ATTACHMENT-4-8-3 SOIL & WATER BASELINE REPORT

2019 IED LICENCE APPLICATION

Technical Report Prepared For

Crag Digital Ltd

Technical Report Prepared By

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Our Reference

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EXECUTIVE SUMMARY

This soil and groundwater quality baseline report has been completed as part of Crag Digital Ltd. IED licence application. The report has been prepared in compliance with *European Commission Guidance concerning baseline reports under Article 22(2) of Directive 2010/75/EU on industrial emissions.*

The only relevant bulk hazardous substances (substances stored or used onsite and which are classified as hazardous by the EPA under the Groundwater Regulations and contained in bulk storage) is diesel for back up generators and lube oil. The diesel store was of sufficient volume to be identified as a hazard present at the site which has the potential to impact soil and groundwater if not adequately mitigated during storage and operation at the plant.

A review of containment and mitigation measures at the facility confirms that the risk of a contamination event resulting in soil or ground water contamination is low. These measures include hard standing, adequate bunding, tank level alarms, double lined transfer lines, spill management procedures and oil interceptors on stormwater lines.

The site is within an urban area situated in Clondalkin Industrial Estate. A review of the site history confirmed that part of the site had previously been used as a cable storage depot with some associated office and warehouse units since the 1980s. The site is relatively flat with a slight fall towards the Grand Canal which passes along the southern edge of the development, this area of the site has not previously been developed.

Much of the site will be hard paved reducing the potential for vertical migration to ground during operation. In the unlikely event of a leakage outside of the storage bunds, the primary pathway would be through the stormwater drainage system which ultimately discharges through 3 no oil interceptors and an attenuation pond with a hydrobrake and shut off valve system. In the event of a fire, run-off would be to the site attenuation pond where water would be held until tested and removed off site if required. Receptors include the underlying aquifer, and Gallanstown stream located on the southern end of the site which discharges to the Camac river. A conceptual site model (CSM) has been presented for the site which includes assessment of site investigation data collected in 2013 and 2018. The data confirms that there is no evidence of extensive soil or groundwater contamination at the site due to previous use. The source pathway qualitative risk assessment concludes that the risk of an impact to soil or water is low.

CONTENTS

1.0 INTRODUCTION

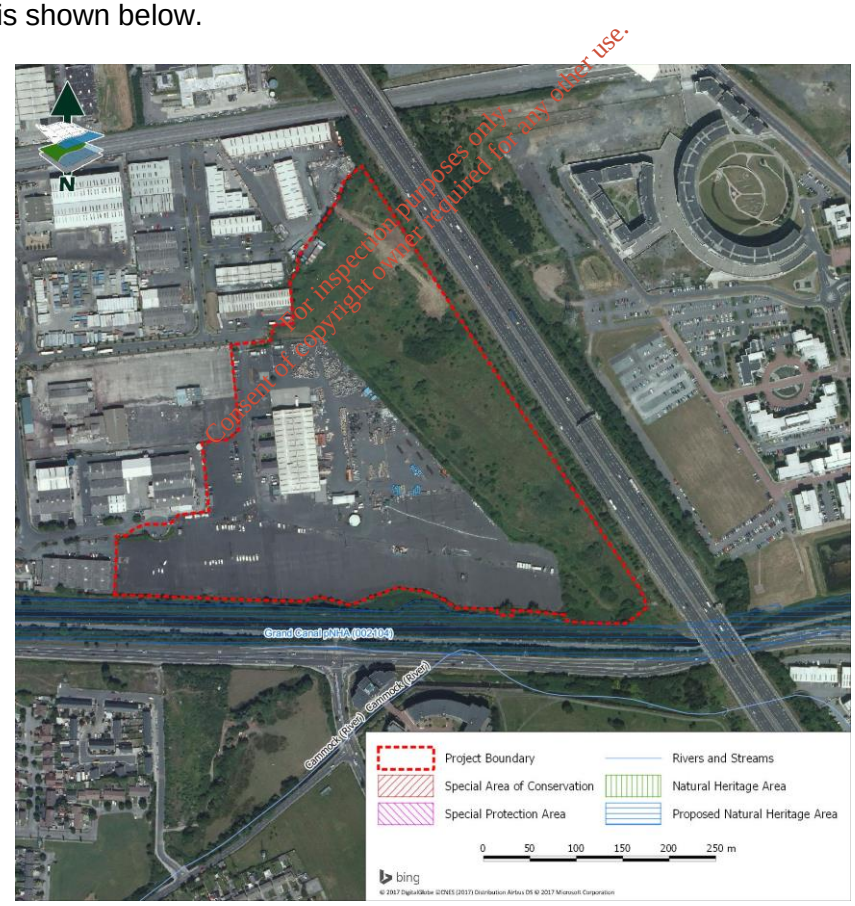
AWN Consulting Ltd. (AWN) was appointed by Crag Digital Ltd.to complete a screening assessment for a baseline report (and subsequent baseline report) for the planned data centre development in Clondalkin Industrial Estate. This report is to accompany an application to the Environmental Protection Agency (EPA) for an IE licence.

This report was completed in accordance with European Commission guidance concerning baseline reports under Article 22(2) of Directive 2010/75/EU on industrial emissions.

1.1 Description of Site

The project is located within the predominantly suburban environment of Clondalkin Industrial Estate. The site has previously been used as a cable storage depot with some associated office and warehouse units. The depot site, in use since the 1980s, is largely hard paved although just under 50% of the site. The eastern portion along the boundary with the M50 motorway, is greenfield and has never been developed.

The site location is presented in Drawing 001 of the licence application and the site setting is shown below.



Insert 1.1 *Site Layout prior to development in relation to River Cammock and adjacent conservation sites.*

1.2 Limitations of the Report

The conclusions presented in this report are professional opinions based solely on the tasks outlined herein and the information made available to AWN. They are intended for the purpose outlined herein and for the indicated site and project. Furthermore, this report is produced solely for the benefit of Crag Digital to address an EPA requirement for a licence application.

This report may not be relied upon by any other party without explicit agreement from AWN. Opinions and recommendations presented herein apply to the site conditions existing at the time of the recently completed field work and subsequent assessment. They cannot apply to changes at the site of which AWN is not aware and has not had the opportunity to evaluate. This report is intended for use in its entirety; no excerpt may be taken to be representative of this baseline assessment. All work carried out in preparing this report has utilised and is based on AWN professional knowledge and understanding of the current relevant Irish and European Community standards, codes, and legislation.

2.0 Methodology

2.1 Methodology Outlined

Table 5 of the Guidance (European Commission Guidance concerning baseline reports under Article 22(2) of Directive 2010/75/EU on industrial emissions), outlines the requirements for this report. These requirements form the methodology adopted for this report which is outlined below as Stages 1 to 8.

- Stage 1 Identifying the potential hazardous substances that are currently used, produced, or released at the site
- Stage 2 Identifying the relevant hazardous substances i.e. those which have the potential to cause soil and groundwater contamination
- Stage 3 Assessment of the site-specific pollution risk
- Stage 4 Site History
- Stage 5 Environmental Setting
- Stage 6 Conceptual Site Model
- Stage 7 Site Investigation – Soil & Water Quality Assessment
- Stage 8 Production of the Baseline Report

2.2 Sources of Information

Reference is made in this report to information from a number of existing data sources and reports including the following:

- Crag Digital, Environmental Impact Assessment Report AWN, 2018
- IGSL Site Investigation Reports 2013 and 2018 Project no 20580 August 2018
- Geological Survey of Ireland (GSI): On-line mapping resources, available at www.gsi.ie including *inter alia* groundwater well database, Karst feature database, geology, aquifer classification and vulnerability;
- Geology Survey of Ireland (GSI) (2016) Summary of Initial Characterisation, Groundwater Body Descriptions available at www.gsi.ie;
- Environmental Protection Agency (EPA) Catchments data: available at https://www.catchments.ie/;

- Latest EPA *Envision* water quality monitoring data for watercourses in the area: On-line data resources available at http://gis.epa.ie/Envision/;
- National Parks & Wildlife Service (NPWS): On-line data resources available at http://webgis.npws.ie/npwsviewer/;
- National River Basin Management Plan, 2018
- The Planning System and Flood Risk Management, Guidelines for Planning Authorities (Department of the Environment, Heritage and Local Government (DoEHLG) and the Office of Public Works (OPW));

2.3 Scope of Work Undertaken

The scope of the work undertaken for this assessment included the following:

- A desktop review of regional and site geology and hydrogeology.
- Review of available soil and groundwater quality data.
- Review of bulk liquid storage at the site and assessment in terms of likely impact to receiving waters.
- Onsite soil quality investigation

3.0 STAGE 1 & 2 – IDENTIFYING SUBSTANCES OF CONCERN

This section summarises the hazardous substances that are proposed for storage, in at the planned facility. The only bulk liquids to be stored on site is diesel which is stored for emergency back-up operation of generators. The diesel store will comprise 9 no. bunded storage tanks for fuel oil (54 m^3 each) including double lined pipelines to data centre diesel fired standby generators.

