HORIZON NUCLEAR POWER

WYLFA NEWYDD

ENERGY WORKING FOR BRITAIN

Wylfa Newydd Project

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HORIZON NUCLEAR POWER

ENERGY WORKING FOR BRITAIN

TRE'R GOF HYDROECOLOGICAL ASSESSMENT

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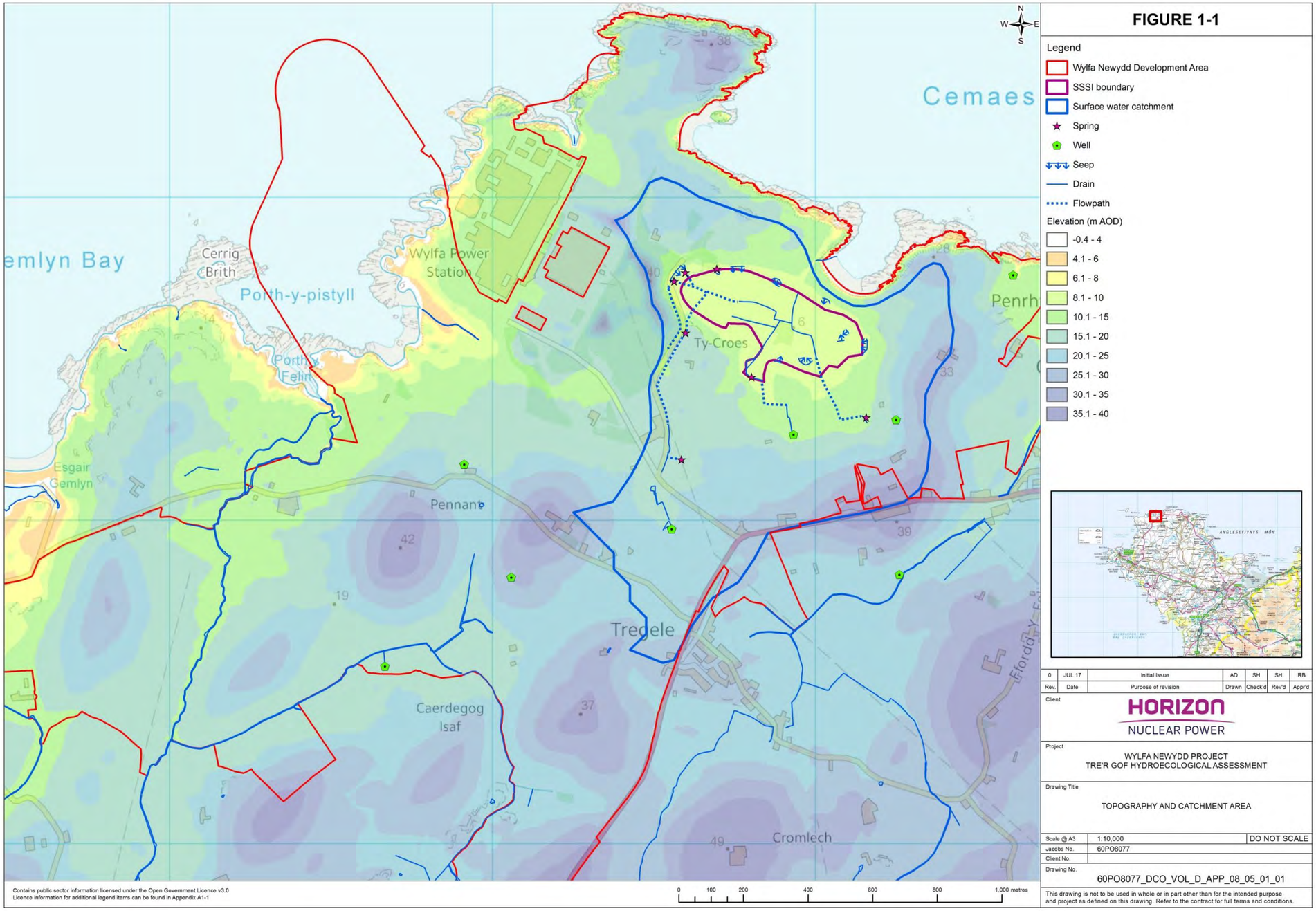
1 Introduction

Horizon Nuclear Power Ltd. is developing a new nuclear Power Station on land west of Cemaes on Anglesey as identified in the *National Policy Statement for Nuclear Power Generation (EN-6)* [RD1]. As a Nationally Significant Infrastructure Project under the *Planning Act 2008*, the construction and operation of the Wylfa Newydd Project must be authorised by a Development Consent Order.

The Tre'r Gof Site of Special Scientific Interest (SSSI) is located within the Wylfa Newydd Development Area; as a result, there is a need to understand the functioning and sensitivities of the wetland and investigate the potential impact of the Wylfa Newydd Project on the specific nature conservation interests of the site. A map showing the location of the Tre'r Gof SSSI and its surface water catchment area is presented as figure 1-1. A preliminary hydrological/hydrogeological conceptual site model (CSM) was prepared in May 2015 [RD2]. This report identified a number of data gaps and uncertainties in the CSM and recommended further monitoring and assessment.

Since February 2015, water quality, flow and level data have been collected from the water environment in and around the Tre'r Gof SSSI (see figure 1-1). This report presents the baseline conditions for the Tre'r Gof SSSI and provides an updated CSM using data collected since February 2015; therefore, it supersedes the preliminary Horizon report [RD2].

Figure 1-1 Topography and catchment area



1.1 Scope and objectives

The primary objectives of this report are to:

- provide a preliminary baseline for the water environment in and around the Tre'r Gof SSSI;
- update and evaluate the existing hydrological CSM using data recorded in and around the Tre'r Gof SSSI between February 2015 and August 2017; and
- provide an integrated hydrological and ecological assessment that identifies hydrological supporting conditions critical to the maintenance of the special features of the Tre'r Gof SSSI.

The report does not assess the effects of the Wylfa Newydd Project on the Tre'r Gof SSSI but provides supporting information for the assessment of effects that are included in chapter D8 (surface water and groundwater) and chapter D9 (Terrestrial and freshwater ecology) (Application Reference Numbers: 6.4.8 and 6.4.9 respectively).

1.2 Sources of information

The main sources of information used in the production of this report are shown in Table 1-1.

Table 1-1 Sources of information

Type of information	Data source
Technical reports	• Tre'r Gof SSSI Hydrogeological Assessment [RD2]. • Groundwater Baseline Report (Application Reference Number: 6.4.28). • Surface Water Baseline Report (Application Reference Number 6.4.26). • Detailed Onshore Ground Investigation Interpretative Report. [RD3]. • Soils Site Report [RD4].
Published sources	• British Geological Survey Geological maps [RD5]. • Tre'r Gof SSSI Citation [RD6]. • Tre'r Gof SSSI Site Management Statement [RD7]. • Tre'r Gof SSSI Potentially Damaging Operations [RD8]. • Tre'r Gof SSSI Site Condition Report [RD9]. • Tre'r Gof SSSI National Vegetation Classification mapping [RD10]. • Palaeoecological studies of two basin mires in north-west Wales [RD11]. • National Vegetation Classification field guide to mires and heaths [RD12]. • Plant communities of rich-fen systems in England and Wales [RD13].

Type of information	Data source
	• Protocol for determining "Significant Damage" to a "Groundwater Dependent Terrestrial Ecosystem" [RD14]. • A wetland framework for impact assessment at statutory sites in England and Wales [RD15].
Fieldwork	• Site observations from walkovers carried out by Jacobs hydrologists and hydrogeologists between February 2015 and August 2017. • Surface water flow data recorded in the Tre'r Gof surface water catchment at four inflow locations (VN1, VN2, VN3 and VN4) and one outflow location (VN5). • Groundwater level data recorded in piezometers (PZ1, PZ2, PZ3, PZ4, PZ5, PZ6, PZ7, PZ8 fixed and PZ8 floating) and boreholes installed in and around Tre'r Gof SSSI and across the Wylfa Newydd Development Area (over 100 boreholes). • Groundwater and surface water quality data – samples collected from boreholes, piezometers, springs, drains and flumes between February 2015 and August 2017. • Data from eight peat cores and 20 peat probe locations within the Tre'r Gof SSSI. • Meteorological data from the Salt Survey Weather station installed on the Wylfa Newydd Development Site (February 2015–January 2017).

1.3 Monitoring and assessment

Table 1-2 summarises the water environment monitoring programme for the Tre'r Gof SSSI; monitoring locations are shown in figure 2-19 later in the report and they are discussed in detail in appendix D8-03 (groundwater baseline report) (Application Reference Number: 6.4.28) in the Environmental Statement.

Table 1-2 Tre'r Gof monitoring programme (note: the monitoring is on-going but this report only assesses data to August 2017 due to constraints regarding report production timescale)

Group	Location ID	Flow	Level	Quality
Boreholes in Superficial deposits	BH309CP, BH310CP, BH311CP, BH524CP, BH525CP, BH526CP, BH526RS,	No	Groundwater loggers installed since 2010. Downloaded quarterly.	Quarterly sampling undertaken: March, June, September and December 2015, April, August and October 2016 and January/February, May and August 2017 Samples collected using HydraSleeves and/or bailer

Group	Location ID	Flow	Level	Quality
Boreholes in bedrock deposits	BH309R, BH309RO, BH310R1, BH310R2, BH524R, BH525R, BH526RD	No	Groundwater loggers installed since 2010. Downloaded quarterly.	Quarterly sampling undertaken: March, June, September and December 2015, April, August and October 2016,January/February, May and August 2017 Samples collected using HydraSleeves and or bailer (following purging).
Springs	Spring A, Spring B, Spring C, Spring D, Spring E	No	Water features walkover – monthly since April 2015	Monthly sampling undertaken: November and December 2015, January, February and April 2016, January/February, May and August 2017. Sample collected directly from spring.
Flumes	VN1, VN2, VN3, VN4 and VN5	Yes – Flumes since April 2015	Yes – flumes since April 2015	Monthly sampling undertaken: November and December 2015, January, February, April, August and October 2016 and February, May and August 2017. Sample collected directly from spring watercourse.
Piezometers	PZ1, PZ2, PZ3, PZ4, PZ5, PZ6, PZ7 and PZ8 fixed and PZ8 floating	No	Yes – groundwater loggers installed November 2015	Monthly sampling undertaken: November and December 2015, January, February, April, August and October 2016 and February, May and August 2017. Samples collected using bailers, three well volumes purged before sampling.

1.4 Uncertainty and data gaps

Whilst the monitoring programme on the Tre'r Gof SSSI is robust, there remain some uncertainties and data gaps as outlined below.

- The flow and quality data for the springs and flumes is focused on the late autumn to winter seasons due to the fact that most of the springs and watercourses dry up over the summer months.
- Although the flumes were installed in 2011 to monitor stream flow, the water level recorders and data loggers on the flumes were not originally collecting data that can be relied upon. The loggers were therefore repaired in April 2015 and a relatively continuous dataset has been collected since then. The flow monitoring equipment on flume VN5 returned highly anomalous data from late June into August 2015 and results from this period have been discounted, although due to the very dry conditions and a number of observations of very low flow, this is not a significant data gap. The same equipment was then damaged in December 2015 which resulted in no flow data being captured at the outfall during a period of 11 days, which included an exceptional rainfall event. The logger also failed during early January 2017 and so data were lost from that period. Some of the flumes may not capture all of the inflow water as the inflow channels are not always discreet. In addition, there are inflows to Tre'r Gof SSSI downstream of the flume locations, but as the inflow is dispersed it would not have been possible to install a flume at a location that would have collected all of this inflow.
- There is no quantitative or continuous monitoring of the flow of seeps and flushes with the available data being based on monthly observations by different Jacobs staff.
- There is no on-site measurement of meteorological conditions and data from the Wylfa Newydd Development Area is only available up to January 2017.
- The groundwater logger in PZ5 was stolen shortly after the piezometers were installed. This logger was replaced in December 2015.
- The groundwater logger in PZ8 fixed appears to be 'drifting'. This logger was replaced in April 2016.
- There are no boreholes drilled through the SSSI basin, therefore data interpretation is reliant upon geological information from adjacent boreholes.

Where uncertainties or data gaps affect the quality of the assessment this is identified and the implications discussed.

2 Baseline environmental setting

The study area in this assessment primarily focuses on the Tre'r Gof SSSI and its associated surface water catchment area shown in figure 1-1. However, the study area has been extended 1km to the west of the Tre'r Gof surface water catchment area in order to interpolate groundwater flow directions using monitoring boreholes installed across the Wylfa Newydd Development Area. There are over 100 monitoring boreholes across the Wylfa Newydd Development Area, variously installed in the superficial or bedrock deposits.

2.1 Tre'r Gof SSSI description

The Tre'r Gof SSSI is located in a small 'inland' drainage basin (see figure 1-1) around 200m east of the Existing Power Station. The elevation of the SSSI ranges from 5m above Ordnance Datum

(AOD) in the west up to 8m AOD in the east (see figure 1-1). To the north, south, east and west of the Tre'r Gof SSSI the land rises steeply, creating the basin feature. The topography of the catchment is dominated by two drumlins rising to a maximum of 40m AOD at their summits. These create low but steep hillslopes and narrow interfluve areas. Based on local topography and drainage channels, the total surface water catchment area draining to the Tre'r Gof SSSI is estimated to be 1km^2. Land use within the surface water catchment and wider study area is predominantly agricultural with the majority of the land being used as enriched pasture for grazing sheep or cattle.

2.2 Ecological interest and management of the Tre'r Gof SSSI

2.2.1 SSSI citation and interest features

Tre'r Gof was designated as a SSSI in 1971 for its biological interest as a representative example of rich-fen habitat in north-west Wales. The SSSI citation [RD6] states that it is a lime-rich wetland with associated plant communities that are characterised by blunt flowered rush, black bog rush, great fen-sedge and the nationally scarce marsh fern. Other associated flora and fauna include swamp, wet willow woodland habitats and notable invertebrate species.

NRW has confirmed that the Tre'r Gof SSSI is in unfavourable condition; the last condition survey was undertaken in 2014 and found the site had been under-grazed for several years. Since this condition survey was carried out, grazing by cattle has been reinstated on the site and work has been undertaken to reduce the extent of gorse [*Ulex europaeus*].

The Site Management Statement (Countryside Council for Wales (CCW) [RD7], undated) identifies the wetland as highly sensitive to changes in water level, water movement and water quality. CCW [RD7] also provide a list of 26 potentially damaging operations, which include:

- modification of field drainage, ditches and drains;
- changes to the utilisation of water, including storage, raising of water levels, irrigation and abstraction; and
- infilling of ditches, dykes, drains, ponds, pools, marshes or pits.

