		048-002-00-0	215-146-2	1306-19-0									
4		chromium in chromium(III) compounds { ● chromium(III) oxide }				86.1	mg/kg	1.462	83.558	mg/kg	0.00836 %	✓	
			215-160-9	1308-38-9									
5		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD
		024-001-00-0	215-607-8	1333-82-0									
6		copper { dicopper oxide; copper (I) oxide }				47	mg/kg	1.126	35.137	mg/kg	0.00351 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
7		lead { ● lead compounds with the exception of those specified elsewhere in this Annex }			1	41	mg/kg		27.224	mg/kg	0.00272 %	✓	
		082-001-00-6											
8		mercury { mercury dichloride }				<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
		080-010-00-X	231-299-8	7487-94-7									
9		molybdenum { molybdenum(VI) oxide }				3	mg/kg	1.5	2.988	mg/kg	0.000299 %	✓	
		042-001-00-9	215-204-7	1313-27-5									
10		nickel { nickel chromate }				2	mg/kg	2.976	3.952	mg/kg	0.000395 %	✓	
		028-035-00-7	238-766-5	14721-18-7									
11		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				2	mg/kg	2.554	3.391	mg/kg	0.000339 %	✓	
		034-002-00-8											
12		zinc { zinc oxide }				6	mg/kg	1.245	4.959	mg/kg	0.000496 %	✓	
		030-013-00-7	215-222-5	1314-13-2									
13	●	TPH (C6 to C40) petroleum group				201	mg/kg		133.464	mg/kg	0.0133 %	✓	
				TPH									
14		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		603-181-00-X	216-653-1	1634-04-4									

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
15		benzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
16		toluene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-021-00-3	203-625-9	108-88-3									
17	●	ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
18		xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
19	●	pH				4.64	pH		4.64	pH	4.64 pH		
				PH									
20		naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
21	●	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-917-1	208-96-8									
22	●	acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
			201-469-6	83-32-9									
23	●	fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			201-695-5	86-73-7									
24	●	phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-581-5	85-01-8									
25	●	anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			204-371-1	120-12-7									
26	●	fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-912-4	206-44-0									
27	●	pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			204-927-3	129-00-0									
28		benzo[a]anthracene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
29		chrysene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
30		benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
31		benzo[k]fluoranthene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
32		benzo[a]pyrene; benzo[def]chrysene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-032-00-3	200-028-5	50-32-8									
33	●	indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-893-2	193-39-5									
34		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
35	●	benzo[ghi]perylene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-883-8	191-24-2									
36	●	polychlorobiphenyls; PCB				<0.035	mg/kg		<0.035	mg/kg	<0.0000035 %		<LOD
		602-039-00-4	215-648-1	1336-36-3									
37		barium { ● barium oxide }				114	mg/kg	1.117	84.515	mg/kg	0.00845 %	✓	
			215-127-9	1304-28-5									
38	●	coronene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-881-7	191-07-1									
39		benzo[j]fluoranthene				<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
		601-035-00-X	205-910-3	205-82-3									
										Total:	0.0388 %		

Key

🟨	User supplied data
▨	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
⚛	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Solid waste without liquid phase

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0133%)

Classification of sample: TP03-04/12/2019-0.50m

✓ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:		LoW Code:	
TP03-04/12/2019-0.50m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
9% (wet weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 9% Wet Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		2	mg/kg	1.197	2.179	mg/kg	0.000218 %	✓	
2		arsenic { arsenic pentoxide }	033-004-00-6	215-116-9	1303-28-2		19.6	mg/kg	1.534	27.358	mg/kg	0.00274 %	✓	
3		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<LOD
4		chromium in chromium(III) compounds { ● chromium(III) oxide }		215-160-9	1308-38-9		41	mg/kg	1.462	54.531	mg/kg	0.00545 %	✓	
5		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD
6		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		49	mg/kg	1.126	50.203	mg/kg	0.00502 %	✓	
7		lead { ● lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	24	mg/kg		21.84	mg/kg	0.00218 %	✓	
8		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
9		molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		0.1	mg/kg	1.5	0.137	mg/kg	0.0000137 %	✓	
10		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		41.3	mg/kg	2.976	111.857	mg/kg	0.0112 %	✓	
11		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				1	mg/kg	2.554	2.324	mg/kg	0.000232 %	✓	
12		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		125	mg/kg	1.245	141.586	mg/kg	0.0142 %	✓	
13	●	TPH (C6 to C40) petroleum group			TPH		63	mg/kg		57.33	mg/kg	0.00573 %	✓	
14		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
15		benzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
16		toluene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-021-00-3	203-625-9	108-88-3									
17	●	ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
18		xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
19	●	pH				8.16	pH		8.16	pH	8.16 pH		
				PH									
20		naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
21	●	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-917-1	208-96-8									
22	●	acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
			201-469-6	83-32-9									
23	●	fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			201-695-5	86-73-7									
24	●	phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-581-5	85-01-8									
25	●	anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			204-371-1	120-12-7									
26	●	fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-912-4	206-44-0									
27	●	pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			204-927-3	129-00-0									
28		benzo[a]anthracene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
29		chrysene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
30		benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
31		benzo[k]fluoranthene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
32		benzo[a]pyrene; benzo[def]chrysene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-032-00-3	200-028-5	50-32-8									
33	●	indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-893-2	193-39-5									
34		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
35	●	benzo[ghi]perylene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-883-8	191-24-2									
36	●	polychlorobiphenyls; PCB				<0.035	mg/kg		<0.035	mg/kg	<0.0000035 %		<LOD
		602-039-00-4	215-648-1	1336-36-3									
37		barium { ● barium oxide }				42	mg/kg	1.117	42.673	mg/kg	0.00427 %	✓	
			215-127-9	1304-28-5									
38	●	coronene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-881-7	191-07-1									
39		benzo[j]fluoranthene				<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
		601-035-00-X	205-910-3	205-82-3									
										Total:	0.0515 %		

Key

🟨	User supplied data
▨	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
⚛	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Solid waste without liquid phase

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.00573%)

Classification of sample: TP05-04/12/2019-1.20m

✓ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:		LoW Code:	
TP05-04/12/2019-1.20m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
30.6% (wet weight correction)			

Hazard properties

None identified

Determinands

Moisture content: 30.6% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		antimony { antimony trioxide } 051-005-00-X	215-175-0	1309-64-4		2	mg/kg	1.197	1.662	mg/kg	0.000166 %	✓	
2		arsenic { arsenic pentoxide } 033-004-00-6	215-116-9	1303-28-2		54.5	mg/kg	1.534	58.016	mg/kg	0.0058 %	✓	
3		cadmium { cadmium oxide } 048-002-00-0	215-146-2	1306-19-0		<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<LOD
4		chromium in chromium(III) compounds { ● chromium(III) oxide }	215-160-9	1308-38-9		46.8	mg/kg	1.462	47.47	mg/kg	0.00475 %	✓	
5		chromium in chromium(VI) compounds { chromium(VI) oxide } 024-001-00-0	215-607-8	1333-82-0		<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD
6		copper { dicopper oxide; copper (I) oxide } 029-002-00-X	215-270-7	1317-39-1		34	mg/kg	1.126	26.566	mg/kg	0.00266 %	✓	
7		lead { ● lead compounds with the exception of those specified elsewhere in this Annex } 082-001-00-6			1	51	mg/kg		35.394	mg/kg	0.00354 %	✓	
8		mercury { mercury dichloride } 080-010-00-X	231-299-8	7487-94-7		<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
9		molybdenum { molybdenum(VI) oxide } 042-001-00-9	215-204-7	1313-27-5		0.9	mg/kg	1.5	0.937	mg/kg	0.0000937 %	✓	
10		nickel { nickel chromate } 028-035-00-7	238-766-5	14721-18-7		21.9	mg/kg	2.976	45.235	mg/kg	0.00452 %	✓	
11		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } 034-002-00-8				3	mg/kg	2.554	5.317	mg/kg	0.000532 %	✓	
12		zinc { zinc oxide } 030-013-00-7	215-222-5	1314-13-2		114	mg/kg	1.245	98.477	mg/kg	0.00985 %	✓	
13	●	TPH (C6 to C40) petroleum group		TPH		<52	mg/kg		<52	mg/kg	<0.0052 %		<LOD
14		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane 603-181-00-X	216-653-1	1634-04-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
15		benzene	601-020-00-8	200-753-7	71-43-2		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		**<LOD**
16		toluene	601-021-00-3	203-625-9	108-88-3		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		**<LOD**
17	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		**<LOD**
18		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		**<LOD**
19	●	pH			PH		7.08 pH		7.08 pH	7.08 pH		
20		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		**<LOD**
21	●	acenaphthylene		205-917-1	208-96-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		**<LOD**
22	●	acenaphthene		201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		**<LOD**
23	●	fluorene		201-695-5	86-73-7		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		**<LOD**
24	●	phenanthrene		201-581-5	85-01-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		**<LOD**
25	●	anthracene		204-371-1	120-12-7		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		**<LOD**
26	●	fluoranthene		205-912-4	206-44-0		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		**<LOD**
27	●	pyrene		204-927-3	129-00-0		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		**<LOD**
28		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.06 mg/kg		<0.06 mg/kg	<0.000006 %		**<LOD**
29		chrysene	601-048-00-0	205-923-4	218-01-9		<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		**<LOD**
30		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		**<LOD**
31		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		**<LOD**
32		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		**<LOD**
33	●	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		**<LOD**
34		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		**<LOD**
35	●	benzo[ghi]perylene		205-883-8	191-24-2		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		**<LOD**
36	●	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.035 mg/kg		<0.035 mg/kg	<0.0000035 %		**<LOD**
37		barium { ● barium oxide }		215-127-9	1304-28-5		50 mg/kg	1.117	38.743 mg/kg	0.00387 %	✓	
38	●	coronene		205-881-7	191-07-1		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		**<LOD**
39		benzo[j]fluoranthene	601-035-00-X	205-910-3	205-82-3		<1 mg/kg		<1 mg/kg	<0.0001 %		**<LOD**
									Total:	0.0412 %		

Key

🟨	User supplied data
▒	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
⚛	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP06-06/12/2019-1.50m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:		LoW Code:	
TP06-06/12/2019-1.50m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
32.2% (wet weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 32.2% Wet Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		2	mg/kg	1.197	1.623	mg/kg	0.000162 %	✓	
2	arsenic { arsenic pentoxide }	033-004-00-6	215-116-9	1303-28-2		58	mg/kg	1.534	60.318	mg/kg	0.00603 %	✓	
3	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		4.8	mg/kg	1.142	3.718	mg/kg	0.000372 %	✓	
4	chromium in chromium(III) compounds { ● chromium(III) oxide }		215-160-9	1308-38-9		35.8	mg/kg	1.462	35.475	mg/kg	0.00355 %	✓	
5	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		1508	mg/kg	1.126	1151.135	mg/kg	0.115 %	✓	
7	lead { ● lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	74	mg/kg		50.172	mg/kg	0.00502 %	✓	
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
9	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		1	mg/kg	1.5	1.017	mg/kg	0.000102 %	✓	
10	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		21.8	mg/kg	2.976	43.99	mg/kg	0.0044 %	✓	
11	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				3	mg/kg	2.554	5.194	mg/kg	0.000519 %	✓	
12	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		1141	mg/kg	1.245	962.908	mg/kg	0.0963 %	✓	
13	● TPH (C6 to C40) petroleum group			TPH		<52	mg/kg		<52	mg/kg	<0.0052 %		<LOD
14	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
15		benzene											
		601-020-00-8	200-753-7	71-43-2		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
16		toluene											
		601-021-00-3	203-625-9	108-88-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
17	●	ethylbenzene											
		601-023-00-4	202-849-4	100-41-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
18		xylene											
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
19	●	pH											
				PH		7.03	pH		7.03	pH	7.03 pH		
20		naphthalene											
		601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
21	●	acenaphthylene											
			205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
22	●	acenaphthene											
			201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
23	●	fluorene											
			201-695-5	86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
24	●	phenanthrene											
			201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
25	●	anthracene											
			204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
26	●	fluoranthene											
			205-912-4	206-44-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
27	●	pyrene											
			204-927-3	129-00-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
28		benzo[a]anthracene											
		601-033-00-9	200-280-6	56-55-3		<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
29		chrysene											
		601-048-00-0	205-923-4	218-01-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
30		benzo[b]fluoranthene											
		601-034-00-4	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
31		benzo[k]fluoranthene											
		601-036-00-5	205-916-6	207-08-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
32		benzo[a]pyrene; benzo[def]chrysene											
		601-032-00-3	200-028-5	50-32-8		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
33	●	indeno[123-cd]pyrene											
			205-893-2	193-39-5		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
34		dibenz[a,h]anthracene											
		601-041-00-2	200-181-8	53-70-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
35	●	benzo[ghi]perylene											
			205-883-8	191-24-2		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
36	●	polychlorobiphenyls; PCB											
		602-039-00-4	215-648-1	1336-36-3		<0.035	mg/kg		<0.035	mg/kg	<0.0000035 %		<LOD
37		barium { ● barium oxide }											
			215-127-9	1304-28-5		55	mg/kg	1.117	41.635	mg/kg	0.00416 %	✓	
38	●	coronene											
			205-881-7	191-07-1		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
39		benzo[j]fluoranthene											
		601-035-00-X	205-910-3	205-82-3		<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
										Total:	0.241 %		

Key

🟨	User supplied data
▒	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
⚛	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP08-05/12/2019-2.50m

✓ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:		LoW Code:	
TP08-05/12/2019-2.50m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
32% (wet weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 32% Wet Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		2	mg/kg	1.197	1.628	mg/kg	0.000163 %	✓	
2		arsenic { arsenic pentoxide }	033-004-00-6	215-116-9	1303-28-2		61.5	mg/kg	1.534	64.147	mg/kg	0.00641 %	✓	
3		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.9	mg/kg	1.142	0.699	mg/kg	0.0000699 %	✓	
4		chromium in chromium(III) compounds { ● chromium(III) oxide }		215-160-9	1308-38-9		34.8	mg/kg	1.462	34.586	mg/kg	0.00346 %	✓	
5		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD
6		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		236	mg/kg	1.126	180.683	mg/kg	0.0181 %	✓	
7		lead { ● lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	45	mg/kg		30.6	mg/kg	0.00306 %	✓	
8		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
9		molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		0.4	mg/kg	1.5	0.408	mg/kg	0.0000408 %	✓	
10		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		17.5	mg/kg	2.976	35.418	mg/kg	0.00354 %	✓	
11		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				5	mg/kg	2.554	8.682	mg/kg	0.000868 %	✓	
12		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		892	mg/kg	1.245	754.994	mg/kg	0.0755 %	✓	
13	●	TPH (C6 to C40) petroleum group			TPH		<52	mg/kg		<52	mg/kg	<0.0052 %		<LOD
14		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
15		benzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
16		toluene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-021-00-3	203-625-9	108-88-3									
17	●	ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
18		xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
19	●	pH				5.82	pH		5.82	pH	5.82 pH		
				PH									
20		naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
21	●	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-917-1	208-96-8									
22	●	acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
			201-469-6	83-32-9									
23	●	fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			201-695-5	86-73-7									
24	●	phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-581-5	85-01-8									
25	●	anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			204-371-1	120-12-7									
26	●	fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-912-4	206-44-0									
27	●	pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			204-927-3	129-00-0									
28		benzo[a]anthracene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
29		chrysene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
30		benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
31		benzo[k]fluoranthene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
32		benzo[a]pyrene; benzo[def]chrysene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-032-00-3	200-028-5	50-32-8									
33	●	indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-893-2	193-39-5									
34		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
35	●	benzo[ghi]perylene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-883-8	191-24-2									
36	●	polychlorobiphenyls; PCB				<0.035	mg/kg		<0.035	mg/kg	<0.0000035 %		<LOD
		602-039-00-4	215-648-1	1336-36-3									
37		barium { ● barium oxide }				67	mg/kg	1.117	50.868	mg/kg	0.00509 %	✓	
			215-127-9	1304-28-5									
38	●	coronene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-881-7	191-07-1									
39		benzo[j]fluoranthene				<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
		601-035-00-X	205-910-3	205-82-3									
										Total:	0.122 %		

Key

🟨	User supplied data
▒	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
⚛	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP09-05/12/2019-0.50m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:		LoW Code:	
TP09-05/12/2019-0.50m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
18.5% (wet weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 18.5% Wet Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		15	mg/kg	1.197	14.635	mg/kg	0.00146 %	✓	
2		arsenic { arsenic pentoxide }	033-004-00-6	215-116-9	1303-28-2		414.2	mg/kg	1.534	517.795	mg/kg	0.0518 %	✓	
3		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		2.7	mg/kg	1.142	2.514	mg/kg	0.000251 %	✓	
4		chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		16.2	mg/kg	1.462	19.297	mg/kg	0.00193 %	✓	
5		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD
6		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		762	mg/kg	1.126	699.21	mg/kg	0.0699 %	✓	
7		lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	532	mg/kg		433.58	mg/kg	0.0434 %	✓	
8		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
9		molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		15.5	mg/kg	1.5	18.951	mg/kg	0.0019 %	✓	
10		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		16.9	mg/kg	2.976	40.994	mg/kg	0.0041 %	✓	
11		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				2	mg/kg	2.554	4.162	mg/kg	0.000416 %	✓	
12		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		927	mg/kg	1.245	940.388	mg/kg	0.094 %	✓	
13	●	TPH (C6 to C40) petroleum group			TPH		<52	mg/kg		<52	mg/kg	<0.0052 %		<LOD
14		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
15		benzene	601-020-00-8	200-753-7	71-43-2		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
16		toluene	601-021-00-3	203-625-9	108-88-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
17	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
18		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
19	●	pH			PH		6.21	pH		6.21	pH	6.21 pH		
20		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
21	●	acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
22	●	acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
23	●	fluorene		201-695-5	86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
24	●	phenanthrene		201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
25	●	anthracene		204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
26	●	fluoranthene		205-912-4	206-44-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
27	●	pyrene		204-927-3	129-00-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
28		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
29		chrysene	601-048-00-0	205-923-4	218-01-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
30		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
31		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
32		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
33	●	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
34		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
35	●	benzo[ghi]perylene		205-883-8	191-24-2		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
36	●	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.035	mg/kg		<0.035	mg/kg	<0.0000035 %		<LOD
37		barium { ● barium oxide }		215-127-9	1304-28-5		32	mg/kg	1.117	29.118	mg/kg	0.00291 %	✓	
38	●	coronene		205-881-7	191-07-1		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
39		benzo[j]fluoranthene	601-035-00-X	205-910-3	205-82-3		<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
											Total:	0.278 %		

