

ESB Moneypoint Conceptual Site Model

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TABLE OF CONTENTS

1.	INTRODUCTION.....	1
1.1	Project Contractual Basis and Personnel Involved.....	1
1.2	Background Information	1
1.3	Project Objective	1
1.4	Scope of Works	1
2.	SITE ENVIRONMENTAL SETTING	2
2.1	Sources of Information	2
2.2	Site Location.....	2
2.3	Site Layout	2
2.4	Topography.....	3
2.5	Hydrology.....	3
2.6	Designated Areas	4
2.7	Regional Geology and Hydrogeology	4
2.8	Summary of Previous Site Investigations	5
2.8.1	<i>1993 Ash Landfill Investigation</i>	<i>5</i>
2.8.2	<i>2002 and 2003 Site-wide Investigation.....</i>	<i>5</i>
2.8.3	<i>2012 Geotechnical Investigation</i>	<i>6</i>
2.8.4	<i>2013 Geotechnical Investigation</i>	<i>6</i>
2.8.5	<i>Groundwater Monitoring</i>	<i>6</i>
2.8.6	<i>2010 and 2011 Ash Landfill Assessments.....</i>	<i>6</i>
2.9	Site Geology and Hydrogeology.....	6
2.9.1	<i>FGD Landfill.....</i>	<i>7</i>
2.9.2	<i>FGD Landfill and Coal Yard.....</i>	<i>7</i>
2.9.3	<i>Generating Station</i>	<i>7</i>
2.9.4	<i>Contractors' Compound and Green Area.....</i>	<i>8</i>
2.9.5	<i>Ash Landfill.....</i>	<i>8</i>
3.	SOURCE AUDIT FINDINGS.....	9
3.1	Previous Site Operations	9
3.2	Current Site Operations.....	9
3.3	Chemicals of Potential Concern	10
4.	CONCEPTUAL SITE MODEL	10
4.1	Main Site Area - Sources, Pathways and Receptors ..	10
4.2	Ash Landfill – Sources, Pathways and Receptors.....	12
5.	SUMMARY, CONCLUSIONS & RECOMMENDATIONS	14
5.1	Summary and Conclusions.....	14
5.2	Recommended Way Forward.....	14

FIGURES

TABLE

APPENDIX A – Photographs

APPENDIX B – ESB Site Maps

APPENDIX C – Geological and Well Construction Logs (1993 and 2003)

APPENDIX D – Geotechnical Borehole Logs and Maps (2012 and 2013)

APPENDIX E – Groundwater Monitoring Data

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1. INTRODUCTION

1.1 Project Contractual Basis and Personnel Involved

AECOM Infrastructure & Environment Ireland Limited (AECOM), is pleased to present this report on the hydrogeological conceptual site model (CSM) for the Moneypoint generating station in Kilrush Co. Clare on behalf of the Electricity Supply Board (ESB). This report has been prepared in accordance with AECOM proposal 3151598, February 2015 and authorised by Mr J. Casey, HSEQ Manager, ESB, Moneypoint under purchase order number 5500173155.

The assessment was completed by staff from the AECOM Cork office:

- Project Manager: Edel O'Hannelly, Principal Hydrogeologist
- Project Director: Kevin Forde, Technical Director

Mr J Casey provided assistance during the site visit conducted on 06 May 2015 and site specific information.

1.2 Background Information

In October 2002, the site was granted an Integrated Pollution Prevention and Control Licence (IPPC) issued by the Environmental Protection Agency (EPA) (IPPC licence number P0605-01). The licence has been revised on two occasions, the most recent being P0605-03 issued in March 2013; which was amended to an Industrial Emissions Licence (IEL P0605-03) in December 2013, as required under *Directive 2010/75/EU*.

Under condition 6.18.3 of the licence, the site was required to complete a technical assessment of groundwater at the site in accordance with the EPA's *Guidance on the Authorisation of Discharges to Groundwater* and to demonstrate compliance with the *European Communities Environmental Objectives (Groundwater) Regulations 2010*.

The hydrogeological assessment was completed based on available data, and reported by URS Ireland Limited¹ in September 2014 under project reference 47092799. The EPA considered that the hydrogeological CSM, as presented in September 2014, was not sufficient to represent the complexity of such a large site as Moneypoint and requested that a revised CSM be prepared in line with the EPA's *Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites*.

1.3 Project Objective

To prepare a source audit and hydrogeological CSM for the ESB Moneypoint site in accordance with EPA guidance.

1.4 Scope of Works

The following scope of works has been completed to meet the project objective:

- Review of publicly available historical and environmental data for the site and surrounding area, including relevant geological, hydrogeological and topographical maps
- Review of previous environmental reports and site documentation available and provided by the ESB
- Completion of a site visit and interview with personnel to identify current environmental conditions which may represent a potential environmental risk, such as evidence of potential contamination sources, as well as visible evidence of ground contamination
- Review of chemical and waste inventories and throughput information
- Data assessment and reporting

¹ On 16 March 2015 the name of URS Ireland Limited changed to AECOM Infrastructure & Environment Ireland Limited to reflect the company's status as a wholly owned subsidiary through which AECOM operates in Ireland.

2. SITE ENVIRONMENTAL SETTING

2.1 Sources of Information

The following sources of publically available information have been consulted in compiling this report:

- Ordnance Survey of Ireland, Discovery Series 1:50,000 Sheet 64, and online map viewer, www.osi.ie
- Environmental Protection Agency map viewer, <http://gis.epa.ie>
- Geological Survey of Ireland, *Geology of the Shannon Estuary* and bedrock geology sheet 17, and online map viewer www.gsi.ie/Mapping
- Office of Public Works flood risk mapping, www.cfram.ie
- Water Framework Directive, watermaps.wdofireland.ie
- National Parks and Wildlife Service, <http://webgis.npws.ie/npwsviewer/>
- National Monuments Service, <http://webgis.archaeology.ie/NationalMonuments/FlexViewer/>
- Department of Environment, Community and Local government, <http://www.myplan.ie/viewer/>

Additional site specific documents were also reviewed, including:

- ESB International, Moneypoint Generating Station Ground and Groundwater Investigation, 2003
- URS Ireland Limited, Ash Storage Area Groundwater Assessment, 49341822, Issue 3 09 April 2010
- URS Ireland Limited, Ash Storage Area Assessment, 46402511, Issue 2 27 September 2011
- Soil Mechanics, Moneypoint 400 kV Substation Redevelopment Report on Ground Investigation, Y1947-12, Issue 1 April 2012
- Causeway Geotech, Moneypoint 400 kV Substation Site Investigation, 13-370, Revision A02 March 2014
- URS Ireland Limited, Hydrogeological Assessment, 47092799, Issue 2 17 September 2014
- Annual Environmental Reports for 2012, 2013 and 2014

2.2 Site Location

The site is located approximately 5 km south-east of Kilrush, Co. Clare, on the northern shore of the River Shannon Estuary, the site location is illustrated in Figure 1. Most of the site lies to the south of the N67 roadway, which links Kilrush in the west with Killimer to the east of the site, and is situated in the townland of Carrowdotia South. Surrounding landuse is predominantly agricultural and low density residential.

2.3 Site Layout

The site is 170 ha in area, 24 ha of which were reclaimed from the estuary. An aerial photograph is presented in Figure 2 with an annotated site layout in Figure 3 and photographs in Appendix A.

For the purposes of this report, the site has been divided into the following areas:

- Generating Station – this is located in the central area of the site and includes the turbines, transformers, heavy fuel oil (HFO) tanks and fire water retention ponds. The ESB's detailed 3D site view is presented in Appendix B. There are three generating turbines in this area of the site, a fourth was planned but not built.
- Coal Yard – is located to the east of the Generating Station and is approximately equal in size to it. Coal is delivered to the site from the purpose built jetty in the estuary and is transferred

from the jetty to the storage area from where it is transported to the Generating Station; approximately 2M tonne of coal is burned at the generating station each year. The Coal Yard is screened from view to the north by a ridge of higher ground.

- FGD Landfill – is located in the eastern corner of the site. Flue gas from the burning of coal is passed through granular lime to remove SOx² and NOx³ from the gas. The lime is then transported to the FGD landfill for disposal; over time, this granular deposit solidifies. Permission has been received from the local council and the EPA to use the FGD waste as a cap for the Ash Landfill, so it will no longer be necessary to landfill it separately.
- Contractors' Compound and Potential FGD Landfill – is located to the west of the Generating Station and includes a significant portion of the land reclaimed from the estuary. This area was originally planned for the construction of four generating turbines, which were not required. It was also considered as a potential FGD landfill once the current FGD Landfill in the east reached capacity; however, this is also no longer considered to be required. The area is currently used for storage.
- Ash Landfill – located in the north-western corner of the site, and is the only part of the site situated on the northern side of the N67 roadway. Ash from the burning of coal is landfilled in this area. There are two types of ash: pulverised fuel ash (PFA) and furnace bottom ash (FBA). When economically viable, PFA can be used in the production of cement, and this reduces the amount of the PFA produced on site which is landfilled. An economic use for FBA has recently been identified in the manufacture of building blocks.
- Green Area – an area of undeveloped land separates the Generating Station from the N67 Roadway. There are also green areas incorporated into the Ash Landfill, and around the perimeter of Coal Storage Yard and FGD Landfill.

2.4 Topography

Topography of the surrounding area is undulating. The general topographic gradient across the main site area (Generating Station, Coal Yard, FGD Landfill, Contractors' Compound and Green Area) is from north to south, toward the Shannon Estuary, which forms the southern site boundary. Across the western site area (Ash Landfill), the topographic gradient is more from north-east to south-west. The nearest topographic high point is approximately 60 m above Ordnance Datum (OD), along the N67 roadway approximately 1 km to the north-east of the site. The topographic gradient along the N67 is from this high point to the south-south-west. The southern and western site boundaries are along the shoreline.

Within the site, the topography was extensively altered during development, with much overburden and rock dug out, this material was used to reclaim the south-western portion of the site from the estuary. Much of the site is now in the process of being in-filled by site activities, specifically the FGD Landfill and Ash Landfill.

2.5 Hydrology

The main surface water feature in the vicinity of the site is the River Shannon Estuary (Lower), which forms the southern and western site boundaries. The River Shannon flows from east to west through the estuary, and water level is subject to tidal fluctuation (typically 0 m to 5 m OD). The site has its own jetty within the estuary for the delivery of coal and heavy fuel oil. There are other maritime activities within the estuary, including a ferry linking Killimer with Tarbert, Co. Kerry on the southern shore; port activities at Foynes and Limerick; and various fishing harbour and leisure boating activities.

Water quality in the River Shannon is brackish, due to the mixing of fresh water from the river with saline water from the Atlantic. Water quality is classified as "unpolluted", and as being of *Moderate Status* under the Water Framework Directive and at risk of not achieving *Good Status*. The Shannon Estuary is not used as a drinking water supply source. The site uses water from the estuary for cooling in the electricity generating station.

Within the main site area there are no surface water features. In the north-west of the site, within the Ash Landfill, a stream is mapped: the Molougha, which flows from north-east to south-west,

² Sulphur oxides

³ Nitrous oxides

discharging to the estuary close to the junction between the N67 road and the third class road from Dysert in the north. This is a small stream with no available water quality monitoring data.

To the north-east of the Ash Landfill is a pond into which several land-drains discharge. Water from this pond discharges through a culvert beneath the Ash Landfill and enters the estuary at a point just north of where the N67 turns to run west-east (the site's licensed surface water monitoring point SW1). During periods of dry weather, water from the pond is used for dust suppression within the landfill and on roads within the site.

According to historic maps, the Ash Landfill area was once subject to flooding during spring tides.

2.6 Designated Areas

The Lower River Shannon (which includes the estuary) is classified as a Special Area of Conservation (SAC), site code 002165; while the River Shannon and River Fergus estuaries are together classified as a single Special Protection Area (SPA), site code 004077.

There are many archaeological monuments within the area, with six ring forts outside the site boundary to the north-east. In the Ash Landfill area, within an area of scrub in the north-west, is a feature which is mapped as an earthwork, and there are two ring forts further to the west of this, outside the site boundary.

2.7 Regional Geology and Hydrogeology

Bedrock beneath the site is mapped as the Central Clare Group consisting of shale, sandstone, siltstone and coal dating from the Upper Carboniferous period (Namurian). The rocks occur in cycles, with the general sequence being thin shale at the base, thicker siltstone, and an upper sandy siltstone or sandstone and, sometimes, a top layer of coal. Historic maps show that, immediately to the south-east of the site and on the coastline, was Moneypoint Quarry, which was a source of slate and flagstone.

Overburden across most of the site is mapped as made ground, with some areas of peat and glacial till. Rock outcrop is also mapped in certain areas.

Bedrock beneath the site is classified as a locally important aquifer which is moderately productive in local zones. The overburden is not classed as an aquifer. Due to the thin overburden cover, the vulnerability of the bedrock aquifer to contamination is classified as ranging from high to extreme.

There is no drinking water source protection area within 2 km radius of the site. However, the GSI has records for several wells within a 2 km radius of the site. Some of the records in the GSI database relate to wells within the Moneypoint site, which were drilled as part of a site investigation in 1993 (see Section 2.8).

Other wells in the database may be related to earlier phases of investigation at the ESB site:

- Well B, drilled in 1982 and subsequently abandoned, to a total depth of 37.5 m below ground level (bgl) with a depth to bedrock of 7.6 m bgl and a yield of 93 m³/d
- BH91, drilled in 1978 to a depth of 2.1 m bgl, this appears to have been an investigation borehole that did not progress beyond the top of bedrock

There are also records for a spring and wells that were used for domestic and/or agricultural supply, it is not known if they are still in use:

- Well E, a seasonal spring which appears to have been located in the green area within the ESB site just south of the N67, and is reported to have had a yield of 49.1 m³/d
- Well C, which is given a similar location to Well E, drilled to a total depth of 150 m, with a depth to bedrock of 1 m bgl and a yield of 38.2 m³/d. According to the database, this well was later sealed
- Two shallow dug wells are noted at Ballymacrinan, to the north-west of the site, that were used for agricultural and domestic supply, total depth did not exceed 3.1 m bgl
- Two wells are located at Pouladarree to the east for agricultural and domestic supply; one is recorded as a shallow dug well (4 m in depth meeting bedrock at 1.8 m bgl) and the second was drilled to 29.7 m bgl, encountering bedrock at 0.9 m bgl

Many springs are noted on historic maps of the site and surrounding area. Several are noted in the townland of Carrowdotia North, with three of these appearing to be in the area now occupied by the Ash Landfill. Within the main site area, one spring is noted on the foreshore, this area appears to have since been reclaimed from the estuary.

Given the shallow depth to bedrock, the overburden is not considered to be a significant hydrogeological unit. From the well records, it appears that the sandstone units within the bedrock are more productive than the shale or siltstone units.

Given the site's location, the direction of groundwater flow through bedrock is expected to follow the topographic gradient, i.e. southwards across the main site area and possibly more south-westwards across the Ash Landfill. Fracturing within the bedrock may locally alter the groundwater flow direction. However, groundwater from the site is expected to ultimately discharge to the Shannon Estuary.

The bedrock aquifer beneath the site is divided into three groundwater waterbodies, see Figure 4:

- The Kilrush Groundwater Waterbody, IE_SH_G_123, this covers most of the site, including the Ash Landfill, the Coal Yard, the FGD Landfill and most of the Contractors' Compound in the west.
- The Kilrush 3 Groundwater Waterbody, IE_SH_G_126, this is just south of the N67 and encompasses the Green Area and the northern portion of the Generating Station Area.
- The Kilrush 4 Groundwater Waterbody, IE_SH_G_127, this encompasses the southern portion of the Generating Station Area and small sections of the Contractors' Compound and the Coal Yard.

The overall status of the three groundwater waterbodies is classified as *Good*. The risk status of Kilrush and Kilrush 4 is classified as *Probably Not At Risk*, while Kilrush 3 is classified as *Probably At Risk*.

2.8 Summary of Previous Site Investigations

The site has been subject to a number of site investigations over the years. As noted above, publically available records indicate that there may have been investigations conducted at the site in the 1970s and 1980s; however, given the length of time that has elapsed, no more detail is available than that which is already on public record.

Site-specific reports provided by the ESB, detail site investigations conducted for a variety of environmental and geotechnical purposes over the past 20+ years. A summary of available drilling records is provided in Table 1, with available drilling logs in Appendices C and D, and a site plan with monitoring well locations is presented in Figure 5.

2.8.1 1993 Ash Landfill Investigation

Six boreholes (BH01 to BH06) were drilled around the perimeter of the Ash Landfill, all of which were installed as groundwater monitoring wells (see Appendix C). All boreholes were commenced by the shell and auger drilling method, which is capable of drilling through unconsolidated material and allows for detailed logging. Some boreholes were progressed with rotary coring into the bedrock beneath.

Only logs are available for this investigation, no factual or interpretative report is available and it is not known if soil or groundwater samples were taken for laboratory analysis.

2.8.2 2002 and 2003 Site-wide Investigation

In accordance with the site's IPPC licence, a hydrogeological site investigation was completed to install a network of groundwater monitoring wells across the site.

BH07 to BH33 were drilled, and logs are provided in Appendix C. As in 1993, a combination of shell and auger and rotary drilling methods was used. In the report, boreholes drilled by rotary method are distinguished by the prefix RC, while BH was used for those boreholes drilled by shell and auger. However, the convention on-site has been to name all monitoring wells BH on subsequent site plans and in monitoring files, and this convention is maintained in this report.

Some boreholes were completed within overburden (shell and auger); while others were continued into bedrock by rotary drilling; and, at some locations, rotary boreholes were drilled adjacent to the shell and auger boreholes. Not all boreholes were installed with monitoring wells, where two

boreholes were drilled adjacent to each other, only one was installed as a monitoring well; there are no paired shallow-deep monitoring well installations. Some trial pitting was also conducted during this investigation.

Soil samples were collected from boreholes and trial pits; and analysed for particle size distribution (PSD) and chemical analysis, including metals and diesel range organics. Groundwater and surface water samples were also collected for laboratory analysis of major ions, metals and hydrocarbons.

The ground elevation relative to OD and location co-ordinates (to Irish National Grid) of all boreholes were recorded.

2.8.3 2012 Geotechnical Investigation

This focussed on three areas of the site: the 400 kV substation in the north of the Generating Station area; the waste transfer station to the east of the substation; and, the proposed waste transfer station and yard to the west of Boiler House No. 3 in the Generating Station Area. The site investigation area plan is provided in Appendix D, together with borehole logs.

While a large number of boreholes (19, BH-01 to BH-18), trial pits (15) and slit trenches (4) were completed, they were in a relatively small portion of the site as a whole. The majority of boreholes were shallow, <1 m bgl, terminating on bedrock, and no monitoring wells were installed as part of this investigation.

A limited number of soil samples were collected for laboratory analysis of geotechnical parameters, including PSD; and chemical analysis (hydrocarbons, polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs) and metals in leachate).

2.8.4 2013 Geotechnical Investigation

This investigation focussed solely on the waste transfer station to the east of the substation and all bores used rotary drilling to progress into rock, due to the limited depth achieved in the previous investigation. Eight boreholes were drilled (BH-19 to BH-26); logs and a site investigation area map are provided in Appendix D. No monitoring wells were installed.

2.8.5 Groundwater Monitoring

Under Condition 6 and Schedule C of the site's IEL, regular groundwater monitoring is required. Groundwater from all monitoring wells installed in the 1993 and 2002-2003 site investigations is required to be sampled (BH01 to BH32).

Groundwater from the majority of wells is sampled annually and analysed for a range of inorganic parameters and hydrocarbons. Given the large number of wells, annual sampling is staggered over the course of a calendar year. In addition, groundwater from wells BH16 to BH19, located in the FGD Landfill, is sampled on a quarterly basis for the same suite of parameters.

Available monitoring data are provided in Appendix E; over time, some wells have become damaged, which prevents their being sampled; while other wells are routinely dry.

2.8.6 2010 and 2011 Ash Landfill Assessments

Non-intrusive assessments of the Ash Landfill were undertaken by URS in 2010 and 2011.

The first considered the significance of certain metal concentrations in groundwater from well BH03 and concluded that background environmental conditions may contribute to some of the elevated concentrations, while potential leaching of metals from landfilled ash could also be a contributing factor. Elevated metal concentrations in groundwater beneath the Ash Landfill were not considered to pose a risk to human health, as groundwater is not potable. A potential risk to water quality in the Shannon Estuary from metals in groundwater was identified; however, analysis of surface water from both up-gradient and down-gradient of the site found no evidence of actual impact in the estuary.

The second assessment considered whether ash in the landfill poses a hazard to groundwater or surface water. It was concluded that, despite the concentrations detected in groundwater and surface water within the Ash Landfill, there was no environmental concern as, when the estimated flux of metals and the assimilative capacity of the estuary were taken into account, there was no predicted impact upon water quality in the estuary.

2.9 Site Geology and Hydrogeology

The geology beneath the site consists of made ground or glacial overburden (ranging from sandy gravelly clay to clayey cobbles and boulders), overlying bedrock of shale, siltstone and sandstone. As overburden is relatively thin and granular, groundwater in the overburden is considered to be in

hydraulic continuity with groundwater in the bedrock beneath. Given the extent of the site, several geological cross-sections are presented to illustrate geological and hydrogeological changes across the site, see Figure 5.

2.9.1 FGD Landfill

The cross-section presented in Figure 7 extends from the site boundary in the east-north-east through BH17, BH18, BH19 and BH09 to the Shannon Estuary. The boreholes for all four wells extend into bedrock, and all wells are screened within bedrock only. Wells BH17 and BH18 were drilled prior to the landfilling of FGD waste.

Ground elevation across this area declines steeply, with higher ground in the east-north-east (estimated elevation ~20+ m OD) declining down to sea level at the estuary. FGD waste accumulation has increased the ground elevation significantly within this area, to the extent that the standpipes of wells BH17 and BH18 have been extended several times; the current elevation of the top of the FGD landfill is not known.

Geological logs indicate that gravelly, clay fill lies between the FGD waste and bedrock. On the southern side of the FGD Landfill there is a steep embankment which, it is assumed, has been built up by rock fill (see Photographs 8 and 9 in Appendix A). The log for BH09 also indicates that rock fill has been used close to the Shannon Estuary.

Depth to groundwater measurements recorded in 2003, indicate that groundwater is unconfined within bedrock beneath the FGD Landfill. However, close to the estuary, the groundwater elevation is above the top of bedrock (BH09), indicating a slight upward hydraulic gradient into the overlying rock fill. This would be consistent with the presence of a spring along the shore which was noted on historic maps prior to land reclamation with rock fill.

The direction of groundwater flow across the FGD landfill is from north-east to south-west with the hydraulic gradient appearing to steepen close to the shore. A groundwater contour map for the site as a whole is presented in Figure 8. The hydraulic gradient between wells BH17 and BH18 is quite gentle at 0.003, this increases to 0.013 between wells BH18 and BH19. The hydraulic gradient then increases steeply between BH19 and BH09, close to the shore line, to 0.03.

Falling head permeability tests were conducted during the 2002-2003 site investigation. From the data it was not possible to calculate the hydraulic conductivity of the bedrock aquifer in the vicinity of BH09, BH18, BH19 or BH20. However, an estimate of 0.5 m/d was calculated for bedrock at BH17.

2.9.2 FGD Landfill and Coal Yard

The cross-section presented in Figure 9 extends from the site boundary in the north-east through BH16, BH08, BH21 and BH10 to the Shannon Estuary in the south-west, and cuts through portions of the FGD Landfill and Coal Yard.

The site boundary in the north-east is at a higher elevation to the rest of the site (between 15 m and 20 m OD), with the FGD Landfill and Coal Yard relatively flat (between 12 m and 14 m OD), and then a relatively steep drop close to the shoreline. Depth to bedrock increases from north-east to south-west, mirroring the topography to some degree. The thickness of overburden increases from <2 m at BH16, to 5.6 m at BH21, the overburden consists of made ground on clayey sand, sandy gravel and gravelly clay. Closer to the shoreline, there is a significant thickness of rock fill (5.5 m in BH10).

Most monitoring wells in this area are screened within bedrock, only BH21 is screened within gravelly clay overburden. Given the gravelly nature of the overburden, groundwater in the bedrock appears to be in hydraulic continuity with the overburden. The direction of groundwater flow is from north-east to south-west and the hydraulic gradient again appears to steepen close to the down-gradient site boundary. Between wells BH16 and BH21 the hydraulic gradient is 0.01, increasing to 0.04 between BH21 and BH10.

Of the falling head permeability tests conducted in this area in the 2002-2003 site investigation, it was only possible to calculate the hydraulic conductivity for the test in BH21, which was conducted in the gravelly clay overburden; an estimate of 4.8 m/d was calculated.

2.9.3 Generating Station

Figure 10 presents a cross-section that is also oriented from north-east to south-west, extending from the site boundary on higher ground (>20 m OD) through the transformer compound, HFO bunds, turbine hall and onto the Shannon Estuary in the south-west (0 m OD). Again, there is a distinct change in elevation across the site along the line of the cross-section, which runs through

boreholes for wells BH07, BH11, BH12 and BH22, as well as several geotechnical bores in the transformer compound.

Depth to bedrock varies, being fairly consistent between BH11 and BH12 (3-4 m OD), but varying considerably in the transformer compound and adjacent former waste transfer compound. In many of the geotechnical bores that were drilled in this area in 2012, bedrock was relatively close to ground level, but one bore was drilled to 6.45 m bgl without encountering bedrock. In the 2013 geotechnical investigation, the deepest bedrock was encountered was ~10 m bgl in BH-22, see Appendix D which also includes a cross-section through the area which illustrates variations in depth to bedrock within a fairly limited area.

Close to the Shannon Estuary, BH22⁴ was drilled to a total depth of 10 m bgl, and did not encounter bedrock. The geological log indicates that this bore went through gravel, cobbles and boulders, this is interpreted as rock fill used for land reclamation in this area. Wells BH14 and BH15 are also located in the Generating Station area, further east of BH22 along the coastline. They were also drilled through gravel, cobbles and boulders (interpreted as rock fill), although BH14 also progressed into bedrock.

The wells installed in BH14, BH15 and BH22 are primarily screened within rock fill. In the interior of the Generating Station Area, well BH07 is screened within sandy, gravelly clay overburden, while BH14 and BH12 are screened within bedrock. BH12 is the deepest borehole drilled on site, extending to a depth of 20.5 m bgl; the monitoring well installed in this bore is screened in bedrock from 14.5 m to 20.5 m bgl, or from -8.6 m to -14.6 m OD.

Groundwater flow across the Generating Station area is generally from north to south. Unlike the FGD Landfill and Coal Yard, the hydraulic gradient does not appear to steepen close to the estuary. The hydraulic gradient between wells BH07 and BH11 situated inland is 0.03 but decreases to 0.01 between BH12 and BH22, closer to the shoreline.

From falling head tests conducted in this area of the site the hydraulic conductivity of the overburden in well BH11 at 2.3 m/d.

2.9.4 Contractors' Compound and Green Area

Relatively few wells are installed across this area of the site given its size, with none at all in the Green Area, which is up-gradient of the main operational areas on site, however, it is also noted that that there is little activity in this area.

BH23, BH24, BH25A and BH26 are all located close to the shore. Boreholes for wells BH23, BH24 and BH25A were drilled into rock fill used to reclaim land from the estuary, all three wells are screened within rock fill. BH26 progressed through the rock fill into bedrock beneath, and the well is screened within bedrock.

BH27A and BH28 are located further inland. The borehole for BH27A progressed through gravelly clay fill into bedrock while BH28 was completed within fill and, as it is such a shallow well it is usually dry.

In the Green Area to the north, there appears to be an area of higher groundwater elevation with groundwater flow diverging from this to the north (toward the Ash Landfill) and south (across the Contractors' Compound). The area of higher groundwater elevation mirrors the topography.

The hydraulic gradient across this area is close to 0.03.

2.9.5 Ash Landfill

A total of ten wells have been installed around the perimeter of the Ash Landfill: BH01 – BH06, which were installed in 1993; and BH29 – BH32, which were installed in 2003.

The boreholes for BH01 – BH06 were drilled through overburden into the top of bedrock, but most of the wells installed are screened within overburden. The bedrock beneath was described as siltstone and sandstone. Boreholes BH29 – B32 did not progress into bedrock.

⁴ BH22 is the borehole and monitoring well that was installed during the 2002-2003 site investigation; as opposed to BH-22, a geotechnical borehole that was not installed as a monitoring well, from the 2012 site investigation.

The overburden consists of grey/brown, gravelly clay and silt with cobbles and boulders, underlain by silty gravel with cobbles and boulders. Peat layers were also encountered in boreholes BH06 (in the north of the Ash Landfill) and BH29 (in the south).

Ground elevation decreases from north (17.54 m OD at BH01) to south (2.87 m OD at BH29). A cross section is presented in Figure 11 that includes boreholes BH01, BH32, BH31, BH30 and BH29 and onto the site boundary at the N67 roadway, which is adjacent to the shoreline at this point. The standpipes of some wells have been extended since they were first installed, as ash has accumulated in the landfill, raising the ground elevation.

Groundwater flow along the line of the cross-section follows the topographic gradient. The main water bearing unit beneath the landfill appears to be the gravel horizon with cobbles and boulders; although, close to the shoreline, the base of the gravelly clay above becomes saturated. Most monitoring wells in this area are screened within overburden, rather than bedrock, however, it is expected that there is good hydraulic continuity between the bedrock aquifer and overlying gravel with cobbles and boulders, to the extent that they can be considered a single hydrogeological unit.

Across the Ash Landfill as a whole, groundwater flow appears to follow a convergent flow path. Flow is from north to south in the west of the landfill; from north-east to south-west across the middle of the site and from south-east to north-west across the south of the site. This indicates a zone of groundwater convergence across the middle of the landfill, which may be related to the presence of a culvert beneath the ash that runs from the pond in the north (near BH02, BH03 and BH06) to the south-west (near BH04 and BH05), where it discharges to the estuary (discharge point SW1).

Falling and/or rising head tests were conducted on wells BH02, BH05 and BH29, and hydraulic conductivities for the overburden calculated from these tests ranged from 0.6 m/d to 6.0 m/d.

3. SOURCE AUDIT FINDINGS

3.1 Previous Site Operations

The site was built on previously undeveloped land that had been used for agriculture. Approximately 24 ha of land was reclaimed from the estuary along the shoreline during the development phase, particularly in the south-west of the site. This land was reclaimed using overburden and rock fill that had been removed from areas of the site that subsequently became the FGD Landfill, Coal Yard and Generating Station.

Development of the site began in 1979 and commissioning was completed in 1987. There are three generating turbines within the Generating Station area; a fourth, though planned for this area, was not built. There is also space for four additional turbines in the area currently used as the Contractors' Compound.

Since the site was commissioned there has been relatively little change to its layout. Over time, the areas being actively filled in the FGD and Ash Landfills have changed as cells reach capacity and new cells become operational. The waste transfer station recently moved from a location just east of the transformer compound to one just west of the boiler houses.

3.2 Current Site Operations

The site generates electricity from the burning of coal, approximately 2M t of coal is burned each year, and the site has a capacity to generate 915 MW of electricity. Coal is delivered to the site by ships which unload at the jetty and coal is stored in the Coal Yard.

HFO and diesel are also delivered by sea to the site at the jetty. HFO is used to augment coal, when required for generation, while diesel is used to supply site vehicles. HFO is stored in two 25,000 t storage tanks and approximately 30,000 t is used annually to augment the coal supply. Diesel is stored in two 300 t tanks, one 200 m³ tank, one 60 m³ tank and one 1,200 L tank.

Coal burning produces ash which is landfilled in the Ash Landfill. Approximately 54,000 t of PFA and 5,600 t of FBA were landfilled in 2014. When economically viable, PFA and FBA can be used as raw materials for construction products (cement and concrete blocks).

Flue gas from the burning of coal is passed through granular lime to remove SO_x and NO_x. The resulting FGD waste is currently landfilled in the east of the site, approximately 46,700 t was landfilled in 2014. It is planned that FGD waste will be used as a capping material in the Ash Landfill in the future.

Samples of PFA, FBA and FGD are taken on a quarterly basis and analysed for pH and metals. The pH tends to be >9.0. Metals with the greatest bulk concentrations in ash tend to be aluminium and

iron (10,000 mg/kg to 25,000 mg/kg). By comparison, analysis of metals in leachate from ash in 2013 had an aluminium concentration of 20 µg/L and an iron concentration that was below the detection limit of 0.019 mg/L. Barium and boron had the highest concentrations in leachate, 16,200 µg/L and 3,180 µg/L, respectively.

Water is abstracted from the estuary by the site, treated and used for cooling. It is then discharged back to the estuary.

3.3 Chemicals of Potential Concern

The 3D site map in Appendix B provides a detailed overview of the site, highlighting areas where various chemicals and materials are stored. In addition to coal and its by-products, and the hydrocarbons listed above, other materials which are used on site include:

- Hydrochloric acid
- Ammonia
- Urea
- Sulphuric acid
- Caustic soda
- Lubricating oil (lube oil)
- Transformer oil

Additional detail on bulk storage at the site and associated drainage lines and discharges to the estuary is provided in the site layout also presented in Appendix B. Surface water lines in the Generating Station and Coal Yard areas of the site have interceptors. Surface water from these lines is monitored, in line with licence requirements, at discharge points to the estuary (discharge points SW1 to SW13).

Bunds, in which tanks and drums are stored, are integrity tested on a rotating three-year cycle. A drain survey was last completed in 2012 and repairs were undertaken in 2014.

4. CONCEPTUAL SITE MODEL

Given the size of the site, it can be considered as two hydrogeological zones:

1. The main site area to the south of the N67, encompassing the FGD Landfill, Coal Yard, Generating Station, Contractors' Compound and Green Area
2. The Ash Landfill to the north of the N67

4.1 Main Site Area - Sources, Pathways and Receptors

Land across the Main Site Area has been altered by development of the site. Extensive areas were dug out to create the FGD Landfill, Coal Yard and Generating Station, with a proportion of the Contractors' Compound reclaimed from the estuary.

There is relatively thin overburden cover overlying bedrock in the north and east, although significant accumulation of FGD waste has occurred in the FGD Landfill. Analysis of FGD waste in 2013 indicates that it has elevated concentrations of certain metals and a pH of up to 12.7. Bedrock is considered to be the main groundwater bearing unit and it is considered to be in hydraulic continuity with the granular overburden. Recharge of the aquifer occurs through the infiltration of rainfall through the overburden, FGD waste and coal vertically downwards to the bedrock. Groundwater then migrates with hydraulic gradient, generally from north-east to south-west, eventually discharging to the estuary. There are no users of groundwater located down-gradient of the site, and water in the River Shannon Estuary does not have a potable resource value.

The majority of potential sources of contamination are located within this area: FGD waste, coal, HFO, diesel, lube oil, transformer oil, acids, bases and other chemicals. Apart from the FGD waste and coal, the majority of potential sources are within the Generating Station Area. With regard to coal as a potential source of contamination (hydrocarbons and metals) it is noted that the native bedrock is reported to include some thin coal seams.

Limited soil sampling and chemical analysis was conducted as part of the site investigations completed in 2003 and 2012.

In 2003, a total of 15 soil samples were collected and analysed for a suite of metals, inorganics and diesel range organics. No particularly elevated metal concentrations were noted and diesel range organics were detected in two soil samples, at 81 mg/kg and 50 mg/kg. Most metal and inorganic results were reported to be within the normal range for Irish agricultural soils.

In 2012, four soil samples were collected and analysed from around the transformer compound and waste storage area. No PAHs or PCBs were detected above reporting limits. While total petroleum hydrocarbons were detected, the concentrations were low (<125 mg/kg) and no BTEX⁵ hydrocarbons were detected.

From the available soil analytical data, it appears that there is limited impact to soil by potential contaminants of concern within this area.

Groundwater monitoring data is available for the FGD Landfill area on a quarterly basis, while groundwater is sampled on an annual basis from wells across the other areas. Groundwater samples are analysed for metals, major ions, hydrocarbons and PAHs.

Metals

- Aluminium concentrations regularly exceed the GTV⁶ (150 µg/L) and IGV⁷ (200 µg/L) in groundwater from wells BH07, BH10, BH14, BH15, BH17, BH18, BH19, BH21 and BH27, with sporadic exceedences in groundwater from the other monitoring wells. Concentrations in groundwater are generally below 1,000 µg/L, the highest concentration detected to date was 6,322 µg/L in groundwater from BH14 in 2007.
- Arsenic concentrations regularly exceed the GTV (7.5 µg/L) and IGV (10 µg/L) in groundwater from wells BH10, BH15, BH22, BH23 and BH26, with sporadic exceedences in groundwater from other monitoring wells. The highest concentration detected to date was 130 µg/L in groundwater from BH10 in 2009.
- Barium concentrations regularly exceed the IGV (100 µg/L) in groundwater from wells BH16, BH17, BH18 and BH19, with sporadic exceedences in groundwater from other monitoring wells. The highest concentration detected to date was 1,750 µg/L in groundwater from BH18 in 2011.
- Boron concentrations regularly exceed the GTV (750 µg/L) and IGV (1,000 µg/L) in groundwater from wells BH10, BH14, BH15, BH22, BH23, BH25 and BH26, with sporadic exceedences in groundwater from other monitoring wells. The highest concentration detected to date was 4,800 µg/L in groundwater from BH15 in 2011.
- Concentrations of other metals sporadically exceed thresholds, where defined.

Elevated concentrations of metals in groundwater can be grouped into two sets of wells: those wells located close to the estuary or in reclaimed land; and, those wells located in the FGD Landfill area. The highest concentrations of boron and arsenic tend to be detected in wells close to the estuary, while the highest concentrations of barium tend to be detected in groundwater from FGD Landfill monitoring wells. Aluminium concentrations tend to be elevated across all areas.

Analysis of FGD waste in 2013 indicates that it has a barium concentration ranges between 100 mg/kg and 150 mg/kg. Rainfall recharge to the aquifer infiltrates through the FGD waste and in doing so may pick up barium. However, barium concentrations in groundwater from down-gradient of the FGD Landfill (wells BH09 and BH10) are at background levels.

Major Ions

⁵ BTEX: benzene, toluene, ethyl benzene and total xylene

⁶ Groundwater Threshold Value, European Environmental Objectives (Groundwater) Regulations, SI No. 9 of 2010

⁷ Interim Guideline Value, EPA, Towards Setting Guideline Values for the Protection of Groundwater in Ireland, 2003

Based on major ion results, groundwater beneath the main site area can be divided into three areas depending on the degree of interaction between groundwater and brackish water from the estuary.

Those wells located some distance from the estuary tend to have the lowest major ion concentrations: BH07, BH11, BH12 and BH28. Chloride concentrations are typically <50 mg/L and sulphate <100 mg/L.

Wells beneath the FGD Landfill tend to have intermediate major ion concentrations: chloride generally <1,000 mg/L, sulphate <1,000 mg/L, calcium <300 mg/L. Given that these wells tend to be screened several metres above OD, and are unlikely to be strongly influenced by estuarine water, it is considered that the major ion concentrations may be related to recharge infiltrating through the FGD waste to the aquifer beneath.

Wells located close to the shoreline and in areas of reclaimed land tend to have the highest major ion concentrations: chloride >10,000 mg/L, sodium >1,000 mg/L, sulphate >1,000 mg/L and calcium >300 mg/L. As can be seen from the cross-sections in Figures 7 and 9, some wells are essentially screened with the estuary, e.g. BH10, which is located in an area of reclaimed land close to the shoreline and screened in rock fill below OD. The high major ion concentrations in groundwater from these wells are considered to be due to interaction with estuarine water and not related to site activities.

Hydrocarbons and PAHs

It is only in groundwater monitoring well BH16 that hydrocarbons are intermittently detected, occasionally rising above 1,000 µg/L, and there are sporadic detections of PAHs. BH16 is located adjacent to a roadway and in an area of vehicle movement around the FGD Landfill and Coal Yard. Hydrocarbons and PAHs are generally below detection limits in groundwater from other wells across the main site including those located down-gradient of BH16 (BH08, BH09, BH10 and BH21).

Summary of Viable Sources-Pathways-Receptors, Main Site Area

Sources	Pathways	Receptors
FGD waste in the FGD Landfill	Vertical migration downward of rainfall recharge through the unsaturated zone to groundwater within deeper granular overburden and bedrock	Human Health – none identified Controlled Water – Shannon Estuary, a SAC and SPA. Water from Shannon Estuary is not used for potable supply
Coal in the Coal Yard		
Chemicals, HFO, hydrocarbon (diesel, lube oil and transformer oil) storage areas in the Generating Station	Lateral migration through granular overburden and bedrock which are considered a single hydrogeological unit	

4.2 Ash Landfill – Sources, Pathways and Receptors

The Ash Landfill is in a natural depression which, according to historic maps, was prone to flooding during spring tides. Unlike the main site area, where overburden can be thin or absent in places; the overburden is relatively thick across the Ash Landfill, with depth to bedrock being generally >5 m. Overburden is generally composed of gravelly clay, overlying gravel with cobbles and boulders, this in turn overlies the sandstone bedrock. Peat and clay are also present around the perimeter of the landfill.

There are fewer potential sources of contamination across the Ash Landfill, as there is no chemical storage in this area, the main potential source is the ash itself which has a high pH and some elevated metals. As there is vehicle activity in this area, there is also the potential for hydrocarbon contamination.

Unlike the main site area where the majority of monitoring wells are screened within bedrock, the majority of monitoring wells are screened within overburden beneath the Ash Landfill. The watertable resides within the deeper granular overburden layer, given its granular nature the overburden is considered to be in hydraulic continuity with the bedrock beneath, as appears to be the case beneath the main site area. Closer to the shoreline, it appears that the base of the shallower, finer grained, gravelly clay becomes saturated. Groundwater discharges to the estuary and it is expected that there may be an upward hydraulic gradient from the bedrock and granular overburden into the gravelly clay close to the site boundary with the estuary.

Recharge of the aquifer occurs through the infiltration of rainfall through the ash waste and shallow, finer grained overburden downwards to the granular overburden and bedrock. Groundwater then migrates with hydraulic gradient eventually discharging to the estuary. Groundwater contours indicate that there may be a hydraulic connection between groundwater beneath the Ash Landfill and a culverted drain that runs from the pond in the north-east to surface water discharge point SW1, beside wells BH04 and BH05. It appears from the contours, that shallow groundwater may discharge to the culvert, probably getting into the culvert through cracks or unsealed joints.

There are no users of groundwater located down-gradient of the site, and water in the River Shannon Estuary does not have a potable resource value.

Metals

Generally, metal concentrations are below relevant screening criteria (GTVs and IGVs); however, aluminium and boron concentrations are frequently above GTVs and IGVs in groundwater from certain monitoring wells.

Aluminium concentrations above the GTV (150 µg/L) and IGV (200 µg/L) are frequently detected in groundwater from wells: BH03, BH30, BH31 and BH32. The highest concentration of aluminium detected to date was 9,864 µg/L in groundwater from BH31 in 2014. In comparison, the aluminium concentration in ash leachate analysed in 2012 and 2013 was close to 20 µg/L.

Boron concentrations above the GTV (750 µg/L) and IGV (1,000 µg/L) are frequently detected in groundwater from wells: BH03, BH04, BH05 and BH29. Concentrations are generally between 1,000 µg/L and 10,000 µg/L, the highest concentration recorded to date was 12,540 µg/L in groundwater from BH03 in 2004. The boron concentration in ash leachate in 2012 was 4,250 µg/L and 3,180 µg/L in 2013. An assessment of groundwater beneath the Ash Landfill in 2010 concluded that the boron concentrations could be naturally occurring, as the boron concentration of seawater is ~4,450 µg/L⁸. Analysis of surface water samples collected by URS in 2010 detected boron at concentrations between 2,300 µg/L and 2,600 µg/L (these samples were collected from up-stream and down-stream of surface water discharge point SW1).

As seen in the main site area, aluminium concentrations tend to be elevated across the area as a whole, while boron concentrations tend to be elevated in groundwater from those wells that are located close to the estuary. In the Ash Landfill area, wells BH04, BH05 and BH29 are located close to the estuary.

In 2011, URS completed an assessment of the toxicological properties of metals of potential concern and concluded that the concentrations detected in groundwater and surface water within the Ash Landfill area were not of environmental concern. When the estimated flux of metals and the assimilative capacity of the estuary were taken into account, the predicted metal concentrations were significantly below Irish quality standards.

Major Ions

Higher major ion concentrations are detected in groundwater from wells adjacent to the Shannon Estuary. As across the main site area, this reflects the interaction between brackish estuarine water and groundwater.

Hydrocarbons and PAHs

Hydrocarbons and PAHs are generally below detection limits in groundwater from across the Ash Landfill. It is only in groundwater from well BH01 that hydrocarbons tend to be detected. However, the detections are intermittent. Well BH01 is located in an up-gradient position around the perimeter of the landfill, and hydrocarbons tend to be below detection limits in groundwater from monitoring wells located down-gradient.

⁸ James Drever, *The Geochemistry of Natural Waters*, 2002, 3rd ed.

Summary of Viable Sources-Pathways-Receptors, Ash Landfill Area

<i>Sources</i>	<i>Pathways</i>	<i>Receptors</i>
Metals and major ions from ash and hydrocarbon (diesel)	Vertical migration of rainfall recharge downward through the unsaturated zone (ash and finer grained overburden) to groundwater within deeper granular overburden and bedrock Lateral migration through granular overburden and bedrock which are considered a single hydrogeological unit	Human Health – none identified Controlled Water – Shannon Estuary, an SAC and SPA. Water from Shannon Estuary is not used for potable supply

5. SUMMARY, CONCLUSIONS & RECOMMENDATIONS

5.1 Summary and Conclusions

The Moneypoint electricity generating station occupies 170 ha and is located on the northern shore of the River Shannon Estuary Lower, an SAC and SPA. The station generates electricity through the burning of coal and much of the site is used for the storage of coal and by-products of its burning (ash and FGD waste).

During site development, the land surface of the site was altered through extensive cut and fill operations – soil and bedrock were dug out to make way for the Generating Station, FGD Landfill and Coal Yard areas, and used to reclaim land from the estuary in the south-west of the site, the Contractor’s Compound. Currently, the Ash Landfill in the north-west and FGD Landfill in the east are being in-filled with ash and FGD waste, respectively.

Chemical storage, which is primarily limited to hydrocarbons, acids and bases, is within bunded tanks and drum stores around the Generating Station area. Drainage from the operational site areas is through a series of lines which pass through interceptors before discharging to the estuary at monitored surface water discharge points.

Although limited soil sampling has been conducted at the site, from the available soil data and also from groundwater monitoring data, it appears that there has been limited impact to soil from activities on site.

A network of over thirty groundwater monitoring wells was installed at the site in 1993 and 2002-2003. Not all of these wells remain accessible and some tend to be dry, but the majority are sampled on an annual basis, with wells in the FGD Landfill area sampled on a quarterly basis. Samples are analysed for a suite of metals, major ions and hydrocarbons, including PAHs.

The main water bearing units beneath the site are the bedrock (shale, siltstone and sandstone with occasional coal layers) and overlying coarse-grained overburden (gravel with cobbles and boulders); together these are considered a single hydrogeological unit. Groundwater flow across the site is from north-east to south-west or north-south, discharging to the River Shannon Estuary.

Groundwater is not used at the site or down-gradient of the site, and water from the estuary is not used for potable supply. Therefore, there are no Human Health receptors of groundwater and the only Controlled Waters receptor is the River Shannon Estuary.

Analytical results indicate that there is interaction between groundwater and estuarine water along the shoreline and in the area of reclaimed land. The elevated concentrations of major ions and some metals in groundwater from this area are due to this interaction.

There are indications that metals are leaching into groundwater from the FGD waste and ash waste. However, results also indicate that the resulting concentrations are either no higher than in the receiving water (aluminium) or decline to background concentrations before discharging to the estuary (barium).

Hydrocarbons are detected in groundwater from isolated wells (BH16 and BH01). The intermittent detections in groundwater from these wells indicate that there is not a persistent source of hydrocarbons and it is likely to be related to vehicle movements in these areas.

5.2 Recommended Way Forward

Continued groundwater monitoring in line with requirements of the site’s IEL is recommended.

The IEL states that groundwater from all monitoring wells on site should be sampled on an annual basis for analysis of a suite of organic and inorganic parameters. To facilitate direct comparison of results between monitoring wells, it is recommended that the annual monitoring round be conducted within a discrete time period, given that there are approximately 30 monitoring wells it is estimated that a single monitoring round could be conducted over three to four consecutive days on site.

The IEL also states that monitoring wells be monitored quarterly for field parameters – pH, electrical conductivity, depth to groundwater and physical inspection (appearance and odour), as well as analysis of sulphate.

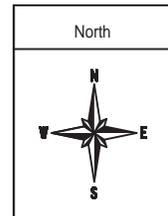
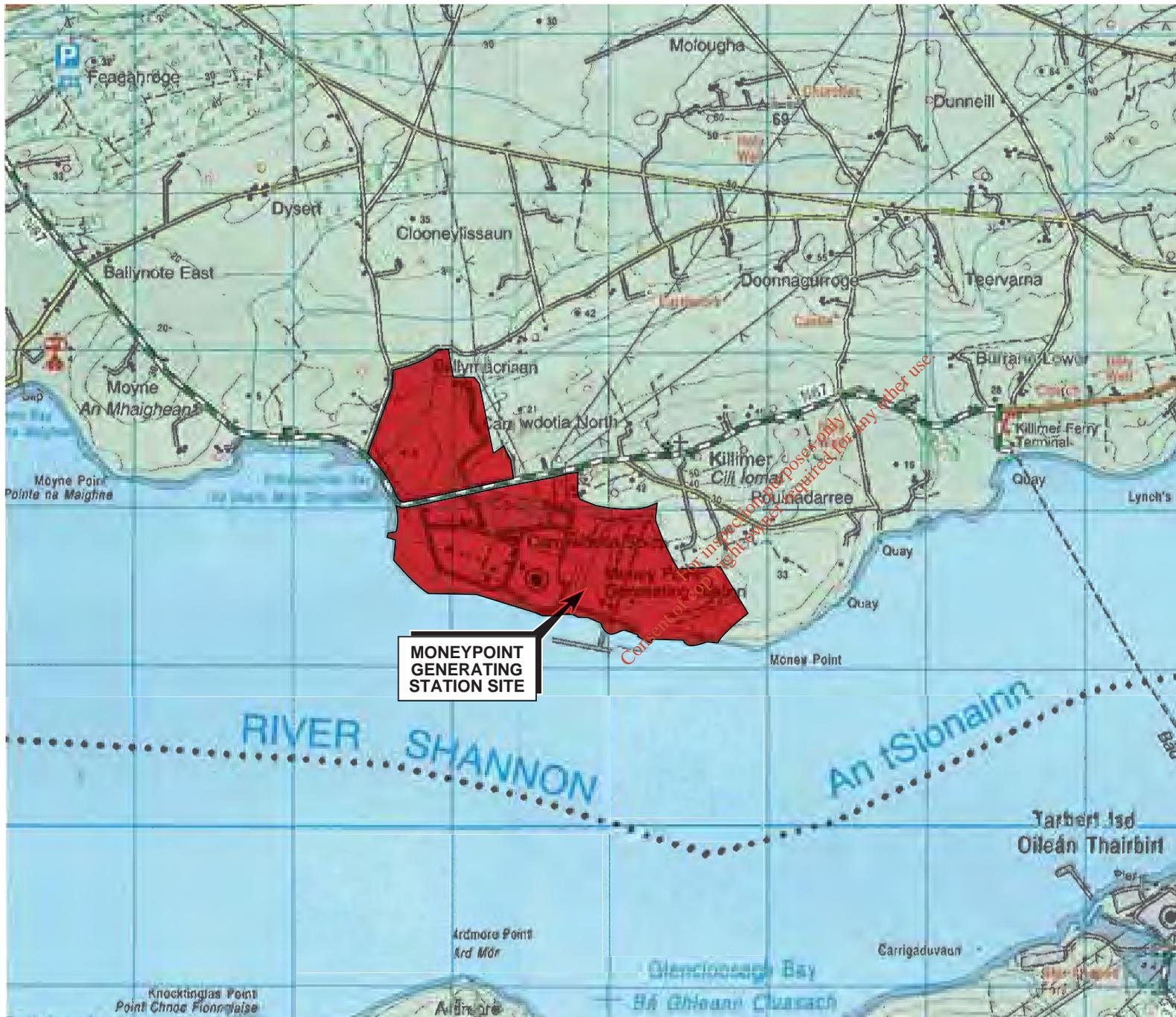
Depth to groundwater measurements should be recorded using an electronic water level dip meter or interface probe. This should be conducted within a restricted time period (two to three hours) and noting when on the tidal cycle the dip round was completed. The total depths of wells should also be recorded during these dip rounds. As the standpipes of some monitoring wells have been extended (i.e. some wells within the FGD Landfill and Ash Landfill) the top of well casing elevations should be surveyed relative to OD, and this should be repeated each time a well standpipe is extended. Combining top of well casing elevations with depth to groundwater measurements will allow groundwater elevations to be calculated for each dip round and changes in groundwater flow direction and hydraulic gradient to be determined.

To allow for direct comparison of metal and major ion concentrations in groundwater beneath the site with concentrations in the estuary it is recommended that surface water samples from the estuary be collected from locations up and down-stream of the site.