The Tre'r Gof SSSI covers an area of 10 hectares (0.1km^2). The following description is taken from the CCW citation for the Tre'r Gof SSSI [RD6]:

"*This site has been selected for its biological interest, in particular as a representative example of rich-fen habitat in north-west Wales.*

The fen has developed in a basin above Cemaes Bay on the north Anglesey coast, and the vegetation present consists of a mosaic of rich-fen and associated communities. There are stands of meadow in which blunt-flowered rush Juncus subnodulosus and other jointed rushes are abundant; these grade into a variety of other communities in which fen species such as great fen-sedge Cladium mariscus, black bog-rush Schoenus nigricans and common reed Phragmites australis are locally dominant. Swamp vegetation with stands of great reedmace Typha latifolia and fen scrub occur in places.

The variable structure of the vegetation at this site probably reflects a chequered management history, as well as other environmental gradients. A wide range of wetland plant species occur in the various communities and of particular interest is the presence of a population of the marsh

fern Thelypteris palustris which is a scarce fen plant in Britain where it appears to be declining over much of its range."

With regards to understanding the baseline ecology of the Tre'r Gof SSSI, this report has relied upon the mapping carried out by CCW in 2010 [RD10] which used the National Vegetation Classification (NVC) system. This high quality mapping and survey is the best source of ecological information for the SSSI. More recent but less detailed NVC mapping is available [RD16]; this mapping broadly corresponds with the NVC mapping carried out by CCW in 2010.

The Tre'r Gof SSSI also has special features other than plants (i.e. invertebrates), but this study has only considered the features for which the site has been notified.

2.2.2 Groundwater dependency of plant communities at the Tre'r Gof SSSI

The Water Framework Directive sets objectives for the protection, enhancement and restoration of the water environment including groundwater dependent wetlands. Groundwater dependent terrestrial ecosystems (GWDTEs) are wetlands, which critically depend on groundwater flows and/or chemistries. The UK Technical Advice Group (UKTAG) has issued groundwater dependency ratings for plant communities that are groundwater dependent, with the classifications being:

1 – The community is highly dependent on groundwater.

2 – The community is moderately dependent on groundwater. A rating of 2 suggests this plant community may only be groundwater dependent under certain conditions and may be less sensitive to impacts on groundwater.

3 – The community has a low dependency on groundwater and within the context of Environmental Impact Assessment is not considered to be solely GWDTE.

For the communities present at the Tre'r Gof SSSI an assessment has been completed based on this grading system and the groundwater dependency is listed in table 2-1, along with the UKTAG category for the relevant plant community.

Two plant communities that potentially provide a good indication of groundwater inflow and which are highly dependent on groundwater (table 2-1) are M22 and M23, both of which are widespread at Tre'r Gof SSSI (see NVC mapping in appendix 1). These communities depend on the presence of year round moist soils and are often associated with seepages and flushes. The plant communities present at the Tre'r Gof SSSI and the importance of the hydrological supporting conditions are discussed in detail in section 4 of this report.

Table 2-1 UKTAG GWDTE classification (Wales) and relevance to communities identified at the Tre'r Gof SSSI

UKTAG GWDTE category	NVC	Description	Dependence of community/ habitat on groundwater
Wetland directly irrigated by spring or seepage/Fen (oligotrophic) and Wetland at tufa forming spring	M9	Calcareous transition mire (*Carex rostrata – Calliergon cuspidatum/giganteum* mire)	1
	M13 (a and b)	*Schoenus nigricans – Juncus subnodulosus* mire	1
Fen (oligotrophic) and Wetland at tufa forming spring/Peatbog and woodland on peatbog/Quaking bog	M15	*Scirpus cespitosus – Erica tetralix* wet heath	2 (1)
Wetland directly irrigated by spring or seepage/Fen (mesotrophic and Fen meadow	M22	Fen Meadow (*Juncus subnodulosus – Cirsium palustre* fen-meadow)	1
Fen (mesotrophic and Fen meadow)	M23	Rush Pasture (*Juncus effusus/acutiflorus – Galium palustre* rush-pasture)	1 (2)
	M27	*Filipendula ulmaria – Angelica sylvestris mire*	2 (3)
Wetland directly irrigated by spring or seepage/Fen (oligotrophic) and Wetland at tufa forming spring	M29	*Hypericum elodes – Potamogeton polygonifolius*	1 (2)
Fen (oligotrophic) and Wetland at tufa forming spring/Swamp (oligo to mesotrophic)	S2	*Cladium mariscus* swamp and sedge-beds	2 (1)
Wetland directly irrigate by spring or seepage/Fen (oligotrophic) and Wetland at tufa forming spring/ Swamp (oligo to mesotrophic)	S3	*Carex paniculata* sedge-swamp	3
Swamp (oligo to mesotrophic)/ Swamp (mesotrophic to eutrophic and reedbed)	S4b	*Phragmites australis* swamp, *Galium palustre* sub-community	3
Fen (oligotrophic) and Wetland at tufa forming spring/ Swamp (oligo to mesotrophic)	S10a	*Equisetum fluviatile* swamp, *Equisetum fluviatile* sub-community	3

UKTAG GWDTE category	NVC	Description	Dependence of community/ habitat on groundwater
Wet Woodland	W1	S*alix cinerea – Galium palustre* woodland	2

Notes: UKTAG classification in table 2-1 is specific to Wales. In column 4 of the table, 1 – highly dependent, 2 – moderate, 3 – low. Where a second dependency is shown in brackets, this indicates that the classification can vary under certain situations.

2.2.3 Tre'r Gof SSSI management

The Site Management Statement [RD7] for the Tre'r Gof SSSI states that:

"*Tre'r Gof has two special features:*

- *lime-rich wetland with associated plant communities, characterised by blunt flowered rush, black bog rush and great fen-sedge; and*
- *the nationally scarce marsh fern."*

As well as the features listed above, Tre'r Gof has other habitats that contribute to the special interest. These include a herb-rich meadow, pools, scrub and a few hedges.

"*This mixture of habitats is important for much of the wildlife including other rushes [Juncus spp.], meadow sweet [Filipendula ulmaria], zigzag clover [Trifolium medium] and several orchids including northern marsh orchid [Dactylorhiza purpurella]. There are also areas of common reed associated with grey willow [Salix cinerea]. Bulrush (reedmace) grows on wetter ground and in some ditches, with thread-leaved water-crowfoot [Ranunculus trichophyllus] on the bare mud. Birds present include jack snipe [Lymnocryptes minimus] and stonechat [Saxicola torquata]. Unless specified below, management of this site should aim to look after these habitats and species as well as the listed features of interest*."

In addition, the Site Management Statement indicates that if the site was in favourable condition it is anticipated that:

"At least 95% of the site should be wetland. In this we would expect to see a range of different plant communities characteristic of low fertility wetland soils - the main elements of this vegetation would include great fen-sedge, mixtures of black bog rush and blunt-flowered rush [Juncus subnodulosus], areas of lesser tussock sedge [Carex diandra] and common reed. Marsh fern should be abundant. Water levels and quality should be maintained to support these communities. Patches of grey willow should remain but should not be permitted to exceed 10% of the wetland area. A few scattered patches of gorse [Ulex europaeus] will be tolerated."

The Site Management Statement indicates that the following are the most important factors (only those relevant to this report are cited) that could damage the special features at Tre'r Gof if they are not properly managed:

"*Water level: Maintaining a high water table level is essential for the survival of wetland plants and animals. It is therefore important that no habitat management work is carried out which would lower or change in any other way water levels on the site – for example by widening or deepening ditches. However, some wetland plants and animals require very shallow surface water or*

moving groundwater, so deep or prolonged flooding can destroy these. Raising water levels should not be undertaken without careful assessment. Equally important is the need to maintain the current water supply to the site through springs, groundwater seepage, ditches and surface run off. Any actions that would reduce the amount of water entering Tre'r Gof would be damaging to the site."

"*Water quality: Good water quality is essential for maintenance of the characteristic assemblage of wetland plants and animals at Tre'r Gof. Nutrients such as nitrogen and phosphorous encourage the spread of strong growing plants such as float-grass [Glyceria fluitans] and common reed [Phragmites australis] which can out-compete the less common (and more desirable) species at Tre'r Gof. This in turn would have a negative effect upon the animals that depend on these plants. Measures to enhance soil fertility within the catchment of the site are therefore likely to prove harmful to the special interest features of Tre'r Gof.*"

"*Water movement: Gradual movement of water from springs through the site is essential for the survival of the spring-water flushed wetland. In order to maintain this important passage of water through the site, great care in the management of water supply and levels is needed.*"

The site receives slightly mineral-enriched waters from the surrounding glacial till. A fen is a type of wetland that relies on some groundwater input for its maintenance in addition to surface water runoff and direct inputs from precipitation. The nutrients sourced from groundwater enable the fen to support particular types of plants such as sedges, mosses and rushes. Tre'r Gof is described as a 'rich' fen which is fed by mineral-rich surface water or groundwater and is characterised by neutral or alkaline pH, with relatively high dissolved mineral levels, but few other plant nutrients (such as phosphorous, potassium or nitrogen).

In addition to the Site Management Statement and SSSI citation, CCW provided a list of potentially damaging operations that could negatively impact the SSSI [RD8]. Those of relevance to this assessment are:

- modification of field drainage, including moor-gripping and the use of mole, tile, tunnel or other artificial drains;
- modification to ditches or drains, including their banks and beds, by realignment, re-grading, dredging or cleaning;
- management of aquatic and bank vegetation;
- changes in the present utilisation of water, including storage, the raising of water levels, irrigation and abstraction from existing water bodies and through boreholes; and
- infilling of ditches, dykes, drains, ponds, pools, marshes or pits.

2.3 Geology and soils

The following summarises the geological setting of the Tre'r Gof study area. A more detailed description of the superficial and bedrock geology is contained within appendix D8-3 (Application Reference Number: 6.4.28) and the ground investigation report [RD5].

2.3.1 Bedrock geology

2.3.1.1 Formations

The bedrock within the study area comprises two main formations; the south and west of the Tre'r Gof study area is underlain by the New Harbour Group, a metamorphic bedrock comprising mica schist, jaspery phyllite and psammite (thin sandy layers). To the north and east of the study area, bedrock comprises the Gwna Group, which contains psammite, quartzite and pillow lava. The geochemistry of both bedrock groups is described as 'basic' [RD5], this may be significant for Tre'r Gof in terms of the influence it has on groundwater quality; basic bedrock can result in alkaline groundwater, relatively high pH and high concentrations of dissolved metals such as manganese. Further details on the geology at and around the Wylfa Newydd Development Area are provided in chapter D7 (soils and geology) (Application Reference Number: 6.4.7).

2.3.1.2 Structure

The bedrock has undergone significant metamorphic and structural deformation due to ancient igneous intrusions and more recent glacial weathering/erosion. The bedrock is crossed by several steeply dipping faults; many of these run between the area proposed for the Power Station and the Tre'r Gof SSSI, mostly with an east to west and north-west to south-east trend, and generally dip between 30 degrees and 80 degrees. A map showing faults and intrusions across the study area and beyond is presented in appendix B. The top 50m of the bedrock is heavily weathered, appendix D8-3 (Application Reference Number: 6.4.28) reports that this is the most permeable horizon in the bedrock and the majority of groundwater flow in this unit occurs here.

The structure of the bedrock is a fundamental reason for the presence of Tre'r Gof. It has been suggested [RD17] that an east-west orientated buried valley is present in the bedrock which deepens from west to east reaching its maximum depth adjacent to Porth y Wylfa. Although not stated in RD17, Porth y Wylfa is likely to be associated with this valley. It is also suggested in RD17 that a kettle hole, which is a depression in the ground that becomes infilled with sediment from a retreating glacier, formed at the eastern end of the valley during deglaciation. Tre'r Gof SSSI is associated with this kettle hole/buried valley feature, although the geological / glacial morphological characteristics of the feature are not known due to the limit ground investigation data below the Tre'r Gof SSSI basin. The sediments present in this feature are discussed below.

2.3.2 Superficial deposits

The Tre'r Gof Catchment and indeed much of north Anglesey is covered in a layer of glacial till, deposited by successive advances of ice 14,000 to 20,000 years ago. The thickness of the glacial till is typically between 3m and 8m across much of the Wylfa Newydd Development Area; however, where drumlins are present superficial deposits are up to 30m thick. Drumlins are half-egg-shaped glacial deposits. Drumlin features in and around the study area are visible on figure 1.1 as circular hills.

During the initial ice sheet advance, the upper part of the ice became decoupled from the lower part and deposited lodgement till, derived from the local lithologies of north Anglesey. It was during the retreat of the first advance of ice that the scour occurred, forming the Tre'r Gof basin and kettle hole.

The northern coastline of Anglesey attenuated a second advance of ice and this resulted in the deposition of a wedge of Irish Sea Lodgement Till against the coast and the formation of drumlin

fields. Unlike the first ice advance, which produced a till derived from local bedrock material, the Irish Sea Lodgement Till is rich in calcareous material derived from shelly fragments entrained from the seabed [RD17 and RD3]. The Irish Sea Lodgement Till is also thought to be a source of mineral enrichment for groundwater.

According to information in RD17, the eastern end of the buried valley adjacent to Porth y Wylfa became plugged with till. Borehole drilling in 2009 (after RD17 had been written) into this "plug" (at BH311, figure 2-1) indicates the presence of gravelly clay from ground level (12.0m AOD) to 15.1mbgl (-3.1m AOD), underlain by a laminated clay to 24.9mbgl (-12.9m AOD). At the base of the borehole is sandy gravel to 25mbgl (-13m AOD), probably weathered bedrock, however bedrock was not confirmed at this location.

Moving inland from BH311 to BH526 the thickness of drift reduces, with gravelly sandy clay to 14.6mbgl (-4.9m AOD), slightly silty clay to 22.3mbgl (-12.6m AOD), slightly sandy gravelly clay to 23mbgl (-13.3m AOD) overlying weathered bedrock. Further inland, on the south side of the Tre'r Gof SSSI at BH309 (figure 2-1), the drift thickness reduces further, with a series of thin layers comprising a mixed assemblage of clays, sands and gravels to 4.7mbgl (4.7m AOD). These are likely to be drift deposits outside of the buried valley/kettle hole.

If the line of the buried valley suggested in RD17 is followed in a westerly direction it would first be penetrated by BH524 (figure 2-19). However, at this location the drift is only present to 6.8mbgl (2.8m AOD). Boreholes have also been drilled further to the west of the Tre'r Gof SSSI with BH864 being in the centre of the conjectured buried valley and BH866 and BH867 just to the south of BH864 (see figure 2C in appendix D8-3 (Application Reference Number: 6.4.28) for details). In BH864, bedrock was encountered at 7.5mbgl (11.6m AOD), drift lithology was sandy gravelly clay, overlain by 4m of made ground. In BH866 sandy gravelly clay was encountered to 3.2mbgl (12.9m AOD) overlying bedrock, whilst in BH867 sandy gravelly clay was encountered to 1.5mbgl (15.3m AOD) overlying bedrock.