Material	Volume stored	Nature of use	Hazard Statement
Diesel	495 m^3	Back up supply	H400 H411

Table 3.1: Materials hazardous to the environment stored on site

Our review shows that apart from the bulk liquid storage described above all other storage of chemicals (e.g. lube oil for generator maintenance) which could be hazardous to the environment are stored within drums or smaller containers within the energy centre.

Table 3.2 summarises the explanations of Hazard Risk Phrases identified for each chemical listed in table 3.1. In reference to the risk to the soil and water environment the Hazard Statements used to classify the environmental hazard rating.

Hazard Statements	Description
H411	Very toxic to aquatic life
H400	Toxic to aquatic life with long lasting effects

Table 3.2: *Hazardous Status Description*

A summary of the planned bulk storage at the proposed facility is outlined below.

Fuel Oil

Fuel oil will be stored in the north section (Licence Drawing 009) of the site in the dedicated delivery area. Each of the nine tanks has a capacity of 55m^3 and will be a double skinned construction with leak and overfill protection. The tanks will be located within a concrete bund. The tanks supply (by underground lines) the diesel generators at the data centre which will provide the necessary power to ensure the data halls operate optimally at all times and in the event of a failure of supply from the energy centre.

Smaller volumes of fuel oil are also used for the firewater pumps (c. 3 x 1.5m^3 tanks) and day tanks for each generator within the datacentre. These are double lined and located on hardstand.

4.0 STAGE 3 – ASSESSMENT OF SITE-SPECIFIC POLLUTION RISK

This section includes a review of the containment measures proposed for potential hazardous substances and potential conduits for migration at the site.

4.1 Containment Systems and Procedures

The following containment arrangements are planned to be in place at the site to prevent any accidental release of hydrocarbons:

- The bulk storage tanks are located within a suitably sized concrete bund.
- All run-off from the bund and delivery area is through an oil interceptor. Two other interceptors are located on the stormwater drainage system.
- In the event of a fire, run-off from the road and hardstand area drain direct to the attenuation pond which can be shut off until sampling is undertaken to determine whether water is suitable for discharge or requires appropriate disposal.

Drawing 004 of the application presents the site drainage.

4.3 Wastewater Drainage lines

Domestic sewage from toilets, changing and kitchen areas will discharge via the foul drainage system and will be pumped directly to the Irish Water sewer which ultimately discharges to Ringsend WWTP.

4.4 Summary of Stages 1 to 3

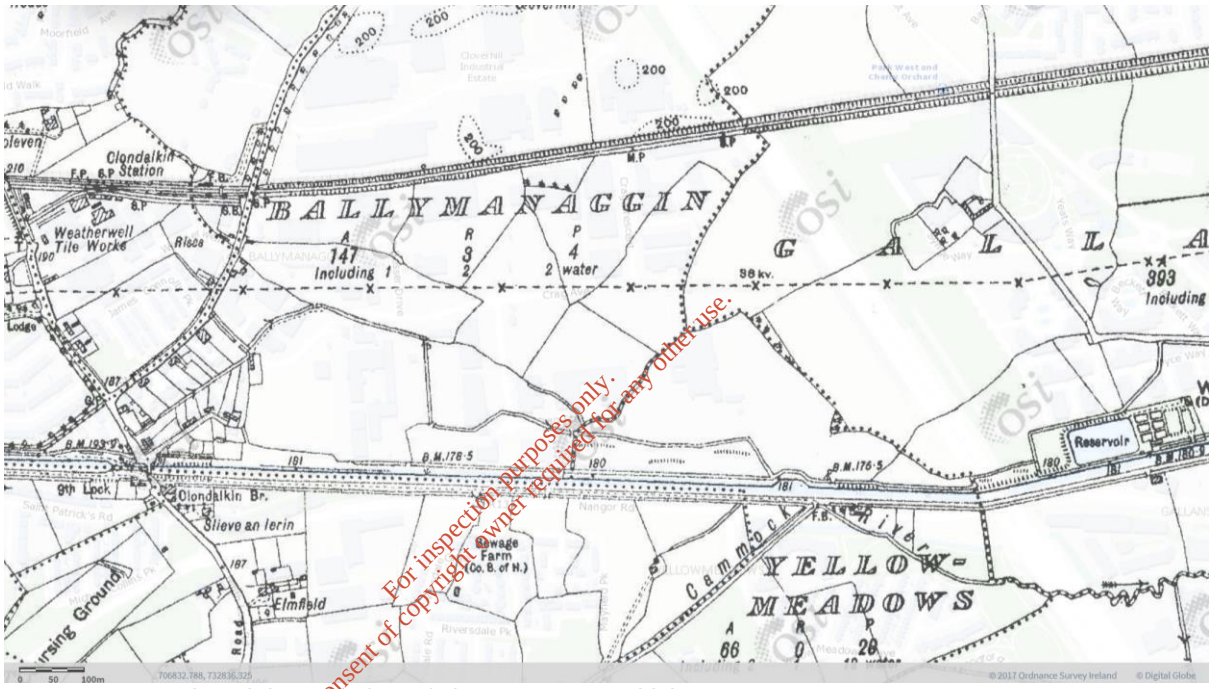
Stages 1 to 3 of the Baseline Assessment have concluded that the Crag Digital datacenter development will store nine bulk oil tanks which have potential to be hazardous to the environment. It is concluded that there are sufficient containment measures in place to ensure that the risk to the soil and water environments is minimised. A Stage 4 to 8 assessment has been completed below.

5.0 STAGE 4 – SITE HISTORY

5.1 Prior Use

This section includes an evaluation of the likelihood of the presence of any contamination on soil/ groundwater at the site and an overview of the site history.

A significant proportion of the site had been previously used for a cable storage depot with some associated office and warehouse units. The depot site, in use since the 1980s, was largely hard paved (7.51ha), while the eastern portion (5.98 ha) along the boundary with the M50 motorway, was greenfield and has never been developed.



Insert 1.2 *OSi Aerial Image (1837) (source www.osi.ie)*

No change in land use is noted in follow on 1880-1842 mapping.