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Figures



NOTES

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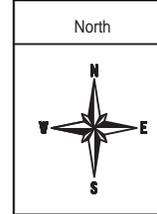
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CLIENT
ELECTRICITY SUPPLY BOARD

PROJECT
HYDROGEOLOGICAL CSM

DRAWING TITLE
FIGURE 1_ SITE LOCATION PLAN

DRAWN	TRACED	CHECKED	APPROVED	DATE
DH		EO'H	KF	JUNE 2015
SCALE	DRG NO.			REV
NTS	47093013			



NOTES

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SITE BOUNDARY

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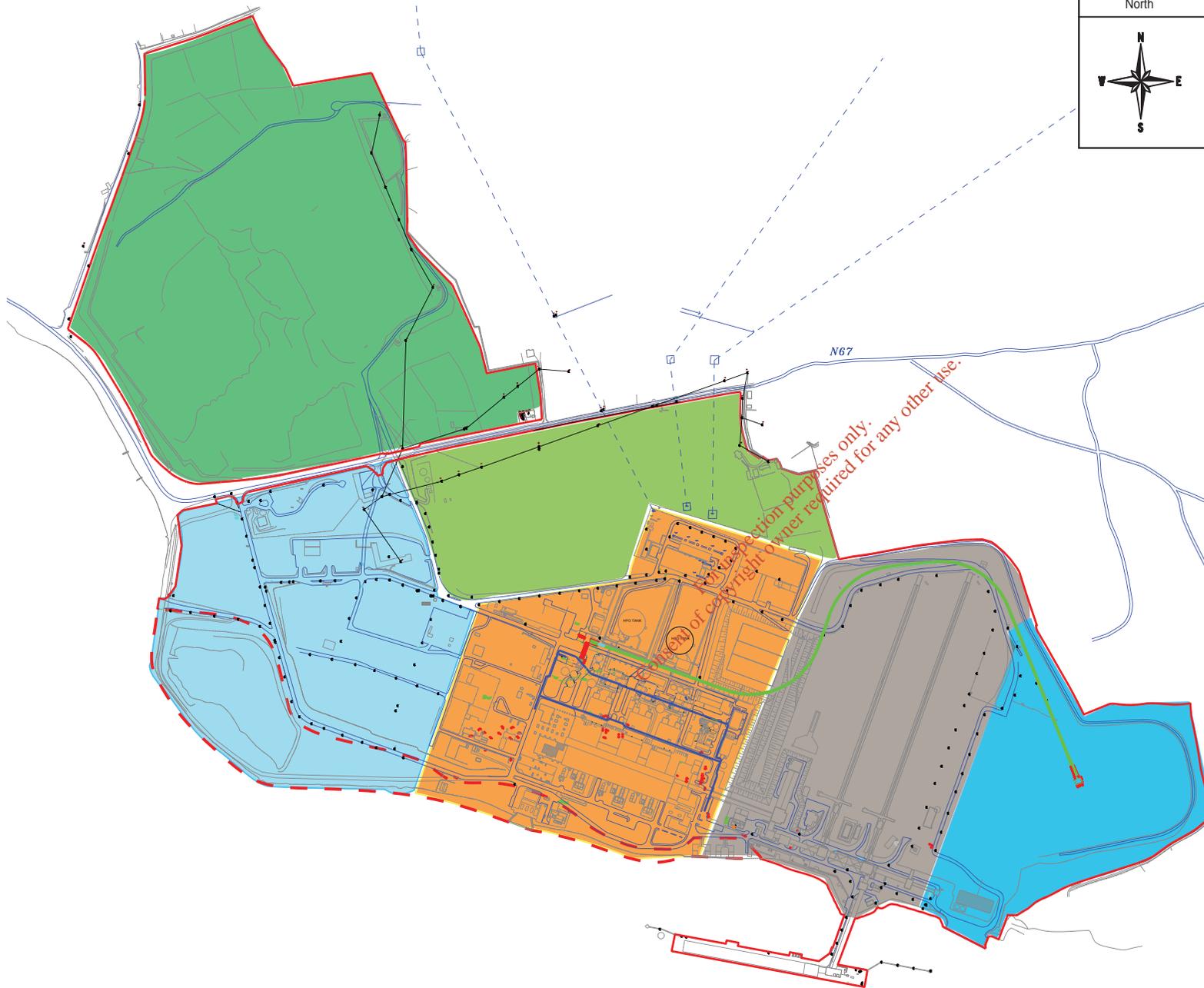
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DRAWING TITLE
FIGURE 2_ AERIAL PHOTOGRAPH

DRAWN DH	TRACED	CHECKED EO'H	APPROVED KF	DATE JUNE 2015
SCALE NTS	DRG NO. 47093013			REV



NOTES

- SITE BOUNDARY
- - - AREA OF RECLAIMED LAND
- COAL ASH DIPOSAL
- FGD CELLS
- COAL YARD
- GREEN AREA
- GENERATING STATION
- CONTRACTORS COMPOUND & GREEN AREA

AECOM

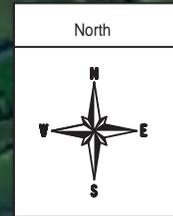
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DRAWING TITLE
FIGURE 3_ SITE LAYOUT

DRAWN	TRACED	CHECKED	APPROVED	DATE
DH		EO'H	KF	JUNE 2015
SCALE	DRG NO.			REV
NTS	47093013			



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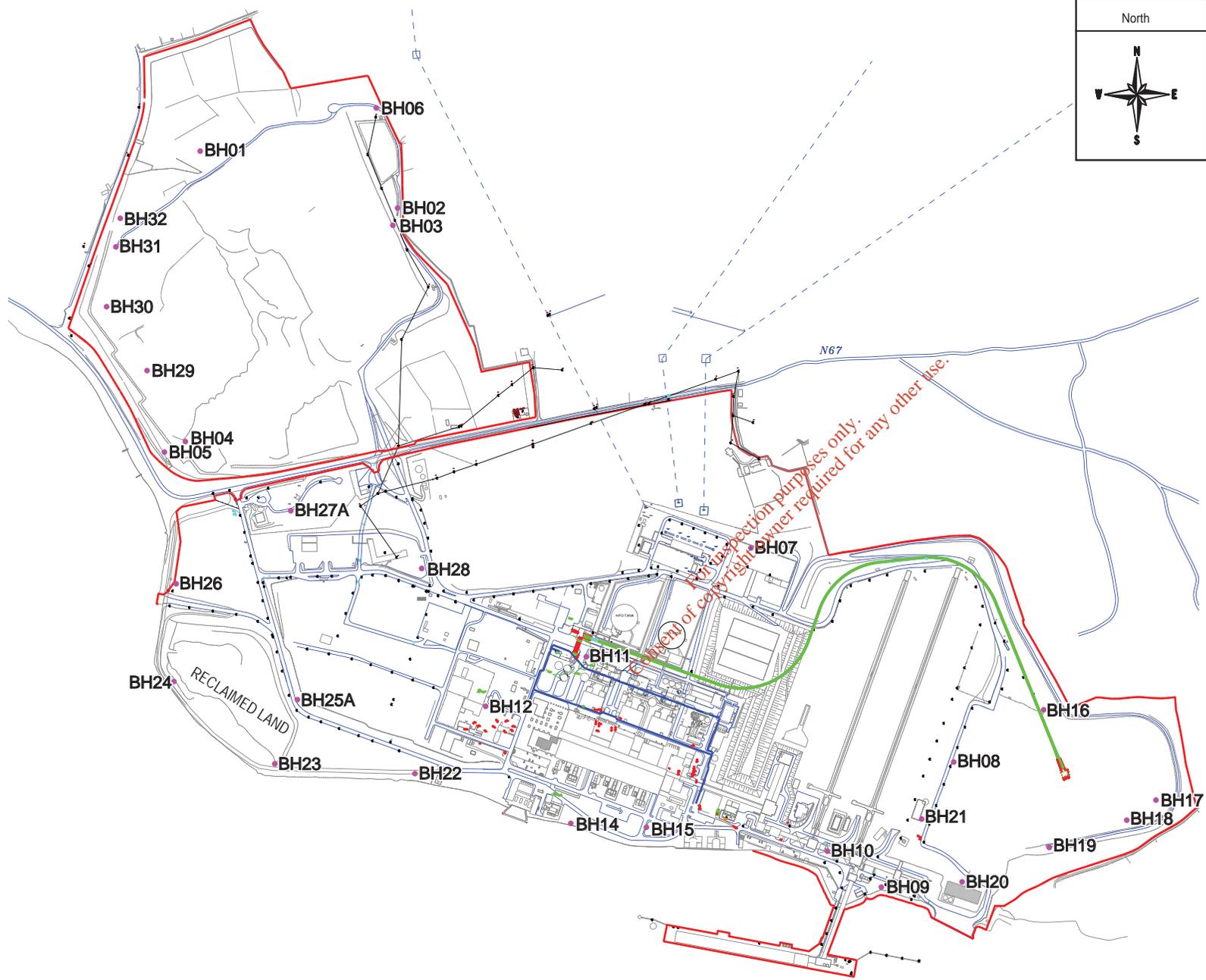
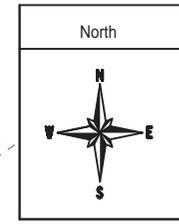
PROJECT
HYDROGEOLOGICAL CSM

DRAWING TITLE
FIGURE 4_WFD GROUNDWATER BODIES

DRAWN DH	TRACED	CHECKED EO'H	APPROVED KF	DATE JUNE 2015
SCALE NTS	DRG NO. 47093013	REV		

NOTES

- SITE BOUNDARY
- MONITORING WELL LOCATION



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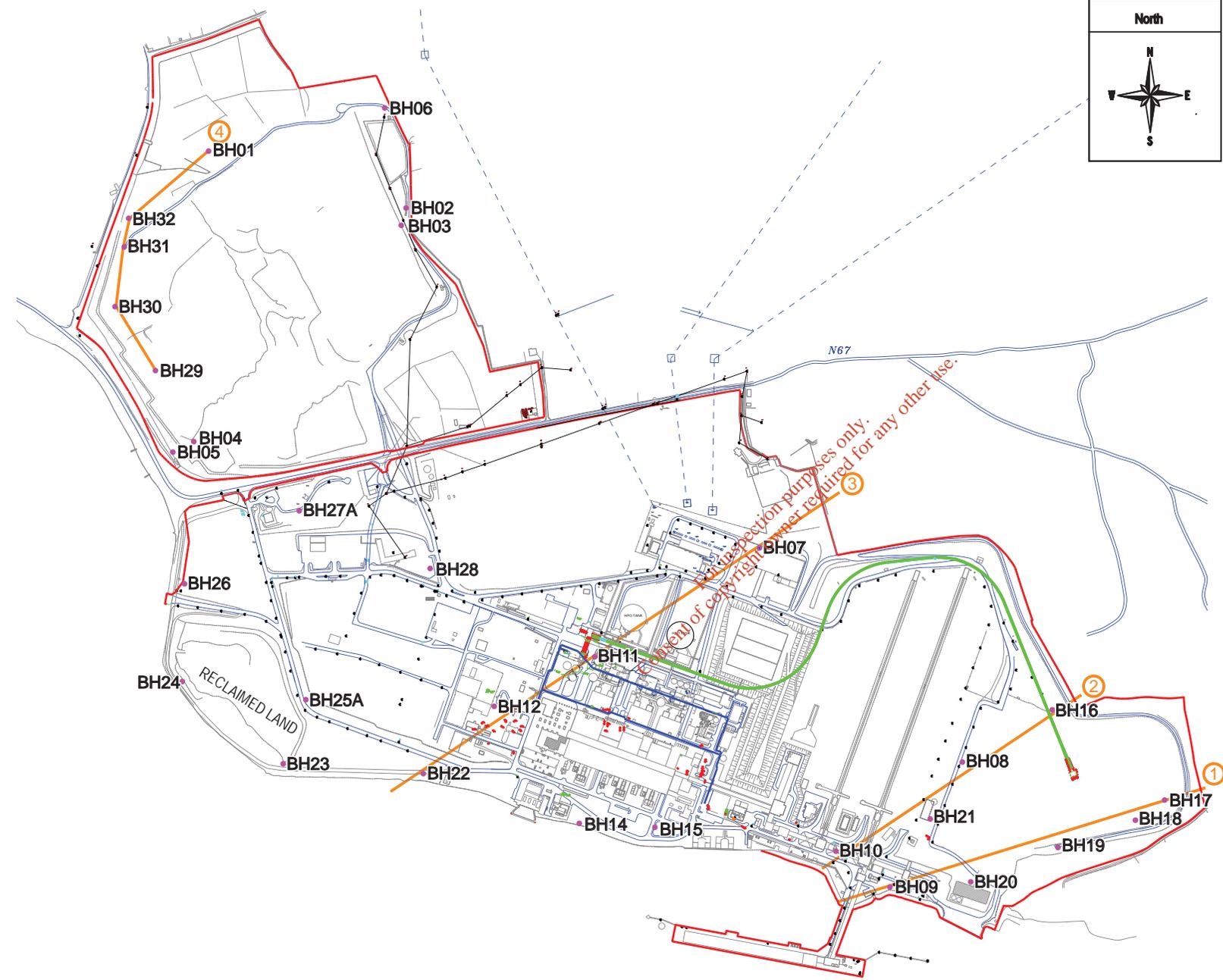
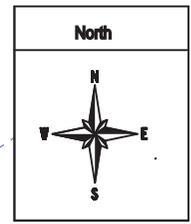
PROJECT
HYDROGEOLOGICAL CSM

DRAWING TITLE
FIGURE 5_ GROUNDWATER MONITORING WELLS

DRAWN	TRACED	CHECKED	APPROVED	DATE
DH		EO'H	KF	JUNE 2015
SCALE	DRG NO.			REV
NTS	47093013			

NOTES

- SITE BOUNDARY
- CROSS SECTION ORIENTATION
- MONITORING WELL LOCATION



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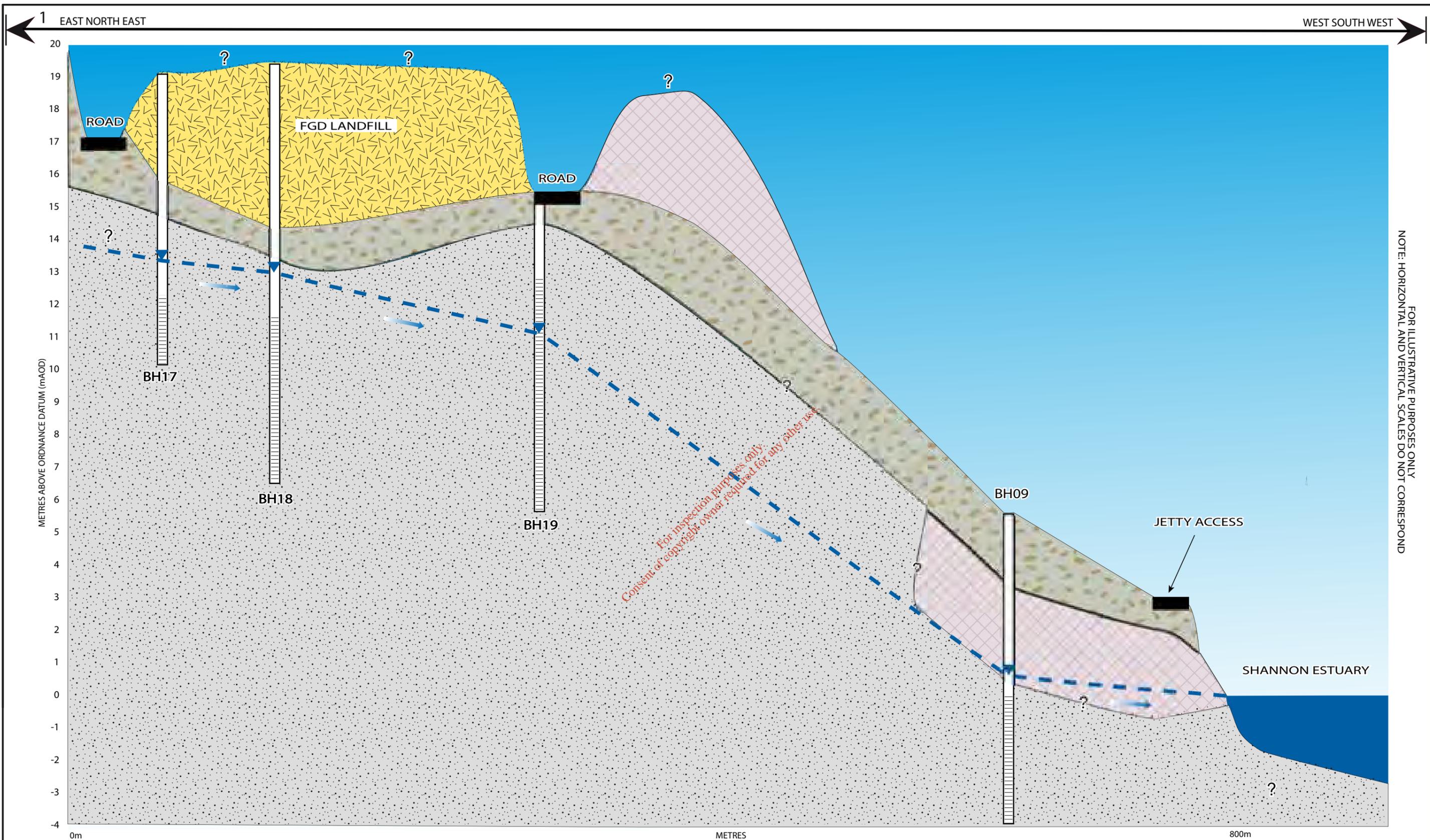
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HYDROGEOLOGICAL CSM

DRAWING TITLE
FIGURE 6_ SITE LAYOUT SHOWING CROSS SECTION ORIENTATION

DRAWN	TRACED	CHECKED	APPROVED	DATE
DH		EO'H	KF	JUNE 2015
SCALE	DRG NO.	47093013		REV
NTS				



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ELECTRICITY SUPPLY BOARD

DRAWING TITLE
FIGURE 7 _ CROSS SECTION 1

PROJECT
HYDROGEOLOGICAL CSM

DRAWN DH	TRACED	CHECKED EO'H	APPROVED KF/COR	DATE JUNE 2015
SCALE N.T.S	Job No: 47093013	REV A		

LEGEND:

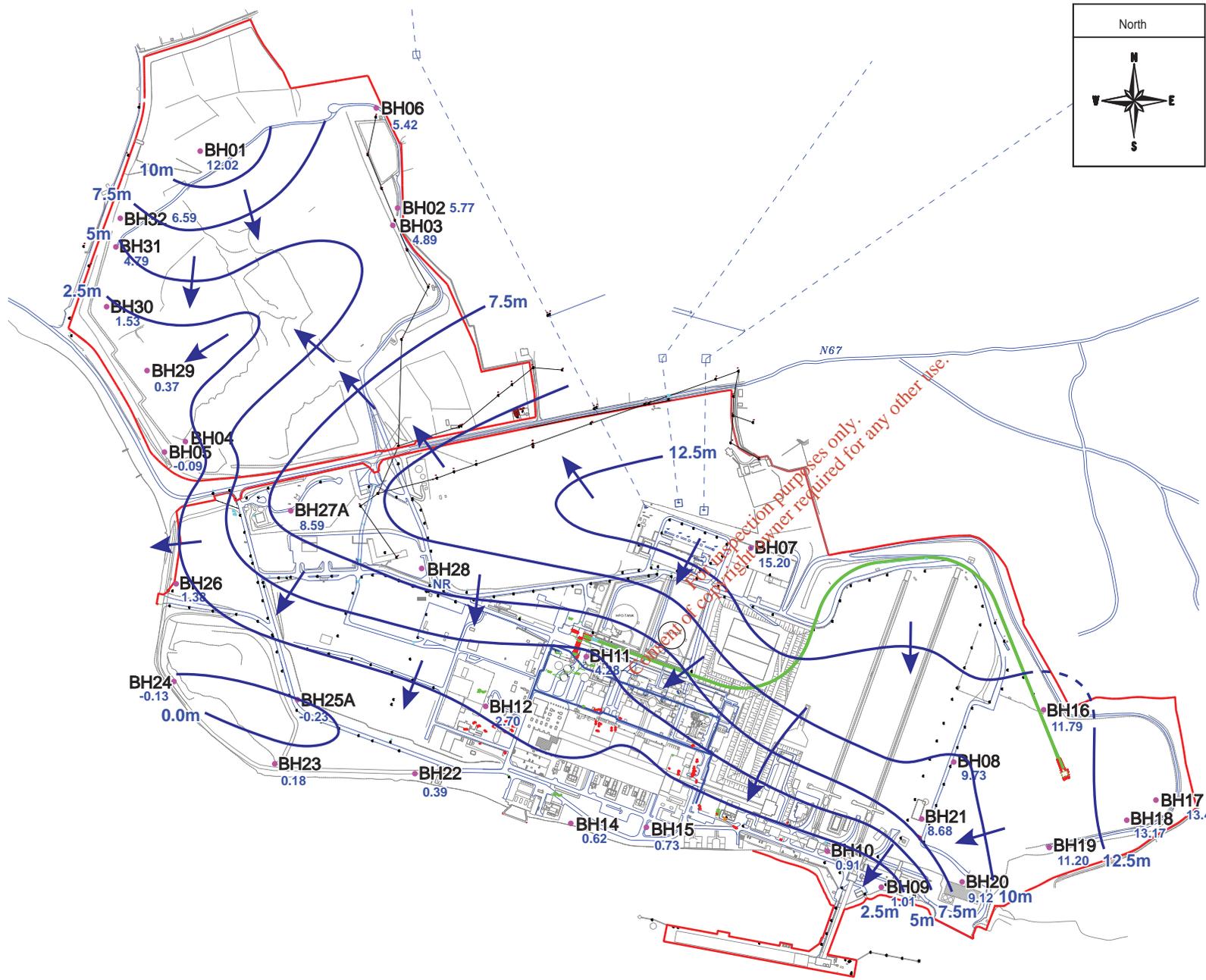
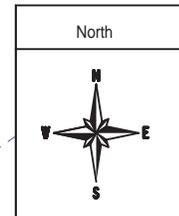
	FGD WASTE		SHALE, SILTSTONE & SANDSTONE
	MADE GROUND/ROCK FILL		GRAVELLY CLAY WITH COBBLES & BOULDER FILL
	INFERRED GROUNDWATER FLOW DIRECTION		INFERRED GROUNDWATER ELEVATION
	GROUNDWATER ELEVATION FEBRUARY 2003		

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NOTES

- SITE BOUNDARY
- MONITORING WELL LOCATION
- GROUNDWATER CONTOURS
- 53.65 ELEVATION IN METERS ABOVE ORDNANCE DATUM
- NR NOT RECORDED
- FLOW DIRECTION
- - - INFERRED GROUNDWATER CONTOURS



AECOM

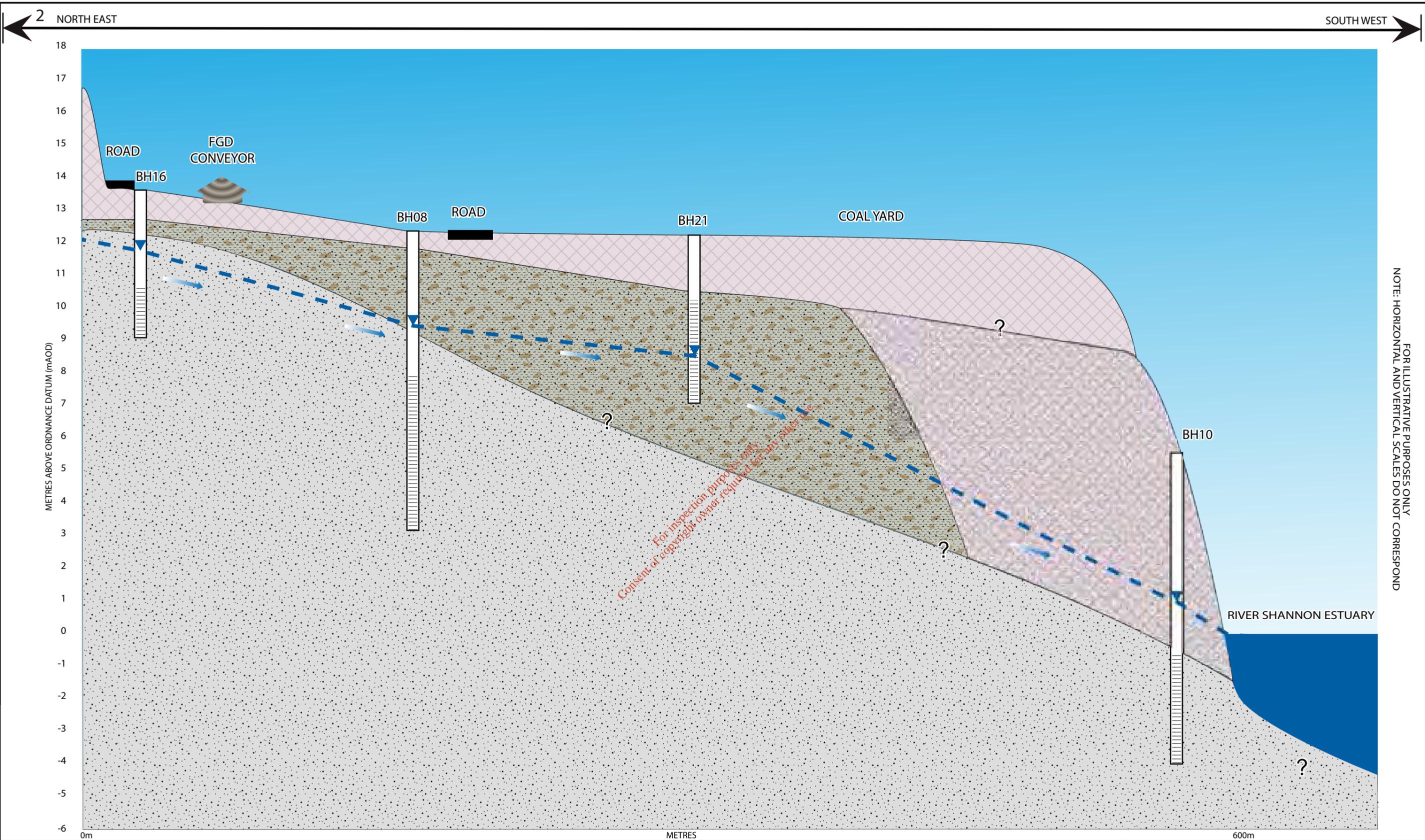
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HYDROGEOLOGICAL CSM

DRAWING TITLE
**FIGURE 8_ GROUNDWATER CONTOUR MAP
FEBRUARY 2003**

DRAWN	TRACED	CHECKED	APPROVED	DATE
DH		EO'H	KF	JUNE 2015
SCALE	DRG NO.			REV
NTS	47093013			



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ELECTRICITY SUPPLY BOARD

DRAWING TITLE
FIGURE 9 _ CROSS SECTION 2

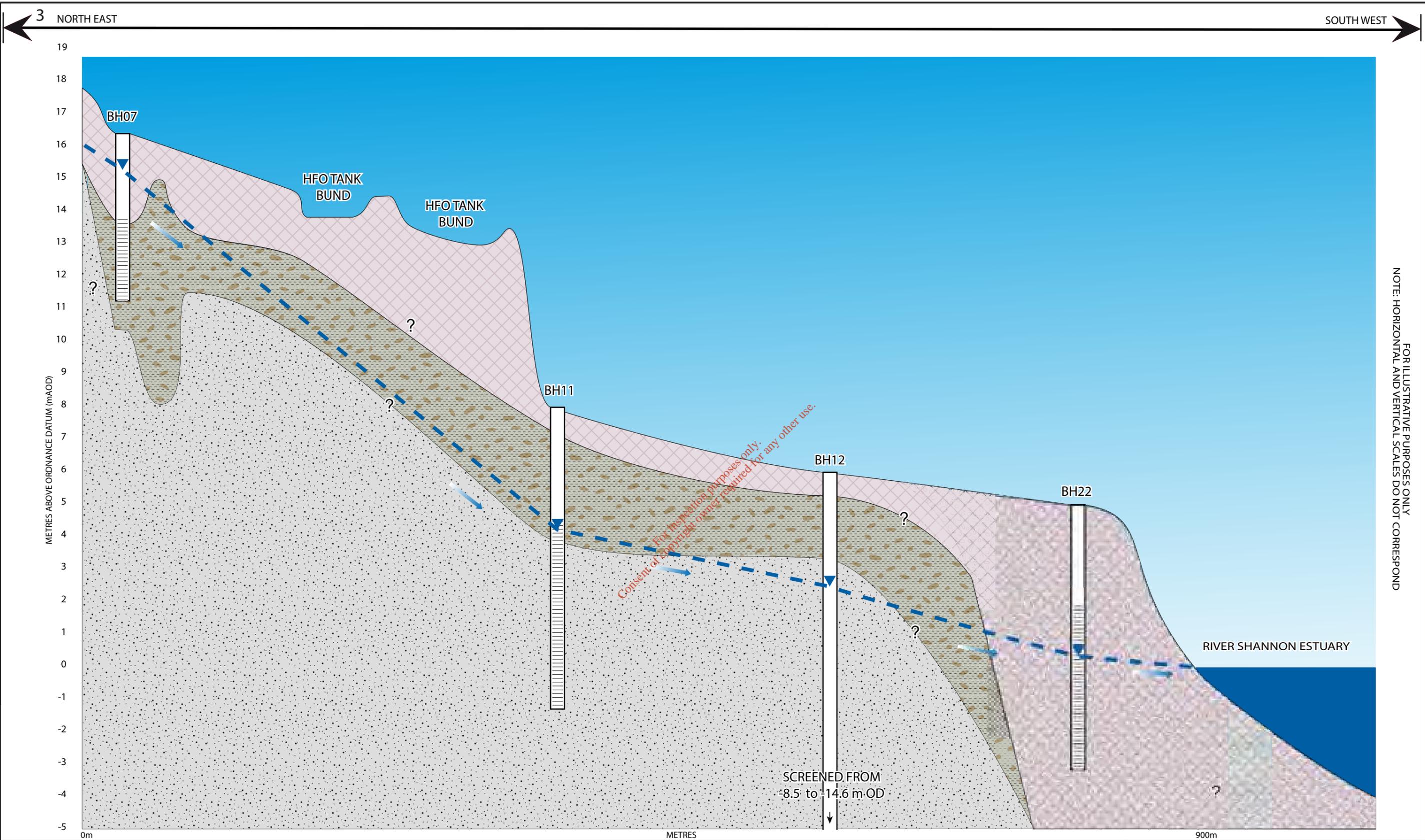
PROJECT
HYDROGEOLOGICAL CSM

DRAWN DH	TRACED	CHECKED EO'H	APPROVED KF/COR	DATE JUNE 2015
SCALE N.T.S	Job No: 47093013			REV A

LEGEND:

- MADE GROUND
- SANDY GRAVELLY CLAY
- ROCK FILL
- PRESUMED BEDROCK
- INFERRED GROUNDWATER FLOW DIRECTION
- INFERRED GROUNDWATER ELEVATION
- GROUNDWATER ELEVATION FEBRUARY 2003

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DRAWING TITLE
FIGURE 10 _ CROSS SECTION 3

LEGEND:

	MADE GROUND		ROCK FILL
	GRAVELLY CLAY WITH COBBLES AND BOULDERS		PRESUMED BEDROCK
	INFERRED GROUNDWATER FLOW DIRECTION		
	INFERRED GROUNDWATER ELEVATION		
	GROUNDWATER ELEVATION FEBRUARY 2003		

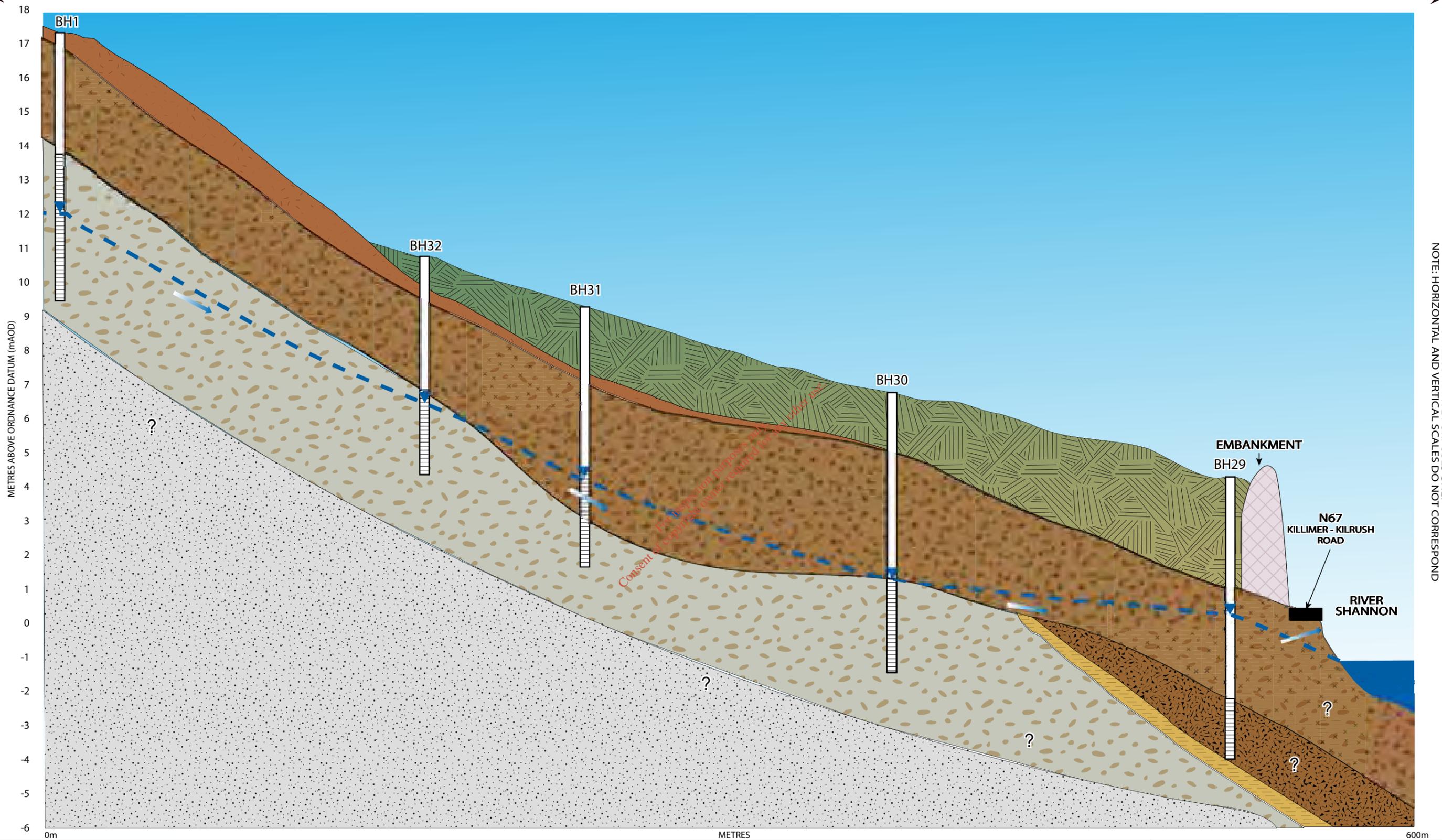
PROJECT
HYDROGEOLOGICAL CSM

DRAWN DH	TRACED	CHECKED EO'H	APPROVED KF/COR	DATE JUNE 2015
SCALE N.T.S	Job No: 47093013		REV A	

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4 NORTH

SOUTH EAST



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DRAWING TITLE
FIGURE 11 _ CROSS SECTION 4

PROJECT
HYDROGEOLOGICAL CSM

DRAWN DH	TRACED	CHECKED EO'H	APPROVED KF/COR	DATE JUNE 2015
SCALE N.T.S	Job No: 47093013	REV A		

LEGEND:

	TOPSOIL		COAL ASH
	SILTY GRAVELLY CLAY WITH COBBLES		PRESUMED BEDROCK
	GRAVEL WITH COBBLES AND BOULDERS		PEAT
	INFERRED GROUNDWATER FLOW DIRECTION		CLAY
	INFERRED GROUNDWATER ELEVATION		MADE GROUND
	GROUNDWATER ELEVATION FEBRUARY 2003		

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Table

**Table 1 - Borehole and Monitoring Well Inventory
ESB Moneypoint**

Point ID	Year Installed	ING Location Co-Ordinate		Elevation (m OD)		Method	Borehole Diameter (mm)	Reinstatement	Geology			Total Depth (m bgl)		Screen				Current Status
		Easting	Northing	Ground	Casing				Unit	Top (m bgl)	Base (m bgl)	Drilled	Installed	Screened Unit	Diameter (mm)	Top (m bgl)	Base (m bgl)	
BH01	1993	102724	152701	17.365	nr	S&A	200	Monitoring Well	Topsoil on grey/brown, very gravelly clay/silt with cobbles and boulders	0.00	5.40	7.9	7.9	Overburden (gravel)	100	nr	7.9	Accessible, sampled
									Grey, clayey/sandy gravel with cobbles and boulders	5.40	7.90							
									Refusal - presumed bedrock or boulder	7.90	np							
BH02	1993	103114	152594	5.665	nr	S&A and Rotary Coring	250	Monitoring Well	Fill on grey/brown, gravelly silt and clay	0.00	3.50	6.9	nr	Bedrock (and overburden?)	200	nr	nr	Accessible, sampled
									Stiff, grey, silty, sandy gravel with boulders	3.50	4.15							
									Light grey, strong, thinly bedded, fractured sandstone	4.15	np							
BH03	1993	103105	152560	10.735	nr	S&A and Rotary Coring	200	Monitoring Well	Topsoil on ash and cobble fill	0.00	4.10	10.1	7.7	Clay and top of bedrock (and ash?)	100	nr	7.7	Damaged, not sampled
									Grey, silty sandy gravel and gravelly clay	4.10	7.15							
									Light grey, strong, thinly bedded sandstone	7.15	np							
BH04	1993	102701	152133	3.335	nr	S&A and Rotary Coring	200	Monitoring Well	Ash and boulder fill	0.00	0.80	8.1	8.1	Bedrock (and overburden?)	50	nr	8.1	Accessible, sampled
									Stiff, brown, silty, gravelly clay with cobbles and boulders	0.80	5.70							
									Light grey, strong, thinly bedded sandstone	5.70	np							
BH05	1993	102660	152112	4.230	nr	S&A and Rotary Coring	250	Monitoring Well	Topsoil on stiff, grey/brown, silty, very gravelly clay with cobbles and boulders	0.00	5.00	8.4	5.0	Overburden	200	nr	5.0	Accessible, sampled
									Very weathered, grey, thinly bedded siltstone	5.00	6.00							
									Grey, strong, fractured sandstone	6.00	np							
BH06	1993	103070	152789	6.240	nr	S&A	200	Monitoring Well	Topsoil on firm/stiff sand silty/silty gravelly clay with some shallow peat layers	0.00	3.80	5.0	5.0	Top of bedrock (and overburden?)	100	nr	5.0	Accessible, sampled
									Broken rock and silty clay	3.80	5.00							
									Bedrock	5.00	np							

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m bgl - metres below ground level
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**Table 1 - Borehole and Monitoring Well Inventory
ESB Moneypoint**

Point ID	Year Installed	ING Location Co-Ordinate		Elevation (m OD)		Method	Borehole Diameter (mm)	Reinstatement	Geology			Total Depth (m bgl)		Screen				Current Status	
		Eastings	Northing	Ground	Casing				Unit	Top (m bgl)	Base (m bgl)	Drilled	Installed	Screened Unit	Diameter (mm)	Top (m bgl)	Base (m bgl)		
BH07	2003	103820	151934	16.190	nr	S&A	250	Monitoring Well	Stiff, brown, gravelly clay fill with cobbles and boulders	0.00	2.60	6.0	5.0	Overburden	nr	2.5	5.0	Not accessible, not sampled	
									Firm to stiff, grey/brown, sandy, gravelly clay and silt	2.60	6.00								
									Obstruction - possible bedrock	6.00	np								
BH08a	2003	104222	151523	12.420	nr	S&A	250	Followed on by Rotary Bore	Gravel fill with coal fragments	0.00	0.30	3.1	Followed on by Rotary Bore	~	~	~	~	Not installed	
									Stiff, grey, clayey, sandy gravel with cobbles and boulders	0.30	2.30								
									Stiff, grey/brown, gravelly clay with cobbles	2.30	3.10								
BH08	2003	104222	151523	12.420	nr	Rotary	75	Monitoring Well	Bedrock	3.10	np	10.0	9.5	Bedrock	nr	4.5	9.5	Accessible, sampled	
BH08b	2002/3			nr	nr	S&A						<10							
BH09a	2003	104079	151277	5.490	nr	S&A	250	Backfilled	Stiff, brown, gravelly clay fill with cobbles and boulders	0.00	1.70	3.6	ni	~	~	~	~	Not installed	
									Grey, clayey, sandy gravel with cobbles and boulders	1.70	np								
BH09	2002	104080	151278	5.490	nr	Rotary	75	Monitoring Well	No recovery	0.00	1.00	10.0	9.5	Bedrock	nr	5.5	9.5	Accessible, sampled	
									Cobbles and boulders	1.00	4.90								
									Bedrock	4.90	np								
BH10	2003	103977	151334	5.330	nr	Rotary	75	Monitoring Well	No recovery	0.00	0.60	10.0	9.5	Bedrock	nr	6.0	9.5	Accessible, sampled	
									Cobbles and boulders	0.60	5.50								
									Bedrock	5.50	np								
BH11a	2003	103493	151736	7.880	nr	S&A	250	Backfilled	Topsoil on gravelly clay fill with cobbles and boulders	0.00	0.90	2.1	ni	~	~	~	~	Not installed	
									Stiff, grey gravelly clay with cobbles and boulders	0.90	2.00								
									Possible bedrock	2.00	np								
BH11	2003	103494	151736	7.880	nr	Rotary	75	Monitoring Well	No recovery	0.00	4.20	10.0	9.5	Overburden and bedrock	nr	3.7	9.5	Not accessible,	
									Bedrock	4.2	np								
BH12	2003	103295	151619	5.930	nr	Rotary	75	Monitoring Well	No recovery	0.00	0.60	20.5	20.5	Bedrock	nr	14.5	20.5	Accessible, sampled	
									Gravel, cobbles and boulders	0.60	2.40								
									Bedrock	2.40	np								
BH14	2003	103453	151427	5.870	nr	S&A	250	Backfilled	Topsoil	0.00	0.40	<10	ni	~	~	~	~	Not installed	
									Stiff, grey, clayey, sandy gravel with cobbles and boulders	0.40	2.60								
BH14	2003	103454	151427	5.870	nr	Rotary	75	Monitoring Well	No recovery	0.00	0.60	10.0	8.0	Overburden and bedrock	nr	4.0	8.0	Accessible, usually dry	
									Gravel, cobbles and boulders	0.60	5.70								
									Bedrock	5.70	np								

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**Table 1 - Borehole and Monitoring Well Inventory
ESB Moneypoint**

Point ID	Year Installed	ING Location Co-Ordinate		Elevation (m OD)		Method	Borehole Diameter (mm)	Reinstatement	Geology			Total Depth (m bgl)		Screen				Current Status
		Eastings	Northing	Ground	Casing				Unit	Top (m bgl)	Base (m bgl)	Drilled	Installed	Screened Unit	Diameter (mm)	Top (m bgl)	Base (m bgl)	
BH15	2003	103613	151377	5.810	nr	Rotary	75	Monitoring Well	No recovery Gravel, cobbles and boulders	0.00 0.50	0.50 np	10.0	9.0	Overburden	nr	3.0	9.0	Accessible, sampled
BH16	2002	104400	151617	13.530	nr	Rotary	75	Monitoring Well	No recovery Clayey sand Bedrock	0.00 1.20 2.00	1.20 2.00 np	5.0	4.5	Bedrock	nr	3.0	4.5	Accessible, sampled
BH17	2003	104620	151453	15.730	nr	Rotary	75	Monitoring Well	No recovery Bedrock	0.00 1.00	1.00 np	6.5	5.5	Bedrock	nr	3.5	5.5	Standpipe recently extended, not sampled recently
BH18	2003	104563	151401	14.460	nr	Rotary	75	Monitoring Well	No recovery Bedrock	0.00 1.10	1.10 np	8.9	8.0	Bedrock	nr	3.0	8.0	Standpipe has been extended, not currently accessible
BH19	2002	104414	151356	15.300	nr	Rotary	75	Monitoring Well	Gravelly clay with occasional cobbles Bedrock	0.00 1.20	1.20 np	10.0	9.5	Bedrock	nr	3.0	9.5	Accessible, sampled
BH20	2003	104244	151286	13.160	nr	Rotary	75	Monitoring Well	Gravelly clay with occasional cobbles Bedrock	0.00 1.70	1.70 np	10.0	9.5	Bedrock	nr	4.0	9.5	Missing
BH21	2003	104159	151406	12.170	nr	S&A	250	Followed on by Rotary Bore	Sandy, clayey, gravel fill with cobbles	0.00	np	1.4	ni	~	~	~	~	Not installed
BH21	2003	104159	151406	12.170	nr	Rotary	75	Monitoring Well	Gravelly clay Bedrock	0.00 5.60	5.60 np	6.1	5.1	Overburden	nr	1.7	5.1	Accessible but
BH22	2003	103161	151484	4.960	nr	Rotary	75	Monitoring Well	Cobbles and boulders	0.00	np	10.0	8.0	Rock fill	nr	3.0	8.0	Accessible, sampled
BH23	2003	102900	151497	5.150	nr	Rotary	75	Monitoring Well	Boulders	0.00	np	10.0	8.0	Rock fill	nr	3.0	8.0	Accessible, sampled
BH24	2003	102682	151665	4.770	nr	Rotary	75	Monitoring Well	Gravelly clay fill with occasional cobbles Boulders	0.00 1.00	1.00 np	10.0	8.7	Rock fill	nr	5.0	8.7	Damaged, not sampled
BH25	2002/3	102931	151638	6.860	nr	Rotary	75	Monitoring Well	Gravel, cobbles and boulders	0.00	np	8.0	7.7	Rock fill	nr	4.7	7.7	Usually dry
BH26	2003	102694	151871	6.720	nr	Rotary	75	Monitoring Well	Topsoil Gravelly clay and boulders Bedrock	0.00 0.60 6.90	0.60 6.90 np	12.0	11.5	Bedrock	nr	8.0	11.5	Accessible, sampled
BH27	2003	102909	152006	12.760	nr	S&A	250	Backfilled	Topsoil on grey, sandy, gravelly clay with cobbles Grey brown, clayey, sandy gravel	0.00 1.50	1.50 np	4.8	~	Overburden	~	~	~	Temporary installation, no longer present
BH27a	2003	102906	151974	11.890	nr	Rotary	75	Monitoring Well	Gravelly clay fill with cobbles Bedrock	0.00 4.20	4.20 np	10.0	9.0	Bedrock	nr	6.0	9.0	Accessible, sampled
BH28	2002/3	103168	151883	9.430	nr	S&A	250	Monitoring Well	Brown, sandy clay gravel fill Brown, very sandy, gravelly clay with cobbles	0.00 1.20	1.20 np	4.6	3.3	Overburden	nr	1.75	3.3	Usually dry

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**Table 1 - Borehole and Monitoring Well Inventory
ESB Moneypoint**

Point ID	Year Installed	ING Location Co-Ordinate		Elevation (m OD)		Method	Borehole Diameter (mm)	Reinstatement	Geology			Total Depth (m bgl)		Screen				Current Status
		Eastings	Northing	Ground	Casing				Unit	Top (m bgl)	Base (m bgl)	Drilled	Installed	Screened Unit	Diameter (mm)	Top (m bgl)	Base (m bgl)	
BH29	2003	102617	152265	1.980	nr	S&A	200	Monitoring Well	Gravelly silt and clay fill	0.00	4.30	7.2	5.5	Fill and peat	nr	2.0	5.5	Standpipe has been extended too high, prevents access, not sampled recently
									Silty, gravelly, sandy peat	4.30	6.40							
									Stiff, brown, gravelly clay with cobbles and silty gravel with cobbles	6.40	7.20							
									Refusal - presumed bedrock	7.20	np							
BH30	2003	102540	152392	5.270	nr	Rotary	75	Monitoring Well	Sandy, clayey, fine to coarse angular gravel	0.00	2.70	8.0	6.5	Cobbles and boulders	nr	3.0	6.5	Accessible, sampled
									Cobbles and boulders	2.70	np							
BH30A	2003	102540	152392	5.270	~	S&A	200	Backfilled	Brown, gravelly silt and clay	0.00	0.40	4.0	ni	~	~	~	~	Not installed
									Stiff, grey/brown, slightly sandy, gravelly clay with cobbles and boulders	0.40	4.00							
									Refusal - presumed boulders	4.00	np							
BH31	2003	102560	152512	7.490	nr	S&A and Rotary	200 & 75	Monitoring Well	Topsoil	0.00	0.20	7.0	6.2	Gravel and cobbles	nr	2.5	6.2	Accessible, sampled
									Grey, clayey, sandy gravel with cobbles	0.20	4.00							
									Cobbles and boulders	4.00	np							
BH32	2003	102563	152563	10.520	~	S&A	200	Backfilled	Topsoil	0.00	0.30	3.3	ni	~	~	~	~	Not installed
									Stiff, brown, slightly sandy, gravelly clay	0.30	3.30							
									Refusal - presumed boulders	3.30	np							
BH32	2003	102563	152563	10.520	nr	Rotary	75	Monitoring Well	Cobbles and boulders	0.00	np	7.0	6.2	Cobbles and boulders	nr	2.5	6.2	In a forest, can't be found
BH33	2003	103000	152848	16.310	nr	S&A	200	Backfilled	Brown, sandy, gravelly clay	0.00	0.90	1.5	ni	~	~	~	~	Not installed
									Brown, clayey, sandy gravel with many cobbles	0.90	np							
BH-01	2012	103853	151898	16.120	~	HD	~	Backfilled	Grey/brown, sandy gravel fill	0.00	0.60	0.8	ni	~	~	~	~	Not installed
									Weathered bedrock - siltstone gravel	0.60	np							
BH-02	2012	103868	151885	15.950	~	HD	~	Backfilled	Grey/brown, sandy gravel fill	0.00	0.60	0.8	ni	~	~	~	~	Not installed
									Weathered bedrock - siltstone gravel	0.60	np							
BH-03	2012	103863	151845	15.450	~	HD	~	Backfilled	Dark grey, clayey, gravelly, sand fill	0.00	0.30	0.4	ni	~	~	~	~	Not installed
									Weathered bedrock - siltstone gravel	0.30	np							
BH-04	2012	103838	151849	15.560	~	HD	~	Backfilled	Dark grey, clayey, sandy, gravel fill	0.00	0.30	0.4	ni	~	~	~	~	Not installed
									Weathered bedrock - siltstone gravel	0.30	np							

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ESB Moneypoint**

Point ID	Year Installed	ING Location Co-Ordinate		Elevation (m OD)		Method	Borehole Diameter (mm)	Reinstatement	Geology			Total Depth (m bgl)		Screen				Current Status
		Easting	Northing	Ground	Casing				Unit	Top (m bgl)	Base (m bgl)	Drilled	Installed	Screened Unit	Diameter (mm)	Top (m bgl)	Base (m bgl)	
BH-05	2012	103804	151935	16.360	~	S&A	150	Backfilled	Grey, sandy gravel fill	0.00	0.30	6.5	ni	~	~	~	~	Not installed
									Brown, slightly sandy, gravelly clay fill with a lot of cobbles	0.30	0.80							
									Stiff, brown with some grey mottling, sandy, slightly gravelly clay, with some cobbles	0.80	np							
BH-06	2012	103798	151912	16.150	~	S&A	150	Backfilled	Grey, sandy gravel/cobble fill	0.00	0.30	4.3	ni	~	~	~	~	Not installed
									Brown, slightly sandy, gravelly clay fill with a lot of cobbles	0.30	0.80							
									Very stiff, brown, with some grey mottling, slightly sandy, slightly gravelly clay with some cobbles	0.80	3.90							
									Weathered bedrock - siltstone gravel	3.90	np							
BH-07	2012	103780	151868	15.330	~	HD	~	Backfilled	Grey, clayey, slightly sand gravel fill	0.00	0.20	0.7	ni	~	~	~	~	Not installed
									Very stiff, brown, sandy, gravelly clay with some cobbles	0.20	0.60							
									Weathered bedrock - siltstone gravel	0.60	np							
BH-08	2012	103762	151888	15.620	~	S&A	150	Backfilled	Grey, coarse gravel fill	0.00	0.30	2.0	ni	~	~	~	~	Not installed
									Dark brown, sandy, gravelly clay fill with some cobbles	0.30	0.80							
									Very stiff, brown, slightly sandy, gravelly, clay with some cobbles	0.80	1.70							
									Weathered bedrock - siltstone gravel	1.70	np							
BH-09	2012	103775	151919	15.900	~	S&A	150	Backfilled	Grey, coarse gravel fill	0.00	0.10	4.6	ni	~	~	~	~	Not installed
									Brown, slightly sandy, gravelly clay fill with some cobbles	0.10	2.00							
									Stiff, brown with grey mottling, slightly sandy, slightly gravelly clay, with a few cobbles	2.00	4.20							
									Weathered bedrock - siltstone gravel	4.20	np							

Notes:
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S A - shell and auger
nr - not recorded/no record
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AECOM

**Table 1 - Borehole and Monitoring Well Inventory
ESB Moneypoint**

Point ID	Year Installed	ING Location Co-Ordinate		Elevation (m OD)		Method	Borehole Diameter (mm)	Reinstatement	Geology			Total Depth (m bgl)		Screen				Current Status
		Easting	Northing	Ground	Casing				Unit	Top (m bgl)	Base (m bgl)	Drilled	Installed	Screened Unit	Diameter (mm)	Top (m bgl)	Base (m bgl)	
BH-10	2012	103790	151959	16.230	~	S&A	150	Backfilled	Brown, sandy, gravelly clay fill with a few cobbles	0.00	0.70	2.5	ni	~	~	~	~	Not installed
									Stiff, brown with grey mottling, gravelly clay, with some cobbles	0.70	2.20							
									Possible bedrock	2.20	np							
BH-11	2012	103627	151994	16.180	~	S&A	150	Backfilled	Grey, coarse gravel fill	0.00	0.10	3.7	ni	~	~	~	~	Not installed
									Brown, sandy, gravelly clay fill with a lot of cobbles	0.10	2.00							
									Very stiff, grey/brown, slightly sandy, slightly gravelly clay with a few cobbles	2.00	3.30							
									Possible bedrock	3.30	np							
BH-12	2012	103633	151971	15.980	~	S&A	150	Backfilled	Grey, coarse gravel fill	0.00	0.40	4.3	ni	~	~	~	~	Not installed
									Very stiff, brown, slightly sandy, slightly gravelly, clay with a lot of cobbles	0.40	4.10							
									Weathered bedrock - siltstone gravel	4.10	np							
BH-14	2012	103468	151644	5.730	~	S&A	150	Backfilled	Grey, coarse gravel fill	0.00	0.20	1.3	ni	~	~	~	~	Not installed
									Grey/brown, clayey, sandy gravel fill	0.20	1.20							
									Brown, slightly sandy, gravelly clay fill with some cobbles	1.20	1.30							
									Weathered bedrock - siltstone gravel	1.30	np							
BH-15	2012	103862	151860	15.600	~	HD	~	Backfilled	Grey, sandy gravel fill	0.00	0.25	0.7	ni	~	~	~	~	Not installed
									Brown, clayey, slightly sandy gravel fill with some cobbles	0.25	0.50							
									Weathered bedrock - siltstone gravel	0.50	np							
BH-16	2012	103788	151917	16.190	~	S&A	150	Backfilled	Dark brown, sandy, gravelly fill	0.00	0.10	4.1	ni	~	~	~	~	Not installed
									Grey angular limestone cobble fill	0.10	0.30							
									Brown, sandy gravelly clay fill with a lot of cobbles	0.30	1.70							
									Very stiff, brown, slightly sandy, slightly gravelly clay with a few cobbles	1.70	3.20							
									Weathered bedrock - siltstone gravel	3.20	np							

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**Table 1 - Borehole and Monitoring Well Inventory
ESB Moneypoint**

Point ID	Year Installed	ING Location Co-Ordinate		Elevation (m OD)		Method	Borehole Diameter (mm)	Reinstatement	Geology			Total Depth (m bgl)		Screen				Current Status
		Easting	Northing	Ground	Casing				Unit	Top (m bgl)	Base (m bgl)	Drilled	Installed	Screened Unit	Diameter (mm)	Top (m bgl)	Base (m bgl)	
BH-17	2012	103640	151993	16.200	~	S&A	150	Backfilled	Grey, angular gravel fill	0.00	0.10	4.1	ni	~	~	~	~	Not installed
									Very stiff, brown with grey mottling, slightly sandy, gravelly clay fill, with a few cobbles	0.10	3.20							
									Grey/brown, slightly sandy gravelly clay	3.20	3.90							
									Weathered bedrock - siltstone gravel	3.90	np							
BH-18	2012	103467	151659	5.850	~	HD	~	Backfilled	Grey, angular coarse gravel fill	0.00	np	0.2	ni	~	~	~	~	Not installed
BH-19	2013	103798	151949	16.100	~	Rotary	150	Backfilled	Hardcore fill	0.00	1.20	7.5	ni	~	~	~	~	Not installed
									Large boulders	1.20	2.00							
									Very weak becoming medium strong, thinly bedded dark grey siltstone, becoming fractured with depth	2.00	np							
BH-20	2013	103810	151944	16.200	~	Rotary	150	Backfilled	Hardcore fill with boulders	0.00	1.20	9.8	ni	~	~	~	~	Not installed
									Grey/brown, sandy, gravelly clay with boulders	1.20	4.80							
									Strong, medium bedded, dark grey, fine grained sandstone, shallow rock partially weathered, fractured at depth	4.80	np							
BH-21	2013	103830	151934	16.210	~	Rotary	150	Backfilled	Hardcore fill	0.00	1.20	12.2	ni	~	~	~	~	Not installed
									Brown/grey, sandy, gravelly clay with cobbles and boulders	1.20	7.00							
									Medium strong, thinly bedded grey siltstone, shallow rock weathered, fractured at depth	7.00	np							
BH-22	2013	103794	151925	16.150	~	Rotary	150	Backfilled	Hardcore fill	0.00	1.20	15.1	ni	~	~	~	~	Not installed
									Brown/grey, sandy, gravelly clay with cobbles and boulders	1.20	8.00							
									Medium strong, thinly bedded, dark grey siltstone, weathered and fractured	8.00	np							

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**Table 1 - Borehole and Monitoring Well Inventory
ESB Moneypoint**

Point ID	Year Installed	ING Location Co-Ordinate		Elevation (m OD)		Method	Borehole Diameter (mm)	Reinstatement	Geology			Total Depth (m bgl)		Screen				Current Status
		Easting	Northing	Ground	Casing				Unit	Top (m bgl)	Base (m bgl)	Drilled	Installed	Screened Unit	Diameter (mm)	Top (m bgl)	Base (m bgl)	
BH-23	2013	103779	151898	15.530	~	Rotary	150	Backfilled	Hardcore fill	0.00	1.20	7.1	ni	~	~	~	~	Not installed
									Very weathered bedrock - firm, brown, sandy, slightly gravelly clay	1.20	2.00							
									Weak, grey, thinly bedded siltstone, very fractured	2.00	np							
BH-24	2013	103823	151908	15.960	~	Rotary	150	Backfilled	Hardcore fill	0.00	1.20	7.2	ni	~	~	~	~	Not installed
									Grey, sandy gravelly clay with cobbles and boulders	1.20	1.90							
									Medium strong, thinly bedded, grey siltstone, very fractured	1.90	np							
BH-25	2013	103770	151917	15.670	~	Rotary	150	Backfilled	Hardcore fill	0.00	1.20	12.5	ni	~	~	~	~	Not installed
									Grey/brown, sandy gravelly clay with cobbles and boulders	1.20	7.50							
									Medium strong, thinly bedded, dark grey siltstone, weathered and very fractured	7.50	np							
BH-26	2013	103795	151911	15.900	~	Rotary	150	Backfilled	Hardcore fill	0.00	1.20	9.5	ni	~	~	~	~	Not installed
									Grey/brown, sandy gravelly clay with a few cobbles and boulders	1.20	4.50							
									Medium strong, thinly bedded, dark grey siltstone, weathered and very fractured	4.50	np							

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Appendix A – Photographs

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Photograph 1 – view south from HFO tank bund to generating station (Boiler House #3) and chimney.