Key

🟨	User supplied data
▨	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
⚛	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP11-05/12/2019-0.50m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
TP11-05/12/2019-0.50m
Moisture content:
7%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 7% Wet Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	**User entered data**		Conv. Factor	Compound conc.		**Classification value**	MC Applied	Conc. Not Used
1		antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		1	mg/kg	1.197	1.113	mg/kg	0.000111 %	✓	
2		arsenic { arsenic pentoxide }	033-004-00-6	215-116-9	1303-28-2		2.6	mg/kg	1.534	3.709	mg/kg	0.000371 %	✓	
3		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<LOD
4		chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		17.5	mg/kg	1.462	23.787	mg/kg	0.00238 %	✓	
5		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD
6		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		18	mg/kg	1.126	18.847	mg/kg	0.00188 %	✓	
7		lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	39	mg/kg		36.27	mg/kg	0.00363 %	✓	
8		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
9		molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		0.5	mg/kg	1.5	0.698	mg/kg	0.0000698 %	✓	
10		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		10	mg/kg	2.976	27.679	mg/kg	0.00277 %	✓	
11		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
12		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		109	mg/kg	1.245	126.177	mg/kg	0.0126 %	✓	
13		TPH (C6 to C40) petroleum group			TPH		<52	mg/kg		<52	mg/kg	<0.0052 %		<LOD
14		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
15		benzene	601-020-00-8	200-753-7	71-43-2		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
16		toluene	601-021-00-3	203-625-9	108-88-3		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
17	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
18		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
19	●	pH			PH		8.56 pH		8.56 pH	8.56 pH		
20		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
21	●	acenaphthylene		205-917-1	208-96-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
22	●	acenaphthene		201-469-6	83-32-9		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
23	●	fluorene		201-695-5	86-73-7		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
24	●	phenanthrene		201-581-5	85-01-8		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
25	●	anthracene		204-371-1	120-12-7		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
26	●	fluoranthene		205-912-4	206-44-0		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
27	●	pyrene		204-927-3	129-00-0		<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
28		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.06 mg/kg		<0.06 mg/kg	<0.000006 %		<LOD
29		chrysene	601-048-00-0	205-923-4	218-01-9		<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
30		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
31		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
32		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
33	●	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
34		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
35	●	benzo[ghi]perylene		205-883-8	191-24-2		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
36	●	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.035 mg/kg		<0.035 mg/kg	<0.0000035 %		<LOD
37		barium { ● barium oxide }		215-127-9	1304-28-5		24 mg/kg	1.117	24.92 mg/kg	0.00249 %	✓	
38	●	coronene		205-881-7	191-07-1		<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
39		benzo[j]fluoranthene	601-035-00-X	205-910-3	205-82-3		<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
									Total:	0.032 %		

Key

🟨	User supplied data
▨	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
⚛	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP11-05/12/2019-1.50m

✓ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:		LoW Code:	
TP11-05/12/2019-1.50m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
34.2% (wet weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 34.2% Wet Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		3	mg/kg	1.197	2.363	mg/kg	0.000236 %	✓	
2		arsenic { arsenic pentoxide }	033-004-00-6	215-116-9	1303-28-2		31.6	mg/kg	1.534	31.894	mg/kg	0.00319 %	✓	
3		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.4	mg/kg	1.142	0.301	mg/kg	0.0000301 %	✓	
4		chromium in chromium(III) compounds { ● chromium(III) oxide }		215-160-9	1308-38-9		50.6	mg/kg	1.462	48.662	mg/kg	0.00487 %	✓	
5		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD
6		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		65	mg/kg	1.126	48.154	mg/kg	0.00482 %	✓	
7		lead { ● lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	63	mg/kg		41.454	mg/kg	0.00415 %	✓	
8		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
9		molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		0.8	mg/kg	1.5	0.79	mg/kg	0.000079 %	✓	
10		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		32.8	mg/kg	2.976	64.235	mg/kg	0.00642 %	✓	
11		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				2	mg/kg	2.554	3.361	mg/kg	0.000336 %	✓	
12		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		191	mg/kg	1.245	156.433	mg/kg	0.0156 %	✓	
13	●	TPH (C6 to C40) petroleum group			TPH		658	mg/kg		432.964	mg/kg	0.0433 %	✓	
14		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
15		benzene	601-020-00-8	200-753-7	71-43-2		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
16		toluene	601-021-00-3	203-625-9	108-88-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
17	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
18		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
19	●	pH			PH		7.17	pH		7.17	pH	7.17 pH		
20		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
21	●	acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
22	●	acenaphthene		201-469-6	83-32-9		0.14	mg/kg		0.0921	mg/kg	0.00000921 %	✓	
23	●	fluorene		201-695-5	86-73-7		0.08	mg/kg		0.0526	mg/kg	0.00000526 %	✓	
24	●	phenanthrene		201-581-5	85-01-8		0.15	mg/kg		0.0987	mg/kg	0.00000987 %	✓	
25	●	anthracene		204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
26	●	fluoranthene		205-912-4	206-44-0		0.06	mg/kg		0.0395	mg/kg	0.00000395 %	✓	
27	●	pyrene		204-927-3	129-00-0		0.06	mg/kg		0.0395	mg/kg	0.00000395 %	✓	
28		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
29		chrysene	601-048-00-0	205-923-4	218-01-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
30		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
31		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
32		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
33	●	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
34		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
35	●	benzo[ghi]perylene		205-883-8	191-24-2		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
36	●	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.035	mg/kg		<0.035	mg/kg	<0.0000035 %		<LOD
37		barium { ● barium oxide }		215-127-9	1304-28-5		49	mg/kg	1.117	35.998	mg/kg	0.0036 %	✓	
38	●	coronene		205-881-7	191-07-1		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
39		benzo[j]fluoranthene	601-035-00-X	205-910-3	205-82-3		<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
											Total:	0.0869 %		

Key

🟨	User supplied data
▨	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
⚛	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Solid waste without liquid phase

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0433%)

Classification of sample: TP13-11/12/2019-0.50m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:		LoW Code:	
TP13-11/12/2019-0.50m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
6.6% (wet weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 6.6% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		antimony { antimony trioxide }				2	mg/kg	1.197	2.236	mg/kg	0.000224 %	✓	
		051-005-00-X	215-175-0	1309-64-4									
2		arsenic { arsenic pentoxide }				25.2	mg/kg	1.534	36.103	mg/kg	0.00361 %	✓	
		033-004-00-6	215-116-9	1303-28-2									
3		cadmium { cadmium oxide }				0.1	mg/kg	1.142	0.107	mg/kg	0.0000107 %	✓	
		048-002-00-0	215-146-2	1306-19-0									
4		chromium in chromium(III) compounds { chromium(III) oxide }				31.5	mg/kg	1.462	43	mg/kg	0.0043 %	✓	
			215-160-9	1308-38-9									
5		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD
		024-001-00-0	215-607-8	1333-82-0									
6		copper { dicopper oxide; copper (I) oxide }				42	mg/kg	1.126	44.166	mg/kg	0.00442 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
7		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	19	mg/kg		17.746	mg/kg	0.00177 %	✓	
		082-001-00-6											
8		mercury { mercury dichloride }				<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
		080-010-00-X	231-299-8	7487-94-7									
9		molybdenum { molybdenum(VI) oxide }				0.4	mg/kg	1.5	0.56	mg/kg	0.000056 %	✓	
		042-001-00-9	215-204-7	1313-27-5									
10		nickel { nickel chromate }				29.3	mg/kg	2.976	81.449	mg/kg	0.00814 %	✓	
		028-035-00-7	238-766-5	14721-18-7									
11		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				1	mg/kg	2.554	2.385	mg/kg	0.000239 %	✓	
		034-002-00-8											
12		zinc { zinc oxide }				217	mg/kg	1.245	252.276	mg/kg	0.0252 %	✓	
		030-013-00-7	215-222-5	1314-13-2									
13		TPH (C6 to C40) petroleum group				<52	mg/kg		<52	mg/kg	<0.0052 %		<LOD
				TPH									
14		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		603-181-00-X	216-653-1	1634-04-4									

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
15		benzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
16		toluene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-021-00-3	203-625-9	108-88-3									
17	●	ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
18		xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
19	●	pH				7.19	pH		7.19	pH	7.19 pH		
				PH									
20		naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
21	●	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-917-1	208-96-8									
22	●	acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
			201-469-6	83-32-9									
23	●	fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			201-695-5	86-73-7									
24	●	phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-581-5	85-01-8									
25	●	anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			204-371-1	120-12-7									
26	●	fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-912-4	206-44-0									
27	●	pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			204-927-3	129-00-0									
28		benzo[a]anthracene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
29		chrysene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
30		benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
31		benzo[k]fluoranthene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
32		benzo[a]pyrene; benzo[def]chrysene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-032-00-3	200-028-5	50-32-8									
33	●	indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-893-2	193-39-5									
34		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
35	●	benzo[ghi]perylene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-883-8	191-24-2									
36	●	polychlorobiphenyls; PCB				0.464	mg/kg		0.433	mg/kg	0.0000433 %	✓	
		602-039-00-4	215-648-1	1336-36-3									
37	⚛	barium { ● barium oxide }				27	mg/kg	1.117	28.156	mg/kg	0.00282 %	✓	
			215-127-9	1304-28-5									
38	●	coronene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-881-7	191-07-1									
39		benzo[j]fluoranthene				<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
		601-035-00-X	205-910-3	205-82-3									
										Total:	0.0563 %		

Key

🟨	User supplied data
▨	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
⚛	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP16-09/12/2019-0.50m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:		LoW Code:	
TP16-09/12/2019-0.50m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
7.1% (wet weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 7.1% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
1	antimony { antimony trioxide }				3	mg/kg	1.197	3.336	mg/kg	0.000334 %	✓	
	051-005-00-X	215-175-0	1309-64-4									
2	arsenic { arsenic pentoxide }				7.6	mg/kg	1.534	10.83	mg/kg	0.00108 %	✓	
	033-004-00-6	215-116-9	1303-28-2									
3	cadmium { cadmium oxide }				0.2	mg/kg	1.142	0.212	mg/kg	0.0000212 %	✓	
	048-002-00-0	215-146-2	1306-19-0									
4	chromium in chromium(III) compounds { chromium(III) oxide }				205.3	mg/kg	1.462	278.753	mg/kg	0.0279 %	✓	
		215-160-9	1308-38-9									
5	chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD
	024-001-00-0	215-607-8	1333-82-0									
6	copper { dicopper oxide; copper (I) oxide }				56	mg/kg	1.126	58.573	mg/kg	0.00586 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	40	mg/kg		37.16	mg/kg	0.00372 %	✓	
	082-001-00-6											
8	mercury { mercury dichloride }				<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7									
9	molybdenum { molybdenum(VI) oxide }				1.4	mg/kg	1.5	1.951	mg/kg	0.000195 %	✓	
	042-001-00-9	215-204-7	1313-27-5									
10	nickel { nickel chromate }				20.4	mg/kg	2.976	56.405	mg/kg	0.00564 %	✓	
	028-035-00-7	238-766-5	14721-18-7									
11	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				1	mg/kg	2.554	2.372	mg/kg	0.000237 %	✓	
	034-002-00-8											
12	zinc { zinc oxide }				258	mg/kg	1.245	298.336	mg/kg	0.0298 %	✓	
	030-013-00-7	215-222-5	1314-13-2									
13	TPH (C6 to C40) petroleum group				127	mg/kg		117.983	mg/kg	0.0118 %	✓	
			TPH									
14	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
	603-181-00-X	216-653-1	1634-04-4									

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
15		benzene	601-020-00-8	200-753-7	71-43-2		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
16		toluene	601-021-00-3	203-625-9	108-88-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
17	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
18		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
19	●	pH			PH		8.33	pH		8.33	pH	8.33 pH		
20		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
21	●	acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
22	●	acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
23	●	fluorene		201-695-5	86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
24	●	phenanthrene		201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
25	●	anthracene		204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
26	●	fluoranthene		205-912-4	206-44-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
27	●	pyrene		204-927-3	129-00-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
28		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
29		chrysene	601-048-00-0	205-923-4	218-01-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
30		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
31		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
32		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
33	●	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
34		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
35	●	benzo[ghi]perylene		205-883-8	191-24-2		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
36	●	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		0.093	mg/kg		0.0864	mg/kg	0.00000864 %	✓	
37		barium { ● barium oxide }		215-127-9	1304-28-5		23	mg/kg	1.117	23.856	mg/kg	0.00239 %	✓	
38	●	coronene		205-881-7	191-07-1		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
39		benzo[j]fluoranthene	601-035-00-X	205-910-3	205-82-3		<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
											Total:	0.0892 %		

Key

🟨	User supplied data
⬜	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
⚛	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Solid waste without liquid phase

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0118%)

Classification of sample: TP17-12/12/2019-1.50m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:
TP17-12/12/2019-1.50m
Moisture content:
39.4%
(wet weight correction)

LoW Code:
Chapter: 17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Entry: 17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 39.4% Wet Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		2 mg/kg	1.197	1.451 mg/kg	0.000145 %	✓	
2	arsenic { arsenic pentoxide }	033-004-00-6	215-116-9	1303-28-2		55.2 mg/kg	1.534	51.31 mg/kg	0.00513 %	✓	
3	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.4 mg/kg	1.142	0.277 mg/kg	0.0000277 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		39.3 mg/kg	1.462	34.808 mg/kg	0.00348 %	✓	
5	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.3 mg/kg	1.923	<0.577 mg/kg	<0.0000577 %		<LOD
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		98 mg/kg	1.126	66.864 mg/kg	0.00669 %	✓	
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	100 mg/kg		60.6 mg/kg	0.00606 %	✓	
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
9	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		0.9 mg/kg	1.5	0.818 mg/kg	0.0000818 %	✓	
10	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		23.4 mg/kg	2.976	42.205 mg/kg	0.00422 %	✓	
11	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				2 mg/kg	2.554	3.095 mg/kg	0.000309 %	✓	
12	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		428 mg/kg	1.245	322.839 mg/kg	0.0323 %	✓	
13	TPH (C6 to C40) petroleum group			TPH		<52 mg/kg		<52 mg/kg	<0.0052 %		<LOD
14	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
15		benzene	601-020-00-8	200-753-7	71-43-2		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		**<LOD**
16		toluene	601-021-00-3	203-625-9	108-88-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		**<LOD**
17	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		**<LOD**
18		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
19	●	pH			PH		7.56	pH		7.56	pH	7.56 pH		
20		naphthalene	601-052-00-2	202-049-5	91-20-3		0.18	mg/kg		0.109	mg/kg	0.0000109 %	✓	
21	●	acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
22	●	acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		**<LOD**
23	●	fluorene		201-695-5	86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
24	●	phenanthrene		201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
25	●	anthracene		204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
26	●	fluoranthene		205-912-4	206-44-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
27	●	pyrene		204-927-3	129-00-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
28		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		**<LOD**
29		chrysene	601-048-00-0	205-923-4	218-01-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		**<LOD**
30		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		**<LOD**
31		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		**<LOD**
32		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
33	●	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
34		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
35	●	benzo[ghi]perylene		205-883-8	191-24-2		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
36	●	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.035	mg/kg		<0.035	mg/kg	<0.0000035 %		**<LOD**
37		barium { ● barium oxide }		215-127-9	1304-28-5		178	mg/kg	1.117	120.435	mg/kg	0.012 %	✓	
38	●	coronene		205-881-7	191-07-1		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
39		benzo[j]fluoranthene	601-035-00-X	205-910-3	205-82-3		<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
											Total:	0.0759 %		

Key

🟨	User supplied data
▨	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
⚛	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP19-11/12/2019-0.50m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:		LoW Code:	
TP19-11/12/2019-0.50m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
6% (wet weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 6% Wet Weight Moisture Correction applied (MC)

#	Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
	CLP index number	EC Number	CAS Number									
1	antimony { antimony trioxide }				2	mg/kg	1.197	2.251	mg/kg	0.000225 %	✓	
	051-005-00-X	215-175-0	1309-64-4									
2	arsenic { arsenic pentoxide }				18.6	mg/kg	1.534	26.818	mg/kg	0.00268 %	✓	
	033-004-00-6	215-116-9	1303-28-2									
3	cadmium { cadmium oxide }				<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<LOD
	048-002-00-0	215-146-2	1306-19-0									
4	chromium in chromium(III) compounds { ● chromium(III) oxide }				36.9	mg/kg	1.462	50.696	mg/kg	0.00507 %	✓	
		215-160-9	1308-38-9									
5	chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD
	024-001-00-0	215-607-8	1333-82-0									
6	copper { dicopper oxide; copper (I) oxide }				37	mg/kg	1.126	39.158	mg/kg	0.00392 %	✓	
	029-002-00-X	215-270-7	1317-39-1									
7	lead { ● lead compounds with the exception of those specified elsewhere in this Annex }			1	17	mg/kg		15.98	mg/kg	0.0016 %	✓	
	082-001-00-6											
8	mercury { mercury dichloride }				<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
	080-010-00-X	231-299-8	7487-94-7									
9	molybdenum { molybdenum(VI) oxide }				1.2	mg/kg	1.5	1.692	mg/kg	0.000169 %	✓	
	042-001-00-9	215-204-7	1313-27-5									
10	nickel { nickel chromate }				25	mg/kg	2.976	69.942	mg/kg	0.00699 %	✓	
	028-035-00-7	238-766-5	14721-18-7									
11	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				1	mg/kg	2.554	2.4	mg/kg	0.00024 %	✓	
	034-002-00-8											
12	zinc { zinc oxide }				134	mg/kg	1.245	156.784	mg/kg	0.0157 %	✓	
	030-013-00-7	215-222-5	1314-13-2									
13	● TPH (C6 to C40) petroleum group				169	mg/kg		158.86	mg/kg	0.0159 %	✓	
			TPH									
14	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
	603-181-00-X	216-653-1	1634-04-4									

#		Determinand			CLP Note	**User entered data**		Conv. Factor	Compound conc.		**Classification value**	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
15		benzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		**<LOD**
		601-020-00-8	200-753-7	71-43-2									
16		toluene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		**<LOD**
		601-021-00-3	203-625-9	108-88-3									
17	●	ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		**<LOD**
		601-023-00-4	202-849-4	100-41-4									
18		xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
19	●	pH				8.33	pH		8.33	pH	8.33 pH		
				PH									
20		naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
		601-052-00-2	202-049-5	91-20-3									
21	●	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
			205-917-1	208-96-8									
22	●	acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		**<LOD**
			201-469-6	83-32-9									
23	●	fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
			201-695-5	86-73-7									
24	●	phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
			201-581-5	85-01-8									
25	●	anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
			204-371-1	120-12-7									
26	●	fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
			205-912-4	206-44-0									
27	●	pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
			204-927-3	129-00-0									
28		benzo[a]anthracene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		**<LOD**
		601-033-00-9	200-280-6	56-55-3									
29		chrysene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		**<LOD**
		601-048-00-0	205-923-4	218-01-9									
30		benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		**<LOD**
		601-034-00-4	205-911-9	205-99-2									
31		benzo[k]fluoranthene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		**<LOD**
		601-036-00-5	205-916-6	207-08-9									
32		benzo[a]pyrene; benzo[def]chrysene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
		601-032-00-3	200-028-5	50-32-8									
33	●	indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
			205-893-2	193-39-5									
34		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
		601-041-00-2	200-181-8	53-70-3									
35	●	benzo[ghi]perylene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
			205-883-8	191-24-2									
36	●	polychlorobiphenyls; PCB				0.069	mg/kg		0.0649	mg/kg	0.00000649 %	✓	
		602-039-00-4	215-648-1	1336-36-3									
37		barium { ● barium oxide }				60	mg/kg	1.117	62.971	mg/kg	0.0063 %	✓	
			215-127-9	1304-28-5									
38	●	coronene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
			205-881-7	191-07-1									
39		benzo[j]fluoranthene				<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
		601-035-00-X	205-910-3	205-82-3									
										Total:	0.059 %		

Key

🟨	User supplied data
▨	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
⚛	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Solid waste without liquid phase

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0159%)