Insert 1.3 *OSi Aerial Image (1837-1842) (source www.osi.ie)*

Insert 1.4 Aerial Map (2000)showing site development

6.0 STAGE 5 - ENVIRONMENTAL SETTING

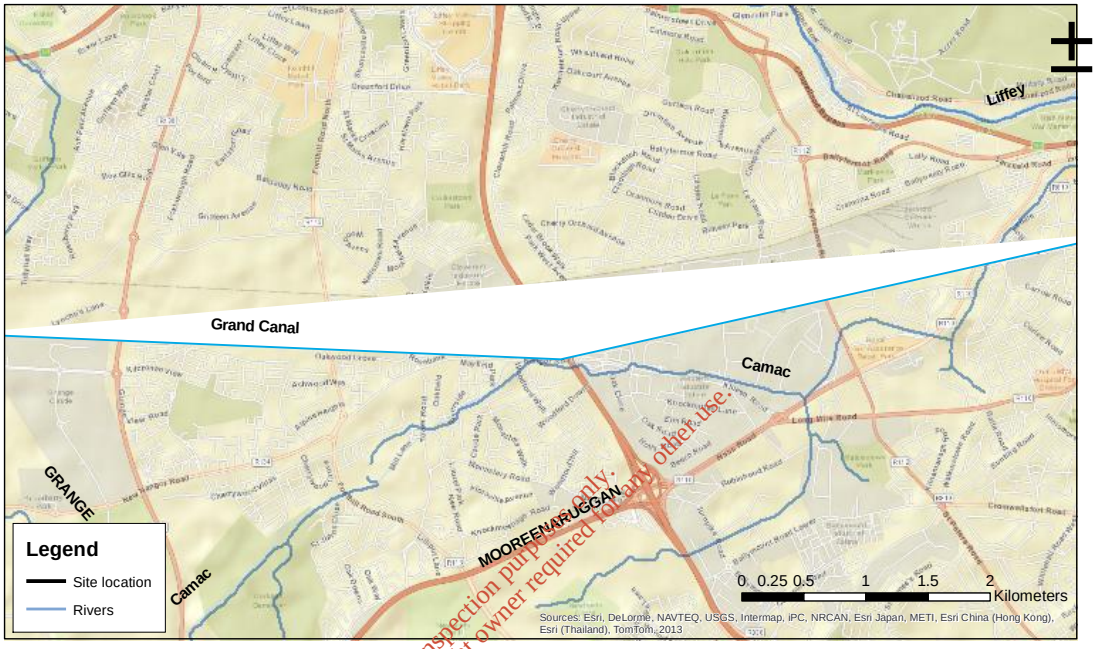
This section includes an assessment of the likely fate of any spill/leak event based on the topography, soil, and groundwater characteristics at the location. Based on the findings of Stages 1 to 4 above, the location where hazardous substances are stored has also been assessed with regard to confirming source-pathway-receptor linkages i.e. in the unlikely event of a leakage/spillage.

6.1 Topography

The site is relatively flat though there is a slight fall towards the Grand Canal which passes along the southern edge of the site.

6.2 Hydrology

The development is located within the Eastern River Basin District (ERBD) in Hydrometric Area No. 09 of the Irish River Network. It is within Camac (The Camac River) Water Management Unit (WMU) which is part of the River Liffey catchment.



Insert 1.5 *Hydrological Environment*

The Gallanstown stream runs along the southern boundary of the site and discharges to the Camac River. The greenfield section of the site is drained by an open ditch on its western extremity. This drain is overgrown and would appear to join the Gallanstown Stream in an area of overgrowth. On the Eastern boundary there is a toe drain at the base of the M50 embankment.

Insert 1.6*. – M50 Toe drainage*

Site Drainage Ditch

The Gallanstown stream enters a large box culvert to pass under the M50. It is noted that at this location the toe drain of the M50 also joins the Gallanstown Stream. The Gallanstown Stream discharges into the Camac River further downstream (eastwards).

***Insert 1.7**. – Gallanstown Stream M50 Culvert.*

The site is adjacent to the Grand Canal which is a man-made water body.

6.2.1 Surface Water Quality

The current status for the River Camac is classified as 'Bad' and is 'at risk of not achieving Good status. Due to its industrial hinterland, the River Camac it is not expected that it will achieve Good Status until at least 2021.

Q Values are used to express the biological water quality by the EPA, based on changes in the macro invertebrate communities of riffle areas brought about by organic pollution. Q1 indicates a seriously polluted water body, Q5 indicates unpolluted water of high quality.

Q Values for the River Camac and its tributaries (for which data are available) are shown in Table 7.3 and the descriptions of each of the Q Ratings are shown in Table 7.4.

RIVER	Station No.	Location	Biological Quality Ratings (Q Values)									
			1987/ 89	1991	1996	1998	2002	2005	2007	2010	2013	2016
Camac	RS09C 020500	Camac Close, Emmet Rd	1	2	1-2	1-2	1	2	2	3	3	3
	RS09C 02310	Riverside Estate Br	1990 3	3	2-3	2-3	3	3	3	3	3	3
	RS09C 020100	Br 1km SW(u/s) of Saggart	4	4	4	3	3-4	3	4-5-	4	4	4

***Table 6.1** EPA Biological Q Ratings for the Camac River*

The water quality at the nearest gauging station (RS09C02310) is classified as 3 (Poor) which was tested in 2016 This Station is located approx. 700m upstream of the site.

6.2.2 Flood Risk

The potential risk of flooding on the site was also assessed within the EIS prepared for planning. A summary of the findings of the flood risk assessment are:

Examination of recorded flood events as detailed on floodmaps.ie shows thirteen recorded flood events within 5km of the site. All events are recorded as occurring to the south of the Grand Canal. The most relevant of the flood events occurred on the 24th of October 2011 and is identified at the Yellow Meadows apartments located directly to the south of the site. This event resulted from overtopping of the Camac river and resulted in a flood level of 52.00m AOD due to debris within the river channel.

Based on the DRAFT PRFA maps, the proposed development resides within ***Flood Zone A*** and ***Flood Zone C***. The nature of the development is light industrial and as such this type of development is categorized as a ***'Less Vulnerable Development'*** and as such a justification test is required under a stage 2 assessment. This development is an ***'appropriate'*** development for the Flood Zone that the site resides in.

Therefore, it is concluded that the proposed development is located appropriately with regard to flooding and based on the use of SUDs within the project design will not cause an increased risk of flooding elsewhere.

6.3 Geology & Hydrogeology

6.3.1 Geology & Aquifer Classification

The bedrock geology underlying the site is classified as Calp formation which is described as dark grey to black limestone & shale of Lower Carboniferous age. The site investigation found the depth to bedrock was 8.3m below ground level (bgl) at its shallowest which fits with GSI well data for the area.

Aquifers are generally classified as rocks or other matrices that contain sufficient void spaces and which are permeable enough to allow water to flow through them in significant quantities.

The GSI (2018) classifies the principal aquifer types in Ireland as:

Bedrock Aquifer
- Lk - Locally Important Aquifer - Karstified
- Ll - Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones
- Lm - Locally Important Aquifer - Bedrock which is Generally Moderately Productive
- Pl - Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones
- Pu - Poor Aquifer - Bedrock which is Generally Unproductive
- Rkd - Regionally Important Aquifer (karstified diffuse)

Gravel Aquifer
- Lg - Locally Important Aquifer - Sand & Gravel
- Rg - Regionally Important Aquifer - Sand & Gravel

Reference to the GSI (2018) National Draft Bedrock Aquifer Map for the site states this is a Locally Important (LI) Aquifer which is moderately productive in local zones only.

There are no source protection areas relating to group water schemes or public water supplies within 2km of the site.

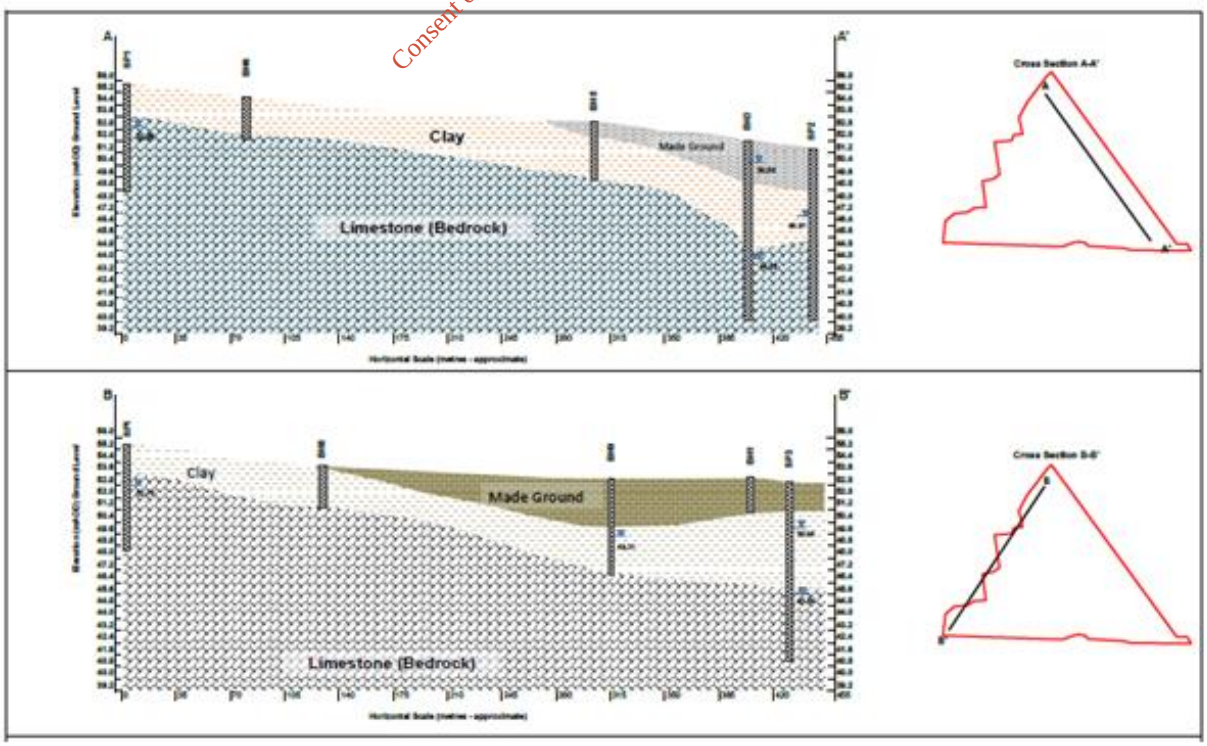
6.3.2 *Soil Type and Aquifer Vulnerability*