The borehole information suggests that either the conjectured buried valley narrows markedly in a westward direction and none of the boreholes penetrate it, or that it is not as extensive in a westward direction as originally thought [RD17]. The borehole logs do indicate that the drift sequence is thick in the vicinity of the Tre'r Gof SSSI, particularly on its north eastern side adjacent to Porth y Wylfa, but there is no direct evidence of the sequence being present beneath the whole of the basin that forms the SSSI. No boreholes have been drilled into the SSSI and the presence of the infilled basin is only inferred from the topography and the boreholes that have been drilled around its margins. The very thick sequence of drift outside of the SSSI, beneath the high ground to the north east, indicates that the bedrock surface topography in this area is complex and It is likely that the Porth y Wylfa inlet is associated with this buried valley/kettle hole. Irrespective of whether it is a valley or a kettle hole, the feature is glacial in origin and has played a key role in the formation of the SSSI, although there is considerable uncertainty regarding its depth and the exact lithology of the drift present.

2.3.3 Made ground

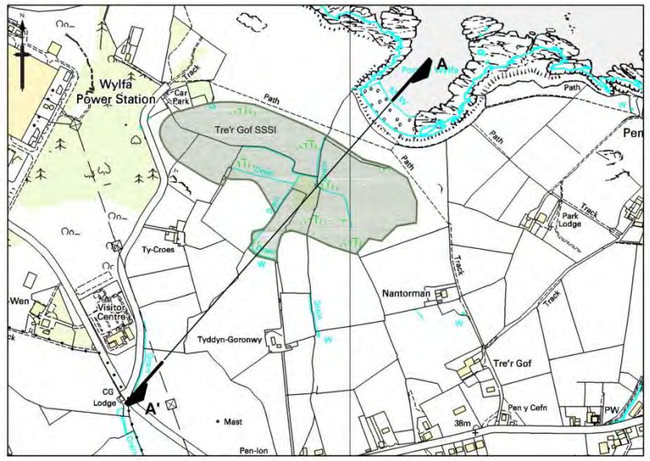
Approximately 100m west of the Tre'r Gof SSSI western boundary is a large artificial mound of vegetated and wooded made ground from the earthworks associated with the Existing Power Station and known as Dame Sylvia Crowe's mound, after the famous landscape architect who designed the landscape. The mound is approximately 50m wide and its crest is elevated at 34m

AOD. The precise nature of material in the mound is unknown but it likely comprises materials excavated for the Existing Power Station platform (i.e. reworked lodgement till and Gwna Group bedrock), and potentially also construction materials and wastes derived from the construction works.

Made ground is also present, surrounding the Existing Power Station, associated with the areas used during construction works. This typically comprises reworked natural material with limited anthropogenic inclusions, but some areas of made ground containing construction wastes and asbestos have also been recorded.

Isolated pockets of made ground are also anticipated in areas surrounding the existing/former farms.

Figure 2-1 North-South geological section through the Tre'r Gof SSSI.



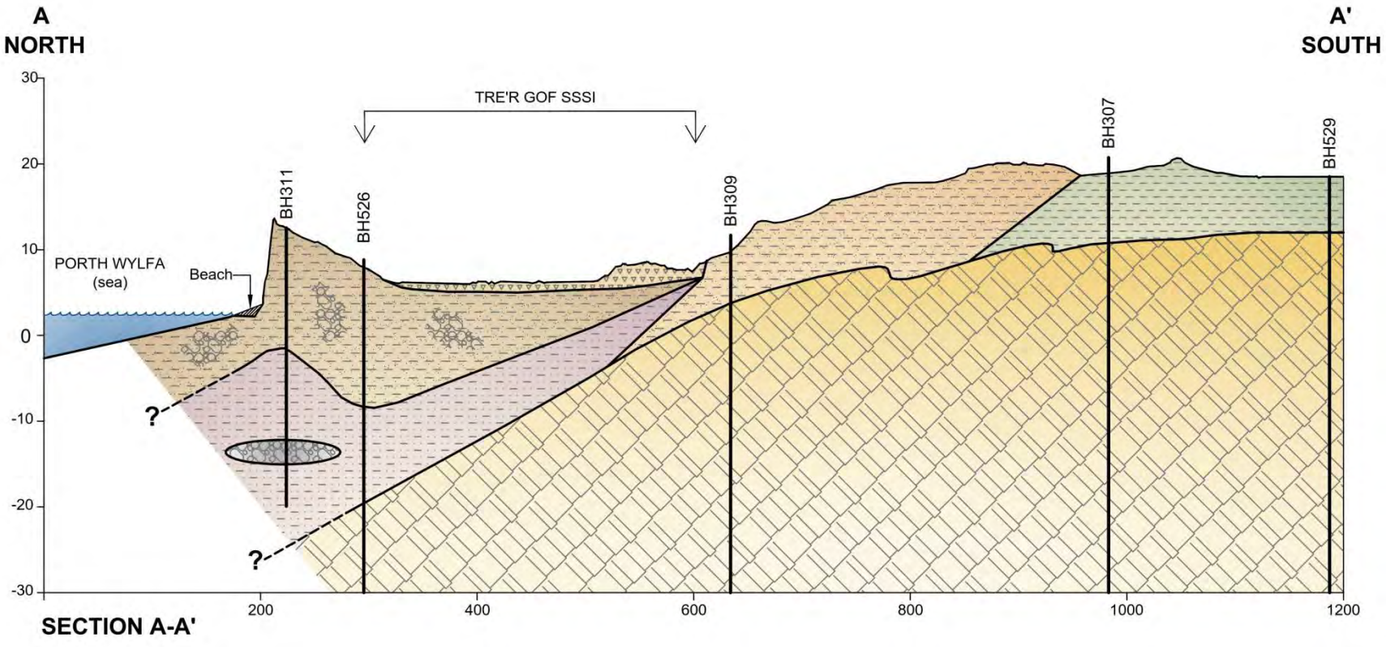


FIGURE 2.1

LEGEND

- Peat
- Boulder Clay
- Sand and Clay Layers
- Sandy Gravelly Clay
- Silty Clay/Laminated Clay
- Gravel
- Bedrock

Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
0	28-07-17	FIRST ISSUE	AR	SH		

Client: HORIZON NUCLEAR POWER

Project: WYLFA NEWYDD PROJECT

Drawing title: NORTH-SOUTH SECTION THROUGH TRE'R GOF SSSI

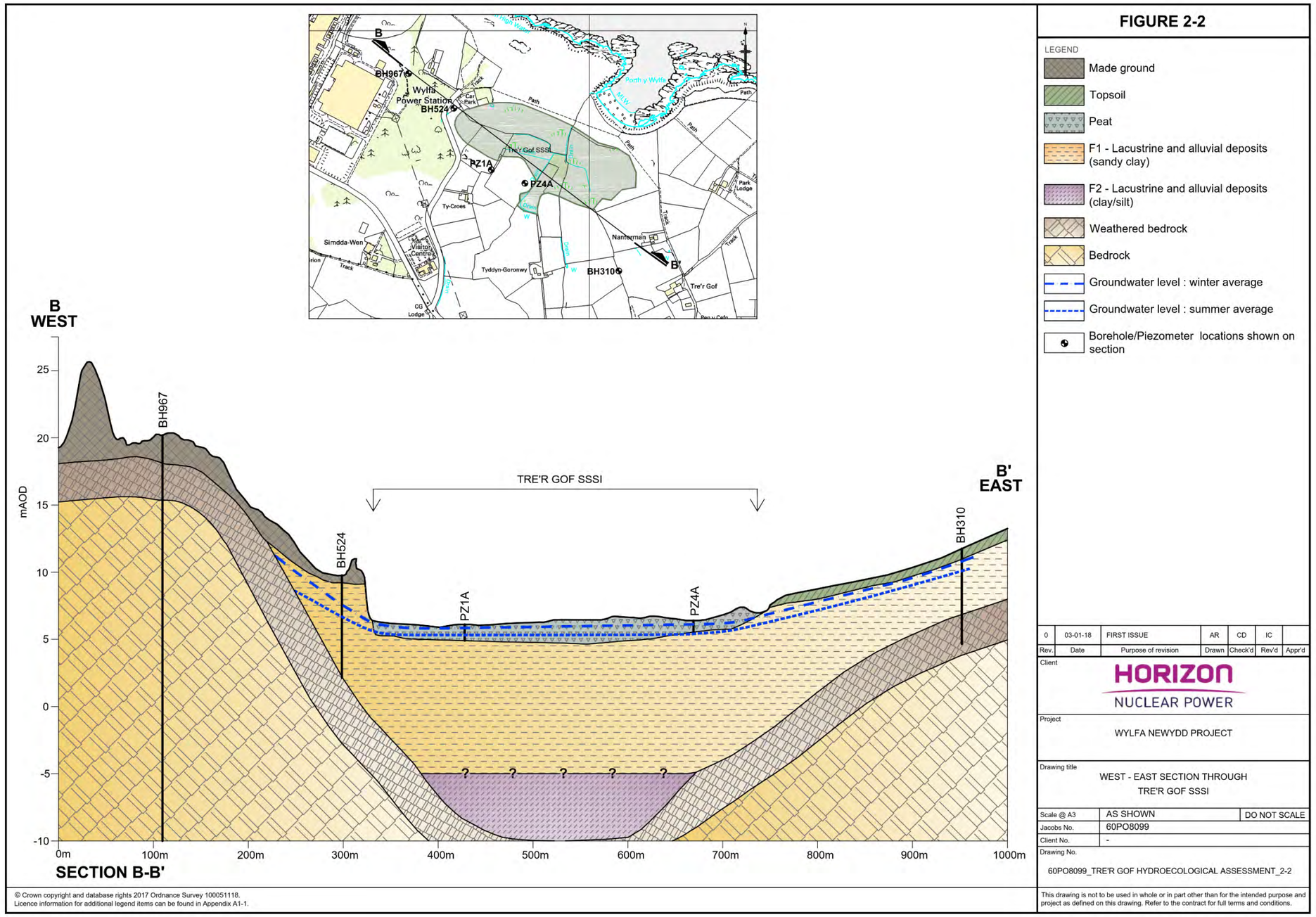
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Drawing No.: 60PO8077_2.1

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Figure 2-2 North west – south east geological section through the Tre'r Gof SSSI



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FIGURE 2-2

LEGEND

- Made ground
- Topsoil
- Peat
- F1 - Lacustrine and alluvial deposits (sandy clay)
- F2 - Lacustrine and alluvial deposits (clay/silt)
- Weathered bedrock
- Bedrock
- Groundwater level : winter average
- Groundwater level : summer average
- Borehole/Piezometer locations shown on section

Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
0	03-01-18	FIRST ISSUE	AR	CD	IC	

Client: HORIZON NUCLEAR POWER

Project: WYLFA NEWYDD PROJECT

Drawing title: WEST - EAST SECTION THROUGH TRE'R GOF SSSI

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Client No.	-	

Drawing No.: 60PO8099_TRE'R GOF HYDROECOLOGICAL ASSESSMENT_2-2

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2.3.4 Peat

Nine piezometers were installed into the peat at eight locations across Tre'r Gof at the beginning of November 2015; the location of the piezometers is shown in figure 2-3. Two piezometers were installed in the same location with the aim of trying to detect the presence of a floating peat raft. These installations are PZ8 fixed and PZ8 floating, the former being anchored with metal poles so that differences between the two piezometers can be identified. Coring and probing of soils during an investigation in November 2015 established the presence of a layer of peat across the majority of the surface of the Tre'r Gof SSSI. The results of the coring and soil probing are presented in appendix C along with photos of the cores. A peat depth map is shown as figure 2-3. In several areas the full thickness of peat was not penetrated due to the limitations of the hand sampling equipment used for the investigation. Based on the topography, the inferred peat distribution shown in figure 2-2 does not appear to be unreasonable.

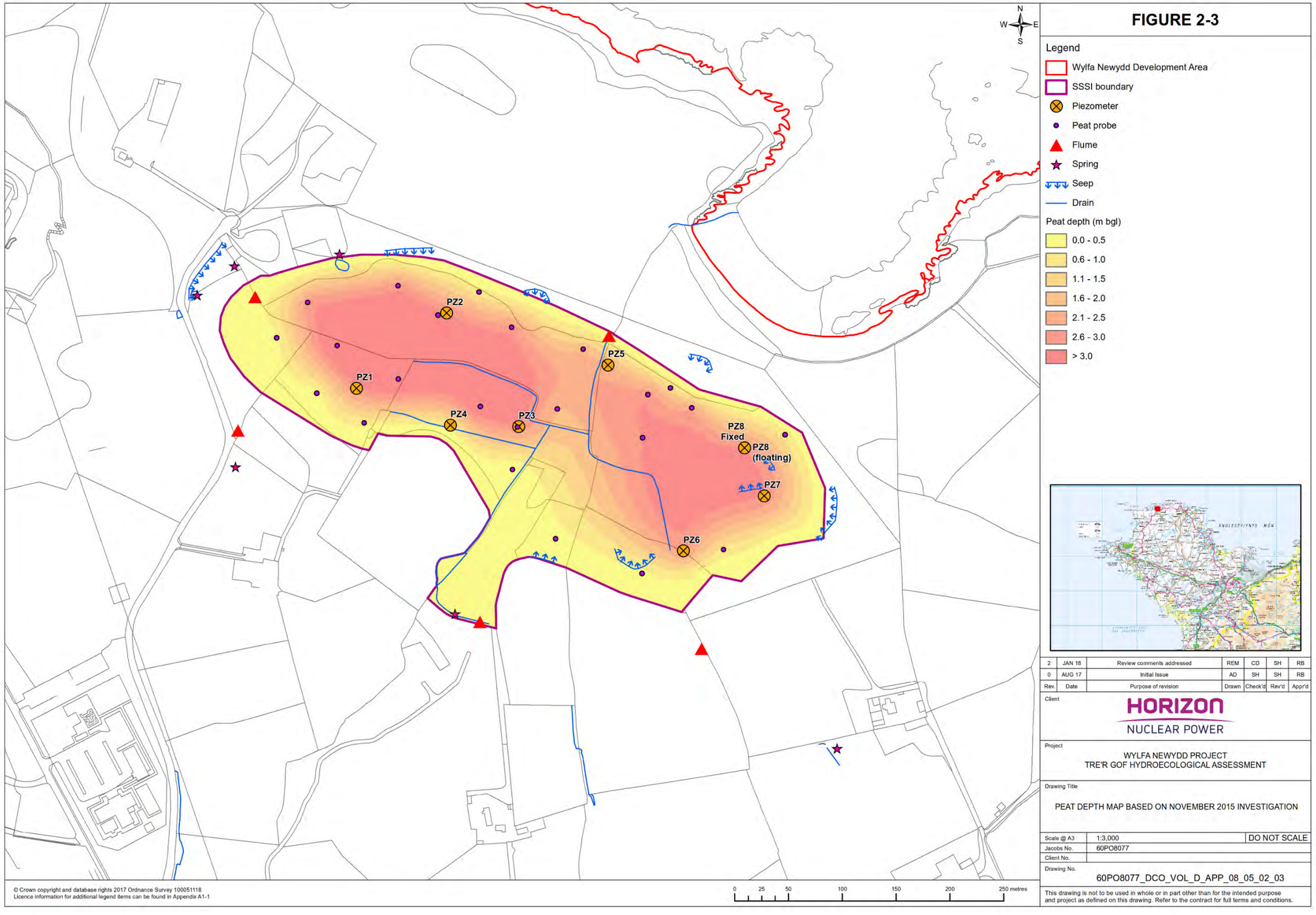
The results show that mineral soils are typically found at the edge of the SSSI. Along the northern boundary of the site, peat depths rapidly increased towards the centre line of the site with depths of greater than 2.5m BGL recorded within 30m of the site boundary in the north-western area. There was a more gradual increase in the depth of organic soils from the west, south and east sides of the site moving in towards the centre line.