Photograph 2 – view south-east from HFO tank bund to FGD waste conveyor.



Photograph 3 – view north from HFO tank bund to transformer compound.



Photograph 4 – view south from ridge across FGD waste conveyor and Coal Yard



Photograph 5 – view south-west from ridge across FGD waste conveyor across to Generating Station.



Photograph 6 – view south-west from completed FGD Landfill cell with Coal Yard and Generating Station in the distance.



Photograph 7 – active section of FGD Landfill with Coal Yard in the distance.



Photograph 8 – view west from perimeter road around FGD Landfill to the Coal Yard in the distance. FGD waste embankment on RHS and rock fill embankment on LHS, well BH19 in the centre-ground.



Photograph 9 – view east from perimeter road around FGD Landfill. FGD waste embankment on LHS and rock fill embankment on RHS.



Photograph 10 – view south across FGD lagoon to Shannon Estuary.



Photograph 11 – drums in bundled stores.



Photograph 12 – burnt lime silos with bunded diesel above ground tanks behind.



Photograph 13 – burnt lime silos.



Photograph 14 – trucks filling with ash.



Photograph 15 – lime silos.

Appendix B – ESB Site Maps

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EMERGENCY TELEPHONE NUMBERS

CENTRAL CONTROL ROOM
EMERGENCY PHONE: 065 6829384
INTERNAL EMERGENCY PHONE: 444
COALYARD CONTROL PHONE: 888
STATION SWITCHBOARD: 065 9051654

SITE MANNED PERMANENTLY
PERSONNEL ON SITE MAX 260 MIN 15

BUILDINGS KEY

- 1 SECURITY
- 2 VISITOR CENTRE
- 3 ASBESTOS STORAGE BUILDING
- 4 SITE LOCKER ROOMS
- 5 E.S.B. ELECTRICIANS STORE
- 6 STORE / WORKSHOP
- 7 SEWAGE TREATMENT PLANT No.1
- 8 CHLORINATION PLANT
- 9 LUBE OIL STORES
- 10 SITE CANTEN BUILDING
- 11 CASCADE BUILDING 3
- 12 CASCADE BUILDING 2
- 13 CASCADE BUILDING 1
- 14 CANTEN
- 15 ADMINISTRATION
- 16 WORKSHOP & STORES
- 17 SEWAGE TREATMENT PLANT No.2
- 18 MEDIUM STORES
- 19 CONTRACTOR WELFARE FACILITY
- 20 CARPENTERS / PAINTERS WORKSHOP
- 21 JETTY
- 22 CHECK WEIGH HOPPER
- 23 STORES / WORKSHOP
- 24 COALYARD CONTROL BUILDING
- 25 MOBILE PLANT PARKING
- 26 CONTRACTOR WORKSHOP
- 27 INDUCTION CENTRE
- 28 WATER TREATMENT PLANT
- 29 FIRE PROTECTION PUMPHOUSE
- 30 ASH WATER PUMPHOUSE
- 31 U2 A AMMONIA BUILDING
- 32 COMPRESSOR BUILDING
- 33 TURBINE HALL
- 34 BUNKER BAY
- 35 CONTROL BUILDING
- 36 BOILER HOUSE NO.1
- 37 BOILER HOUSE NO.2
- 38 BOILER HOUSE NO.3
- 39 SCR UNIT 1
- 40 SCR UNIT 2
- 41 SCR UNIT 3
- 42 PRECIP. NO.1
- 43 PRECIP. NO.2
- 44 PRECIP. NO.3
- 45 ASH COMPRESSOR HOUSE
- 46 FGD 1
- 47 FGD 2
- 48 FGD 3
- 49 ASH SILOS
- 50 FUEL OIL PUMP HOUSE NO.1
- 51 WASTE COLLECTION & STORAGE AREA
- 52 400 KV SWITCHGEAR BUILDING
- 53 400 KV RELAY BUILDING
- 54 FUEL OIL PUMP HOUSE NO.2
- 55 OFFICES (ESBi)
- 56 MOBILE PLANT WORKSHOP / GARAGE

TANKS KEY

CONTENTS	VOLUME
1 HYDRO CHLORIC ACID (HCL)	750 Ltrs.
2 AMMONIA	45m ³
3 TRANSFORMER OIL (400Kv)	96,500 Ltrs
4A TRANSFORMER OIL (UT23)	5,000 Ltrs
4B TRANSFORMER OIL (UT22)	5,000 Ltrs
4C TRANSFORMER OIL (UT21)	5,000 Ltrs
5 HYDRAZINE (Unit 2 Only)	1,500 Ltrs
6 TRANSFORMER OIL (400Kv)	96,500 Ltrs
7 TRANSFORMER OIL (400Kv)	96,500 Ltrs
8 LUBE OIL STORE	500 Gallons
9 COALYARD MONITORING TANK	1,000m ³
10 COALYARD FGD LAGOON	
11 YARD TANK (Aux RFW)	1,400 Tonnes
12 CAUSTIC SODA	2 x 59,000 Ltrs
13 SULPHURIC ACID	2 x 59,000 Ltrs
14 UREA (Disolver)	70m ³
15 UREA (Disolver)	70m ³
16 UREA	1200m ³
17 UREA	120m ³
18 ASH SETTLING POND	4,600m ³
19 SERVICE RESERVOIR	8 Million Gallons
20 TRANSFORMER OIL	71,500 Ltrs
21 TRANSFORMER OIL	18,000 Ltrs
22 HEAVY FUEL TANK	25,000 Tonnes
23 HEAVY FUEL TANK	25,000 Tonnes
24 DIESEL	300 Tonnes
25 DIESEL	300 Tonnes
26 WHITE DIESEL	60m ³
27 BIO-DIESEL	1200 Ltrs
28 DIESEL (MOBILE PLANT)	200m ³
29 PROPANE	12.5m ³
30 HYDRATION WATER TANK	2 x 270m ³
31 INDUSTRIAL WATER (MERP)	4,180m ³
32 FGD PRODUCT SILOS	
33 BURNT LIME SILOS	2 x 2300 Tonnes
34 SITE RESERVOIRS	



EMERGENCY KEY

- RENDEZVOUS POINT
- EMERGENCY CONTROL CENTRE
- FIRE HYDRANT (Double Outlet)
- HOSE BOX
- FIRE WATER RING MAIN (8 Inch)
- DUST SUPPRESSION SYSTEM
- FIRE PANELS / ALARMS
- FIRE PUMPS
- LIFE BUOY
- WINDSOCK
- ON SITE FIRE TENDER
- ON SITE AMBULANCE
- BEACON
- JETTY FIRE FIGHTING LANDING VALVES
- COALYARD FIRE FIGHTING LANDING VALVES
- TYPE B SPRAY (60m Radius)
- TYPE A SPRAY (85m Radius)
- OIL INTERCEPTOR
- INTERCEPTOR DRAIN OUTLET

HAZARDS KEY

- RADIOACTIVE SOURCE
- TRANSFORMER 400kv (BLACK)
- TRANSFORMER 6.6kv (BROWN)
- ELECTRIC SHOCK
- DANGEROUS NOISE
- DANGER BY SQUEEZING
- CARBON DIOXIDE
- GAS STORAGE
- UNPROTECTED PIER
- SKIP
- HEAVY VEHICLES
- OIL PIPELINE
- TOXIC / VERY TOXIC
- EXPLOSIVE
- CORROSIVE
- POLLUTANT
- FLAMMABLE LIQUID/GAS
- FLAMMABLE SOLIDS
- ASBESTOS

SAFETY KEY

- LOCKED GATE
- EMERGENCY SHOWER
- MEDICAL POINT
- ASSEMBLY POINT
- DEFIBRILLATOR

ESB STAFF P.P.E

- ESB ISSUED WORKWEAR IN ALL OPERATING AREAS**
- SAFETY GLASSES
 - HIGH VISIBILITY JACKET (where indicated)
 - SAFETY BOOTS
 - HARD HAT
 - EAR PROTECTORS (where indicated)
 - FACE MASK (Where Indicated)
 - OVERALLS (Arc Resistant)

SCHEDULE OF BULK CHEMICALS

ITEM	COLOUR	DESCRIPTION	LOCATION	CAPACITY	COMMENTS
01	Yellow	SULPHURIC ACID (98%)	W.T.P. INSTALLED 1984	2 x 60 T. TANKS	BUNDED
02	Grey	SODIUM HYDROXIDE (47%)	W.T.P. INSTALLED 1984	2 x 60 T. TANKS	BUNDED
03	Purple	AMMONIA (30%)	C.W. PUMPHOUSE	1 x 45 T. TANK	BUNDED
04	Blue	BULK HYDRAZINE (35%)	BULK HYDRAZINE	2 x 3 T. TANK	BUNDED
05	Black	HYDROCHLORIC ACID (7%)	ELECTROCHLORINATION	1 x 1 T. TANK	BUNDED

SCHEDULE OF CARBOXY STORAGE

ITEM	COLOUR	DESCRIPTION	LOCATION	CAPACITY	COMMENTS
06	Black	HYDROCHLORIC ACID (CON)	W.T.P.	500 GALS.	BUNDED CHEMSTORE
07	Blue	HYDRAZINE (IDL)	WEST OF W.T.P.	5 T. MAX	BUNDED CHEMSTORE

SCHEDULE OF DILUTE DOSAGE TANKS

ITEM	COLOUR	DESCRIPTION	LOCATION	CAPACITY	COMMENTS
08	Purple	AMMONIA (DIL.)	CHEM. INJ. BUILDINGS	3 x 400 GALS.	NOT BUNDED
09	Blue	HYDRAZINE (DIL.)	CHEM. INJ. BUILDINGS	3 x 400 GALS.	NOT BUNDED

SCHEDULE OF OIL STORAGE

ITEM	COLOUR	DESCRIPTION	LOCATION	CAPACITY	COMMENTS
10	Red	HEAVY FUEL OIL	H.F.O. TANK No.1	25,000 T.	BUNDED
11	Red	HEAVY FUEL OIL	H.F.O. TANK No.2	25,000 T.	BUNDED
12	Green	DIESEL FOR BOILERS	DIESEL OIL TANK AREA	2 x 300 T.	BUNDED
13	Green	WHITE DIESEL FOR VEHICLES	DIESEL OIL TANK AREA	348 M ³	BUNDED
14	Green	GREEN DIESEL FOR VEHICLES	DIESEL OIL TANK AREA	83 L AND 14.7 M ³	BUNDED
15	Orange	VARIOUS LUBE PRODUCTS	LUBE OIL STORES	53750 L	DEDICATED STORES
15A	Green	DIESEL	MOBILE PLANT MAINT.	1100L	BUNDED
15B	Orange	VARIOUS OILS	MOBILE PLANT MAINT.	13 OFF 45 GL DRUMS	DRP TRAYS

SCHEDULE OF UNIT OIL TANKS (ALL UNITS)

ITEM	COLOUR	DESCRIPTION	LOCATION	CAPACITY	COMMENTS
16	Orange	TURBINE LUBE OIL TANK	ENGINE ROOM	24.4 M ³ PER UNIT	BUNDED
17	Orange	BOILER FEED PUMP	ENGINE ROOM	2 x 3.5 M ³ PER UNIT	BUNDED
18	Orange	HP HYDRAULIC FLUID TANK	BOILER HOUSE	0.6 M ³	NOT BUNDED

SCHEDULE OF WASTE OIL AND SOLVENT STORAGE

ITEM	COLOUR	DESCRIPTION	LOCATION	CAPACITY	COMMENTS
19	Orange	WASTE OIL	DRUMS & U/GROUND SUMP		DE-COMMISSIONED
20	Orange	WASTE OIL	WASTE OIL TANK	4000 GALS	BUNDED
21	Orange	SOLVENT	DRUMS		DE-COMMISSIONED
21A	Orange	WASTE OIL	MOBILE PLANT MAINT.	1.4M ³	BUNDED
21B	Orange	WASTE OIL	DRUMS		BUNDED PLINTH
21C	Orange	SOLVENT	WASTE COLLECTION AND STORAGE AREA		BUNDED PLINTH

SCHEDULE OF GAS STORAGE

ITEM	COLOUR	DESCRIPTION	LOCATION	CAPACITY	COMMENTS
22	Blue	L.P.G. - CALOR GAS		68 M ³	FENCED
23	Black	HYDROGEN	MOUNTED ON TRAILER	2 x 240 BOTTLES	FENCED COMPOUND
24	Green	CARBON DIOXIDE	ENGINE ROOM	24 BOTTLES/UNIT	
25	Green	OTHER GASES ON SITE			

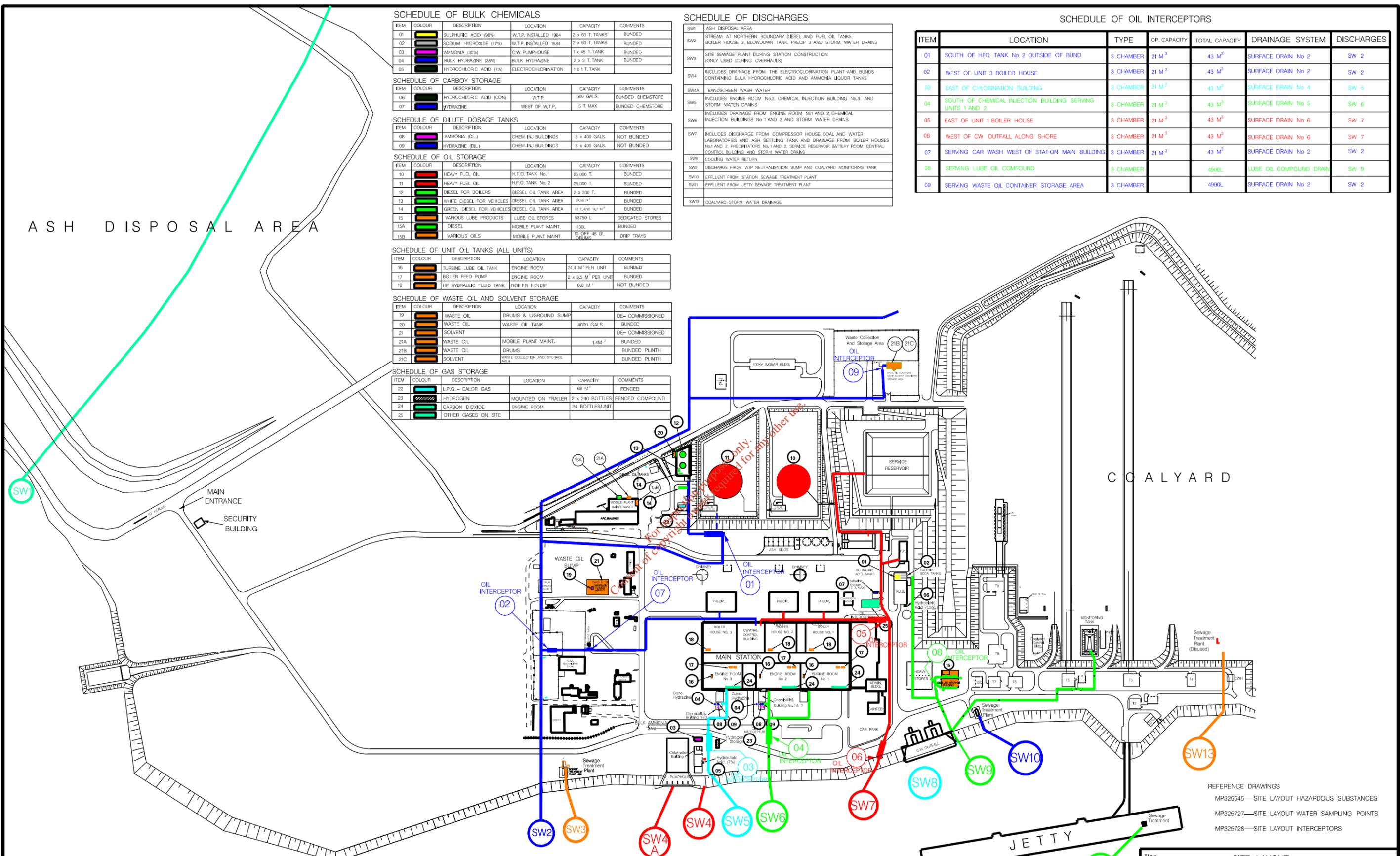
SCHEDULE OF DISCHARGES

ITEM	DESCRIPTION
SW1	ASH DISPOSAL AREA
SW2	STREAM AT NORTHERN BOUNDARY DIESEL AND FUEL OIL TANKS, BOILER HOUSE 3, BLOWDOWN TANK, PRECIP 3 AND STORM WATER DRAINS
SW3	SITE SEWAGE PLANT DURING STATION CONSTRUCTION (ONLY USED DURING OVERHAULS)
SW4	INCLUDES DRAINAGE FROM THE ELECTROCHLORINATION PLANT AND BUNDS CONTAINING BULK HYDROCHLORIC ACID AND AMMONIA LIQUOR TANKS
SW4A	BANDSCREEN WASH WATER
SW5	INCLUDES ENGINE ROOM No.3, CHEMICAL INJECTION BUILDING No.3 AND STORM WATER DRAINS
SW6	INCLUDES DRAINAGE FROM ENGINE ROOM No.1 AND 2; CHEMICAL INJECTION BUILDINGS No.1 AND 2 AND STORM WATER DRAINS
SW7	INCLUDES DISCHARGE FROM COMPRESSOR HOUSE, COAL AND WATER LABORATORIES AND ASH SETTLING TANK AND DRAINAGE FROM BOILER HOUSES No.1 AND 2, PRECIPITATORS No.1 AND 2, SERVICE RESERVOIR BATTERY ROOM, CENTRAL CONTROL BUILDING AND STORM WATER DRAINS
SW8	COOLING WATER RETURN
SW9	DISCHARGE FROM WTP NEUTRALISATION SUMP AND COALYARD MONITORING TANK
SW10	EFFLUENT FROM STATION SEWAGE TREATMENT PLANT
SW11	EFFLUENT FROM JETTY SEWAGE TREATMENT PLANT
SW13	COALYARD STORM WATER DRAINAGE

SCHEDULE OF OIL INTERCEPTORS

ITEM	LOCATION	TYPE	OP. CAPACITY	TOTAL CAPACITY	DRAINAGE SYSTEM	DISCHARGES
01	SOUTH OF HFO TANK No.2 OUTSIDE OF BUND	3 CHAMBER	21 M ³	43 M ³	SURFACE DRAIN No.2	SW 2
02	WEST OF UNIT 3 BOILER HOUSE	3 CHAMBER	21 M ³	43 M ³	SURFACE DRAIN No.2	SW 2
03	EAST OF CHLORINATION BUILDING	3 CHAMBER	21 M ³	43 M ³	SURFACE DRAIN No.4	SW 5
04	SOUTH OF CHEMICAL INJECTION BUILDING SERVING UNITS 1 AND 2	3 CHAMBER	21 M ³	43 M ³	SURFACE DRAIN No.5	SW 6
05	EAST OF UNIT 1 BOILER HOUSE	3 CHAMBER	21 M ³	43 M ³	SURFACE DRAIN No.6	SW 7
06	WEST OF CW OUTFALL ALONG SHORE	3 CHAMBER	21 M ³	43 M ³	SURFACE DRAIN No.6	SW 7
07	SERVING CAR WASH WEST OF STATION MAIN BUILDING	3 CHAMBER	21 M ³	43 M ³	SURFACE DRAIN No.2	SW 2
08	SERVING LUBE OIL COMPOUND	3 CHAMBER		4900L	LUBE OIL COMPOUND DRAIN	SW 9
09	SERVING WASTE OIL CONTAINER STORAGE AREA	3 CHAMBER		4900L	SURFACE DRAIN No.2	SW 2

ASH DISPOSAL AREA



REFERENCE DRAWINGS
 MP325545—SITE LAYOUT HAZARDOUS SUBSTANCES
 MP325727—SITE LAYOUT WATER SAMPLING POINTS
 MP325728—SITE LAYOUT INTERCEPTORS

ESB ELECTRICITY SUPPLY BOARD
MONEYPOINT GENERATING STATION
 KILRUSH, Co. CLARE, IRELAND
 Tel 065-51652, Fax 065-51890

Site LAYOUT HAZARDOUS SUBSTANCES, OIL INTERCEPTORS AND DISCHARGE POINTS

MP325750 rev 07

REV	DATE	DESCRIPTION	DRN	ISSUED	APPROVED
07	17-10-2003	REVISED AND REV CHANGED TO SW1 (SW11) AND SW3		T.C.	
06	05-12-2000	DISCHARGE ADDED TO SCHEDULE OF OIL INTERCEPTORS		phd	
05	24-08-2000	REV REMOVED		T.C.	
04	25-03-1999	ITEMS 15A AND 15B ARE NOW BUNDED ITEMS 19 AND 21A NOW DE-COMMISSIONED		phd	4 copies to e.s.b.
03	12-10-1998	Interceptor item 19 added waste oil drum storage item 21b added		phd	4 copies to e.s.b.
02	22-09-1998	Items 15A, 15B, and 21a added waste oil tank item 20 now installed		phd	2 copies to e.s.b.
01	03-03-98	oil interceptors item 8 "1 chamber" changed to "3 chamber"		phd	

Appendix C – Geological and Well Construction Logs (1993 and 2003)

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SITE INVESTIGATIONS LIMITED

BOREHOLE RECORD

CONTRACT Monitoring Boreholes - Moneypoint
 CLIENT E.S.B. International
 Site Address Co. Clare
 Boring Commenced 27/8/93
 Type of Boring Shell & Auger

Borehole No. 1B Rebore
 Sheet 1 of 1

Boring Completed 30/8/93
 Diameter of Borehole 200 mm

Description of Strata	Reduced Level m	Depth m	Leg- and	Samples/Tests			Date	Water Depth m
				Type	Depth m	Ref. No.		
Ground Level	17.365	0.00						
Topsoil	16.865	0.50						
Grey brown silty very gravelly clay with cobbles and boulders (Chiselling ½ hr)								
				D	2.00	10708		
	14.165	3.20		D	3.00	10709		
Hard grey gravelly silt with cobbles				D	3.40	10710		
				D	4.50	10711		
	11.965	5.40						
Grey fine to coarse gravel	11.665	5.70						
Boulder (Chiselling 2¼ hrs)							27/8	5.8
	11.165	6.20						
Grey silty very gravelly clay				D	6.40	10713		
	10.465	6.90						
Grey fine to coarse sandy gravel with cobbles				D	7.30	10714		
Presumed rock or boulder (Ch. 2 hrs)	9.565	7.80						
Final Level	9.465	7.90						

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<p>Remarks:</p> <p>Added water from 5.4m to facilitate boring Chiselling 5 hours Installed 100mm Ø perforated plastic pipe to 7.9mBGL with pea gravel surround and sealed cap</p>	<p>KEY - EXPLANATION</p> <ul style="list-style-type: none"> + - Water Strikes D - Disturbed Sample B - Bulk Disturbed Sample W - Water Sample U - Undisturbed Sample P - Piston Sample C(N) - Cone Penetration Test S(N) - Standard Penetration Test N - Blows /300mm V - Vane Test
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SITE INVESTIGATIONS LIMITED

BOREHOLE RECORD

CONTRACT Monitoring Boreholes - Moneypoint

Borehole No. 2

CLIENT E.S.B. International

Sheet 1 of 1

Site Address Co. Clare

Boring Commenced 31/8/93

Boring Completed 13/9/93

Type of Boring Shell & Auger and Diamond Drill

Diameter of Borehole 250/TNW mm

Description of Strata	Reduced Level m	Depth m	Legend	Samples/Tests			Date	Water Depth m
				Type	Depth m	Ref. No.		
Ground Level 5.665mOD Malin								
Fill of silty gravelly clay	4.765	0.90						
Firm mottled grey and brown clayey gravelly silt	4.065	1.60		D	1.00	10715		
Stiff grey brown clayey gravelly silt	3.365	2.30		D	2.00	10716		
Stiff brown silty stony clay	2.165	3.00		D	3.00	10717		
Stiff grey siltbound sandy gravel	1.965	3.70		D	3.60	10718		
Very dense grey silty sand	1.265	3.90		D	3.80	10719	31/8	3.8
Boulder (Chiselling 1 hr)	2.465	4.00		D	4.00	10720		
Stiff/hard grey silty gravelly clay	1.365	4.30		W	4.00	ESB		
Presumed rock (Chiselling 1 1/2 hrs)	1.065	4.60		C(+)	4.15			
Extremely fractured slightly discoloured SANDSTONE. Fractured zone associated with vertical fracture thinly bedded	0.865	4.80					8/9	0.6
Medium to light grey medium grained slightly discoloured thinly bedded SANDSTONE; very strong. Closely spaced to medium spaced (occasionally very closely spaced) partly open oxidized planar to undulating joints generally dipping parallel to bedding at 10°- 15°, occasionally steeply dipping	-1.235	6.90						
Final Level								

Remarks:

At 4.15m 62 blows to 130mm Refusal
 Chiselling 2 1/2 hours
 Installed 200mm Ø perforated plastic pipe with pea gravel surround and steel cover
 Cored from 4.6 to 6.9mBGL

KEY - EXPLANATION

- + - Water Strike
- D - Disturbed Sample
- B - Bulk Disturbed Sample
- W - Water Sample
- U - Undisturbed Sample
- P - Piston Sample
- ↓ C(N) - Cone Penetration Test
- ↓ S(N) - Standard Penetration Test
- N - Blows /300mm
- V - Vane Test

SITE INVESTIGATIONS LIMITED

BOREHOLE RECORD

CONTRACT Monitoring Boreholes - Moneypoint
 CLIENT E.S.B. International
 Site Address Co. Clare
 Boring Commenced 3/9/93
 Type of Boring Shell & Auger and Diamond Drill

Borehole No. 3
 Sheet 1 of 3
 Boring Completed 6/9/93
 Diameter of Borehole 200/TNW mm

Description of Strata	Reduced Level m	Depth m	Leg-end	Samples/Tests			Date	Water Depth m
				Type	Depth m	Ref. No.		
Ground Level 10.73mCD Malin								
Topsoil	10.535	0.20						
Fill of ash and cobbles	10.235	0.50		D	1.00	10726		
Fill of very dense ash (Chiselling 1/2 hr)				C(+)	1.00			
				D	2.00	10727		
				C(+)	2.00			
Fill of loose ash	6.635	4.80		D	3.00	10728		
				C(+)	3.00			
	6.035	4.10		D	4.00	10729		
Loose grey fine to coarse silty sandy gravel				(6)	4.15			
	6.235	4.50						
Stiff grey silty stony clay			D	5.00	10730			
			C(24)	5.15				
Presumed rock (Chiselling 2 hrs)			D	6.00	10731			
			C(22)	6.15		3/9	Nil	
						6/9	6.1	
	3.535	7.20	D	7.00	10732			
Presumed rock (Chiselling 2 hrs)			C(+)	7.15				
			D	7.20	ESB			
	3.035	7.70	D	7.50	10733			

Remarks:

Installed 100mm Ø perforated plastic pipe to 7.7mBGL with pea gravel surround and bentonite seal at top and steel cover
 Cored from 7.7 to 10.1mBGL
 Chiselling 2 1/2 hours
 At 1.00m 68 blows to 110mm Refusal
 At 2.00m 64 blows to 100mm Refusal
 At 3.00m 66 blows to 105mm Refusal
 At 7.15m 66 blows to 105mm Refusal

KEY - EXPLANATION

- * - Water Strike
- D - Disturbed Sample
- B - Bulk Disturbed Sample
- W - Water Sample
- U - Undisturbed Sample
- P - Platon Sample
- C(N) - Cone Penetration Test
- S(N) - Standard Penetration Test
- N - Blows /300mm
- V - Vane Test

SITE INVESTIGATIONS LIMITED

BOREHOLE RECORD

CONTRACT Monitoring Boreholes - Moneypoint
 CLIENT E.S.B. International
 Site Address Co. Clare
 Boring Commenced 3/9/93
 Type of Boring Shell & Auger and Diamond Drill

Borehole No. 3
 Sheet 2 of 2
 Boring Completed 6/9/93
 Diameter of Borehole 250/TNW mm

Description of Strata	Re-duced Level	Depth	Leg- and	Samples/Tests				Date	Water Depth m
				Type	Depth m	Ref. No.	Casing Depth		
Ground Level 10.735m OD Malin	m	m							
Medium to light grey medium grained slightly discoloured very thinly bedded SANDSTONE, very strong. Closely spaced to medium spaced partly open to tight discoloured planar joints generally dipping parallel to bedding at 10°. High angle discoloured joints from 8.0m and 8.2m and from 9.25m to 9.45mBGL.	0.635	10.10							
Final Level									

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Remarks:	KEY - EXPLANATION + - Water Strike D - Disturbed Sample B - Bulk Disturbed Sample W - Water Sample U - Undisturbed Sample P - Piston Sample C(N) - Cone Penetration Test S(N) - Standard Penetration Test N - Blows /300mm V - Vane Test
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SITE INVESTIGATIONS LIMITED

BOREHOLE RECORD

CONTRACT Monitoring Borehole - Moneypoint

Borehole No. 5

CLIENT E.S.B. International

Sheet 1 of 2

Site Address Co. Clare

Boring Commenced 1/9/93

Boring Completed 16/9/93

Type of Boring Shell & Auger and Diamond Drill

Diameter of Borehole 250/TNW mm

Description of Strata	Reduced Level m	Depth m	Leg-end	Samples/Tests			Date	Water Depth m
				Type	Depth m	Ref. No.		
Ground Level 4.23mOD Main								
Topsoil	4.03	0.20	+					
Stiff/hard grey brown silty very gravelly clay with cobbles and boulders (Chiselling 2 hrs)			O	D	1.00	10721		
			C(80)		1.15			
			+	D	2.00	10722		
			C(+)		2.00			
	1.43	2.80	+					
Stiff/hard grey silty stony clay with traces of organic matter			O	D	3.00	10723		
			C(31)		3.15			
Firm grey clayey sandy silt with stones	0.73	3.50	+					
Stiff mottled grey and brown silty sandy clay with cobbles.			O	D	4.00	10724		
			C(22)		4.15			
Extremely fractured grey fine grained wholly discoloured very thinly laminated SILTSTONE, moderately strong to strong. Open clay coated occasionally clay filled joints	-0.57	4.80	T				1/9	4.8
	-0.77	5.00					8/9	4.55
Grey fine to medium grained discoloured SANDSTONE, strong. Partly open to open planar to undulating wholly discoloured joints generally dipping parallel to bedding at 20°. Decomposed clay filled joints from 6.5 to 6.8m, from 7.1m to 7.4m. Extremely fractured zone from 7.9m to 8.1mBGL associated with partially healed vertical joint from 7.9 to 8.2mBGL.	-1.77	6.00						
Final Level	-4.17	8.40						

Remarks:
 Chiselling 4 hours
 Installed 200mm Ø perforated plastic pipe to 5.0mBGL with pea gravel surround
 At 2.00 64 blows to 145mm Refusal
 Cored from 5.0 to 8.10mBGL

- KEY - EXPLANATION
- + - Water Strike
 - O - Disturbed Sample
 - B - Bulk Disturbed Sample
 - W - Water Sample
 - U - Undisturbed Sample
 - P - Piston Sample
 - C(N) - Cone Penetration Test
 - S(N) - Standard Penetration Test
 - N - Blows /300mm
 - V - Vane Test

SITE INVESTIGATIONS LIMITED

BOREHOLE RECORD

CONTRACT Monitoring Boreholes - Moneypoint
CLIENT E.S.B. International
Site Address Co. Clare
Boring Commenced 26/8/93
Type of Boring Shell & Auger

Borehole No. 6
Sheet 1 of 1

Boring Completed 9/9/93
Diameter of Borehole 200 mm

Description of Strata	Reduced Level m	Depth m	Log-end	Samples/Tests			Date	Water Depth m
				Type	Depth m	Ref. No.		
Ground Level 6.24mOD Malin	m	m						
Topsoil	5.74	0.50						
Firm grey sandy silt with layers of peat	4.84	1.40		D	0.70	10701		
				D	1.50	10702		
Stiff grey silty stony clay				D	2.50	10703		
				D	3.50	10704		
Presumed broken rock and silty clay	2.04	3.80		W	3.80	ESB	26/8	3.8+
	1.74	4.50		D	4.50	10705		
Presumed broken rock	1.44	4.80		D	4.60	10706		
Presumed rock (Chis. 1 hr)	1.24	5.00						
Final Level								

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Remarks:
 Chiselling 1 hour
 Installed 100mm Ø perforated plastic pipe to 5.0m with pea gravel surround and sealed cap

KEY	- EXPLANATION
+	- Water Strike
D	- Disturbed Sample
B	- Bulk Disturbed Sample
W	- Water Sample
U	- Undisturbed Sample
P	- Piston Sample
C(N)	- Cone Penetration Test
S(N)	- Standard Penetration Test
N	- Blows /300mm
V	- Vane Test

REPORT NO: 8497

GEOTECHNICAL BORING RECORD

IGSL

CONTRACT: Manypoint Power Station

BOREHOLE NO: BH7
Sheet 1 of 1

CLIENT: ESB
ENGINEER: ESB International

GROUND LEVEL (mOD) 16.19
BOREHOLE DIAMETER (mm) 250
BOREHOLE DEPTH (m) 6.00
CASING DEPTH (m) 6.00

DATE STARTED: 21/01/2003
DATE COMPLETED: 21/01/2003

CO-ORDINATES: E 103820
N 151934

BORED BY: D.Harrington

DEPTH (m)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES			FIELD TEST RESULTS	STANDARD PIPE DETAILS
					REF NUMBER	SAMPLE TYPE	DEPTH (m)		
0	MADE GROUND consisting of cobbles and gravel								
1.55	MADE GROUND consisting of stiff brown gravelly clay with cobbles and boulders		15.59	0.60		D	1.00		
2.00						U	2.00		
2.60	Firm to stiff grey gravelly CLAY with occasional cobbles and boulders		13.59	2.60	1502	B	2.50		
3.00					1503	B	3.00		
3.30	Firm to stiff gray/brown slightly organic slightly sandy, slightly gravelly SILT/CLAY with cobbles and boulders		12.69	3.30	1504	B	3.50		
4.50	Stiff grey slightly sandy gravelly CLAY with angular cobbles and boulders		11.78	4.50	1505	B	4.50		
5.50					1506	B	5.50		
5.90	OBSTRUCTION		10.29	5.90					
6.00	End of Borehole at 6.00 m		10.19	6.00					

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Hard Strata Boring / Chiseling

From (m)	To (m)	Hours	Comments
0.00	0.50	1.00	
1.30	1.60	0.50	
2.00	2.30	0.50	
4.90	5.20	0.50	
5.90	6.00	2.00	

Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
-	6.00	-	-	-	No Water encountered

Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
21/01/2003	6.00	6.00	-	Dry at end of boring

Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type
21/01/2003	5.00	2.50	5.00	SP

Remarks: Falling head test @ 2-3m

REPORT NO: 8497

GEOTECHNICAL BORING RECORD

IGSL

CONTRACT : Moneypoint Power Station

BOREHOLE NO: BH8A
Sheet 1 of 1

CLIENT : ESB
ENGINEER : ESB International

GROUND LEVEL (mOD) 12.42
BOREHOLE DIAMETER (mm) 250
BOREHOLE DEPTH (m) 3.10
CASING DEPTH (m) 3.10

DATE STARTED: 23/01/2003
DATE COMPLETED: 23/01/2003

CO-ORDINATES : E 104222
N 151523

BORED BY: D.Harrington

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES			FIELD TEST RESULTS	STAND PIPE DETAILS
					REF. NUMBER	SAMPLE TYPE	DEPTH (m)		
0	MADE GROUND consisting of coal fragments								
0.30	Stiff grey clayey sandy GRAVEL with many cobbles and boulders		12.12	0.30					
1.00					1508	B D	1.00		
2.00	Falling head test				1509	B	2.00		
2.30	Stiff grey gravelly CLAY with occasional cobbles and boulders		10.12	2.30					
2.90	Stiff brown gravelly CLAY with angular cobbles		8.52	2.90	1509	B D	3.00		
3.10	End of Borehole at 3.10 m		9.32	3.10					

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Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
0.50	0.70	0.50	
2.80	2.90	0.50	
3.00	3.10	2.00	

Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
	3.10				No Water encountered

Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
23/01/2003	3.10	3.10	-	Dry at end of boring

Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type

Remarks:

REPORT NO.

8497

GEOTECHNICAL CORE LOG RECORD

IGSL

CONTRACT: Moneypoint Power Station

DRILLHOLE NO : RC8
SHEET: Sheet 1 of 2

CLIENT: ESB
ENGINEER: ESB International

CORE DIAMETER (mm): 75
GROUND LEVEL (mOD): 12.42

DATE STARTED: 23/01/2003
DATE COMPLETED: 23/01/2003

CO-ORDINATES: 104223
15123

INCLINATION (Degrees): 90
FLUSH: Air/Mist

DRILLED BY: MILLDRILL
LOGGED BY: IGSL

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing (mm)	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
0		0	0	0					9.42	3.00			Drilled by Shell and Auger ODEX DRILLING: No recovery, observed by driller as returns of rock.
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
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Continued next sheet

REMARKS: Water encountered @ 8.0m

INSTALLATION DETAILS
 Installation Type : SP
 Depth to Response Zone top (m) :4.50
 Depth to Response Zone bottom (m) 9.50
 Comments : Gravel 10.0-3.8, slotted 9.5-4.5m, sand 3.8-2.5m, fill 2.5-0.5m, headworks

REPORT NO.

8497

GEOTECHNICAL CORE LOG RECORD

IGSL

CONTRACT: Moneypoint Power Station

DRILLHOLE NO: RC8
SHEET: Sheet 2 of 2

CLIENT: ESB
ENGINEER: ESB International

CORE DIAMETER (mm): 75
GROUND LEVEL (mOD): 12.42

DATE STARTED: 23/01/2003
DATE COMPLETED: 23/01/2003

CO-ORDINATES: 104223
15123

INCLINATION (Degrees): 90
FLUSH: Air/Mist

DRILLED BY: MILLDRILL
LOGGED BY: IGSL

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.O.D.%	Fracture Spacing (mm)	UCS (MPa)	POINT LOAD I _s (50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
10.00									2.42	10.00			ODEX DRILLING: No recovery, observed by driller as returns of rock
													End of Borehole at 10.00 m

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REMARKS: Water encountered @ 8.0m

INSTALLATION DETAILS

Installation Type : SP
Depth to Response Zone top (m) :4.50
Depth to Response Zone bottom (m) 9.50
Comments : Gravel 10.0-3.8,slotted 9.5-4.5m,sand 3.8-2.5m,fill 2.5-0.5m,headworks

REPORT NO: 8497

GEOTECHNICAL BORING RECORD

IGSL

CONTRACT: Moneypoint Power Station

BOREHOLE NO: BH9
Sheet 1 of 1

CLIENT: ESB
ENGINEER: ESB International

GROUND LEVEL (mOD) 5.49
BOREHOLE DIAMETER (mm) 250
BOREHOLE DEPTH (m) 3.60
CASING DEPTH (m) 3.60

DATE STARTED: 23/01/2003
DATE COMPLETED: 23/01/2003

CO-ORDINATES: E 104079
N 151277

BORED BY: O.Harrington

DEPTH (m)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES			FIELD TEST RESULTS	STAND PIPE DETAILS
					REF. NUMBER	SAMPLE TYPE	DEPTH (m)		
0	MADE GROUND consisting of gravel								
0.30	MADE GROUND consisting of stiff brown gravelly clay with cobbles and boulders		5.19	0.30	1512	B	1.00		
1.70	Stiff grey clayey sandy GRAVEL cobbles and boulders		3.79	1.70	1513	B	2.00		
2.50					1513	D	2.50		
3.00					1514	B	3.00		
3.50	OBSTRUCTION		1.99	3.50					
3.60	End of Borehole at 3.60 m		1.89	3.60					

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Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
0.90	1.80	1.50	
2.50	3.60	1.00	
2.60	2.80	0.50	

Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
-	3.60	-	-	-	No Water encountered

Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
23/01/2003	3.60	3.60	-	Dry at end of boring

Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type

Remarks:

REPORT NO.

8497

GEOTECHNICAL CORE LOG RECORD

IGSL

CONTRACT: Monypoint Power Station

DRILLHOLE NO.: RC9
SHEET: Sheet 1 of 2

CLIENT: ESB
ENGINEER: ESB International

CORE DIAMETER (mm): 75
GROUND LEVEL (mOD): 5.49

DATE STARTED: 22/01/2003
DATE COMPLETED: 22/01/2003

CO-ORDINATES: 104080
151278

INCLINATION (Degrees): 90
FLUSH: Air/Mist

DRILLED BY: MILLDRILL
LOGGED BY: IGSL

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R. %	S.C.R. %	R.O.D. %	Fracture Spacing (mm)	UCS (MPa)	POINT LOAD I ₅₀ (MPa)	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
0													
4.90		0	0	0					4.49	1.00			No recovery, observed by driller as returns of madeground consisting of gravelly clay with occasional cobbles.
													ODEX DRILLING: No recovery, observed by driller as returns of cobbles and boulders.
									0.59	4.30			ODEX DRILLING: No recovery, observed by driller as returns of rock

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Continued next sheet

REMARKS: Water encountered at 8.2m. Falling head test @3.0-4.0m, 5.0-6.0m

INSTALLATION DETAILS

Installation Type : SP
Depth to Response Zone top (m) : 5.50
Depth to Response Zone bottom (m) : 9.50
Comments : Gravel 10.0-5.5m, slotted 9.5-5.5m, sand 5.5-5.2m, seal 5.2-5.4m, fill 4.2-0.5m, headworks

REPORT NO.		8497		GEOTECHNICAL CORE LOG RECORD				IGSL					
CONTRACT: Moneypoint Power Station							DRILLHOLE NO: RC9						
							SHEET: Sheet 2 of 2						
CLIENT: ESB			CORE DIAMETER (mm): 75			DATE STARTED: 22/01/2003							
ENGINEER: ESB International			GROUND LEVEL (MOD): 5.49			DATE COMPLETED: 22/01/2003							
CO-ORDINATES: 104080			INCLINATION (Degrees): 90			DRILLED BY: MILLDRILL							
151278			FLUSH: Air/Mist			LOGGED BY: IGSL							
DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.O.D.%	Fracture Spacing (mm)	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (MOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
10.00									-4.51	10.00			ODEX DRILLING: No recovery, observed by driller as returns of rock
													End of Borehole at 10.00 m
REMARKS: Water encountered at 8.2m. Falling head test @3.0-4.0m, 5.0-6.0m						INSTALLATION DETAILS Installation Type : SP Depth to Response Zone top (m) :5.50 Depth to Response Zone bottom (m) 9.50 Comments : Gravel 10.0-5.5m,slotted 9.5-5.5m,sand 5.5-5.2m,seal 5.2-5.4m,fill 4.2-0.5m,headworks							

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REPORT NO.	8497	GEOTECHNICAL CORE LOG RECORD	IGSL
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CONTRACT: Moneypoint Power Station	DRILLHOLE NO: RC10
	SHEET: Sheet 1 of 2

CLIENT: ESB	CORE DIAMETER (mm): 75	DATE STARTED: 21/01/2003
ENGINEER: ESB International	GROUND LEVEL (mOD): 5.33	DATE COMPLETED: 21/01/2003

CO-ORDINATES: 103977 151334	INCLINATION (Degrees): 90	DRILLED BY: MILDRILL
	FLUSH: Air/Mist	LOGGED BY: IGSL

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.O.D.%	Fracture Spacing (mm)	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
0													
0.60								[Symbolic Log: Gravelly clay with occasional cobbles]	4.73	0.60			No recovery, observed by driller as returns of madeground consisting of gravelly clay with occasional cobbles.
5.50		0	0	0				[Symbolic Log: Cobbles and boulders]					ODEX DRILLING: No recovery, observed by driller as returns of cobbles and boulders
5.50		0	0	0				[Symbolic Log: Rock]	-0.17	5.50			ODEX DRILLING: No recovery, observed by driller as returns of rock.

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REMARKS: No water encountered, Falling head test @ 4.0-5.0m	INSTALLATION DETAILS Installation Type : SP Depth to Response Zone top (m) :6.00 Depth to Response Zone bottom (m) 9.50 Comments : Gravel 9.5-5.8m, slotted 9.5-6.0m, sand 5.8-5.5m, seal 5.5-4.5m, fill 4.5-0.5m, headworks
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Continued next sheet

REPORT NO.	8497	GEOTECHNICAL CORE LOG RECORD	IGSL
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CONTRACT: Moneypoint Power Station		DRILLHOLE NO : RC10
		SHEET: Sheet 2 of 2
CLIENT: ESB	CORE DIAMETER (mm): 75	DATE STARTED: 21/01/2003
ENGINEER: ESB International	GROUND LEVEL (mOD): 5.33	DATE COMPLETED: 21/01/2003
CO-ORDINATES: 103977	INCLINATION (Degrees): 90	DRILLED BY: MILLDRILL
151334	FLUSH: Air/Mist	LOGGED BY: IGSL

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing (mm)	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
10	10.00				0 250 500			[Symbolic Log Pattern]	-4.67	10.00		[Standpipe Details]	ODEX DRILLING: No recovery, observed by driller as returns of rock End of Borehole at 10.00 m
11													
12													
13													
14													
15													
18													

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REMARKS: No water encountered. Falling head test @ 4.0-5.0m	INSTALLATION DETAILS Instalation Type : SP Depth to Response Zone top (m) :6.00 Depth to Response Zone bottom (m) 9.50 Comments : Gravel 9.5-5.8m, slotted 9.5-8.0m, sand 5.8-5.5m, seal 5.5-4.5m, fill 4.5-0.5m, headworks
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REPORT NO: 8497

GEOTECHNICAL BORING RECORD

IGSL

CONTRACT : Moneypoint Power Station

BOREHOLE NO: BH11
Sheet 1 of 1

CLIENT : ESB
ENGINEER : ESB International

GROUND LEVEL (mOD) 7.88
BOREHOLE DIAMETER (mm) 250
BOREHOLE DEPTH (m) 2.10
CASING DEPTH (m) 2.10

DATE STARTED: 21/01/2003
DATE COMPLETED: 21/01/2003

CO-ORDINATES : E 103493
N 151736

BORED BY: D.Harrington

DEPTH (m)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES			FIELD TEST RESULTS	STAND PIPE DETAILS
					REF. NUMBER	SAMPLE TYPE	DEPTH (m)		
0.00 - 0.40	TOPSOIL	[Pattern]	7.48	0.40					
0.40 - 0.90	MADE GROUND consisting of gravelly clay with cobbles and boulders	[Pattern]	6.98	0.90		D	1.00		
0.90 - 1.90	Stiff grey gravelly CLAY with cobbles and boulders	[Pattern]	5.88	2.00	1501	B	1.90		
1.90 - 2.10	OBSTRUCTION Falling head test End of Borehole at 2.10 m	[Pattern]	5.78	2.10		D	2.00		

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Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
0.40	0.90	1.00	
1.40	1.50	0.50	
2.00	2.10	2.00	

Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
	2.10				No Water encountered

Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
21/01/2003	2.10	2.10	-	Dry at end of boring

Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type

Remarks:

REPORT NO.

8497

GEOTECHNICAL CORE LOG RECORD

IGSL

CONTRACT: Moneypoint Power Station

DRILLHOLE NO : RC11
SHEET: Sheet 1 of 2

CLIENT: ESB
ENGINEER: ESB International

CORE DIAMETER (mm): 75
GROUND LEVEL (mOD): 7.88

DATE STARTED: 22/01/2003
DATE COMPLETED: 22/01/2003

CO-ORDINATES: 103494
151738

INCLINATION (Degrees): 90
FLUSH: Air/Mist

DRILLED BY: MILLDRILL
LOGGED BY: IGSL

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.O.D.%	Fracture Spacing (mm)	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
0					0								
1													
2		0	0	0									
3													
4	4.20												
5													
6													
7		0	0	0									
8													
9													
10													
11													
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ODEX DRILLING: No returns, observed by driller as returns as madeground consisting of sandy clayey gravel

ODEX DRILLING: No returns, observed by driller as returns as rock

Continued next sheet

REMARKS: No water encountered. Falling head test @ 4m-5m

INSTALLATION DETAILS
Installation Type : SP
Depth to Response Zone top (m) :3.70
Depth to Response Zone bottom (m) 9.50
Comments : Gravel 9.5-3.7m, slotted 9.5-4.0m, sand 3.7-3.4m, seal 3.4-2.4m&1.0-5m, fill 2.4-1.0m, headwrt

REPORT NO.