A subsoil map, produced by Teagasc, indicates that the majority of the site and surrounding area is underlain Made Ground with evidence of Limestone till Carboniferous (TLs) located along the northeast boundary of the site with the M50. Therefore, the MADE GROUND at the proposed development site is underlain with the GLACIAL TILLS derived from limestone.

A site investigation was carried out at the site by IGSL in 2013 and consisted of 9 no. trial pits (TP1 – TP9), 9 no. boreholes in overburden (BH1 – BH9) and 3 no. boreholes extended into bedrock (SP1 – SP3). The bedrock boreholes were fitted with standpipes to allow for groundwater sampling. Boreholes BH2, BH3 and BH7 were extended into bedrock, see borehole logs RC2, RC3 and RC7.

Made ground deposits were encountered across the site at most locations, with made ground encountered up to 3.5m below ground level. The made ground comprises brick, rubble, hardcore and sandy gravel. There was no visual or olfactory evidence of contamination at any of the locations.

The made ground is underlain by firm to stiff brown to grey gravelly Clay. Depth to bedrock varies from 8.3m below ground level (bgl) to 2m below ground level (bgl) at to the north of the site. The depth to bedrock increases towards the south east and south west.A cross section of the site geology has been undertaken and is presented below.



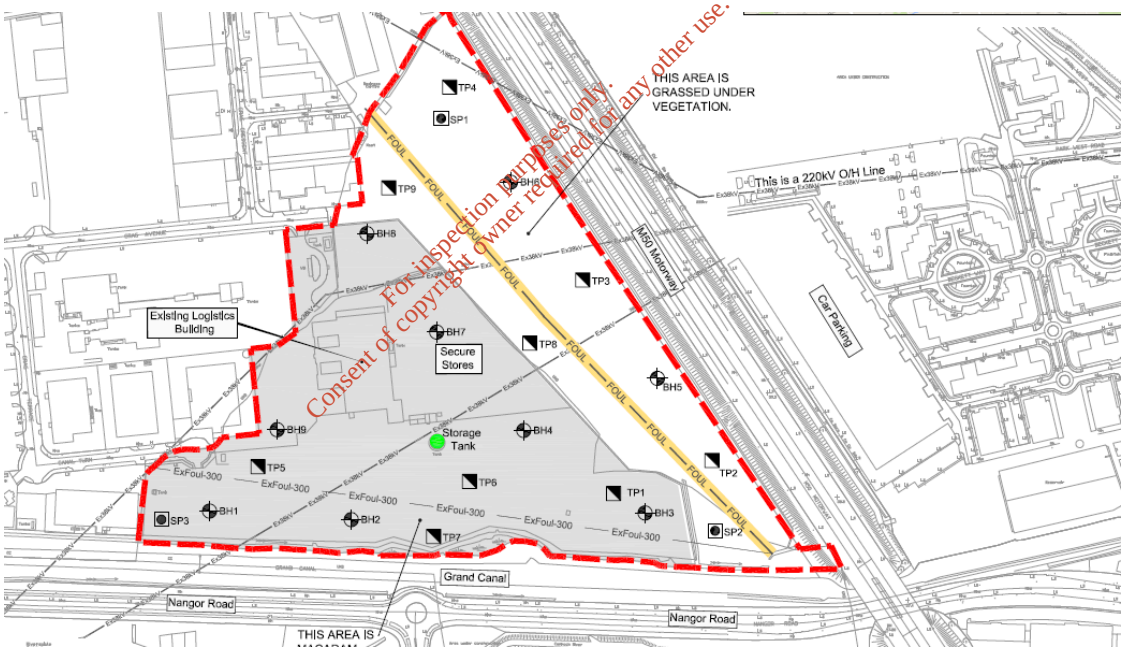
Insert 1.8 *Schematic cross sections of the site.*

Aquifer vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated generally by human activities. Due to the nature of the flow of groundwater through bedrock in Ireland, which is almost completely through fissures, the main feature that protects groundwater from contamination, and therefore the most important feature in protection of groundwater, is the subsoil (which can consist solely/ or of mixtures of peat, sand, gravel, glacial till, clays, or silts).

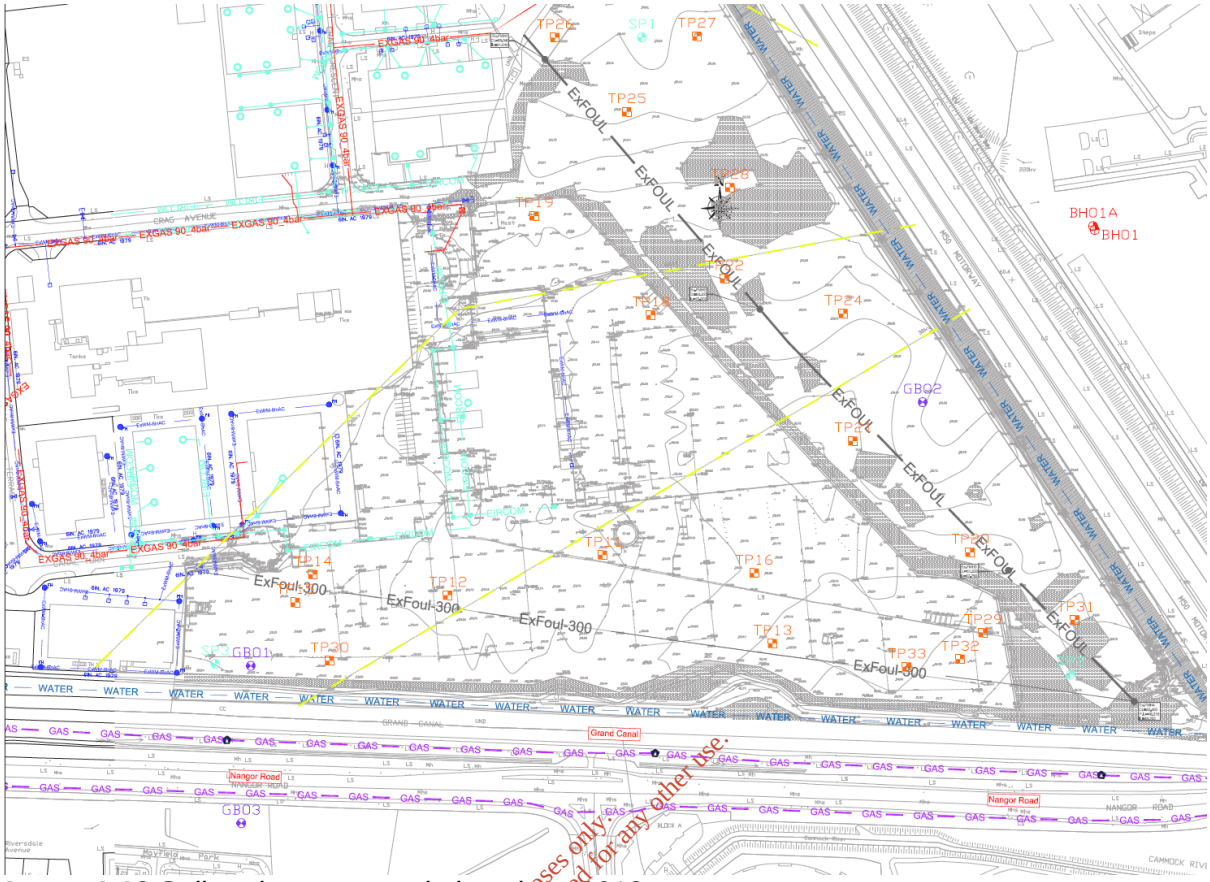
Reference to the GSI Vulnerability data indicates that there are two different vulnerability classifications at the proposed development site. The western half of the site is classified as having a 'High' aquifer vulnerability which indicates that the soil cover is between 3-5m of clayey soil deep at the site. The eastern half is classified as having a 'Moderate' vulnerability which indicates clayey soil cover is 5-10m. Comparison with the site investigation results shows that the 'High' aquifer vulnerability should apply to the north of the site only, with the rest of the site being classified as 'Moderate'.