Shallow samples of peat from PZ2 and PZ8 were scheduled for analysis of total and leachable concentrations of major ions; the results are included in appendix C. The aim of the sampling was to try to establish whether there was a source of carbonate within the peat. Concentrations of calcium were 15,200mg/kg at PZ2 and 19,400mg/kg at PZ8. To put the results into context, the average concentration of calcium in soils within a 50km radius of the Tre'r Gof SSSI (based on 61 samples) is 2,025mg/kg [RD6], an order of magnitude less than the concentrations recorded in the peat in the Tre'r Gof SSSI. This suggests that the peat within the Tre'r Gof SSSI is enriched with calcium, the potential source of which is discussed further below as part of the water quality assessment. The calcium enriched peat is likely to be important for the plant assemblages present in the fen. Concentrations of other metals measured in the peat, such as magnesium and potassium, are comparable to regional averages [RD6].

Peat was proven to a depth of up to 3.0m BGL by coring (although in some areas the full thickness of peat was not penetrated) and was observed to be underlain by very soft grey silty clay. This has been interpreted to be the top layer of the glaciolacustrine deposits that infill the Tre'r Gof basin. The results of the coring broadly accord with those in [RD11] that indicate typical peat thickness of 1 to 2m and a maximum of 3m.

Peat plays a crucial role in the maintenance of saturated conditions in a wetland; it is very porous and can store a lot of water. Saturated peat is typically 90–95% water by mass [RD18]. When peat is fully saturated, it can promote overland runoff as new recharge cannot be stored. Peat has a very low permeability that prevents significant groundwater flows [RD18], except where pipes are formed through the peat.

Figure 2-3 Peat depth map based on November 2015 investigation



2.4 Hydrology

The Tre'r Gof SSSI is an isolated 'inland' drainage basin. There are four main surface water drains that flow into the Tre'r Gof SSSI; these have been fitted with flumes referred to here as VN1, VN2, VN3 and VN4. These feed into a series of heavily vegetated drainage routes/channels that cut through the site to the single outflow point; this has been fitted with a flume identified as VN5. The locations of the flumes and drains are shown on figure 2-4.

In addition to the drainage inflows, numerous springs and seepage lines were identified by successive walkover surveys carried out between February 2015 and August 2017. The primary springs are identified as Spring A, B, C, D, F and G on figure 2-4. Spring E is located within the SSSI surface water catchment although it has no direct influence on the Tre'r Gof SSSI.

All of the influent drains are likely to have undergone a degree of human intervention, including areas of channel straightening, deepening or realignments and installing channels in areas of seepages and flushes. Figure 2-4 shows the Tre'r Gof Catchment and the current position of channels as well as springs and seeps relative to changes/breaks in slope.

2.4.1 Surface water flow routing

The approximate catchment areas contributing surface water flows to identified inflow locations are mapped on figure 2-4 with the key features outlined below.

- Based on local topography and drainage channels, the total surface water catchment area for the Tre'r Gof SSSI has been drawn and presented on figure 2-4. The total catchment area is estimated to be approximately 1km^2. The geometry of the catchment is elongated towards the south and south-west. This suggests that the majority of the surface water within the Tre'r Gof Catchment is derived from the south towards Tregele.

- The surface areas of the catchments that drain through flumes VN1, VN2, VN3 and VN4 cover a total area of 0.57km^2. The Tre'r Gof SSSI itself covers an area of 0.1km^2 which receives direct rainfall. This means that potential runoff to the Tre'r Gof SSSI and which discharges through flume VN5 includes an area of catchment of 0.33km^2, flows from which are not being recorded (i.e. 1km^2 – (0.57km^2 + 0.1km^2) = 0.33km^2). This 'ungauged area' of catchment is shown on figure 2-4 as the area in white, outside of the Tre'r Gof SSSI boundary, but inside the Tre'r Gof Catchment.

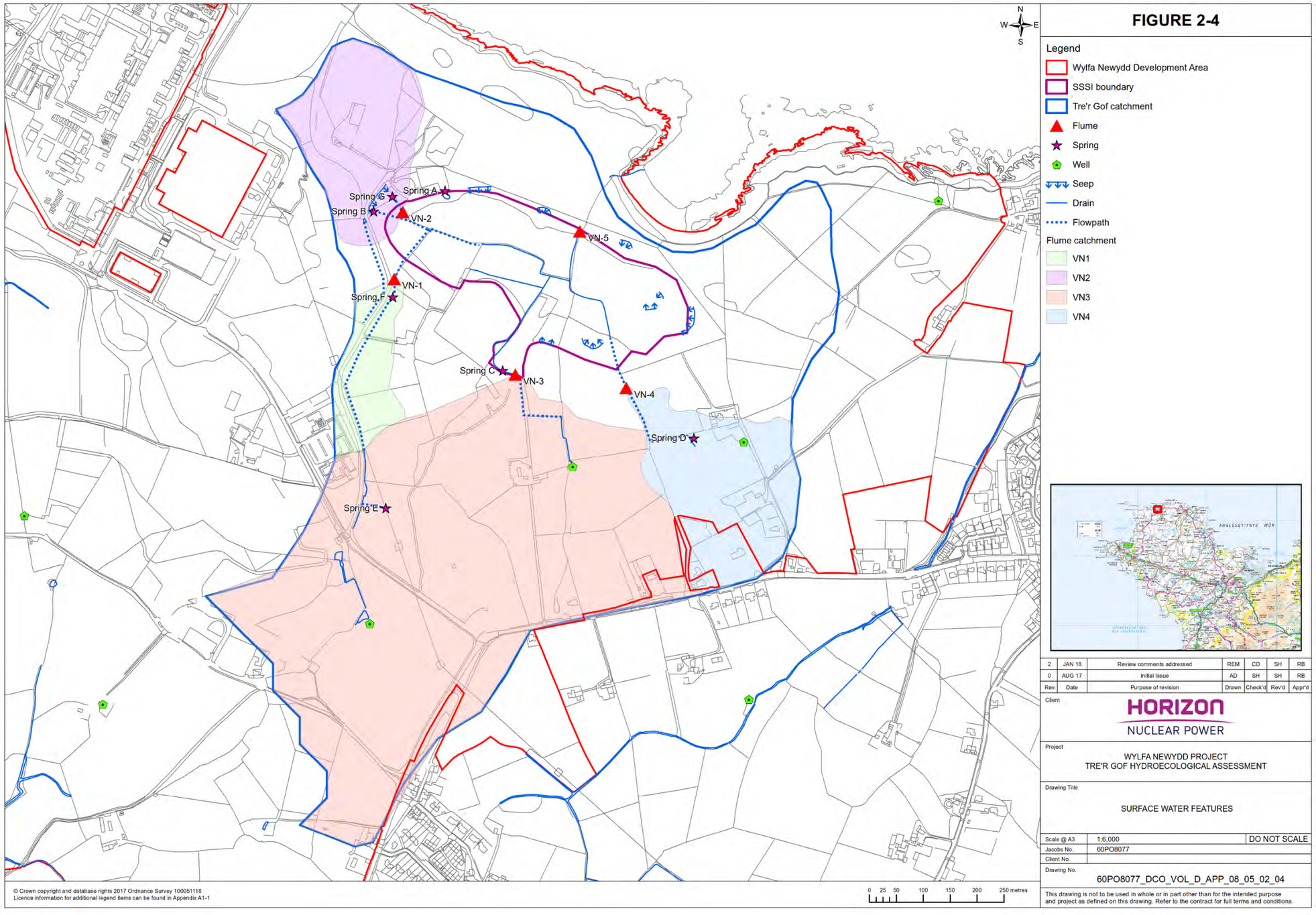
- The inflow to the east (VN4) appears to drain the land immediately upslope to the south but runoff from the slopes to the east and north-east of the SSSI, and the thin strip to the north, are not captured by flume inflow measurement (these are shown as white areas within the catchment on figure 2-4). There are no significant drains or watercourses in these areas.

- Runoff from a significant contributing area to the far south of the catchment drains to either VN1 or VN3 via a channel located immediately to the east of the Existing Power Station Visitor Centre. Exactly how water observed to be flowing within that channel reaches the wetland has not been confirmed, but based on observations of relative flow rates and the surface topographic form it is believed that this upper catchment is potentially connected to both of these flumes via a shallow groundwater flow pathway. In addition, there are

several culverts beneath the road that runs from the Existing Power Station Visitor Centre to Fisherman's Car Park and these take flow from the land to the south east of the Existing Power Station and direct it into the Tre'r Gof SSSI via VN1.

- Spring E is situated in this upper part of the catchment and flows that emerge on the surface disappear and are believed to re-emerge further down gradient at other springs and seeps closer to the SSSI.

Figure 2-4 Surface water features



2.4.2 Walkover surveys

The water features surveys carried out between February 2015 and August 2017 broadly confirmed the four significant surface inflow routes but also noted numerous point spring sources and several diffuse seepage areas (see figure 2-4). Significant observations are outlined below.

- During the walkovers it was identified that VN2 is sustained by Spring G. VN2 does not appear to receive any flows from Spring B which is ungauged. Spring B flows towards the west-east drain which bisects the Tre'r Gof SSSI. Spring G flows through VN2 and appears to flow year-round which is in contrast to other springs identified on site.

- Flume VN3 receives groundwater baseflow during the winter months. Spring C is located directly down gradient of the flume and no flow from this spring passes through the flume. The groundwater baseflow that is routed through VN3 is sourced from a deep ditch immediately up-gradient of the flume; this ditch is thought to intercept shallow groundwater flow in the winter months. Spring C was observed discharging during late spring in 2016 and 2017, but there were no flows passing through VN3.

- Between July 2015 and the end of October 2015, all of the peripheral springs and seepage zones dried up. Similarly, flows in VN1, VN3 and VN4 also ceased although a small amount of flow continued to occur through VN2 right through the summer/autumn period. This baseflow was recorded as inflow through flume VN2 and outflow at VN5. A similar pattern is observed during the summer, autumn and early winter months of 2016 with springs and seepage zones drying up between May and November/December, flows in VN1, VN3 and VN4 ceasing, and small amounts of flow continuing in VN2 and VN5. In 2017, springs and seepage zones were generally dry in the summer months. Flows in VN3 and VN4 ceased entirely, with flow in VN1 during only June 2017. Small amounts of flow continued in VN2 and VN5.

- Flume VN4 receives inflow from Spring D up-gradient. Between July 2015 and August 2017, VN4 was almost entirely dry, with minimal flow recorded in VN3 only between December 2015 and March 2016 and in March 2017. In 2016 and 2017 water was observed at Spring D in all months except August 2016, May 2017 and July 2017. However, in the majority of cases, the water observed was small pools of standing water of minimal or no flow.

- Flows from springs and flumes did not recommence until November 2015 with full flow returning during December 2015 after a period of heavy rainfall. This is consistent with walkover surveys carried out between September 2014 and February 2015, which noted similar behaviour in response to wetting up through the autumn period. The wetting up response was slightly later during 2016, with springs and flume flow reappearing in December 2016. The behaviour in 2017 has been similar based on observations to December 2017.

- Aside from Spring G, the observations suggest that the springs identified are not permanent features, but instead either emerge at different locations depending on where the water table is relative to the ground surface or flow following saturation of shallow ground. They may also be located where the peat, silts and clays in the Tre'r Gof basin

form a barrier to shallow groundwater flow. The groundwater supporting these features is likely to be predominantly from the superficial deposits, although in some localised areas it is possible that it is from groundwater in the bedrock.

- The occurrence of springs appears to be concentrated around the western side of the SSSI. When they occurred, those spring flows that were not directly feeding into flumes were never observed to be large (i.e. <0.5l/s) and were also observed to radiate out, flushing an extensive area rather than flowing into a defined channel.

- NRW NVC mapping (appendix A) identifies the presence of spring features. When these features were investigated by a Jacobs hydrogeologist they were found to be areas of diffuse seepage rather than point springs.

- During an exceptionally wet December 2015, overland flow was observed running off the catchment area into the Tre'r Gof SSSI; the hydrograph recorded at VN4 reflects this. The low permeability soils and superficial deposits in the catchment promote runoff during extreme rainfall events.

- The VN5 outfall discharges water to a culvert/buried pipe with a drop of 4m to 5m into Porth y Wylfa. There is some evidence from the landform and field boundaries that there was a north to south trending incised narrow valley in this location (possibly a geological fault) although the current outfall arrangement (via a culvert) is clearly not natural.

2.4.3 Flow data

The five permanent flumes were installed around Tre'r Gof in 2010 with the aim of providing a continuous, long-term record of inflows and outflows. The flumes were installed at locations as close as possible to the SSSI basin, at discrete inflow points where the stream was constrained in a defined channel and where it was possible to capture the majority of the flow in a single structure. However, it is noted that some seeps and flows occur downstream of the flumes and so not all of the inflows are captured at these locations. It is also recognised that there are a large number of seeps and flushes that flow into the SSSI, but which are not quantitatively monitored.

The flumes and associated loggers were not well maintained and by the end of 2014 no meaningful data were being collected. In addition, the limited records and observations over this period were not quality-assured. As a result, this information is not as useful as it might otherwise have been and there are no periods between 2010 and 2014 for which reliable flow data have been collected for all four inflow locations and the outflow from the Tre'r Gof Catchment.