8497

GEOTECHNICAL CORE LOG RECORD

IGSL

CONTRACT: Moneypoint Power Station

DRILLHOLE NO.: RC11
SHEET: Sheet 2 of 2

CLIENT: ESB
ENGINEER: ESB International

CORE DIAMETER (mm): 75
GROUND LEVEL (mODD): 7.88

DATE STARTED: 22/01/2003
DATE COMPLETED: 22/01/2003

CO-ORDINATES: 103494
151736

INCLINATION (Degrees): 90
FLUSH: Air/Mist

DRILLED BY: MILDRILL
LOGGED BY: IGSL

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing (mm)	UCS (MPa)	POINT LOAD I _s (50) MPa	SYMBOLIC LOG	ELEVATION (mODD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
10.00								[Symbolic Log Pattern]	-2.12	10.00			OOEX DRILLING: No returns, observed by driller as returns as rock End of Borehole at 10.00 m

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REMARKS: No water encountered. Falling head test @ 4m-5m

INSTALLATION DETAILS
Installation Type : SP
Depth to Response Zone top (m) :3.70
Depth to Response Zone bottom (m) 9.50
Comments : Gravel 9.5-3.7m, slotted 9.5-4.0m, sand 3.7-3.4m, seal 3.4-2.4m&1.0-5m, fill 2.4-1.0m, headwo

CONTRACT: Moneypoint Power Station		DRILLHOLE NO.: RC12
		SHEET: Sheet 1 of 3
CLIENT: ESB	CORE DIAMETER (mm): 75	DATE STARTED: 16/01/2003
ENGINEER: ESB International	GROUND LEVEL (mGD): 5.93	DATE COMPLETED: 17/01/2003
CO-ORDINATES: 103295 151619	INCLINATION (Degrees): 90	DRILLED BY: MILLDRILL
	FLUSH: Air/Mist	LOGGED BY: IGSL

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R. %	S.C.R. %	R.Q.D. %	Fracture Spacing (mm)	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mGD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
0	0	0	0	0				[Symbolic Log Pattern]	5.33	0.60			No recovery, observed by driller as returns of madeground consisting of gravelly clay with occasional cobbles.
2.40								[Symbolic Log Pattern]	3.50	1.40			ODEX DRILLING: No recovery, observed by driller as returns of gravel, cobbles and boulders
19.20								[Symbolic Log Pattern]					ODEX DRILLING: No recovery, observed by driller as returns of rock

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REMARKS: Water encountered at 19.2m	INSTALLATION DETAILS Installation Type : SP Depth to Response Zone top (m) :14.50 Depth to Response Zone bottom (m) 20.50 Comments : Gravel 20.5-13.8m, slotted 20.5-14.5m, sand 13.8-13.5m, seal 13.5-12.5m, fill 12.5-0.5m, heath/c
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Continued next sheet

REPORT NO.	8497	GEOTECHNICAL CORE LOG RECORD	IGSL
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CONTRACT: Moneypoint Power Station	DRILLHOLE NO : RC12 SHEET: Sheet 2 of 3
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CLIENT: ESB ENGINEER: ESB International	CORE DIAMETER (mm): 75 GROUND LEVEL (mOD): 5.93	DATE STARTED: 16/01/2003 DATE COMPLETED: 17/01/2003
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CO-ORDINATES: 103295 151619	INCLINATION (Degrees): 90 FLUSH: Air/Mist	DRILLED BY: MILLDRILL LOGGED BY: IGSL
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DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing (mm)	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
10 11 12 13 14 15 16		0	0	0				[Symbolic Log Pattern]					<p>ODEX DRILLING: No recovery, observed by driller as returns of rock</p>

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REMARKS: Water encountered at 19.2m	INSTALLATION DETAILS Installation Type : SP Depth to Response Zone top (m) :14.50 Depth to Response Zone bottom (m) 20.50 Comments : Gravel 20.5-13.8m, slotted 20.5-14.5m, sand 13.8-13.5m, seal 13.5-12.5m, fill 12.5-0.5m, heath
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REPORT NO: 8497		GEOTECHNICAL BORING RECORD		IGSL
CONTRACT : Moneypoint Power Station			BOREHOLE NO: BH14 Sheet 1 of 1	
CLIENT : ESB	GROUND LEVEL (mOD)	5.87		
ENGINEER : ESB International	BOREHOLE DIAMETER (mm)	250		
CO-ORDINATES : E 103453 N 151427	BOREHOLE DEPTH (m)	2.60		
	CASING DEPTH (m)	2.60		
				BORED BY: D.Harrington

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES			FIELD TEST RESULTS	STAND PIPE DETAILS
					REF. NUMBER	SAMPLE TYPE	DEPTH (m)		
0.00	TOPSOIL								
0.40	Stiff grey clayey sandy GRAVEL with many cobbles and boulders.		5.47	0.40					
1.00				1515	B	1.00			
2.00					1516	B	2.00		
2.50	OBSTRUCTION End of Borehole at 2.60 m		3.37	2.50					
2.60			3.27	2.60					

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Hard Strata Boring / Chiselling				Water Strike Details					
From (m)	To (m)	Hours	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
0.00	0.40	1.00			2.60	-	-	-	No Water encountered
2.50	2.60	2.00							
Standpipe Installation Details				Groundwater Observations					
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments
					24/01/2003	2.60	2.60	-	Dry at end of boring

Remarks:

REPORT NO.

8497

GEOTECHNICAL CORE LOG RECORD

IGSL

CONTRACT: Moneypoint Power Station

DRILLHOLE NO: RC14
SHEET: Sheet 1 of 2

CLIENT: ESB
ENGINEER: ESB International

CORE DIAMETER (mm): 75
GROUND LEVEL (mOD): 5.87

DATE STARTED: 20/01/2003
DATE COMPLETED: 21/01/2003

CO-ORDINATES: 103454
151427

INCLINATION (Degrees): 90
FLUSH: Air/Mist

DRILLED BY: MILLDRILL
LOGGED BY: IGSL

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R. %	S.C.R. %	R.Q.D. %	Fracture Spacing (mm)	UCS (MPa)	POINT LOAD I _s (50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
0									5.27	0.60			No recovery, observed by driller as returns of madaground consisting of gravelly clay with occasional cobbles.
1													ODEX DRILLING: No recovery, observed by driller as returns of gravel, cobbles and boulders
5.70		0	0	0					0.17	5.70			ODEX DRILLING: No recovery, observed by driller as returns of rock
8.00		0	0	0									

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Continued next sheet

REMARKS: Water encountered at 10.0m

INSTALLATION DETAILS

Installation Type : SP
Depth to Response Zone top (m) :4.00
Depth to Response Zone bottom (m) 8.00
Comments : Gravel 8.2-3.5m, slotted 8.0-4.0m, sand 3.5-3.2m, seal 3.2-2.7m, fill 2.7-0.5m, headworks

REPORT NO.

8497

GEOTECHNICAL CORE LOG RECORD

IGSL

CONTRACT: Moneypoint Power Station

DRILLHOLE NO : RC14
SHEET: Sheet 2 of 2

CLIENT: ESB
ENGINEER: ESB International

CORE DIAMETER (mm): 75
GROUND LEVEL (mOD): 5.87

DATE STARTED: 20/01/2003
DATE COMPLETED: 21/01/2003

CO-ORDINATES: 103454
151427

INCLINATION (Degrees): 90
FLUSH: Air/Mist

DRILLED BY: MILLDRILL
LOGGED BY: IGSL

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.O.D.%	Fracture Spacing (mm)	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
10.00									-4.13	10.00			ODEX DRILLING: No recovery, observed by driller as returns of rock
													End of Borehole at 10.00 m

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REMARKS: Water encountered at 10.0m

INSTALLATION DETAILS

Installation Type : SP
Depth to Response Zone top (m) :4.00
Depth to Response Zone bottom (m) 8.00
Comments : Gravel 8.2-3.5m, slotted 8.0-4.0m, sand 3.5-3.2m, seal 3.2-2.7m, fill 2.7-0.5m, headworks

REPORT NO.

8497

GEOTECHNICAL CORE LOG RECORD

IGSL

CONTRACT: Moneypoint Power Station

DRILLHOLE NO.: RC15
SHEET: Sheet 1 of 2

CLIENT: ESB
ENGINEER: ESB International

CORE DIAMETER (mm): 75
GROUND LEVEL (mGO): 5.81

DATE STARTED: 24/01/2003
DATE COMPLETED: 24/01/2003

CO-ORDINATES: 103613
151377

INCLINATION (Degrees): 90
FLUSH: Air/Mist

DRILLED BY: MILLDRILL
LOGGED BY: IGSL

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing (mm)	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mGO)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
0		0	0	0					5.31	0.50			ODEX DRILLING: No recovery, observed by driller as returns of madeground consisting of tarmacadam
2.70		0	0	0									ODEX DRILLING: No recovery, observed by driller as returns of gravel, cobbles and boulders.
5.70		0	0	0									
7.20		0	0	0									

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Continued next sheet

REMARKS: Water encountered at 7.2m.

INSTALLATION DETAILS

Installation Type : SP
Depth to Response Zone top (m) :3.00
Depth to Response Zone bottom (m) 9.00
Comments : Seal 10.0-9.5m&2.2-1.2m,sand 9.5-9.2m&2.5-2.2m,gravel 9.2-2.5m,slotted 9.0-3.0m,fill 1.2-0.5m

CONTRACT: Moneypoint Power Station		DRILLHOLE NO.: RC15
		SHEET: Sheet 2 of 2
CLIENT: ESB	CORE DIAMETER (mm): 75	DATE STARTED: 24/01/2003
ENGINEER: ESB International	GROUND LEVEL (mOD): 5.81	DATE COMPLETED: 24/01/2003
CO-ORDINATES: 103613	INCLINATION (Degrees): 90	DRILLED BY: MILDRILL
151377	FLUSH: Air/Mist	LOGGED BY: IGSL

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing (mm)	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
10	10.00				0 250 500				-4.19	10.00		<input type="checkbox"/>	<p>COEX DRILLING: No recovery, observed by driller as returns of gravel, cobbles and boulders.</p> <hr/> <p style="text-align: center;">End of Borehole at 10.00 m</p>
11													
12													
13													
14													
15													
16													

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REMARKS: Water encountered at 7.2m.	INSTALLATION DETAILS Installation Type : SP Depth to Response Zone top (m) :3.00 Depth to Response Zone bottom (m) 9.00 Comments : Seal 10.0-9.5m&2.2-1.2m,sand 9.5-9.2m&2.5-2.2m,gravel 9.2-2.5m,slotted 9.0-3.0m,fill 1.7-0
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CONTRACT: Moneypoint Power Station		DRILLHOLE NO: RC16
		SHEET: Sheet 1 of 1
CLIENT: ESB	CORE DIAMETER (mm): 75	DATE STARTED: 18/12/2002
ENGINEER: ESB International	GROUND LEVEL (mOD): 13.53	DATE COMPLETED: 18/12/2002
CO-ORDINATES: 104400 151817	INCLINATION (Degrees): 90	DRILLED BY: MILLDRILL
	FLUSH: Air/Mist	LOGGED BY: IGSL

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.O.D.%	Fracture Spacing (mm)	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
0													
1.20		0	0	0					12.33	1.20			No recovery, observed by driller as returns of madeground consisting of gravelly clay with occasional cobbles.
1.80		0	0	0									ODEX DRILLING: No recovery, observed by driller as returns of clayey sand
2.00		0	0	0					11.53	2.00			ODEX DRILLING: No recovery, observed by driller as returns of rock
3.00		0	0	0									
4.20		0	0	0									
5.00		0	0	0					8.53	5.00			End of Borehole at 5.00 m

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REMARKS: Water encountered at 1.8m	INSTALLATION DETAILS Installation Type : SP Depth to Response Zone top (m) :3.00 Depth to Response Zone bottom (m) :4.50 Comments : Gravel 5.0-4.5m, slotted 4.5-3.0m, seal 2.5-0.5m, headworks.
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REPORT NO.	8497	GEOTECHNICAL CORE LOG RECORD	IGSL
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CONTRACT: Moneypoint Power Station		DRILLHOLE NO : RC17
		SHEET: Sheet 1 of 1
CLIENT: ESB	CORE DIAMETER (mm): 75	DATE STARTED: 19/12/2001
ENGINEER: ESB International	GROUND LEVEL (mOD): 15.73	DATE COMPLETED: 06/03/2003
CO-ORDINATES: 104620 151453	INCLINATION (Degrees): 90	DRILLED BY: MILLDRILL
	FLUSH: Air/Mist	LOGGED BY: IGSL

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.O.D.%	Fracture Spacing (mm)	UCS (MPa)	POINT LOAD I ₅₀ (MPa)	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
1.00		0	0	0				[Cross-hatched pattern]	14.73	1.00			No recovery, observed by driller as returns of madeground consisting of gravelly clay with occasional cobbles.
2.50		0	0	0				[Brick pattern]					ODEX DRILLING: No recovery, observed by driller as returns of rock.
3.50		0	0	0				[Brick pattern]					
5.50		0	0	0				[Brick pattern]	9.23	6.50			End of Borehole at 6.50 m

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REMARKS: No water encountered	INSTALLATION DETAILS Installation Type : SP Depth to Response Zone top (m) :3.50 Depth to Response Zone bottom (m) 5.50 Comments : Gravel 6.5-1.8m, slotted 5.5-3.5m, sand 1.8-1.5m, seal 1.5-0.5m, headworks:
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REPORT NO.	8497	GEOTECHNICAL CORE LOG RECORD	IGSL
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CONTRACT: Monaypoint Power Station		DRILLHOLE NO: RC19
		SHEET: Sheet 1 of 2
CLIENT: ESB	CORE DIAMETER (mm): 75	DATE STARTED: 08/01/2002
ENGINEER: ESB International	GROUND LEVEL (mOD): 15.30	DATE COMPLETED: 08/01/2002
CO-ORDINATES: 104414 151356	INCLINATION (Degrees): 90	DRILLED BY: MILLDRILL
	FLUSH: Air/Mist	LOGGED BY: IGSL

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.O.D.%	Fracture Spacing (mm)	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
1.20		0	0	0				[Cross-hatched pattern]	14.10	1.20			ODEX DRILLING: No recovery, observed by driller as returns of madeground consisting of gravelly clay with occasional cobbles.
2.50		0	0	0				[Brick pattern]					ODEX DRILLING: No recovery, observed by driller as returns of rock.
3.50		0	0	0				[Brick pattern]					
4.50		0	0	0				[Brick pattern]					
5.10		0	0	0				[Brick pattern]					

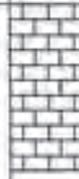
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REMARKS: Water encountered @ 5.1m	INSTALLATION DETAILS Installation Type : SP Depth to Response Zone top (m) :3.00 Depth to Response Zone bottom (m) 9.50 Comments : Gravel 10.0-2.0m, slotted 9.5-3.0m, sand 2.0-1.7m, seal 1.7-0.5m, headworks.
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Continued next sheet.

REPORT NO.	8497	GEOTECHNICAL CORE LOG RECORD	IGSL
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CONTRACT: Moneypoint Power Station		DRILLHOLE NO : RC19
		SHEET: Sheet 2 of 2
CLIENT: ESB	CORE DIAMETER (mm): 75	DATE STARTED: 08/01/2002
ENGINEER: ESB International	GROUND LEVEL (mOD): 15.30	DATE COMPLETED: 08/01/2002
CO-ORDINATES: 104414	INCLINATION (Degrees): 90	DRILLED BY: MILDRILL
151356	FLUSH: Air/Mist	LOGGED BY: IGSL

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing (mm)	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
10	10.00								5.30	10.00			ODEX DRILLING: No recovery, observed by driller as returns of rock. End of Borehole at 10.00 m

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REMARKS: Water encountered @ 5.1m	INSTALLATION DETAILS Installation Type : SP Depth to Response Zone top (m) :3.00 Depth to Response Zone bottom (m) 9.50 Comments : Gravel 10.0-2.0m, slotted 9.5-3.0m, sand 2.0-1.7m, seal 1.7-0.5m, headworks.
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REPORT NO.	8497	GEOTECHNICAL CORE LOG RECORD	IGSL
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CONTRACT: Moneypoint Power Station		DRILLHOLE NO : FC20
		SHEET: Sheet 1 of 2
CLIENT: ESB	CORE DIAMETER (mm): 75	DATE STARTED: 07/01/2003
ENGINEER: ESB International	GROUND LEVEL (mOD): 13.16	DATE COMPLETED: 08/01/2003
CO-ORDINATES: 104244	INCLINATION (Degrees): 90	DRILLED BY: MILLDRILL
151288	FLUSH: Air/Mist	LOGGED BY: IGSL

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.O.D.%	Fracture Spacing (mm)	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
0.20		0	0	0									No recovery, observed by driller as returns of madeground consisting of gravelly clay with occasional cobbles.
1.70		0	0	0					11.46	1.70			ODEX DRILLING: No recovery, observed by driller as returns of rock.
2.50		0	0	0									
3.50		0	0	0									
4.00		0	0	0									
8.00		0	0	0									

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REMARKS: No water encountered. Falling head test @ 3.0-4.0m	INSTALLATION DETAILS Installation Type : SP Depth to Response Zone top (m) :4.00 Depth to Response Zone bottom (m) 10.00 Comments : Gravel 10.0-2.5m, slotted 9.5-4.0m, sand 2.5-2.2m, seal 12.2-0.5m, headworks.
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Continued next sheet

CONTRACT: Moneypoint Power Station		DRILLHOLE NO : RC20
		SHEET: Sheet 2 of 2
CLIENT: ESB	CORE DIAMETER (mm): 75	DATE STARTED: 07/01/2003
ENGINEER: ESB International	GROUND LEVEL (mOD): 13.16	DATE COMPLETED: 08/01/2003
CO-ORDINATES: 104244	INCLINATION (Degrees): 90	DRILLED BY: MILLDRILL
151286	FLUSH: Air/Mist	LOGGED BY: IGSL

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing (mm)	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
9.20								[Symbolic Log Pattern]					ODEX DRILLING: No recovery, observed by driller as returns of rock.
10.00		0	0	0					3.16	10.00			End of Borehole at 10.00 m

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REMARKS: No water encountered. Falling head test @ 3.0-4.0m	INSTALLATION DETAILS Installation Type : SP Depth to Response Zone top (m) : 4.00 Depth to Response Zone bottom (m) : 10.00 Comments : Gravel 10.0-2.5m, slotted 9.5-4.0m, sand 2.5-2.2m, seal 12.2-0.5m, headworks.
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REPORT NO: 8497

GEOTECHNICAL BORING RECORD

IGSL

CONTRACT : Moneypoint Power Station

BOREHOLE NO: BH21
Sheet 1 of 1

CLIENT : ESB
ENGINEER : ESB International

GROUND LEVEL (mOD) 12.17
BOREHOLE DIAMETER (mm) 250
BOREHOLE DEPTH (m) 1.40
CASING DEPTH (m) 1.40

DATE STARTED: 17/12/2002
DATE COMPLETED: 07/01/2003

CO-ORDINATES : E 104159
N 151405

BORED BY: J. Quinn

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (M)	SAMPLES			FIELD TEST RESULTS	STAND PIPE DETAILS
					REF. NUMBER	SAMPLE TYPE	DEPTH (M)		
0.00	MADE GROUND (brown/black slightly clayey sandy gravel)		11.27	0.90					
1.00	MADE GROUND (brown/black slightly clayey sandy gravel with large cobbles)		10.77	1.40					
1.40	End of Borehole at 1.40 m								

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Hard Strata Boring / Chiseling

From (m)	To (m)	Hours	Comments
1.10	1.40	2.00	

Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
-	1.40	-	-	-	No Water encountered

Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type

Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
07/01/2003	1.40	1.40	-	Dry at end of boring

Remarks:

REPORT NO.	B497	GEOTECHNICAL CORE LOG RECORD	IGSL
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CONTRACT: Moneypoint Power Station		DRILLHOLE NO : RC21
		SHEET: Sheet 1 of 1
CLIENT: ESB	CORE DIAMETER (mm): 75	DATE STARTED: 09/01/2003
ENGINEER: ESB International	GROUND LEVEL (mOD): 12.17	DATE COMPLETED: 09/01/2003
CO-ORDINATES: 104159	INCLINATION (Degrees): 90	DRILLED BY: MILLDRILL
151406	FLUSH: Air/Mist	LOGGED BY: IGSL

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.O.D.%	Fracture Spacing (mm)	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
1.00		0	0	0					11.17	1.00			Hole opened by shell and auger.
2.70		0	0	0									ODEX DRILLING: No recovery, observed by driller as returns of gravelly clay.
4.26		0	0	0									
4.50		0	0	0									
5.70		0	0	0					6.57	5.60			ODEX DRILLING: No recovery, observed by driller as returns of rock.
6.10		0	0	0					6.07	6.10			End of Borehole at 6.10 m

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REMARKS: Water encountered at 4.2m & 5.6m.	INSTALLATION DETAILS Installation Type : SP Depth to Response Zone top (m) :1.70 Depth to Response Zone bottom (m) 5.10 Comments : Gravel 4.8-2.0m, slotted 4.5-2.5m, sand 5.1-4.8 & 1.7-1.2m, seal 5.1-5.1m & 1.2-0.5m, headwa
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CONTRACT: Moneypoint Power Station		DRILLHOLE NO : RC22
		SHEET: Sheet 1 of 2
CLIENT: ESB	CORE DIAMETER (mm): 75	DATE STARTED: 14/01/2003
ENGINEER: ESB International	GROUND LEVEL (mOD): 4.96	DATE COMPLETED: 14/01/2003
CO-ORDINATES: 103161 151484	INCLINATION (Degrees): 90	DRILLED BY: MILLDRILL
	FLUSH: Air/Mist	LOGGED BY: IGSL

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.O.D.%	Fracture Spacing (mm)	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N values)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
									3.86	1.10			<p>No recovery, observed by driller as returns of madeground consisting of gravelly clay with occasional cobbles.</p> <p>ODEX DRILLING: No recovery, observed by driller as returns of madeground consisting of gravel, cobbles and boulders.</p>

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Continued next sheet

REMARKS: Water encountered @5.6m	INSTALLATION DETAILS Installation Type : SP Depth to Response Zone top (m) :3.00 Depth to Response Zone bottom (m) 8.00 Comments : Gravel 8.7-2.3m,slotted 8.0-3.0m,sand 2.3-2.0m,seal 2.0-1.0m,fill 1.0-0.5m,headworks
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REPORT NO.	8497	GEOTECHNICAL CORE LOG RECORD	IGSL
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CONTRACT: Moneypoint Power Station	DRILLHOLE NO : RC22 SHEET: Sheet 2 of 2
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CLIENT: ESB ENGINEER: ESB International	CORE DIAMETER (mm): 75 GROUND LEVEL (mOD): 4.96	DATE STARTED: 14/01/2003 DATE COMPLETED: 14/01/2003
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CO-ORDINATES: 103161 151484	INCLINATION (Degrees): 90 FLUSH: Air/Mist	DRILLED BY: MILLDRILL LOGGED BY: IGSL
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DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.O.D.%	Fracture Spacing (mm)	UCS (MPa)	POINT LOAD I ₅₀ (MPa)	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
10 11 12 13 14 15 16	10.00							[Cross-hatched box]	-5.04	10.00			<p>ODEX DRILLING: No recovery, observed by driller as returns of madeground consisting of gravel, cobbles and boulders</p> <hr/> <p>End of Borehole at 10.00 m</p>

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REMARKS: Water encountered @5.6m	INSTALLATION DETAILS Installation Type : SP Depth to Response Zone top (m) :3.00 Depth to Response Zone bottom (m) 8.00 Comments : Gravel 6.7-2.3m, slotted 8.0-3.0m, sand 2.3-2.0m, seal 2.0-1.0m, fill 1.0-0.5m, headworks
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CONTRACT: Moneypoint Power Station		DRILLHOLE NO : RC23
		SHEET: Sheet 1 of 2
CLIENT: ESB	CORE DIAMETER (mm): 75	DATE STARTED: 13/01/2003
ENGINEER: ESB International	GROUND LEVEL (mOD): 5.15	DATE COMPLETED: 14/01/2003
CO-ORDINATES: 102900	INCLINATION (Degrees): 90	DRILLED BY: MILLDRILL
151497	FLUSH: Air/Mist	LOGGED BY: IGSL

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.O.D.%	Fracture Spacing (mm)	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
0.40									4.90	0.25			No recovery, observed by driller as returns of topsoil.
5.70	2.50	0	0	0									ODEX DRILLING: No recovery, observed by driller as returns of boulders.
7.40		0	0	0									

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REMARKS: Water encountered @ 6.5m	INSTALLATION DETAILS Installation Type : SP Depth to Response Zone top (m) :3.00 Depth to Response Zone bottom (m) 8.00 Comments : Gravel 8.0-2.3m, slotted 8.0-3.0m, sand 9.0-8.7 & 2.3-2.0m, seal 10.0-9.0 & 2.0-0.5m, headwork
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REPORT NO.		8497		GEOTECHNICAL CORE LOG RECORD					IGSL				
CONTRACT: Moneypoint Power Station							DRILLHOLE NO : RC23		SHEET: Sheet 2 of 2				
CLIENT: ESB			ENGINEER: ESB International			CORE DIAMETER (mm): 75		GROUND LEVEL (mOD): 5.15		DATE STARTED: 13/01/2003			
CO-ORDINATES: 102900			151497			INCLINATION (Degrees): 90		FLUSH: Air/Mist		DATE COMPLETED: 14/01/2003			
DRILLED BY: MILLDRILL			LOGGED BY: IGSL										
DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.O.D.%	Fracture Spacing (mm)	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
10.00		0	0	0				Gravel	-4.85	10.00			ODEX DRILLING: No recovery, observed by driller as returns of boulders.
End of Borehole at 10.00 m													
REMARKS: Water encountered @ 6.5m						INSTALLATION DETAILS							
						Installation Type : SP							
						Depth to Response Zone top (m) :3.00							
						Depth to Response Zone bottom (m) 8.00							
						Comments : Gravel 8.0-2.3m, slotted 8.0-3.0m, sand 9.0-8.7 & 2.3-2.0m, seal 10.0-9.0 & 2.0-0.5m, headwork							

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REPORT NO.	8497	GEOTECHNICAL CORE LOG RECORD	IGSL
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CONTRACT: Moneypoint Power Station	DRILLHOLE NO : RC24
	SHEET: Sheet 1 of 2

CLIENT: ESB	CORE DIAMETER (mm): 75	DATE STARTED: 13/01/2003
ENGINEER: ESB International	GROUND LEVEL (mOD): 4.77	DATE COMPLETED: 13/01/2003

CO-ORDINATES: 102808 151549	INCLINATION (Degrees): 90	DRILLED BY: MILLDRILL
	FLUSH: Air/Mist	LOGGED BY: IGSL

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.O.D.%	Fracture Spacing (mm)	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
0.00		0	0	0					3.77	1.00			No recovery, observed by driller as returns of madeground consisting of gravelly clay with occasional cobbles.
2.50		0	0	0									ODEX DRILLING: No recovery, observed by driller as returns of boulders.
6.50		0	0	0									
		0	0	0									

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REMARKS: Water encountered at 4.4m.	INSTALLATION DETAILS Installation Type : SP Depth to Response Zone top (m) :5.00 Depth to Response Zone bottom (m) 8.70 Comments : Gravel 9.2-4.5m, stotted 8.7-5.0m, sand 9.5-9.2 & 4.5-4.2m, seal 10.0-9.5m & 4.2-3.2m, headw...
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REPORT NO: 8497	GEOTECHNICAL BORING RECORD		IGSL
CONTRACT : Moneypoint Power Station		BOREHOLE NO: BH25 Sheet 1 of 1	
CLIENT : ESB	GROUND LEVEL (mOD)	5.86	
ENGINEER : ESB International	BOREHOLE DIAMETER (mm)	250	
CO-ORDINATES : E 102930 N 151638	BOREHOLE DEPTH (m)	1.00	
	CASING DEPTH (m)	1.00	
		BORED BY: J. Quinn	

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES			FIELD TEST RESULTS	STAND PIPE DETAILS
					REF. NUMBER	SAMPLE TYPE	DEPTH (m)		
0	TOPSOIL	[Pattern]	6.56	0.30					
0.60	Firm brown sandy clayey medium to coarse angular GRAVEL with cobbles	[Pattern]	6.26	0.60					
1.00	Boulders and cobbles with some sandy clayey medium to coarse angular GRAVEL End of Borehole at 1.00 m	[Pattern]	5.88	1.00		B	1.00		
1.00									
2.00									
3.00									
4.00									
5.00									
6.00									
7.00									
8.00									
9.00									
10.00									

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Hard Strata Boring / Chiseling				Water Strike Details					
From (m)	To (m)	Hours	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
0.60	1.00	1.50		-	1.00	-	-	-	No Water encountered
Standpipe Installation Details				Groundwater Observations:					
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments
					20/01/2003	1.00	1.00	-	Dry at end of boring

Remarks:

REPORT NO: 8497

GEOTECHNICAL BORING RECORD

IGSL

CONTRACT : Moneypoint Power Station

BOREHOLE NO: BH25A
Sheet 1 of 1

CLIENT : ESB
ENGINEER : ESB International

GROUND LEVEL (mOD) 6.86
BOREHOLE DIAMETER (mm) 250
BOREHOLE DEPTH (m) 1.20
CASING DEPTH (m) 1.20

DATE STARTED: 22/01/2003
DATE COMPLETED: 22/01/2003

CO-ORDINATES : E 102930
N 151638

BORED BY: D.Harrington

DEPTH (m)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES			FIELD TEST RESULTS	STAND PIPE DETAILS
					REF. NUMBER	SAMPLE TYPE	DEPTH (m)		
0	TOPSOIL								
0.40	Stiff grey gravelly CLAY with cobbles and boulders		5.46	0.40					
1.10	OBSTRUCTION End of Borehole at 1.20 m		5.76	1.10	1507	D			
1.20			5.66	1.20		B			1.20

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Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
0.50	0.70	0.50	
0.90	1.20	2.00	

Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
-	1.20	-	-	-	No Water encountered

Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type

Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
22/01/2003	1.20	1.20	-	Dry at end of boring

Remarks:

REPORT NO.	8497	GEOTECHNICAL CORE LOG RECORD	IGSL
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CONTRACT: Moneypoint Power Station	DRILLHOLE NO : RC25 SHEET: Sheet 1 of 1
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CLIENT: ESB ENGINEER: ESB International	CORE DIAMETER (mm): 75 GROUND LEVEL (mGD): 6.86	DATE STARTED: 15/01/2003 DATE COMPLETED: 16/01/2003
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CO-ORDINATES: 102931 151638	INCLINATION (Degrees): 90 FLUSH: Air/Mist	DRILLED BY: MILLDRILL LOGGED BY: IGSL
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DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R. %	S.C.R. %	R.O.D. %	Fracture Spacing (mm)	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mGD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
8.00		0	0	0				-1.14	8.00				End of Borehole at 8.00 m

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REMARKS: Water encountered at 7.0m	INSTALLATION DETAILS Installation Type : SP Depth to Response Zone top (m) :4.70 Depth to Response Zone bottom (m) 7.70 Comments : Gravel 8.0-4.0m, plotted 7.7-4.7m, sand 4.0-3.7m, seal 3.7-2.7m, fill 2.7-0.5m, headworks
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REPORT NO.	8497	GEOTECHNICAL CORE LOG RECORD	IGSL
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CONTRACT: Moneypoint Power Station		DRILLHOLE NO : RC26
		SHEET: Sheet 1 of 2
CLIENT: ESB	CORE DIAMETER (mm): 75	DATE STARTED: 10/01/2003
ENGINEER: ESB International	GROUND LEVEL (mOD): 6.72	DATE COMPLETED: 10/01/2003
CO-ORDINATES: 102694 151871	INCLINATION (Degrees): 90	DRILLED BY: MILLDRILL
	FLUSH: Air/Mist	LOGGED BY: IGSL

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing (mm)	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
0									6.12	0.80			No recovery, observed by driller as returns of topsoil.
1		0	0	0									ODEX DRILLING: No recovery, observed by driller as returns of madaground consisting of gravelly clay with occasional cobbles.
2													
2.50													
3		0	0	0									
3.50													
4		0	0	0									ODEX DRILLING: No recovery, observed by driller as returns of rock.
4.20													
5		0	0	0									
5.70													
6		0	0	0									
7													
7.20		0	0	0					-0.18	6.90			
7.70													
8.20		0	0	0									

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REMARKS: Water encountered @ 6.6m. Falling head test @ 7.2-8.2m	INSTALLATION DETAILS Installation Type : SP Depth to Response Zone top (m) :6.00 Depth to Response Zone bottom (m) :11.50 Comments : Gravel 12.0-7.7m, slotted 11.5-8.0m, sand 7.4-7.7m, seal 7.4-6.9m, headworks.
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Continued next sheet

REPORT NO: 8497		GEOTECHNICAL BORING RECORD		IGSL	
CONTRACT : Moneypoint Power Station				BOREHOLE NO: BH27 Sheet 1 of 1	
CLIENT : ESB		GROUND LEVEL (mOD) 12.76		DATE STARTED: 08/01/2003	
ENGINEER : ESB International		BOREHOLE DIAMETER (mm) 250		DATE COMPLETED: 09/01/2003	
CO-ORDINATES : E 102909 N 152006		BOREHOLE DEPTH (m) 4.80		BORED BY: J. Quinn	
		CASING DEPTH (m) 4.80			

DEPTH (m)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES			FIELD TEST RESULTS	STAND PIPE DETAILS
					REF. NUMBER	SAMPLE TYPE	DEPTH (m)		
0.00	TOPSOIL		12.56	0.20		D	0.25		
0.20	Brown grey slightly sandy gravelly CLAY with cobbles					B	1.00		
1.50	Grey brown clayey sandy GRAVEL with cobbles		11.28	1.50		D	2.00		
2.00	Falling head test					B	2.50		
3.00	Broken rock grading as slightly clayey/silty slightly sandy GRAVEL		9.76	3.00		D	3.00		
3.50						D	3.50		
4.00						B	4.00		
4.50						D	4.50		
4.80	End of Borehole at 4.80 m			4.80		B	4.80		

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Hard Strata Boring / Chiseling

From (m)	To (m)	Hours	Comments
2.20	2.40	1.00	
2.70	3.00	1.00	
4.30	4.80	2.00	

Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
-	4.80	-	-	-	No Water encountered

Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
09/01/2003	4.80	4.80	-	Dry at end of boring

Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type

Remarks: Falling head test @ 2-3m

REPORT NO.	8497	GEOTECHNICAL CORE LOG RECORD	IGSL
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CONTRACT: Moneypoint Power Station		DRILLHOLE NO : RC27A
		SHEET: Sheet 1 of 2
CLIENT: ESB	CORE DIAMETER (mm): 75	DATE STARTED: 15/01/2003
ENGINEER: ESB International	GROUND LEVEL (mOD): 11.89	DATE COMPLETED: 15/01/2003
CO-ORDINATES: 102908	INCLINATION (Degrees): 90	DRILLED BY: MILLDRILL
151974	FLUSH: Air/Mist	LOGGED BY: IGSL

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.-%	S.C.R.-%	R.Q.D.-%	Fracture Spacing (mm)	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
0								[Symbolic Log Pattern]	10.69	1.20			No recovery, observed by driller as returns of madeground consisting of gravely clay with occasional cobbles.
4.20		0	0	0				[Symbolic Log Pattern]	7.69	4.20			ODEX DRILLING: No recovery, observed by driller as returns of madeground consisting of gravel, cobbles and boulders.
9.00		0	0	0				[Symbolic Log Pattern]					ODEX DRILLING: No recovery, observed by driller as returns of rock.

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Continued next sheet

REMARKS: Water encountered at 6.9m. Falling head test @4-5m	INSTALLATION DETAILS Installation Type : SP Depth to Response Zone top (m) :6.00 Depth to Response Zone bottom (m) 9.00 Comments : Gravel 10.0-6.3, slotted 9.0-6.0m, sand 5.3-4.7m, seal 4.7-3.7m, fill 3.7-0.5m, headworks
--	---

CONTRACT: Moneypoint Power Station CLIENT: ESB ENGINEER: ESB International	DRILLHOLE NO : RC27A SHEET: Sheet 2 of 2
CO-ORDINATES: 102906 151974	DATE STARTED: 15/01/2003 DATE COMPLETED: 15/01/2003
INCLINATION (Degrees): 90 FLUSH: Air/Mist	DRILLED BY: MILLDRILL LOGGED BY: IGSL

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.O.D.%	Fracture Spacing (mm)	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
	10.00								1.89	10.00		<input type="checkbox"/>	ODEX DRILLING: No recovery, observed by driller as returns of rock. End of Borehole at 10.00 m

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REMARKS: Water encountered at 6.9m. Falling head test @4.5m	INSTALLATION DETAILS Installation Type : SP Depth to Response Zone top (m) :6.00 Depth to Response Zone bottom (m) 9.00 Comments : Gravel 10.0-5.3, slotted 9.0-6.0m, sand 5.3-4.7m, seal 4.7-3.7m, fill 3.7-0.5m, headworks
--	---

REPORT NO: 8497		GEOTECHNICAL BORING RECORD		IGSL	
CONTRACT : Moneypoint Power Station				BOREHOLE NO: BH28 Sheet 1 of 1	
CLIENT : ESB		GROUND LEVEL (MOD) 9.43		DATE STARTED: 20/01/2003	
ENGINEER : ESB International		BOREHOLE DIAMETER (mm) 250		DATE COMPLETED: 27/01/2003	
CO-ORDINATES : E 103188 N 151883		BOREHOLE DEPTH (m) 4.60		BORED BY: J. Quinn	
		CASING DEPTH (m) 4.60			

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (MOD)	DEPTH (M)	SAMPLES			FIELD TEST RESULTS	STAND PIPE DETAILS
					REF. NUMBER	SAMPLE TYPE	DEPTH (M)		
0	MADE GROUND (brown sandy clayey gravel)					D	0.10		
						D	0.25		
1	Grey brown sandy very gravelly CLAY with cobbles		8.23	1.20		B	1.00		
2	Falling head test					D	2.00		
5	End of Borehole at 4.60 m		4.83	4.60					

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Hard Strata Boring / Chiselling				Water Strike Details					
From (m)	To (m)	Hours	Comments	Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
3.70	4.40	1.75			4.60	-	-	-	No Water encountered
4.40	4.60	2.00							
Standpipe Installation Details				Groundwater Observations					
Date	Tip Depth	RZ Top	RZ Base	Type	Date	Hole Depth	Casing Depth	Depth to Water	Comments
27/01/2003	3.18	1.80	3.18	SP	27/01/2003	4.60	4.60	-	Dry at end of boring

Remarks:

REPORT NO: 8497

GEOTECHNICAL BORING RECORD

IGSL

CONTRACT: Moneypoint Power Station

BOREHOLE NO: BH29
Sheet 1 of 1

CLIENT: ESB
ENGINEER: ESB International

GROUND LEVEL (mOD) 1.98
BOREHOLE DIAMETER (mm) 200
BOREHOLE DEPTH (m) 7.20
CASING DEPTH (m) 7.20

DATE STARTED: 27/01/2003
DATE COMPLETED: 27/01/2003

CO-ORDINATES: E 102617
N 152265

BORED BY: D.Hamington

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES			FIELD TEST RESULTS	STAND PIPE DETAILS
					REF. NUMBER	SAMPLE TYPE	DEPTH (m)		
0	MADE GROUND (containing gravelly silty clay)	[Cross-hatched pattern]							
1					1517	B	1.00		
2	Falling head test								
3					1517	D	2.50		
4									
5	Silty gravelly sandy PEAT	[Stippled pattern]	-2.32	2.32	1518	B	4.50		
6					1518	D	5.00		
7	Stiff brown gravelly CLAY with cobbles	[Dotted pattern]	-4.42	6.40	1519	B	6.60		
8						D			
9	Silty GRAVEL with cobbles	[Dotted pattern]	-4.82	6.80					
10	Presumed Rock End of Borehole at 7.20 m	[Solid black pattern]	-5.22	7.20					

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Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
1.70	1.90	0.50	
2.40	2.90	0.50	
4.00	4.50	0.50	
7.20	7.20	2.00	Presumed Rock

Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
1.50	7.20	-	0.90	60	Fast

Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type
27/01/2003	5.50	2.00	5.50	SP

Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
27/01/2003	7.20	7.20	2.60	

Remarks:

REPORT NO: 8497		GEOTECHNICAL BORING RECORD		IGSL	
CONTRACT : Moneypoint Power Station				BOREHOLE NO: BH30 Sheet 1 of 1	
CLIENT : ESB		GROUND LEVEL (mOD) 5.27		DATE STARTED: 31/01/2003	
ENGINEER : ESB International		BOREHOLE DIAMETER (mm) 200		DATE COMPLETED: 31/01/2003	
CO-ORDINATES : E 102540 N 152392		BOREHOLE DEPTH (m) 4.00		BORED BY: D.Harrington	
		CASING DEPTH (m) 4.00			

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (M)	SAMPLES			FIELD TEST RESULTS	STAND PIPE DETAILS
					REF. NUMBER	SAMPLE TYPE	DEPTH (M)		
0.0	Brown gravelly SILT / CLAY		4.87	0.40					
1.0	Still grey-brown slightly sandy gravelly CLAY with cobbles and boulders				1525	B	1.50		
2.0					1526	B	2.00		
3.0					1526	D	2.50		
4.0					1527	B	3.00		
4.0					1527	D	3.50		
4.0	Presumed Rock Boulders End of Borehole at 4.00 m		1.27	4.00					

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From (m)	To (m)	Hours	Comments
1.70	1.90	0.50	
2.20	2.50	0.50	
3.60	4.00	2.00	

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
-	4.00	-	-	-	No Water encountered

Date	Tip Depth	RZ Top	RZ Base	Type

Date	Hole Depth	Casing Depth	Depth to Water	Comments
31/01/2003	4.00	4.00	-	Dry at end of boring

Remarks:

CONTRACT: Moneypoint Power Station		DRILLHOLE NO : RC30
		SHEET: Sheet 1 of 1
CLIENT: ESB	CORE DIAMETER (mm): 75	DATE STARTED: 27/01/2003
ENGINEER: ESB International	GROUND LEVEL (mOD): 5.27	DATE COMPLETED: 27/01/2003
CO-ORDINATES: 102540	INCLINATION (Degrees): 90	DRILLED BY: MILLDRILL
152393	FLUSH: Air/Mist	LOGGED BY: IGSL

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.O.D.%	Fracture Spacing (mm)	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
0													
2.70		0	0	0					4.17	1.10			No recovery, observed by driller as returns of sandy clayey fine to coarse angular GRAVEL
													ODEX DRILLING: No recovery, observed by driller as returns of sandy clayey fine to coarse angular GRAVEL
									5.57	2.70			ODEX DRILLING: No recovery, observed by driller as returns of cobbles and boulders
									-2.73	8.00			End of Borehole at 8.00 m

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REMARKS: Water encountered at 5.9m	INSTALLATION DETAILS Installation Type : SP Depth to Response Zone top (m) :3.00 Depth to Response Zone bottom (m) 6.50 Comments : Seal 8.0-7.5m&2.2-1.7m,sand 7.5-7.2m&2.5-2.2m,gravel 7.2-2.5m,slotted 6.5-3.0m,fill 1.7-0.5m
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REPORT NO: 8497 **GEOTECHNICAL BORING RECORD** **IGSL**

CONTRACT : Moneypoint Power Station BOREHOLE NO: BH31
 Sheet 1 of 1

CLIENT : ESB GROUND LEVEL (mOD) 7.49 DATE STARTED: 28/01/2003
 ENGINEER : ESB International BOREHOLE DIAMETER (mm) 200 DATE COMPLETED: 28/01/2003

CO-ORDINATES : E 102557 BOREHOLE DEPTH (m) 4.00 BORED BY: D.Harrington
 N 152507 CASING DEPTH (m) 4.00

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (M)	SAMPLES			FIELD TEST RESULTS	STAND PIPE DETAILS
					REF. NUMBER	SAMPLE TYPE	DEPTH (M)		
0.00 - 0.20	Brown silty TOPSOIL	[Pattern]	7.29	0.20					
0.20 - 1.00	Cobbles with grey clayey sandy gravel	[Pattern]				D	1.00		
1.00 - 2.00					1520	B	2.00		
2.00 - 3.00					1521	B	3.00		
3.00 - 4.00	Presumed Rock Boulders End of Borehole at 4.00 m	[Pattern]	3.49	4.00	1522	B	4.00		
4.00 - 4.00									

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Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
0.00	1.30	1.00	-
2.60	2.80	0.50	Presumed Rock
4.00	4.00	2.00	

Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
-	4.00	-	-	-	No Water encountered

Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type

Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
28/01/2003	4.00	4.00	3.70	

Remarks: Falling head test @ 2.3m

CONTRACT: Moneypoint Power Station		DRILLHOLE NO.: RC31
		SHEET: Sheet 1 of 1
CLIENT: ESB	CORE DIAMETER (mm): 75	DATE STARTED: 31/01/2003
ENGINEER: ESB International	GROUND LEVEL (mOD): 7.49	DATE COMPLETED: 31/01/2003
CO-ORDINATES: 102558	INCLINATION (Degrees): 90	DRILLED BY: MILLDRILL
152507	FLUSH: Air/Mist	LOGGED BY: IGSL

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.O.D.%	Fracture Spacing (mm)	UCS (MPa)	POINT LOAD q_{50} (MPa)	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
0													Drilled by Shell and Auger
3.00		0	0	0				[Symbolic Log Pattern]	4.49	3.00			ODEX DRILLING: No recovery, observed by driller as returns of gravel, cobbles and boulders
6.00		0	0	0				[Symbolic Log Pattern]	1.49	6.00			ODEX DRILLING: observed by driller as returns of cobbles and boulders
7.00									0.49	7.00			End of Borehole at 7.00 m

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REMARKS: No water encountered	INSTALLATION DETAILS Installation Type : SP Depth to Response Zone top (m) :2.50 Depth to Response Zone bottom (m) 6.20 Comments : Gravel 6.5-2.0m, slotted 5.5-2.5m, sand 2.0-1.7m, seal 1.8-1.2m, headworks
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REPORT NO: 8497	GEOTECHNICAL BORING RECORD		IGSL
CONTRACT : Manaypoint Power Station		BOREHOLE NO: BH32 Sheet 1 of 1	
CLIENT : ESB	GROUND LEVEL (mOD)	10.52	
ENGINEER : ESB International	BOREHOLE DIAMETER (mm)	200	
CO-ORDINATES : E 102563 N 152563	BOREHOLE DEPTH (m)	3.30	
	CASING DEPTH (m)	3.30	
		BORED BY: D.Harrington	

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (M)	SAMPLES			FIELD TEST RESULTS	STAND PIPE DETAILS
					REF. NUMBER	SAMPLE TYPE	DEPTH (M)		
0	TOPSOIL								
0.30	Stiff brown slightly sandy gravelly CLAY		10.22	0.30		D	1.00		
1.50					1523	B	1.50		
2.50	Falling head test				1524	B	2.50		
3.00					1524	D	3.00		
3.30	Presumed Rock Boulders End of Borehole at 3.30 m		7.22	3.30					

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Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
0.70	1.00	0.50	
3.30	3.30	2.00	Presumed Rock

Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
-	3.30	-	-	-	No Water encountered

Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
29/01/2003	3.30	3.30	-	Dry at end of boring

Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type

Remarks:

REPORT NO.	8497	GEOTECHNICAL CORE LOG RECORD	IGSL
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CONTRACT: Moneypoint Power Station	DRILLHOLE NO: RC32
	SHEET: Sheet 1 of 1

CLIENT: ESB	CORE DIAMETER (mm): 75	DATE STARTED: 30/01/2003
ENGINEER: ESB International	GROUND LEVEL (mOD): 10.52	DATE COMPLETED: 30/01/2003

CO-ORDINATES: 102563	INCLINATION (Degrees): 90	DRILLED BY: MILLDRILL
152563	FLUSH: Air/Mist	LOGGED BY: IGSL

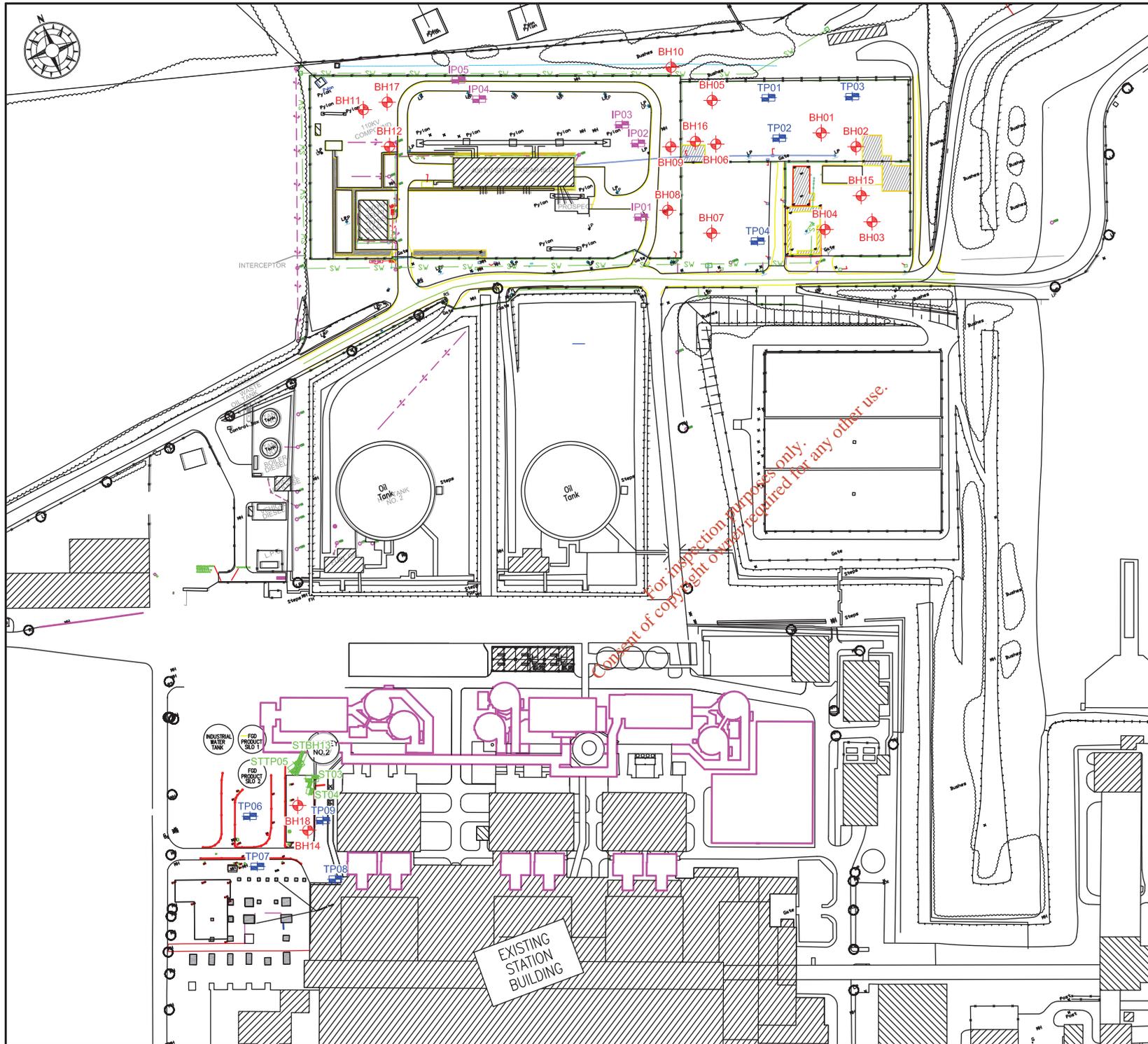
DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.O.D.%	Fracture Spacing (mm)	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
0					0								
1													
2													
3													
4													
5													
6													
7	7.00	0	0	0					3.52	7.00			ODEX DRILLING: No recovery, observed by driller as returns of boulders and cobbles
													End of Borehole at 7.00 m

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REMARKS: No water encountered	INSTALLATION DETAILS Installation Type : SP Depth to Response Zone top (m) :2.50 Depth to Response Zone bottom (m) 6.20 Comments : Seal 7.0-6.5m&1.7-1.2m,sand 6.5-6.2m 2.0-1.7m,slotted 5.5-2.5m,gravel 6.2-2.0m,fill 1.2-0.5m
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Appendix D – Geotechnical Borehole Logs and Maps (2012 and 2013)

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GENERAL NOTES					
1. Reproduced from ESB Networks Drawing No. PE493-D101-050-001-000. 2. Hole Locations to Irish Transverse Mecator Co-ordinate Reference System.					
LEGEND TO SYMBOLS					
<ul style="list-style-type: none"> ● Borehole Location ■ Trial Pit Location ■ Inspection Pit Location ■ Silt Trench Pit Location 					
Scale: 1:1500					
AMENDMENTS					
Title					
SITE PLAN					
Project					
MONEYPOINT					
Client					
ESB NETWORKS					
Date	Drawn By	Approv. By			
13/09/2012	BS	AO			
Sheet Size	Scale	Project No			
A3	1:1500	Y1947-12			
Drawing No					Rev
2					0

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Borehole Log



Soil Mechanics

Drilled DA Logged AO Checked mnh	Start 07/06/2012 End 07/06/2012	Equipment, Methods and Remarks Hand excavated inspection pit GL to 0.80m.	Depth from 0.00m to 0.80m Diameter - Casing Depth	Ground Level +16.12 mOD Coordinates E 503824.68 National Grid N 651943.37 Chainage
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Samples and Tests				Strata			Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
Depth	Type & No	Records	Date Casing	Time Water	Description				
0.00-0.25 0.10 0.25 0.25-0.60	B 1 D 2 D 3 B 4		07/06/2012	dry	Grey sandy GRAVEL hardcore. Sand is fine to coarse. Gravel is angular fine to coarse of limestone. (MADE GROUND) Brown clayey slightly sandy GRAVEL. Sand is fine to coarse. Gravel is angular fine to coarse of various lithologies. (MADE GROUND) Driller reports: Weathered bedrock - recovered as gravel of siltstone EXPLORATORY HOLE ENDS AT 0.80 m	0.25 +15.87 (0.35) 0.60 +15.52 0.80 +15.32			

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Groundwater Entries No. Struck Post strike behaviour (m) None observed (see Key Sheet)	Depth sealed (m)	Depth Related Remarks * From to (m) 0.80 Borehole terminated due to refusal on suspected bedrock.	Chiselling Depths (m) Time Tools used
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Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Project Moneypoint 400kV Substation Redevelopment Project No. Y1947-12 Carried out for ESB Networks	Borehole BH1 Sheet 1 of 1
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Borehole Log



Soil Mechanics

Drilled DA Logged AO Checked mnh	Start 11/06/2012 End 11/06/2012	Equipment, Methods and Remarks Hand excavated inspection pit GL to 0.80m.	Depth from 0.00m to 0.80m Diameter - Casing Depth	Ground Level +15.95 mOD Coordinates E 503839.71 National Grid N 651930.14 Chainage
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Samples and Tests				Strata			Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
Depth	Type & No	Records	Date Casing	Time Water	Description				
0.00-0.30	B 1				Grey sandy GRAVEL. Sand is fine to coarse. Gravel is angular fine to coarse of limestone. (MADE GROUND)	(0.30)			
0.10	D 2					0.30 +15.65			
0.30	D 3					(0.30)			
0.30-0.60	B 4		11/06/2012	dry		Brown clayey slightly sandy GRAVEL. Sand is fine to coarse. Gravel is angular fine to coarse of various lithologies. (MADE GROUND)	0.60 +15.35		
					Driller reports: Weathered bedrock. Recovered as gravel of siltstone. EXPLORATORY HOLE ENDS AT 0.80 m	0.80 +15.15			