6.3.3 Soil Quality

Site investigations were undertaken in 2013 and 2018.



Insert 1.9 *Soil and water sample locations 2013*



Insert 1.10 *Soil and water sample locations 2018*

In 2013, eleven soil samples were analysed and in 2018 an additional 18 soil samples were analysed from the top 2m of soil. Samples were tested for Volatile Organic Compounds (VOCs), Semi Volatile Organic Compounds (SVOCs), metals and asbestos. As expected on a former industrial site some slight exceedance above soil laboratory detection were noted for hydrocarbon related parameters. Representative soil samples were analysed for waste classification (2003/33/EC). The latter relates to the suitability for disposal off site to landfill and classified as Inert apart from a few samples The TP1 classified as Non-Hazardous, due to the concentrations of antimony and selenium only.

There are no legislated threshold values for soils in Ireland. As such soil samples were compared to a Generic Assessment Criteria (GAC) derived to be protective of human health, water bodies (including groundwater) and also ecology for a resident and commercial/industrial end use.

Generic Assessment Criteria in the UK has been derived using the Contaminated Land Exposure Assessment (CLEA) model to be protective of human health for a number of different land uses. LQM (Land Quality Management) and the CIEH (Chartered Institute of Environmental Health) developed a document in July 2009 detailing their own research and derivation of their own 'LQM GACs'. A total of 82 substances including many organic substances had LQM GACs derived, for the standard land uses of residential, commercial/industrial and allotments. This was updated in 2015 following further research and the derived results are now called LQM/CIEH Suitable 4 Use Level (S4UL). The LQM/CIEH S4ULs are intended for use in assessing the potential risks posed to human health by contaminants in soil and as transparently -derived and cautious "trigger values" above which further assessment of the risks or remedial action may be needed. For each contaminant S4ULs have

been derived for six land use scenarios based on assessing exposure pathways in each planning scenario. In this instance the commercial scenario has been considered. Soil type and soil organic matter (SOM) has an influence on the behaviour of contaminants. S4ULs have been derived for three SOM contents (1%, 2.5% and 6%) to cover the likely range in soils. A prudent approach has been taken by considering the lower 1% SOM content.

The results indicated that there was no significant soil contamination at the site. All results were below the threshold for land suitable for commercial use. Laboratory results compared with threshold concentrations are tabulated in Appendix A.

6.3.5 Groundwater Quality

The European Communities Directive 2000/60/EC established a framework for community action in the field of water policy, (commonly known as the Water Framework Directive [WFD]). The WFD required 'Good Water Status' for all European waters by December 2015, to be achieved through a system of river basin management planning and extensive monitoring. 'Good status' means both 'Good Ecological Status' and 'Good Chemical Status'.

The Groundwater Body (GWB) underlying the site is the Dublin Aquifer (IE_EA_G_008) Currently, the EPA (2018) on-line mapping classifies the Dublin water body as having 'Good Status', with a WFD risk is "Not at Risk".

Three. groundwater samples were taken from bedrock boreholes SP1, SP2 and SP3. Overall, there was no evidence of any significant contamination from previous use of the site.

It is noted that contaminants of concern (PAHs, SVOCs, EPH and phenols) were not elevated above the limit of detection in the water samples.

Ammoniacal Nitrogen was recorded at concentrations higher that the Groundwater Regulations criteria of 0.065mg/l for all water samples. This may indicate possible leaking drains in the vicinity

6.4 Man-Made Pathways

As identified in Stages 1-4 there is bulk storage for hydrocarbons only planned for the facility. Due to the volumes stored and the hazard classifications of these substances they could pose a risk to receiving waters if a source-pathway-receptor linkage existed. The tanks are fully bunded within a hardstand area, and any spills outside of these areas would be addressed by the on-line oil interceptors prior to discharge following attenuation in the attenuation pond to the off site land drain and Gallowstown stream.

Surface water from the delivery bay adjacent to the bulk diesel storage tanks will be diverted via a class 1 full retention separator located adjacent to the delivery bay before connecting into the main stormwater network.

Similarly, stormwater from the yard to the north of the Energy Centre will be diverted through a class 1 full retention separator located in the yard before connecting into the main stormwater network.

All surface water from the site will then pass through a class 1 by-pass interceptor and silt trap located upstream of the attenuation pond in accordance with EN 858 – Separator System for Light Liquids' and PPG3.

All 3 no. interceptors will be equipped with a level detector which is alarmed. Alarms will be connected to the BMS and will alarm in the main control room to alarm personnel to an accumulation of product issue.

7.0 STAGE 6 – CONCEPTUAL SITE MODEL

A summary of the conceptual site model (CSM) is described below with reference to schematic cross section (Insert 1.8) and proposed development above.

- The profile on site comprises made ground overlying low permeability glacial clay topsoil.
- Depth to bedrock varies from 8.3m below ground level (bgl) to 2m below ground level (bgl) at to the north of the site. There is not a continuous perched water table but groundwater is encountered at a shallow level within the weathered surface of the bedrock.
- There is no evidence of historical soil contamination.
- There are no groundwater dependent terrestrial ecosystems which have potential to be impacted by the proposed development. The site storm drainage will ultimately discharge to the Camoc River.
- The land is zoned for industrial development of this type and is within flood zone C and therefore suitable for industrial development.
- The only hazard proposed for the development is bulk oil storage tanks which will be fully contained in bunds and all underground lines will be double lined. The underground stretch occurs just between the tank farm and the datacentre building.

The pollutant linkages based on the primary sources of possible contaminants on site are summaries in Table 7.1

Source	Pathways	Receptor	Impact Assessment
Diesel Fuel Spill (not contained)	Vertical and lateral migration via shallow overburden to underlying bedrock Lateral migration via groundwater within the bedrock aquifer Lateral migration via drainage system	Locally Important Bedrock Aquifer with high to moderate vulnerability Stormwater system to drainage ditch	Low – Tanks are bunded and double skinned and on hard stand areas with interceptors on the drainage system. Low – Tanks contained (as above), gradient low and hydrocarbons will have attenuated prior to reaching the Camac river.

Table 7.1 Pollutant Linkages

8.0 STAGE 7 – SITE INVESTIGATION & BASELINE SOIL & WATER QUALITY ASSESSMENT

Site investigations were undertaken in 2013 and 2018 by IGSL Ltd. Locations for trial holes and boreholes and laboratory results are presented in Appendix 1.

The investigations did not identify any evidence of soil or groundwater contamination on the site as a result of previous use of the site.

9.0 CONCLUSIONS

On the basis of the soil and groundwater investigations undertaken prior to construction of the Crag Digital facility and an assessment of source-pathways-receptors, the following conclusions have been made:

- A review of soil and water quality confirms that there is no evidence of any residual contamination beneath the site.
- There is only bulk oil storage proposed for the facility. However, the risk prevention measures planned at the facility significantly reduce the potential for an environmental impact to soil or water to occur. These measures include bunded and double contained vessels, double lined drainage and containment systems and spill management procedures.
- Source-pathway-receptor linkages were assessed for the bulk storage areas. It was concluded that there are no direct pathways to either the soil and groundwater environment. Interceptors are installed on the surface water drainage. A leakage from a bulk tank would be fully contained in the designated bund or the double skin lining of the tank, with leaks during delivery fully contained within the continuous hard stand delivery area. Any leakage outside of the delivery area would be contained within the drainage system.