Classification of sample: TP19-11/12/2019-1.50m

⚠ **Hazardous Waste**
Classified as **17 05 03 ***
in the List of Waste

Sample details

Sample Name:		LoW Code:	
TP19-11/12/2019-1.50m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
25.9% (wet weight correction)		Entry:	17 05 03 * (Soil and stones containing hazardous substances)

Hazard properties

HP 7: Carcinogenic "waste which induces cancer or increases its incidence"

Hazard Statements hit:

Carc. 1B; H350 "May cause cancer [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.113%)

HP 11: Mutagenic "waste which may cause a mutation, that is a permanent change in the amount or structure of the genetic material in a cell"

Hazard Statements hit:

Muta. 1B; H340 "May cause genetic defects [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.113%)

Determinands

Moisture content: 25.9% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	**User entered data**		Conv. Factor	Compound conc.		**Classification value**	MC Applied	Conc. Not Used
			CLP index number	EC Number	CAS Number								
1		antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		2	mg/kg	1.197	1.774	mg/kg	0.000177 %	✓	
2		arsenic { arsenic pentoxide }	033-004-00-6	215-116-9	1303-28-2		28.3	mg/kg	1.534	32.166	mg/kg	0.00322 %	✓	
3		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.2	mg/kg	1.142	0.169	mg/kg	0.0000169 %	✓	
4		chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		48.3	mg/kg	1.462	52.31	mg/kg	0.00523 %	✓	
5		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		**<LOD**
6		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		93	mg/kg	1.126	77.588	mg/kg	0.00776 %	✓	
7		lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	145	mg/kg		107.445	mg/kg	0.0107 %	✓	

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
8		mercury { mercury dichloride }				<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		**<LOD**
		080-010-00-X	231-299-8	7487-94-7									
9		molybdenum { molybdenum(VI) oxide }				1.8	mg/kg	1.5	2.001	mg/kg	0.0002 %	✓	
		042-001-00-9	215-204-7	1313-27-5									
10		nickel { nickel chromate }				29	mg/kg	2.976	63.957	mg/kg	0.0064 %	✓	
		028-035-00-7	238-766-5	14721-18-7									
11		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				2	mg/kg	2.554	3.784	mg/kg	0.000378 %	✓	
		034-002-00-8											
12		zinc { zinc oxide }				162	mg/kg	1.245	149.418	mg/kg	0.0149 %	✓	
		030-013-00-7	215-222-5	1314-13-2									
13	●	TPH (C6 to C40) petroleum group				1524	mg/kg		1129.284	mg/kg	0.113 %	✓	
				TPH									
14		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		**<LOD**
		603-181-00-X	216-653-1	1634-04-4									
15		benzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		**<LOD**
		601-020-00-8	200-753-7	71-43-2									
16		toluene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		**<LOD**
		601-021-00-3	203-625-9	108-88-3									
17	●	ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		**<LOD**
		601-023-00-4	202-849-4	100-41-4									
18		xylene				0.048	mg/kg		0.0356	mg/kg	0.00000356 %	✓	
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
19	●	pH				8.04	pH		8.04	pH	8.04 pH		
				PH									
20		naphthalene				0.84	mg/kg		0.622	mg/kg	0.0000622 %	✓	
		601-052-00-2	202-049-5	91-20-3									
21	●	acenaphthylene				0.08	mg/kg		0.0593	mg/kg	0.00000593 %	✓	
			205-917-1	208-96-8									
22	●	acenaphthene				0.09	mg/kg		0.0667	mg/kg	0.00000667 %	✓	
			201-469-6	83-32-9									
23	●	fluorene				0.32	mg/kg		0.237	mg/kg	0.0000237 %	✓	
			201-695-5	86-73-7									
24	●	phenanthrene				1.5	mg/kg		1.112	mg/kg	0.000111 %	✓	
			201-581-5	85-01-8									
25	●	anthracene				0.11	mg/kg		0.0815	mg/kg	0.00000815 %	✓	
			204-371-1	120-12-7									
26	●	fluoranthene				0.09	mg/kg		0.0667	mg/kg	0.00000667 %	✓	
			205-912-4	206-44-0									
27	●	pyrene				0.81	mg/kg		0.6	mg/kg	0.00006 %	✓	
			204-927-3	129-00-0									
28		benzo[a]anthracene				0.18	mg/kg		0.133	mg/kg	0.0000133 %	✓	
		601-033-00-9	200-280-6	56-55-3									
29		chrysene				0.88	mg/kg		0.652	mg/kg	0.0000652 %	✓	
		601-048-00-0	205-923-4	218-01-9									
30		benzo[b]fluoranthene				0.11	mg/kg		0.0815	mg/kg	0.00000815 %	✓	
		601-034-00-4	205-911-9	205-99-2									
31		benzo[k]fluoranthene				0.04	mg/kg		0.0296	mg/kg	0.00000296 %	✓	
		601-036-00-5	205-916-6	207-08-9									
32		benzo[a]pyrene; benzo[def]chrysene				0.23	mg/kg		0.17	mg/kg	0.000017 %	✓	
		601-032-00-3	200-028-5	50-32-8									
33	●	indeno[123-cd]pyrene				<0.4	mg/kg		<0.4	mg/kg	<0.00004 %		**<LOD**
			205-893-2	193-39-5									
34		dibenz[a,h]anthracene				<0.4	mg/kg		<0.4	mg/kg	<0.00004 %		**<LOD**
		601-041-00-2	200-181-8	53-70-3									

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
35	●	benzo[ghi]perylene				<0.4	mg/kg		<0.4	mg/kg	<0.00004 %		**<LOD**
			205-883-8	191-24-2									
36	●	polychlorobiphenyls; PCB				0.206	mg/kg		0.153	mg/kg	0.0000153 %	✓	
		602-039-00-4	215-648-1	1336-36-3									
37	⚛	barium { ● barium oxide }				52	mg/kg	1.117	43.021	mg/kg	0.0043 %	✓	
			215-127-9	1304-28-5									
38	●	coronene				<0.4	mg/kg		<0.4	mg/kg	<0.00004 %		**<LOD**
			205-881-7	191-07-1									
39		benzo[j]fluoranthene				<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
		601-035-00-X	205-910-3	205-82-3									
										Total:	0.167 %		

Key

🟨	User supplied data
▨	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
🟥	Hazardous result
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
⚛	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Solid waste without liquid phase

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinands:

TPH (C6 to C40) petroleum group: (conc.: 0.113%)
xylene: (conc.: 3.56e-06%)

Classification of sample: TP20-09/12/2019-0.50m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:	
TP20-09/12/2019-0.50m	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:		
14% (wet weight correction)	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 14% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	**User entered data**	Conv. Factor	Compound conc.	**Classification value**	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
1		antimony { antimony trioxide } 051-005-00-X	215-175-0	1309-64-4		2 mg/kg	1.197	2.059 mg/kg	0.000206 %	✓	
2		arsenic { arsenic pentoxide } 033-004-00-6	215-116-9	1303-28-2		18.1 mg/kg	1.534	23.876 mg/kg	0.00239 %	✓	
3		cadmium { cadmium oxide } 048-002-00-0	215-146-2	1306-19-0		0.7 mg/kg	1.142	0.688 mg/kg	0.0000688 %	✓	
4		chromium in chromium(III) compounds { ● chromium(III) oxide }	215-160-9	1308-38-9		90.6 mg/kg	1.462	113.879 mg/kg	0.0114 %	✓	
5		chromium in chromium(VI) compounds { chromium(VI) oxide } 024-001-00-0	215-607-8	1333-82-0		<0.3 mg/kg	1.923	<0.577 mg/kg	<0.0000577 %		<LOD
6		copper { dicopper oxide; copper (I) oxide } 029-002-00-X	215-270-7	1317-39-1		129 mg/kg	1.126	124.906 mg/kg	0.0125 %	✓	
7		lead { ● lead compounds with the exception of those specified elsewhere in this Annex } 082-001-00-6			1	77 mg/kg		66.22 mg/kg	0.00662 %	✓	
8		mercury { mercury dichloride } 080-010-00-X	231-299-8	7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
9		molybdenum { molybdenum(VI) oxide } 042-001-00-9	215-204-7	1313-27-5		2.7 mg/kg	1.5	3.483 mg/kg	0.000348 %	✓	
10		nickel { nickel chromate } 028-035-00-7	238-766-5	14721-18-7		25.4 mg/kg	2.976	65.014 mg/kg	0.0065 %	✓	
11		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex } 034-002-00-8				<1 mg/kg	2.554	<2.554 mg/kg	<0.000255 %		<LOD
12		zinc { zinc oxide } 030-013-00-7	215-222-5	1314-13-2		331 mg/kg	1.245	354.32 mg/kg	0.0354 %	✓	
13	●	TPH (C6 to C40) petroleum group		TPH		151 mg/kg		129.86 mg/kg	0.013 %	✓	
14		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane 603-181-00-X	216-653-1	1634-04-4		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
15		benzene	601-020-00-8	200-753-7	71-43-2		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
16		toluene	601-021-00-3	203-625-9	108-88-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
17	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
18		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
19	●	pH			PH		8.34	pH		8.34	pH	8.34 pH		
20		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
21	●	acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
22	●	acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
23	●	fluorene		201-695-5	86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
24	●	phenanthrene		201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
25	●	anthracene		204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
26	●	fluoranthene		205-912-4	206-44-0		0.05	mg/kg		0.043	mg/kg	0.0000043 %	✓	
27	●	pyrene		204-927-3	129-00-0		0.05	mg/kg		0.043	mg/kg	0.0000043 %	✓	
28		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
29		chrysene	601-048-00-0	205-923-4	218-01-9		0.02	mg/kg		0.0172	mg/kg	0.00000172 %	✓	
30		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
31		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
32		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
33	●	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
34		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
35	●	benzo[ghi]perylene		205-883-8	191-24-2		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
36	●	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		3.715	mg/kg		3.195	mg/kg	0.000319 %	✓	
37		barium { ● barium oxide }		215-127-9	1304-28-5		45	mg/kg	1.117	43.209	mg/kg	0.00432 %	✓	
38	●	coronene		205-881-7	191-07-1		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
39		benzo[j]fluoranthene	601-035-00-X	205-910-3	205-82-3		<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
40		asbestos	650-013-00-6	- - - - - - -	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5		<10	mg/kg		<10	mg/kg	<0.001 %		<LOD

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
								Total:	0.0946 %		

Key

🟨	User supplied data
▨	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
⚛	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Solid waste without liquid phase

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.013%)

Classification of sample: TP20-09/12/2019-1.50m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:		LoW Code:	
TP20-09/12/2019-1.50m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)
17.1% (wet weight correction)			

Hazard properties

None identified

Determinands

Moisture content: 17.1% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		antimony { antimony trioxide }				13	mg/kg	1.197	12.901	mg/kg	0.00129 %	✓	
		051-005-00-X	215-175-0	1309-64-4									
2		arsenic { arsenic pentoxide }				18.7	mg/kg	1.534	23.779	mg/kg	0.00238 %	✓	
		033-004-00-6	215-116-9	1303-28-2									
3		cadmium { cadmium oxide }				0.4	mg/kg	1.142	0.379	mg/kg	0.0000379 %	✓	
		048-002-00-0	215-146-2	1306-19-0									
4		chromium in chromium(III) compounds { ● chromium(III) oxide }				1194.5	mg/kg	1.462	1447.292	mg/kg	0.145 %	✓	
			215-160-9	1308-38-9									
5		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD
		024-001-00-0	215-607-8	1333-82-0									
6		copper { dicopper oxide; copper (I) oxide }				124	mg/kg	1.126	115.737	mg/kg	0.0116 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
7		lead { ● lead compounds with the exception of those specified elsewhere in this Annex }			1	71	mg/kg		58.859	mg/kg	0.00589 %	✓	
		082-001-00-6											
8		mercury { mercury dichloride }				<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
		080-010-00-X	231-299-8	7487-94-7									
9		molybdenum { molybdenum(VI) oxide }				1.3	mg/kg	1.5	1.617	mg/kg	0.000162 %	✓	
		042-001-00-9	215-204-7	1313-27-5									
10		nickel { nickel chromate }				104.9	mg/kg	2.976	258.822	mg/kg	0.0259 %	✓	
		028-035-00-7	238-766-5	14721-18-7									
11		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
		034-002-00-8											
12		zinc { zinc oxide }				182	mg/kg	1.245	187.8	mg/kg	0.0188 %	✓	
		030-013-00-7	215-222-5	1314-13-2									
13	●	TPH (C6 to C40) petroleum group				197	mg/kg		163.313	mg/kg	0.0163 %	✓	
				TPH									
14		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		603-181-00-X	216-653-1	1634-04-4									

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
15		benzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
		601-020-00-8	200-753-7	71-43-2							
16		toluene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
		601-021-00-3	203-625-9	108-88-3							
17	●	ethylbenzene				<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD
		601-023-00-4	202-849-4	100-41-4							
18		xylene				<0.01 mg/kg		<0.01 mg/kg	<0.000001 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]							
19	●	pH				7.82 pH		7.82 pH	7.82 pH		
				PH							
20		naphthalene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		601-052-00-2	202-049-5	91-20-3							
21	●	acenaphthylene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
			205-917-1	208-96-8							
22	●	acenaphthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
			201-469-6	83-32-9							
23	●	fluorene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
			201-695-5	86-73-7							
24	●	phenanthrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
			201-581-5	85-01-8							
25	●	anthracene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
			204-371-1	120-12-7							
26	●	fluoranthene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
			205-912-4	206-44-0							
27	●	pyrene				<0.03 mg/kg		<0.03 mg/kg	<0.000003 %		<LOD
			204-927-3	129-00-0							
28		benzo[a]anthracene				<0.06 mg/kg		<0.06 mg/kg	<0.000006 %		<LOD
		601-033-00-9	200-280-6	56-55-3							
29		chrysene				<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
		601-048-00-0	205-923-4	218-01-9							
30		benzo[b]fluoranthene				<0.05 mg/kg		<0.05 mg/kg	<0.000005 %		<LOD
		601-034-00-4	205-911-9	205-99-2							
31		benzo[k]fluoranthene				<0.02 mg/kg		<0.02 mg/kg	<0.000002 %		<LOD
		601-036-00-5	205-916-6	207-08-9							
32		benzo[a]pyrene; benzo[def]chrysene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		601-032-00-3	200-028-5	50-32-8							
33	●	indeno[123-cd]pyrene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
			205-893-2	193-39-5							
34		dibenz[a,h]anthracene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
		601-041-00-2	200-181-8	53-70-3							
35	●	benzo[ghi]perylene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
			205-883-8	191-24-2							
36	●	polychlorobiphenyls; PCB				<0.035 mg/kg		<0.035 mg/kg	<0.0000035 %		<LOD
		602-039-00-4	215-648-1	1336-36-3							
37		barium { ● barium oxide }				35 mg/kg	1.117	32.395 mg/kg	0.00324 %	✓	
			215-127-9	1304-28-5							
38	●	coronene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
			205-881-7	191-07-1							
39		benzo[j]fluoranthene				<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
		601-035-00-X	205-910-3	205-82-3							
40		asbestos				<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
		650-013-00-6	- - - - - - -	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5							

#		Determinand			CLP Note	**User entered data**	Conv. Factor	Compound conc.	**Classification value**	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
								Total:	0.232 %		

Key

🟨	User supplied data
▒	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
⚛	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Solid waste without liquid phase

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0163%)

Classification of sample: TP21-09/12/2019-0.50m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name: **TP21-09/12/2019-0.50m** Moisture content: **6.8%** (wet weight correction)	LoW Code:		
	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)	
	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)	

Hazard properties

None identified

Determinands

Moisture content: 6.8% Wet Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	**User entered data**		Conv. Factor	Compound conc.		**Classification value**	MC Applied	Conc. Not Used
1		antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		1	mg/kg	1.197	1.116	mg/kg	0.000112 %	✓	
2		arsenic { arsenic pentoxide }	033-004-00-6	215-116-9	1303-28-2		14.6	mg/kg	1.534	20.872	mg/kg	0.00209 %	✓	
3		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.1	mg/kg	1.142	0.106	mg/kg	0.0000106 %	✓	
4		chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		46.3	mg/kg	1.462	63.068	mg/kg	0.00631 %	✓	
5		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD
6		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		86	mg/kg	1.126	90.242	mg/kg	0.00902 %	✓	
7		lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	53	mg/kg		49.396	mg/kg	0.00494 %	✓	
8		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
9		molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		1.4	mg/kg	1.5	1.957	mg/kg	0.000196 %	✓	
10		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		22.1	mg/kg	2.976	61.303	mg/kg	0.00613 %	✓	
11		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
12		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		357	mg/kg	1.245	414.146	mg/kg	0.0414 %	✓	
13	●	TPH (C6 to C40) petroleum group			TPH		263	mg/kg		245.116	mg/kg	0.0245 %	✓	
14		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
15		benzene											
		601-020-00-8	200-753-7	71-43-2		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
16		toluene											
		601-021-00-3	203-625-9	108-88-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
17	●	ethylbenzene											
		601-023-00-4	202-849-4	100-41-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
18		xylene											
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
19	●	pH											
				PH		8.34	pH		8.34	pH	8.34 pH		
20		naphthalene											
		601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
21	●	acenaphthylene											
			205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
22	●	acenaphthene											
			201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
23	●	fluorene											
			201-695-5	86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
24	●	phenanthrene											
			201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
25	●	anthracene											
			204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
26	●	fluoranthene											
			205-912-4	206-44-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
27	●	pyrene											
			204-927-3	129-00-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
28		benzo[a]anthracene											
		601-033-00-9	200-280-6	56-55-3		<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
29		chrysene											
		601-048-00-0	205-923-4	218-01-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
30		benzo[b]fluoranthene											
		601-034-00-4	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
31		benzo[k]fluoranthene											
		601-036-00-5	205-916-6	207-08-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
32		benzo[a]pyrene; benzo[def]chrysene											
		601-032-00-3	200-028-5	50-32-8		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
33	●	indeno[123-cd]pyrene											
			205-893-2	193-39-5		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
34		dibenz[a,h]anthracene											
		601-041-00-2	200-181-8	53-70-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
35	●	benzo[ghi]perylene											
			205-883-8	191-24-2		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
36	●	polychlorobiphenyls; PCB											
		602-039-00-4	215-648-1	1336-36-3		<0.035	mg/kg		<0.035	mg/kg	<0.0000035 %		<LOD
37		barium { ● barium oxide }											
			215-127-9	1304-28-5		21	mg/kg	1.117	21.852	mg/kg	0.00219 %	✓	
38	●	coronene											
			205-881-7	191-07-1		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
39		benzo[j]fluoranthene											
		601-035-00-X	205-910-3	205-82-3		<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
										Total:	0.0974 %		

Key

🟨	User supplied data
▨	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
⚛	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Solid waste without liquid phase

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0245%)