The flumes were re-established in April 2015 and since then good quality flow data have been collected for all locations except for eight weeks in the summer and one week in the autumn of 2015 when the instrumentation at VN5 appears to have been tampered with. Similarly, flow data are absent for VN5 during January 2017 due to the logger needing maintenance.

Logging has continued since January 2017. During this period a number of issues have affected all the loggers with the exception of VN2. The logging equipment on VN5 was removed for maintenance between March and April 2017; Data from VN1 was lost during April 2017 due to a hardware malfunction; VN4 was removed for maintenance in May 2017 and was not re-installed until August 2017. VN3 was removed in July 2017 for maintenance and was replaced until after

August. As a result of these data gaps the analysis remains focussed on the period until February 2017.

The following descriptions and analyses are based on the data collected between April 2015 and August 2017, but are also informed, albeit to a lesser extent, by the observation from the earlier period of flow monitoring.

2.4.4 Hydrographs

Understanding how surface water inflows and outflows behave can yield information regarding their origin. The following section seeks to characterise surface water inputs using available data. This information is presented in table 2-2 with flume hydrographs presented in figure 2-5, figure 2-6, figure 2-7, figure 2-8, figure 2-9 and figure 2-10.

Table 2-2 Description of flume and flow data

Flume ID	Channel description	Elevation m AOD	Description of flow
VN1	Inflow. Steep runoff route over hillock, poorly defined channel, approximately 0.3m deep and 0.5m wide.	12.35	See figure 2-5 which shows total daily discharge. During the spring months of April and May 2015 and 2016, flows through VN1 were relatively steady. During the dry summer months there was typically no flow at VN1 suggesting that the majority of rainfall infiltrates into the soil. However, following very extreme and prolonged rainfall events surface water flows do occur through VN1 (e.g. early May 2015 – see figure 2-5). Whilst occasional and short in duration, these inflows are the most significant observed surface water inputs into the wetland during the summer and probably suggest runoff from impermeable surfaces such as the road up-gradient of the flume. After the summer dry period, regular flows restarted in mid to late November 2015 and in early December 2016. These flows were very peaky and periodic in nature, but following full wetting up of the catchment in early December 2015 and mid-December 2016, regular and consistent strong flows of 1–3l/s were observed with significant peaks during storms. The largest of these peaks, on 26 December 2015, exceeded 30l/s for a short period of time. These peaks receded quickly (within 24hrs) back to the baseflow level indicating a rapid response to rainfall which is typical of low permeability soils. During these wet periods (more notably December 2015), VN1 had a strong baseflow component, which increased in its significance through the wet winter, ultimately contributing around 30% of total inflows to the wetland. The observations suggest that flume VN1 receives surface runoff flows from a small catchment immediately upstream that contains some impermeable areas. Runoff from this area is however much more significant when ground conditions are already wet.

Flume ID	Channel description	Elevation m AOD	Description of flow
			In addition, during extended wet periods when more remote upstream areas are saturated, these flows are consistent and significant and there is a component of this flow that has a long lag time of the order of at least one month.
VN2	Inflow. No defined channel, flow over flat margin of SSSI.	6.46	See figure 2-6 for daily discharge. The flows observed at VN2 are predominantly fed by a spring and surface water runoff does not appear to be significant in comparison to spring flow. Unlike other inflows, there is almost always water flowing through VN2. Flow varies between 1.5l/s and 3.5l/s in winter and no flow and 1.3l/s in summer. Flows typically extend right through the summer, although they are very low, with a few instances where no flow is recorded. The lack of a defined channel and restrictions to the embedment of this flume mean that it is possible that shallow groundwater flows may bypass this flume resulting in an underestimation of flow within this sub-catchment.
VN3	Inflow. Incised field drain running approximately 0.8m deep and 1.5m wide along field boundary.	8.07	See figure 2-7 for daily flows. From recommencement of monitoring in April 2015 through to early autumn 2015 there was no flow at VN3 aside from a short period (eight days) in May 2015 and some very short peaks in response to larger rainfall events. Following a series of large rainfall events in November 2015, for which no flow was observed, significant flows through the flume commenced in early December and ranged from 5l/s to 12l/s with large, but short, responses during storms that peaked at over 30l/s. These inflows are very important volumetrically for the wetland and contribute up to 60% of total inflow over certain periods, typically about a week after significant rainfall. Some flow was also observed rising downstream of the flume and while this was not large (<1l/s) this discharge was a little more persistent than those through the flume. A similar pattern was observed in 2016, with no flow at VN3 in late April through to mid-November, with the exception of some short peaks in response to larger rainfall events in mid-summer 2016 and a small, one-week period of heavy rain in September. Flows through the flume commenced in early December 2016 and ranged from 1l/s to 2l/s with short-lived peaks at around 6l/s. The observations suggest that during wet periods baseflows arriving at VN3 are derived from shallow groundwater within the till, but that this does not flow until the sub-catchment is saturated and groundwater levels have exceeded the elevation of the ditch. In addition, the small peaks show that surface flows from the fields immediately up-gradient are also routed via VN3 and that particularly when the ground is saturated these flows, while short in duration, can be significant. The lack of a defined channel and restrictions to the embedment of this flume mean that it is possible that shallow

Flume ID	Channel description	Elevation m AOD	Description of flow
			groundwater flows may bypass this flume resulting in an underestimation of flow within this sub-catchment.
VN4	Inflow. Barely any channel present. Slight depression along field boundary indicating occasional flow path.	9.23	See figure 2-8 for daily flows. During the dry summer and early autumn of 2015 no flow was observed at this location except for very short periods following significant rainfall events. The spring, summer and early autumn of 2016 also had no flow in VN4. Following the very wet period in November 2015 regular flow commenced at VN4 contributing up to 20% of total inflows into the wetland during storm periods. These flows responded very quickly to rainfall events and had a small baseflow component, but at their peaks were (for short periods), in excess of 50l/s. In the winter of 2016, very low flows commenced in late December (<1l/s), with only two peaks observed in late November and early December, in response to heavy rainfall events, in the region of 3–10l/s. The observations are suggestive of a significant local catchment, which is dominated by surface water runoff. There is no evidence of groundwater baseflow; the baseflow observed (only in very wet conditions) probably related to slightly slower throughflow from shallow soils over a period of 48 hours following a storm. The lack of a defined channel and restrictions to the embedment of this flume mean that it is possible that shallow groundwater flows may bypass this flume resulting in an underestimation of flow within this sub-catchment.
VN5	Outflow point. Well-formed channel, 1.5m deep and 2.5m wide.	5.75	Outflow point, see figure 2-9 and figure 2-10 for daily discharge. Outflows vary significantly in response to conditions and range between no flow being observed, to peaks of around 250l/s. During wetter periods, discharges via VN5 are variable, but are more subdued than inflows with peak discharges occurring about 48 hours after a rainfall event. This suggests that during the winter, flows take around two days to move through Tre'r Gof basin.

Figure 2-5 VN1 Hydrograph – inflow expressed as m^3/d (note there is no rainfall data for 2017 for the Wylfa Newydd Development Area rain gauge)

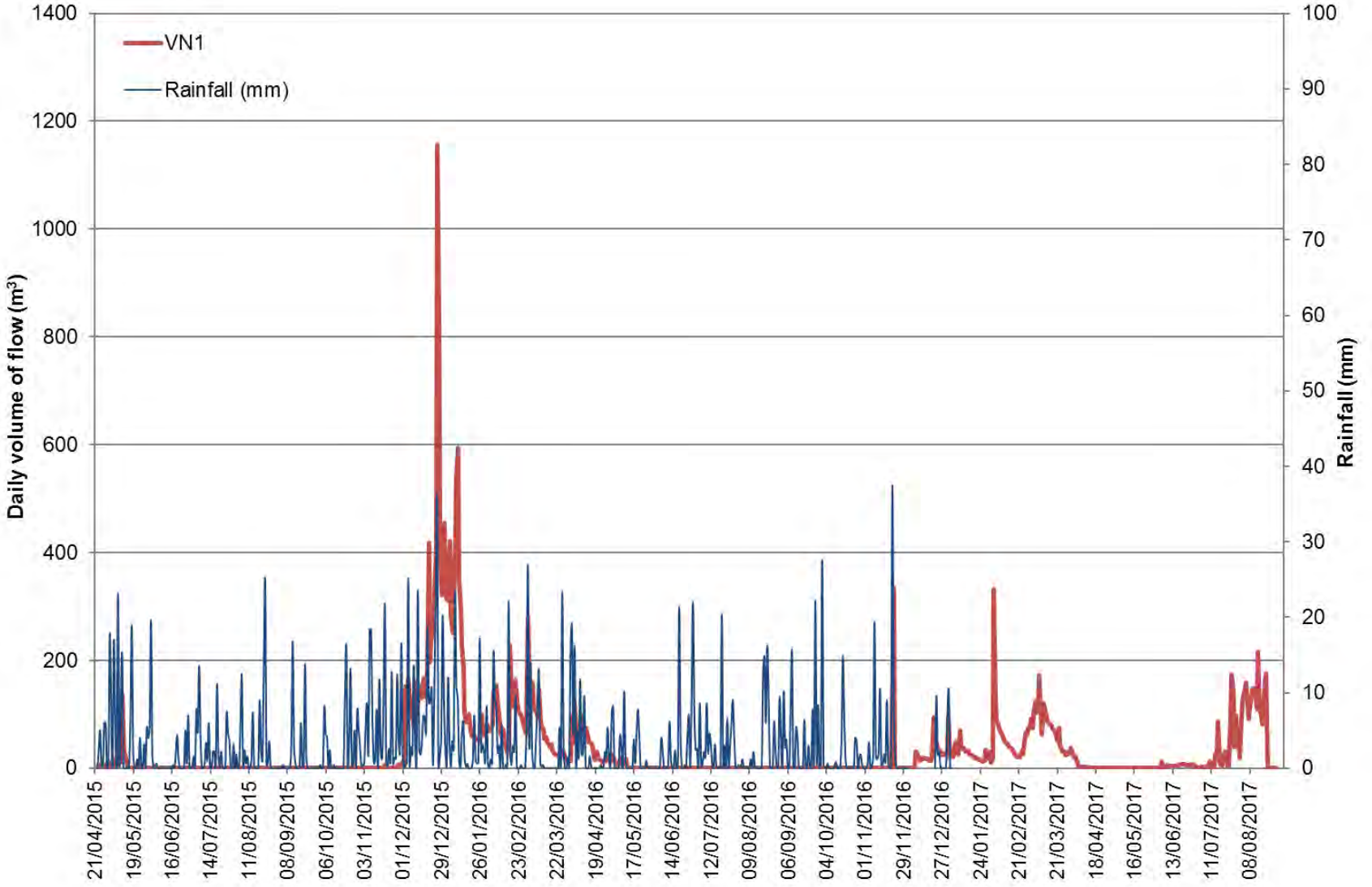


Figure 2-6 VN2 Hydrograph – inflow expressed as m^3/d (note there is no rainfall data for 2017 for the Wylfa Newydd Development Area rain gauge)

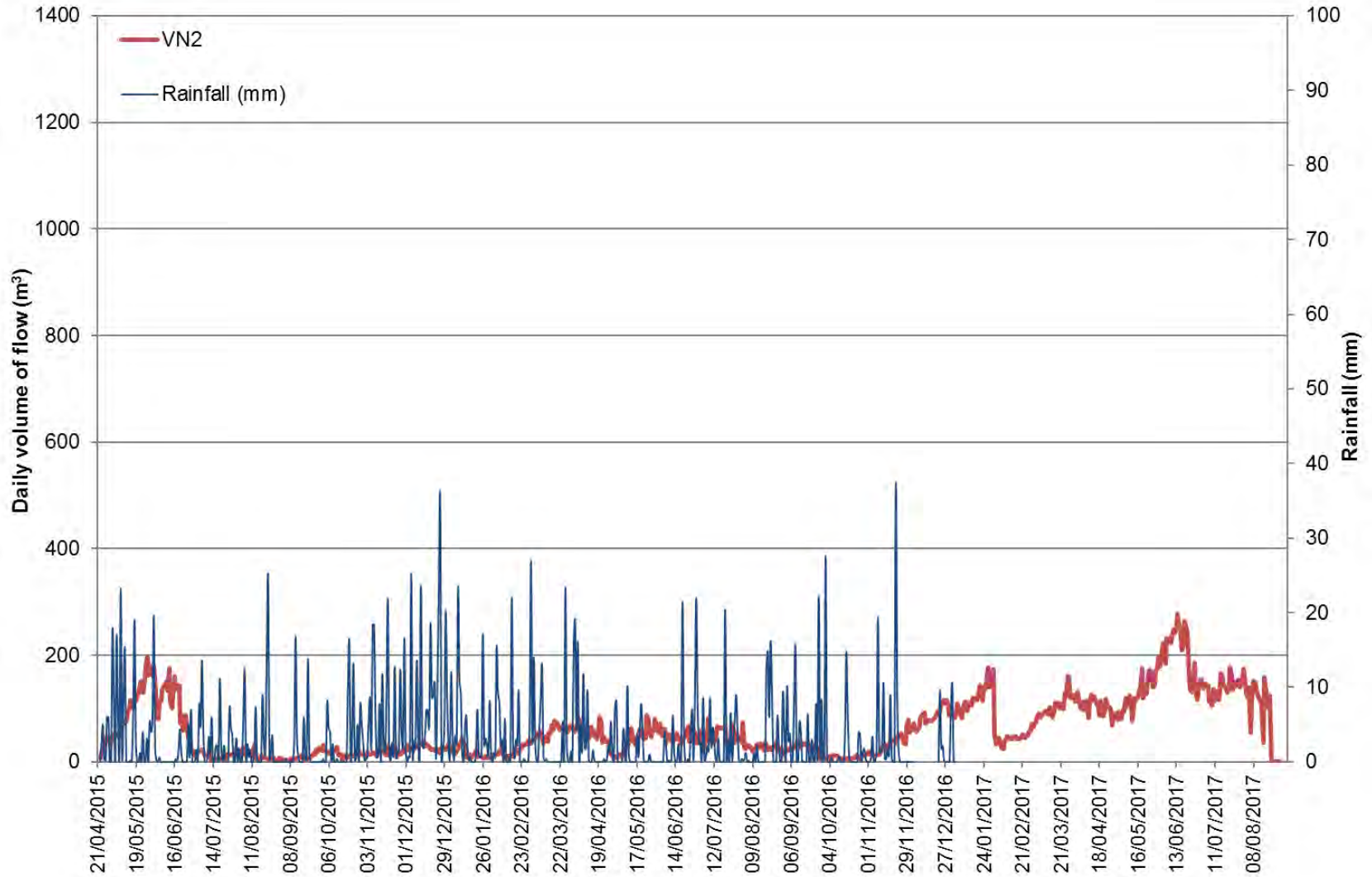


Figure 2-7 VN3 Hydrograph – inflow expressed as m^3/d (note there is no rainfall data for 2017 for the Wylfa Newydd Development Area rain gauge)