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Groundwater Entries No. Struck Post strike behaviour (m)	Depth sealed (m)	Depth Related Remarks * From to (m) 0.80 Borehole terminated due to refusal on suspected bedrock.	Chiselling Depths (m) Time Tools used
None observed (see Key Sheet)			

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Project Moneypoint 400kV Substation Redevelopment Project No. Y1947-12 Carried out for ESB Networks	Borehole BH2 Sheet 1 of 1
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Borehole Log



Soil Mechanics

Drilled DA Logged AO Checked mnh	Start 11/06/2012 End 11/06/2012	Equipment, Methods and Remarks Hand excavated inspection pit GL to 0.40m.	Depth from 0.00m to 0.40m Diameter - Casing Depth	Ground Level +15.45 mOD Coordinates E 503834.07 National Grid N 651889.65 Chainage
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Samples and Tests				Strata			Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
Depth	Type & No	Records	Date Casing	Time Water	Description				
0.00-0.30 0.10	B 1 D 2		11/06/2012	dry	Dark grey clayey slightly gravelly SAND. Sand is fine to coarse. Gravel is angular fine to coarse of limestone. (MADE GROUND) Driller reports: Weathered bedrock. Recovered as gravel of siltstone EXPLORATORY HOLE ENDS AT 0.40 m	(0.30)			
						0.30 +15.15			
						0.40 +15.05			

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Groundwater Entries No. Struck Post strike behaviour (m) None observed (see Key Sheet)	Depth sealed (m)	Depth Related Remarks * From to (m) 0.40 Borehole terminated due to refusal on suspected bedrock.	Chiselling Depths (m) Time Tools used
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Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:50 (c) ESG www.esg.co.uk 426.4803/04/2013 11:40:51	Project Moneypoint 400kV Substation Redevelopment Project No. Y1947-12 Carried out for ESB Networks	Borehole BH3 Sheet 1 of 1
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Borehole Log



Soil Mechanics

Drilled DA Logged AO Checked mnh	Start 11/06/2012 End 11/06/2012	Equipment, Methods and Remarks Hand excavated inspection pit GL to 0.40m.	Depth from 0.00m to 0.40m Diameter - Casing Depth	Ground Level +15.56 mOD Coordinates E 503809.03 National Grid N 651894.44 Chainage
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Samples and Tests				Strata			Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
Depth	Type & No	Records	Date Casing	Time Water	Description				
0.00-0.30 0.10 0.30	B 1 D 2 ES 3		11/06/2012	dry	Dark grey clayey sandy GRAVEL. Sand is fine to coarse. Gravel is angular fine to coarse of limestone. (MADE GROUND) Driller reports: Weathered bedrock. Recovered as gravel of siltstone EXPLORATORY HOLE ENDS AT 0.40 m	(0.30) 0.30 +15.26 0.40 +15.16			

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Groundwater Entries No. Struck Post strike behaviour (m) None observed (see Key Sheet)	Depth sealed (m)	Depth Related Remarks * From to (m) 0.40 Borehole terminated due to refusal on suspected bedrock.	Chiselling Depths (m) Time Tools used
--	------------------	--	---

Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Project Moneypoint 400kV Substation Redevelopment Project No. Y1947-12 Carried out for ESB Networks	Borehole BH4 Sheet 1 of 1
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Borehole Log



Soil Mechanics

Drilled DA Logged AO Checked mnh	Start 06/06/2012 End 07/06/2012	Equipment, Methods and Remarks Dando 2000, Cable percussion boring.	Depth from 0.00m to 6.45m Diameter 150mm Casing Depth 6.00m	Ground Level +16.36 mOD Coordinates E 503775.67 National Grid N 651979.70 Chainage
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Samples and Tests				Strata		Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
Depth	Type & No	Records	Date Casing	Time Water	Description			
0.00-0.30 0.10 0.30 0.30-0.80	B 1 D 2 D 3 B 4	*			Grey sandy GRAVEL hardcore. Sand is fine to coarse. Gravel is angular fine to coarse of limestone. (MADE GROUND)	(0.30) 0.30 +16.06		
0.80 0.80-1.20 1.00	D 5 B 6 ES 7				Brown slightly sandy gravelly CLAY with high cobble content and low boulder content. Cobbles and boulders are subangular to angular of siltstone up to 300mm. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of siltstone. (MADE GROUND)	(0.50) 0.80 +15.56		
1.20-1.65 1.20-1.70	SPT C B 8	N=25 (5,5/5,6,7,7)	1.20	dry				
2.00 2.20-2.65 2.20-2.70	D 9 SPT C B 10	N=16 (2,2/3,3,4,6)	2.20	dry	Stiff to very stiff brown with occasional grey mottling slightly sandy slightly gravelly CLAY with low cobble content. Cobbles are subangular of siltstone. Sand is fine to coarse. Gravel is subangular to angular fine to coarse of various lithologies. (GLACIAL DEPOSITS)			
3.00 3.20-3.65 3.20-3.70	D 11 SPT C B 12	N=19 (2,2/3,4,4,8)	3.20	dry				
3.80 4.00 4.20-4.64 4.20-4.70	W 13 D 14 SPT C B 15	50 (4,5/11,12,14,13 for 65mm)	06/06/2012 4.20	3.60				
			07/06/2012 4.20	0800 1.40				4.20-4.70 m recovered as slightly sandy gravel
5.00 5.30-5.75 5.30-5.80	D 16 SPT C B 17	N=28 (2,4/4,6,8,10)	5.20	2.10				5.30-5.80 m recovered as slightly sandy gravel
6.00-6.45 6.00	SPT C D 18	N=37 (4,4/8,8,10,11)	6.00	3.20				
			07/06/2012 6.00	3.20				
EXPLORATORY HOLE ENDS AT 6.45 m						6.45	+9.97	

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Groundwater Entries No. 1 Struck (m) 3.80 Post strike behaviour Rose to 1.20 m after 20 minutes.	Depth sealed (m) -	Depth Related Remarks * From 0.00 to (m) 1.20 to 6.45 Hand excavated inspection pit. Borehole terminated at required depth.	Chiselling Depths (m) 4.20-4.60 Time 60 mins Tools used
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Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Project Moneypoint 400kV Substation Redevelopment Project No. Y1947-12 Carried out for ESB Networks	Borehole BH5 Sheet 1 of 1
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Borehole Log



Soil Mechanics

Drilled DA Logged DA Checked mnh	Start 06/06/2012 End 06/06/2012	Equipment, Methods and Remarks Hand excavated inspection pit GL to 0.60m.	Depth from 0.00m to 0.60m Diameter - Casing Depth	Ground Level +16.36 mOD Coordinates E 503772.65 National Grid N 651981.70 Chainage
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Samples and Tests				Strata			Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
Depth	Type & No	Records	Date Casing	Time Water	Description				
			06/06/2012	dry	Driller reports: Large hardcore. (MADE GROUND)	(0.30)			
					Driller reports: COBBLES. (MADE GROUND)	0.30 +16.06			
					Driller reports: COBBLES. (MADE GROUND)	(0.30)			
					EXPLORATORY HOLE ENDS AT 0.60 m	0.60 +15.76			

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Groundwater Entries No. Struck Post strike behaviour (m) None observed (see Key Sheet)	Depth sealed (m)	Depth Related Remarks * From to (m) 0.60 Borehole position relocated to BH5 due to refusal.	Chiselling Depths (m) Time Tools used
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Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Project Moneypoint 400kV Substation Redevelopment Project No. Y1947-12 Carried out for ESB Networks	Borehole BH5A Sheet 1 of 1
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Borehole Log



Soil Mechanics

Drilled DA Logged AO Checked mnh	Start 06/06/2012 End 06/06/2012	Equipment, Methods and Remarks Dando 2000, Cable percussion boring.	Depth from 0.00m to 4.30m Diameter 150mm Casing Depth 4.30m	Ground Level +16.15 mOD Coordinates E 503769.65 National Grid N 651957.18 Chainage
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Samples and Tests				Strata		Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
Depth	Type & No	Records	Date Casing	Time Water	Description			
0.00-0.30 0.10 0.30 0.30-0.80	B 1 D 2 D 3 B 4	*			Grey slightly sandy GRAVEL/COBBLES. Gravel is angular fine to coarse of limestone. Cobbles are angular of limestone. (MADE GROUND)	(0.30) 0.30 +15.85		
0.80 0.80-1.20	D 5 B 6				Brown slightly sandy gravelly CLAY with high cobble content and low boulder content. Cobbles and boulders are subangular of siltstone up to 300mm. Sand is fine to coarse. Gravel is subangular fine to coarse of siltstone. (MADE GROUND)	(0.50) 0.80 +15.35		
1.20-1.51 1.20-1.70	SPT C B 7	50 (4,10/18,25,7 for 12mm)	1.20	dry				
2.00 2.20-2.49 2.20-2.70	D 8 SPT C B 9	50 (7,10/23,27 for 65mm)	2.20		Very stiff brown with grey mottling slightly sandy slightly gravelly CLAY with low cobble content. Cobbles are subangular of siltstone. Gravel is subangular fine to coarse of siltstone. (GLACIAL DEPOSITS)	(3.10)		
3.00 3.20-3.44 3.20-3.70	D 10 SPT C B 11	50 (14,11 for 35mm/ 24,26 for 55mm)	3.20					
3.90 4.10 4.10-4.30 4.30	D 12 SPT C B 13 SPT C	(25 for 0mm) (25 for 0mm)	4.10 06/06/2012 4.30	2.10 - 2.20	Weathered bedrock. Recovered as dark grey clayey sandy GRAVEL. Sand is fine to coarse. Gravel is angular fine to coarse of siltstone.	3.90 +12.25 (0.40) 4.30 +11.85		
EXPLORATORY HOLE ENDS AT 4.30 m								

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Groundwater Entries No. 1 Struck (m) 2.20 Post strike behaviour No inflow Depth sealed (m) -	Depth Related Remarks * From 0.00 to 1.20 Hand excavated inspection pit. to 4.30 Borehole terminated due to refusal on suspected bedrock.	Chiselling Depths (m) 4.10-4.30 Time 60 mins Tools used
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Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:50 (c) ESG www.esg.co.uk 426.4803/04/2013 11:40:58	Project Moneypoint 400kV Substation Redevelopment Project No. Y1947-12 Carried out for ESB Networks	Borehole BH6 Sheet 1 of 1
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Borehole Log



Soil Mechanics

Drilled DA Logged AO Checked mnh	Start 08/06/2012 End 08/06/2012	Equipment, Methods and Remarks Hand excavated inspection pit GL to 0.70m.	Depth from 0.00m to 0.70m Diameter - Casing Depth	Ground Level +15.33 mOD Coordinates E 503751.27 National Grid N 651913.44 Chainage
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Samples and Tests				Strata			Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
Depth	Type & No	Records	Date Casing	Time Water	Description				
0.00-0.20	B 1				Grey clayey slightly sandy GRAVEL. Sand is fine to coarse. Gravel is angular fine to coarse of various lithologies. (MADE GROUND) Very stiff brown sandy gravelly CLAY with medium cobble content of angular siltstone. Sand is fine to coarse. Gravel is angular fine to coarse of siltstone. (GLACIAL DEPOSITS) Weathered bedrock: Recovered as: Brown grey slightly clayey sandy GRAVEL of angular siltstone. Sand is fine to coarse. EXPLORATORY HOLE ENDS AT 0.70 m	0.20 +15.13			
0.10	D 2					(0.40)			
0.20	D 3								
0.20-0.60	B 4						0.60 +14.73		
0.50	ES 5		08/06/2012	dry			0.70 +14.63		
0.60	D 6								
0.60-0.70	B 7								

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Groundwater Entries No. Struck Post strike behaviour (m) None observed (see Key Sheet)	Depth sealed (m)	Depth Related Remarks * From to (m) 0.70 Borehole terminated due to refusal on suspected bedrock. □□	Chiselling Depths (m) Time Tools used
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Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Project Moneypoint 400kV Substation Redevelopment Project No. Y1947-12 Carried out for ESB Networks	Borehole BH7 Sheet 1 of 1
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Borehole Log



Soil Mechanics

Drilled DA Logged AO Checked mnh	Start 14/06/2012 End 14/06/2012	Equipment, Methods and Remarks Dando 2000 Cable percussion boring	Depth from 0.00m to 2.00m Diameter 150mm Casing Depth 2.00m	Ground Level +15.62 mOD Coordinates E 503733.33 National Grid N 651933.00 Chainage
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Samples and Tests				Strata			Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
Depth	Type & No	Records	Date Casing	Time Water	Description				
0.00-0.30 0.10 0.30 0.30-0.80	B 1 D 2 D 3 B 4	*			Grey angular coarse GRAVEL of limestone. (Hardcore) (MADE GROUND)	(0.30) 0.30 +15.32			
0.80 0.80-1.20	D 5 B 6				Dark brown sandy gravelly CLAY with high cobble content of subangular siltstone. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies. (MADE GROUND)	(0.50) 0.80 +14.82			
1.20-1.48 1.20-1.70	SPT C B 7	50 (9,16 for 60mm/ 24,26 for 65mm)	1.20	dry	Very stiff brown slightly sandy gravelly CLAY with medium cobble content of subangular siltstone. Sand is fine to coarse. Gravel is subangular fine to coarse of siltstone. (MADE GROUND)	(0.90)			
1.70	D 8		14/06/2012	dry	Very stiff brown slightly sandy gravelly CLAY with medium cobble content of subangular siltstone. Sand is fine to coarse. Gravel is subangular fine to coarse of siltstone. (GLACIAL DEPOSITS)	1.70 +13.92 (0.30)			
2.00	SPT-C	(25 for 0mm)	2.00	dry	Weathered bedrock: Recovered as: Brown angular coarse GRAVEL of siltstone. EXPLORATORY HOLE ENDS AT 2.00 m	2.00 +13.62			

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Groundwater Entries No. Struck Post strike behaviour (m) None observed (see Key Sheet)	Depth sealed (m)	Depth Related Remarks * From to (m) 0.00 1.20 Hand excavated inspection pit 2.00 Borehole terminated due to refusal on suspected bedrock.	Chiselling Depths (m) Time Tools used 1.70-2.00 60 mins
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Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:50 (c) ESG www.esg.co.uk 426.4803/04/2013 11:41:01	Project Moneypoint 400kV Substation Redevelopment Project No. Y1947-12 Carried out for ESB Networks	Borehole BH8 Sheet 1 of 1
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Borehole Log



Soil Mechanics

Drilled DA Logged AO Checked mnh		Start 12/06/2012 End 12/06/2012		Equipment, Methods and Remarks Dando 2000 Cable percussion boring		Depth from 0.00m to 4.62m		Diameter 150mm		Casing Depth 4.62m		Ground Level +15.90 mOD Coordinates National Grid E 503746.42 N 651964.16	
Samples and Tests						Strata						Chainage	
Depth	Type & No	Records	Date Casing	Time Water	Description	Depth, Level/ (Thickness)	Legend	Backfill/ Instruments					
0.00-0.10 0.00 0.10 0.10-0.60	B 1 D 2 D 3 B 4	*			Grey angular coarse GRAVEL of limestone. (Hardcore) (MADE GROUND)	0.10 +15.80							
1.20-1.65 1.20-1.70	SPT S B 5	N=28 (15,8/8,7,7,6)		dry	Brown slightly sandy gravelly CLAY with low cobble content of subangular siltstone. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies. (MADE GROUND)	(1.90)							
2.00 2.20-0.00 2.20-2.70	D 6 SPT S B 7	N=19 (2,4/4,6,4,5)	2.20		Stiff brown with grey mottling slightly sandy slightly gravelly CLAY with low cobble content of subangular siltstone. Sand is fine to coarse. Gravel is subangular fine to coarse of siltstone. (GLACIAL DEPOSITS)	2.00 +13.90							
2.70-3.15 3.15 3.20-0.00 3.20-3.70	U 8 D 9 SPT S B 10	70 blows 400 mm rec N=18 (2,4/4,4,5,5)	3.20			(2.20)							
4.00 4.20-4.33 4.20 4.20-4.50 4.50-4.62	D 11 SPT S D 12 D 13 B 14 SPT S	50 (13,12 for 20mm/ 50 for 30mm) 50 (25 for 70mm/50 for 45mm)	4.20 12/06/2012 4.20 4.50	1.30	Weathered bedrock: Recovered as: Grey brown clayey slightly sandy angular to subangular fine to coarse GRAVEL of siltstone. Sand is fine to coarse. EXPLORATORY HOLE EMOS AT 4.62 m	4.20 +11.70 (0.42) 4.62 +11.29							
Groundwater Entries						Depth Related Remarks *						Chiselling	
No.	Struck (m)	Post strike behaviour	Depth sealed (m)		From to (m)	From to (m)	Time	Tools used					
1	4.20	Rose to 1.30 m after 20 minutes.	-		0.00 1.20	Hand excavated inspection pit	4.20-4.62	60 mins					
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.						Project Moneypoint 400kV Substation Redevelopment						Borehole BH9	
Scale 1:50						Project No. Y1947-12						Sheet 1 of 1	
(c) ESG www.esg.co.uk 426.4803/04/2013 11:41:03						Carried out for ESB Networks							

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Borehole Log



Soil Mechanics

Drilled DA Logged AO Checked mnh	Start 12/06/2012 End 12/06/2012	Equipment, Methods and Remarks Dando 2000 Cable percussion boring	Depth from 0.00m to 2.50m Diameter 150mm Casing Depth 2.50m	Ground Level +16.23 mOD Coordinates E 503761.09 National Grid N 652003.84 Chainage
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Samples and Tests					Strata			Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
Depth	Type & No	Records	Date Casing	Time Water	Description					
0.00-0.50 0.20	B 1 D 2	*			Brown sandy gravelly CLAY with low cobble content of subangular to subrounded to siltstone. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies. (MADE GROUND)			(0.70)		
0.70 0.70-1.20	D 3 B 4				(MADE GROUND)			0.70 +15.53		
1.20-1.65 1.20-1.70	SPT C B 5	N=26 (5,5/6,8,6,6)	1.20	dry	Stiff brown with grey mottling sandy gravelly CLAY with medium cobble content of subangular siltstone. Sand is fine to coarse. Gravel is subangular fine to coarse of siltstone. (GLACIAL DEPOSITS)			(1.50)		
2.00 2.20-2.32	D 6 SPT C	50 (25/50 for 40mm)	2.20 12/06/2012	1.80	Driller reports: Possible bedrock.			2.20 +14.03 (0.30)		
2.50	SPT C	(25 for 0mm)	2.50		EXPLORATORY HOLE ENDS AT 2.50 m			2.50 +13.73		

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Groundwater Entries No. Struck Post strike behaviour 1 1.30 No inflow	Depth sealed (m) -	Depth Related Remarks * From to (m) 0.00 1.20 Hand excavated inspection pit 2.50 Borehole terminated due to refusal on suspected bedrock.	Chiselling Depths (m) 2.20-2.50 Time 60 mins Tools used
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Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:50 (c) ESG www.esg.co.uk 426.4803/04/2013 11.41.04	Project Moneypoint 400kV Substation Redevelopment Project No. Y1947-12 Carried out for ESB Networks	Borehole BH10 Sheet 1 of 1
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Borehole Log



Soil Mechanics

Drilled DA Logged AO Checked mnh	Start 12/06/2012 End 12/06/2012	Equipment, Methods and Remarks Dando 2000 Cable percussion boring	Depth from 0.00m to 3.70m Diameter 150mm Casing Depth 3.70m	Ground Level +16.18 mOD Coordinates E 503598.35 National Grid N 652039.23 Chainage
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Samples and Tests				Strata		Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
Depth	Type & No	Records	Date Casing	Time Water	Description			
0.00-0.10 0.00 0.10 0.10-0.60	B 1 D 2 D 3 B 4	*			Grey angular coarse GRAVEL of limestone. (Hardcore) (MADE GROUND)	0.10 +16.08		
1.20-1.30 1.20-1.70	SPT C B 5	50 (25 for 60mm/50 for 40mm)		dry	Brown sandy gravelly CLAY with high cobble content of angular siltstone. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies. (MADE GROUND)	(1.90)		
2.00 2.20-2.65 2.20-2.70	D 6 SPT C B 7	N=32 (3,6/7,8,8,9)	2.20		Very stiff grey brown slightly sandy slightly gravelly CLAY with low cobble content of subangular siltstone. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies. (GLACIAL DEPOSITS)	2.00 +14.18		
2.70-3.15	U 8	150 blows 300 mm rec				(1.30)		
3.15 3.20-3.49	D 9 SPT C	50 (4,14/22,28 for 60mm)	3.20		Driller reports: Possible bedrock.	3.30 +12.88		
3.70	SPT-C	(25 for 0mm)	3.70	12/06/2012	EXPLORATORY HOLE ENDS AT 3.70 m	(0.40) 3.70 +12.48		

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Groundwater Entries No. Struck Post strike behaviour None observed (see Key Sheet)	Depth sealed (m)	Depth Related Remarks * From to (m) 0.00 1.20 Hand excavated inspection pit 3.70 Borehole terminated due to refusal on suspected bedrock.	Chiselling Depths (m) 3.30-3.70 Time 60 mins Tools used
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Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:50 (c) ESG www.esg.co.uk 426.4803/04/2013 11:41:09	Project Moneypoint 400kV Substation Redevelopment Project No. Y1947-12 Carried out for ESB Networks	Borehole BH11 Sheet 1 of 1
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Borehole Log



Soil Mechanics

Drilled DA Logged AO Checked mnh	Start 11/06/2012 End 11/06/2012	Equipment, Methods and Remarks Dando 2000 Cable percussion boring	Depth from 0.00m to 4.30m Diameter 150mm Casing Depth 4.30m	Ground Level +15.98 mOD Coordinates E 503604.81 National Grid N 652016.02 Chainage
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Samples and Tests					Strata			
Depth	Type & No	Records	Date Casing	Time Water	Description	Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
0.00-0.40	B 1	*			Grey angular coarse GRAVEL of limestone. (Hardcore) (MADE GROUND) Very stiff brown slightly sandy slightly gravelly to gravelly CLAY with high cobble content of subangular siltstone. Sand is fine to coarse. Gravel is subangular fine to coarse of siltstone. (Possible MADE GROUND)	(0.40)		
0.20	D 2			0.40 +15.58				
0.40	D 3							
0.40-0.90	B 4							
1.20-1.65	SPT C B 5	N=32 (2,4/9,8,7,8)	1.20	dry				
1.70-2.10	U 6							
2.10	D 7							
2.20-2.40	SPT C B 8	50 (4,21 for 70mm/50 for 55mm)				(3.70)		
2.20-2.70	B 8							
3.00	D 9							
3.20-3.49	SPT C B 10	50 (2,9/28,22 for 65mm)	3.10	dry				
3.20-3.70	B 10							
4.00	D 11							
4.10	SPT C	(25 for 0mm)	4.10		Driller reports: Possible bedrock.	4.10 +11.88		
4.10	SPT C	(25 for 0mm)	11/06/2012		Recovered as gravel of siltstone.	4.30 +11.68		
4.30	SPT C	(25 for 0mm)			EXPLORATORY HOLE ENDS AT 4.30 m			

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Groundwater Entries No. Struck Post strike behaviour None observed (see Key Sheet)	Depth sealed (m) ()	Depth Related Remarks * From to (m) 0.00 1.20 Hand excavated inspection pit. 4.30 Borehole terminated due to refusal on suspected bedrock.	Chiselling Depths (m) Time Tools used 4.10-4.30 60 mins
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Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:50 (c) ESG www.esg.co.uk 426.4803/04/2013 11:41:12	Project Moneypoint 400kV Substation Redevelopment Project No. Y1947-12 Carried out for ESB Networks	Borehole BH12 Sheet 1 of 1
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Borehole Log



Soil Mechanics

Drilled DA Logged AO Checked mnh	Start 08/06/2012 End 08/06/2012	Equipment, Methods and Remarks Dando 2000 Cable percussion boring	Depth from 0.00m to 1.30m Diameter 150mm Casing Depth 1.30m	Ground Level +5.73 mOD Coordinates E 503438.98 National Grid N 651689.62 Chainage
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Samples and Tests				Strata			Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
Depth	Type & No	Records	Date Casing	Time Water	Description				
0.00-0.10	B 1	*			Grey angular coarse GRAVEL of limestone. (Hardcore) (MADE GROUND) Grey brown clayey sandy GRAVEL. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of limestone. (MADE GROUND) Brown slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of various lithologies. (MADE GROUND) Driller reports: Possible bedrock. Recovered as gravel of siltstone. EXPLORATORY HOLE ENDS AT 1.30 m	0.10 +5.63			
0.00	D 2					0.20 +5.53			
0.10	D 3								
0.10-0.20	B 4					(1.00)			
0.20	D 5								
0.20-0.70	B 6					1.20 +4.53			
1.20	SPT C	(25 for 0mm)	08/06/2012	dry		1.30 +4.43			
1.30	SPT-C	(25 for 0mm)	1.30						

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Groundwater Entries No. Struck Post strike behaviour None observed (see Key Sheet)	Depth sealed (m)	Depth Related Remarks * From to (m) 0.00 1.20 Hand excavated inspection pit 1.30 Borehole terminated due to refusal on suspected bedrock.	Chiselling Depths (m) 1.20-1.30 Time 60 mins Tools used
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Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:50 (c) ESG www.esg.co.uk 426.4803/04/2013 11:41:15	Project Moneypoint 400kV Substation Redevelopment Project No. Y1947-12 Carried out for ESB Networks	Borehole BH14 Sheet 1 of 1
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Borehole Log



Soil Mechanics

Drilled DA Logged AO Checked mnh	Start 07/06/2012 End 07/06/2012	Equipment, Methods and Remarks Hand excavated inspection pit GL to 0.70m.	Depth from 0.00m to 0.70m Diameter - Casing Depth	Ground Level +15.60 mOD Coordinates E 503833.40 National Grid N 651904.68 Chainage
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Samples and Tests				Strata			Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
Depth	Type & No	Records	Date Casing	Time Water	Description				
0.00-0.25 0.10 0.25 0.25-0.50 0.50	B 1 D 2 D 3 B 4 ES 5		07/06/2012		Grey sandy fine to coarse GRAVEL of angular fine to coarse limestone. (MADE GROUND) Brown clayey slightly sandy GRAVEL with medium cobble content of siltstone. Sand is fine to coarse. Gravel is angular fine to coarse of siltstone. (MADE GROUND) Driller reports: Weathered bedrock. Recovered as gravel of siltstone. EXPLORATORY HOLE ENDS AT 0.70 m	0.25 +15.35 0.50 +15.10 0.70 +14.90			

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Groundwater Entries No. Struck Post strike behaviour (m) None observed (see Key Sheet)	Depth sealed (m)	Depth Related Remarks * From to (m) 0.70 Borehole terminated due to refusal on suspected bedrock.	Chiselling Depths (m) Time Tools used
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Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:50 (c) ESG www.esg.co.uk 426.4803/04/2013 11:41:16	Project Moneypoint 400kV Substation Redevelopment Project No. Y1947-12 Carried out for ESB Networks	Borehole BH15 Sheet 1 of 1
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Borehole Log



Soil Mechanics

Drilled DA Logged AO Checked mnh	Start 05/06/2012 End 05/06/2012	Equipment, Methods and Remarks Dando 2000 Cable percussion boring	Depth from 0.00m to 4.00m Diameter 150mm Casing Depth 4.00m	Ground Level +16.19 mOD Coordinates E 503759.75 National Grid N 651962.27 Chainage
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Samples and Tests				Strata		Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
Depth	Type & No	Records	Date Casing	Time Water	Description			
0.00-0.10 0.00 0.10 0.10-0.30 0.30 0.30-0.80	B 1 D 2 D 3 B 4 D 5 B 6	*			Dark brown sandy GRAVEL subangular to subrounded fine to coarse of various lithologies. Sand is fine to coarse. (MADE GROUND)	0.10 +16.09 0.30 +15.89		
1.20-1.65	SPT C	N=24 (4,7/6,5,7,6)	1.20	1.00	Grey angular COBBLES of limestone. (MADE GROUND)	(1.40)	1	
1.70 1.70-2.20	D 7 B 8				Brown sandy gravelly CLAY with high cobble content of subangular siltstone. Low boulder content of siltstone up to 300mm. Sand is fine to coarse. Gravel is subangular fine to coarse of siltstone. (MADE GROUND)	1.70 +14.49	2	
2.20-2.65 2.20-2.70	SPT C B 9	N=36 (1,2/4,6,10,16)	2.20	dry	Very stiff brown slightly sandy slightly gravelly CLAY with low cobble content of subangular siltstone. Sand is fine to coarse. Gravel is subangular fine to coarse of siltstone. Occasional grey mottling.	(1.50)		
2.70-3.20	B 10							
3.00 3.20-3.64 3.20 3.20 3.20-3.70	D 11 SPT C W 12 D 13 B 14	50 (4,7/12,12,13,13 for 60mm)	3.20		Weathered bedrock: Recovered as: Brown sandy angular fine to coarse GRAVEL of siltstone. Sand is fine to coarse.	3.20 +12.99 (0.94)	2	
4.00-4.14 4.00	SPT C D.15	50 (15,10 for 15mm/ 50 for 45mm)	05/06/2012		EXPLORATORY HOLE ENDS AT 4.14	4.14 +12.05		

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Groundwater Entries No. Struck Post strike behaviour 1 0.80 - 2 3.20 Rose to 1.80 m after 20 minutes.	Depth sealed (m) 1.20 -	Depth Related Remarks * From to (m) 0.00 1.20 Hand excavated inspection pit 3.20 4.00 Water added to assist drilling 4.14 Borehole terminated due to refusal on suspected bedrock.	Chiselling Depths (m) 3.60-4.00 Time 60 mins Tools used
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Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:50 (c) ESG www.esg.co.uk 426.4803/04/2013 11:41:18	Project Moneypoint 400kV Substation Redevelopment Project No. Y1947-12 Carried out for ESB Networks	Borehole BH16 Sheet 1 of 1
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Borehole Log



Soil Mechanics

Drilled DA Logged AO Checked mnh	Start 11/06/2012 End 11/06/2012	Equipment, Methods and Remarks Dando 2000 Cable percussion boring	Depth from 0.00m to 4.10m Diameter 150mm Casing Depth 4.10m	Ground Level +16.20 mOD Coordinates E 503611.73 National Grid N 652038.54 Chainage
--	------------------------------------	---	---	---

Samples and Tests					Strata		Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
Depth	Type & No	Records	Date Casing	Time Water	Description				
0.00-0.10 0.00 0.10 0.10-0.60	B 1 D 2 D 3 B 4	*			Grey GRAVEL of angular coarse of limestone. (Hardcore) (MADE GROUND)	0.10 +16.10			
1.20-1.62 1.20-1.70	SPT C B 5	50 (5,12/13,15,15,7 for 40mm)	1.20	dry	Very stiff brown grey mottling slightly sandy slightly gravelly CLAY with low cobble content of subangular siltstone. Sand is fine to coarse. Gravel is subangular fine to coarse of various lithologies. (Possible MADE GROUND)	(3.10)			
2.00 2.20-2.55 2.20-2.70	D 6 SPT C B 7	50 (3,6/9,22,19 for 50mm)	2.20						
3.00 3.20-3.54 3.20-3.70	D 8 SPT C B 9	50 (16,9 for 5mm/50 for 35mm)	3.20		Grey brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is angular fine to coarse of siltstone. (GLACIAL DEPOSITS)	3.20 +13.00 (0.70)			
3.90	SPT C	(25 for 0mm)	3.90	3.90	Driller reports: Possible bedrock..	3.90 +12.30			
4.10	SPT C	(25 for 0mm)	4.10		Recovered as gravel of siltstone EXPLORATORY HOLE ENDS AT 4.10m	4.10 +12.10			

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Groundwater Entries No. Struck Post strike behaviour 1 3.90 No inflow	Depth sealed (m) -	Depth Related Remarks * From to (m) 0.00 1.20 Hand excavated inspection pit 4.10 Borehole terminated due to refusal on suspected bedrock.	Chiselling Depths (m) 3.90-4.10 Time 60 mins Tools used
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Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column. Scale 1:50 (c) ESG www.esg.co.uk 426.4803/04/2013 11:41:20	Project Moneypoint 400kV Substation Redevelopment Project No. Y1947-12 Carried out for ESB Networks	Borehole BH17 Sheet 1 of 1
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Borehole Log



Drilled DA Logged AO Checked mnh	Start 08/06/2012 End 08/06/2012	Equipment, Methods and Remarks Hand excavated inspection pit GL to 0.15m.	Depth from to Diameter Casing Depth	Ground Level +5.85 mOD Coordinates E 503438.47 National Grid N 651703.81 Chainage
--	------------------------------------	--	-------------------------------------	--

Samples and Tests				Strata			Depth, Level/ (Thickness)	Legend	Backfill/ Instruments
Depth	Type & No	Records	Date Casing	Time Water	Description				
0.00-0.10	B 1				Grey angular coarse GRAVEL of limestone. (Hardcore) (MADE GROUND) Grey brown clayey sandy GRAVEL of angular fine to coarse limestone. Sand is fine to coarse. (MADE GROUND) EXPLORATORY HOLE ENDS AT 0.15 m	0.10 +5.75			
0.00	D 2					0.15 +5.70			
0.10	D 3								
0.10-0.15	B 4								

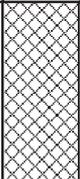
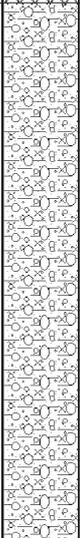
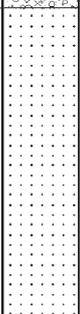
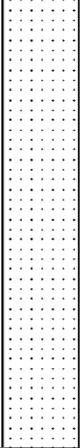
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Groundwater Entries No. Struck Post strike behaviour None observed (see Key Sheet)	Depth sealed (m)	Depth Related Remarks * From to (m) 0.15 Borehole terminated due to refusal on concrete.	Chiselling Depths (m) Time Tools used
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Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Project Moneypoint 400kV Substation Redevelopment Project No. Y1947-12 Carried out for ESB Networks	Borehole BH18 Sheet 1 of 1
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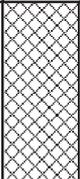
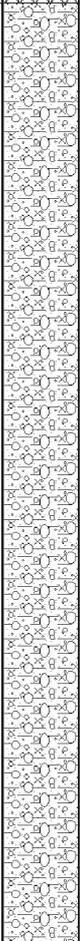
Causeway Geotech Ltd					Project No. 13-370	Project Name: Moneypoint 400kV Building - Site Investigation	Borehole No. BH20
Method and Equipment: Hand dug 0.00-1.20m Rotary drilling 1.20-4.80m Rotary coring 4.80-9.80m Comacchio 450					Co-ords: 503780.9mE 651989.3mN		Client: ESB Networks Engineer: ESB International
					Ground Level: 16.20mOD		Dates: 04/12/2013
					Field Records		Stratum Description
					Level Depth (Thickness)		Legend & Backfill/Installs
Depth (m)	Sample / Test	Casing Depth (m)	Water Depth (m)	Field Records	Level Depth (Thickness)	Stratum Description	Legend & Backfill/Installs
					(1.20)	MADE GROUND: Hardcore fill with boulders	
					15.00 1.20	Grey brown sandy gravelly silty CLAY with large cobbles and boulders	
					(3.60)		
4.80	92 74 38		8		11.40 4.80	Strong, medium to thickly bedded, grey becoming dark grey fine grained SANDSTONE. Moderately fractured. Partially weathered with orange brown discolouration on fracture surfaces and occasional clay smearing	
5.80	100 72 63		6.00			Discontinuity Set 1: 20-30 degrees dipping, closely spaced, undulating smooth at 5.80m becoming weathered to weak 70 degree to sub-vertical, undulating smooth fractures	
6.80	100 86 86		4		(5.00)		
7.80	100 43 30		8.00			Non intact from 7.40m - 7.48m, 8.00m - 8.08m, 8.40m - 8.50m	
8.80	100 54 14		13				
					9.80	6.40 9.80	End of Borehole at 9.80 m
	TCR SCR RQD FI						
Remarks: Borehole backfilled with bentonite on completion.						Water Strikes: Struck rising to time (m) (m) (min) No Groundwater Encountered	Last Revised: 12/02/2014
Core Barrel: T2 101 Flush type: Water						Casing: to (m) dia. (mm) 4.80 150	 www.causewaygeotech.com (c) Causeway Geotech Ltd

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Causeway Geotech Ltd					Project No. 13-370	Project Name: Moneypoint 400kV Building - Site Investigation	Borehole No. BH21	
Method and Equipment: Hand dug 0.00-1.20m Rotary drilling 1.20-7.20m Rotary coring 7.20-12.20m Comacchio 450					Co-ords: 503801.3mE 651978.9mN		Client: ESB Networks	
					Ground Level: 16.21mOD		Engineer: ESB International	
					Dates: 12/12/2013		Scale: 1:50	
							Driller: GT	
				Logger: DOM				
Depth (m)	Sample / Test	Casing Depth (m)	Water Depth (m)	Field Records	Level Depth (Thickness)	Stratum Description	Legend & Water Strikes	Backfill/Installs
					(1.20)	MADE GROUND: Hardcore Fill		
					15.01 1.20	Brown and grey sandy gravelly CLAY with cobbles and boulders		
					(6.00)			
7.20					9.01 7.20	Medium strong, thickly laminated to very thinly bedded grey SILTSTONE. Distinctly weathered with widespread clay smearing and occasional orange brown penetrative staining of fracture surfaces		
8.20	97 28 21					Discontinuity Set 1: Bedding planes, 30-40 degrees dipping, very close to closely spaced, planar smooth highly fractured from 7.20m - 9.20m Sub-vertical fractures from 7.37m - 7.53m, 7.65m - 7.80m, 8.10m - 9.10m Non-intact from 7.85m - 7.97m, 8.70m - 9.00m, 10.15m - 10.20m, 11.20m - 11.33m moderately fractured from 9.20m - 12.20m		
9.20	95 22 0							
	100 58 40				(5.00)			
	TCR SCR RQD FI							
						Continued next sheet		
Remarks: Borehole backfilled with bentonite on completion.						Water Strikes: Struck (m) rising to time (min) 4.00 - -	Last Revised: 12/02/2014	
						Core Barrel: T2 101 Flush type: Water	Casing: to (m) dia. (mm) 7.20 150	 www.causewaygeotech.com (c) Causeway Geotech Ltd

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Causeway Geotech Ltd				Project No. 13-370	Project Name: Moneypoint 400kV Building - Site Investigation	Borehole No. BH23			
Method and Equipment: Hand dug 0.00-1.20m Rotary drilling 1.20-3.10m Rotary coring 3.10-7.10m Comacchio 450				Co-ords: 503750.4mE 651943.0mN		Client: ESB Networks			
				Ground Level: 15.53mOD		Engineer: ESB International		Sheet 1 of 1	
				Dates: 03/12/2013		Driller: GT		Scale: 1:50	
Logger: AO									
Depth (m)	Sample / Test	Casing Depth (m)	Water Depth (m)	Field Records	Level Depth (Thickness)	Stratum Description	Legend & Water Strikes	Backfill/Installs	
					(1.20)	MADE GROUND: Hardcore fill			
					14.33 1.20	Highly weathered BEDROCK recovered as firm brown slightly sandy slightly gravelly CLAY			
2.00			NI	2.15	13.53 2.00	Very weak to weak grey thickly laminated to thinly bedded SILTSTONE. Highly fractured			
	91 48 43		7			Discontinuity Set 1: 20-30 degrees dipping, very closely to closely spaced, planar smooth fractures			
3.10				3.10		From 2.20m - 2.80m: highly weathered becoming extremely weak and brown			
	91 11 0					From 2.80m - 7.10m: moderately weathered with occasional orange staining of fracture surfaces and occasional clay smearing			
4.20			NI			Non-intact from 3.10m - 3.25m, 3.34m - 3.58m, 4.20m - 4.50m			
	95 26 9			5.15	(5.10)				
5.30									
	91 17 0		20						
6.40									
	100 43 16								
				7.10	8.43 7.10	End of Borehole at 7.10 m			
	TCR SCR RQD FI								
Remarks: Borehole backfilled with bentonite on completion.						Water Strikes: Struck rising to time (m) (m) (min) No Groundwater Encountered		Last Revised: 12/02/2014	
Core Barrel: T2 101						Casing: to (m) dia. (mm) 2.00 150		 www.causewaygeotech.com (c) Causeway Geotech Ltd	
Flush type: Water									

Causeway Geotech Ltd				Project No. 13-370	Project Name: Moneypoint 400kV Building - Site Investigation	Borehole No. BH25			
Method and Equipment: Hand dug 0.00-1.20m Rotary drilling 1.20-7.50m Rotary coring 7.50-12.50m Comacchio 450				Co-ords: 503741.0mE 651961.6mN		Client: ESB Networks			
				Ground Level: 15.67mOD		Engineer: ESB International		Sheet 1 of 2	
						Dates: 12/12/2013		Scale: 1:50	
						Driller: GT			
						Logger: DOM			
Depth (m)	Sample / Test	Casing Depth (m)	Water Depth (m)	Field Records	Level Depth (Thickness)	Stratum Description	Legend & Backfill/Installs		
					(1.20)	MADE GROUND: Hardcore Fill			
					14.47 1.20	Grey brown sandy gravelly CLAY with cobbles and boulders			
					(6.30)				
7.50					8.17 7.50	Medium strong, probably thickly laminated to very thinly bedded dark grey SILTSTONE. Distinctly weathered with clay smearing and infill up to 10mm thick, occasional orange brown discolouration of fracture surfaces. Highly becoming moderately fractured			
	97	33	0		7.85				
					8.12				
8.50						Discontinuity Set 1: Bedding planes, 30-40 degrees dipping very closely to closely spaced, planar, smooth Non-intact from 7.85m - 8.12m and 9.73m - 9.80m			
	100	28	0						
					9.73				
9.50					9.80				
	TCR	SCR	RQD	FI					

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Continued next sheet

Remarks:
Borehole backfilled with bentonite on completion.

Water Strikes:
Struck (m) rising to (m) time (min)
4.50 - -

Last Revised:
12/02/2014

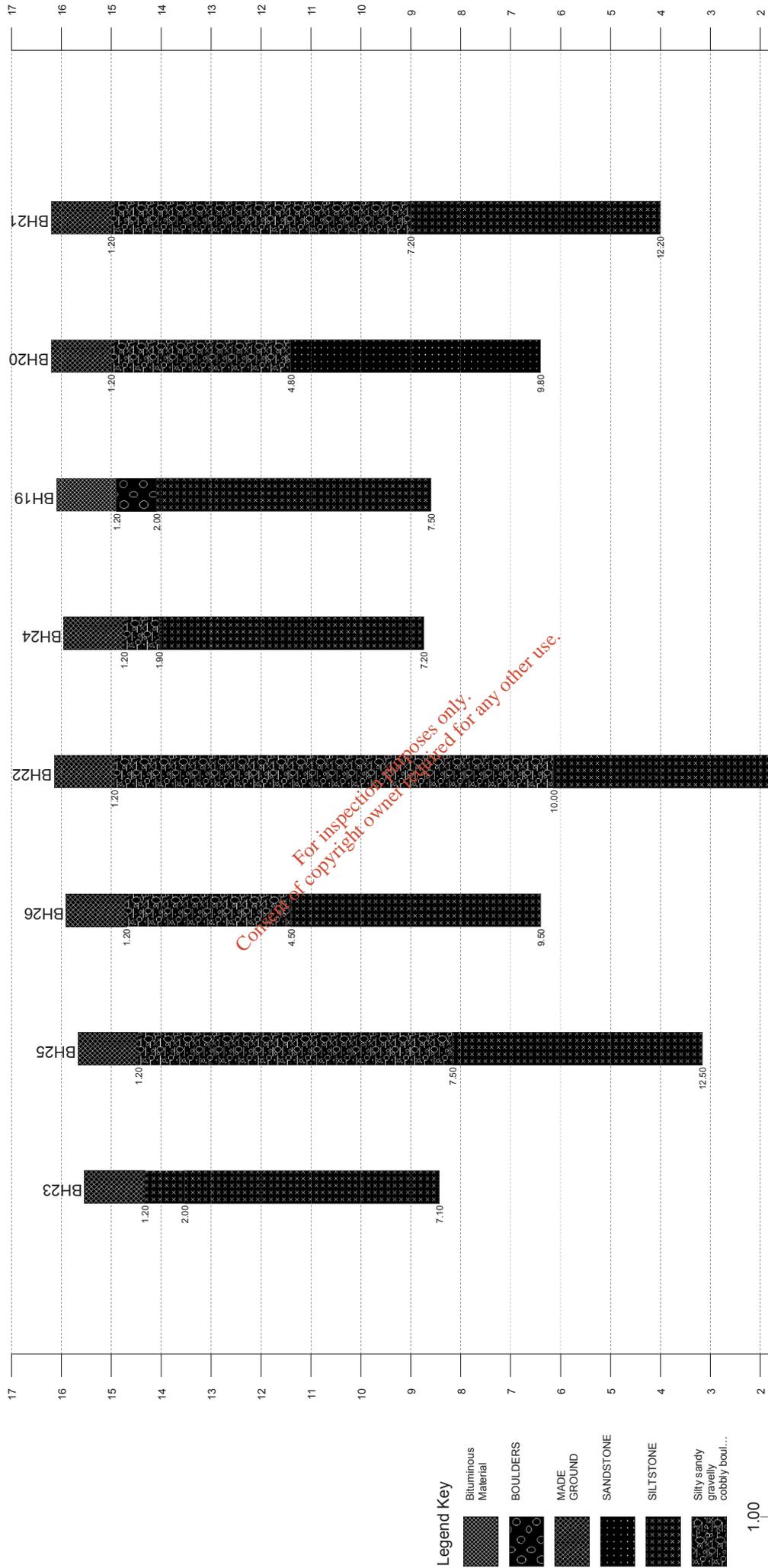
Core Barrel:
T2 101
Flush type:
Water

Casing:
to (m) dia. (mm)



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Causeway Geotech Ltd					Project No. 13-370	Project Name: Moneypoint 400kV Building - Site Investigation	Borehole No. BH26	
Method and Equipment: Hand dug 0.00-1.20m Rotary drilling 1.20-4.50m Rotary coring 4.50-9.50m Comacchio 450					Co-ords: 503765.9mE 651955.7mN		Client: ESB Networks	
					Ground Level: 15.90mOD		Engineer: ESB International	
					Dates: 11/12/2013		Scale: 1:50	
							Driller: GT	
				Logger: DOM				
Depth (m)	Sample / Test	Casing Depth (m)	Water Depth (m)	Field Records	Level Depth (Thickness)	Stratum Description	Legend & Water Strikes	Backfill/Installs
					(1.20)	MADE GROUND: Hardcore Fill		
					14.70 1.20	Grey brown sandy gravelly CLAY with low cobble and boulder content		
					(3.30)			
4.50	96 33 0	12	NI	4.80 4.90	11.40 4.50	Medium strong (locally weak), probably very thinly bedded dark grey SILTSTONE. Distinctly weathered with widespread clay smearing at fracture surfaces and occasional orange brown discoloration. Highly fractured		
5.50	85 18 0	15	NI	6.19 6.36		Discontinuity Set 1: Bedding planes, 30-40 degrees dipping, very closely spaced, planar, smooth Discontinuity Set 2: joints, probably medium to widely spaced, sub-vertical, planar, rough, clean to locally quartz lined		
6.50	97 38 12				(5.00)	weak from 4.50m - 5.50m Non-intact from 4.80m - 4.90m, 6.19m - 6.36m and 8.30m - 8.40m Sub-vertical fractured from 5.30m - 5.40m, 7.20m - 7.50m, 9.00m - 9.48m		
7.50	90 28 0	14						
8.50	100 64 23							
				9.50	6.40 9.50	End of Borehole at 9.50 m		
	TCR SCR RQD FI							
Remarks: Borehole backfilled with bentonite on completion.						Water Strikes: Struck (m) rising to (m) time (min) 4.00 - -	Last Revised: 12/02/2014	
						Core Barrel: T2 10-1 Flush type: Water	Casing: to (m) dia. (mm) 4.50 150	 www.causewaygeotech.com (c) Causeway Geotech Ltd



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Chainage (m)	Offset (m)	Elevation (mAOD)
15.53	12.24	12.35
15.67	8.38	15.38
15.90	10.53	32.94
16.15	1.94	40.35
15.96	27.82	55.40
16.10	20.65	56.01
16.20	10.12	63.39
16.21	9.43	75.30

1.00

Appendix E – Groundwater Monitoring Data

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Appendix E - Groundwater Monitoring Results

BH01

Date	Metals													
	Aluminium	Arsenic	Barium	Boron	Cadmium	Chromium	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Tin	Zinc
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	80	2.3	60	10	<0.1	<0.01	<0.01	<2	<0.1	<0.01	0.01	<1.0	<0.01	0.03
Sep-05	94	<1.0	70	<0.01	<0.1	<0.01	<0.01	14	<0.1	<0.01	<0.01	<0.01	<0.01	0.14
Nov-05								<2						
Oct-06	76	0.6	43	<0.01	<0.5	<1	0.00033	<2	0.090	0.45	1.6	<0.5	<0.5	0.01
Oct-07	136	5.0	81	30	0.3	<1	0.00037	2	<0.02	1.9	2.2	<0.5	<0.5	0.02
Jan-08	<8.0	0.5	45	30	<0.03	<50	<0.05	<0.20	<0.02	2.0	<0.10	0.9	<0.5	0.01
Nov-12	1.7	1.5	24	36	<0.09	<2.14	0.54	0.069	0.072	<5	0.7	<0.47	<2.8	1.55
May-13	1.5	1.4	24	33	<0.09	<2.14	0.23	<0.02	<0.04	<5	0.2	<0.47	<2.8	1.15
Mar-14	137	<0.1	42	63	<0.09	3.08	14	3.2	<0.04	<5	2.4	0.8	<2.8	21.20
May-14	30	1.3	12	42	<0.09	<2.14	0.29	0.026	<0.04	<5	0.4	0.9	<2.8	1.09
Mar-15	6.3	2.9	12	38	<0.09	<2.14	0.28	<0.02	<0.04	<5	0.4	0.9	<2.8	<0.41

GTV	150	7.5	~	750	3.75	37.5	1500	18.75	0.75	~	15	~	~	~
IGV	200	10	100	1000	5	30	30	10	1	~	~	~	~	100

>GTV
>IGV

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BH01

Date	General Organics and Hydrocarbons											Total PAHs
	Total Organic Carbon	Oils, Fats & Grease	TPH	DRO	Mineral Oil	PRO	Benzene	Toluene	Ethyl Benzene	o-Xylene	m+p-Xylene	
	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	
Nov-04	3		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01		<0.05
Sep-05	5		0.04	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01		<1.0
Nov-05												
Oct-06	1		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Oct-07	3	3	<0.01	<0.01	<0.01		<1	<1	<1	<1	<1	0.02
Jan-08			<0.01									
Nov-12	9	<1	1590	1074	477	<5	<0.35	<0.40	<0.42	<0.33		<0.10
May-13	11		<1									<0.10
Mar-14	10	<1	129	102	27		<0.35	<0.40	<0.42	<0.33		<0.01
May-14	5	<1	477	267	210		<0.35	<0.40	<0.42	<0.33		<0.01
Mar-15	14	<1	<1	<1	<2.5		<0.35	<0.40	<0.42	<0.33		<0.01

GTV	~	~	~	~	~	~	0.75	~	~	~	~	0.075
IGV	NAC	~	10	~	~	~	1	10	10	10	~	0.1

>GTV
>IGV

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BH01

Date	Polycyclic Aromatic Hydrocarbons															
	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b)+(j)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(ghi)perylene
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04																
Sep-05																
Nov-05																
Oct-06																
Oct-07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Jan-08																
Nov-12																
May-13																
Mar-14																
May-14																
Mar-15																

GTV	~	~	~	~	~	~	~	~	~	~	~	~	0.0075	~	~	~
IGV	1	~	~	~	~	10000	1	~	~	~	0.5	0.05	~	0.05	~	0.05

>GTV
>IGV

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BH01

Date	General Inorganics and Major Ions												
	Nitrate	Total Ammonia as NH ₃	Total Nitrogen	Ortho-Phosphate	Calcium	Sulphate	Sodium	Potassium	Magnesium	Iron	Manganese	Chloride	Chemical Oxygen Demand
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Nov-04										0.94			
Sep-05										<0.03			
Nov-05													
Oct-06										<0.008			
Oct-07										1.85			
Jan-08	1	<01	<1	<1						0.44			
Nov-12	0.31	69	59	1.0	60					0.20		49	327
May-13	<0.110	2	23	0.1	48	19	29	6	12	0.15	1.18	46	11
Mar-14	<0.110	42	36	4.4	44					5.08		48	26
May-14	<0.110	33	29	1.4	44	2	28	6	10	0.25	0.82	44	34
Mar-15	<0.110	45	38	2.0	54	2	38	9	14	133	0.84	43	16

GTV	37.5	0.08 - 0.21*	~	0.035	~	187.5	150	~	~	~	~	24 - 187.5	~
IGV	25.0	0.14**	~	0.03	200	200	150	5	50	0.2	0.05	30	~

>GTV
>IGV

*Given as 0.065 - 0.175 mg/L as nitrogen

**Given as 0.15 mg/L as NH₄

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BH01

Date	Unstable Field Parameters								Comments
	Dissolved Oxygen	pH	Conductivity @ 20°C	Temperature	Depth	Depth to Groundwater			
						Pre-Purging	Post-Purging	On Sampling	
mg/L		µg/L	°C	m	m	m	m		
Nov-04	2.2	7.1	437	11	7.67	4.12	7.17	4.03	
Sep-05	1.1	7.4		12	7.67	6.17	7.07	6.33	
Nov-05	1.1	7.9		6					
Oct-06	3.2	7.0		12	7.67	5.53	7.67	5.64	
Oct-07	1.6	7.5		11	7.70	6.10	7.63	3.26	
Jan-08		7.5				6.15	7.65	2.57	
Nov-12		7.6	864						
May-13		6.9	577						
Mar-14		7.0	633						
May-14		7.3	591						
Mar-15		7.5	654						