Classification of sample: TP21-09/12/2019-1.50m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:		LoW Code:	
TP21-09/12/2019-1.50m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
33.9% (wet weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 33.9% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		antimony { antimony trioxide }				1	mg/kg	1.197	0.791	mg/kg	0.0000791 %	✓	
		051-005-00-X	215-175-0	1309-64-4									
2		arsenic { arsenic pentoxide }				48.8	mg/kg	1.534	49.478	mg/kg	0.00495 %	✓	
		033-004-00-6	215-116-9	1303-28-2									
3		cadmium { cadmium oxide }				<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<LOD
		048-002-00-0	215-146-2	1306-19-0									
4		chromium in chromium(III) compounds { chromium(III) oxide }				40.4	mg/kg	1.462	39.03	mg/kg	0.0039 %	✓	
			215-160-9	1308-38-9									
5		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD
		024-001-00-0	215-607-8	1333-82-0									
6		copper { dicopper oxide; copper (I) oxide }				28	mg/kg	1.126	20.838	mg/kg	0.00208 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
7		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	46	mg/kg		30.406	mg/kg	0.00304 %	✓	
		082-001-00-6											
8		mercury { mercury dichloride }				<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
		080-010-00-X	231-299-8	7487-94-7									
9		molybdenum { molybdenum(VI) oxide }				0.8	mg/kg	1.5	0.793	mg/kg	0.0000793 %	✓	
		042-001-00-9	215-204-7	1313-27-5									
10		nickel { nickel chromate }				21	mg/kg	2.976	41.314	mg/kg	0.00413 %	✓	
		028-035-00-7	238-766-5	14721-18-7									
11		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				5	mg/kg	2.554	8.44	mg/kg	0.000844 %	✓	
		034-002-00-8											
12		zinc { zinc oxide }				103	mg/kg	1.245	84.744	mg/kg	0.00847 %	✓	
		030-013-00-7	215-222-5	1314-13-2									
13	●	TPH (C6 to C40) petroleum group				<52	mg/kg		<52	mg/kg	<0.0052 %		<LOD
				TPH									
14		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		603-181-00-X	216-653-1	1634-04-4									

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
			CLP index number	EC Number	CAS Number								
15		benzene	601-020-00-8	200-753-7	71-43-2	<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
16		toluene	601-021-00-3	203-625-9	108-88-3	<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
17	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4	<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
18		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]	<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
19	●	pH			PH	7.12	pH		7.12	pH	7.12 pH		
20		naphthalene	601-052-00-2	202-049-5	91-20-3	<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
21	●	acenaphthylene		205-917-1	208-96-8	<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
22	●	acenaphthene		201-469-6	83-32-9	<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
23	●	fluorene		201-695-5	86-73-7	<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
24	●	phenanthrene		201-581-5	85-01-8	<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
25	●	anthracene		204-371-1	120-12-7	<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
26	●	fluoranthene		205-912-4	206-44-0	<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
27	●	pyrene		204-927-3	129-00-0	<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
28		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3	<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
29		chrysene	601-048-00-0	205-923-4	218-01-9	<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
30		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2	<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
31		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9	<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
32		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8	<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
33	●	indeno[123-cd]pyrene		205-893-2	193-39-5	<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
34		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3	<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
35	●	benzo[ghi]perylene		205-883-8	191-24-2	<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
36	●	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3	<0.035	mg/kg		<0.035	mg/kg	<0.0000035 %		<LOD
37	⚛	barium { ● barium oxide }		215-127-9	1304-28-5	52	mg/kg	1.117	38.377	mg/kg	0.00384 %	✓	
38	●	coronene		205-881-7	191-07-1	<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
39		benzo[j]fluoranthene	601-035-00-X	205-910-3	205-82-3	<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
										Total:	0.0369 %		

Key

🟨	User supplied data
⬜	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
⚛	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP22-09/12/2019-0.50m

✓ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:	
TP22-09/12/2019-0.50m	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:		
22.2% (wet weight correction)	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 22.2% Wet Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1		antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		4 mg/kg	1.197	3.725 mg/kg	0.000373 %	✓	
2		arsenic { arsenic pentoxide }	033-004-00-6	215-116-9	1303-28-2		30.4 mg/kg	1.534	36.278 mg/kg	0.00363 %	✓	
3		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.3 mg/kg	1.142	0.267 mg/kg	0.0000267 %	✓	
4		chromium in chromium(III) compounds { ● chromium(III) oxide }		215-160-9	1308-38-9		23.6 mg/kg	1.462	26.835 mg/kg	0.00268 %	✓	
5		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.3 mg/kg	1.923	<0.577 mg/kg	<0.0000577 %		<LOD
6		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		99 mg/kg	1.126	86.718 mg/kg	0.00867 %	✓	
7		lead { ● lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	244 mg/kg		189.832 mg/kg	0.019 %	✓	
8		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
9		molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		1.2 mg/kg	1.5	1.401 mg/kg	0.00014 %	✓	
10		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		14 mg/kg	2.976	32.417 mg/kg	0.00324 %	✓	
11		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				1 mg/kg	2.554	1.987 mg/kg	0.000199 %	✓	
12		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		132 mg/kg	1.245	127.827 mg/kg	0.0128 %	✓	
13	●	TPH (C6 to C40) petroleum group			TPH		143 mg/kg		111.254 mg/kg	0.0111 %	✓	
14		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
15		benzene	601-020-00-8	200-753-7	71-43-2		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
16		toluene	601-021-00-3	203-625-9	108-88-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
17	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
18		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
19	●	pH			PH		9.59	pH		9.59	pH	9.59 pH		
20		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
21	●	acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
22	●	acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
23	●	fluorene		201-695-5	86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
24	●	phenanthrene		201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
25	●	anthracene		204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
26	●	fluoranthene		205-912-4	206-44-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
27	●	pyrene		204-927-3	129-00-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
28		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
29		chrysene	601-048-00-0	205-923-4	218-01-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
30		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
31		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
32		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
33	●	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
34		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
35	●	benzo[ghi]perylene		205-883-8	191-24-2		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
36	●	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.035	mg/kg		<0.035	mg/kg	<0.0000035 %		<LOD
37		barium { ● barium oxide }		215-127-9	1304-28-5		34	mg/kg	1.117	29.534	mg/kg	0.00295 %	✓	
38	●	coronene		205-881-7	191-07-1		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
39		benzo[j]fluoranthene	601-035-00-X	205-910-3	205-82-3		<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
											Total:	0.065 %		

Key

🟨	User supplied data
▒	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
⚛	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Solid waste without liquid phase

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0111%)

Classification of sample: TP24-09/12/2019-0.50m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:		LoW Code:	
TP24-09/12/2019-0.50m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
8.6% (wet weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 8.6% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		antimony { antimony trioxide }				1	mg/kg	1.197	1.094	mg/kg	0.000109 %	✓	
		051-005-00-X	215-175-0	1309-64-4									
2		arsenic { arsenic pentoxide }				20.9	mg/kg	1.534	29.301	mg/kg	0.00293 %	✓	
		033-004-00-6	215-116-9	1303-28-2									
3		cadmium { cadmium oxide }				0.2	mg/kg	1.142	0.209	mg/kg	0.0000209 %	✓	
		048-002-00-0	215-146-2	1306-19-0									
4		chromium in chromium(III) compounds { ● chromium(III) oxide }				28.2	mg/kg	1.462	37.671	mg/kg	0.00377 %	✓	
			215-160-9	1308-38-9									
5		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD
		024-001-00-0	215-607-8	1333-82-0									
6		copper { dicopper oxide; copper (I) oxide }				75	mg/kg	1.126	77.18	mg/kg	0.00772 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
7		lead { ● lead compounds with the exception of those specified elsewhere in this Annex }			1	98	mg/kg		89.572	mg/kg	0.00896 %	✓	
		082-001-00-6											
8		mercury { mercury dichloride }				<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
		080-010-00-X	231-299-8	7487-94-7									
9		molybdenum { molybdenum(VI) oxide }				0.9	mg/kg	1.5	1.234	mg/kg	0.000123 %	✓	
		042-001-00-9	215-204-7	1313-27-5									
10		nickel { nickel chromate }				20.7	mg/kg	2.976	56.31	mg/kg	0.00563 %	✓	
		028-035-00-7	238-766-5	14721-18-7									
11		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
		034-002-00-8											
12		zinc { zinc oxide }				235	mg/kg	1.245	267.352	mg/kg	0.0267 %	✓	
		030-013-00-7	215-222-5	1314-13-2									
13	●	TPH (C6 to C40) petroleum group				149	mg/kg		136.186	mg/kg	0.0136 %	✓	
				TPH									
14		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		603-181-00-X	216-653-1	1634-04-4									

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
15		benzene	601-020-00-8	200-753-7	71-43-2		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
16		toluene	601-021-00-3	203-625-9	108-88-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
17	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
18		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
19	●	pH			PH		8.04	pH		8.04	pH	8.04 pH		
20		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
21	●	acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
22	●	acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
23	●	fluorene		201-695-5	86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
24	●	phenanthrene		201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
25	●	anthracene		204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
26	●	fluoranthene		205-912-4	206-44-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
27	●	pyrene		204-927-3	129-00-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
28		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
29		chrysene	601-048-00-0	205-923-4	218-01-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
30		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
31		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
32		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
33	●	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
34		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
35	●	benzo[ghi]perylene		205-883-8	191-24-2		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
36	●	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.035	mg/kg		<0.035	mg/kg	<0.0000035 %		<LOD
37		barium { ● barium oxide }		215-127-9	1304-28-5		36	mg/kg	1.117	36.738	mg/kg	0.00367 %	✓	
38	●	coronene		205-881-7	191-07-1		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
39		benzo[j]fluoranthene	601-035-00-X	205-910-3	205-82-3		<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
40		asbestos	650-013-00-6	- - - - - - -	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5		<10	mg/kg		<10	mg/kg	<0.001 %		<LOD

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
								Total:	0.0748 %		

Key

🟨	User supplied data
▒	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
⚛	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Solid waste without liquid phase

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0136%)

Classification of sample: TP24-09/12/2019-1.50m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:		LoW Code:	
TP24-09/12/2019-1.50m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
45.7% (wet weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 45.7% Wet Weight Moisture Correction applied (MC)

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1		antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		3	mg/kg	1.197	1.95	mg/kg	0.000195 %	✓	
2		arsenic { arsenic pentoxide }	033-004-00-6	215-116-9	1303-28-2		55.8	mg/kg	1.534	46.476	mg/kg	0.00465 %	✓	
3		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		0.7	mg/kg	1.142	0.434	mg/kg	0.0000434 %	✓	
4		chromium in chromium(III) compounds { ● chromium(III) oxide }		215-160-9	1308-38-9		75.8	mg/kg	1.462	60.157	mg/kg	0.00602 %	✓	
5		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD
6		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		118	mg/kg	1.126	72.14	mg/kg	0.00721 %	✓	
7		lead { ● lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	364	mg/kg		197.652	mg/kg	0.0198 %	✓	
8		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
9		molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		4.8	mg/kg	1.5	3.91	mg/kg	0.000391 %	✓	
10		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		27.6	mg/kg	2.976	44.605	mg/kg	0.00446 %	✓	
11		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				2	mg/kg	2.554	2.773	mg/kg	0.000277 %	✓	
12		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		260	mg/kg	1.245	175.729	mg/kg	0.0176 %	✓	
13	●	TPH (C6 to C40) petroleum group			TPH		70	mg/kg		38.01	mg/kg	0.0038 %	✓	
14		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD

#		Determinand				CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
			CLP index number	EC Number	CAS Number									
15		benzene	601-020-00-8	200-753-7	71-43-2		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
16		toluene	601-021-00-3	203-625-9	108-88-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
17	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
18		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
19	●	pH			PH		6.69	pH		6.69	pH	6.69 pH		
20		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
21	●	acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
22	●	acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
23	●	fluorene		201-695-5	86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
24	●	phenanthrene		201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
25	●	anthracene		204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
26	●	fluoranthene		205-912-4	206-44-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
27	●	pyrene		204-927-3	129-00-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
28		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
29		chrysene	601-048-00-0	205-923-4	218-01-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
30		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
31		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
32		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
33	●	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
34		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
35	●	benzo[ghi]perylene		205-883-8	191-24-2		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
36	●	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.035	mg/kg		<0.035	mg/kg	<0.0000035 %		<LOD
37		barium { ● barium oxide }		215-127-9	1304-28-5		92	mg/kg	1.117	55.776	mg/kg	0.00558 %	✓	
38	●	coronene		205-881-7	191-07-1		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
39		benzo[j]fluoranthene	601-035-00-X	205-910-3	205-82-3		<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
											Total:	0.0702 %		

Key

🟨	User supplied data
▨	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
⚗	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Solid waste without liquid phase

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0038%)

Classification of sample: TP25-10/12/2019-0.50m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:	
TP25-10/12/2019-0.50m	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:		
11.1% (wet weight correction)	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 11.1% Wet Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
1	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		2 mg/kg	1.197	2.128 mg/kg	0.000213 %	✓	
2	arsenic { arsenic pentoxide }	033-004-00-6	215-116-9	1303-28-2		8.3 mg/kg	1.534	11.318 mg/kg	0.00113 %	✓	
3	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<0.1 mg/kg	1.142	<0.114 mg/kg	<0.0000114 %		<LOD
4	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		49.7 mg/kg	1.462	64.576 mg/kg	0.00646 %	✓	
5	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.3 mg/kg	1.923	<0.577 mg/kg	<0.0000577 %		<LOD
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		44 mg/kg	1.126	44.04 mg/kg	0.0044 %	✓	
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	17 mg/kg		15.113 mg/kg	0.00151 %	✓	
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1 mg/kg	1.353	<0.135 mg/kg	<0.0000135 %		<LOD
9	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		0.5 mg/kg	1.5	0.667 mg/kg	0.0000667 %	✓	
10	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		28.1 mg/kg	2.976	74.35 mg/kg	0.00743 %	✓	
11	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				1 mg/kg	2.554	2.27 mg/kg	0.000227 %	✓	
12	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		119 mg/kg	1.245	131.68 mg/kg	0.0132 %	✓	
13	TPH (C6 to C40) petroleum group			TPH		<52 mg/kg		<52 mg/kg	<0.0052 %		<LOD
14	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.005 mg/kg		<0.005 mg/kg	<0.0000005 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
15		benzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
16		toluene				0.018	mg/kg		0.016	mg/kg	0.0000016 %	✓	
		601-021-00-3	203-625-9	108-88-3									
17	●	ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
18		xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
19	●	pH				7.08	pH		7.08	pH	7.08 pH		
				PH									
20		naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
21	●	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-917-1	208-96-8									
22	●	acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
			201-469-6	83-32-9									
23	●	fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			201-695-5	86-73-7									
24	●	phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-581-5	85-01-8									
25	●	anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			204-371-1	120-12-7									
26	●	fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-912-4	206-44-0									
27	●	pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			204-927-3	129-00-0									
28		benzo[a]anthracene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
29		chrysene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
30		benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
31		benzo[k]fluoranthene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
32		benzo[a]pyrene; benzo[def]chrysene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-032-00-3	200-028-5	50-32-8									
33	●	indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-893-2	193-39-5									
34		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
35	●	benzo[ghi]perylene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-883-8	191-24-2									
36	●	polychlorobiphenyls; PCB				<0.035	mg/kg		<0.035	mg/kg	<0.0000035 %		<LOD
		602-039-00-4	215-648-1	1336-36-3									
37		barium { ● barium oxide }				38	mg/kg	1.117	37.718	mg/kg	0.00377 %	✓	
			215-127-9	1304-28-5									
38	●	coronene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-881-7	191-07-1									
39		benzo[j]fluoranthene				<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
		601-035-00-X	205-910-3	205-82-3									
										Total:	0.0438 %		

Key

🟨	User supplied data
▒	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
⚛	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Solid waste without liquid phase

Hazard Statements hit:

Flam. Liq. 2; H225 "Highly flammable liquid and vapour."

Because of determinand:

toluene: (conc.: 1.6e-06%)

Classification of sample: TP26-12/12/2019-0.50m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:		LoW Code:	
TP26-12/12/2019-0.50m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
14.6% (wet weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 14.6% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		antimony { antimony trioxide }				2	mg/kg	1.197	2.045	mg/kg	0.000204 %	✓	
		051-005-00-X	215-175-0	1309-64-4									
2		arsenic { arsenic pentoxide }				16.7	mg/kg	1.534	21.876	mg/kg	0.00219 %	✓	
		033-004-00-6	215-116-9	1303-28-2									
3		cadmium { cadmium oxide }				<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<LOD
		048-002-00-0	215-146-2	1306-19-0									
4		chromium in chromium(III) compounds { ● chromium(III) oxide }				38.4	mg/kg	1.462	47.93	mg/kg	0.00479 %	✓	
			215-160-9	1308-38-9									
5		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD
		024-001-00-0	215-607-8	1333-82-0									
6		copper { dicopper oxide; copper (I) oxide }				34	mg/kg	1.126	32.691	mg/kg	0.00327 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
7		lead { ● lead compounds with the exception of those specified elsewhere in this Annex }			1	19	mg/kg		16.226	mg/kg	0.00162 %	✓	
		082-001-00-6											
8		mercury { mercury dichloride }				<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
		080-010-00-X	231-299-8	7487-94-7									
9		molybdenum { molybdenum(VI) oxide }				<0.1	mg/kg	1.5	<0.15	mg/kg	<0.000015 %		<LOD
		042-001-00-9	215-204-7	1313-27-5									
10		nickel { nickel chromate }				37	mg/kg	2.976	94.044	mg/kg	0.0094 %	✓	
		028-035-00-7	238-766-5	14721-18-7									
11		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				1	mg/kg	2.554	2.181	mg/kg	0.000218 %	✓	
		034-002-00-8											
12		zinc { zinc oxide }				122	mg/kg	1.245	129.684	mg/kg	0.013 %	✓	
		030-013-00-7	215-222-5	1314-13-2									
13	●	TPH (C6 to C40) petroleum group				55	mg/kg		46.97	mg/kg	0.0047 %	✓	
				TPH									
14		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		603-181-00-X	216-653-1	1634-04-4									

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
15		benzene	601-020-00-8	200-753-7	71-43-2		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
16		toluene	601-021-00-3	203-625-9	108-88-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
17	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
18		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
19	●	pH			PH		7.17	pH		7.17	pH	7.17 pH		
20		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
21	●	acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
22	●	acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
23	●	fluorene		201-695-5	86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
24	●	phenanthrene		201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
25	●	anthracene		204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
26	●	fluoranthene		205-912-4	206-44-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
27	●	pyrene		204-927-3	129-00-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
28		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
29		chrysene	601-048-00-0	205-923-4	218-01-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
30		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
31		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
32		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
33	●	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
34		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
35	●	benzo[ghi]perylene		205-883-8	191-24-2		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
36	●	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.035	mg/kg		<0.035	mg/kg	<0.0000035 %		<LOD
37		barium { ● barium oxide }		215-127-9	1304-28-5		38	mg/kg	1.117	36.233	mg/kg	0.00362 %	✓	
38	●	coronene		205-881-7	191-07-1		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
39		benzo[j]fluoranthene	601-035-00-X	205-910-3	205-82-3		<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
											Total:	0.0433 %		

Key

🟨	User supplied data
▨	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
⚛	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Solid waste without liquid phase

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0047%)