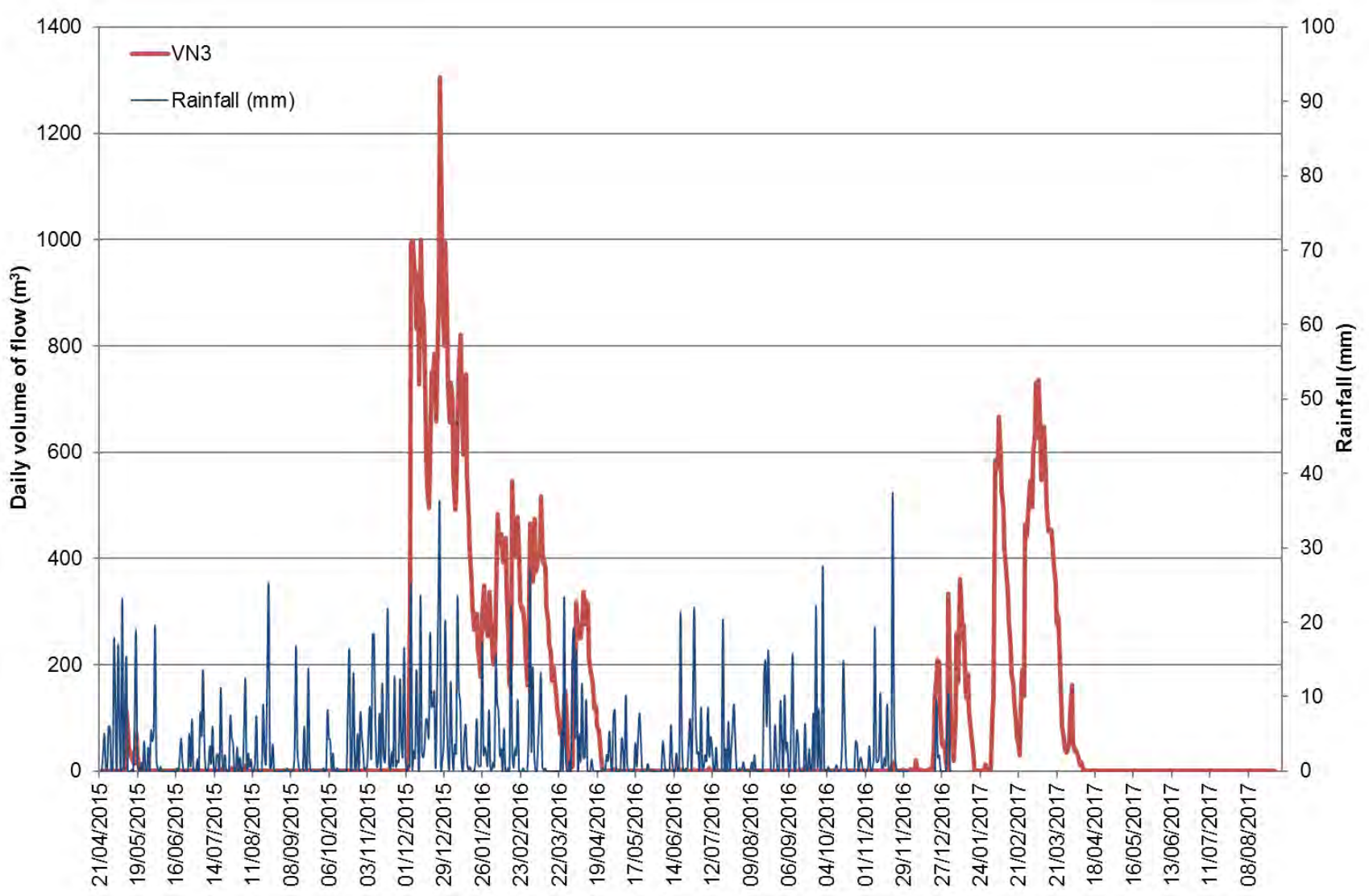


Figure 2-8 VN4 Hydrograph – inflow expressed as m³/d (note there is no rainfall data for 2017 for the Wylfa Newydd Development Area rain gauge)

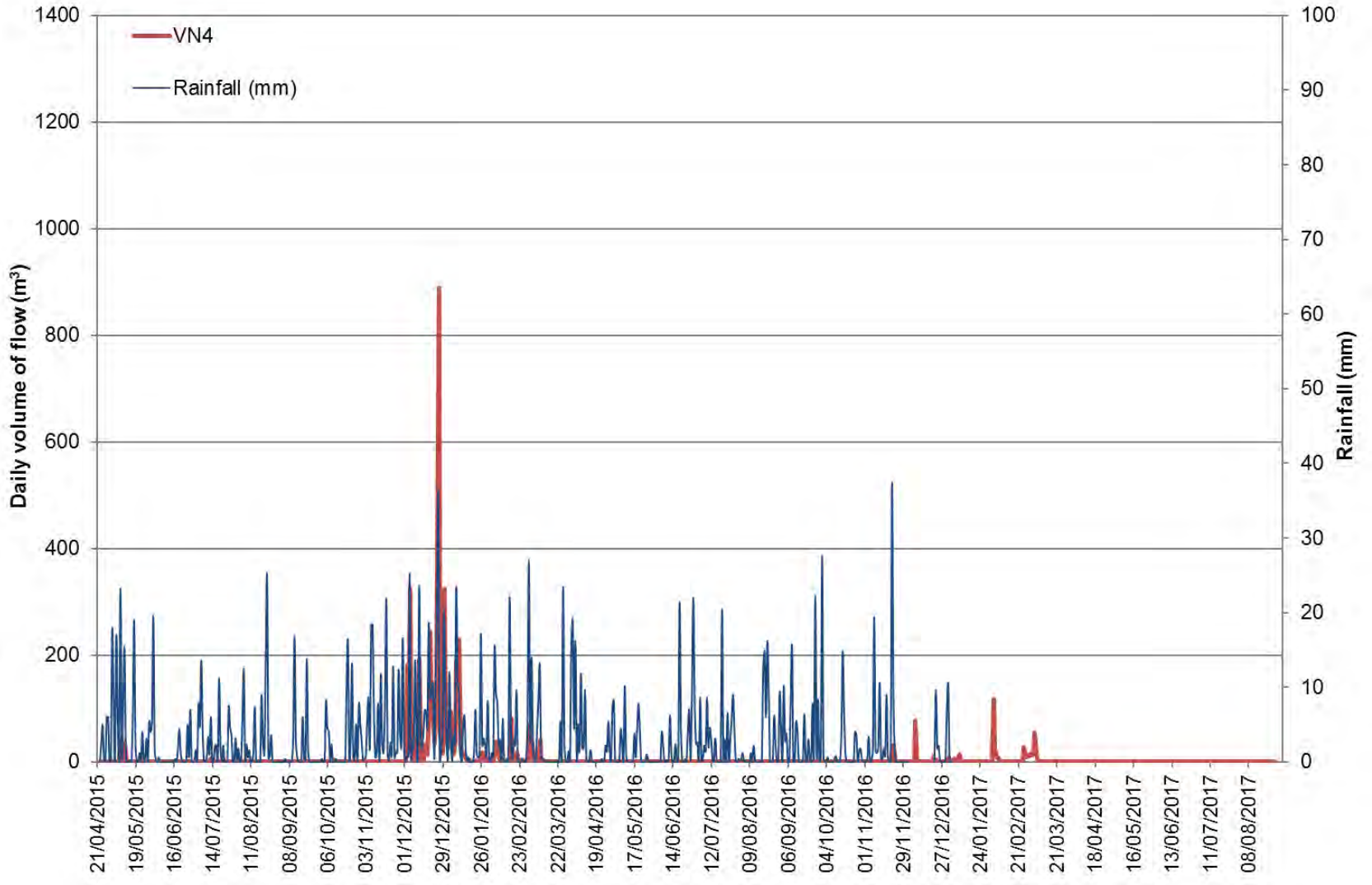


Figure 2-9 VN5 Hydrograph - outflow expressed as m^3/d (scale as per VN1-VN4 to allow comparison) (note there is no rainfall data for 2017 for the Wylfa Newydd Development Area rain gauge)

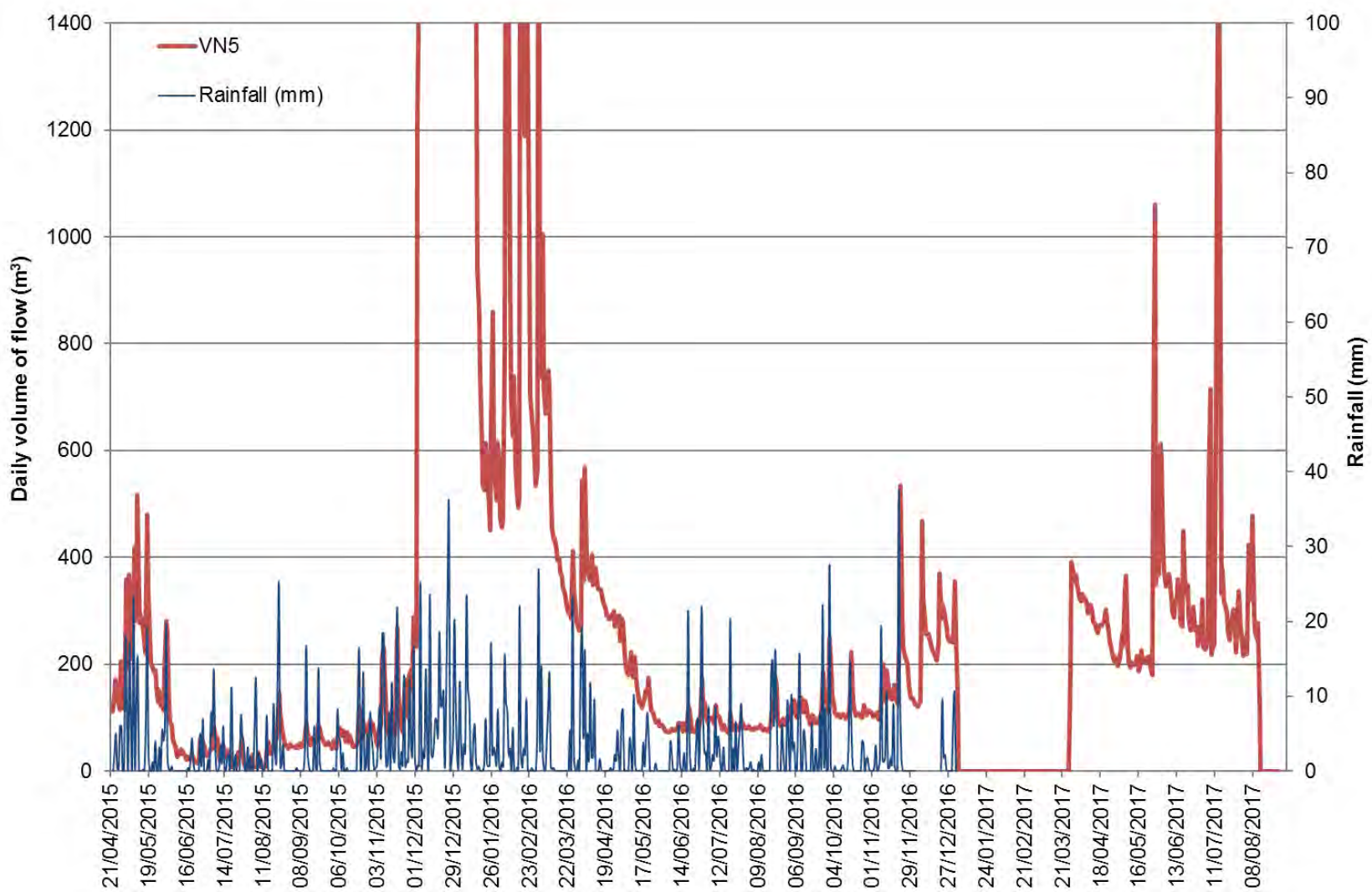
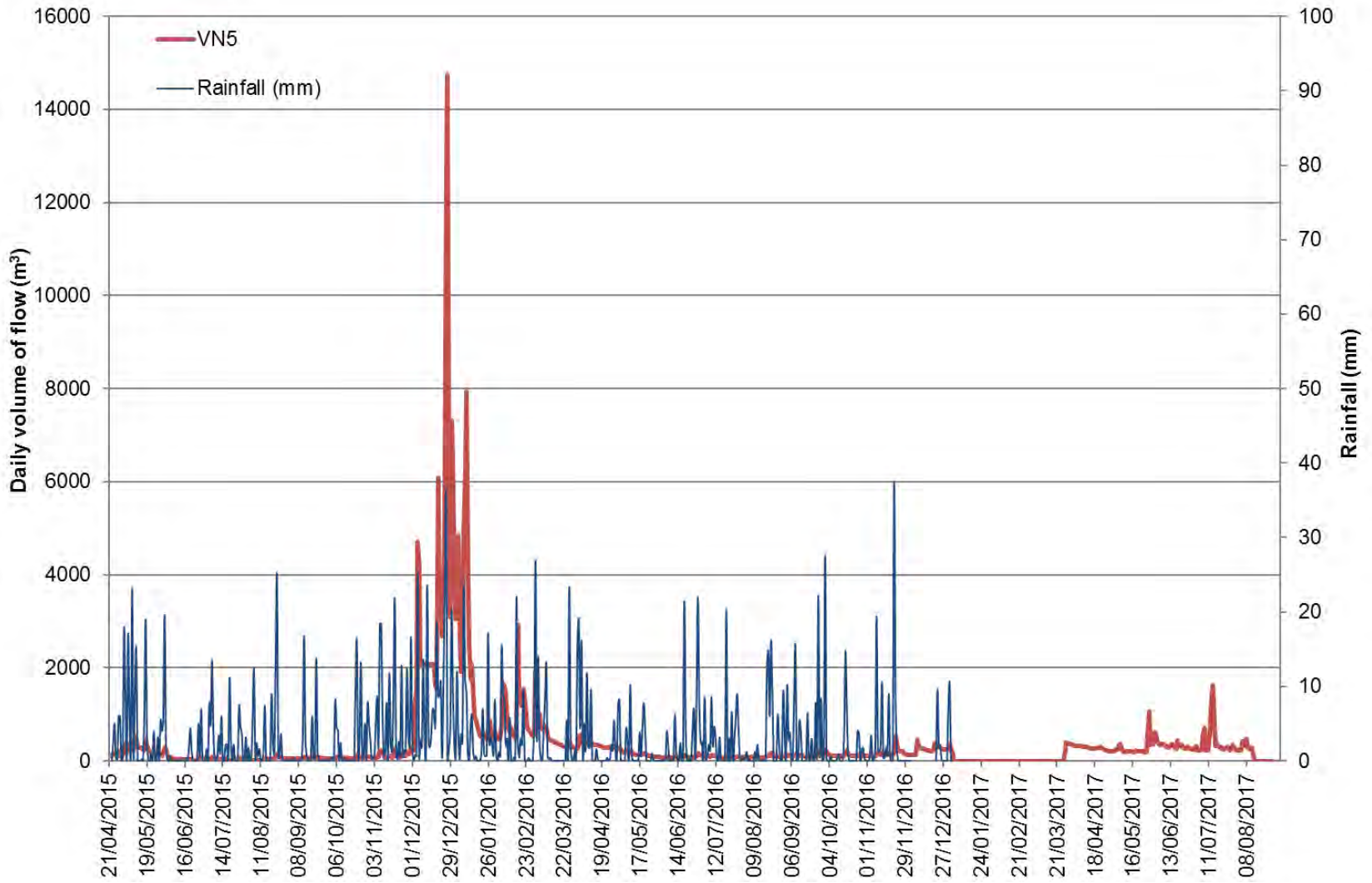


Figure 2-10 VN5 Hydrograph - outflow expressed as m^3/d (full scale to show peak daily discharges) (note there is no rainfall data for 2017 for the Wylfa Newydd Development Area rain gauge)



Data from the recorded inflows together with meteorological data collected within the Wylfa Newydd Development Area have been used to calculate a water balance for the period May 2015 to November 2016 (data from 2017 is not assessed due to data limitations). Details of this analysis along with the limitations and assumptions are presented within Appendix D. Although there are significant limitations to the data, the exercise does provide some broad conclusions, that when considered along with other lines of evidence, contributes to our understanding of the hydrology of the Tre'r Gof SSSI.