GTV	~	~	~	~	~	~	~	~	~
IGV	~	~	~	~	~	~	~	~	~

>GTV

>IGV

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BH02

Date	Metals													
	Aluminium	Arsenic	Barium	Boron	Cadmium	Chromium	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Tin	Zinc
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	111	<1.0	10	50	<0.1	<0.01	<0.01	<2	<0.1	<0.01	0.01	<1.0	<0.01	0.03
Sep-05	93	<1.0	10	330	<0.1	<0.01	<0.01	<2	<0.1	<0.01	<0.01	<1.0	<0.01	0.03
Oct-06	86	0.5	13	10	<0.2	<1	0.00076	<2	0.06	0.10	8.2	<0.5	<0.5	<0.01
Oct-07	162	<0.2	14	30	<1	<1	0.00081	<2	0.05	0.08	8.2	<0.5	<0.5	0.02
Jan-08	9.5	0.3	15	30	<0.03	<50	<0.05	<0.20	<0.02	0.54	<0.10	1.4	<0.5	0.02
Aug-09	183	1.1	14	0.18		<50	<0.05		<50	<1	<100	4.1	<0.01	0.03
Sep-10	125	<1	16	410		<50	<50		<0.05	<10	<0.10	<3	<10	<0.01
Aug-11	47	<1.0	45	<100		<50	<0.05		<0.05	12	<0.10	<12	<10	<0.01

GTV	150	7.5	~	750	3.75	37.5	1500	18.75	0.75	~	15	~	~	~
IGV	200	10	100	1000	5	30	30	10	1	~	~	~	~	100

>GTV

≥IGV

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BH02

Date	General Organics and Hydrocarbons										
	Total Organic Carbon	Oils, Fats & Grease	TPH	DRO	Mineral Oil	PRO	Benzene	Toluene	Ethyl Benzene	o-Xylene	m+p-Xylene
	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	1.9		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Sep-05	1.6		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Oct-06	1.6	-	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01
Oct-07	1.4	5	<0.01	<0.01	<0.01		<1	<1	<1	<1	<1
Jan-08			<0.01								
Aug-09	1.8	5	<0.01	<0.01	<0.01	0.03	<1	<1	<1	<1	<1
Sep-10	2.0	<2	33	<10	25	<1	<1	<1	<1	<1	
Aug-11	2.6	<2	<10	<10	<10	<1.0	<1.0	<1.0	<1.0	<1.0	

GTV	~	~	~	~	~	~	0.75	~	~	~	~
IGV	NAC	~	10	~	~	~		10	10	10	

>GTV

≥IGV

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BH02

Date	Polycyclic Aromatic Hydrocarbons																
	Total PAHs	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b)+(j)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(ghi)perylene
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	<0.05																
Sep-05	<0.05																
Oct-06	<0.01																
Oct-07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Jan-08																	
Aug-09	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01
Sep-10	<0.20																
Aug-11	<0.20																

GTV	0.075	~	~	~	~	~	~	~	~	~	~	~	~	0.0075	~	~	~
IGV	0.1	1	~	~	~	~	10000	1	~	~	~	0.5	0.05	~	0.05	~	0.05

>GTV
>IGV

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BH02

Date	General Inorganics and Major Ions												
	Nitrate	Total Ammonia as NH ₃	Total Nitrogen	Ortho-Phosphate	Calcium	Sulphate	Sodium	Potassium	Magnesium	Iron	Manganese	Chloride	Chemical Oxygen Demand
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Nov-04										<0.03			
Sep-05										<0.03			
Oct-06										0.01			
Oct-07										<0.008			
Jan-08	34	<0.1	8	<1						0.12			
Aug-09	24	<0.1	5	<1						0.18		47	6
Sep-10	18	<0.1	5	<1						0.05		47	7
Aug-11	18	<0.1	4	<1						0.06		43	<4

GTV	37.5	0.08 - 0.21*	~	0.035	~	187.5	150	~	~	~	~	24 - 187.5	~
IGV	25.0	0.14**	~	0.03	200	200	150	~	50	0.2	0.05	30	~

>GTV

*Given as 0.065 - 0.175 mg/L as nitrogen

>IGV

**Given as 0.15 mg/L as NH₄

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BH02

Date	Unstable Field Parameters								Comments
	Dissolved Oxygen	pH	Conductivity @ 20°C	Temperature	Depth	Depth to Groundwater			
						Pre-Purgig	Post-Purgig	On Sampling	
	mg/L		µg/L	°C	m	m	m	m	
Nov-04	3.5	7.1	411	12	5.77	0.11	3.71	0.17	
Sep-05	3.5	7.0		13	5.77	0.23	3.76	0.36	
Oct-06	7.6	6.0		12	5.77	0.00	3.94	0.00	
Oct-07	6.2	4.2		11	5.79	0.17	5.75	0.18	
Jan-08		6.3			5.79	0.00	5.78	0.05	
Aug-09		6.1	358	14		0.00	5.68	0.00	
Sep-10		6.7	383	17		0.22	3.82	0.23	
Aug-11		6.4	362						

GTV	~	~	~	~	~	~	~	~	~
IGV	~	~	~	~	~	~	~	~	~

>GTV
 ≥IGV

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BH03

Date	Metals													
	Aluminium	Arsenic	Barium	Boron	Cadmium	Chromium	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Tin	Zinc
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	490	<1.0	40	12540	0.3	<0.01	0.01	<2	<0.1	0.12	<0.01	1.5	<0.01	0.03
Sep-05	117	<1.0	10	12160	<0.1	<0.01	<0.01	<2	<0.1	0.23	<0.01	1.2	<0.01	0.02
Oct-07	284	1.2	30	11730	0.7	<1	0.00182	<4	0.13	199	1	2.6	<0.5	0.02
Jan-08	<8.0	<0.2	31	12340	<0.03	<50	<0.05	<0.20	<0.02	160	<0.10	60	<0.5	0.02
Aug-09	82	2.5	21	11		<50	<0.05		<50	280	<100	32	<0.01	0.07
Sep-10	142	<1	20	6600		<50	<50		0.06	260	<0.10	<3	<10	<0.01
Aug-11	66	<1.0	73	12000		<50	<0.05		0.05	250	<0.10	<12	<10	<0.01
Mar-15														

GTV	150	7.5	~	750	3.75	37.5	1500	18.75	0.75	~	15	~	~	~
IGV	200	10	100	1000	5	30	30	40	1	~	~	~	~	100

>GTV
>IGV

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BH03

Date	General Organics and Hydrocarbons										
	Total Organic Carbon	Oils, Fats & Grease	TPH	DRO	Mineral Oil	PRO	Benzene	Toluene	Ethyl Benzene	o-Xylene	m+p-Xylene
	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	5.7		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Sep-05	4.5		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Oct-07	4.7	7	<0.01	<0.01	<0.01		<1	<1	<1	<1	<1
Jan-08			<0.01								
Aug-09	4.2	5	<0.01	<0.01	<0.01	0.07	<1	<1	<1	<1	<1
Sep-10	4.8	6	17	<10	13	<1	<1	<1	<1	<1	
Aug-11	4.8	7	12	<10	11	<1.0	<1.0	<1.0	<1.0	<1.0	
Mar-15											

GTV	~	~	~	~	~	~	0.75	~	~	~	~
IGV	NAC	~	10	~	~	~	1	10	10	10	~

>GTV
>IGV

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BH03

Date	Polycyclic Aromatic Hydrocarbons																
	Total PAHs	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b)(j)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(ghi)perylene
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	<0.05																
Sep-05	<0.05																
Oct-07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Jan-08																	
Aug-09	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01
Sep-10	<0.20																
Aug-11	<0.20																
Mar-15																	

GTV	0.075	~	~	~	~	~	~	~	~	~	~	~	~	0.0075	~	~	~
IGV	0.1	1	~	~	~	~	10000	1	~	~	~	0.5	0.05	~	0.05	~	0.05

>GTV
>IGV

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BH03

Date	General Inorganics and Major Ions												
	Nitrate	Total Ammonia as NH ₃	Total Nitrogen	Ortho-Phosphate	Calcium	Sulphate	Sodium	Potassium	Magnesium	Iron	Manganese	Chloride	Chemical Oxygen Demand
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Nov-04										<0.03			
Sep-05										<0.03			
Oct-07										<.0080			
Jan-08	6.0	0.12	3	<1						0.11			
Aug-09	7.0	0.19	2	<1						0.09		33	8
Sep-10	0.8	0.66	2	<1						0.12		33	15
Aug-11	0.5	1.70	1	<1						0.10		29	16
Mar-15													

GTV	37.5	0.08 - 0.21*	~	0.035	~	187.5	150		~	~	~	24 - 187.5	~
IGV	25.0	0.14**	~	0.03	200	200	150	5	50	0.2	0.05	30	~

>GTV

*Given as 0.065 - 0.175 mg/L as nitrogen

>IGV

**Given as 0.15 mg/L as NH₄

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BH03

Date	Unstable Field Parameters								Comments
	Dissolved Oxygen	pH	Conductivity @ 20°C	Temperature	Depth	Depth to Groundwater			
						Pre-Purgig	Post-Purgig	On Sampling	
mg/L		µg/L	°C	m	m	m	m		
Nov-04	2.1	7.0	883	12	8.71	5.95	6.41	5.96	
Sep-05	2.2	6.4		13	8.71	6.09	6.32	6.07	
Oct-07	2.3	6.7		11	8.71	6.19	7.11	6.06	
Jan-08		7.0				6.23	7.14	6.36	
Aug-09		6.9	896	13		5.88	6.19	5.35	
Sep-10		6.9	877	17		6.00	6.67	5.98	
Aug-11		6.9	1013						
Mar-15									Damaged, unable to sample

GTV	~	~	~	~	~	~	~	~	~
IGV	~	~	~	~	~	~	~	~	~

>GTV
>IGV

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BH04

Date	Metals													
	Aluminium	Arsenic	Barium	Boron	Cadmium	Chromium	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Tin	Zinc
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-05	16	1.1	10	1370	<0.1	0.01	0.020	7	<0.1	0.02	<0.01	2	<0.01	0.02
Oct-06	49	2.5	20	3250	0.5	7.0	0.001	4	0.02	32	3.1	22	<0.5	0.01
Oct-07	29	0.6	24	4250	<1	13	0.001	<4	<0.02	21	3.6	25	<0.5	0.01
Jan-08	<8.0	0.7	23	1950	<0.03	<50	<0.05	<0.20	<0.02	18	<0.10	18	<0.5	0.02
Aug-09	23	1.6	34	4		<50	<0.05		<50	30	<100	40	<0.01	0.01
Sep-10	30	2.0	120	6000		<50	<50		<0.05	5000	<0.10	<3	<10	0.45
Nov-12	18	0.4	18	1061	<0.09	<2.14	1.79	0.8	<0.04	17	1.5	12	<2.8	86
Nov-13	106	0.3	35	721	0.098	11	16.8	12	<0.04	12	2.0	4	<2.8	2.4
Mar-14	18	<0.1	17	621	<0.09	<2.14	1.04	8	<0.04	<5	1.4	7	<2.8	22
May-14	22	0.7	15	1000	0.31	2.8	0.757	3	0.113	12	1.3	7	<2.8	2.7
Mar-15	13	0.4	16	1881	<0.09	6.2	0.533	<0.02	<0.04	26	1.8	19	<2.8	5.4

GTV	150	7.5	~	750	3.75	37.5	1500	18.75	0.75	~	15	~	~	~
IGV	200	10	100	1000	5	30	30	10	1	~	~	~	~	100

>GTV
>IGV

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BH04

Date	General Organics and Hydrocarbons										
	Total Organic Carbon	Oils, Fats & Grease	TPH	DRO	Mineral Oil	PRO	Benzene	Toluene	Ethyl Benzene	o-Xylene	m+p-Xylene
	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-05	5		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Oct-06	2	-	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01
Oct-07	2	2	<0.01	<0.01	<0.01		<1	<1	<1	<1	<1
Jan-08			<0.01								
Aug-09	2	9	0	<0.01	0.03	0.01	18	4	<1	<1	<1
Sep-10	36	5	<10	<10	<10	<1	<1	<1	<1	<1	
Nov-12	11	<1	<1	<1	<2.5	<5	<0.35	<0.40	<0.42	<0.33	
Nov-13	12		<1								
Mar-14	9	<1	<1	<1	<2.5		<0.35	<0.40	<0.42	<0.33	
May-14	5	<1	704	471	232		<0.35	<0.40	<0.42	<0.33	
Mar-15	1	<1	<1	<1	<2.5		<0.35	<0.40	<0.42	<0.33	

GTV	~	~	~	~	~	~	0.75	~	~	~	~
IGV	NAC	~	10	~	~	~	1	10	10	10	~

>GTV

>IGV

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BH04

Date	Polycyclic Aromatic Hydrocarbons																
	Total PAHs	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b)+(j)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(ghi)perylene
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-05	<0.05																
Oct-06	<0.01																
Oct-07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Jan-08																	
Aug-09	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01
Sep-10	<0.20																
Nov-12	<0.10																
Nov-13	<0.10																
Mar-14	<0.01																
May-14	<0.01																
Mar-15	<0.01																

GTV	0.075	~	~	~	~	~	~	~	~	~	~	~	~	0.0075	~	~	~
IGV	0.1	1	~	~	~	~	10000	1	~	~	~	0.5	0.05	~	0.05	~	0.05

>GTV
>IGV

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BH04

Date	General Inorganics and Major Ions												
	Nitrate	Total Ammonia as NH ₃	Total Nitrogen	Ortho-Phosphate	Calcium	Sulphate	Sodium	Potassium	Magnesium	Iron	Manganese	Chloride	Chemical Oxygen Demand
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Nov-05										0.100			
Oct-06										0.042			
Oct-07										<.0080			
Jan-08	13	<0.1	5	<1						<0.05			
Aug-09	27	0.36	6	<1						<0.05		64	12
Sep-10	57	341	313	<5						0.120		4043	230
Nov-12	4.7	0.15	5	0.1	36					0.011		37	<5
Nov-13	<0.110	0.01	1	2.3	20	61	27	7	12	0.339	0.28	42	30
Mar-14	5.1	1.1	6	1.0	31					0.129		18	<5
May-14	<0.110	19.2	17	2.9	35	115	43	8	18	0.136	0.09	69	33
Mar-15	3.0	1.6	4	0.4	62	148	58	9	32	11.9	0.04	62	<5

GTV	37.5	0.08 - 0.21*	~	0.035	~	187.5	150	~	~	~	~	24 - 187.5	~
IGV	25.0	0.14**	~	0.03	200	200	150	5	50	0.2	0.05	30	~

>GTV

*Given as 0.065 - 0.175 mg/L as nitrogen

>IGV

**Given as 0.15 mg/L as NH₄

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BH04

Date	Unstable Field Parameters								Comments
	Dissolved Oxygen	pH	Conductivity @ 20°C	Temperature	Depth	Depth to Groundwater			
						Pre-Purgig	Post-Purgig	On Sampling	
mg/L		µg/L	°C	m	m	m	m		
Nov-05	1.8	6.7		5	9.69	6.78			
Oct-06	5.5	6.0		13	9.69	7.26	7.26	7.10	
Oct-07	3.9	6.2		10	9.67	8.46	8.54	8.54	
Jan-08		6.5				8.32	8.56	8.55	
Aug-09		5.2	948	13		8.06	8.30	8.32	
Sep-10		8.3	11540	16		10.29	10.43	10.42	
Nov-12		7.1	511						
Nov-13		6.9	414						
Mar-14		6.0	411						
May-14		6.4	610						
Mar-15		6.6	577						

GTV	~	~	~	~	~	~	~	~	~
IGV	~	~	~	~	~	~	~	~	~

>GTV
>IGV

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BH05

Date	Metals													
	Aluminium	Arsenic	Barium	Boron	Cadmium	Chromium	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Tin	Zinc
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Sep-05	196	<1.0	80	3700	<1	<0.01	<0.01	15	<0.1	0.12	<0.01	<1.0	<0.01	0.03
Oct-06	22	8.7	22	3590	1.00	<10	0.002	9	<0.02	6	1.10	22	<0.5	<0.01
Oct-07	64	0.5	14	4030	1.30	6	0.001	8	0.05	4	1.00	29	<0.5	0.02
Jan-08	<8.0	0.3	8	1400	<0.03	<50	<0.05	<0.20	<0.02	8	<0.10	11	<0.5	0.01
Aug-09	66	7.9	14	2.8		<50	<0.05		<50	5	<100	39	<0.01	0.01
Sep-10	89	<1	25	4800		<50	<50		<0.05	95	<0.10	<3	<10	<0.01
Aug-11	16	<1.0	35	4800		<50	<0.05		<0.05	<10	<0.10	24	<10	<0.01
Nov-12	29	1.3	11	910	0.18	22	0.660	<0.02	0.142	300	1.12	19	<2.8	5.3
Nov-13	65	0.6	27	2107	0.29	17	10.6	0.643	<0.04	376	0.36	8	<2.8	<0.41
Mar-14	62	0.7	27	2795	0.44	73	0.553	<0.02	0.760	<5	0.97	29	<2.8	5.1
May-14	51	2.6	45	5335	0.84	45	0.600	0.075	0.475	1167	1.53	18	<2.8	3.6
Mar-15	31	1.9	24	4476	0.90	56	0.792	<0.02	0.830	864	1.51	40	<2.8	4.8

GTV	150	7.5	~	750	3.75	37.5	1500	1575	0.75	~	15	~	~	~
IGV	200	10	100	1000	5	30	30	10	1	~	~	~	~	100

>GTV
>IGV

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BH05

Date	General Organics and Hydrocarbons										
	Total Organic Carbon	Oils, Fats & Grease	TPH	DRO	Mineral Oil	PRO	Benzene	Toluene	Ethyl Benzene	o-Xylene	m+p-Xylene
	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Sep-05	0.5		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Oct-06	0.9	-	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01
Oct-07	2.2	2	<0.01	<0.01	<0.01		<1	<1	<1	<1	<1
Jan-08			<0.01								
Aug-09	3.2	4	<0.01	<0.01	<0.01	0.01	<1	<1	<1	<1	<1
Sep-10	2.0	3	<10	<10	<10	<1	<1	<1	<1	<1	
Aug-11	3.2	2	<10	<10	<10	<1.0	<1.0	<1.0	<1.0	<1.0	
Nov-12	6.5	<1	<1	<1	<2.5	<5	<0.35	<0.40	<0.42	<0.33	
Nov-13	6.4		<1								
Mar-14	4.2	<1	<1	<1	<2.5		<0.35	<0.40	<0.42	<0.33	
May-14	3.4	<1	103	36	67		<0.35	<0.40	<0.42	<0.33	
Mar-15	1.8	<1	<1	<1	<2.5		<0.35	<0.40	<0.42	<0.33	

GTV	~	~	~	~	~		0.75	~	~	~	~
IGV	NAC	~	10	~	~		1	10	10	10	~

>GTV
 >IGV

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BH05

Date	Polycyclic Aromatic Hydrocarbons																
	Total PAHs	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b)+(j)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(ghi)perylene
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Sep-05	0.11																
Oct-06	<0.01																
Oct-07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Jan-08																	
Aug-09	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01
Sep-10	<0.20																
Aug-11	0.49																
Nov-12	<0.10																
Nov-13	<0.10																
Mar-14	<0.01																
May-14	<0.01																
Mar-15	<0.01																

GTV	0.075	~	~	~	~	~	~	~	~	~	~	~	~	0.0075	~	~	~
IGV	0.1	1	~	~	~	~	10000	1	~	~	~	0.5	0.05	~	0.05	~	0.05

>GTV
>IGV

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BH05

Date	General Inorganics and Major Ions												
	Nitrate	Total Ammonia as NH ₃	Total Nitrogen	Ortho-Phosphate	Calcium	Sulphate	Sodium	Potassium	Magnesium	Iron	Manganese	Chloride	Chemical Oxygen Demand
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Sep-05										<0.03			
Oct-06										0.010			
Oct-07										<.0080			
Jan-08	7	<0.1	2	<1						0.140			
Aug-09	17	<0.1	5	<1						0.150		245	13
Sep-10	39	0.64	10	<1						<0.05		159	<4
Aug-11	41	<0.1	11	<1						0.140		138	63
Nov-12	4	0.17	5	<0.005	76					0.018		160	9
Nov-13	5	0.30	5	0.006	134	750	2048	77	205	0.064	0.115	2778	30
Mar-14	4	0.28	4	0.018	123					0.032		1324	10
May-14	4	0.32	4	0.023	249	1468	687	187	555	0.032	0.068	11044	790
Mar-15	4	0.26	6	<0.005	209	588	584	99	241	6.554	0.210	2037	22

GTV	37.5	0.08 - 0.21*	~	0.035	~	187.5	150	~	~	~	~	24 - 187.5	~
IGV	25.0	0.14**	~	0.03	200	200	150	5	50	0.2	0.05	30	~

>GTV

*Given as 0.065 - 0.175 mg/L as nitrogen

>IGV

**Given as 0.15 mg/L as NH₄

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BH05

Date	Unstable Field Parameters								Comments
	Dissolved Oxygen	pH	Conductivity @ 20°C	Temperature	Depth	Depth to Groundwater			
						Pre-Purgig	Post-Purgig	On Sampling	
	mg/L		µg/L	°C	m	m	m	m	
Sep-05	5.4	6.1		12	5.56	4.28	4.93	4.93	
Oct-06	4.6	6.0		15	5.56	3.06	3.70	3.12	
Oct-07	2.2	6.4		12	5.50	14.00	5.41	4.62	
Jan-08		6.8					5.45	4.41	
Aug-09		6.3	1480	15		4.37	5.59	4.42	
Sep-10		6.8	1437	17		4.64	5.44	4.00	
Aug-11		6.5	1376						
Nov-12		7.6	1072						
Nov-13		6.7	10100						
Mar-14		6.4	4400						
May-14		6.6	24700						
Mar-15		6.7	6850						

GTV	~	~	~	~		~	~	~	~
IGV	~	~	~	~		~	~	~	~

>GTV
 ≥IGV

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BH06

Date	Metals													
	Aluminium	Arsenic	Barium	Boron	Cadmium	Chromium	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Tin	Zinc
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	78	<1.0	10	20	<0.1	<0.01	<0.01	<2	<0.1	<0.01	<0.01	<1.0	<0.01	0.02
Sep-05	<10	<1.0	10	670	<0.1	<0.01	<0.01	<2	<0.1	<0.01	<0.01	<1.0	<0.01	0.01
Oct-06	<10	0.5	12	10	<0.5	<1	0.00031	<2	0.02	<0.07	1.7	<0.5	<0.5	<0.01
Oct-07	<10	<0.2	7	40	<1	<1	0.00045	<2	<0.02	0.23	1.1	<0.5	<0.5	0.01
Jan-08	<8	0.3	12	30	<0.03	<50	<0.05	<0.20	<0.02	<0.07	<0.10	<0.5	<0.5	<0.01
Aug-09	<10	2.8	8	0.15		<50	<0.05		<50	<1	<100	2.1	<0.01	<0.01
Sep-10	12	<1	7	230		<50	<50		<0.05	<10	<0.10	<3	<10	<0.01
Aug-11	<10	<1.0	11	110		<50	<0.05		<0.05	<10	<0.10	<12	<10	<0.01
Nov-12	2	<0.10	8	42	<0.09	<2.14	<0.11	<0.02	<0.04	<5	0.20	<0.47	<2.8	<0.41
May-13	2	<0.10	5	40	<0.09	<2.14	<0.11	<0.02	<0.04	<5	<0.14	<0.47	<2.8	<0.41
May-14	4	0.2	7	95	<0.09	<2.14	0.181	<0.02	<0.04	<5	0.39	<0.47	<2.8	<0.41

GTV	150	7.5	~	750	3.75	37.5	1500	18.75	0.75	~	15	~	~	~
IGV	200	10	100	1000	5	30	30	30	1	~	~	~	~	100

>GTV
>IGV

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BH06

Date	General Organics and Hydrocarbons										
	Total Organic Carbon	Oils, Fats & Grease	TPH	DRO	Mineral Oil	PRO	Benzene	Toluene	Ethyl Benzene	o-Xylene	m+p-Xylene
	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	1		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Sep-05	1		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Oct-06	1	-	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01
Oct-07	1	3	<0.01	<0.01	<0.01		<1	<1	<1	<1	<1
Jan-08			<0.01								
Aug-09	1	<2	<0.01	<0.01	<0.01	<0.01	<1	<1	<1	<1	<1
Sep-10	1	6	<10	<10	<10	<1	<1	<1	<1	<1	
Aug-11	2	<2	<10	<10	<10	<1.0	<1.0	<1.0	<1.0	<1.0	
Nov-12	3	<1	<1	<1	<2.5	<5	<0.35	5.8	<0.42	<0.33	
May-13	4		<1								
May-14	1	<1	<1	<1	<2.5		<0.35	<0.40	<0.42	<0.33	

GTV	~	~	~	~	~	~	0.75	~	~	~	~
IGV	NAC	~	10	~	~	~	1	10	10	10	~

>GTV
>IGV

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BH06

Date	Polycyclic Aromatic Hydrocarbons																
	Total PAHs	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b)(j)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(ghi)perylene
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	<0.05																
Sep-05	<0.05																
Oct-06	<0.01																
Oct-07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Jan-08																	
Aug-09	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sep-10	<0.20																
Aug-11	<0.20																
Nov-12	<0.10																
May-13	<0.10																
May-14	<0.01																

GTV	0.075	~	~	~	~	~	~	~	~	~	~	~	~	0.0075	~	~	~
IGV	0.1	1	~	~	~	~	10000	1	~	~	~	0.5	0.05	~	0.05	~	0.05

>GTV
>IGV

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BH06

Date	General Inorganics and Major Ions												
	Nitrate	Total Ammonia as NH ₃	Total Nitrogen	Ortho-Phosphate	Calcium	Sulphate	Sodium	Potassium	Magnesium	Iron	Manganese	Chloride	Chemical Oxygen Demand
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Nov-04										<0.03			
Sep-05										<0.03			
Oct-06										0.0128			
Oct-07										<0.008			
Jan-08	0.80	<0.1	2	<1						0.28			
Aug-09	2.00	<0.1	<1	<1						0.36		46	7
Sep-10	1.00	<0.1	<1	<1						0.15		47	<4
Aug-11	1.00	<0.1	<1	<5						0.51		48	14
Nov-12	0.29	0.075	<1	<0.005	35					0.01		46	<5
May-13	<0.110	<0.01	1	0.005	37	19	32	2	15	0.02	0.001	46	<5
May-14	0.81	0.019	<1	0.006	36	20	34	2	15	0.26	0.136	45	12

GTV	37.5	0.08 - 0.21*	~	0.035	~	187.5	150	~	~	~	~	24 - 187.5	~
IGV	25.0	0.14**	~	0.03	200	200	150	5	50	0.2	0.05	30	~

>GTV

*Given as 0.065 - 0.175 mg/L as nitrogen

>IGV

**Given as 0.15 mg/L as NH₄

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BH06

Date	Unstable Field Parameters								Comments
	Dissolved Oxygen	pH	Conductivity @ 20°C	Temperature	Depth	Depth to Groundwater			
						Pre-Purgig	Post-Purgig	On Sampling	
	mg/L		µg/L	°C	m	m	m	m	
Nov-04	1.5	7.2	387	12	4.67	0.81	1.45	1.20	
Sep-05	2.1	6.5		12	4.67	1.04	2.34	1.17	
Oct-06	3.1	6.0		13	4.67	0.93	1.94	0.85	
Oct-07	2.8	7.1		12	4.68	0.98	2.56	0.91	
Jan-08		7.2				1.01	2.33	1.00	
Aug-09		7.1	388	15		0.86	2.28	1.03	
Sep-10		7.2	388	17		1.33	2.70	1.83	
Aug-11		7.0	391						
Nov-12		7.0	366						
May-13		7.2	376						
May-14		7.2	385						

GTV	~	~	~	~	~	~	~	~	~
IGV	~	~	~	~	~	~	~	~	~

>GTV
>IGV

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BH07

Date	Metals													
	Aluminium	Arsenic	Barium	Boron	Cadmium	Chromium	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Tin	Zinc
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	440	<1.0	50	50	0.15	0.02	<0.01	<2	<0.1	0.01	0.01	<1.0	<0.01	0.01
Sep-05	62	<1.0	50	620	<0.2	<0.01	<0.01	<2	<0.1	<0.01	<0.01	<1.0	<0.01	<0.01
Oct-06	125	0.9	18	120	<0.1	<1	0.003	<2	<0.02	2	1.6	<0.5	<0.5	<0.01
Oct-07	461	<0.2	31	160	2	<1	0.002	4	<0.02	1	2.0	0.6	<0.5	0.01
Jan-08	<8	0.5	10	50	<0.03	<50	<0.05	<0.20	<0.02	2	<0.10	0.7	<0.5	0.01
Aug-09	94	2.9	15	0.09		<50	<0.05		<50	4	<100	3.3	<0.01	
Sep-10	48	<1	22	<100		<50	<50		<0.05	<10	<0.10	<3	13	<0.01
Aug-11	236	<1.0	26	160		<50	<0.05		<0.05	<10	<0.10	<12	<10	<0.01

GTV	150	7.5	~	750	3.75	37.5	1500	18.75	0.75	~	15	~	~	~
IGV	200	10	100	1000	5	30	30	10	1	~	~	~	~	100

>GTV

≥IGV

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BH07

Date	General Organics and Hydrocarbons										
	Total Organic Carbon	Oils, Fats & Grease	TPH	DRO	Mineral Oil	PRO	Benzene	Toluene	Ethyl Benzene	o-Xylene	m+p-Xylene
	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	7		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Sep-05	12		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Oct-06	5	-	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01
Oct-07	8	5	<0.01	<0.01	<0.01		<1	<1	<1	<1	<1
Jan-08			<0.01								
Aug-09	7	<2		<0.01	0.21		<1		<1	<1	<1
Sep-10	8	6	23	<10	18	<1	<1	<1	<1	<1	
Aug-11	10	3	47	29	17	<1.0	<1.0	<1.0	<1.0	<1.0	

GTV	~	~	~	~	~	~	0.75	~	~	~	~
IGV	NAC	~	10	~	~	~		10	10	10	

>GTV

≥IGV

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BH07

Date	Polycyclic Aromatic Hydrocarbons																
	Total PAHs	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b)+(j)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(ghi)perylene
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	<0.05																
Sep-05	0.24																
Oct-06	<0.01																
Oct-07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Jan-08																	
Aug-09	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sep-10	<0.20																
Aug-11	<0.20																

GTV	0.075	~	~	~	~	~	~	~	~	~	~	~	~	0.0075	~	~	~
IGV	0.1	1	~	~	~	~	10000	1	~	~	~	0.5	0.05	~	0.05	~	0.05

>GTV
>IGV

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BH07

Date	General Inorganics and Major Ions												
	Nitrate	Total Ammonia as NH ₃	Total Nitrogen	Ortho-Phosphate	Calcium	Sulphate	Sodium	Potassium	Magnesium	Iron	Manganese	Chloride	Chemical Oxygen Demand
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Nov-04										0.06			
Sep-05										<0.03			
Oct-06										0.01			
Oct-07										0.51			
Jan-08	1	0.12	3	<1						0.31			
Aug-09	4	0.25	4	<1						0.37		10	120
Sep-10	1	<0.1	2	0.8						0.06		16	55
Aug-11	1	<0.1	5	<1						0.11		33	280

GTV	37.5	0.08 - 0.21*	~	0.035	~	187.5	150	~	~	~	~	24 - 187.5	~
IGV	25.0	0.14**	~	0.03	200	200	150	~	50	0.2	0.05	30	~

>GTV

*Given as 0.065 - 0.175 mg/L as nitrogen

>IGV

**Given as 0.15 mg/L as NH₄

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BH07

Date	Unstable Field Parameters								Comments
	Dissolved Oxygen	pH	Conductivity @ 20°C	Temperature	Depth	Depth to Groundwater			
						Pre-Purgig	Post-Purgig	On Sampling	
	mg/L		µg/L	°C	m	m	m	m	
Nov-04	2.4	7.1	563	11	5.01	1.90	3.15	1.66	
Sep-05	1.6	6.4		13	5.01	2.11	3.26	2.17	
Oct-06	8.9	6.0		14	5.01	0.76	4.27	0.82	
Oct-07	1.7	6.9		12	3.70	0.95	3.57	1.21	
Jan-08		7.6				0.98	3.68	1.03	
Aug-09		6.9	405	14		1.21	3.57	1.39	
Sep-10		7.6	557	19		1.68	3.17	1.73	
Aug-11		6.7	868						

GTV	~	~	~	~	~	~	~	~	~
IGV	~	~	~	~	~	~	~	~	~

>GTV
 ≥IGV

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BH08

Date	Metals													
	Aluminium	Arsenic	Barium	Boron	Cadmium	Chromium	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Tin	Zinc
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	97	<1.0	20	230	0.25	<0.01	<0.01	<2	<0.1	<0.01	0.01	<1.0	<0.01	0.07
Sep-05	36	<1.0	10	710	0.12	<0.01	<0.01	<2	<0.1	<0.01	<0.01	<1.0	<0.01	0.02
Oct-06	<100	0.5	19	310	<0.2	<1	0.00065	<2	<0.02	<0.07	0.5	0.8	<0.5	0.01
Oct-07	35	<0.2	10	230	<1	<1	0.00075	<2	<0.02	<0.07	0.7	<0.5	<0.5	0.02
Aug-09	108	1.9	15	0.28		<50	<0.05		<50	<1	<100	2.6	<0.01	0.04
Sep-10	150	<1	15	280		<50	<50		<0.05	<10	<0.10	<3	<10	<0.01
Aug-11	164	<1.0	67	340		<50	<0.05		<0.05	<10	<0.10	<12	<10	<0.01
Nov-12	34	<0.10	15	301	<0.09	<2.14	0.427	<0.02	<0.04	<5	0.20	<0.47	<2.8	1.56
Apr-13	57	<0.10	19	395	<0.09	<2.14	0.205	0.032	<0.04	<5	0.25	1.8	<2.8	<0.41
May-14	14	0.2	16	434	<0.09	<2.14	0.446	0.124	<0.04	<5	0.75	4.2	<2.8	1.10

GTV	150	7.5	~	750	3.75	37.5	1500	18.75	0.75	~	15	~	~	~
IGV	200	10	100	1000	5	30	30	10	1	~	~	~	~	100

>GTV
 ≥IGV

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BH08

Date	General Organics and Hydrocarbons										
	Total Organic Carbon	Oils, Fats & Grease	TPH	DRO	Mineral Oil	PRO	Benzene	Toluene	Ethyl Benzene	o-Xylene	m+p-Xylene
	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	1.6		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Sep-05	1.5		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Oct-06	1.8	-	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01
Oct-07	1.4	4	<0.01	<0.01	<0.01		<1	<1	<1	<1	<1
Aug-09	1.6	6	<0.01	<0.01	<0.01	0.04	<1	<1	<1	<1	<1
Sep-10	1.7	3	58	23	35	<1	<1	<1	<1	<1	
Aug-11	2.6	<2	15	<10	12	<1.0	<1.0	<1.0	<1.0	<1.0	
Nov-12	2.4	<1	<1	<1	<2.5	<5	<0.35	29	<0.42	1	
Apr-13	2.7		1319								
May-14	1.7	<1	<1	<1	<2.5		<0.35	<0.40	<0.42	<0.33	

GTV	~	~	~	~	~	~	0.75	~	~	~	~
IGV	NAC	~	10	~	~	~	1	10	10	10	~

>GTV

≥IGV

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BH08

Date	Polycyclic Aromatic Hydrocarbons																
	Total PAHs	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b)(j)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(ghi)perylene
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	<0.05																
Sep-05	<0.05																
Oct-06	<0.01																
Oct-07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aug-09	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01
Sep-10	<0.20																
Aug-11	0.21																
Nov-12	<0.10																
Apr-13	<0.10																
May-14	<0.01																

GTV	0.075	~	~	~	~	~	~	~	~	~	~	~	~	0.0075	~	~	~
IGV	0.1	1	~	~	~	~	10000	1	~	~	~	0.5	0.05	~	0.05	~	0.05

>GTV
>IGV

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BH08

General Inorganics and Major Ions													
Date	Nitrate	Total Ammonia as NH ₃	Total Nitrogen	Ortho-Phosphate	Calcium	Sulphate	Sodium	Potassium	Magnesium	Iron	Manganese	Chloride	Chemical Oxygen Demand
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Nov-04										<0.03			
Sep-05										<0.03			
Oct-06										0.0103			
Oct-07										<0.008			
Aug-09	1	<0.1	<1	<1						0.11		46	17
Sep-10	0.5	0.11	1	<1						0.29		58	55
Aug-11	1	<0.1	<1	<1						0.19		53	71
Nov-12	0.22	0.023	<1	<0.005	187					0.043		40	<5
Apr-13	<0.110	0.021	1.18	<0.005	293	1012	109	5	97	0.040	0.002	66	<5
May-14	<0.110	<0.01	<1	<0.005	312	605	85	6	87	0.044	0.008	41	<5

GTV	37.5	0.08 - 0.21*	~	0.035	~	187.5	150	~	~	~	~	24 - 187.5	~
IGV	25.0	0.14**	~	0.03	200	200	150	5	50	0.2	0.05	30	~

>GTV

*Given as 0.065 - 0.175 mg/L as nitrogen

>IGV

**Given as 0.15 mg/L as NH₄

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BH08

Date	Unstable Field Parameters								Comments
	Dissolved Oxygen	pH	Conductivity @ 20°C	Temperature	Depth	Depth to Groundwater			
						Pre-Purgig	Post-Purgig	On Sampling	
	mg/L		µg/L	°C	m	m	m	m	
Nov-04	2.5	6.9	1236	12	9.50	3.18	4.41	3.08	
Sep-05	3.2	6.9		12	9.50	3.98	5.36	3.99	
Oct-06	5.4	6.0		13	3.38	3.38	5.36	3.40	
Oct-07	2.4	7.0		11	9.68	4.07	5.98	3.97	
Aug-09		6.9	1431	14		3.90	6.43	3.64	
Sep-10		7.4	2590	17		4.11	6.49	4.11	
Aug-11		7.0	2240						
Nov-12		7.0	1440						
Apr-13		7.0	2010						
May-14		7.0	1209						

GTV	~	~	~	~	~	~	~	~	~
IGV	~	~	~	~	~	~	~	~	~

>GTV

≥IGV

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BH09

Date	Metals													
	Aluminium	Arsenic	Barium	Boron	Cadmium	Chromium	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Tin	Zinc
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	114	<1.0	<010	150	<0.1	<0.01	0.01	<2	<0.1	<0.01	<0.01	<1.0	<0.01	0.02
Sep-05	97	<1.0	10	620	<0.5	<0.01	<0.01	4	<0.1	<0.01	<0.01	<1.0	<0.01	0.01
Oct-06	189	1.6	11	70	0.5	<1	0.00158	5	<0.02	0.13	<0.5	1.4	<0.5	<0.01
Oct-07	49	<2.0	5	80	0.6	<1	0.00086	<10	<0.02	0.22	<0.5	<5.0	<0.5	0.01
Jan-08	<8	<0.2	32	50	<0.03	<50	<0.05	<0.20	<0.02	<0.07	<0.10	<0.5	<0.5	0.02
Aug-09	31	17	33	0.39		<50	<0.05		<50	<1	<100	40	<0.01	<0.01
Sep-10	16	<1	10	800		<50	<50		<0.05	<10	<0.10	<3	<10	<0.01
Aug-11	34	<1.0	22	130		<50	<0.05		<0.05	<10	<0.10	<12	<10	<0.01
Nov-12	2	<0.10	14	57	<0.09	<2.14	0.136	<0.02	<0.04	<5	0.146	<0.47	<2.8	<0.41
Sep-13	27	<0.10	76	<4.33	<0.09	<2.14	0.551	0.06	<0.04	<5	1.0	<0.47	49	8
Sep-14	6	<0.1	8	59	<0.09	<2.14	0.143	<0.02	<0.5	<5	<0.14	<0.47	<2.8	210

GTV	150	7.5	~	750	3.75	37.5	1500	18.75	0.75	~	15	~	~	~
IGV	200	10	100	1000	5	30	30	10	1	~	~	~	~	100

>GTV
>IGV

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BH09

Date	General Organics and Hydrocarbons										
	Total Organic Carbon	Oils, Fats & Grease	TPH	DRO	Mineral Oil	PRO	Benzene	Toluene	Ethyl Benzene	o-Xylene	m+p-Xylene
	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	1.0		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Sep-05	<0.25		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Oct-06	1.3	-	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01
Oct-07	1.2	<2	<0.01	<0.01	<0.01		<1	<1	<1	<1	<1
Jan-08			<0.01								
Aug-09	1.0	4	0	0.04	0.06	<0.01	<1	<1	<1	<1	<1
Sep-10	1.3	2	<10	<10	<10	<1	<1	<1	<1	<1	<1
Aug-11	2.0	<2	<10	<10	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Nov-12	3.1	<1	<1	<1	<2.5	<5	<0.35	<0.40	<0.42	<0.33	
Sep-13	3.7		<1								
Sep-14	1.7	<1	<1	<1	<2.5		<0.35	<0.40	<0.42	<0.33	

GTV	~	~	~	~	~	~	0.75	~	~	~	~
IGV	NAC	~	10	~	~	~	1	10	10	10	~

>GTV
>IGV

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BH09

Date	Polycyclic Aromatic Hydrocarbons																
	Total PAHs	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b)+(j)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(ghi)perylene
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	<0.05																
Sep-05	<0.05																
Oct-06	<0.01																
Oct-07	0.41	0.32	<0.02	<0.02	<0.02	0.02	<0.02	0.02	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Jan-08																	
Aug-09	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sep-10	<0.20																
Aug-11	<0.20																
Nov-12	<0.10																
Sep-13	<0.10																
Sep-14	<0.01																

GTV	0.075	~	~	~	~	~	~	~	~	~	~	~	~	0.0075	~	~	~
IGV	0.1	1	~	~	~	~	10000	1	~	~	~	0.5	0.05	~	0.05	~	0.05

>GTV
>IGV

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BH09

Date	General Inorganics and Major Ions												
	Nitrate	Total Ammonia as NH ₃	Total Nitrogen	Ortho-Phosphate	Calcium	Sulphate	Sodium	Potassium	Magnesium	Iron	Manganese	Chloride	Chemical Oxygen Demand
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Nov-04										<0.03			
Sep-05										<0.03			
Oct-06										0.015			
Oct-07										<0.008			
Jan-08	0.6	<0.1	<1	<1						<0.05			
Aug-09	0.7	<0.1	1	<1						<0.05		1194	141
Sep-10	0.7	<0.1	<1	<1						<0.05		96	193
Aug-11	1	<0.1	2	<1						0.060		72	32
Nov-12	0.23	0.024	<1	<0.005	102					0.002		80	<5
Sep-13	<0.110	0.011	<1.00	<0.005	121	314	72	4	40	0.025	2.26	109	<5
Sep-14	<0.110	0.051	1.12	<0.005	134	349	170	14	92	0.719	0.05	201	<5

GTV	37.5	0.08 - 0.21*	~	0.035	~	187.5	150	~	~	~	~	24 - 187.5	~
IGV	25.0	0.14**	~	0.03	200	200	150	5	50	0.2	0.05	30	~

>GTV

*Given as 0.065 - 0.175 mg/L as nitrogen

>IGV

**Given as 0.15 mg/L as NH₄

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BH09

Date	Unstable Field Parameters								Comments
	Dissolved Oxygen	pH	Conductivity @ 20°C	Temperature	Depth	Depth to Groundwater			
						Pre-Purgig	Post-Purgig	On Sampling	
	mg/L		µg/L	°C	m	m	m	m	
Nov-04	3.9	7.1	2600	12	8.13	4.98	6.19	4.98	
Sep-05	2.4	6.9		12	8.13	5.07	7.21	4.98	
Oct-06	5.6	6.0		15	8.13	5.00	8.13	5.00	
Oct-07	2.2	7.3		14	8.29	4.99	8.08	4.98	
Jan-08		7.3			8.29	4.91	8.26	5.03	
Aug-09		6.9	4080	13		4.97	8.02	4.63	
Sep-10		7.6	1026	18		5.21	8.00	4.99	
Aug-11		7.1	1006						
Nov-12		7.7	988						
Sep-13		7.0	1020						
Sep-14		7.0	1332						

GTV	~	~	~	~	~	~	~	~	~
IGV	~	~	~	~	~	~	~	~	~

>GTV
>IGV

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BH10

Date	Metals													
	Aluminium	Arsenic	Barium	Boron	Cadmium	Chromium	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Tin	Zinc
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	398	1.1	30	2380	3.7	<0.01	0.02	<10	<0.1	<0.01	0.01	<1.0	<0.01	0.03
Sep-05	282	1.1	10	2980	3.8	<0.01	<0.01	18	<0.1	<0.01	<0.01	<1.0	<0.01	0.01
Nov-05														
Oct-06	388	59	37	2750	7.0	<2	0.00442	50	<0.02	13	2.4	1.2	<0.5	0.01
Oct-07	303	16	25	2780	11	<2	0.00409	74	<0.02	7	1.6	45	<0.5	0.04
Aug-09	441	130	23	3		<50	<0.05		<50	10	<100	50	<0.01	<0.01
Sep-10	373	<1	17	2800		<50	<50		<0.05	<10	<0.10	<3	<10	<0.01
Aug-11	355	<1.0	10	2900		<50	<0.05		<0.05	<10	<0.10	<12	<10	<0.01
Nov-12	3	1.3	19	323	<0.09	<2.14	2.7	<0.02	<0.04	<5	0.9	1.3	<2.8	<0.41
Sep-13	1958	11	56	3090	0.096	3.5	25.2	20	<0.04	9	4.3	0.8	2158	49
Sep-14	265	2.3	31	3144	<0.09	<2.14	1.1	<0.02	<0.5	16	0.5	1.3	<2.8	188

GTV	150	7.5	~	750	3.75	37.5	1500	18.75	0.75	~	15	~	~	~
IGV	200	10	100	1000	5	30	30	30	1	~	~	~	~	100

>GTV
>IGV

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BH10

Date	General Organics and Hydrocarbons										
	Total Organic Carbon	Oils, Fats & Grease	TPH	DRO	Mineral Oil	PRO	Benzene	Toluene	Ethyl Benzene	o-Xylene	m+p-Xylene
	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	0.35		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Sep-05	<0.25		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Nov-05											
Oct-06	<0.25	-	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01
Oct-07	0.20	3	<0.01	<0.01	<0.01		<1	<1	<1	<1	<1
Aug-09	0.48	4	<0.01	<0.01	<0.01	<0.01	<1	<1	<1	<1	<1
Sep-10	0.47	3	<10	<10	<10	<1	<1	<1	<1	<1	<1
Aug-11	0.73	5	<10	<10	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Nov-12	6.43	<1	<1	<1	<2.5	<5	<0.35	<0.40	<0.42	<0.33	
Sep-13	31.5		<1								
Sep-14	2.12	<1	<1	<1	<2.5		<0.35	<0.40	<0.42	<0.33	

GTV	~	~	~	~	~	~	0.75	~	~	~	~
IGV	NAC	~	10	~	~	~	1	10	10	10	~

>GTV
>IGV

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BH10

Date	Polycyclic Aromatic Hydrocarbons																
	Total PAHs	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b)+(j)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(ghi)perylene
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	<0.05																
Sep-05	<0.05																
Nov-05																	
Oct-06	<0.01																
Oct-07	0.2	0.14	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	0.03	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aug-09	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sep-10	<0.20																
Aug-11	<0.20																
Nov-12	<0.10																
Sep-13	<0.10																
Sep-14	<0.01																

GTV	0.075	~	~	~	~	~	~	~	~	~	~	~	~	0.0075	~	~	~
IGV	0.1	1	~	~	~	~	10000	1	~	~	~	0.5	0.05	~	0.05	~	0.05

>GTV
>IGV

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BH10

Date	General Inorganics and Major Ions												
	Nitrate	Total Ammonia as NH ₃	Total Nitrogen	Ortho-Phosphate	Calcium	Sulphate	Sodium	Potassium	Magnesium	Iron	Manganese	Chloride	Chemical Oxygen Demand
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Nov-04										<0.03			
Sep-05										<0.03			
Nov-05													
Oct-06										<0.008			
Oct-07										0.027			
Aug-09	18	<0.1	9							0.600		14113	160
Sep-10	9	<0.1	5	<5						0.890		15222	170
Aug-11	4	<0.1	2	<5						0.270		13342	40
Nov-12	<0.110	0.4	<1	0.009	398					0.006		14879	2356
Sep-13	<0.110	0.3	<1.00	0.019	385	2150	7950	315	951	6.4	0.689	11584	52
Sep-14	0.14	0.4	2	0.011	440	2399	<0.47	0.070	663	72.0	0.002	12064	3230

GTV	37.5	0.08 - 0.21*	~	0.035	~	187.5	150	~	~	~	~	24 - 187.5	~
IGV	25.0	0.14**	~	0.03	200	200	150	5	50	0.2	0.05	30	~

>GTV

*Given as 0.065 - 0.175 mg/L as nitrogen

>IGV

**Given as 0.15 mg/L as NH₄

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BH10

Date	Unstable Field Parameters								Comments
	Dissolved Oxygen	pH	Conductivity @ 20°C	Temperature	Depth	Depth to Groundwater			
						Pre-Purgig	Post-Purgig	On Sampling	
	mg/L		µg/L	°C	m	m	m	m	
Nov-04	4.8	7.3	31700	11	9.61	5.42	6.71	5.11	
Sep-05	5.9	10.5		11	9.61	5.56	8.25	5.28	
Nov-05		7.4							
Oct-06	5.2	7.0		16	9.61	5.56	9.60	5.55	
Oct-07	4.8	7.7		14	9.67	5.26	6.06	5.73	
Aug-09		7.4	36200	15		5.62	9.50	4.58	
Sep-10		8.2	36700	18		5.85	9.35	5.73	
Aug-11		7.9	29700						
Nov-12		7.1	36900						
Sep-13		7.3	38500						
Sep-14		7.3	42100						

GTV	~	~	~	~	~	~	~	~	~
IGV	~	~	~	~	~	~	~	~	~

>GTV
>IGV

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BH11

Date	Metals													
	Aluminium	Arsenic	Barium	Boron	Cadmium	Chromium	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Tin	Zinc
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	71	<1.0	20	50	<0.1	<0.01	0.12	<2	0.1	<0.01	<0.01	<1.0	<0.01	0.03
Nov-05	79	<1.0	60	<0.01	<0.1	<0.01	0.01	<2	<0.1	<0.01	<0.01	<1.0	<0.01	0.01

GTV	150	7.5	~	750	3.75	37.5	1500	18.75	0.75	~	15	~	~	~
IGV	200	10	100	1000	5	30	30	10	1	~	~	~	~	100

>GTV
 ≥IGV

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BH11

Date	General Organics and Hydrocarbons										
	Total Organic Carbon	Oils, Fats & Grease	TPH	DRO	Mineral Oil	PRO	Benzene	Toluene	Ethyl Benzene	o-Xylene	m+p-Xylene
	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	1.7		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Nov-05	2.8		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	

GTV	~	~	~	~	~	~	0.75	~	~	~	~
IGV	NAC	~	10	~	~	~	1	10	10	10	~

>GTV

≥IGV

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BH11

Date	Polycyclic Aromatic Hydrocarbons																	
	Total PAHs	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b)(j)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(ghi)perylene	
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	
Nov-04	0.42																	
Nov-05	<0.05																	

GTV	0.075	~	~	~	~	~	~	~	~	~	~	~	~	0.0075	~	~	~	~
IGV	0.1	1	~	~	~	~	10000	1	~	~	~	0.5	0.05	~	0.05	~	~	0.05

>GTV
>IGV

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BH11

General Inorganics and Major Ions													
Date	Nitrate	Total Ammonia as NH ₃	Total Nitrogen	Ortho-Phosphate	Calcium	Sulphate	Sodium	Potassium	Magnesium	Iron	Manganese	Chloride	Chemical Oxygen Demand
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Nov-04										<0.03			
Nov-05										<0.03			

GTV	37.5	0.08 - 0.21*	~	0.035	~	187.5	150	~	~	~	~	24 - 187.5	~
IGV	25.0	0.14**	~	0.03	200	200	150	5	50	0.2	0.05	30	~

>GTV

*Given as 0.065 - 0.175 mg/L as nitrogen

>IGV

**Given as 0.15 mg/L as NH₄

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BH11

Date	Unstable Field Parameters								Comments
	Dissolved Oxygen	pH	Conductivity @ 20°C	Temperature	Depth	Depth to Groundwater			
						Pre-Purgig	Post-Purgig	On Sampling	
mg/L		µg/L	°C	m	m	m	m		
Nov-04	2	7.3	448	12	9.53	4.48	6.01	3.98	
Nov-05	-	7.3		5	6.68		2.46		

GTV	~	~	~	~	~	~	~	~	~
IGV	~	~	~	~	~	~	~	~	~

>GTV
 ≥IGV

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BH12

Date	Metals													
	Aluminium	Arsenic	Barium	Boron	Cadmium	Chromium	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Tin	Zinc
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	20	<1.0	130	20	<0.1	<0.01	<0.01	<2	<0.1	<0.01	0.01	<1.0	<0.01	0.02
Sep-05	12	<1.0	30	660	<0.1	<0.01	<0.01	<2	<0.1	<0.01	<0.01	<1.0	<0.01	<0.01
Oct-06	<100	0.5	31	20	0.2	<1	0.0006	<2	<0.02	<0.07	0.6	1	<0.5	<0.01
Oct-07	173	<0.2	56	40	<1	<1	0.0009	<4	<0.02	0.6	1.2	<0.5	<0.5	0.02
Aug-09	38	2.2	45	0.09		<50	<0.05		<50	<1	<100	2.1	<0.01	0.01
Sep-10	67	<1	26	390		<50	<50		<0.05	<10	<0.10	<3	<10	<0.01
Aug-11	31	<1.0	35	180		<50	<0.05		<0.05	<10	<0.10	<12	<10	<0.01
Nov-12	8	0.3	41	25	<0.09	<2.14	0.714	<0.02	<0.047	<5	<0.14	1.857	<2.8	<0.41
Sep-13	144	0.8	43	17	<0.09	<2.14	6.78	7.185	<0.04	<5	1.4	<0.47	10.8	42.1
Sep-14	12	0.1	32	57	<0.09	<2.14	0.543	<0.02	<0.5	<5	0.3	1.3	<2.8	212