Classification of sample: TP27-10/12/2019-0.50m

✓ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:		LoW Code:	
TP27-10/12/2019-0.50m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
12.4% (wet weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 12.4% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		antimony { antimony trioxide }				3	mg/kg	1.197	3.146	mg/kg	0.000315 %	✓	
		051-005-00-X	215-175-0	1309-64-4									
2		arsenic { arsenic pentoxide }				19.6	mg/kg	1.534	26.336	mg/kg	0.00263 %	✓	
		033-004-00-6	215-116-9	1303-28-2									
3		cadmium { cadmium oxide }				<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<LOD
		048-002-00-0	215-146-2	1306-19-0									
4		chromium in chromium(III) compounds { ● chromium(III) oxide }				46.2	mg/kg	1.462	59.151	mg/kg	0.00592 %	✓	
			215-160-9	1308-38-9									
5		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD
		024-001-00-0	215-607-8	1333-82-0									
6		copper { dicopper oxide; copper (I) oxide }				48	mg/kg	1.126	47.341	mg/kg	0.00473 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
7		lead { ● lead compounds with the exception of those specified elsewhere in this Annex }			1	42	mg/kg		36.792	mg/kg	0.00368 %	✓	
		082-001-00-6											
8		mercury { mercury dichloride }				<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
		080-010-00-X	231-299-8	7487-94-7									
9		molybdenum { molybdenum(VI) oxide }				<0.1	mg/kg	1.5	<0.15	mg/kg	<0.000015 %		<LOD
		042-001-00-9	215-204-7	1313-27-5									
10		nickel { nickel chromate }				58.5	mg/kg	2.976	152.522	mg/kg	0.0153 %	✓	
		028-035-00-7	238-766-5	14721-18-7									
11		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				2	mg/kg	2.554	4.474	mg/kg	0.000447 %	✓	
		034-002-00-8											
12		zinc { zinc oxide }				149	mg/kg	1.245	162.465	mg/kg	0.0162 %	✓	
		030-013-00-7	215-222-5	1314-13-2									
13	●	TPH (C6 to C40) petroleum group				<52	mg/kg		<52	mg/kg	<0.0052 %		<LOD
				TPH									
14		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		603-181-00-X	216-653-1	1634-04-4									

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
15		benzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
16		toluene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-021-00-3	203-625-9	108-88-3									
17	●	ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
18		xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
19	●	pH				7.12	pH		7.12	pH	7.12 pH		
				PH									
20		naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
21	●	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-917-1	208-96-8									
22	●	acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
			201-469-6	83-32-9									
23	●	fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			201-695-5	86-73-7									
24	●	phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-581-5	85-01-8									
25	●	anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			204-371-1	120-12-7									
26	●	fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-912-4	206-44-0									
27	●	pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			204-927-3	129-00-0									
28		benzo[a]anthracene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
29		chrysene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
30		benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
31		benzo[k]fluoranthene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
32		benzo[a]pyrene; benzo[def]chrysene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-032-00-3	200-028-5	50-32-8									
33	●	indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-893-2	193-39-5									
34		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
35	●	benzo[ghi]perylene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-883-8	191-24-2									
36	●	polychlorobiphenyls; PCB				<0.035	mg/kg		<0.035	mg/kg	<0.0000035 %		<LOD
		602-039-00-4	215-648-1	1336-36-3									
37		barium { ● barium oxide }				70	mg/kg	1.117	68.464	mg/kg	0.00685 %	✓	
			215-127-9	1304-28-5									
38	●	coronene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-881-7	191-07-1									
39		benzo[j]fluoranthene				<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
		601-035-00-X	205-910-3	205-82-3									
										Total:	0.0615 %		

Key

🟨	User supplied data
▨	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
⚛	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP28-10/12/2019-0.50m

✓ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:		LoW Code:	
TP28-10/12/2019-0.50m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
13.2% (wet weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 13.2% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		antimony { antimony trioxide }				3	mg/kg	1.197	3.117	mg/kg	0.000312 %	✓	
		051-005-00-X	215-175-0	1309-64-4									
2		arsenic { arsenic pentoxide }				12	mg/kg	1.534	15.977	mg/kg	0.0016 %	✓	
		033-004-00-6	215-116-9	1303-28-2									
3		cadmium { cadmium oxide }				<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<LOD
		048-002-00-0	215-146-2	1306-19-0									
4		chromium in chromium(III) compounds { ● chromium(III) oxide }				38.1	mg/kg	1.462	48.335	mg/kg	0.00483 %	✓	
			215-160-9	1308-38-9									
5		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD
		024-001-00-0	215-607-8	1333-82-0									
6		copper { dicopper oxide; copper (I) oxide }				35	mg/kg	1.126	34.204	mg/kg	0.00342 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
7		lead { ● lead compounds with the exception of those specified elsewhere in this Annex }			1	20	mg/kg		17.36	mg/kg	0.00174 %	✓	
		082-001-00-6											
8		mercury { mercury dichloride }				<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
		080-010-00-X	231-299-8	7487-94-7									
9		molybdenum { molybdenum(VI) oxide }				<0.1	mg/kg	1.5	<0.15	mg/kg	<0.000015 %		<LOD
		042-001-00-9	215-204-7	1313-27-5									
10		nickel { nickel chromate }				41.8	mg/kg	2.976	107.986	mg/kg	0.0108 %	✓	
		028-035-00-7	238-766-5	14721-18-7									
11		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				2	mg/kg	2.554	4.433	mg/kg	0.000443 %	✓	
		034-002-00-8											
12		zinc { zinc oxide }				133	mg/kg	1.245	143.695	mg/kg	0.0144 %	✓	
		030-013-00-7	215-222-5	1314-13-2									
13	●	TPH (C6 to C40) petroleum group				85	mg/kg		73.78	mg/kg	0.00738 %	✓	
				TPH									
14		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		603-181-00-X	216-653-1	1634-04-4									

#		Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
15		benzene	601-020-00-8	200-753-7	71-43-2		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
16		toluene	601-021-00-3	203-625-9	108-88-3		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
17	●	ethylbenzene	601-023-00-4	202-849-4	100-41-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
18		xylene	601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]		<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
19	●	pH			PH		6.28	pH		6.28	pH	6.28 pH		
20		naphthalene	601-052-00-2	202-049-5	91-20-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
21	●	acenaphthylene		205-917-1	208-96-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
22	●	acenaphthene		201-469-6	83-32-9		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
23	●	fluorene		201-695-5	86-73-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
24	●	phenanthrene		201-581-5	85-01-8		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
25	●	anthracene		204-371-1	120-12-7		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
26	●	fluoranthene		205-912-4	206-44-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
27	●	pyrene		204-927-3	129-00-0		<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
28		benzo[a]anthracene	601-033-00-9	200-280-6	56-55-3		<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
29		chrysene	601-048-00-0	205-923-4	218-01-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
30		benzo[b]fluoranthene	601-034-00-4	205-911-9	205-99-2		<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
31		benzo[k]fluoranthene	601-036-00-5	205-916-6	207-08-9		<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
32		benzo[a]pyrene; benzo[def]chrysene	601-032-00-3	200-028-5	50-32-8		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
33	●	indeno[123-cd]pyrene		205-893-2	193-39-5		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
34		dibenz[a,h]anthracene	601-041-00-2	200-181-8	53-70-3		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
35	●	benzo[ghi]perylene		205-883-8	191-24-2		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
36	●	polychlorobiphenyls; PCB	602-039-00-4	215-648-1	1336-36-3		<0.035	mg/kg		<0.035	mg/kg	<0.0000035 %		<LOD
37		barium { ● barium oxide }		215-127-9	1304-28-5		54	mg/kg	1.117	52.333	mg/kg	0.00523 %	✓	
38	●	coronene		205-881-7	191-07-1		<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
39		benzo[j]fluoranthene	601-035-00-X	205-910-3	205-82-3		<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
											Total:	0.0504 %		

Key

🟨	User supplied data
▒	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
⚛	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Solid waste without liquid phase

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.00738%)

Classification of sample: TP28-10/12/2019-1.50m

Non Hazardous Waste
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:		LoW Code:	
TP28-10/12/2019-1.50m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
39.5% (wet weight correction)		Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 39.5% Wet Weight Moisture Correction applied (MC)

#	Determinand	CLP index number	EC Number	CAS Number	CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
1	antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		1	mg/kg	1.197	0.724	mg/kg	0.0000724 %	✓	
2	arsenic { arsenic pentoxide }	033-004-00-6	215-116-9	1303-28-2		50.3	mg/kg	1.534	46.678	mg/kg	0.00467 %	✓	
3	cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		1.7	mg/kg	1.142	1.175	mg/kg	0.000117 %	✓	
4	chromium in chromium(III) compounds { chromium(III) oxide }		215-160-9	1308-38-9		37.4	mg/kg	1.462	33.071	mg/kg	0.00331 %	✓	
5	chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD
6	copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		132	mg/kg	1.126	89.913	mg/kg	0.00899 %	✓	
7	lead { lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	210	mg/kg		127.05	mg/kg	0.0127 %	✓	
8	mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
9	molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		1.1	mg/kg	1.5	0.998	mg/kg	0.0000998 %	✓	
10	nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		26.8	mg/kg	2.976	48.257	mg/kg	0.00483 %	✓	
11	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				2	mg/kg	2.554	3.09	mg/kg	0.000309 %	✓	
12	zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		263	mg/kg	1.245	198.053	mg/kg	0.0198 %	✓	
13	TPH (C6 to C40) petroleum group			TPH		<52	mg/kg		<52	mg/kg	<0.0052 %		<LOD
14	tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
15		benzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
16		toluene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-021-00-3	203-625-9	108-88-3									
17	●	ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-023-00-4	202-849-4	100-41-4									
18		xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		<LOD
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
19	●	pH				7.4	pH		7.4	pH	7.4 pH		
				PH									
20		naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-052-00-2	202-049-5	91-20-3									
21	●	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-917-1	208-96-8									
22	●	acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
			201-469-6	83-32-9									
23	●	fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			201-695-5	86-73-7									
24	●	phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			201-581-5	85-01-8									
25	●	anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			204-371-1	120-12-7									
26	●	fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-912-4	206-44-0									
27	●	pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			204-927-3	129-00-0									
28		benzo[a]anthracene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
29		chrysene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-048-00-0	205-923-4	218-01-9									
30		benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
31		benzo[k]fluoranthene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
32		benzo[a]pyrene; benzo[def]chrysene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-032-00-3	200-028-5	50-32-8									
33	●	indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-893-2	193-39-5									
34		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-041-00-2	200-181-8	53-70-3									
35	●	benzo[ghi]perylene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-883-8	191-24-2									
36	●	polychlorobiphenyls; PCB				<0.035	mg/kg		<0.035	mg/kg	<0.0000035 %		<LOD
		602-039-00-4	215-648-1	1336-36-3									
37		barium { ● barium oxide }				67	mg/kg	1.117	45.258	mg/kg	0.00453 %	✓	
			215-127-9	1304-28-5									
38	●	coronene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-881-7	191-07-1									
39		benzo[j]fluoranthene				<1	mg/kg		<1	mg/kg	<0.0001 %		<LOD
		601-035-00-X	205-910-3	205-82-3									
										Total:	0.0649 %		

Key

🟨	User supplied data
▒	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
⚛	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Classification of sample: TP29-12/12/2019-0.50m

✓ **Non Hazardous Waste**
Classified as **17 05 04**
in the List of Waste

Sample details

Sample Name:	LoW Code:	
TP29-12/12/2019-0.50m	Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:		
7.6% (wet weight correction)	Entry:	17 05 04 (Soil and stones other than those mentioned in 17 05 03)

Hazard properties

None identified

Determinands

Moisture content: 7.6% Wet Weight Moisture Correction applied (MC)

#		Determinand				CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
			CLP index number	EC Number	CAS Number									
1		antimony { antimony trioxide }	051-005-00-X	215-175-0	1309-64-4		1	mg/kg	1.197	1.106	mg/kg	0.000111 %	✓	
2		arsenic { arsenic pentoxide }	033-004-00-6	215-116-9	1303-28-2		<0.5	mg/kg	1.534	<0.767	mg/kg	<0.0000767 %		<LOD
3		cadmium { cadmium oxide }	048-002-00-0	215-146-2	1306-19-0		<0.1	mg/kg	1.142	<0.114	mg/kg	<0.0000114 %		<LOD
4		chromium in chromium(III) compounds { ● chromium(III) oxide }		215-160-9	1308-38-9		41.4	mg/kg	1.462	55.91	mg/kg	0.00559 %	✓	
5		chromium in chromium(VI) compounds { chromium(VI) oxide }	024-001-00-0	215-607-8	1333-82-0		<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD
6		copper { dicopper oxide; copper (I) oxide }	029-002-00-X	215-270-7	1317-39-1		35	mg/kg	1.126	36.411	mg/kg	0.00364 %	✓	
7		lead { ● lead compounds with the exception of those specified elsewhere in this Annex }	082-001-00-6			1	10	mg/kg		9.24	mg/kg	0.000924 %	✓	
8		mercury { mercury dichloride }	080-010-00-X	231-299-8	7487-94-7		<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
9		molybdenum { molybdenum(VI) oxide }	042-001-00-9	215-204-7	1313-27-5		0.8	mg/kg	1.5	1.109	mg/kg	0.000111 %	✓	
10		nickel { nickel chromate }	028-035-00-7	238-766-5	14721-18-7		10.1	mg/kg	2.976	27.776	mg/kg	0.00278 %	✓	
11		selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }	034-002-00-8				<1	mg/kg	2.554	<2.554	mg/kg	<0.000255 %		<LOD
12		zinc { zinc oxide }	030-013-00-7	215-222-5	1314-13-2		169	mg/kg	1.245	194.37	mg/kg	0.0194 %	✓	
13	●	TPH (C6 to C40) petroleum group			TPH		176	mg/kg		162.624	mg/kg	0.0163 %	✓	
14		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane	603-181-00-X	216-653-1	1634-04-4		<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD

#		Determinand			CLP Note	**User entered data**		Conv. Factor	Compound conc.		**Classification value**	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
15		benzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		**<LOD**
		601-020-00-8	200-753-7	71-43-2									
16		toluene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		**<LOD**
		601-021-00-3	203-625-9	108-88-3									
17	●	ethylbenzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		**<LOD**
		601-023-00-4	202-849-4	100-41-4									
18		xylene				<0.01	mg/kg		<0.01	mg/kg	<0.000001 %		**<LOD**
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
19	●	pH				8.43	pH		8.43	pH	8.43 pH		
				PH									
20		naphthalene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
		601-052-00-2	202-049-5	91-20-3									
21	●	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
			205-917-1	208-96-8									
22	●	acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		**<LOD**
			201-469-6	83-32-9									
23	●	fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
			201-695-5	86-73-7									
24	●	phenanthrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
			201-581-5	85-01-8									
25	●	anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
			204-371-1	120-12-7									
26	●	fluoranthene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
			205-912-4	206-44-0									
27	●	pyrene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		**<LOD**
			204-927-3	129-00-0									
28		benzo[a]anthracene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		**<LOD**
		601-033-00-9	200-280-6	56-55-3									
29		chrysene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		**<LOD**
		601-048-00-0	205-923-4	218-01-9									
30		benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		**<LOD**
		601-034-00-4	205-911-9	205-99-2									
31		benzo[k]fluoranthene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		**<LOD**
		601-036-00-5	205-916-6	207-08-9									
32		benzo[a]pyrene; benzo[def]chrysene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
		601-032-00-3	200-028-5	50-32-8									
33	●	indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
			205-893-2	193-39-5									
34		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
		601-041-00-2	200-181-8	53-70-3									
35	●	benzo[ghi]perylene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
			205-883-8	191-24-2									
36	●	polychlorobiphenyls; PCB				0.36	mg/kg		0.333	mg/kg	0.0000333 %	✓	
		602-039-00-4	215-648-1	1336-36-3									
37		barium { ● barium oxide }				15	mg/kg	1.117	15.475	mg/kg	0.00155 %	✓	
			215-127-9	1304-28-5									
38	●	coronene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		**<LOD**
			205-881-7	191-07-1									
39		benzo[j]fluoranthene				<1	mg/kg		<1	mg/kg	<0.0001 %		**<LOD**
		601-035-00-X	205-910-3	205-82-3									
										Total:	0.051 %		

Key

🟨	User supplied data
▨	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
⚛	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Solid waste without liquid phase

Hazard Statements hit:

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.0163%)

Classification of sample: TP29-12/12/2019-1.50m

⚠ **Hazardous Waste**
Classified as **17 05 03 ***
in the List of Waste

Sample details

Sample Name:		LoW Code:	
TP29-12/12/2019-1.50m		Chapter:	17: Construction and Demolition Wastes (including excavated soil from contaminated sites)
Moisture content:			
22.3% (wet weight correction)		Entry:	17 05 03 * (Soil and stones containing hazardous substances)

Hazard properties

HP 7: Carcinogenic "waste which induces cancer or increases its incidence"

Hazard Statements hit:

Carc. 1B; H350 "May cause cancer [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.123%)

HP 11: Mutagenic "waste which may cause a mutation, that is a permanent change in the amount or structure of the genetic material in a cell"

Hazard Statements hit:

Muta. 1B; H340 "May cause genetic defects [state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard]."