The key conclusions from the water balance estimation are summarised below:

1. During late spring and summer the inflows and outflows more or less balance. However, during the winter months there tends to be much greater inflow to the catchment than outflow suggesting that water moves into storage at this time and the fen becomes saturated. This is supported by observations of the basin becoming submerged in winter and the surface dying out in summer.

2. Flows through the gauged watercourses are of relatively minor importance in terms of total volumes entering the basin.

3. The near balance between inflows and outflows in spring and summer suggests that the drainage channels through the fen act largely as a throughflow system with limited interaction with the fen. When water levels in the ditches are low this will result in localised drainage from the fen (hence outflows are slightly greater than inflows), but due to the low permeability of the peat this is likely limited to areas in the immediate vicinity of the ditches and only has a limited effect on the fen.

4. During dry periods outflows were greater than inflows, indicating that the SSSI was drying out. However, there are typically only two months of the year when outflows significantly exceed inflows and the peat fen can be considered to be drying. Clearly this will vary from one year to the next, but it does suggest that there is sufficient water within the fen to maintain its current wetland status.

5. After the SSSI has re-saturated in the wet winter months (i.e. December onwards), inputs of rainfall showed a rapid response in discharge peaks via VN5 (figure 2-9) indicating that the fen had become saturated with direct rainfall, resulting in rapid overland flow and throughflow to the drainage ditches

2.5 Hydrogeology

2.5.1 Groundwater monitoring

There is a comprehensive groundwater level and quality-monitoring programme in place across the Wylfa Newydd Development Area. There are over 100 groundwater monitoring installations and logger data from all of these installations have been used in the production of groundwater contour plots. Details of the installation of the boreholes are presented in appendix D8-3 (Application Reference Number: 6.4.28).

There are 100 groundwater monitoring installations in the Wylfa Newydd Development Area (see appendix D8-3 (Application Reference Number: 6.4.28) and figure 2C in that document for

details), of which the following groundwater-monitoring boreholes are installed within the Tre'r Gof SSSI surface water catchment area:

- Superficial tills - BH309CP, BH310CP, BH311CP, BH524CP, BH525CP, BH526CP.
- Shallow/weathered bedrock - BH309RS, BH310R1, BH524R, BH525R, BH526RS.
- Deeper bedrock - BH529RD, BH309RD, BH310R2.

Whilst there is a spatially variable degree of continuity between water within the superficial deposits and the bedrock, flow mechanisms and flow rates vary within these strata which can be seen in the rates of groundwater recharge and water levels in paired installations. Therefore, although there is a degree of continuity between groundwater in these geological units, they are considered separately.

Borehole logs and installation details are provided in appendix E and the location of those boreholes around the Tre'r Gof SSSI are shown in figure 2-19. In addition to the groundwater-monitoring boreholes, water-level loggers were installed in piezometers installed into the peat in the Tre'r Gof SSSI (PZ1, PZ2, PZ3, PZ4, PZ5, PZ6, PZ7, PZ8 fixed and PZ8 floating). Installation details are shown in appendix E with the locations shown on figure 2-3.

2.5.2 Groundwater flow

Groundwater contour plots have been prepared for summer (September 2016) and winter (December 2015) seasons using data from the superficial (including piezometers) and bedrock boreholes. These plans are presented in appendix F. The bedrock and superficial deposits have been plotted separately as in some areas the two do not appear to be in hydraulic continuity, although in other areas they are. This is a fundamental issue with heterogeneous deposits such as glacial till. This approach is consistent with that adopted in the appendix D-3 (Application Reference Number: 6.4.28) and which draws on information from a much larger number of boreholes that penetrate the glacial till and that indicate the matrix is dominantly clay based which likely indicates limited continuity.

The bedrock groundwater level plots show that the flow direction is typically towards the coastline. A groundwater divide, trending from the south-east towards the north-west under a slight topographic ridge, passes close to Tregele village. Groundwater west of the divide flows north-west across the Wylfa Newydd Development Area towards Porth-y-pistyll and Cemlyn Bay, whilst groundwater east of the divide flows towards Porth y Wylfa. A further divide is present to the east, close to the eastern extent of the Tre'r Gof surface water catchment.

With respect to the Tre'r Gof SSSI, the hydraulic gradient in the bedrock is slightly steeper to the immediate south west of the SSSI, in comparison to that beneath the SSSI. This could be the effect of the groundwater in the steeply dipping bedrock surface at the Tre'r Gof basin meeting the lower permeability glacial deposits (silts and clays) which infill the basin, although as there are few boreholes in this area it is difficult to be certain. Groundwater levels continue to decline north of Tre'r Gof towards the coast with groundwater in the bedrock discharging to the sea.

In the superficial deposits groundwater flow is more strongly influenced by the surface topography including the basin and the drumlins with significant components of east, west and south flow from the surrounding steep hills and slopes. The contours suggest that groundwater in the till north of the SSSI also flows into the Tre'r Gof SSSI emerging as a seepage line and springs at the wetland edge, although potentially some water could infiltrate to groundwater beneath the

SSSI. There is also potential for water to move through the till directly to the coast, especially further north of the SSSI. The contours suggest that most of the groundwater in the superficial deposits discharges into the wetland, unlike groundwater in the bedrock aquifer, where the majority of flow discharges towards the sea. Horizontal hydraulic gradients around Tre'r Gof in both bedrock and superficial deposits are relatively steep reflecting the steepness of the local topography. Gradients are estimated to be between 0.02 and 0.03.

2.5.3 Groundwater levels

Groundwater level monitoring in boreholes indicates that seasonal minimum groundwater levels generally occur around September to October and maximum levels occur around December to January. Actual peak and low water levels will depend on the rainfall pattern over the seasons.

Groundwater levels in both bedrock and superficial deposits can fluctuate by up to 4m over the course of a year. The water levels in the superficial deposits often differ from those in the bedrock. In the case of BH526, the difference is quite significant due to the depth of the well screen in the bedrock borehole with the water level in the drift being higher than the bedrock. In BH309 the vertical hydraulic gradient is reversed with the groundwater level in the bedrock higher than within the superficial deposits.

During the wet winter months, groundwater levels around the southern and western margins of the SSSI in both the superficial and bedrock deposits are close to the ground surface (524CP, 524R, 525CP and 525R), fluctuating between approximately 6m AOD (summer) and approximately 10m AOD (winter). This is approximately the same elevation as observed occurrences of seeps and springs. The response in all boreholes is reasonably consistent within the monitoring period with the highest water levels in late December 2015/early January 2016.

Groundwater levels intersect the ground surface along the southern margin of the SSSI during the winter months (309CP, 309R and 309RO). Walkover surveys of the wetland noted that Springs A, C, D, E and F were all dry from July 2015 through to early November 2015 and again from May 2016 through to December 2016. By December 2015 and January 2017, springs had reappeared, corresponding with a rise in groundwater levels in response to rainfall (see appendix G). The seasonality of these springs suggests that they only flow at the surface following winter rain when the water table rises and intersects the ground surface. However, below surface flows into the basin may continue for a period following the cessation of surface flows.

Water level variations have been assessed in boreholes around Tre'r Gof SSSI in order to try to determine if bedrock and superficial groundwater are in hydraulic continuity and to assess the importance of seasonal variations in level for water movement into the SSSI. Four groups of boreholes have been analysed, with the boreholes in each group being completed to different depths.

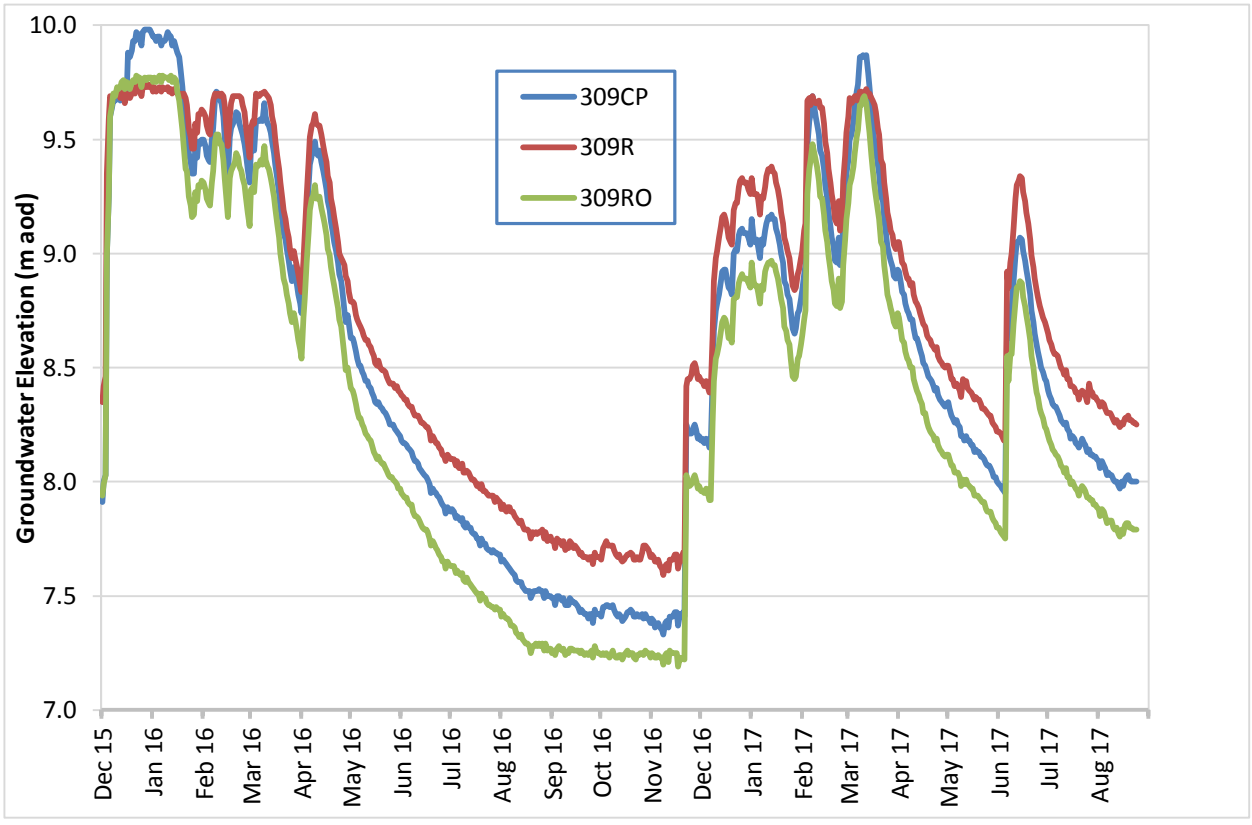
The first group is of three boreholes to the south of the SSSI, details of which are summarised in table 2-3.

Table 2-3 Installation details for the three boreholes to the south of the Tre'r Gof SSSI

BH	Ground Level (m AOD)	Well Screen (mbgl)		Well Screen (m AOD)		Strata
		from	to	from	to	
309RO	9.54	1.7	2.5	7.8	7.0	Clayey gravel and clay
309CP	9.45	5.0	7.0	4.5	2.5	Sandy boulder clay
309R	9.39	30.0	35.0	-20.6	-25.6	Weathered bedrock (overlain by sand and clay layers)

The water level plots in figure 2-11 show a range in water level variation of around 3m with a typical seasonal variation of winter high and summer low with all boreholes responding quickly to rainfall. Figure 2-11 shows a very similar response to rainfall in all three boreholes with the water level in the weathered bedrock borehole almost always the highest and very slightly damped compared to the other two holes. However, there is as much difference between the two boreholes installed in the drift as there is between the drift and weathered bedrock borehole, even though all boreholes are within a 5m radius. This indicates that the weathered bedrock and drift deposits are likely to be in hydraulic continuity at this location, but that there are local variations.