GTV	150	7.5	~	750	3.75	37.5	1500	18.75	0.75	~	15	~	~	~
IGV	200	10	100	1000	5	30	30	10	1	~	~	~	~	100

>GTV

≥IGV

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BH12

Date	General Organics and Hydrocarbons										
	Total Organic Carbon	Oils, Fats & Grease	TPH	DRO	Mineral Oil	PRO	Benzene	Toluene	Ethyl Benzene	o-Xylene	m+p-Xylene
	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	2.1		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Sep-05	1.6		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Oct-06	2.6	-	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01
Oct-07	1.8	2	<0.01	<0.01	<0.01		<1	<1	<1	<1	<1
Aug-09	1.4	7	<0.01	<0.01	<0.01	0.01	<1	<1	<1	<1	<1
Sep-10	1.4	2	25	<10	25	<1	<1	<1	<1	<1	
Aug-11	1.8	<2	<10	<10	<10	<1.0	<1.0	<1.0	<1.0	<1.0	
Nov-12	1.9	<1	<1	<1	<2.5	<5	<0.35	<0.40	<0.42	<0.33	
Sep-13	4.1		<1								
Sep-14	1.7	<1	16	16	<2.5		<0.35	<0.40	<0.42	<0.33	

GTV	~	~	~	~	~	~	0.75	~	~	~	~
IGV	NAC	~	10	~	~	~	1	10	10	10	~

>GTV

≥IGV

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BH12

Date	Polycyclic Aromatic Hydrocarbons																
	Total PAHs	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b)(j)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(ghi)perylene
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	<0.05																
Sep-05	<0.05																
Oct-06	<0.01																
Oct-07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aug-09	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01
Sep-10	<0.20																
Aug-11	<0.20																
Nov-12	<0.10																
Sep-13	<0.10																
Sep-14	<0.01																

GTV	0.075	~	~	~	~	~	~	~	~	~	~	~	~	0.0075	~	~	~
IGV	0.1	1	~	~	~	~	10000	1	~	~	~	0.5	0.05	~	0.05	~	0.05

>GTV
>IGV

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BH12

Date	General Inorganics and Major Ions												
	Nitrate	Total Ammonia as NH ₃	Total Nitrogen	Ortho-Phosphate	Calcium	Sulphate	Sodium	Potassium	Magnesium	Iron	Manganese	Chloride	Chemical Oxygen Demand
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Nov-04										<0.03			
Sep-05										<0.03			
Oct-06										0.085			
Oct-07										<.0080			
Aug-09	1	<0.1	<1	<1						0.14		56	<4
Sep-10	4	<0.1	<1	<1						0.07		46	8
Aug-11	1	<0.1	<1	<1						0.06		48	4
Nov-12	0.5	0.183	1.1	<0.005	49					0.00		27	10
Sep-13	0.4	0.055	1.0	<0.005	36	61	22	3	12	0.65	0.249	27	6
Sep-14	0.1	0.021	1.2	<0.005	73	73	74	7	28	7.00	0.002	50	7

GTV	37.5	0.08 - 0.21*	~	0.035	~	187.5	150		~	~	~	24 - 187.5	~
IGV	25.0	0.14**	~	0.03	200	200	150	5	50	0.2	0.05	30	~

>GTV

*Given as 0.065 - 0.175 mg/L as nitrogen

>IGV

**Given as 0.15 mg/L as NH₄

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BH12

Date	Unstable Field Parameters								Comments
	Dissolved Oxygen	pH	Conductivity @ 20°C	Temperature	Depth	Depth to Groundwater			
						Pre-Purgig	Post-Purgig	On Sampling	
	mg/L		µg/L	°C	m	m	m	m	
Nov-04	2.3	7.3	713	12	21.48	4.29	5.34	3.87	
Sep-05	1.6	7.4		12	21.48	4.01	8.54	4.00	
Oct-06	8.0	7.0		14	21.48	3.52	9.06	3.42	
Oct-07	2.7	7.5		9	20.15	5.93	20.08	3.88	
Aug-09		7.7	571	14		3.80	15.49	3.75	
Sep-10		7.6	541	17		3.92	10.78	3.82	
Aug-11		7.5	567						
Nov-12		7.4	499						
Sep-13		7.0	332						
Sep-14		7.7	602						

GTV	~	~	~	~	~	~	~	~	~
IGV	~	~	~	~	~	~	~	~	~

>GTV
 ≥IGV

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BH14

Date	Metals													
	Aluminium	Arsenic	Barium	Boron	Cadmium	Chromium	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Tin	Zinc
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Sep-05	Dry													
Oct-07	6322	<0.2	45	2890	12	4	0.004	164	0.12	6	3.1	1.1	0.7	0.03
Aug-09	68	120	37	3		<50	<0.05		<50	12	<100	32	<0.01	<0.01
Sep-10	380	<1	16	3400		<50	<50		<0.05	<10	<0.10	<3	12	0.02
Aug-11	140	<1.0	12	4300		<50	<0.05		<0.05	<10	<0.10	<12	<10	<0.01
May-13	218	1	33	1964	<0.09	<2.14	0.54	<0.02	<0.04	11	1.4	0.86	<2.8	0.54

GTV	150	7.5	~	750	3.75	37.5	1500	18.75	0.75	~	15	~	~	~
IGV	200	10	100	1000	5	30	30	10	1	~	~	~	~	100

>GTV

>IGV

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BH14

Date	General Organics and Hydrocarbons										
	Total Organic Carbon	Oils, Fats & Grease	TPH	DRO	Mineral Oil	PRO	Benzene	Toluene	Ethyl Benzene	o-Xylene	m+p-Xylene
	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Sep-05											
Oct-07	0.65	2	<0.01	<0.01	<0.01		<1	<1	<1	<1	<1
Aug-09	0.52	4	1	0.49	0.51	<0.01	<1	<1	<1	<1	<1
Sep-10	0.39	4	<10	<10	<10	<1	<1	<1	<1	<1	
Aug-11	0.72	<2	<10	<10	<10	<1.0	<1.0	<1.0	<1.0	<1.0	
May-13	19.7		4308								

GTV	~	~	~	~	~	~	0.75	~	~	~	~
IGV	NAC	~	10	~	~	~	1	10	10	10	~

>GTV

≥IGV

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BH14

Date	Polycyclic Aromatic Hydrocarbons																
	Total PAHs	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b)(j)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(ghi)perylene
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Sep-05																	
Oct-07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aug-09	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sep-10	<0.20																
Aug-11	<0.20																
May-13	<0.10																

GTV	0.075	~	~	~	~	~	~	~	~	~	~	~	~	0.0075	~	~	~
IGV	0.1	1	~	~	~	~	10000	1	~	~	~	0.5	0.05	~	0.05	~	0.05

>GTV
>IGV

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BH14

General Inorganics and Major Ions													
Date	Nitrate	Total Ammonia as NH ₃	Total Nitrogen	Ortho-Phosphate	Calcium	Sulphate	Sodium	Potassium	Magnesium	Iron	Manganese	Chloride	Chemical Oxygen Demand
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Sep-05													
Oct-07										<0.008			
Aug-09	29	<0.1	8							0.39		13231	180
Sep-10	12	0.15	<6	<5						0.45		20357	310
Aug-11	3	<0.1	2	<5						0.07		19331	60
May-13	<0.110	0.32	2	0.02	318	1716	6891	238	805	0.06	0.004	11842	165

GTV	37.5	0.08 - 0.21*	~	0.035	~	187.5	150	~	~	~	~	24 - 187.5	~
IGV	25.0	0.14**	~	0.03	200	200	150	5	50	0.2	0.05	30	~

>GTV

*Given as 0.065 - 0.175 mg/L as nitrogen

>IGV

**Given as 0.15 mg/L as NH₄

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BH14

Date	Unstable Field Parameters								Comments
	Dissolved Oxygen	pH	Conductivity @ 20°C	Temperature	Depth	Depth to Groundwater			
						Pre-Purgig	Post-Purgig	On Sampling	
	mg/L		µg/L	°C	m	m	m	m	
Sep-05									
Oct-07	4.6	7.8		17	6.75	5.37	6.56	5.39	
Aug-09		7.8	33500	14				3.29	
Sep-10		8.3	40500	18				3.26	
Aug-11		7.9	40500						
May-13		7.7	36400						

GTV	~	~	~	~	~	~	~	~	~
IGV	~	~	~	~	~	~	~	~	~

>GTV

≥IGV

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BH15

Date	Metals													
	Aluminium	Arsenic	Barium	Boron	Cadmium	Chromium	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Tin	Zinc
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	487	1.1	10	2280	<2.5	<0.01	0.03	<10	<0.1	<0.01	<0.01	<1.0	<0.01	0.06
Sep-05	183	1.2	10	3600	7	<0.01	0.14	30	<0.1	<0.01	<0.01	<1.0	<0.01	0.03
Oct-06	218	65	15	2930	7	<1	0.004	67	<0.02	8	2.1	0.7	<0.5	0.03
Oct-07	166	19	14	3370	12	<2	0.004	79	<0.02	9	2.3	51	<0.5	0.03
Aug-09	215	120	13	3		<50	<0.05		<50	11	<100	2.3	<0.01	<0.01
Sep-10	33	<1	11	3800		<50	<50		<0.05	41	<0.10	<3	<10	<0.01
Aug-11	<10	1.0	7	4800		<50	<0.05		<0.05	<10	<0.10	15	<10	<0.01
Nov-12	1	1.9	12	624	<0.09	<2.14	0.77	<0.02	<0.04	7	0.4	1.1	<2.8	<0.41
Nov-13	116	0.5	15	1590	<0.09	<2.14	13	0.4	<0.04	<5	0.2	<0.47	3.6	2.2
Sep-14	13	1.9	14	3062	<0.09	<2.14	0.76	<0.02	2	22	0.3	9.3	<2.8	184

GTV	150	7.5	~	750	3.75	37.5	1500	18.75	0.75	~	15	~	~	~
IGV	200	10	100	1000	5	30	30	10	1	~	~	~	~	100

>GTV
 ≥IGV

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BH15

Date	General Organics and Hydrocarbons										
	Total Organic Carbon	Oils, Fats & Grease	TPH	DRO	Mineral Oil	PRO	Benzene	Toluene	Ethyl Benzene	o-Xylene	m+p-Xylene
	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	0.4		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Sep-05	<0.25		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Oct-06	<0.25	5	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01
Oct-07	0.3	3	<0.01	<0.01	<0.01		<1	<1	<1	<1	<1
Aug-09	0.7	<2	<0.01	<0.01	<0.01	<0.01	<1	<1	<1	<1	<1
Sep-10	0.9	<2	<10	<10	<10	<1	<1	<1	<1	<1	
Aug-11	0.8	<2	<10	<10	<10	<1.0	<1.0	<1.0	<1.0	<1.0	
Nov-12	11.5	<1	<1	<1	<2.5	<5	<0.35	<0.40	<0.42	<0.33	
Nov-13	8.7		<1								
Sep-14	2.3	<1	<1	<1	<2.5		<0.35	<0.40	<0.42	<0.33	

GTV	~	~	~	~	~	~	0.75	~	~	~	~
IGV	NAC	~	10	~	~	~	1	10	10	10	~

>GTV

≥IGV

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BH15

Date	Polycyclic Aromatic Hydrocarbons																
	Total PAHs	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b)(j)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(ghi)perylene
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	<0.05																
Sep-05	<0.05																
Oct-06	<0.01																
Oct-07	0.28	0.16	<0.02	<0.02	<0.02	<0.02	<0.02	0.03	0.07	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aug-09	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sep-10	<0.20																
Aug-11	1.1																
Nov-12	<0.10																
Nov-13	<0.10																
Sep-14	<0.01																

GTV	0.075	~	~	~	~	~	~	~	~	~	~	~	~	0.0075	~	~	~
IGV	0.1	1	~	~	~	~	10000	1	~	~	~	0.5	0.05	~	0.05	~	0.05

>GTV
>IGV

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BH15

Date	General Inorganics and Major Ions												
	Nitrate	Total Ammonia as NH ₃	Total Nitrogen	Ortho-Phosphate	Calcium	Sulphate	Sodium	Potassium	Magnesium	Iron	Manganese	Chloride	Chemical Oxygen Demand
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Nov-04										<0.03			
Sep-05										<0.03			
Oct-06										<0.008			
Oct-07										<0.008			
Aug-09	19	<0.1	6							0.11		15762	190
Sep-10	<5	<0.1	<4	<5						<0.05		20869	240
Aug-11	6	<0.1	1	<5						<0.05		21377	60
Nov-12	1.8	0.40	2.39	0.035	333					0.00		13541	1000
Nov-13	1.1	0.25	1.67	0.037	257	1716	6275	208	781	0.07	0.002	10076	25
Sep-14	0.3	0.38	1.73	0.038	4831	2432	13870	755	664	6.29	0.396	12143	2356

GTV	37.5	0.08 - 0.21*	~	0.035	~	187.5	150			~	~	24 - 187.5	~
IGV	25.0	0.14**	~	0.03	200	200	150	5	50	0.2	0.05	30	~

>GTV

*Given as 0.065 - 0.175 mg/L as nitrogen

>IGV

**Given as 0.15 mg/L as NH₄

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BH15

Date	Unstable Field Parameters								Comments
	Dissolved Oxygen	pH	Conductivity @ 20°C	Temperature	Depth	Depth to Groundwater			
						Pre-Purgig	Post-Purgig	On Sampling	
	mg/L		µg/L	°C	m	m	m	m	
Nov-04	6.5	7.7	27000	12	9.56	6.32	6.10	6.07	
Sep-05	3.2	6.9		13	9.56	3.62	3.42	4.84	
Oct-06	4.7	7.0		18	9.56	3.12	7.23	7.61	
Oct-07	4.3	7.8		18	8.75	4.75	5.87	7.40	
Aug-09		7.8	37500	14		7.39	7.61	4.33	
Sep-10		8.4	43900	17		7.28	7.30	4.76	
Aug-11		8.0	44500						
Nov-12		7.3	33700						
Nov-13		6.9	30100						
Sep-14		7.5	42400						

GTV	~	~	~	~	~	~	~	~	~
IGV	~	~	~	~	~	~	~	~	~

>GTV

≥IGV

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BH16

Date	Metals													
	Aluminium	Arsenic	Barium	Boron	Cadmium	Chromium	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Tin	Zinc
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	23	<1.0	18	50	<0.1	<0.01	<0.01	<2	<0.1	<0.01	0.01	<1.0	<0.01	0.02
Sep-05	25	<1.0	70	<0.01	0.11	<0.01	<0.01	<2	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01
Oct-06	10	0.8	44	110	<0.2	<1	0.001	<2	<0.02	1.0	<0.5	0.6	<0.5	<0.01
Oct-07	113	<0.2	36	110	<1	<1	0.001	<4	<0.02	0.7	0.5	0.8	<0.5	0.01
Aug-09	141	2.3	98	2		<50	<0.05		<50	<1	<100	5.5	<0.01	0.35
Jan-10		0.7			<0.1	5.5			<0.01	0.9	2.1			
Apr-10		0.5			<0.1	7.2			<0.01	22.2	1.8			
Jul-10		0.4			0.15	2.4			<0.01	0.7	2.0			
Sep-10	16	<1	43	150		<50	<50		<0.05	<10	<0.10	<3	<10	<0.01
Dec-10		0.4			<0.1	4.2			<0.01	0.7	3.0			
Mar-11		0.3			<0.1	6.2			<0.01	0.3	1.9			
May-11		0.6			0.14	4.0			<0.01	2.6	3.5			
Aug-11	20	<1.0	130	130		<50	<0.05		<0.05	<10	<0.10	<12	17	<0.01
Nov-11	<2.9	1.5	38		<0.1	5.3	1.9	0.08	<0.01	2.2	1.3	2.6	5.4	1.61
Jan-12		0.2			<0.1	<0.22	1.3	<0.02	<0.01		2.1	1.1		0.5
Apr-12	<2.9	0.3	40	222	<0.1	7.0	2.0	0.07	<0.01	0.5	1.9	2.0	<0.36	5.6
Jul-12	<2.9	0.3	58		<0.1	1.4	2.0	0.04	<0.01	0.4	1.8	0.9	<0.36	2.9
Nov-12	9	<0.10	57	562	<0.09	<2.14	0.91	<0.02	<0.04	<5	0.9	1.8	<2.8	<0.41
Apr-13	8	<0.10	70	397	<0.09	<2.14	0.64	<0.02	<0.04	<5	0.7	1.0	<2.8	<0.41
Sep-13	326	1.3	130	155	0.39	<2.14	9.9	3.4	<0.04	<5	4.0	0.5	4.4	26.6
Nov-13	45	<0.10	63	429	<0.09	2.2	15	1.2	<0.04	<5	1.5	<0.47	<2.8	0.5
Mar-14	89	2.2	104	415	<0.09	4.1	20	1.9	0.225	<5	3.5	0.7	<2.8	18.0
May-14	9	0.3	132	505	0.25	<2.14	0.69	0.12	<0.04	<5	2.4	<0.47	<2.8	2.2
Sep-14	5	0.2	39	348	<0.09	<2.14	0.63	<0.02	<0.5	<5	1.2	0.7	<2.8	208
Dec-14	12	0.2	92	571	0.10	<2.14	0.43	<0.02	<0.04	<5	2.2	1.9	<2.8	2.5
Mar-15	4	0.3	90	583	0.10	<2.14	1.3	<0.02	<0.04	5.2	2.4	1.7	<2.8	2.5

GTV	150	7.5	~	750	3.75	37.5	1500	18.75	0.75	~	15	~	~	~
IGV	200	10	100	1000	5	30	30	10	1	~	~	~	~	100

>GTV
>IGV

BH16

Date	General Organics and Hydrocarbons										
	Total Organic Carbon	Oils, Fats & Grease	TPH	DRO	Mineral Oil	PRO	Benzene	Toluene	Ethyl Benzene	o-Xylene	m+p-Xylene
	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	3.1		<0.01	1.37	<0.01		<0.01	<0.01	<0.01	<0.01	
Sep-05	2.6		3.1	0.72	1.28		<0.01	<0.01	<0.01	<0.01	
Oct-06	3.2	-	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01
Oct-07	3.4	6	<0.01	<0.01	<0.01		<1	<1	<1	<1	<1
Aug-09	3.7	<2	0	<0.01	0.16	0.35	<1	<1	<1	<1	<1
Jan-10	3.1	<1									
Apr-10	3.5	<1									
Jul-10	3.7	<1									
Sep-10	2.3	3	400	64	340	<1	<1	<1	<1	<1	
Dec-10	4.7	<1									
Mar-11	3.2	2									
May-11	3.9	<1									
Aug-11	3.7	<2	110	12	99	<1.0	<1	<1.0	<1.0	<1.0	
Nov-11	<3	<1									
Jan-12	4.3	<1									
Apr-12	3.2	<1									
Jul-12	3.7	<1									
Nov-12	4.0	<1	1068	<1	833		<0.35	3	<0.42	<0.33	
Apr-13	5.4		<1								
Sep-13	4.4		1442								
Nov-13	3.7		<1								
Mar-14	5.9	<1	458	275	183		<0.35	<0.40	<0.42	<0.33	
May-14	2.8	<1	<1	<1	<2.5		<0.35	<0.40	<0.42	<0.33	
Sep-14	2.2	<1	<1	<1	<2.5		<0.35	<0.40	<0.42	<0.33	
Dec-14	3.1	<1	368	<1	368		<0.35	<0.40	<0.42	<0.33	
Mar-15	2.5	<1	1048	252	797		<0.35	<0.40	<0.42	<0.33	

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GTV	~	~	~	~	~	~	0.75	~	~	~	~
IGV	NAC	~	10	~	~	~	1	10	10	10	~

>GTV
>IGV

BH16

Date	Polycyclic Aromatic Hydrocarbons																
	Total PAHs	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b)+(j)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(ghi)perylene
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	<0.05																
Sep-05	<1.0																
Oct-06	<0.01																
Oct-07	0.06	0.06	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aug-09	0.18	0.11	<0.01	0.02	0.02	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Jan-10																	
Apr-10																	
Jul-10																	
Sep-10	<0.20																
Dec-10																	
Mar-11																	
May-11																	
Aug-11	0.73																
Nov-11																	
Jan-12																	
Apr-12																	
Jul-12																	
Nov-12	<0.10																
Apr-13	<0.10																
Sep-13	<0.10																
Nov-13	<0.10																
Mar-14	<0.01																
May-14	<0.01																
Sep-14	<0.01																
Dec-14	<0.01																
Mar-15	3.3																

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GTV	0.075	~	~	~	~	~	~	~	~	~	~	~	~	~	0.0075	~	~	~
IGV	0.1	1	~	~	~	~	10000	1	~	~	~	0.5	0.05	~	0.05	~	~	0.05

>GTV
>IGV

BH16

Date	General Inorganics and Major Ions												
	Nitrate	Total Ammonia as NH ₃	Total Nitrogen	Ortho-Phosphate	Calcium	Sulphate	Sodium	Potassium	Magnesium	Iron	Manganese	Chloride	Chemical Oxygen Demand
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Nov-04										<0.03			
Sep-05										<0.03			
Oct-06										0.01			
Oct-07										<0.008			
Aug-09	2	<0.1	2	<1						0.2		43	72
Jan-10	0.09	0.3	<1							<0.019		59	10
Apr-10	<0.0677	<0.2	<1							<0.019		39	25
Jul-10	<0.0677	<0.2	<1							<0.019		38	16
Sep-10	0.6	<0.1	<1	<1						0.1		40	16
Dec-10	<0.0677	<0.2	<1							<0.019		45	18
Mar-11	<0.0677	<0.2	<1							<0.019		52	75
May-11	0.1	<0.2	<1							<0.019		16	16
Aug-11	1	<0.1	2	<1						0.1		36	12
Nov-11	0.7	<0.2	<1		119					<0.019		48	<7
Jan-12	0.3	<0.2	<1									89	14
Apr-12	0.6	<0.2	<1		132					0.2		65	8
Jul-12	<0.03	<0.2	1		146					<0.019		57	30
Nov-12	0.3	0.13	<1	<0.005	218					0.002		98	19
Apr-13	<0.110	0.07	<1.00	<0.005	167	240	56	9	36	0.01	0.01	166	<5
Sep-13	<0.110	0.17	<1.00	<0.005	101	169	34	5	18	2.1	2.44	74	11
Nov-13	<0.110	0.20	<1.00	<0.005	183	407	38	6	31	0.2	0.02	193	<5
Mar-14	0.5	0.15	1	<0.005	273					0.2		425	<5
May-14	<0.110	0.81	1	<0.005	267	304	139	39	43	0.1	1.23	557	<5
Sep-14	<0.110	0.41	<1.00	<0.005	184	299	159	62	56	17	0.49	292	10
Dec-14	<0.110	0.38	1	<0.005	415	378	214	46	59	8.0	2.18	495	<5
Mar-15	0.5	0.35	3	<0.005	547	452	369	169	61	3.1	1.07	902	11

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GTV	37.5	0.08 - 0.21*	~	0.035	~	187.5	150	~	~	~	~	24 - 187.5	~
IGV	25.0	0.14**	~	0.03	200	200	150	5	50	0.2	0.05	30	~

>GTV

*Given as 0.065 - 0.175 mg/L as nitrogen

>IGV

**Given as 0.15 mg/L as NH₄

BH16

Date	Unstable Field Parameters								Comments
	Dissolved Oxygen	pH	Conductivity @ 20°C	Temperature	Depth	Depth to Groundwater			
						Pre-Purging	Post-Purging	On Sampling	
mg/L		µg/L	°C	m	m	m	m		
Nov-04	2.7	7.2	618	11	5.10	2.25	2.28	2.17	
Sep-05	3.2	7.1		14	5.10	2.61	2.63	2.63	
Oct-06	7.0	6.0		13	5.10	1.70	1.74	1.79	
Oct-07	3.8	7.6		12	5.15	2.30	2.56	2.35	
Aug-09		7.2	979	14		1.62	1.63	1.74	
Jan-10		8.4	819						
Apr-10		8.3	707						
Jul-10		7.6	410						
Sep-10		7.2	489	18		2.88	3.57	2.90	
Dec-10		8.1	942						
Mar-11		8.3	921						
May-11		8.1	1040						
Aug-11		6.6	401						
Nov-11		7.3	740						
Jan-12		7.6	1040						
Apr-12		7.6	813						
Jul-12		7.6	849						
Nov-12		7.0	1302						
Apr-13		7.1	1150						
Sep-13		6.8	725						
Nov-13		7.0	1225						
Mar-14		7.0	1739						
May-14		6.7	2410						
Sep-14		7.2	1660						
Dec-14		6.5	2360						
Mar-15		6.9	3450						

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GTV	~	~	~	~	~	~	~	~	~
IGV	~	~	~	~	~	~	~	~	~

>GTV

>IGV

BH17

Date	Metals													
	Aluminium	Arsenic	Barium	Boron	Cadmium	Chromium	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Tin	Zinc
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	193	<1.0	90	20	<0.1	<0.01	<0.01	<2	<0.1	0.01	0.02	<1.0	<0.01	0.01
Sep-05	369	<1.0	60	<0.01	<0.1	<0.01	<0.01	<2	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01
Oct-06	418	1.7	54		0.4	<1	0.0005	<2	<0.02	20.2	2.5	<0.5	<0.5	0.02
Oct-07	187	4.7	41	40	<1	<1	0.00099	<4	<0.02	6.2	2.8	0.7	<0.5	<0.01
Aug-09	514	3.3	54	0.25		<50	<0.05		<50	6.0	<100	5	<0.01	0.05
Jan-10		2.4			<0.1	4.7			<0.01	1.1	2.2			
Apr-10		1.4			<0.1	6.5			<0.01	1.6	2.1			
Sep-10	31	2	43	<100		<50	<50		<0.05	<10	<0.10	<3	<10	0.03
Dec-10		2.4			<0.1	4.5			<0.01	1.3	2.4			
Mar-11		1.8			<0.1	7.3			<0.01	1.3	1.4			
May-11		1.6			<0.1	4.6			<0.01	1.9	2.0			
Aug-11	527	<1.0	140	<100		<50	<0.05		<0.05	<10	<0.10	<12	<10	0.09
Nov-11	<2.9	2.1	80		<0.1	6.7	<0.85	0.053	<0.01	2.5	1.6	2	2.12	27
Jan-12		1.5			<0.1	<0.22	0.902	<0.02	<0.01		1.7	2		6
Apr-12	<2.9	2.5	154	197	0.127	6.0	1.6	0.115	<0.01	0.8	7.3	9	<0.36	12
Jul-12	<2.9	8.6	155		0.171	1.7	7.0	0.087	<0.01	0.8	17.2	30	<0.36	24
Nov-12	16	0.6	174	43	0.144	<2.14	1.2	<0.02	<0.04	12.0	3.6	8	<2.8	24
Apr-13	48	0.6	172	99	0.249	<2.14	0.76	<0.02	<0.04	34.3	4.0	6	<2.8	6
Sep-13	3342	35.4	381	<4.33	0.456	6.1	57	91	<0.04	75.8	14.1	10	510	57
Nov-13	106	0.2	141	56	0.157	<2.14	12	1.6	<0.04	43.0	3.2	1	<2.8	<0.41
Mar-14	139	<0.1	154	94	<0.09	4.2	7.5	22	<0.04	<5	4.1	3	<2.8	16
May-14	19	0.9	201	90	0.267	<2.14	0.824	0.164	<0.04	82.1	3.8	4	<2.8	4
Sep-14	71	0.4	95	57	0.096	<2.14	0.773	<0.02	<0.5	147.4	1.6	9	<2.8	216
Dec-14	99	0.9	108	68	0.111	<2.14	1.1	0.107	<0.04	95.0	2.7	7	<2.8	86
Mar-15	30	0.7	83	127	0.155	<2.14	1.2	<0.02	<0.04	94.1	4.3	6	<2.8	23

GTV	150	7.5	~	750	3.75	37.5	1500	18.75	0.75	~	15	~	~	~
IGV	200	10	100	1000	5	30	30	10	1	~	~	~	~	100

>GTV

>IGV

BH17

Date	General Organics and Hydrocarbons										
	Total Organic Carbon	Oils, Fats & Grease	TPH	DRO	Mineral Oil	PRO	Benzene	Toluene	Ethyl Benzene	o-Xylene	m+p-Xylene
	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	3		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Sep-05	11		0.04	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Oct-06	3	-	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01
Oct-07	3	6	<0.01	<0.01	<0.01		<1	<1	<1	<1	<1
Aug-09	3	<2	<0.01	<0.01	<0.01	0.05	<1	<1	<1	<1	<1
Jan-10	34	<1									
Apr-10	4	<1									
Sep-10	3	3	57	15	42	<1	<1	<1	<1	<1	
Dec-10	5	<1									
Mar-11	4	<1									
May-11	5	<1									
Aug-11	4	4	17	<10	<10	<1.0	<1.0	<1.0	<1.0	<1.0	
Nov-11	<3	<1									
Jan-12	4	<1									
Apr-12	<3	<1									
Jul-12	<3	<1									
Nov-12	3	<1	<1	<1	<2.5	<5	<0.35	<0.40	<0.42	<0.33	
Apr-13	6		<1								
Sep-13	14		<1								
Nov-13	8		<1								
Mar-14	5	<1	<1	<1	<2.5		<0.35	<0.40	<0.42	<0.33	
May-14	2	<1	<1	<1	<2.5		<0.35	<0.40	<0.42	<0.33	
Sep-14	2	<1	<1	<1	<2.5		<0.35	<0.40	<0.42	<0.33	
Dec-14	2	<1	<1	<1	<2.5		<0.35	<0.40	<0.42	<0.33	
Mar-15	2	<1	<1	<1	<2.5		<0.35	<0.40	<0.42	<0.33	

GTV	~	~	~	~	~	~	0.75	~	~	~	~
IGV	NAC	~	10	-	~	~	1	10	10	10	~

>GTV

>IGV

BH17

Date	Polycyclic Aromatic Hydrocarbons																
	Total PAHs	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b)(j)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(ghi)perylene
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	<0.05																
Sep-05	<1.0																
Oct-06	<0.01																
Oct-07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aug-09	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Jan-10																	
Apr-10																	
Sep-10	<0.20																
Dec-10																	
Mar-11																	
May-11																	
Aug-11	<0.20																
Nov-11																	
Jan-12																	
Apr-12																	
Jul-12																	
Nov-12	<0.10																
Apr-13	<0.10																
Sep-13	<0.10																
Nov-13	<0.10																
Mar-14	<0.01																
May-14	<0.01																
Sep-14	<0.01																
Dec-14	<0.01																
Mar-15	<0.01																

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GTV	0.075	~	~	~	~	~	~	~	~	~	~	~	~	0.0075	~	~	~
IGV	0.1	1	~	~	~	~	10000	1	~	~	~	~	0.5	0.05	~	0.05	0.05

>GTV
>IGV

BH17

Date	General Inorganics and Major Ions												Chemical Oxygen Demand
	Nitrate	Total Ammonia as NH ₃	Total Nitrogen	Ortho-Phosphate	Calcium	Sulphate	Sodium	Potassium	Magnesium	Iron	Manganese	Chloride	
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
Nov-04										<0.03			
Sep-05										0.81			
Oct-06										0.026			
Oct-07										<0.008			
Aug-09	1.0	0.26	1	<1						0.20		31	60
Jan-10	0.1	<0.2	<1							<0.019		30	58
Apr-10	<0.0677	<0.2	<1							<0.019		41	28
Sep-10	0.7	0.10	2	<1						0.14		45	158
Dec-10	<0.0677	<0.2	<1							<0.019		40	18
Mar-11	<0.0677	1.11	<1							<0.019		61	52
May-11	<0.0677	<0.2	<1							<0.019		62	28
Aug-11	<0.5	0.12	1	<1						0.46		58	80
Nov-11	0.3	<0.2	<1		102					<0.019		57	20
Jan-12	<0.3	0.35	<1									177	10
Apr-12	0.5	0.33	4		678					0.197		1470	34
Jul-12	1.3	<0.2	<1		2080					<0.019		3880	192
Nov-12	5.3	0.46	8	<0.005	1708					0.010		3295	79
Apr-13	4.7	1.16	6	<0.005	1505	1167	1498	1251	34	0.047	3.2	5257	124
Sep-13	8.6	0.82	10	<0.005	1203	1084	1101	1179	18	20	8.2	3045	44
Nov-13	3.7	1.47	5	<0.005	1106	909	1159	1111	24	0.564	3.8	3172	35
Mar-14	3.3	1.44	5	<0.005	1080					0.486		3139	70
May-14	8.6	0.46	10	<0.005	989	688	926	984	30	0.088	3.5	4842	25
Sep-14	3.1	0.23	4	<0.005	1255	724	1591	1256	37	35	2.3	2756	<5
Dec-14	2.2	1.38	4	<0.005	843	735	914	896	20	64	2.7	2710	33
Mar-15	2.2	0.53	4	<0.005	1019	821	734	922	30	25	3.0	2570	40

GTV	37.5	0.08 - 0.21*	~	0.035	~	187.5	150	~	~	~	~	24 - 187.5	~
IGV	25.0	0.14**	~	0.03	200	200	150	5	50	0.2	0.05	30	~

>GTV

*Given as 0.065 - 0.175 mg/L as nitrogen

>IGV

**Given as 0.15 mg/L as NH₄

BH17

Date	Unstable Field Parameters								Comments
	Dissolved Oxygen	pH	Conductivity @ 20°C	Temperature	Depth	Depth to Groundwater			
						Pre-Purgig	Post-Purgig	On Sampling	
mg/L		µg/L	°C	m	m	m	m		
Nov-04	2.5	7.5	824	11	5.74	2.62	5.07	-	
Sep-05	4.1	7.3		12	5.74	3.00	5.60	4.86	
Oct-06	6.9	7.0		11	5.74	2.49	5.33	3.68	
Oct-07	2.1	7.6		12	5.74	2.81	5.67	2.72	
Aug-09		7.3	791	14		2.35	5.56	3.27	
Jan-10		8.2	858						
Apr-10		8.2	739						
Sep-10		7.7	688	18		9.55	11.57	9.55	
Dec-10		8.3	734						
Mar-11		8.3	714						
May-11		8.0	676						
Aug-11		7.1	671						
Nov-11		7.7	677						
Jan-12		7.7	1040						
Apr-12		7.6	4900						
Jul-12		7.3	10800						
Nov-12		7.3	17050						
Apr-13		6.8	16620						
Sep-13		6.8	13340						
Nov-13		6.3	13900						
Mar-14		6.4	11580						
May-14		6.6	12590						
Sep-14		7.0	11420						
Dec-14		6.5	11550						
Mar-15		7.0	9530						

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GTV	~	~	~	~	~	~	~	~	~
IGV	~	~	~	~	~	~	~	~	~

>GTV
>IGV

BH18

Date	Metals													
	Aluminium	Arsenic	Barium	Boron	Cadmium	Chromium	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Tin	Zinc
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	205	<1.0	20	30	<0.1	<0.01	<0.01	5.8	<0.1	<0.01	<0.01	<1.0	<0.01	0.03
Sep-05	296	<1.0	10	<0.01	<0.1	<0.01	<0.01	<10	<0.1	<0.01	<0.01	<0.01	<0.01	0.02
Oct-06	96	0.9	16	20	0.200	<1	0.010	<2	<0.02	0.17	1.1	<0.5	<0.5	0.02
Oct-07	93	<0.2	22	50	<1	<1	0.006	<4	<0.02	0.71	1.7	0.8	<0.5	0.02
Aug-09	138	2.0	20	0.05		<50	<0.05		<50	<1	<100	4.8	<0.01	0.03
Jan-10		0.836			<0.1	5.4			<0.01	0.59	1.55			
Apr-10		0.693			<0.1	4.4			<0.01	0.56	1.16			
Mar-11		0.759			<0.1	5.9			<0.01	0.76	2.48			
Nov-11	27	2.0	1750		0.124	0.57	5.3	1.1	0.0101	91	4.06	7.9	1.34	2.0
Jan-12		0.931			<0.1	<0.22	1.9	<0.02	<0.01		1.89	8.1		<.41
Apr-12	6	1.7	269	526	0.155	7.1	3.9	0.069	<0.01	8.01	6.24	9.6	<0.36	6.6
Jul-12	4	1.1	76		<0.1	2.0	2.9	0.037	<0.01	2.91	1.73	3.0	<0.36	0.571
Nov-12	11	0.939	116	272	<0.09	<2.14	2.5	<0.02	<0.04	10	0.789	7.6	<2.8	<0.41
Apr-13	35	0.791	126	380	<0.09	<2.14	2.7	0.102	<0.04	5.77	2.03	3.2	<2.8	<0.41
Sep-13	680	5.8	157	<4.33	0.380	<2.14	23	7.4	<0.04	<5	9.89	1.4	74	75.7
Nov-13	35	<0.10	129	92	0.428	<2.14	15	12	<0.04	<5	1832	0.6	<2.8	5.0
Dec-14														
Mar-15														

GTV	150	7.5	~	750	3.75	37.5	1500	18.75	0.75	~	15	~	~	~
IGV	200	10	100	1000	5	30	30	10	1	~	~	~	~	100

>GTV
 ≥IGV

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BH18

Date	General Organics and Hydrocarbons										
	Total Organic Carbon	Oils, Fats & Grease	TPH	DRO	Mineral Oil	PRO	Benzene	Toluene	Ethyl Benzene	o-Xylene	m+p-Xylene
	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	6		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Sep-05	4		0.12	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Oct-06	9	-	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01
Oct-07	5	5	<0.01	<0.01	<0.01		<1	<1	<1	<1	<1
Aug-09	6	9	<0.01	<0.01	<0.01	0.03	<1	<1	<1	<1	<1
Jan-10	37	<1									
Apr-10	8	<1									
Mar-11	6	<1									
Nov-11	3	<1									
Jan-12	<3	<1									
Apr-12	5	<1									
Jul-12	5	<1									
Nov-12	6	<1	<1	<1	<2.5	<5	<0.33	7	<0.42	<0.33	
Apr-13	5		475								
Sep-13	4		<1								
Nov-13	5		<1								
Dec-14											
Mar-15											

GTV	~	~	~	~	~	~	0.75	~	~	~	~
IGV	NAC	~	10	~	~	~	1	10	10	10	~

>GTV
 ≥IGV

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BH18

Date	Polycyclic Aromatic Hydrocarbons																
	Total PAHs	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b)+(j)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(ghi)perylene
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	<0.05																
Sep-05	<1.0																
Oct-06	<0.01																
Oct-07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aug-09	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Jan-10																	
Apr-10																	
Mar-11																	
Nov-11																	
Jan-12																	
Apr-12																	
Jul-12																	
Nov-12	<0.10																
Apr-13	<0.10																
Sep-13	<0.10																
Nov-13	<0.10																
Dec-14																	
Mar-15																	

GTV	0.075	~	~	~	~	~	~	~	~	~	~	~	~	0.0075	~	~	~
IGV	0.1	1	~	~	~	~	10000	~	~	~	~	0.5	0.05	~	0.05	~	0.05

>GTV
 ≥IGV

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BH18

Date	General Inorganics and Major Ions												Chemical Oxygen Demand
	Nitrate	Total Ammonia as NH ₃	Total Nitrogen	Ortho-Phosphate	Calcium	Sulphate	Sodium	Potassium	Magnesium	Iron	Manganese	Chloride	
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
Nov-04										<0.03			
Sep-05										<0.03			
Oct-06										0.02			
Oct-07										<.0080			
Aug-09	4	<0.1	1.0	<1						0.85		41	29
Jan-10	0.4	<0.2	1.1							<0.019		38	15
Apr-10	3	<0.2	2.5							<0.019		30	22
Mar-11	1	<0.2	1.6							<0.019		57	40
Nov-11	4	1.02	4.1		369					<0.019		271	42
Jan-12	5	<0.2	2.0									127	23
Apr-12	8	<0.2	2.6		256					0.53		417	17
Jul-12	2	<0.2	27		111					<0.019		99	47
Nov-12	<0.110	0.137	<1.00	<0.005	196					0.01		208	16
Apr-13	0.8	<0.01	1.9	<0.005	202	95	114	55	30	0.03	0.01	274	6
Sep-13	1	0.012	1.9	<0.005	197	150	84	27	20	1.64	1.54	735	13
Nov-13	1	0.015	1.9	<0.005	246	96	142	66	24	0.08	0.50	316	<5
Dec-14													
Mar-15													

GTV	37.5	0.08 - 0.21*	~	0.035	~	187.5	150	~	~	~	~	24 - 187.5	~
IGV	25.0	0.14**	~	0.03	200	200	150	5	50	0.2	0.05	30	~

>GTV

*Given as 0.065 - 0.175 mg/L as nitrogen

≥IGV

**Given as 0.15 mg/L as NH₄

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BH18

Date	Unstable Field Parameters								Comments
	Dissolved Oxygen	pH	Conductivity @ 20°C	Temperature	Depth	Depth to Groundwater			
						Pre-Purgig	Post-Purgig	On Sampling	
mg/L		µg/L	°C	m	m	m	m		
Nov-04	4.3	7.3	535	12	7.84	1.92	6.35	1.75	
Sep-05	3.2	7.4		15	7.84	2.23	3.25	2.35	
Oct-06	3.0	6.0		13	7.84	1.83	4.79	1.84	
Oct-07	2.7	7.6		12	3.58	2.23	2.9	2.21	
Aug-09		7.1	444	14		1.76	3.21	1.79	
Jan-10		8.5	398						
Apr-10		8.2	344						
Mar-11		8.4	520						
Nov-11		11.8	3470						
Jan-12		8.1	984						
Apr-12		7.7	1870						
Jul-12		7.7	741						
Nov-12		7.3	1050						
Apr-13		7.1	1229						
Sep-13		6.9	2320						
Nov-13		7.0	1283						
Dec-14									Not accessible
Mar-15									Not accessible

GTV	~	~	~	~	~	~	~	~	~
IGV	~	~	~	~	~	~	~	~	~

>GTV
 ≥IGV

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BH19

Date	Metals													
	Aluminium	Arsenic	Barium	Boron	Cadmium	Chromium	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Tin	Zinc
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	369	<1.0	150	60	<0.1	<0.01	0.01	<2	<0.1	<0.01	<0.01	<1.0	<0.01	<0.01
Sep-05	4178	<1.0	160	240	<0.1	<0.01	<0.01	8	<0.1	<0.01	<0.01	<1.0	<0.01	0.02
Oct-06	1742	1.1	157	30	0.2	<10	0.00053	6	<0.02	1.25	0.9	<0.5	<0.5	<0.01
Oct-07	173	0.8	154	50	<1	<2	0.00094	<4	<0.02	1.02	0.6	<0.5	<0.5	<0.01
Aug-09	137	2.5	170	0.15		<50	<0.05		<50	<1	<100	3.5	<0.01	0.04
Jan-10		0.6			<0.1	3.6			<0.01	1.31	0.7			
Apr-10		0.9			0.115	5.5			<0.01	6	0.9			
Sep-10	143	1.0	110	<100		<50	<50		<0.05	<10	<0.10	<3	<10	<0.01
Dec-10		0.6			<0.1	2.7			<0.01	1.13	0.9			
Mar-11		0.7			<0.1	6.4			<0.01	0.755	0.7			
May-11		0.7			<0.1	4.1			<0.01	1.14	0.7			
Aug-11	356	<1.0	160	<100		<50	<0.05		<0.05	<10	<0.10	<12	<10	0.01
Nov-11	<2.9	0.7	108		<0.1	4.3	3.9	0.02	0.0105	1.61	0.5	1.6	0.917	0.72
Jan-12		0.3			<0.1	<0.22	3.0	<0.02	<0.01		0.5	0.8		0.60
Apr-12	<2.9	0.6	176	45	<0.1	4.9	1.9	0.04	<0.01	0.881	0.8	0.9	<0.36	0.60
Jul-12	<2.9	0.5	122		<0.1	1.4	4.5	0.026	<0.01	0.939	0.8	1.0	<0.36	0.65
Nov-12	455	0.5	93	46	<0.09	<2.14	5.8	0.143	<0.04	<5	0.5	<0.47	<2.8	<0.41
Apr-13	279	0.6	355	72	<0.09	<2.14	2.3	0.191	<0.04	<5	0.4	0.8	<2.8	<0.41
Sep-13	2838	5.6	1065	<4.33	0.53	<2.14	35.8	39	<0.04	<5	8.7	1.1	68	43
Nov-13	342	<0.10	119	45	<0.09	12.5	18.2	1.5	<0.04	<5	<0.14	<0.47	<2.8	<0.41
Mar-14	970	1.1	107	77	<0.09	3.7	15.1	51	<0.04	<5	3.0	0.5	<2.8	12
May-14	20	0.5	455	106	<0.09	<2.14	2.1	0.046	<0.04	<5	0.7	<0.47	<2.8	<0.41
Sep-14	115	0.9	184	8	<0.09	<2.14	2.1	<0.02	<0.5	<5	0.8	1.4	<2.8	202
Dec-14	932	0.9	305	102	<0.09	<2.14	2.9	0.208	<0.04	<5	0.6	18.5	<2.8	1.1
Mar-15	22	0.4	131	399	<0.09	<2.14	2.5	<0.02	<0.04	<5	0.4	10.4	<2.8	<0.41

GTV	150	7.5	~	750	3.75	37.5	1500	18.75	0.75	~	15	~	~	~
IGV	200	10	100	1000	5	30	30	10	1	~	~	~	~	100

>GTV
>IGV

BH19

Date	General Organics and Hydrocarbons										
	Total Organic Carbon	Oils, Fats & Grease	TPH	DRO	Mineral Oil	PRO	Benzene	Toluene	Ethyl Benzene	o-Xylene	m+p-Xylene
	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	4.6		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Sep-05	3.0		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Oct-06	3.5		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01
Oct-07	3.1	2	<0.01	<0.01	<0.01		<1	<1	<1	<1	<1
Aug-09	2.6	<2	0	0.01	0.03	0.04	<1	<1	<1	<1	<1
Jan-10	7.2	<1									
Apr-10	5.2	<1									
Sep-10	2.2	4	<10	<10	<10	<1	<1	<1	<1	<1	
Dec-10	7.2	<1									
Mar-11	3.2	<1									
May-11	4.2	<1									
Aug-11	3.9	<2	14	<10	<10	<1.0	<1.0	<1.0	<1.0	<1.0	
Nov-11	7.6	<1									
Jan-12	6.1	<1									
Apr-12	3.9	<1									
Jul-12	4.7	<1									
Nov-12	7.2	<1	<1	<1	<2.5	5	<0.35	4.951	<0.42	<0.33	
Apr-13	3.8		<1								
Sep-13	4.9		<1								
Nov-13	7.2		<1								
Mar-14	8.2	<1	<1	<1	<2.5		<0.35	<0.40	<0.42	<0.33	
May-14	3.2	<1	265	159	3		<0.35	<0.40	<0.42	<0.33	
Sep-14	2.8	<1	<1	<1	<2.5		<0.35	<0.40	<0.42	<0.33	
Dec-14	5.5	<1	<1	<1	<2.5		<0.35	<0.40	<0.42	<0.33	
Mar-15	2.8	<1	<1	<1	<2.5		<0.35	<0.40	<0.42	<0.33	

GTV	~	~	~	~	~	~	0.75	~	~	~	~
IGV	NAC	~	10	~	~	~	1	10	10	10	~

>GTV

>IGV

BH19

Date	Polycyclic Aromatic Hydrocarbons																
	Total PAHs	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b)(j)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(ghi)perylene
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	<0.05																
Sep-05	<0.05																
Oct-06	<0.01																
Oct-07	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aug-09	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Jan-10																	
Apr-10																	
Sep-10	<0.20																
Dec-10																	
Mar-11																	
May-11																	
Aug-11	1.3																
Nov-11																	
Jan-12																	
Apr-12																	
Jul-12																	
Nov-12	<0.10																
Apr-13	<0.10																
Sep-13	<0.10																
Nov-13	<0.10																
Mar-14	<0.01																
May-14	<0.01																
Sep-14	<0.01																
Dec-14	<0.01																
Mar-15	<0.01																

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GTV	0.075	~	~	~	~	~	~	~	~	~	~	~	~	0.0075	~	~	~
IGV	0.1	1	~	~	~	~	10000	1	~	~	~	~	0.5	0.05	~	0.05	0.05

>GTV

>IGV

BH19

Date	General Inorganics and Major Ions												Chemical Oxygen Demand
	Nitrate	Total Ammonia as NH ₃	Total Nitrogen	Ortho-Phosphate	Calcium	Sulphate	Sodium	Potassium	Magnesium	Iron	Manganese	Chloride	
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
Nov-04										<0.03			
Sep-05										<0.03			
Oct-06										0.036			
Oct-07										<0.008			
Aug-09	0.7	0.15	<1	<1						0.740		54	110
Jan-10	0.5	<0.2	1.3							<0.019		29	61
Apr-10	0.6	<0.2	<1							<0.019		39	26
Sep-10	0.7	0.1	1.0	<1						0.090		59	64
Dec-10	1.1	<0.2	1.1							<0.019		26	68
Mar-11	0.6	<0.2	<1							<0.019		48	26
May-11	0.4	<0.2	<1							<0.019		51	13
Aug-11	1.0	<0.1	<1	<1						0.080		60	48
Nov-11	2.4	<0.2	1.2		51					<0.019		45	19
Jan-12	8.0	<0.2	2.3									57	18
Apr-12	6.2	<0.2	1.8		73					0.045		92	10
Jul-12	2.9	<0.2	2.2		58					<0.019		34	32
Nov-12	1.5	0.066	2.0	<0.005	46					0.156		34	19
Apr-13	1.4	<0.01	2.5	0.009	116	125	7	9	27	0.160	0.003	207	<5
Sep-13	<0.110	<0.01	<1.00	<0.005	72	35	35	6	17	17	3.378	82	7
Nov-13	0.7	<0.01	1.3	<0.005	45	61	24	4	10	0.359	0.021	36	<5
Mar-14	1.9	0.276	2.5	0.006	49					0.751		84	8
May-14	1.8	<0.01	2.4	0.005	165	70	97	13	30	0.021	0.002	399	24
Sep-14	<0.110	0.011	<1.00	<0.005	104	36	73	14	22	675	0.011	77	<5
Dec-14	0.5	<0.01	1.3	<0.005	92	320	106	0.6	15	239	0.009	46	<5
Mar-15	0.7	<0.01	<1.00	<0.005	293	514	90	14	54	69	0.003	105	7

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GTV	37.5	0.08 - 0.21*	~	0.035	~	187.5	150	~	~	~	~	24 - 187.5	~
IGV	25.0	0.14**	~	0.03	200	200	150	5	50	0.2	0.05	30	~

>GTV *Given as 0.065 - 0.175 mg/L as nitrogen
>IGV **Given as 0.15 mg/L as NH₄

BH19

Date	Unstable Field Parameters								Comments
	Dissolved Oxygen	pH	Conductivity @ 20°C	Temperature	Depth	Depth to Groundwater			
						Pre-Purgig	Post-Purgig	On Sampling	
	mg/L		µg/L	°C	m	m	m	m	
Nov-04	3.3	7.6	414	11	9.64	4.54	7.03	6.36	
Sep-05	2.3	7.7		12	9.64	4.85	8.44	7.66	
Oct-06	4.5	7.0		11	9.64	4.30	8.23	8.20	
Oct-07	2.6	7.9		11	9.58	4.66	8.98	6.20	
Aug-09		7.5	484	13		3.94	9.48	5.93	
Jan-10		8.4	281						
Apr-10		8.4	396						
Sep-10		8.0	505	18		5.19	9.49	6.48	
Dec-10		8.3	333						
Mar-11		8.5	427						
May-11		8.3	468						
Aug-11		7.6	538						
Nov-11		8.0	416						
Jan-12		7.9	421						
Apr-12		8.0	596						
Jul-12		8.0	427						
Nov-12		7.3	355						
Apr-13		7.5	922						
Sep-13		7.4	517						
Nov-13		7.7	376						
Mar-14		7.6	446						
May-14		7.4	1444						
Sep-14		7.7	591						
Dec-14		7.3	1015						
Mar-15		7.5	1351						

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GTV	~	~	~	~	~	~	~	~	~
IGV	~	~	~	~	~	~	~	~	~

>GTV
>IGV

BH20

Date	Metals													
	Aluminium	Arsenic	Barium	Boron	Cadmium	Chromium	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Tin	Zinc
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	1499	<1.0	100	10	<0.1	<0.01	<0.01	<2	<0.1	<0.01	<0.01	<1.0	<0.01	0.02
Sep-05	700	<1.0	110	660	<0.1	<0.01	<0.01	<2	<0.1	<0.01	<0.01	<1.0	<0.01	<0.01
Dec-14														

GTV	150	7.5	~	750	3.75	37.5	1500	18.75	0.75	~	15	~	~	~
IGV	200	10	100	1000	5	30	30	10	1	~	~	~	~	100

>GTV
>IGV

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BH20

Date	General Organics and Hydrocarbons										
	Total Organic Carbon	Oils, Fats & Grease	TPH	DRO	Mineral Oil	PRO	Benzene	Toluene	Ethyl Benzene	o-Xylene	m+p-Xylene
	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	2.5		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Sep-05	1.9		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Dec-14											

GTV	~	~	~	~	~	~	0.75	~	~	~	~
IGV	NAC	~	10	~	~	~	1	10	10	10	~

>GTV
>IGV

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BH20

Date	Polycyclic Aromatic Hydrocarbons																	
	Total PAHs	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b)+(j)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(ghi)perylene	
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	
Nov-04	<0.05																	
Sep-05	<0.05																	
Dec-14																		

GTV	0.075	~	~	~	~	~	~	~	~	~	~	~	~	0.0075	~	~	~	~
IGV	0.1	1	~	~	~	~	10000	1	~	~	~	0.5	0.05	~	0.05	~	0.05	0.05

>GTV
>IGV

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BH20

Date	General Inorganics and Major Ions												
	Nitrate	Total Ammonia as NH ₃	Total Nitrogen	Ortho-Phosphate	Calcium	Sulphate	Sodium	Potassium	Magnesium	Iron	Manganese	Chloride	Chemical Oxygen Demand
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Nov-04										0.06			
Sep-05										<0.03			
Dec-14													

GTV	37.5	0.08 - 0.21*	~	0.035	~	187.5	150	~	~	~	~	24 - 187.5	~
IGV	25.0	0.14**	~	0.03	200	200	150	5	50	0.2	0.05	30	~

>GTV

*Given as 0.065 - 0.175 mg/L as nitrogen

>IGV

**Given as 0.15 mg/L as NH₄

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BH20

Date	Unstable Field Parameters								Comments
	Dissolved Oxygen	pH	Conductivity @ 20°C	Temperature	Depth	Depth to Groundwater			
						Pre-Purging	Post-Purging	On Sampling	
	mg/L		µg/L	°C	m	m	m	m	
Nov-04	4.4	7.8	452	12	9.50	3.59	6.44	3.84	
Sep-05	4.0	7.3		12	9.50	7.55	8.68	7.58	
Dec-14									Not accessible