10.0 REFERENCES

Catchment Flood Risk Assessment and Management (CFRAM) Flood Reports, available at: http://www.opw.ie/en/floodplans/ or www.floodinfo.ie. Accessed 2018.

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Office of Public Works (OPW), (2017). Flood points & Historical Floods; Available on-line at: www.floodmaps.ie

Office of Public Works (OPW) Provisional Flood Risk Assessment (PFRA) maps, available at: http://www.cfram.ie/pfra/interactive-mapping/. Accessed 2018.

APPENDIX 1

Laboratory Analysis

Sample Type				FILL	FILL	SOIL	SOIL	SOIL	SOIL	FILL	FILL	FILL	FILL
Sample ID				TP11	TP15	TP18	TP20	TP24	TP25	TP29	TP32	BH4	BH8
Sample Depth (m)				0.55-0.65	0.8-0.85	0.55-0.60	0.60-0.70	0.80-0.90	1.00-1.10	1.00-1.10	2	1.0-1.5	1
Year Sampled				2018	2018	2018	2018	2018	2018	2018	2018	2013	2013
Parameters	Units	LOD	LQM/CIEH S4ul for HHRA Residental Threshold (mg/kg)										
Arsenic	mg/kg	<0.5	37	**41**	33	32	21	32.0	29.0	**43.0**	29.0	6.0	10.7
Cadmium	mg/kg	<0.1	11	0.82	1.3	1.8	1.2	2	1	0.43	1.3	<0.1	<0.1
Chromium III	mg/kg	<0.03	910	13	22	11	18	18	18	26	30	**1018**	**1645**
Copper	mg/kg	<1	2400	14	37	19	17	27	25	67	35	88	122
Mercury	mg/kg	<0.1	1.2	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	<0.7	180	29	44	31	33	50	56	41	35	95	**221.6**
Selenium	mg/kg	<1	250	0.72	0.700	<0.20	0.27	0.36	0.85	<0.20	0.53	2.00	4.00
Zinc	mg/kg	<5	3700	54	110	58	33	73	57	66	130	52	35
Benzene	ug/kg	1	0.38	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	-
Toluene	ug/kg	1	880	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	-
Ethylbenzene	ug/kg	1	83	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	-
m & p-Xylene	ug/kg	1	161	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	-
o-Xylene	ug/kg	1	88	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	-
Napthalene	mg/kg	0.1	2.3	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	20	<1.0
Phenanthrene	mg/kg	0.1	13000	<1.0	0.27	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	19	<1.0
Benzo(a)anthracene	mg/kg	0.1	11	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	mg/kg	0.1	3.2	<1.0	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0

Legend

16.4 Results exceed LQM/CIEH S4ul for HHRA Residential Threshold with homegrown produce at 1% SOM (mg/kg)

nv Guideline threshold value not available

Notes

HHRA 2015 - LQM/CIEH Suitable 4 Use Levels based on 'Commercial' and/or 'residential' land use using 1% SOM. Metals are compared against a 6% SOM

Sol : sol S4UL presented exceed the solubility saturation limit, which is presented in brackets

Vap: vap S4UL presented exceed the vapour staturation limit which is prensted in brackets

			CRITERIA			SOIL SAMPLES						Classification
			WAC			TP1	TP2	TP5				
			CD 2003/33/EC			1.1	0.85-1.1	1				
	Units	LOD	Inert	Non-Haz	Haz							
Waste Acceptance Criteria (WAC)										Min	Max	
Solid Analysis												
Organic Carbon, Total	%	<0.02	3.00	5.00		0.77	NDP	NDP		0.77	0.77	INERT
BTEX, Total	mg/kg	<0.025	6	-		<0.025	<0.025	<0.025		0	0	INERT
PCBs, Total ICES 7	mg/kg	<0.035	1	-		<0.035	<0.035	<0.035		0	0	INERT
Mineral oil >C10-C40	mg/kg	<30	500	-		195	<30	33		33	195	INERT
Polyaromatic hydrocarbons, Total 17	mg/kg	<0.64	100	40		<0.64	<0.64	1.19		1.19	1.19	INERT
Eluate Analysis (mg/kg)												
CEN 10:1 - Arsenic (diss.filt)	mg/kg	<0.025	0.5	2	25	0.149	<0.025	0.045		0.045	0.149	INERT
CEN 10:1 - Barium (diss.filt)	mg/kg	<0.03	20	100	300	0.14	0.11	0.07		0.07	0.14	INERT
CEN 10:1 - Cadmium (diss.filt)	mg/kg	<0.005	0.04	1	5	<0.005	<0.005	<0.005		0	0	INERT
CEN 10:1 - Chromium (diss.filt)	mg/kg	<0.015	0.5	10	70	<0.015	0.025	<0.015		0.025	0.025	INERT
CEN 10:1 - Copper (diss.filt)	mg/kg	<0.07	2	50	100	0.49	<0.07	<0.07		0.49	0.49	INERT
CEN 10:1 - Mercury (diss.filt)	mg/kg	<0.0001	0.01	0.2	2	0.0008	0.0005	0.0005		0.0005	0.0008	INERT
CEN 10:1 - Molybdenum (diss.filt)	mg/kg	<0.02	0.5	10	30	0.06	<0.02	<0.02		0.06	0.06	INERT
CEN 10:1 - Nickel (diss.filt)	mg/kg	<0.02	0.4	10	40	0.2	<0.02	<0.02		0.2	0.2	INERT
CEN 10:1 - Lead (diss.filt)	mg/kg	<0.05	0.5	10	50	<0.05	<0.05	<0.05		0	0	INERT
CEN 10:1 - Antimony (diss.filt)	mg/kg	<0.02	0.06	0.7	5	0.33	0.02	0.03		0.02	0.33	NON HAZ
CEN 10:1 - Selenium (diss.filt)	mg/kg	<0.03	0.1	0.5	7	0.18	<0.03	<0.03		0.18	0.18	NON HAZ
CEN 10:1 - Zinc (diss.filt)	mg/kg	<0.03	4	50	200	0.04	0.05	<0.03		0.04	0.05	INERT
CEN 10:1 - Chloride	mg/kg	<3	800	15000	25000	<3	<3	<3		0	0	INERT
CEN 10:1 - Fluoride	mg/kg	<3	10	150	500	9	6	<3		6	9	INERT
CEN 10:1 - Sulphate	mg/kg	<0.5	1000	20000	50000	80.9	23	435.1		23	435.1	INERT
CEN 10:1 - TDS	mg/kg	<100	4000	60000	100000	1331	<100	950		950	1331	INERT
CEN 10:1 - Phenols	mg/kg	<0.1	1	-	-	0.4	<0.1	<0.1		0.4	0.4	INERT
CEN 10:1 - Carbon, Organic (diss.filt)	mg/kg	<100	500	800	1000	290	30	20		20	290	INERT