Because of determinand:

TPH (C6 to C40) petroleum group: (conc.: 0.123%)

Determinands

Moisture content: 22.3% Wet Weight Moisture Correction applied (MC)

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
1		antimony { antimony trioxide }				6	mg/kg	1.197	5.581	mg/kg	0.000558 %	✓	
		051-005-00-X	215-175-0	1309-64-4									
2		arsenic { arsenic pentoxide }				24.1	mg/kg	1.534	28.723	mg/kg	0.00287 %	✓	
		033-004-00-6	215-116-9	1303-28-2									
3		cadmium { cadmium oxide }				0.6	mg/kg	1.142	0.533	mg/kg	0.0000533 %	✓	
		048-002-00-0	215-146-2	1306-19-0									
4		chromium in chromium(III) compounds { chromium(III) oxide }				530.3	mg/kg	1.462	602.224	mg/kg	0.0602 %	✓	
			215-160-9	1308-38-9									
5		chromium in chromium(VI) compounds { chromium(VI) oxide }				<0.3	mg/kg	1.923	<0.577	mg/kg	<0.0000577 %		<LOD
		024-001-00-0	215-607-8	1333-82-0									
6		copper { dicopper oxide; copper (I) oxide }				98	mg/kg	1.126	85.732	mg/kg	0.00857 %	✓	
		029-002-00-X	215-270-7	1317-39-1									
7		lead { lead compounds with the exception of those specified elsewhere in this Annex }			1	67	mg/kg		52.059	mg/kg	0.00521 %	✓	
		082-001-00-6											

#		Determinand			CLP Note	User entered data		Conv. Factor	Compound conc.		Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number									
8	⚛	mercury { mercury dichloride }				<0.1	mg/kg	1.353	<0.135	mg/kg	<0.0000135 %		<LOD
		080-010-00-X	231-299-8	7487-94-7									
9	⚛	molybdenum { molybdenum(VI) oxide }				1.7	mg/kg	1.5	1.982	mg/kg	0.000198 %	✓	
		042-001-00-9	215-204-7	1313-27-5									
10	⚛	nickel { nickel chromate }				31.7	mg/kg	2.976	73.308	mg/kg	0.00733 %	✓	
		028-035-00-7	238-766-5	14721-18-7									
11	⚛	selenium { selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex }				1	mg/kg	2.554	1.984	mg/kg	0.000198 %	✓	
		034-002-00-8											
12	⚛	zinc { zinc oxide }				134	mg/kg	1.245	129.597	mg/kg	0.013 %	✓	
		030-013-00-7	215-222-5	1314-13-2									
13	●	TPH (C6 to C40) petroleum group				1587	mg/kg		1233.099	mg/kg	0.123 %	✓	
				TPH									
14		tert-butyl methyl ether; MTBE; 2-methoxy-2-methylpropane				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		603-181-00-X	216-653-1	1634-04-4									
15		benzene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-020-00-8	200-753-7	71-43-2									
16		toluene				<0.005	mg/kg		<0.005	mg/kg	<0.0000005 %		<LOD
		601-021-00-3	203-625-9	108-88-3									
17	●	ethylbenzene				0.108	mg/kg		0.0839	mg/kg	0.00000839 %	✓	
		601-023-00-4	202-849-4	100-41-4									
18		xylene				1.007	mg/kg		0.782	mg/kg	0.0000782 %	✓	
		601-022-00-9	202-422-2 [1] 203-396-5 [2] 203-576-3 [3] 215-535-7 [4]	95-47-6 [1] 106-42-3 [2] 108-38-3 [3] 1330-20-7 [4]									
19	●	pH				7.44	pH		7.44	pH	7.44 pH		
				PH									
20		naphthalene				0.12	mg/kg		0.0932	mg/kg	0.00000932 %	✓	
		601-052-00-2	202-049-5	91-20-3									
21	●	acenaphthylene				<0.03	mg/kg		<0.03	mg/kg	<0.000003 %		<LOD
			205-917-1	208-96-8									
22	●	acenaphthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
			201-469-6	83-32-9									
23	●	fluorene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			201-695-5	86-73-7									
24	●	phenanthrene				0.13	mg/kg		0.101	mg/kg	0.0000101 %	✓	
			201-581-5	85-01-8									
25	●	anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			204-371-1	120-12-7									
26	●	fluoranthene				0.09	mg/kg		0.0699	mg/kg	0.00000699 %	✓	
			205-912-4	206-44-0									
27	●	pyrene				0.14	mg/kg		0.109	mg/kg	0.0000109 %	✓	
			204-927-3	129-00-0									
28		benzo[a]anthracene				<0.06	mg/kg		<0.06	mg/kg	<0.000006 %		<LOD
		601-033-00-9	200-280-6	56-55-3									
29		chrysene				0.13	mg/kg		0.101	mg/kg	0.0000101 %	✓	
		601-048-00-0	205-923-4	218-01-9									
30		benzo[b]fluoranthene				<0.05	mg/kg		<0.05	mg/kg	<0.000005 %		<LOD
		601-034-00-4	205-911-9	205-99-2									
31		benzo[k]fluoranthene				<0.02	mg/kg		<0.02	mg/kg	<0.000002 %		<LOD
		601-036-00-5	205-916-6	207-08-9									
32		benzo[a]pyrene; benzo[def]chrysene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-032-00-3	200-028-5	50-32-8									
33	●	indeno[123-cd]pyrene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
			205-893-2	193-39-5									
34		dibenz[a,h]anthracene				<0.04	mg/kg		<0.04	mg/kg	<0.000004 %		<LOD
		601-041-00-2	200-181-8	53-70-3									

#		Determinand			CLP Note	User entered data	Conv. Factor	Compound conc.	Classification value	MC Applied	Conc. Not Used
		CLP index number	EC Number	CAS Number							
35	●	benzo[ghi]perylene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
			205-883-8	191-24-2							
36	●	polychlorobiphenyls; PCB				<0.175 mg/kg		<0.175 mg/kg	<0.0000175 %		<LOD
		602-039-00-4	215-648-1	1336-36-3							
37	⚛	barium { ● barium oxide }				40 mg/kg	1.117	34.701 mg/kg	0.00347 %	✓	
			215-127-9	1304-28-5							
38	●	coronene				<0.04 mg/kg		<0.04 mg/kg	<0.000004 %		<LOD
			205-881-7	191-07-1							
39		benzo[j]fluoranthene				<1 mg/kg		<1 mg/kg	<0.0001 %		<LOD
		601-035-00-X	205-910-3	205-82-3							
40		asbestos				<10 mg/kg		<10 mg/kg	<0.001 %		<LOD
		650-013-00-6	- - - - - - -	12001-28-4 132207-32-0 12172-73-5 77536-66-4 77536-68-6 77536-67-5 12001-29-5							
								Total:	0.226 %		

Key

🟨	User supplied data
▒	Determinand values ignored for classification, see column 'Conc. Not Used' for reason
🟥	Hazardous result
●	Determinand defined or amended by HazWasteOnline (see Appendix A)
⚛	Speciated Deteminand - Unless the Determinand is Note 1, the Conversion Factor is used to calculate the compound concentration
<LOD	Below limit of detection
ND	Not detected
CLP: Note 1	Only the metal concentration has been used for classification

Supplementary Hazardous Property Information

HP 3(i): Flammable "flammable liquid waste: liquid waste having a flash point below 60°C or waste gas oil, diesel and light heating oils having a flash point > 55°C and <= 75°C"

Force this Hazardous property to non hazardous because Solid waste without liquid phase

Hazard Statements hit:

Flam. Liq. 2; H225 "Highly flammable liquid and vapour."

Because of determinand:

ethylbenzene: (conc.: 8.39e-06%)

Flam. Liq. 3; H226 "Flammable liquid and vapour."

Because of determinands:

TPH (C6 to C40) petroleum group: (conc.: 0.123%)
xylene: (conc.: 0.00007%)

Appendix A: Classifier defined and non CLP determinands

- **chromium(III) oxide** (EC Number: 215-160-9, CAS Number: 1308-38-9)

Conversion factor: 1.462
Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4 H332 , Acute Tox. 4 H302 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Skin Irrit. 2 H315 , Resp. Sens. 1 H334 , Skin Sens. 1 H317 , Repr. 1B H360FD , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

- **lead compounds with the exception of those specified elsewhere in this Annex**

CLP index number: 082-001-00-6
Description/Comments: Least-worst case: Lead REACH Consortium considers some lead compounds Carcinogenic category 2B
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): Carc. 2 H351
Reason for additional Hazards Statement(s):
03 Jun 2015 - Carc. 2 H351 hazard statement sourced from: IARC Group 2A (Sup 7, 87) 2006; Lead REACH Consortium www.reach-lead.eu/substanceinformation.html. Review date 29/09/2015

- **TPH (C6 to C40) petroleum group** (CAS Number: TPH)

Description/Comments: Hazard statements taken from WM3 1st Edition 2015; Risk phrases: WM2 3rd Edition 2013
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: Flam. Liq. 3 H226 , Asp. Tox. 1 H304 , STOT RE 2 H373 , Muta. 1B H340 , Carc. 1B H350 , Repr. 2 H361d , Aquatic Chronic 2 H411

- **ethylbenzene** (EC Number: 202-849-4, CAS Number: 100-41-4)

CLP index number: 601-023-00-4
Description/Comments:
Data source: Commission Regulation (EU) No 605/2014 – 6th Adaptation to Technical Progress for Regulation (EC) No 1272/2008. (ATP6)
Additional Hazard Statement(s): Carc. 2 H351
Reason for additional Hazards Statement(s):
03 Jun 2015 - Carc. 2 H351 hazard statement sourced from: IARC Group 2B (77) 2000

- **pH** (CAS Number: PH)

Description/Comments: Appendix C4
Data source: WM3 1st Edition 2015
Data source date: 25 May 2015
Hazard Statements: None.

- **acenaphthylene** (EC Number: 205-917-1, CAS Number: 208-96-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Acute Tox. 4 H302 , Acute Tox. 1 H330 , Acute Tox. 1 H310 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Skin Irrit. 2 H315

- **acenaphthene** (EC Number: 201-469-6, CAS Number: 83-32-9)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2 H319 , STOT SE 3 H335 , Skin Irrit. 2 H315 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410 , Aquatic Chronic 2 H411

- **fluorene** (EC Number: 201-695-5, CAS Number: 86-73-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

- **phenanthrene** (EC Number: 201-581-5, CAS Number: 85-01-8)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Acute Tox. 4 H302 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Carc. 2 H351 , Skin Sens. 1 H317 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410 , Skin Irrit. 2 H315

- **anthracene** (EC Number: 204-371-1, CAS Number: 120-12-7)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 17 Jul 2015
Hazard Statements: Eye Irrit. 2 H319 , STOT SE 3 H335 , Skin Irrit. 2 H315 , Skin Sens. 1 H317 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

- **fluoranthene** (EC Number: 205-912-4, CAS Number: 206-44-0)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Acute Tox. 4 H302 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

- **pyrene** (EC Number: 204-927-3, CAS Number: 129-00-0)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 2014
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 21 Aug 2015
Hazard Statements: Skin Irrit. 2 H315 , Eye Irrit. 2 H319 , STOT SE 3 H335 , Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

- **indeno[123-cd]pyrene** (EC Number: 205-893-2, CAS Number: 193-39-5)

Description/Comments: Data from C&L Inventory Database
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 06 Aug 2015
Hazard Statements: Carc. 2 H351

- **benzo[ghi]perylene** (EC Number: 205-883-8, CAS Number: 191-24-2)

Description/Comments: Data from C&L Inventory Database; SDS Sigma Aldrich 28/02/2015
Data source: http://echa.europa.eu/web/guest/information-on-chemicals/cl-inventory-database
Data source date: 23 Jul 2015
Hazard Statements: Aquatic Acute 1 H400 , Aquatic Chronic 1 H410

- **polychlorobiphenyls; PCB** (EC Number: 215-648-1, CAS Number: 1336-36-3)

CLP index number: 602-039-00-4
Description/Comments: Worst Case: IARC considers PCB Group 1; Carcinogenic to humans; POP specific threshold from ATP1 (Regulation 756/2010/EU) to POPs Regulation (Regulation 850/2004/EC). Where applicable, the calculation method laid down in European standards EN 12766-1 and EN 12766-2 shall be applied.
Data source: Regulation 1272/2008/EC - Classification, labelling and packaging of substances and mixtures. (CLP)
Additional Hazard Statement(s): Carc. 1A H350
Reason for additional Hazards Statement(s):
29 Sep 2015 - Carc. 1A H350 hazard statement sourced from: IARC Group 1 (23, Sup 7, 100C) 2012

- **barium oxide** (EC Number: 215-127-9, CAS Number: 1304-28-5)

Conversion factor: 1.117
Description/Comments: Data from ECHA's C&L Inventory Database, Sigma Aldrich SDS dated 6/2/20
Data source: https://echa.europa.eu/information-on-chemicals/cl-inventory-database/-/discli/details/88825
Data source date: 02 Apr 2020
Hazard Statements: Acute Tox. 1 H332 , Eye Dam. 1 H318 , Skin Corr. 1B H314 , Acute Tox. 3 H301

- **coronene** (EC Number: 205-881-7, CAS Number: 191-07-1)

Description/Comments: Data from C&L Inventory Database; no entries in Registered Substances or Pesticides Properties databases; SDS: Sigma Aldrich, 1907/2006 compliant, dated 2012 - no entries; IARC – Group 3, not carcinogenic.
Data source:
http://clp-inventory.echa.europa.eu/SummaryOfClassAndLabelling.aspx?SubstanceID=17010&HarmOnly=no?fc=true&lang=en
Data source date: 16 Jun 2014
Hazard Statements: STOT SE 2 H371

Appendix B: Rationale for selection of metal species

antimony {antimony trioxide}

Worst case CLP species based on hazard statements/molecular weight and low solubility. Industrial sources include: flame retardants in electrical apparatus, textiles and coatings (edit as required)

arsenic {arsenic pentoxide}

worst case

cadmium {cadmium oxide}

Reasonable case CLP species based on hazard statements/molecular weight, very low solubility in water. Industrial sources include: electroplating baths, electrodes for storage batteries, catalysts, ceramic glazes, phosphors, pigments and nematocides. (edit as required) Worst case compounds in CLP: cadmium sulphate, chloride, fluoride & iodide not expected as either very soluble and/or compound's industrial usage not related to site history (edit as required)

chromium in chromium(III) compounds {chromium(III) oxide}

Reasonable case species based on hazard statements/molecular weight. Industrial sources include: tanning, pigment in paint, inks and glass (edit as required)

chromium in chromium(VI) compounds {chromium(VI) oxide}

Worst case CLP species based on hazard statements/molecular weight. Industrial sources include: production stainless steel, electroplating, wood preservation, anti-corrosion agents or coatings, pigments (edit as required)

copper {dicopper oxide; copper (I) oxide}

Reasonable case CLP species based on hazard statements/molecular weight and insolubility in water. Industrial sources include: oxidised copper metal, brake pads, pigments, antifouling paints, fungicide. (edit as required) Worse case copper sulphate is very soluble and likely to have been leached away if ever present and/or not enough soluble sulphate detected. (edit as required)

lead {lead compounds with the exception of those specified elsewhere in this Annex}

Cr VI not detected

mercury {mercury dichloride}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

molybdenum {molybdenum(VI) oxide}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

nickel {nickel chromate}

Worst case CLP species based on hazard statements/molecular weight (edit as required)

selenium {selenium compounds with the exception of cadmium sulphoselenide and those specified elsewhere in this Annex}

Harmonised group entry used as most reasonable case. Pigment cadmium sulphoselenide not likely to be present in this soil. No evidence for the other CLP entries: sodium selenite, nickel II selenite and nickel selenide, to be present in this soil. (edit as required)

zinc {zinc oxide}

Cr Vi not detected

barium {barium oxide}

Cr VI not detected

Appendix C: Version

HazWasteOnline Classification Engine: WM3 1st Edition v1.1, May 2018
HazWasteOnline Classification Engine Version: 2020.270.4480.8732 (26 Sep 2020)
HazWasteOnline Database: 2020.270.4480.8732 (26 Sep 2020)

This classification utilises the following guidance and legislation:
WM3 v1.1 - Waste Classification - 1st Edition v1.1 - May 2018
CLP Regulation - Regulation 1272/2008/EC of 16 December 2008
1st ATP - Regulation 790/2009/EC of 10 August 2009
2nd ATP - Regulation 286/2011/EC of 10 March 2011
3rd ATP - Regulation 618/2012/EU of 10 July 2012
4th ATP - Regulation 487/2013/EU of 8 May 2013
Correction to 1st ATP - Regulation 758/2013/EU of 7 August 2013
5th ATP - Regulation 944/2013/EU of 2 October 2013
6th ATP - Regulation 605/2014/EU of 5 June 2014
WFD Annex III replacement - Regulation 1357/2014/EU of 18 December 2014
Revised List of Wastes 2014 - Decision 2014/955/EU of 18 December 2014
7th ATP - Regulation 2015/1221/EU of 24 July 2015
8th ATP - Regulation (EU) 2016/918 of 19 May 2016
9th ATP - Regulation (EU) 2016/1179 of 19 July 2016
10th ATP - Regulation (EU) 2017/776 of 4 May 2017
HP14 amendment - Regulation (EU) 2017/997 of 8 June 2017
13th ATP - Regulation (EU) 2018/1480 of 4 October 2018
14th ATP - Regulation (EU) 2020/217 of 4 October 2019
15th ATP - Regulation (EU) 2020/1182 of 19 May 2020
POPs Regulation 2004 - Regulation 850/2004/EC of 29 April 2004
1st ATP to POPs Regulation - Regulation 756/2010/EU of 24 August 2010
2nd ATP to POPs Regulation - Regulation 757/2010/EU of 24 August 2010

APPENDIX 11 – WAC Summary Data

Waste Categorisation Summary Table

Avoca River Park, December 2019

Sample ID	**TP02**	**TP03**	**TP05**	**TP06**	**TP08**	**TP08**	**TP09**	**TP09**					
Sample Depth (m)	**0.50**	**0.50**	**1.20**	**1.50**	**1.50**	**2.50**	**0.50**	**1.50**					
Material Description	**Made Ground**	**Made Ground**	**Clay**	**Silt**	**Made Ground**	**Silt**	**Made Ground**	**Clay**					
Sample Date	**05/12/2019**	**04/12/2019**	**04/12/2019**	**06/12/2019**	**05/12/2019**	**05/12/2019**	**05/12/2019**	**05/12/2019**					
LoW Code	**17 05 04**	**17 05 04**	**17 05 04**	**17 05 04**	**17 05 03**	**17 05 04**	**17 05 04**	**17 05 03**	**Inert Criteria**	**IMS* Criteria**	**Hazardous Criteria**	**LOD LOR**	**Units**
Waste Category	**Category C**	**Category B1**	**Category A**	**Category A**	**Category D**	**Category C**	**Category B2**	**Category D**					
Metals													
Antimony	1	2	2	2	104	2	15	3	-	-	HazWaste	<1	mg/kg
Arsenic	4.5	19.6	54.5	58.0	1658.0	61.5	414.2	78.4	-	-	HazWaste	<0.5	mg/kg
Barium	114	42	50	55	50	67	32	80	-	-	HazWaste	<1	mg/kg
Cadmium	1.0	<0.1	<0.1	4.8	11.3	0.9	2.7	<0.1	-	-	HazWaste	<0.1	mg/kg
Chromium	86.1	41.0	46.8	35.8	<0.5	34.8	16.2	44.3	-	-	HazWaste	<0.5	mg/kg
Copper	47	49	34	1508	4010	236	762	172	-	-	HazWaste	<1	mg/kg
Lead	41	24	51	74	1617	45	532	113	-	-	HazWaste	<5	mg/kg
Mercury	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	HazWaste	<0.1	mg/kg
Molybdenum	3.0	0.1	0.9	1.0	83.9	0.4	15.5	0.5	-	-	HazWaste	<0.1	mg/kg
Nickel	2.0	41.3	21.9	21.8	<0.7	17.5	16.9	32.3	-	-	HazWaste	<0.7	mg/kg
Selenium	2	1	3	3	<1	5	2	3	-	-	HazWaste	<1	mg/kg
Zinc	6	125	114	1141	4572	892	927	4693	-	-	HazWaste	<5	mg/kg
Hexavalent Chromium	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	-	-	HazWaste	<0.3	mg/kg
pH (solid sample)	4.64	8.16	7.08	7.03	6.74	5.82	6.21	7.12	-	-	HazWaste	<0.01	pH units
alkali reserve	-	-	-	-	-	-	-	-	-	-	-	<0.000	gNaOH/100g
Asbestos													
Asbestos Fibres	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD	-	-	0.1	<0.001	%
ACM Detected	-	-	-	-	-	-	-	-	-	-	-	Presence	Presence
PAHs													
Naphthalene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	HazWaste	<0.04	mg/kg
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	-	-	HazWaste	<0.03	mg/kg
Acenaphthene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	HazWaste	<0.05	mg/kg
Fluorene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	HazWaste	<0.04	mg/kg
Phenanthrene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	-	-	HazWaste	<0.03	mg/kg
Anthracene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	HazWaste	<0.04	mg/kg
Fluoranthene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	-	-	HazWaste	<0.03	mg/kg
Pyrene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	-	-	HazWaste	<0.03	mg/kg
Benzo(a)anthracene	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	-	-	HazWaste	<0.06	mg/kg
Chrysene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-	-	HazWaste	<0.02	mg/kg
Benzo(bk)fluoranthene	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	-	-	HazWaste	<0.07	mg/kg
Benzo(a)pyrene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	HazWaste	<0.04	mg/kg
Indeno(123cd)pyrene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	HazWaste	<0.04	mg/kg
Dibenzo(ah)anthracene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	HazWaste	<0.04	mg/kg
Benzo(ghi)perylene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	HazWaste	<0.04	mg/kg
Coronene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	HazWaste	<0.04	mg/kg
PAH 6 Total	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	-	-	-	<0.22	mg/kg
PAH 17 Total	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	100	100	-	<0.64	mg/kg
Benzo(b)fluoranthene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	HazWaste	<0.05	mg/kg
Benzo(k)fluoranthene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-	-	HazWaste	<0.02	mg/kg
Benzo(j)fluoranthene	<1	<1	<1	<1	<1	<1	<1	<1	-	-	HazWaste	<1	mg/kg
Hydrocarbons													
TPH (C5-40)	65	63	<26	<26	<26	<26	<26	<26	-	-	HazWaste	<52	mg/kg
MTBE	<5	<5	<5	<5	<5	<5	<5	<5	-	-	HazWaste	<5	ug/kg
Benzene	<5	<5	<5	<5	<5	<5	<5	<5	-	-	HazWaste	<5	ug/kg
Toluene	<5	<5	<5	<5	<5	<5	<5	<5	-	-	HazWaste	<5	ug/kg
Ethylbenzene	<5	<5	<5	<5	<5	<5	<5	<5	-	-	HazWaste	<5	ug/kg
m/p-Xylene	<5	<5	<5	<5	<5	<5	<5	<5	-	-	HazWaste	<5	ug/kg
o-Xylene	<5	<5	<5	<5	<5	<5	<5	<5	-	-	HazWaste	<5	ug/kg
Total 7 PCBs	<35	<35	<35	<35	<35	<35	<35	<35	1,000	1,000	HazWaste	<35	ug/kg
WAC Solid Sample Summary**													
Total Organic Carbon *	0.40	0.33	0.61	1.38	0.38	0.28	0.24	2.47	3	6	-	<0.02	%
Sum of BTEX	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	6	6	-	<0.025	mg/kg
Sum of 7 PCBs	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	1	1	-	<0.035	mg/kg
Mineral Oil	136	<30	<30	<30	<30	<30	<30	<30	500	500	-	<30	mg/kg
PAH Sum of 6	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	-	-	-	<0.22	mg/kg
PAH Sum of 17	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	100	100	-	<0.64	mg/kg
WAC Leachate Data**													
Arsenic	1.129	<0.025	0.165	0.165	0.995	<0.025	0.580	0.773	0.5	1.5	-	<0.025	mg/kg
Barium	0.18	<0.03	0.07	0.07	0.10	0.16	<0.03	0.06	20	20	-	<0.03	mg/kg
Cadmium	0.039	<0.005	<0.005	0.007	0.020	<0.005	<0.005	<0.005	0.04	0.04	-	<0.005	mg/kg
Chromium	0.059	<0.015	<0.015	<0.015	<0.015	0.100	<0.015	<0.015	0.5	0.5	-	<0.015	mg/kg
Copper	0.09	<0.07	<0.07	0.43	0.60	<0.07	<0.07	0.14	2	2	-	<0.07	mg/kg
Mercury	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.01	0.01	-	<0.0001	mg/kg
Molybdenum	0.04	0.06	<0.02	<0.02	0.43	<0.02	0.84	0.07	0.5	1.5	-	<0.02	mg/kg
Nickel	0.09	<0.02	<0.02	<0.02	<0.02	0.05	<0.02	0.04	0.4	0.4	-	<0.02	mg/kg
Lead	0.13	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.14	0.5	0.5	-	<0.05	mg/kg
Antimony	0.07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.05	0.06	0.18	-	<0.02	mg/kg
Selenium	<0.03	<0.03	<0.03	<0.03	<0.03	0.28	<0.03	<0.03	0.1	0.3	-	<0.03	mg/kg
Zinc	0.70	0.04	0.07	0.44	5.04	4.65	0.18	4.20	4	4	-	<0.03	mg/kg
Total Dissolved Solids	23,559	480	1040	650	1190	3311	1680	990	4000	12,000	-	<350	mg/kg
Dissolved Organic Carbon	60	<20	110	160	50	<20	30	250	500	500	-	<20	mg/kg
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1	1	-	<0.1	mg/kg
Sulphate as SO4	13,331	19	136	<5	724	1,885	743	<5	1000	3,000	-	<0.5	mg/kg
Chloride	<3	<3	6	<3	16	18	6	79	800	2,400	-	<3	mg/kg