GTV	~	~	~	~	~	~	~	~	~
IGV	~	~	~	~	~	~	~	~	~

>GTV
>IGV

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BH21

Date	Metals													
	Aluminium	Arsenic	Barium	Boron	Cadmium	Chromium	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Tin	Zinc
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	243	1.5	20	100	0.14	<0.01	<0.01	<2	<0.1	<0.01	0.01	<1.0	<0.01	0.03
Sep-05	1057	<1.0	10	<0.01	<0.1	<0.01	<0.01	<4	<0.1	<0.01	<0.01	<0.01	<0.01	0.03
Oct-06	461	1.5	21	140	0.2	<1	0.00091	2	<0.02	<0.07	2.7	0.9	<0.5	<0.01
Oct-07	6580	0.5	22	190	<1	3	0.00264	5	0.02	0.25	2.4	1.3	<0.5	0.03
Aug-09	568	2.3	34	0.2		<50	<0.05		<50	<1	<100	7.0	<0.01	0.04
Sep-10	211	<1	31	380		<50	<50		<0.05	<10	<0.10	<3	<10	<0.01
Aug-11	121	<1.0	27	580		<50	<0.05		<0.05	<10	<0.10	<12	<10	<0.01
Nov-12	32	0.273	70	416	<0.09	<2.14	1.315	<0.02	0.053	<5	3.2	1.3	<2.8	6.72
Nov-13	69	<0.10	68	339	0.117	22	10.61	1.2	<0.04	<5	3.0	<0.47	<2.8	<0.41
Dec-14														

GTV	150	7.5	~	750	3.75	37.5	1500	18.75	0.75	~	15	~	~	~
IGV	200	10	100	1000	5	30	30	10	1	~	~	~	~	100

>GTV
 ≥IGV

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BH21

Date	General Organics and Hydrocarbons										
	Total Organic Carbon	Oils, Fats & Grease	TPH	DRO	Mineral Oil	PRO	Benzene	Toluene	Ethyl Benzene	o-Xylene	m+p-Xylene
	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	8.3		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Sep-05	4.6		0.04	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Oct-06	5.5	-	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01
Oct-07	5.3	8	<0.01	<0.01	<0.01		<1	<1	<1	<1	<1
Aug-09	4.2	2	<0.01	<0.01	<0.01	0.04	<1	<1	<1	<1	<1
Sep-10	4.9	<2	43	18	25	<1	<1	<1	<1	<1	
Aug-11	5.0	<2	13	<10	<10	<1.0	<1.0	<1.0	<1.0	<1.0	
Nov-12	9.1	<1	464	52	371	<5	<0.35	45	<0.42	2	
Nov-13	5.9		<1								
Dec-14											

GTV	~	~	~	~	~	~	0.75	~	~	~	~
IGV	NAC	~	10	~	~	~	1	10	10	10	~

>GTV

≥IGV

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BH21

Date	Polycyclic Aromatic Hydrocarbons																
	Total PAHs	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b)(j)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(ghi)perylene
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	<0.05																
Sep-05	<1.0																
Oct-06	<0.01																
Oct-07	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Aug-09	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sep-10	<0.20																
Aug-11	<0.20																
Nov-12	<0.10																
Nov-13	<0.10																
Dec-14																	

GTV	0.075	~	~	~	~	~	~	~	~	~	~	~	~	0.0075	~	~	~
IGV	0.1	1	~	~	~	~	10000	1	~	~	~	0.5	0.05	~	0.05	~	0.05

>GTV
>IGV

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BH21

Date	General Inorganics and Major Ions												
	Nitrate	Total Ammonia as NH ₃	Total Nitrogen	Ortho-Phosphate	Calcium	Sulphate	Sodium	Potassium	Magnesium	Iron	Manganese	Chloride	Chemical Oxygen Demand
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Nov-04										<0.03			
Sep-05										<0.03			
Oct-06										0.04			
Oct-07										0.07			
Aug-09	2.0	2	6	<1						0.74		108	200
Sep-10	3.0	5	7	<1						1.20		64	1220
Aug-11	1.0	4	4	<1						6.10		120	53
Nov-12	0.3	5	5	<0.005	257					0.06		373	10
Nov-13	1.8	2	4	<0.005	249	362	101	10	47	0.35	6.16	477	<5
Dec-14													

GTV	37.5	0.08 - 0.21*	~	0.035	~	187.5	150		~	~	~	24 - 187.5	~
IGV	25.0	0.14**	~	0.03	200	200	150	5	50	0.2	0.05	30	~

>GTV

*Given as 0.065 - 0.175 mg/L as nitrogen

>IGV

**Given as 0.15 mg/L as NH₄

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BH21

Date	Unstable Field Parameters								Comments
	Dissolved Oxygen	pH	Conductivity @ 20°C	Temperature	Depth	Depth to Groundwater			
						Pre-Purgig	Post-Purgig	On Sampling	
	mg/L		µg/L	°C	m	m	m	m	
Nov-04	2.0	6.5	972	12	4.67	3.98	3.97	3.97	
Sep-05	1.3	6.6		14	4.67	4.32	4.32	4.32	
Oct-06	2.0	6.0		13	4.67	3.96	4.09	3.97	
Oct-07	1.1	7.0		12	4.73	4.21	4.70	4.43	
Aug-09		6.6	980	13		4.15	4.70	4.28	
Sep-10		7.1	1176	17		4.21	4.64	4.22	
Aug-11		6.4	1528						
Nov-12		6.2	2100						
Nov-13		6.5	1968						
Dec-14									Well blocked

GTV	~	~	~	~	~	~	~	~	~
IGV	~	~	~	~	~	~	~	~	~

>GTV

≥IGV

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BH22

Date	Metals													
	Aluminium	Arsenic	Barium	Boron	Cadmium	Chromium	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Tin	Zinc
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Sep-05														
Oct-06	80	66	16	2950	8	<1	0.0045	67	<0.02	8	2	0.9	<0.5	0.03
Oct-07	<10	12	16	3270	11	<1	0.00327	84	<0.02	7	4	22	0.7	0.03
Jan-08	<8.0	<2.0*	13	2400	<0.03	<50	<0.05	<0.20	<0.2*	6	0.1	5	0.6	0.02
Aug-09	73	100	14	3		<50	<0.05		<50	11	<100	<0.5	<0.01	0
Sep-10	14	<1	12	3400		<50	<50		<0.05	<10	<0.10	<3	<10	<0.01
Aug-11	16	<1.0	7	4400		<50	<0.05		<0.05	<10	<0.10	<12	<10	<0.01
Nov-12	22	1.8	13	1009	<0.09	<2.14	1.5	0.119	0.116	7	0.526	<0.47	7	5
Nov-13	70	0.3	14	1496	<0.09	<2.14	7.8	0.406	<0.04	<5	<0.14	<0.47	8	<0.41
Sep-14	78	1.6	17	3331	<0.09	<2.14	0.584	<0.02	1.2	22	0.323	7	<2.8	184

GTV	150	7.5	~	750	3.75	37.5	1500	18.75	0.75	~	15	~	~	~
IGV	200	10	100	1000	5	30	30	10	1	~	~	~	~	100

>GTV
 ≥IGV

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BH22

Date	General Organics and Hydrocarbons										
	Total Organic Carbon	Oils, Fats & Grease	TPH	DRO	Mineral Oil	PRO	Benzene	Toluene	Ethyl Benzene	o-Xylene	m+p-Xylene
	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Sep-05											
Oct-06	0.4	-	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01
Oct-07	0.5	2	<0.01	<0.01	<0.01		<1	<1	<1	<1	<1
Jan-08			<0.01								
Aug-09	0.5	<2	<0.01	<0.01	0.02	0	<1	0	<1	<1	<1
Sep-10	0.4	6	<10	<10	<10	<1	<1	<1	<1	<1	
Aug-11	0.8	<2	<10	<10	<10	<1.0	<1.0	<1.0	<1.0	<1.0	
Nov-12	8.9	<1	<1	<1	<2.5	<5	<0.35	<0.40	<0.42	<0.33	
Nov-13	13.8		<1								
Sep-14	2.3	<1	<1	<1	<2.5		<0.35	<0.40	<0.42	<0.33	

GTV	~	~	~	~	~	~	0.75	~	~	~	~
IGV	NAC	~	10	~	~	~	1	10	10	10	~

>GTV

≥IGV

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BH22

Date	Polycyclic Aromatic Hydrocarbons																
	Total PAHs	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b)(j)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(ghi)perylene
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Sep-05																	
Oct-06	<0.01																
Oct-07	<0.2*	<0.2*	<0.2*	<0.2*	<0.2*	<0.2*	<0.2*	<0.2*	<0.2*	<0.1*	<0.1*	<0.1*	<0.1*	<0.1*	<0.1*	<0.1*	<0.1*
Jan-08																	
Aug-09	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01
Sep-10	<0.20																
Aug-11	<0.20																
Nov-12	<0.10																
Nov-13	<0.10																
Sep-14	<0.01																

GTV	0.075	~	~	~	~	~	~	~	~	~	~	~	~	0.0075	~	~	~
IGV	0.1	1	~	~	~	~	10000	1	~	~	~	0.5	0.05	~	0.05	~	0.05

>GTV
>IGV

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BH22

General Inorganics and Major Ions													
Date	Nitrate	Total Ammonia as NH ₃	Total Nitrogen	Ortho-Phosphate	Calcium	Sulphate	Sodium	Potassium	Magnesium	Iron	Manganese	Chloride	Chemical Oxygen Demand
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Sep-05													
Oct-06										0.055			
Oct-07										<0.008			
Jan-08	6	<0.1	1	<5						0.17			
Aug-09	18	<0.1	4							0.08		16676	220
Sep-10	<5	<0.1	1	<5						<0.05		18485	290
Aug-11	<2.5	<0.1	1	<5						<0.05		21382	80
Nov-12	0.4	0.3	3	0.014	306					0.010		13195	1152
Nov-13	0.1	0.3	<1.00	0.014	91	1943	164	33	50	0.177	0.002	10899	40
Sep-14	0.2	0.4	1	0.014	444	2466	14362	776	659	13.9	0.001	12235	2082

GTV	37.5	0.08 - 0.21*	~	0.035	~	187.5	150		~	~	~	24 - 187.5	~
IGV	25.0	0.14**	~	0.03	200	200	150	5	50	0.2	0.05	30	~

>GTV

*Given as 0.065 - 0.175 mg/L as nitrogen

>IGV

**Given as 0.15 mg/L as NH₄

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BH22

Date	Unstable Field Parameters								Comments
	Dissolved Oxygen	pH	Conductivity @ 20°C	Temperature	Depth	Depth to Groundwater			
						Pre-Purgig	Post-Purgig	On Sampling	
	mg/L		µg/L	°C	m	m	m	m	
Sep-05									Dry
Oct-06	5.1	7.0		16	8.05	7.65	8.05	7.46	
Oct-07	5.2	7.8		16	8.58	4.57	4.70	7.52	
Jan-08		7.9			5.85	4.21	4.91	7.57	
Aug-09		6.5	38000	13		4.18	7.14	4.04	
Sep-10		8.3	44500	17		6.62	7.07	4.21	
Aug-11		8.1	44200						
Nov-12		7.5	33400						
Nov-13		7.7	34900						
Sep-14		7.6	43300						

GTV	~	~	~	~	~	~	~	~	~
IGV	~	~	~	~	~	~	~	~	~

>GTV

≥IGV

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BH23

Date	Metals													
	Aluminium	Arsenic	Barium	Boron	Cadmium	Chromium	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Tin	Zinc
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	532	<1.0	10	2810	7	<0.01	0.02	<50	<0.1	<0.01	<0.01	<1.0	<0.01	0.03
Sep-05														
Oct-06	14	68	14	3070	8	<1	0.00481	70	<0.02	9	2.2	0.8	<0.5	0.03
Oct-07	129	20	20	3480	12	<1	0.00486	167	<0.02	8	4.1	52	<0.5	0.03
Jan-08	<8.0	<2.0*	19	2460	<0.03	<50	<0.05	<0.20	<0.2	6	0.12	18	<0.5	0.03
Aug-09	86	110	12	3		<50	<0.05		<50	12	<100	<0.5	<0.01	0
Sep-10	20	1.0	9	3900		<50	<50		<0.05	<10	<0.10	<3	<10	<0.01
Aug-11	<10	1.2	6	4700		<50	<0.05		<0.05	<10	<0.10	<12	<10	<0.01
Nov-12	14	1.6	11	287	<0.09	<2.14	1.8	<0.02	<0.04	7	0.993	1.93	<2.8	<0.41
Nov-13	15	0.72	10	2380	<0.09	<2.14	9.1	<0.02	<0.04	<5	<0.14	<0.47	6.27	<0.41
Dec-14	110	1.5	13	1701	<0.09	<2.14	0.879	<0.02	<0.04	14	0.485	<0.47	<2.8	0.873

GTV	150	7.5	~	750	3.75	37.5	1500	18.75	0.75	~	15	~	~	~
IGV	200	10	100	1000	5	30	30	30	1	~	~	~	~	100

>GTV
>IGV

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BH23

Date	General Organics and Hydrocarbons										
	Total Organic Carbon	Oils, Fats & Grease	TPH	DRO	Mineral Oil	PRO	Benzene	Toluene	Ethyl Benzene	o-Xylene	m+p-Xylene
	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	0.5		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Sep-05											
Oct-06	0.6	-	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01
Oct-07	0.6	7	<0.01	<0.01	<0.01		<1	<1	<1	<1	<1
Jan-08			<0.01								
Aug-09	0.8	<2	<0.01	<0.01	<0.01	0	<1	0	<1	<1	<1
Sep-10	0.4	5	<10	<10	<10	<1	<1	<1	<1	<1	
Aug-11	0.9	<2	<10	<10	<10	<1.0	<1.0	<1.0	<1.0	<1.0	
Nov-12	6.8	<1	<1	<1	<2.5	<5	<0.35	<0.40	<0.42	<0.33	
Nov-13	1.4		<1								
Dec-14	3.1	<1	<1	<1	<2.5		<0.35	<0.40	<0.42	<0.33	

GTV	~	~	~	~	~	~	0.75	~	~	~	~
IGV	NAC	~	10	~	~	~	1	10	10	10	~

>GTV
>IGV

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BH23

Date	Polycyclic Aromatic Hydrocarbons																
	Total PAHs	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b)+(j)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(ghi)perylene
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	<0.05																
Sep-05																	
Oct-06	<0.01																
Oct-07	0.07	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Jan-08																	
Aug-09	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sep-10	<0.20																
Aug-11	<0.20																
Nov-12	<0.10																
Nov-13	<0.10																
Dec-14	<0.01																

GTV	0.075	~	~	~	~	~	~	~	~	~	~	~	~	~	0.0075	~	~	~	
IGV	0.1	1	~	~	~	~	~	10000	1	~	~	~	~	0.5	0.05	~	0.05	~	0.05

>GTV
>IGV

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BH23

Date	General Inorganics and Major Ions												
	Nitrate	Total Ammonia as NH ₃	Total Nitrogen	Ortho-Phosphate	Calcium	Sulphate	Sodium	Potassium	Magnesium	Iron	Manganese	Chloride	Chemical Oxygen Demand
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Nov-04										<0.03			
Sep-05													
Oct-06										<0.008			
Oct-07										<0.008			
Jan-08	6	<0.1	<3	<5						0.41			
Aug-09	19	<0.1	4							0.09		16333	170
Sep-10	<5	<0.1	<4	<5						<0.05		18816	280
Aug-11	<2.5	<0.1	<1	<5						<0.05		21343	80
Nov-12	<0.110	0.489	1	0.011	380					0.0053		15228	1134
Nov-13	<0.110	0.355	<1.00	0.012	292	2139	7446	247	949	0.0682	0.002	11242	20
Dec-14	0.43	0.262	2	0.02	362	1842	8469	334	992	32	0.004	1241	190

GTV	37.5	0.08 - 0.21*	~	0.035	~	187.5	150	~	~	~	~	24 - 187.5	~
IGV	25.0	0.14**	~	0.03	200	200	150	5	50	0.2	0.05	30	~

>GTV

*Given as 0.065 - 0.175 mg/L as nitrogen

>IGV

**Given as 0.15 mg/L as NH₄

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BH23

Date	Unstable Field Parameters								Comments
	Dissolved Oxygen	pH	Conductivity @ 20°C	Temperature	Depth	Depth to Groundwater			
						Pre-Purgig	Post-Purgig	On Sampling	
	mg/L		µg/L	°C	m	m	m	m	
Nov-04	7.4	7.7	38100	12	8.30	4.62	6.08	4.90	
Sep-05									Dry
Oct-06	4.8	7.0		16	8.30	7.63	8.38	6.21	
Oct-07	4.4	8.0		15	8.24	4.42	4.60	7.42	
Jan-08		7.9			8.24	4.32	4.58	7.32	
Aug-09		7.9	38900	14		4.68	5.25	4.38	
Sep-10		8.4	45300	17		5.65	6.91	4.85	
Aug-11		8.1	44600						
Nov-12		7.4	35500						
Nov-13		7.8	36500						
Dec-14		7.4	35400						

GTV	~	~	~	~	~	~	~	~	~
IGV	~	~	~	~	~	~	~	~	~

>GTV
>IGV

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BH24

Date	Metals													
	Aluminium	Arsenic	Barium	Boron	Cadmium	Chromium	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Tin	Zinc
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Sep-05														
Dec-14														

GTV	150	7.5	~	750	3.75	37.5	1500	18.75	0.75	~	15	~	~	~
IGV	200	10	100	1000	5	30	30	10	1	~	~	~	~	100

>GTV
 ≥IGV

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BH24

Date	General Organics and Hydrocarbons										
	Total Organic Carbon	Oils, Fats & Grease	TPH	DRO	Mineral Oil	PRO	Benzene	Toluene	Ethyl Benzene	o-Xylene	m+p-Xylene
	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Sep-05											
Dec-14											

GTV	~	~	~	~	~	~	0.75	~	~	~	~
IGV	NAC	~	10	~	~	~	1	10	10	10	~

>GTV

≥IGV

For inspection purposes only.
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BH24

Date	Polycyclic Aromatic Hydrocarbons																	
	Total PAHs	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b)(j)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(ghi)perylene	
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	
Sep-05																		
Dec-14																		

GTV	0.075	~	~	~	~	~	~	~	~	~	~	~	~	0.0075	~	~	~
IGV	0.1	1	~	~	~	~	10000	1	~	~	~	0.5	0.05	~	0.05	~	0.05

>GTV
>IGV

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BH24

Date	General Inorganics and Major Ions												
	Nitrate	Total Ammonia as NH ₃	Total Nitrogen	Ortho-Phosphate	Calcium	Sulphate	Sodium	Potassium	Magnesium	Iron	Manganese	Chloride	Chemical Oxygen Demand
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Sep-05													
Dec-14													

GTV	37.5	0.08 - 0.21*	~	0.035	~	187.5	150	~	~	~	~	24 - 187.5	~
IGV	25.0	0.14**	~	0.03	200	200	150	5	50	0.2	0.05	30	~

>GTV

*Given as 0.065 - 0.175 mg/L as nitrogen

>IGV

**Given as 0.15 mg/L as NH₄

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BH24

Date	Unstable Field Parameters								Comments
	Dissolved Oxygen	pH	Conductivity @ 20°C	Temperature	Depth	Depth to Groundwater			
						Pre-Purging	Post-Purging	On Sampling	
mg/L		µg/L	°C	m	m	m	m		
Sep-05									Dry
Dec-14									Well damaged

GTV	~	~	~	~	~	~	~	~	~
IGV	~	~	~	~	~	~	~	~	~

>GTV
 ≥IGV

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BH25

Date	Metals													
	Aluminium	Arsenic	Barium	Boron	Cadmium	Chromium	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Tin	Zinc
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Sep-05														
Oct-07														
Sep-10	16	<1	12	4100		<50	<50		<0.05	<10	<0.10	<3	<10	<0.01
Aug-11	253	<1.0	10	4600		<50	<0.05		<0.05	<10	<0.10	<12	<10	<0.01
Dec-14														

GTV	150	7.5	~	750	3.75	37.5	1500	18.75	0.75	~	15	~	~	~
IGV	200	10	100	1000	5	30	30	10	1	~	~	~	~	100

>GTV
>IGV

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BH25

Date	General Organics and Hydrocarbons										
	Total Organic Carbon	Oils, Fats & Grease	TPH	DRO	Mineral Oil	PRO	Benzene	Toluene	Ethyl Benzene	o-Xylene	m+p-Xylene
	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Sep-05											
Oct-07											
Sep-10	0.27	2	<10	<10	<10	<1	<1	<1	<1	<1	
Aug-11	0.78	<2	<10	<10	<10	<1.0	<1.0	<1.0	<1.0	<1.0	
Dec-14											

GTV	~	~	~	~	~	~	0.75	~	~	~	~
IGV	NAC	~	10	~	~	~	1	10	10	10	

>GTV
 ≥IGV

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BH25

Date	Polycyclic Aromatic Hydrocarbons																	
	Total PAHs	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b)(j)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(ghi)perylene	
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	
Sep-05																		
Oct-07																		
Sep-10	<0.20																	
Aug-11	<0.20																	
Dec-14																		

GTV	0.075	~	~	~	~	~	~	~	~	~	~	~	~	0.0075	~	~	~
IGV	0.1	1	~	~	~	~	10000	1	~	~	~	0.5	0.05	~	0.05	~	0.05

>GTV
>IGV

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BH25

General Inorganics and Major Ions													
Date	Nitrate	Total Ammonia as NH ₃	Total Nitrogen	Ortho-Phosphate	Calcium	Sulphate	Sodium	Potassium	Magnesium	Iron	Manganese	Chloride	Chemical Oxygen Demand
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Sep-05													
Oct-07													
Sep-10	<5	<0.1	<3	<5						<0.05		17807	250
Aug-11	<2.5	<0.1	3	<5						0.23		20546	70
Dec-14													

GTV	37.5	0.08 - 0.21*	~	0.035	~	187.5	150	~	~	~	~	24 - 187.5	~
IGV	25.0	0.14**	~	0.03	200	200	150	5	50	0.2	0.05	30	~

>GTV

*Given as 0.065 - 0.175 mg/L as nitrogen

>IGV

**Given as 0.15 mg/L as NH₄

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BH25

Date	Unstable Field Parameters								Comments
	Dissolved Oxygen	pH	Conductivity @ 20°C	Temperature	Depth	Depth to Groundwater			
						Pre-Purgig	Post-Purgig	On Sampling	
mg/L		µg/L	°C	m	m	m	m		
Sep-05									Dry
Oct-07									
Sep-10		8.3	43900	17		6.42	6.91	6.67	
Aug-11		7.8	43000						
Dec-14									Dry

GTV	~	~	~	~	~	~	~	~	~
IGV	~	~	~	~	~	~	~	~	~

>GTV
 >IGV

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BH26

Date	Metals													
	Aluminium	Arsenic	Barium	Boron	Cadmium	Chromium	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Tin	Zinc
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	660	1	20	2820	7	<0.01	0.03	<50	<0.1	<0.01	<0.01	1.1	<0.01	0.06
Sep-05	73	1	10	3570	7	<0.01	<0.01	34	0.10	<0.01	<0.01	<1.0	<0.01	0.03
Oct-06	556	65	21	2940	8	2	0.00488	52	<0.02	10	3	<0.5	<0.5	0.03
Oct-07	127	20	15	3460	12	2	0.00768	73	<0.02	9	15	48	<0.5	0.05
Sep-10	99	<1	12	3400		<50	<50		0.10	<10	<0.10	<3	<10	<0.01
Aug-11	35	<1.0	16	4700		<50	<0.05		0.05	<10	<0.10	<12	<10	<0.01
Nov-12	8	1	11	475	<0.09	<2.14	2	<0.02	0.06	7	1	2	3	0.501
Nov-13	93	0.3	15	3292	0.094	3	13	0.791	<0.04	7	0.7	0.6	7	<0.41
Sep-14	121	1	15	3080	<0.09	<2.14	1	<0.02	<0.5	27	1	12	<2.8	188

GTV	150	7.5	~	750	3.75	37.5	1500	18.75	0.75	~	15	~	~	~
IGV	200	10	100	1000	5	30	30	10	1	~	~	~	~	100

>GTV

>IGV

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BH26

Date	General Organics and Hydrocarbons										
	Total Organic Carbon	Oils, Fats & Grease	TPH	DRO	Mineral Oil	PRO	Benzene	Toluene	Ethyl Benzene	o-Xylene	m+p-Xylene
	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	0.4		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Sep-05	<0.25		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Oct-06	0.4	-	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01
Oct-07	0.4	2	<0.01	<0.01	<0.01		<1	<1	<1	<1	<1
Sep-10	0.4	<2	<10	<10	<10	<1	<1	<1	<1	<1	
Aug-11	1	<2	<10	<10	<10	<1.0	<1.0	<1.0	<1.0	<1.0	
Nov-12	6	<1	<1	<1	<2.5	<5	<0.35	<0.40	<0.42	<0.33	
Nov-13	7		<1								
Sep-14	2	<1	<1	<1	<2.5		<0.35	<0.40	<0.42	<0.33	

GTV	~	~	~	~	~	~	0.75	~	~	~	~
IGV	NAC	~	10	~	~	~	1	10	10	10	~

>GTV
 ≥IGV

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BH26

Date	Polycyclic Aromatic Hydrocarbons																
	Total PAHs	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b)+(j)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(ghi)perylene
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	<0.05																
Sep-05	<0.05																
Oct-06	<0.01																
Oct-07	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sep-10	<0.20																
Aug-11	<0.20																
Nov-12	<0.10																
Nov-13	<0.10																
Sep-14	<0.01																

GTV	0.075	~	~	~	~	~	~	~	~	~	~	~	~	0.0075	~	~	~
IGV	0.1	1	~	~	~	~	10000	1	~	~	~	0.5	0.05	~	0.05	~	0.05

>GTV
>IGV

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BH26

Date	General Inorganics and Major Ions												
	Nitrate	Total Ammonia as NH ₃	Total Nitrogen	Ortho-Phosphate	Calcium	Sulphate	Sodium	Potassium	Magnesium	Iron	Manganese	Chloride	Chemical Oxygen Demand
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Nov-04										<0.03			
Sep-05										<0.03			
Oct-06										0.23			
Oct-07										<0.008			
Sep-10	<5	<0.1	<4	<5						0.52		19465	300
Aug-11	5	<0.1	3	<5						0.19		21255	80
Nov-12	1	0.335	2	0.013	289					0.005		11443	698
Nov-13	<0.110	0.339	<1.00	0.006	309	2180	7606	255	962	0.16	0.003006	11236	35
Sep-14	0.11	0.386	<1.00	0.007	505	2411	16279	866	640	69	0.000488	12322	2032

GTV	37.5	0.08 - 0.21*	~	0.035	~	187.5	150	~	~	~	~	24 - 187.5	~
IGV	25.0	0.14**	~	0.03	200	200	150	50	50	0.2	0.05	30	~

>GTV

*Given as 0.065 - 0.175 mg/L as nitrogen

>IGV

**Given as 0.15 mg/L as NH₄

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BH26

Date	Unstable Field Parameters								Comments
	Dissolved Oxygen	pH	Conductivity @ 20°C	Temperature	Depth	Depth to Groundwater			
						Pre-Purgig	Post-Purgig	On Sampling	
	mg/L		µg/L	°C	m	m	m	m	
Nov-04	5.2	7.3	38100	12	11.92	8.50	9.38	6.08	
Sep-05	4.7	8.2		12	11.92	7.30	9.76	6.15	
Oct-06	4.0	8.0		16	11.92	7.30	11.90	7.26	
Oct-07	3.7	7.8		14	11.56	5.84	6.43	7.25	
Sep-10		8.3	41500	17		7.27	10.51	6.69	
Aug-11		7.9	44100						
Nov-12		7.8	28900						
Nov-13		7.6	36600						
Sep-14		7.6	43100						

GTV	~	~	~	~	~	~	~	~	~
IGV	~	~	~	~	~	~	~	~	~

>GTV
 >IGV

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BH27A

Date	Metals													
	Aluminium	Arsenic	Barium	Boron	Cadmium	Chromium	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Tin	Zinc
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	69	1.1	70	<0.01	0.31	<0.01	<0.01	<2	<0.1	<0.01	0.01	<1.0	<0.01	0.14
Sep-05	337	<1.0	50	400	<0.1	<0.01	<0.01	<2	<0.1	<0.01	<0.01	<1.0	<0.01	0.03
Oct-06	117	2.3	28	20	0.6	<1	0.00229	<2	0.03	0.46	7.3	<0.5	2.7	0.03
Oct-07	60	<2.0	56	40	3.8	<1	0.00301	<2	<0.02	<0.07	8.7	<5.0	<0.5	0.05
Sep-10	159	<1	39	140		<50	<50		<0.05	<10	<0.10	<3	<10	0.02
Aug-11	166	<1.0	44	220		<50	<0.05		<0.05	<10	<0.10	<12	<10	<0.01
Nov-12	16	0.274	<1.62	25	<0.09	<2.14	1	<0.02	<0.04	<5	1.5	0.602	<2.8	145
Nov-13	189	<0.1	17	52	<0.09	3.64	13	1.03	<0.04	<5	1.0	<0.47	<2.8	411
Dec-14	109	0.335	30	38	<0.09	<2.14	1	0.068	<0.04	<5	6.1	<0.47	<2.8	130

GTV	150	7.5	~	750	3.75	37.5	1500	18.75	0.75	~	15	~	~	~
IGV	200	10	100	1000	5	30	30	10	1	~	~	~	~	100

>GTV
>IGV

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BH27A

Date	General Organics and Hydrocarbons										
	Total Organic Carbon	Oils, Fats & Grease	TPH	DRO	Mineral Oil	PRO	Benzene	Toluene	Ethyl Benzene	o-Xylene	m+p-Xylene
	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	7		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Sep-05	3		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Oct-06	7	-	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01
Oct-07	5	2	<0.01	<0.01	<0.01		<1	<1	<1	<1	<1
Sep-10	5	<2	<10	<10	<10	<1	<1	<1	<1	<1	
Aug-11	6	4	<10	<10	<10	<1.0	<1.0	<1.0	<1.0	<1.0	
Nov-12	5	<1	<1	<1	<2.5	<5	<0.35	<0.40	<0.42	<0.33	
Nov-13	3		<1								
Dec-14	4	<1	<1	<1	<2.5		<0.35	<0.40	<0.42	<0.33	

GTV	~	~	~	~	~	~	0.75	~	~	~	~
IGV	NAC	~	10	~	~	~	1	10	10	10	~

>GTV

>IGV

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BH27A

Date	Polycyclic Aromatic Hydrocarbons																
	Total PAHs	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b)(j)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(ghi)perylene
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	<0.05																
Sep-05	<0.05																
Oct-06	<0.01																
Oct-07	0.29	0.29	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sep-10	<0.20																
Aug-11	<0.20																
Nov-12	<0.10																
Nov-13	<0.10																
Dec-14	<0.01																

GTV	0.075	~	~	~	~	~	~	~	~	~	~	~	~	0.0075	~	~	~
IGV	0.1	1	~	~	~	~	10000	1	~	~	~	0.5	0.05	~	0.05	~	0.05

>GTV
>IGV

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BH27A

Date	General Inorganics and Major Ions												
	Nitrate	Total Ammonia as NH ₃	Total Nitrogen	Ortho-Phosphate	Calcium	Sulphate	Sodium	Potassium	Magnesium	Iron	Manganese	Chloride	Chemical Oxygen Demand
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Nov-04										<0.03			
Sep-05										<0.03			
Oct-06										0.0101			
Oct-07										<0.008			
Sep-10	1	<0.1	<1	<1						0.08		75	98
Aug-11	1	<0.1	<1	<1						0.10		67	52
Nov-12	0.42	0.181	<1.00	<0.005	23					0.004		43	13
Nov-13	0.94	0.029	1.5	<0.005	17	11	23	5	6	0.38	0.31	58	<5
Dec-14	0.43	<0.01	1.6	<0.005	22	14	30	0.07	7	53	3.58	68	<5

GTV	37.5	0.08 - 0.21*	~	0.035	~	187.5	150		~	~	~	24 - 187.5	~
IGV	25.0	0.14**	~	0.03	200	200	150	5	50	0.2	0.05	30	~

>GTV

*Given as 0.065 - 0.175 mg/L as nitrogen

>IGV

**Given as 0.15 mg/L as NH₄

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BH27A

Date	Unstable Field Parameters								Comments
	Dissolved Oxygen	pH	Conductivity @ 20°C	Temperature	Depth	Depth to Groundwater			
						Pre-Purgig	Post-Purgig	On Sampling	
	mg/L		µg/L	°C	m	m	m	m	
Nov-04	3.4	6.2	494	12	8.72	3.52	3.50	5.50	
Sep-05	2.6	7.2		12	8.76	3.91	7.13	3.91	
Oct-06	3.8	5.0		13	8.76	3.00	4.01	3.21	
Oct-07	2.6	6.3		12	8.80	3.90	7.14	3.90	
Sep-10		6.5	628	16		3.93	7.29	3.94	
Aug-11		6.3	551						
Nov-12		7.4	400						
Nov-13		6.4	271						
Dec-14		6.0	472						

GTV	~	~	~	~	~	~	~	~	~
IGV	~	~	~	~	~	~	~	~	~

>GTV
 >IGV

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BH28

Date	Metals													
	Aluminium	Arsenic	Barium	Boron	Cadmium	Chromium	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Tin	Zinc
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Sep-05														
Oct-07														
Nov-12	414	0.635	43	36	<0.09	<2.14	3.1	0.13	<0.04	<5	1.2	<0.47	<2.8	<0.41
Nov-13	119	<0.1	65	104	0.099	5.5	8.9	0.64	<0.04	<5	0.8	<0.47	<2.8	<0.41
Dec-14														

GTV	150	7.5	~	750	3.75	37.5	1500	18.75	0.75	~	15	~	~	~
IGV	200	10	100	1000	5	30	30	10	1	~	~	~	~	100

>GTV
>IGV

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BH28

Date	General Organics and Hydrocarbons										
	Total Organic Carbon	Oils, Fats & Grease	TPH	DRO	Mineral Oil	PRO	Benzene	Toluene	Ethyl Benzene	o-Xylene	m+p-Xylene
	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Sep-05											
Oct-07											
Nov-12	5.0	<1	<1	<1	<2.5	<5	<0.35	<0.40	<0.42	<0.33	
Nov-13	4.1		<1								
Dec-14											

GTV	~	~	~	~	~	~	0.75	~	~	~	~
IGV	NAC	~	10	~	~	~	1	10	10	10	

>GTV
 >IGV

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BH28

Date	Polycyclic Aromatic Hydrocarbons																	
	Total PAHs	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b)(j)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(ghi)perylene	
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	
Sep-05																		
Oct-07																		
Nov-12	<0.10																	
Nov-13	<0.10																	
Dec-14																		

GTV	0.075	~	~	~	~	~	~	~	~	~	~	~	~	0.0075	~	~	~
IGV	0.1	1	~	~	~	~	10000	1	~	~	~	0.5	0.05	~	0.05	~	0.05

>GTV
>IGV

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BH28

General Inorganics and Major Ions													
Date	Nitrate	Total Ammonia as NH ₃	Total Nitrogen	Ortho-Phosphate	Calcium	Sulphate	Sodium	Potassium	Magnesium	Iron	Manganese	Chloride	Chemical Oxygen Demand
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Sep-05													
Oct-07													
Nov-12	0.53	0.035	1.1	<0.005	86					0.208		11	12
Nov-13	0.44	0.114	1.0	<0.005	89	17	19	13	5	0.182	0.01	37	<5
Dec-14													

GTV	37.5	0.08 - 0.21*	~	0.035	~	187.5	150	~	~	~	~	24 - 187.5	~
IGV	25.0	0.14**	~	0.03	200	200	150	5	50	0.2	0.05	30	~

>GTV

*Given as 0.065 - 0.175 mg/L as nitrogen

>IGV

**Given as 0.15 mg/L as NH₄

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BH28

Date	Unstable Field Parameters								Comments
	Dissolved Oxygen	pH	Conductivity @ 20°C	Temperature	Depth	Depth to Groundwater			
						Pre-Purgig	Post-Purgig	On Sampling	
mg/L		µg/L	°C	m	m	m	m		
Sep-05									Dry
Oct-07									
Nov-12		7.0	391						
Nov-13		7.3	462						
Dec-14									Dry

GTV	~	~	~	~	~	~	~	~	~
IGV	~	~	~	~	~	~	~	~	~

>GTV
 >IGV

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BH29

Date	Metals													
	Aluminium	Arsenic	Barium	Boron	Cadmium	Chromium	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Tin	Zinc
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	24	<1.0	50	1180	<0.1	<0.01	0.02	5	<0.1	<0.01	0.01	<1.0	<0.01	0.02
Sep-05	<10	<1.0	190	1020	<1.0	<0.01	<0.01	<4	<0.1	<0.01	<0.01	<0.01	<0.01	0.04
Oct-06	<10	32	188	1110	2	<1	0.015	55	0.02	12	1.0	1.2	0.6	<0.01
Oct-07	10	0.6	350	1010	5	<1	0.002	24	0.02	57	2.8	3.4	<0.5	0.04
Jan-08	<8.0	0.6	26	1470	<0.03	<50	<0.05	<0.20	<0.02	281	<0.10	5.6	<0.5	<0.01
Dec-14														

GTV	150	7.5	~	750	3.75	37.5	1500	18.75	0.75	~	15	~	~	~
IGV	200	10	100	1000	5	30	30	10	1	~	~	~	~	100

>GTV
 >IGV

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BH29

Date	General Organics and Hydrocarbons										
	Total Organic Carbon	Oils, Fats & Grease	TPH	DRO	Mineral Oil	PRO	Benzene	Toluene	Ethyl Benzene	o-Xylene	m+p-Xylene
	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	2.4		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Sep-05	1.1		0.21	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Oct-06	1.4	-	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01
Oct-07	2.4	3	<0.01	<0.01	<0.01		<1	<1	<1	<1	<1
Jan-08			<0.01								
Dec-14											

GTV	~	~	~	~	~	~	0.75	~	~	~	~
IGV	NAC	~	10	~	~	~	1	10	10	10	~

>GTV

≥IGV

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BH29

Date	Polycyclic Aromatic Hydrocarbons																
	Total PAHs	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b)(j)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(ghi)perylene
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	<0.05																
Sep-05	<1.0																
Oct-06	<0.01																
Oct-07	0.02	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Jan-08																	
Dec-14																	

GTV	0.075	~	~	~	~	~	~	~	~	~	~	~	~	0.0075	~	~	~
IGV	0.1	1	~	~	~	~	10000	1	~	~	~	0.5	0.05	~	0.05	~	0.05

>GTV
>IGV

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BH29

General Inorganics and Major Ions													
Date	Nitrate	Total Ammonia as NH ₃	Total Nitrogen	Ortho-Phosphate	Calcium	Sulphate	Sodium	Potassium	Magnesium	Iron	Manganese	Chloride	Chemical Oxygen Demand
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Nov-04										<0.03			
Sep-05										<0.03			
Oct-06										0.08			
Oct-07										1.35			
Jan-08	2	<0.1	<1	<1						0.13			
Dec-14													

GTV	37.5	0.08 - 0.21*	~	0.035	~	187.5	150	~	~	~	~	24 - 187.5	~
IGV	25.0	0.14**	~	0.03	200	200	150	5	50	0.2	0.05	30	~

>GTV

*Given as 0.065 - 0.175 mg/L as nitrogen

>IGV

**Given as 0.15 mg/L as NH₄

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BH29

Date	Unstable Field Parameters								Comments
	Dissolved Oxygen	pH	Conductivity @ 20°C	Temperature	Depth	Depth to Groundwater			
						Pre-Purgig	Post-Purgig	On Sampling	
	mg/L		µg/L	°C	m	m	m	m	
Nov-04	3.9	7.0	3930	12	4.94	1.43	1.41	1.42	
Sep-05	3.3	7.2		14	4.94	1.28	1.29	1.33	
Oct-06	7.1	7.0		13	4.94	1.16	1.17	1.14	
Oct-07	2.1	-		16	4.85	1.61	1.72	1.61	
Jan-08		7.7				1.35	1.56	1.35	
Dec-14									Not accessible

GTV	~	~	~	~	~	~	~	~	~
IGV	~	~	~	~	~	~	~	~	~

>GTV

≥IGV

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BH30

Date	Metals													
	Aluminium	Arsenic	Barium	Boron	Cadmium	Chromium	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Tin	Zinc
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	457	1.2	70	80	<0.1	<0.01	<0.01	<2	<0.1	<0.01	<0.01	<1.0	<0.01	<0.01
Sep-05	1167	<1.0	20	<0.01	<0.1	<0.01	<0.01	<2	<0.1	<0.01	<0.01	<0.01	<0.01	0.02
Oct-06	478	0.9	15	80	<0.5	<1	0.00063	7	<0.02	<0.07	1.1	<0.5	<0.5	<0.01
Oct-07	2318	<0.2	37	70	<1	5	0.00096	<4	<0.02	<0.07	0.8	0.9	<0.5	0.02
Jan-08	<8.0	0.4	38	90	<0.03	<50	<0.05	<0.20	<0.02	0.07	<0.10	1.6	<0.5	0.01
Aug-09	409	2.3	52	0.17		<50	<0.05		<50	<1	<100	6.3	<0.01	0.53
Sep-10	514	<1	38	<100		<50	<50		<0.05	<10	<0.10	<3	<10	0.02
Aug-11	138	<1.0	48	<100		<50	<0.05		<0.05	<10	<0.10	<12	<10	<0.01
Nov-12	3079	0.53	20	51	<0.09	4	3.31	0.66	<0.04	<5	1.5	<0.47	<2.8	<0.41
Dec-14	712	0.25	25	507	<0.09	<2.14	0.63	0.04	<0.04	<5	2.4	1.4	<2.8	1.7

GTV	150	7.5	~	750	3.75	37.5	1500	18.75	0.75	~	15	~	~	~
IGV	200	10	100	1000	5	30	30	10	1	~	~	~	~	100

>GTV
 >IGV

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BH30

Date	General Organics and Hydrocarbons										
	Total Organic Carbon	Oils, Fats & Grease	TPH	DRO	Mineral Oil	PRO	Benzene	Toluene	Ethyl Benzene	o-Xylene	m+p-Xylene
	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	1.8		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Sep-05	1.4		0.03	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Oct-06	1.9	-	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01
Oct-07	1.7	2	<0.01	<0.01	<0.01		<1	<1	<1	<1	<1
Jan-08			<0.01								
Aug-09	2.8	3	<0.01	<0.01	<0.01	0.53	<1	<1	<1	<1	<1
Sep-10	1.3	6	<10	<10	<10	<1	<1	<1	<1	<1	
Aug-11	1.3	3	13	<10	11	<1.0	<1.0	<1.0	<1.0	<1.0	
Nov-12	5.7	<1	<1	<1	<2.5	<5	<0.35	<0.40	<0.42	<0.33	
Dec-14	1.9	<1	<1	<1	<2.5		<0.35	<0.40	<0.42	<0.33	

GTV	~	~	~	~	~	~	0.75	~	~	~	~
IGV	NAC	~	10	~	~	~	1	10	10	10	~

>GTV

≥IGV

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BH30

Date	Polycyclic Aromatic Hydrocarbons																
	Total PAHs	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b)+(j)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(ghi)perylene
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	<0.05																
Sep-05	<1.0																
Oct-06	<0.01																
Oct-07	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Jan-08																	
Aug-09	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01
Sep-10	<0.20																
Aug-11	<0.20																
Nov-12	<0.10																
Dec-14	<0.01																

GTV	0.075	~	~	~	~	~	~	~	~	~	~	~	~	0.0075	~	~	~
IGV	0.1	1	~	~	~	~	10000	1	~	~	~	0.5	0.05	~	0.05	~	0.05

>GTV
>IGV

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BH30

Date	General Inorganics and Major Ions												
	Nitrate	Total Ammonia as NH ₃	Total Nitrogen	Ortho-Phosphate	Calcium	Sulphate	Sodium	Potassium	Magnesium	Iron	Manganese	Chloride	Chemical Oxygen Demand
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Nov-04										0.03			
Sep-05										<0.03			
Oct-06										<0.008			
Oct-07										<0.008			
Jan-08	7	<0.1	3	<1						0.17			
Aug-09	6	1.7	3	<1						0.25		143	224
Sep-10	0.9	1	5	<1						4.46		91	80
Aug-11	1	<0.1	<1	<1						0.09		83	22
Nov-12	1.9	0.032	2.4	<0.005	27					0.628		46	13
Dec-14	0.3	0.011	1.2	<0.005	73	43	65	0.07	32	122	1.436	47	<5

GTV	37.5	0.08 - 0.21*	~	0.035	~	187.5	150		~	~	~	24 - 187.5	~
IGV	25.0	0.14**	~	0.03	200	200	150	5	50	0.2	0.05	30	~

>GTV

*Given as 0.065 - 0.175 mg/L as nitrogen

>IGV

**Given as 0.15 mg/L as NH₄

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BH30

Date	Unstable Field Parameters								Comments
	Dissolved Oxygen	pH	Conductivity @ 20°C	Temperature	Depth	Depth to Groundwater			
						Pre-Purgig	Post-Purgig	On Sampling	
	mg/L		µg/L	°C	m	m	m	m	
Nov-04	2.0	6.8	882	11	6.71	3.24	3.28	3.64	
Sep-05	2.1	7.5		14	6.71	4.35	4.54	4.30	
Oct-06	2.1	6.0		13	6.71	3.55	4.64	3.47	
Oct-07	3.3	6.9		10	6.99	4.56	5.72	6.40	
Jan-08		6.9				4.60	5.94	6.25	
Aug-09		6.8	778	14		3.82	5.16	3.75	
Sep-10		7.2	597	19		4.00	5.28	3.92	
Aug-11		6.4	527						
Nov-12		7.7	349						
Dec-14		6.3	906						

GTV	~	~	~	~	~	~	~	~	~
IGV	~	~	~	~	~	~	~	~	~

>GTV
 ≥IGV

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BH31

Date	Metals													
	Aluminium	Arsenic	Barium	Boron	Cadmium	Chromium	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Tin	Zinc
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	503	<1.0	40	20	<0.1	<0.01	<0.01	<2	<0.1	0.01	<0.01	<1.0	0.01	<0.01
Sep-05														
Oct-06	129	0.5	52	20	<0.1	<1	0.00065	<2	<0.02	<0.07	<0.5	<0.5	<0.5	<0.01
Oct-07														
Jan-08	23	0.3	19	30	<0.03	<50	<0.05	<0.20	<0.02	0.2	<0.10	0.5	0.8	0.01
Aug-09	397	1.5	41	0.11	<50	<0.05	<0.05	<50	<1	<100	2.9	<0.01	0.15	
Nov-13	231	<0.1	53	63	<0.09	<2.14	14	0.814	<0.04	<5	1.1	<0.47	<2.8	<0.41
Dec-14	9864	2.6	135	49	0.19	12	6	2.632	0.045	<5	5.5	<0.47	<2.8	5.8

GTV	150	7.5	~	750	3.75	37.5	1500	18.75	0.75	~	15	~	~	~
IGV	200	10	100	1000	5	30	30	10	1	~	~	~	~	100

>GTV

≥IGV

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BH31

Date	General Organics and Hydrocarbons										
	Total Organic Carbon	Oils, Fats & Grease	TPH	DRO	Mineral Oil	PRO	Benzene	Toluene	Ethyl Benzene	o-Xylene	m+p-Xylene
	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	4.3		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Sep-05											
Oct-06	2.5	-	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01
Oct-07											
Jan-08			<0.01								
Aug-09	6.3	3	<0.01	<0.01	<0.01	0.15	<1	<1	<1	<1	<1
Nov-13	3.9		<1								
Dec-14	4.7	<1	<1	<1	<2.5		<0.35	<0.40	<0.42	<0.33	

GTV	~	~	~	~	~	~	0.75	~	~	~	~
IGV	NAC	~	10	~	~	~		10	10	10	

>GTV

≥IGV

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BH31

Date	Polycyclic Aromatic Hydrocarbons																
	Total PAHs	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b)+(j)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(ghi)perylene
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	<0.05																
Sep-05																	
Oct-06	<0.01																
Oct-07																	
Jan-08																	
Aug-09	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01
Nov-13	<0.10																
Dec-14	<0.01																

GTV	0.075	~	~	~	~	~	~	~	~	~	~	~	~	0.0075	~	~	~
IGV	0.1	1	~	~	~	~	10000	1	~	~	~	0.5	0.05	~	0.05	~	0.05

>GTV
>IGV

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BH31

Date	General Inorganics and Major Ions												
	Nitrate	Total Ammonia as NH ₃	Total Nitrogen	Ortho-Phosphate	Calcium	Sulphate	Sodium	Potassium	Magnesium	Iron	Manganese	Chloride	Chemical Oxygen Demand
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Nov-04										<0.03			
Sep-05													
Oct-06										0.011			
Oct-07													
Jan-08	0.9	<0.1	<1	<1						1.58			
Aug-09	2	0.91	3	<1						0.91		25	290
Nov-13	<0.110	0.115	<1.00	<0.005	72	33	20	5	11	0.33	0.117	35	9
Dec-14	<0.110	0.035	<1.00	0.009	79	257	24	0.07	7	3665	0.147	49	<5

GTV	37.5	0.08 - 0.21*	~	0.035	~	187.5	150	~	~	~	~	24 - 187.5	~
IGV	25.0	0.14**	~	0.03	200	200	150	5	50	0.2	0.05	30	~

>GTV

*Given as 0.065 - 0.175 mg/L as nitrogen

>IGV

**Given as 0.15 mg/L as NH₄

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BH31

Date	Unstable Field Parameters								Comments
	Dissolved Oxygen	pH	Conductivity @ 20°C	Temperature	Depth	Depth to Groundwater			
						Pre-Purging	Post-Purging	On Sampling	
	mg/L		µg/L	°C	m	m	m	m	
Nov-04	3.6	7.0	527	11	4.81	2.41	3.21	2.46	
Sep-05									Dry
Oct-06	8.2	7.0		13	4.91	2.88	4.91	2.85	
Oct-07									
Jan-08		7.4				4.92	2.55	4.23	
Aug-09		7.2	373	14		3.19	4.85	3.10	
Nov-13		7.0	472						
Dec-14		6.6	554						

GTV	~	~	~	~	~	~	~	~	~
IGV	~	~	~	~	~	~	~	~	~

>GTV
 ≥IGV

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Date	Metals													
	Aluminium	Arsenic	Barium	Boron	Cadmium	Chromium	Copper	Lead	Mercury	Molybdenum	Nickel	Selenium	Tin	Zinc
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	291	<1.0	10	10	0.13	<0.01	<0.01	<2	<0.1	0.01	<0.01	<1.0	<0.01	0.01
Sep-05	4322	<1.0	10	<0.01	<0.1	<0.01	<0.01	4	<0.1	<0.01	<0.01	<0.01	<0.01	<0.01
Oct-06	1428	0.4	6	20	0.2	<10	0.00077	<20	0.02	<0.07	0.9	<0.5	<0.5	<0.01
Aug-09	536	1.5	9	0.1		<50	<0.05		<50	<1	<100	4	<0.01	0.02
Mar-15														

GTV	150	7.5	~	750	3.75	37.5	1500	18.75	0.75	~	15	~	~	~
IGV	200	10	100	1000	5	30	30	10	1	~	~	~	~	100

>GTV
>IGV

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Date	General Organics and Hydrocarbons										
	Total Organic Carbon	Oils, Fats & Grease	TPH	DRO	Mineral Oil	PRO	Benzene	Toluene	Ethyl Benzene	o-Xylene	m+p-Xylene
	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Nov-04	2		<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Sep-05	1.5		0.04	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Oct-06	2	-	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	<0.01
Aug-09	2	3	<0.01	<0.01	<0.01	0.02	<1	<1	<1	<1	<1
Mar-15											

GTV	~	~	~	~	~	~	0.75	~	~	~	~
IGV	NAC	~	10	~	~	~	1	10	10	10	~

>GTV

>IGV

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Date	Polycyclic Aromatic Hydrocarbons																	
	Total PAHs	Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	Benzo(a)anthracene	Chrysene	Benzo(b)(j)fluoranthene	Benzo(k)fluoranthene	Benzo(a)pyrene	Indeno(1,2,3-cd)pyrene	Dibenz(a,h)anthracene	Benzo(ghi)perylene	
	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	
Nov-04	<0.05																	
Sep-05	<1.0																	
Oct-06	<0.01																	
Aug-09	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	
Mar-15																		

GTV	0.075	~	~	~	~	~	~	~	~	~	~	~	~	0.0075	~	~	~	
IGV	0.1	1	~	~	~	~	10000	1	~	~	~	0.5	0.05	~	0.05	~	0.05	

>GTV
>IGV

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General Inorganics and Major Ions													
Date	Nitrate	Total Ammonia as NH ₃	Total Nitrogen	Ortho-Phosphate	Calcium	Sulphate	Sodium	Potassium	Magnesium	Iron	Manganese	Chloride	Chemical Oxygen Demand
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Nov-04										<0.03			
Sep-05										<0.03			
Oct-06										0.02			
Aug-09	21	2	13	<1						0.45		64	100
Mar-15													

GTV	37.5	0.08 - 0.21*	~	0.035	~	187.5	150	~	~	~	~	24 - 187.5	~
IGV	25.0	0.14**	~	0.03	200	200	150	5	50	0.2	0.05	30	~

>GTV

*Given as 0.065 - 0.175 mg/L as nitrogen

>IGV

**Given as 0.15 mg/L as NH₄

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BH32

Date	Unstable Field Parameters								Comments
	Dissolved Oxygen	pH	Conductivity @ 20°C	Temperature	Depth	Depth to Groundwater			
						Pre-Purgig	Post-Purgig	On Sampling	
	mg/L		µg/L	°C	m	m	m	m	
Nov-04	4.7	6.4	433	11	5.65	4.59	4.94	4.28	
Sep-05	6.1	7.4		13	5.65	4.53	5.25	4.67	
Oct-06	6.0	6.0		14	5.65	4.57	5.65	4.57	
Aug-09		6.5	405	14		4.87	5.33	4.76	
Mar-15									Not accessible

GTV	~	~	~	~	~	~	~	~	~
IGV	~	~	~	~	~	~	~	~	~

>GTV
 >IGV

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