		GROUNDWATER				SURFACE WATER		WATER SAMPLES						Notes
	Units	SI No 9 of 2010 (GW Regs)	SI No 278 of 2007 (EC Drinking Water Regs)	EPA IGVs	WHO DWS	SI 272 of 2009 EQS Inland Surface Waters (MACs)	SI 272 of 2009 EQS Other Surface Waters (MACs)	SP1	SP2	SP3D	SW1	Min	Max	
Inorganics/Metals														
Dissolved Arsenic	ug/l	7.5	10	10	10			8	9.8	7.5	6.7	6.7	9.8	3No exceedecnes of GW regs
Dissolved Barium	ug/l			100				102	88	65	41	41	102	1No very slight exceedence of IGV
Dissolved Boron	ug/l	750		1000				43	50	56	35	35	56	No exceedences
Dissolved Cadmium	ug/l	3.75	5	5	3	32	32	<0.5	<0.5	<0.5	<0.5	0	0	No exceedences
Total Dissolved Chromium	ug/l	37.5	50	30	50			<1.5	<1.5	<1.5	<1.5	0	0	No exceedences
Dissolved Copper	ug/l	1500	2000	30	2000			<7	<7	<7	<7	0	0	No exceedences
Dissolved Lead	ug/l	18.75	10	10		N/A	N/A	<5	5	<5	<5	5	5	No exceedences
Dissolved Mercury	ug/l	0.75	1	1	6	0.07	0.07	<1	<1	<1	<1	0	0	No exceedences
Dissolved Nickel	ug/l	15	20	20	70			11	3	<2	2	2	11	No exceedences
Dissolved Selenium	ug/l		10					<3	<3	<3	<3	0	0	No exceedences
Dissolved Vanadium	ug/l							<1.5	<1.5	1.8	1.7	1.7	1.8	No exceedences
Dissolved Zinc	ug/l			100				5	3	4	14	3	14	No exceedences
VOC MS												Min	Max	
Dichlorodifluoromethane	ug/l							<2	<2	<2	<2	0	0	No exceedences
Methyl Tertiary Butyl Ether	ug/l							<0.1	<0.1	<0.1	<0.1	0	0	No exceedences
Chloromethane	ug/l							<3	<3	<3	<3	0	0	No exceedences
Vinyl Chloride	ug/l	0.375	0.5		0.3			<0.1	<0.1	<0.1	<0.1	0	0	No exceedences
Bromomethane	ug/l							<1	<1	<1	<1	0	0	No exceedences
Chloroethane	ug/l							<3	<3	<3	<3	0	0	No exceedences
Trichlorofluoromethane	ug/l							<3	<3	<3	<3	0	0	No exceedences
1,1-Dichloroethene (1,1 DCE)	ug/l				30			<3	<3	<3	<3	0	0	No exceedences
Dichloromethane (DCM)	ug/l			10	20	N/A	N/A	<3	<3	<3	<3	0	0	No exceedences
trans-1-2-Dichloroethene	ug/l				50			<3	<3	<3	<3	0	0	No exceedences
1,1-Dichloroethane	ug/l							<3	<3	<3	<3	0	0	No exceedences
cis-1-2-Dichloroethene	ug/l				50			<3	<3	<3	<3	0	0	No exceedences
2,2-Dichloropropane	ug/l							<1	<1	<1	<1	0	0	No exceedences
Bromochloromethane	ug/l							<2	<2	<2	<2	0	0	No exceedences
Chloroform	ug/l			12	300			<2	<2	<2	<2	0	0	No exceedences
1,1,1-Trichloroethane	ug/l			500				<2	<2	<2	<2	0	0	No exceedences
1,1-Dichloropropene	ug/l							<3	<3	<3	<3	0	0	No exceedences
Carbon tetrachloride	ug/l							<2	<2	<2	<2	0	0	No exceedences
1,2-Dichloroethane	ug/l	2.25	3	10		N/A	N/A	<2	<2	<2	<2	0	0	No exceedences
Benzene	ug/l	0.75	1	1		50	50	<0.5	<0.5	<0.5	<0.5	0	0	No exceedences
Trichloroethene (TCE)	ug/l		10*	70				<3	<3	<3	<3	0	0	No exceedences
1,2-Dichloropropane	ug/l							<2	<2	<2	<2	0	0	No exceedences
Dibromomethane	ug/l				10			<3	<3	<3	<3	0	0	No exceedences
Bromodichloromethane	ug/l							<2	<2	<2	<2	0	0	No exceedences
cis-1-3-Dichloropropene	ug/l							<2	<2	<2	<2	0	0	No exceedences
Toluene	ug/l			10	700			<0.5	<0.5	<0.5	<0.5	0	0	No exceedences
trans-1-3-Dichloropropene	ug/l							<2	<2	<2	<2	0	0	No exceedences
1,1,2-Trichloroethane	ug/l							<2	<2	<2	<2	0	0	No exceedences
Tetrachloroethene (PCE)	ug/l				4	N/A	N/A	<3	<3	<3	<3	0	0	No exceedences
1,3-Dichloropropane	ug/l							<2	<2	<2	<2	0	0	No exceedences
Dibromochloromethane	ug/l							<2	<2	<2	<2	0	0	No exceedences
1,2-Dibromoethane	ug/l				10			<2	<2	<2	<2	0	0	No exceedences
Chlorobenzene	ug/l			1				<2	<2	<2	<2	0	0	No exceedences
1,1,1,2-Tetrachloroethane	ug/l							<2	<2	<2	<2	0	0	No exceedences
Ethylbenzene	ug/l			10	300			<0.5	<0.5	<0.5	<0.5	0	0	No exceedences
p/m- Xylene	ug/l				500			<1	<1	<1	<1	0	0	No exceedences
o-Xylene	ug/l				500			<0.5	<0.5	<0.5	<0.5	0	0	No exceedences
Styrene	ug/l				20			<2	<2	<2	<2	0	0	No exceedences
Bromoform	ug/l							<2	<2	<2	<2	0	0	No exceedences
Isopropylbenzene	ug/l							<3	<3	<3	<3	0	0	No exceedences
1,1,2,2-Tetrachloroethane	ug/l							<4	<4	<4	<4	0	0	No exceedences
Bromobenzene	ug/l							<2	<2	<2	<2	0	0	No exceedences
1,2,3-Trichloropropane	ug/l							<3	<3	<3	<3	0	0	No exceedences
Propylbenzene	ug/l							<3	<3	<3	<3	0	0	No exceedences
2-Chlorotoluene	ug/l							<3	<3	<3	<3	0	0	No exceedences
1,3,5-Trimethylbenzene	ug/l							<3	<3	<3	<3	0	0	No exceedences
4-Chlorotoluene	ug/l							<3	<3	<3	<3	0	0	No exceedences
tert-Butylbenzene	ug/l							<3	<3	<3	<3	0	0	No exceedences
1,2,4-Trimethylbenzene	ug/l							<3	<3	<3	<3	0	0	No exceedences
sec-Butylbenzene	ug/l							<3	<3	<3	<3	0	0	No exceedences
4-Isopropyltoluene	ug/l							<3	<3	<3	<3	0	0	No exceedences
1,3-Dichlorobenzene	ug/l							<3	<3	<3	<3	0	0	No exceedences
1,4-Dichlorobenzene	ug/l							<3	<3	<3	<3	0	0	No exceedences
n-Butylbenzene	ug/l							<3	<3	<3	<3	0	0	No exceedences
1,2-Dichlorobenzene	ug/l			10	1000			<3	<3	<3	<3	0	0	No exceedences
1,2-Dibromo-3-chloropropane	ug/l							<2	<2	<2	<2	0	0	No exceedences
1,2,4-Trichlorobenzene	ug/l							<3	<3	<3	<3	0	0	No exceedences
Hexachlorobutadiene	ug/l							<3	<3	<3	<3	0	0	No exceedences
1,2,3-Trichlorobenzene	ug/l							<3	<3	<3	<3	0	0	No exceedences
Methyl Tertiary Butyl Ether	ug/l							<0.1	<0.1	<0.1	<0.1	0	0	No exceedences
Benzene	ug/l	0.75	1	1	10 (Benzene)			<0.5	<0.5	<0.5	<0.5	0	0	No exceedences
Toluene	ug/l			10	700 (Toluene)			<0.5	<0.5	<0.5	<0.5	0	0	No exceedences
Ethylbenzene	ug/l			10	300 (Ethylbenzene)			<0.5	<0.5	<0.5	<0.5	0	0	No exceedences
p/m- Xylene	ug/l				100			<1	<1	<1	<1	0	0	No exceedences
o-Xylene	ug/l							<0.5	<0.5	<0.5	<0.5	0	0	No exceedences
SVOC MS												Min	Max	
Phenols														
2-Chlorophenol	ug/l							<1	<1	<1	<1	0	0	No exceedences
2-Methylphenol	ug/l							<0.5	<0.5	<0.5	<0.5	0	0	No exceedences
2-Nitrophenol	ug/l							<0.5	<0.5	<0.5	<0.5	0	0	No exceedences
2,4-Dichlorophenol	ug/l							<0.5	<0.5	<0.5	<0.5	0	0	No exceedences
2,4-Dimethylphenol	ug/l							<10	<10	<10	<10	0	0	No exceedences
2,4,5-Trichlorophenol	ug/l							<0.5	<0.5	<0.5	<0.5	0	0	No exceedences
2,4,6-Trichlorophenol	ug/l			200				<10	<10	<10	<10	0	0	No exceedences
4-Chloro-3-methylphenol	ug/l							<0.5	<0.5	<0.5	<0.5	0	0	No exceedences
4-Methylphenol	ug/l							<10	<10	<10	<10	0	0	No exceedences
4-Nitrophenol	ug/l							<10	<10	<10	<10	0	0	No exceedences
Pentachlorophenol	ug/l			2	9	1	1	<10	<10	<10	<10	0	0	No exceedences
Phenol	ug/l			0.5		46	46	<10	<10	<10	<10	0	0	No exceedences
PAHs												Min	Max	
2-Chloronaphthalene	ug/l							<1	<1	<1	<1	0	0	No exceedences
2-Methylnaphthalene	ug/l							<1	<1	<1	<1	0	0	No exceedences
Naphthalene	ug/l							<1	<1	<1	<1	0	0	No exceedences
Acenaphthylene	ug/l							<0.5	<0.5	<0.5	<0.5	0	0	No exceedences
Acenaphthene	ug/l							<1	<1	<1	<1	0	0	No exceedences
Fluorene	ug/l							<0.5	<0.5	<0.5	<0.5	0	0	No exceedences
Phenanthrene	ug/l							<0.5	<0.5	<0.5	<0.5	0	0	No exceedences
Anthracene	ug/l							<0.5	<0.5	<0.5	<0.5	0	0	No exceedences
Fluoranthene	ug/l					1	1	<0.5	<0.5	<0.5	<0.5	0	0	No exceedences
Pyrene	ug/l							<0.5	<0.5	<0.5	<0.5	0	0	No exceedences
Benzo(a)anthracene	ug/l							<0.5	<0.5	<0.5	<0.5	0	0	No exceedences
Chrysene	ug/l							<0.5	<0.5	<0.5	<0.5	0	0	No exceedences
Benzo(b)fluoranthene	ug/l			0.05				<1	<1	<1	<1	0	0	No exceedences
Benzo(a)pyrene	ug/l	0.0075		0.01	0.7			<10	<10	<10	<10	0	0	No exceedences
Indeno(123cd)pyrene	ug/l			0.05				<10	<10	<10	<10	0	0	No exceedences
Dibenz(ah)anthracene	ug/l							<0.5	<0.5	<0.5	<0.5	0	0	No exceedences
Benzo(ghi)perylene	ug/l			0.05				<0.5	<0.5	<0.5	<0.5	0	0	No exceedences
Phthalates												Min	Max	
Bis(2-ethylhexyl) phthalate	ug/l				8			<10	<10	<10	<10	0	0	No exceedences
Butylbenzyl phthalate	ug/l							<10	<10	<10	<10	0	0	No exceedences
Di-n-butyl phthalate	ug/l							<1.5	<1.5	<1.5	<1.5	0	0	No exceedences
Di-n-Octyl phthalate	ug/l							<10	<10	<10	<10	0	0	No exceedences
Diethyl phthalate	ug/l							<1	<1	<1	<1	0	0	No exceedences
Dimethyl phthalate	ug/l							<10	<10	<10	<10	0	0	No exceedences
Other SVOCs												Min	Max	
1,2-Dichlorobenzene	ug/l			10	1000			<1	<1	<1	<1	0	0	No exceedences
1,2,4-Trichlorobenzene	ug/l							<1	<1	<1	<1	0	0	No exceedences
1,3-Dichlorobenzene	ug/l				300			<1	<1	<1	<1	0	0	No exceedences
1,4-Dichlorobenzene	ug/l							<1	<1	<1	<1	0	0	No exceedences
2-Nitroaniline	ug/l							<10	<10	<10	<10	0	0	No exceedences
2,4-Dinitrotoluene	ug/l							<0.5	<0.5	<0.5	<0.5	0	0	No exceedences
2,6-Dinitrotoluene	ug/l							<10	<10	<10	<10	0	0	No exceedences
3-Nitroaniline	ug/l							<10	<10	<10	<10	0	0	No exceedences
4-Bromophenylphenylether	ug/l							<1	<1	<1	<1	0	0	No exceedences
4-Chloroaniline	ug/l							<10	<10	<10	<10	0	0	No exceedences