NAD- no asbestos detected

* - Integrated Materials Solutions Landfill, Hollywood Great, Nag's Head, The Naul, Co. Dublin

** - limits as specified in Council Decision 2003/33/EC

Waste Categorisation Summary Table

Avoca River Park, December 2019

GROUND INVESTIGATIONS IRELAND
Geotechnical & Environmental

Sample ID	**TP11**	**TP11**	**TP13**	**TP13**	**TP16**	**TP17**	**TP19**	**TP19**					
Sample Depth (m)	**0.50**	**1.50**	**0.50**	**1.50**	**0.50**	**1.50**	**0.50**	**1.50**					
Material Description	**Made Ground**	**Made Ground**	**Made Ground**	**Made Ground**	**Made Ground**	**Clay**	**Made Ground**	**Made Ground**					
Sample Date	**05/12/2019**	**05/12/2019**	**11/12/2019**	**11/12/2019**	**09/12/2019**	**12/12/2019**	**11/12/2019**	**11/12/2019**					
LoW Code	**17 05 04**	**17 05 04**	**17 05 04**	**17 05 03**	**17 05 04**	**17 05 04**	**17 05 04**	**17 05 03**	**Inert Criteria**	**IMS* Criteria**	**Hazardous Criteria**	**LOD LOR**	**Units**
Waste Category	**Category B1**	**Category B1**	**Category B1**	**Category D**	**Category B1**	**Category C**	**Category B1**	**Category D**					
Metals													
Antimony	1	3	2	102	3	2	2	2	-	-	HazWaste	<1	mg/kg
Arsenic	2.6	31.6	25.2	1,603.0	7.6	55.2	18.6	28.3	-	-	HazWaste	<0.5	mg/kg
Barium	24	49	27	20	23	178	60	52	-	-	HazWaste	<1	mg/kg
Cadmium	<0.1	0.4	0.1	4.6	0.2	0.4	<0.1	0.2	-	-	HazWaste	<0.1	mg/kg
Chromium	17.5	50.6	31.5	<0.5	205.3	39.3	36.9	48.3	-	-	HazWaste	<0.5	mg/kg
Copper	18	65	42	6,327	56	98	37	93	-	-	HazWaste	<1	mg/kg
Lead	39	63	19	1,633	40	100	17	145	-	-	HazWaste	<5	mg/kg
Mercury	<0.1	<0.1	<0.1	0.8	<0.1	<0.1	<0.1	<0.1	-	-	HazWaste	<0.1	mg/kg
Molybdenum	0.5	0.8	0.4	110.8	1.4	0.9	1.2	1.8	-	-	HazWaste	<0.1	mg/kg
Nickel	10.0	32.8	29.3	<0.7	20.4	23.4	25.0	29.0	-	-	HazWaste	<0.7	mg/kg
Selenium	<1	2	1	<1	1	2	1	2	-	-	HazWaste	<1	mg/kg
Zinc	109	191	217	1,830	258	428	134	162	-	-	HazWaste	<5	mg/kg
Hexavalent Chromium	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	-	-	HazWaste	<0.3	mg/kg
pH (solid sample)	8.56	7.17	7.19	4.55	8.33	7.56	8.33	8.04	-	-	HazWaste	<0.01	pH units
alkali reserve	-	-							-	-	-	<0.000	gNaOH/100g
Asbestos													
Asbestos Fibres	NAD	NAD	NAD	NAD	NAD	NAD	NAD	NAD	-	-	0.1	<0.001	%
ACM Detected	-	-	-	-	-	-	-	-	-	-	-	Presence	Presence
PAHs													
Naphthalene	<0.04	<0.04	<0.04	<0.04	<0.04	0.18	<0.04	0.84	-	-	HazWaste	<0.04	mg/kg
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.08	-	-	HazWaste	<0.03	mg/kg
Acenaphthene	<0.05	0.14	<0.05	<0.05	<0.05	<0.05	<0.05	0.09	-	-	HazWaste	<0.05	mg/kg
Fluorene	<0.04	0.08	<0.04	<0.04	<0.04	<0.04	<0.04	0.32	-	-	HazWaste	<0.04	mg/kg
Phenanthrene	<0.03	0.15	<0.03	<0.03	<0.03	<0.03	<0.03	1.50	-	-	HazWaste	<0.03	mg/kg
Anthracene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.11	-	-	HazWaste	<0.04	mg/kg
Fluoranthene	<0.03	0.06	<0.03	<0.03	<0.03	<0.03	<0.03	0.09	-	-	HazWaste	<0.03	mg/kg
Pyrene	<0.03	0.06	<0.03	<0.03	<0.03	<0.03	<0.03	0.81	-	-	HazWaste	<0.03	mg/kg
Benzo(a)anthracene	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	0.18	-	-	HazWaste	<0.06	mg/kg
Chrysene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.88	-	-	HazWaste	<0.02	mg/kg
Benzo(bk)fluoranthene	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	0.15	-	-	HazWaste	<0.07	mg/kg
Benzo(a)pyrene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	0.23	-	-	HazWaste	<0.04	mg/kg
Indeno(123cd)pyrene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.40	-	-	HazWaste	<0.04	mg/kg
Dibenzo(ah)anthracene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	HazWaste	<0.04	mg/kg
Benzo(ghi)perylene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	HazWaste	<0.04	mg/kg
Coronene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	HazWaste	<0.04	mg/kg
PAH 6 Total	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	0.47	-	-	-	<0.22	mg/kg
PAH 17 Total	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	5.28	100	100	-	<0.64	mg/kg
Benzo(b)fluoranthene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.11	-	-	HazWaste	<0.05	mg/kg
Benzo(k)fluoranthene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.04	-	-	HazWaste	<0.02	mg/kg
Benzo(j)fluoranthene	<1	<1	<1	<1	<1	<1	<1	<1	-	-	HazWaste	<1	mg/kg
Hydrocarbons													
TPH (C5-40)	<26	409	<52	<52	127	<52	169	1,524	-	-	HazWaste	<52	mg/kg
MTBE	<5	<5	<5	<5	<5	<5	<5	<5	-	-	HazWaste	<5	ug/kg
Benzene	<5	<5	<5	<5	<5	<5	<5	<5	-	-	HazWaste	<5	ug/kg
Toluene	<5	<5	<5	<5	<5	<5	<5	<5	-	-	HazWaste	<5	ug/kg
Ethylbenzene	<5	<5	<5	<5	<5	<5	<5	<5	-	-	HazWaste	<5	ug/kg
m/p-Xylene	<5	<5	<5	<5	<5	<5	<5	26	-	-	HazWaste	<5	ug/kg
o-Xylene	<5	<5	<5	<5	<5	<5	<5	22	-	-	HazWaste	<5	ug/kg
Total 7 PCBs	<35	<35	**464**	<35	**93**	<35	**69**	**206**	1,000	1,000	HazWaste	<35	ug/kg
WAC Solid Sample Summary**													
Total Organic Carbon *	0.10	2.30	0.32	0.11	0.70	7.23	0.42	3.94	3	6	-	<0.02	%
Sum of BTEX	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.048	6	6	-	<0.025	mg/kg
Sum of 7 PCBs	<0.035	<0.035	0.464	<0.035	0.093	<0.035	0.069	0.206	1	1	-	<0.035	mg/kg
Mineral Oil	<30	249	31	<30	61	<30	82	576	500	500	-	<30	mg/kg
PAH Sum of 6	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	0.47	-	-	-	<0.22	mg/kg
PAH Sum of 17	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	5.28	100	100	-	<0.64	mg/kg
WAC Leachate Data**													
Arsenic	<0.025	<0.025	<0.025	0.265	<0.025	0.267	<0.025	0.203	0.5	1.5	-	<0.025	mg/kg
Barium	<0.03	<0.03	<0.03	<0.03	<0.03	0.23	<0.03	0.06	20	20	-	<0.03	mg/kg
Cadmium	<0.005	<0.005	<0.005	0.021	<0.005	<0.005	<0.005	<0.005	0.04	0.04	-	<0.005	mg/kg
Chromium	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	0.033	0.5	0.5	-	<0.015	mg/kg
Copper	<0.07	<0.07	<0.07	0.28	<0.07	<0.07	<0.07	<0.07	2	2	-	<0.07	mg/kg
Mercury	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.01	0.01	-	<0.0001	mg/kg
Molybdenum	0.03	<0.02	<0.02	0.13	0.06	0.15	0.03	0.26	0.5	1.5	-	<0.02	mg/kg
Nickel	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.4	0.4	-	<0.02	mg/kg
Lead	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.5	0.5	-	<0.05	mg/kg
Antimony	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	<0.02	0.06	0.06	0.18	-	<0.02	mg/kg
Selenium	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.1	0.3	-	<0.03	mg/kg
Zinc	0.04	0.06	0.18	3.81	0.04	0.04	0.05	0.07	4	4	-	<0.03	mg/kg
Total Dissolved Solids	620	880	1390	2820	<350	4,561	430	1330	4000	12,000	-	<350	mg/kg
Dissolved Organic Carbon	<20	40	30	<20	<20	170	<20	300	500	500	-	<20	mg/kg
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1	1	-	<0.1	mg/kg
Sulphate as SO4	104	405	425	1,216	<5	1,904	11	240	1000	3,000	-	<0.5	mg/kg
Chloride	12	6	<3	7	<3	21	<3	95	800	2,400	-	<3	mg/kg

NAD- no asbestos detected

* - Integrated Materials Solutions Landfill, Hollywood Great, Nag's Head, The Naul, Co. Dublin

** - limits as specified in Council Decision 2003/33/EC

Waste Categorisation Summary Table

Avoca River Park, December 2019

Sample ID	**TP20**	**TP20**	**TP21**	**TP21**	**TP22**	**TP24**	**TP24**	**TP25**					
Sample Depth (m)	**0.50**	**1.50**	**0.50**	**1.50**	**0.50**	**0.50**	**1.50**	**0.50**					
Material Description	**Made Ground**	**Silt**	**Made Ground**	**Clay**	**Made Ground**	**Made Ground**	**Peat**	**Made Ground**					
Sample Date	**09/12/2019**	**09/12/2019**	**09/12/2019**	**09/12/2019**	**09/12/2019**	**09/12/2019**	**09/12/2019**	**10/12/2019**					
LoW Code	**17 05 04**	**17 05 04**	**17 05 04**	**17 05 04**	**17 05 04**	**17 05 04**	**17 05 04**	**17 05 04**	**Inert Criteria**	**IMS* Criteria**	**Hazardous Criteria**	**LOD LOR**	**Units**
Waste Category	**Category C1**	**Category C1**	**Category B1**	**Cateogy A**	**Category B2**	**Category C1**	**Category C**	**Category B1**					
Metals													
Antimony	2	13	1	1	4	1	3	2	-	-	HazWaste	<1	mg/kg
Arsenic	18.1	18.7	14.6	48.8	30.4	20.9	55.8	8.3	-	-	HazWaste	<0.5	mg/kg
Barium	45	35	21	52	34	36	92	38	-	-	HazWaste	<1	mg/kg
Cadmium	0.7	0.4	0.1	<0.1	0.3	0.2	0.7	<0.1	-	-	HazWaste	<0.1	mg/kg
Chromium	90.6	1194.5	46.3	40.4	23.6	28.2	75.8	49.7	-	-	HazWaste	<0.5	mg/kg
Copper	129	124	86	28	99	75	118	44	-	-	HazWaste	<1	mg/kg
Lead	77	71	53	46	244	98	364	17	-	-	HazWaste	<5	mg/kg
Mercury	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	HazWaste	<0.1	mg/kg
Molybdenum	2.7	1.3	1.4	0.8	1.2	0.9	4.8	0.5	-	-	HazWaste	<0.1	mg/kg
Nickel	25.4	104.9	22.1	21.0	14.0	20.7	27.6	28.1	-	-	HazWaste	<0.7	mg/kg
Selenium	<1	<1	<1	5	1	<1	2	1	-	-	HazWaste	<1	mg/kg
Zinc	331	182	357	103	132	235	260	119	-	-	HazWaste	<5	mg/kg
Hexavalent Chromium	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	-	-	HazWaste	<0.3	mg/kg
pH (solid sample)	8.34	7.82	8.34	7.12	9.59	8.04	6.69	7.08	-	-	HazWaste	<0.01	pH units
alkali reserve									-	-	-	<0.000	gNaOH/100g
Asbestos													
Asbestos Fibres	<0.001	<0.001	NAD	NAD	NAD	<0.001	NAD	NAD	-	-	0.1	<0.001	%
ACM Detected	-	-	-	-	-	-	-	-	-	-	-	Presence	Presence
PAHs													
Naphthalene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	HazWaste	<0.04	mg/kg
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	-	-	HazWaste	<0.03	mg/kg
Acenaphthene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	HazWaste	<0.05	mg/kg
Fluorene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	HazWaste	<0.04	mg/kg
Phenanthrene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	-	-	HazWaste	<0.03	mg/kg
Anthracene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	HazWaste	<0.04	mg/kg
Fluoranthene	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	-	-	HazWaste	<0.03	mg/kg
Pyrene	0.05	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	-	-	HazWaste	<0.03	mg/kg
Benzo(a)anthracene	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	-	-	HazWaste	<0.06	mg/kg
Chrysene	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-	-	HazWaste	<0.02	mg/kg
Benzo(bk)fluoranthene	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	-	-	HazWaste	<0.07	mg/kg
Benzo(a)pyrene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	HazWaste	<0.04	mg/kg
Indeno(123cd)pyrene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	HazWaste	<0.04	mg/kg
Dibenzo(ah)anthracene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	HazWaste	<0.04	mg/kg
Benzo(ghi)perylene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	HazWaste	<0.04	mg/kg
Coronene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	HazWaste	<0.04	mg/kg
PAH 6 Total	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	-	-	-	<0.22	mg/kg
PAH 17 Total	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	100	100	-	<0.64	mg/kg
Benzo(b)fluoranthene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	HazWaste	<0.05	mg/kg
Benzo(k)fluoranthene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-	-	HazWaste	<0.02	mg/kg
Benzo(j)fluoranthene	<1	<1	<1	<1	<1	<1	<1	<1	-	-	HazWaste	<1	mg/kg
Hydrocarbons													
TPH (C5-40)	151	197	263	<52	143	149	70	<52	-	-	HazWaste	<52	mg/kg
MTBE	<5	<5	<5	<5	<5	<5	<5	<5	-	-	HazWaste	<5	ug/kg
Benzene	<5	<5	<5	<5	<5	<5	<5	<5	-	-	HazWaste	<5	ug/kg
Toluene	<5	<5	<5	<5	<5	<5	<5	18	-	-	HazWaste	<5	ug/kg
Ethylbenzene	<5	<5	<5	<5	<5	<5	<5	<5	-	-	HazWaste	<5	ug/kg
m/p-Xylene	<5	<5	<5	<5	<5	<5	<5	<5	-	-	HazWaste	<5	ug/kg
o-Xylene	<5	<5	<5	<5	<5	<5	<5	<5	-	-	HazWaste	<5	ug/kg
Total 7 PCBs	**3715**	<35	<35	<35	<35	<35	<35	<35	1,000	1,000	HazWaste	<35	ug/kg
WAC Solid Sample Summary**													
Total Organic Carbon *	NDP	NDP	0.22	0.40	1.65	NDP	3.43	0.14	3	6	-	<0.02	%
Sum of BTEX	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	6	6	-	<0.025	mg/kg
Sum of 7 PCBs	3.715	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	<0.035	1	1	-	<0.035	mg/kg
Mineral Oil	60	93	168	<30	90	67	<30	<30	500	500	-	<30	mg/kg
PAH Sum of 6	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	-	-	-	<0.22	mg/kg
PAH Sum of 17	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	100	100	-	<0.64	mg/kg
WAC Leachate Data**													
Arsenic	0.038	0.035	0.078	0.294	0.148	0.058	0.477	<0.025	0.5	1.5	-	<0.025	mg/kg
Barium	0.03	0.04	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	20	20	-	<0.03	mg/kg
Cadmium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006	<0.005	0.04	0.04	-	<0.005	mg/kg
Chromium	0.024	<0.015	<0.015	<0.015	0.043	<0.015	0.017	<0.015	0.5	0.5	-	<0.015	mg/kg
Copper	<0.07	<0.07	0.08	<0.07	1.04	<0.07	1.01	<0.07	2	2	-	<0.07	mg/kg
Mercury	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0002	<0.0001	0.01	0.01	-	<0.0001	mg/kg
Molybdenum	0.13	0.14	0.06	0.04	0.10	0.06	0.06	0.05	0.5	1.5	-	<0.02	mg/kg
Nickel	<0.02	0.03	<0.02	<0.02	0.05	<0.02	0.04	<0.02	0.4	0.4	-	<0.02	mg/kg
Lead	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.97	<0.05	0.5	0.5	-	<0.05	mg/kg
Antimony	<0.02	<0.02	<0.02	<0.02	0.09	<0.02	0.02	<0.02	0.06	0.18	-	<0.02	mg/kg
Selenium	<0.03	<0.03	<0.03	<0.03	0.07	<0.03	<0.03	<0.03	0.1	0.3	-	<0.03	mg/kg
Zinc	0.03	0.05	0.06	0.07	<0.03	<0.03	0.24	<0.03	4	4	-	<0.03	mg/kg
Total Dissolved Solids	770	1310	840	620	3570	<350	<350	420	4000	12,000	-	<350	mg/kg
Dissolved Organic Carbon	<20	50	60	150	270	<20	360	<20	500	500	-	<20	mg/kg
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1	1	-	<0.1	mg/kg
Sulphate as SO4	89	155	51	<5	217	37	<5	43	1000	3,000	-	<0.5	mg/kg
Chloride	<3	<3	24	23	48	<3	84	<3	800	2,400	-	<3	mg/kg