4-Chlorophenylphenylether #	ug/l							<1	<1	<1	<1	0	0	No exceedences
4-Nitroaniline	ug/l							<0.5	<0.5	<0.5	<0.5	0	0	No exceedences
Azobenzene #	ug/l							<0.5	<0.5	<0.5	<0.5	0	0	No exceedences
Bis(2-chloroethoxy)methane #	ug/l							<0.5	<0.5	<0.5	<0.5	0	0	No exceedences
Bis(2-chloroethyl)ether #	ug/l							<1	<1	<1	<1	0	0	No exceedences
Carbazole #	ug/l							<0.5	<0.5	<0.5	<0.5	0	0	No exceedences
Dibenzofuran #	ug/l							<0.5	<0.5	<0.5	<0.5	0	0	No exceedences
Hexachlorobenzene #	ug/l			0.03		0.05	0.05	<1	<1	<1	<1	0	0	No exceedences
Hexachlorobutadiene #	ug/l			0.1		0.6	0.6	<1	<1	<1	<1	0	0	No exceedences
Hexachlorocyclopentadiene	ug/l							<10	<10	<10	<10	0	0	No exceedences
Hexachloroethane #	ug/l							<1	<1	<1	<1	0	0	No exceedences
Isophorone #	ug/l					1	1	<0.5	<0.5	<0.5	<0.5	0	0	No exceedences
N-nitrosodi-n-propylamine #	ug/l							<0.5	<0.5	<0.5	<0.5	0	0	No exceedences
Nitrobenzene #	ug/l			10				<1	<1	<1	<1	0	0	No exceedences
EPH (C8-C40) #	ug/l							<10	<10	<10	<10	0	0	No exceedences
C8-C40 Mineral Oil (Calculation)	ug/l							<10	<10	<10	<10	0	0	No exceedences
PCB 28	ug/l							<0.1	<0.1	<0.1	<0.1	0	0	No exceedences
PCB 52	ug/l							<0.1	<0.1	<0.1	<0.1	0	0	No exceedences
PCB 101	ug/l							<0.1	<0.1	<0.1	<0.1	0	0	No exceedences
PCB 118	ug/l							<0.1	<0.1	<0.1	<0.1	0	0	No exceedences
PCB 138	ug/l							<0.1	<0.1	<0.1	<0.1	0	0	No exceedences
PCB 153	ug/l							<0.1	<0.1	<0.1	<0.1	0	0	No exceedences
PCB 180	ug/l							<0.1	<0.1	<0.1	<0.1	0	0	No exceedences
Total 7 PCBs	ug/l			0.01				<0.7	<0.7	<0.7	<0.7	0	0	No exceedences
Sulphate #	mg/l	187.5	250	200				486.7	55.66	63.78	64.8	55.66	486.7	1No exceedence of GW regs, DWS and IGVs
Chloride #	mg/l	187.5	25000	30				142.1	15.4	18.6	37.4	15.4	142.1	2No exceedences of IGV
Nitrate as NO3 #	mg/l	37.5	50	25				0.6	0.5	0.8	3.1	0.5	3.1	No exceedences
Ammoniacal Nitrogen as N #	mg/l	0.065-0.175		0.15		High status ≤0.040 (mean) or ≤0.090(95%ile) Good status ≤0.065 (mean) or ≤0.140 (95%ile)		0.15	0.98	0.23	0.09	0.09	0.98	4No. Exceedences of GW Regs, 3No, Exceedences of IGVs
Total Alkalinity as CaCO3 #	mg/l							1194	394	248	208	208	1194	No exceedences
BOD (Settled) #	mg/l							NA	NA	NA	<1	0	0	No exceedences
COD (Settled) #	mg/l							11	<7	9	9	9	11	No exceedences
Electrical Conductivity @25C #	uS/cm	1875	2500	1000				1675	675	572	611	572	1675	1No. Exceedence of IGV
pH #	pH units			6.5 - 9.5				7.29	7.35	7.48	7.55	7.29	7.55	No exceedences
Total Nitrogen*	mg/l							6.5	7.9	2.7	19.8	2.7	19.8	No exceedences
Notes:														
The limit values for the Groundwater Regulations (SI 9 of 2010) are for the Category "Column 4" Threshold Values for for the general quality of groundwater in a groundwater body in terms of whether its ability to support human uses has been significantly impaired by pollution. Where no value is defined, the Overall Threshold														
* Sum of tetrachloroethene and trichloroethene														