NAD- no asbestos detected

* - Integrated Materials Solutions Landfill, Hollywood Great, Nag's Head, The Naul, Co. Dublin

** - limits as specified in Council Decision 2003/33/EC

Waste Categorisation Summary Table

Avoca River Park, December 2019

Sample ID	TP26	TP27	TP28	TP28	TP29	TP29	Inert Criteria	IMS* Criteria	Hazardous Criteria	LOD LOR	Units
Sample Depth (m)	**0.50**	**0.50**	**0.50**	**1.50**	**0.50**	**1.50**					
Material Description	**Made Ground**	**Made Ground**	**Made Ground**	**Silt**	**Made Ground**	**Clay**					
Sample Date	**12/12/2019**	**10/12/2019**	**10/12/2019**	**10/12/2019**	**12/12/2019**	**12/12/2019**					
LoW Code	**17 05 04**	**17 05 04**	**17 05 04**	**17 05 04**	**17 05 04**	**17 05 03**					
Waste Category	**Category B1**	**Category B1**	**Category B1**	**Category B2**	**Category B1**	**Category D**					
Metals											
Antimony	2	3	3	1	1	6	-	-	HazWaste	<1	mg/kg
Arsenic	16.7	19.6	12.0	50.3	<0.5	24.1	-	-	HazWaste	<0.5	mg/kg
Barium	38	70	54	67	15	40	-	-	HazWaste	<1	mg/kg
Cadmium	<0.1	<0.1	<0.1	1.7	<0.1	0.6	-	-	HazWaste	<0.1	mg/kg
Chromium	38.4	46.2	38.1	37.4	41.4	530.3	-	-	HazWaste	<0.5	mg/kg
Copper	34	48	35	132	35	98	-	-	HazWaste	<1	mg/kg
Lead	19	42	20	210	10	67	-	-	HazWaste	<5	mg/kg
Mercury	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	-	-	HazWaste	<0.1	mg/kg
Molybdenum	<0.1	<0.1	<0.1	1.1	0.8	1.7	-	-	HazWaste	<0.1	mg/kg
Nickel	37.0	58.5	41.8	26.8	10.1	31.7	-	-	HazWaste	<0.7	mg/kg
Selenium	1	2	2	2	<1	1	-	-	HazWaste	<1	mg/kg
Zinc	122	149	133	263	169	134	-	-	HazWaste	<5	mg/kg
Hexavalent Chromium	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	-	-	HazWaste	<0.3	mg/kg
pH (solid sample)	7.17	7.12	6.28	7.40	8.43	7.44	-	-	HazWaste	<0.01	pH units
alkali reserve							-	-	-	<0.000	gNaOH/100g
Asbestos											
Asbestos Fibres	NAD	NAD	NAD	NAD	NAD	<0.001	-	-	0.1	<0.001	%
ACM Detected	-	-	-	-	-	-	-	-	-	Presence	Presence
PAHs											
Naphthalene	<0.04	<0.04	<0.04	<0.04	<0.04	0.12	-	-	HazWaste	<0.04	mg/kg
Acenaphthylene	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	-	-	HazWaste	<0.03	mg/kg
Acenaphthene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	HazWaste	<0.05	mg/kg
Fluorene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	HazWaste	<0.04	mg/kg
Phenanthrene	<0.03	<0.03	<0.03	<0.03	<0.03	0.13	-	-	HazWaste	<0.03	mg/kg
Anthracene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	HazWaste	<0.04	mg/kg
Fluoranthene	<0.03	<0.03	<0.03	<0.03	<0.03	0.09	-	-	HazWaste	<0.03	mg/kg
Pyrene	<0.03	<0.03	<0.03	<0.03	<0.03	0.14	-	-	HazWaste	<0.03	mg/kg
Benzo(a)anthracene	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	-	-	HazWaste	<0.06	mg/kg
Chrysene	<0.02	<0.02	<0.02	<0.02	<0.02	0.13	-	-	HazWaste	<0.02	mg/kg
Benzo(bk)fluoranthene	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	-	-	HazWaste	<0.07	mg/kg
Benzo(a)pyrene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	HazWaste	<0.04	mg/kg
Indeno(123cd)pyrene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	HazWaste	<0.04	mg/kg
Dibenzo(ah)anthracene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	HazWaste	<0.04	mg/kg
Benzo(ghi)perylene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	HazWaste	<0.04	mg/kg
Coronene	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	-	-	HazWaste	<0.04	mg/kg
PAH 6 Total	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	-	-	-	<0.22	mg/kg
PAH 17 Total	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	100	100	-	<0.64	mg/kg
Benzo(b)fluoranthene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	-	HazWaste	<0.05	mg/kg
Benzo(k)fluoranthene	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	-	-	HazWaste	<0.02	mg/kg
Benzo(j)fluoranthene	<1	<1	<1	<1	<1	<1	-	-	HazWaste	<1	mg/kg
Hydrocarbons											
TPH (C5-40)	55	<52	85	<52	176	1587	-	-	HazWaste	<52	mg/kg
MTBE	<5	<5	<5	<5	<5	<5	-	-	HazWaste	<5	ug/kg
Benzene	<5	<5	<5	<5	<5	<5	-	-	HazWaste	<5	ug/kg
Toluene	<5	<5	<5	<5	<5	<5	-	-	HazWaste	<5	ug/kg
Ethylbenzene	<5	<5	<5	<5	<5	108	-	-	HazWaste	<5	ug/kg
m/p-Xylene	<5	<5	<5	<5	<5	859	-	-	HazWaste	<5	ug/kg
o-Xylene	<5	<5	<5	<5	<5	148	-	-	HazWaste	<5	ug/kg
Total 7 PCBs	<35	<35	<35	<35	**360**	<175	1,000	1,000	HazWaste	<35	ug/kg
WAC Solid Sample Summary**											
Total Organic Carbon *	0.45	0.21	0.14	2.15	0.07	NDP	3	6	-	<0.02	%
Sum of BTEX	<0.025	<0.025	<0.025	<0.025	<0.025	1.115	6	6	-	<0.025	mg/kg
Sum of 7 PCBs	<0.035	<0.035	<0.035	<0.035	0.360	<0.175	1	1	-	<0.035	mg/kg
Mineral Oil	<30	<30	44	-	-	542	500	500	-	<30	mg/kg
PAH Sum of 6	<0.22	<0.22	<0.22	<0.22	<0.22	<0.22	-	-	-	<0.22	mg/kg
PAH Sum of 17	<0.64	<0.64	<0.64	<0.64	<0.64	<0.64	100	100	-	<0.64	mg/kg
WAC Leachate Data**											
Arsenic	<0.025	<0.025	0.028	0.882	0.073	0.115	0.5	1.5	-	<0.025	mg/kg
Barium	<0.03	<0.03	<0.03	0.12	<0.03	0.06	20	20	-	<0.03	mg/kg
Cadmium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.04	0.04	-	<0.005	mg/kg
Chromium	<0.015	<0.015	<0.015	0.051	<0.015	<0.015	0.5	0.5	-	<0.015	mg/kg
Copper	<0.07	<0.07	<0.07	0.27	<0.07	<0.07	2	2	-	<0.07	mg/kg
Mercury	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.01	0.01	-	<0.0001	mg/kg
Molybdenum	0.03	<0.02	<0.02	0.09	0.03	0.21	0.5	1.5	-	<0.02	mg/kg
Nickel	<0.02	<0.02	<0.02	0.07	<0.02	0.07	0.4	0.4	-	<0.02	mg/kg
Lead	<0.05	<0.05	<0.05	0.42	<0.05	<0.05	0.5	0.5	-	<0.05	mg/kg
Antimony	<0.02	<0.02	<0.02	0.04	<0.02	0.03	0.06	0.18	-	<0.02	mg/kg
Selenium	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	0.1	0.3	-	<0.03	mg/kg
Zinc	<0.03	0.03	0.04	0.22	0.03	0.04	4	4	-	<0.03	mg/kg
Total Dissolved Solids	670	<350	420	740	450	3728	4000	12,000	-	<350	mg/kg
Dissolved Organic Carbon	30	<20	<20	480	<20	140	500	500	-	<20	mg/kg
Phenol	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	1	1	-	<0.1	mg/kg
Sulphate as SO4	37	32	74	<5	8	2294	1000	3,000	-	<0.5	mg/kg
Chloride	4	<3	<3	101	<3	56	800	2,400	-	<3	mg/kg

NAD- no asbestos detected

* - Integrated Materials Solutions Landfill, Hollywood Great, Nag's Head, The Naul, Co. Dublin

** - limits as specified in Council Decision 2003/33/EC

APPENDIX 12 – Suitable 4 Waste Data

S4UL - Metals, (Commerical), Avoca River Park, December 2019

Sample ID	TP02	TP03	TP05	TP06	TP08	TP08	TP09	TP09	TP11	TP11	Max Level Detected	Units	Commercial
Sample Depth (m)	0.5	0.5	1.2	1.5	1.5	2.5	0.5	1.5	0.5	1.5			
Antimony	1	2	2	2	104	2	15	3	1	3	104	mg/kg	ne
Arsenic	4.5	19.6	54.5	58	1658	61.5	414.2	78.4	2.6	31.6	1658	mg/kg	640
Barium	114	42	50	55	50	67	32	80	24	49	114	mg/kg	ne
Cadmium	1	<0.1	<0.1	4.8	11.3	0.9	2.7	<0.1	<0.1	0.4	11.3	mg/kg	190
Chromium	86.1	41	46.8	35.8	<0.5	34.8	16.2	44.3	17.5	50.6	86.1	mg/kg	8,600
Copper	47	49	34	1508	4010	236	762	172	18	65	4010	mg/kg	68,000
Lead	41	24	51	74	1617	45	532	113	39	63	1617	mg/kg	ne
Mercury	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0	mg/kg	58
Molybdenum	3	0.1	0.9	1	83.9	0.4	15.5	0.5	0.5	0.8	83.9	mg/kg	ne
Nickel	2	41.3	21.9	21.8	<0.7	17.5	16.9	32.3	10	32.8	41.3	mg/kg	980
Selenium	2	1	3	3	<1	5	2	3	<1	2	5	mg/kg	12,000
Zinc	6	125	114	1141	4572	892	927	4693	109	191	4693	mg/kg	730,000
Hexavalent Chromium	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	0	mg/kg	33*

S4UL - Metals, (Commerical), Avoca River Park, December 2019

Sample ID	TP13	TP13	TP16	TP17	TP19	TP19	TP20	TP20	TP21	TP21	Max Level Detected	Units	Commercial
Sample Depth (m)	0.5	1.5	0.5	1.5	0.5	1.5	0.5	1.5	0.5	1.5			
Antimony	2	102	3	2	2	2	2	13	1	1	102	mg/kg	ne
Arsenic	25.2	1603	7.6	55.2	18.6	28.3	18.1	18.7	14.6	48.8	1603	mg/kg	640
Barium	27	20	23	178	60	52	45	35	21	52	178	mg/kg	ne
Cadmium	0.1	4.6	0.2	0.4	<0.1	0.2	0.7	0.4	0.1	<0.1	4.6	mg/kg	190
Chromium	31.5	<0.5	205.3	39.3	36.9	48.3	90.6	1194.5	46.3	40.4	1194.5	mg/kg	8,600
Copper	42	6327	56	98	37	93	129	124	86	28	6327	mg/kg	68,000
Lead	19	1633	40	100	17	93	77	71	53	46	1633	mg/kg	ne
Mercury	<0.1	0.8	<0.1	<0.1	<0.1	93	<0.1	<0.1	<0.1	<0.1	93	mg/kg	58
Molybdenum	0.4	110.8	1.4	0.9	1.2	93	2.7	1.3	1.4	0.8	110.8	mg/kg	ne
Nickel	29.3	<0.7	20.4	23.4	25	93	25.4	104.9	22.1	21	104.9	mg/kg	980
Selenium	1	<1	1	2	1	93	<1	<1	<1	5	93	mg/kg	12,000
Zinc	217	1830	258	428	134	93	331	182	357	103	1830	mg/kg	730,000
Hexavalent Chromium	<0.3	<0.3	<0.3	<0.3	<0.3	93	<0.3	<0.3	<0.3	<0.3	93	mg/kg	33*

S4UL - Metals, (Commerical), Avoca River Park, December 2019

Sample ID	TP22	TP24	TP24	TP25	TP26	TP27	TP28	TP28	TP29	TP29	Max Level Detected	Units	Commercial
Sample Depth (m)	**0.5**	**0.5**	**1.5**	**0.5**	**0.5**	**0.5**	**0.5**	**1.5**	**0.5**	**1.5**			
Antimony	4	1	3	2	2	3	3	1	1	6	6	mg/kg	ne
Arsenic	30.4	20.9	55.8	8.3	16.7	19.6	12	50.3	<0.5	24.1	55.8	mg/kg	640
Barium	34	36	92	38	38	70	54	67	15	40	92	mg/kg	ne
Cadmium	0.3	0.2	0.7	<0.1	<0.1	<0.1	<0.1	1.7	<0.1	0.6	1.7	mg/kg	190
Chromium	23.6	28.2	75.8	49.7	38.4	46.2	38.1	37.4	41.4	530.3	530.3	mg/kg	8,600
Copper	99	75	118	44	34	48	35	132	35	98	132	mg/kg	68,000
Lead	244	98	364	17	19	42	20	210	10	67	364	mg/kg	ne
Mercury	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0	mg/kg	58
Molybdenum	1.2	0.9	4.8	0.5	<0.1	<0.1	<0.1	1.1	0.8	1.7	4.8	mg/kg	ne
Nickel	14	20.7	27.6	28.1	37	58.5	41.8	26.8	10.1	31.7	58.5	mg/kg	980
Selenium	1	<1	2	1	1	2	2	2	<1	1	2	mg/kg	12,000
Zinc	132	235	260	119	122	149	133	263	169	134	263	mg/kg	730,000
Hexavalent Chromium	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	0	mg/kg	33*

APPENDIX 13 – Potential Material Outlets

Waste Category	Classification Criteria	Potential Outlets
Category A Unlined Soil Recovery Facilities	Soil and Stone only which are free from[23] anthropogenic materials such as concrete, brick timber. Soil must be free from "contamination" e.g. PAHs, Hydrocarbons.	Soil Recovery Facilities, Waste Facility Permitted Sites, COR Sites or potential by-product if deemed not to be a waste and complying with requirements under Article 27 of European Waste Directive Regulations (2011).[24]
Category B1 Inert Landfill	Reported concentrations within inert waste limits, which are set out by the adopted EU Council Decision 2003/33/EC establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 and Annex II of Directive 1999/31/EC (2002). Results also found to be non-hazardous using the HWOL application.	Integrated Materials Solutions Limited Partnership (IMS), Naul, County Dublin W0129-02 Walshestown Landfill Walshestown, Blackhall, Tipperkevin & Bawnoge, Naas, County Kildare W0254-01
Category B2 Inert Landfill	Reported concentrations greater than Category B1 criteria but less than IMS Hollywood Landfill acceptance criteria, as set out in their Waste Licence W0129-02. Results also found to be non-hazardous using the HWOL application*	Integrated Materials Solutions Limited Partnership (IMS), Naul, County Dublin W0129-02 Walshestown Landfill Walshestown, Blackhall, Tipperkevin & Bawnoge, Naas, County Kildare W0254-01[25]
Category C Non-Haz Landfill	Reported concentrations greater than Category B2 criteria but within non-haz landfill waste acceptance limits set out by the adopted EU Council Decision 2003/33/EC establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 and Annex II of Directive 1999/31/EC (2002). Results also found to be non-hazardous using the HWOL application.	Walshestown Landfill Walshestown, Blackhall, Tipperkevin & Bawnoge, Naas, County Kildare W0254-01[26] Ballynagran Landfill, Co. Wicklow. W165-02 Drehid Landfill, Co. Kildare. W0201-01 East Galway Landfill, Co. Galway. W0178-02 Knockharley Landfill, Co. Meath. W0146-02
Category C 1 Non-Haz Landfill	As Category C but containing < 0.001% w/w asbestos fibres.	RILTA Environmental LTD. W0192-03 Enva Portlaoise. W0184-02

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[23] Free from equates to less than 2%.

[24] S.I. No. 126/2011 - European Communities (Waste Directive) Regulations 2011 (Article 27).

[25] Licenced to accept Category B2 material for recovery.

[26] Licenced to accept Category C material for recovery.

Category C 2 Non-Haz Landfill	As Category C but containing >0.001% and <0.01% w/w asbestos fibres	RILTA Environmental LTD. W0192-03 Enva Portlaoise. W0184-02
Category C Non-Haz Landfill	As Category C but containing >0.01% and <0.1% w/w asbestos fibres.	RILTA Environmental LTD. W0192-03 Enva Portlaoise. W0184-02
Category D Hazardous Treatment	Results found to be hazardous using HWOL Application.	RILTA Environmental LTD. W0192-03 Enva Portlaoise. W0184-02
Category D 1 Hazardous Treatment	Results found to be hazardous due to the presence of asbestos (>0.1%).	RILTA Environmental LTD. W0192-03