Figure 2-11 Groundwater levels recorded by the three boreholes to the south of the Tre'r Gof SSSI (December 2015 to August 2017)



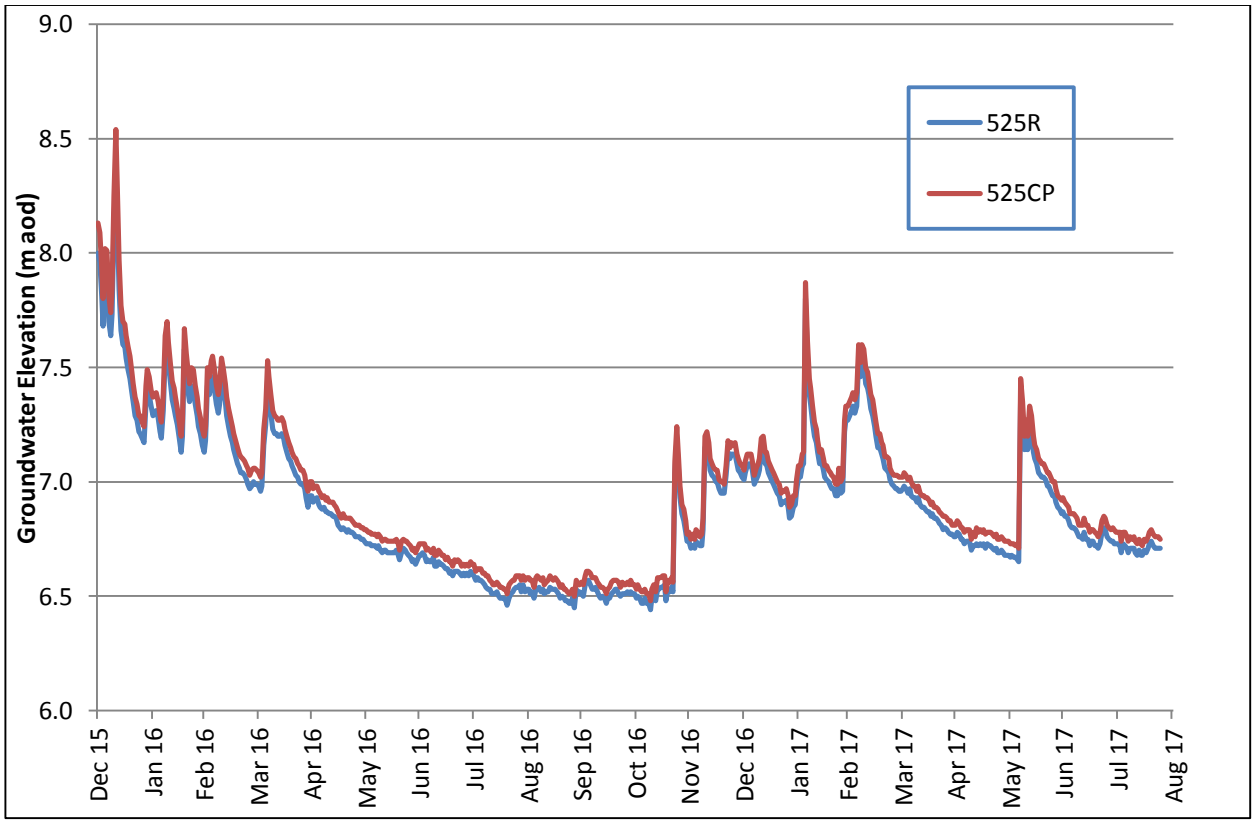
Also to the south of Tre'r Gof is a group of paired boreholes, with one well screen completed in the drift and one in bedrock, albeit that the lower end of the well screen in the drift is only just over 1m from the upper end of the bedrock well screen (see table 2-4).

Table 2-4 Installation details for the two paired boreholes to the south of the Tre'r Gof SSSI

BH	Ground Level (m AOD)	Well Screen (mbgl)		Well Screen (m AOD)		Strata
		from	to	from	to	
525CP	10.85	3.4	5.3	7.5	5.6	Gravelly clay
525R	10.76	6.6	12.6	4.2	-1.8	Bedrock (overlain by sandy gravelly clay)

The water levels in these two boreholes, between December 2015 and August 2017 (see figure 2-12), are comparable with only a very minor variation between them suggesting that they respond in unison to rainfall and that the drift and bedrock are in hydraulic continuity at this location.

Figure 2-12 Groundwater levels recorded by the paired boreholes to the south of the Tre'r Gof SSSI (December 2015 to August 2017)



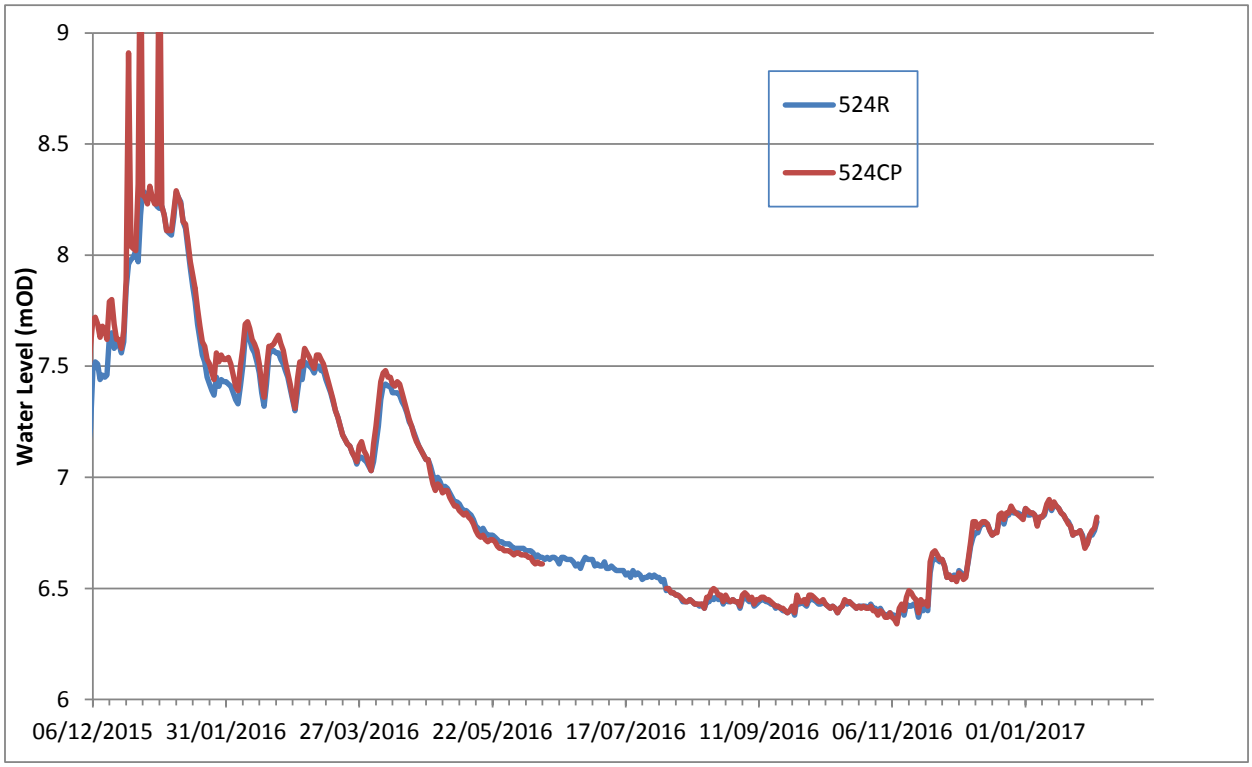
To the west of the Tre'r Gof SSSI is another pair of boreholes, with one screened in the drift and one in the bedrock, albeit with only 1m between the base of the drift well screen and the top of the bedrock screen (see table 2-5).

Table 2-5 Installation details for the paired boreholes to the west of the Tre'r Gof SSSI

BH	Ground Level (m AOD)	Well Screen (mbgl)		Well Screen (m AOD)		Strata
		from	to	from	to	
524CP	9.63	3.0	6.5	6.6	3.1	Clay
524R	9.56	7.5	19.0	2.1	-9.4	Bedrock (overlain by clay)

The water levels in these two boreholes are shown in figure 2-13 below, and are generally comparable, with only a very minor variation between them suggesting that they respond in unison to rainfall and that the drift and bedrock are in hydraulic continuity at this location. However, in December 2015/January 2016 there was heavy rainfall that resulted in significant and rapid changes in water level in the shallower of the two boreholes, but not a response in the deeper hole, which suggests that the drift and bedrock are not in complete continuity.

Figure 2-13 Groundwater levels recorded by the paired boreholes to the west of the Tre'r Gof SSSI (December 2015 to January 2017 (Logger data is missing after January 2017)



To the north of Tre'r Gof is a group of three boreholes, the installation details for which are provided in table 2-6 below.

Table 2-6 Installation details for the paired boreholes to the south of the Tre'r Gof SSSI

BH	Ground Level (m AOD)	Well Screen (mbgl)		Well Screen (m AOD)		Strata
		from	to	from	to	
526CP	9.75	8.1	11.8	1.7	-2.1	Slightly gravelly sandy clay
526RS	7.89	17.0	23.0	-9.1	-15.1	Clay
526RD	7.89	26.5	39.0	-18.6	-31.1	Bedrock (overlain by clay)

The water level data are markedly different between the shallow drift borehole and the deep drift and bedrock installations (see figure 2-14). The latter two respond in exactly the same manner, although it should be noted that the well screens for RS and RD are both 50mm diameter and are installed in a 121mm diameter borehole so there is the potential that the seals between the two wells screens are not water tight allowing water to move from one screen section into the other.

Figure 2-14 Groundwater levels recorded by the paired boreholes to the south of the Tre'r Gof SSSI (December 2015 to August 2017)



Hydrographs representing the water levels from monitoring installations within different strata at BH310 located to the south east of Tre r' Gof are presented in Appendix G. These show a pattern similar to BH525, BH524 and BH309 where groundwater levels within the different strata respond

in unison to rainfall events and intervening dry period Table 2-7 summarises the range in water levels for these paired installations within the Tre'r Gof surface water catchment. Installation details are presented in appendix E.

Table 2-7 also shows the differences between the water levels in the superficial deposits and bedrock on the same date for each pair of boreholes. This indicates that in BH309 and BH525 there is very little difference in head in either summer or winter. Both of these boreholes are on the southern side of the Tre'r Gof SSSI and the bedrock and superficial deposits at these locations may be in hydraulic continuity. In both instances the water levels in the superficial deposits on the date shown in table 2-7 is slightly higher than in the bedrock indicating a slight downward hydraulic gradient. However, at BH309, the hydrographs in figure 2-11 indicate that the hydraulic gradient is generally upward with the water level in the bedrock being higher than in the superficial deposits.

There is a significant difference in water levels in the bedrock and superficial deposits at BH524 and BH526, both of which are on the northern side of Tre'r Gof, although in the case of BH526 this is likely due to the very deep completion of the bedrock borehole. At BH524 the direction of the hydraulic gradient changes from winter to summer potentially indicating some upward groundwater movement from the bedrock in summer, although this appears to be limited to this location.

Overall the data do not suggest any consistency across Tre'r Gof regarding hydraulic continuity between the drift and bedrock. There are variations across to the area due to heterogeneous drift deposits that vary both spatially and with depth and a highly fractured aquifer the surface of which has been strongly affected by glacial action.

Whilst it is acknowledged that there is a degree of continuity between the shallow groundwater within the superficial deposits and deeper groundwater within the bedrock, the data presented suggests that this is not consistent across the site. Therefore, the conceptual model of the site identifies the two different groundwater units whilst accepting that there is interaction between them.

Table 2-7 Groundwater levels in paired boreholes in the Tre'r Gof Catchment area (range based on all monitoring data)

Borehole pairs	Target **g**eology	Borehole **d**epth (m BGL)	Groundwater **l**evel (m AOD)				Range (m)	Difference in **g**roundwater **l**evel (m) on set date		Notes
			Summer **l**ow	Date	Winter **h**igh	Date		Summer **l**ow	Winter **h**igh	
BH309RO	Superficial	2.5	6.34	20/9/15	9.78	5/1/16	3.44	0.01 (10/9/11)	0.05 (5/1/16)	Water level response to rainfall is similar in both holes, but response is greater in superficial deposits and water level in superficial is generally higher.
BH309R	Rock	35	6.87	8/3/15	9.74	22/12/15	2.87			
BH524CP	Superficial	6.5	5.79	19/7/16	9.59	4/1/16	3.80	-0.76 (20/7/16)	1.38 (4/1/16)	Water level in the superficial deposits is generally higher than bedrock with a very high peak in Jan 2016.
BH524R	Rock	19	5.94	17/9/13	8.29	28/12/15	2.35			
BH525CP	Superficial	5.25	6.19	11/9/15	8.63	28/12/15	2.44	0.04 (11/9/15)	0.16 (28/12/15)	Water level response and water level is similar in both holes
BH525R	Rock	12.5	6.15	11/9/15	8.47	28/12/15	2.32			
BH526CP	Superficial	11.8	7.01	5/10/15	9.31	27/12/15	2.30	3.59 (10/10/15)	4.23 (27/12/15)	Water levels are much lower in the bedrock borehole and the response to rainfall is slightly less in bedrock compared to the superficial deposits
BH526RD	Rock	39	3.44	20/10/15	5.24	11/1/16	1.80			

Negative value for difference in water level shows the water level in the shallow borehole (usually superficial deposit) is lower than in the deeper (bedrock) borehole

2.5.4 Groundwater recharge and baseflow

Groundwater recharge refers to the flux of water which moves from the ground surface or a surface water body into an underlying aquifer. Rainfall is often the most significant source of recharge although only a proportion of total annual rainfall actually enters the groundwater system; runoff, evaporation and transpiration from plants all reduce the total annual flux.

Average annual recharge rates have been estimated based on data for the Cefni flow gauging station [RD19], Anglesey at National Grid Reference SH 429 769. This rate has been estimated to be approximately 500mm/a, based on data reported The recharge rate of approximately 500mm/a likely reflects the flux, which recharges shallow groundwater located in the superficial deposits or into the upper bedrock where overburden is very thin or absent. In comparison the recharge rate calculated for the 2015 and 2016 period using the soil moisture deficit model for the water balance was greater than this at 568mm/a, although the annual average rainfall over the period was 1148mm, higher than the long-term average of 841mm/a at RAF Valley.

Recharge to bedrock in areas where the superficial overburden is very thick (such as beneath drumlins) is likely to be significantly lower. Studies indicate recharge rates through glacial till are typically approximately 20% of the annual effective rainfall [RD20]. Although the results cited in [RD20] are not from Anglesey, they indicate the order of magnitude reduction in recharge that can occur where glacial tills with a predominantly clay matrix are present. In this case the recharge rate would be approximately 100mm/a (i.e. 20% x 500mm/a).

The flow of shallow groundwater from soils, superficial deposits and the top of the bedrock into the SSSI is thought to be a key hydrological supporting condition. For this reason the groundwater catchment area recharging typical springs and seeps has been estimated. However, as there has been no formal measurement of flow from the seeps and the majority of springs, conservative flow estimates have been made based on visual observations. From these, typical spring flow is approximately 0.5 l/s, whilst seeps are typically 0.1 l/s, although these are gross generalisations with significant seasonal variations. Groundwater catchment areas for these have been estimated (table 2-8) using the following radial flow equation:

$$R = \sqrt{\frac{(Q/r_w)x2}{\pi}}$$

Where:

- R is the radius of the recharge area calculated as a semi-circle, expressed in m – as the catchment area can only capture water upgradient of the point discharge;
- Q is the estimated groundwater flow expressed as m^3/a; and
- r_w is rainwater recharge expressed as m/a (this has been assumed to be 0.500m/a).

Table 2-8 Estimated shallow groundwater catchment area (*rounded to the nearest 5m) for typical seeps and springs

	Estimated flow (l/s)	Estimated flow (m^3/year)	Estimated recharge radius (m)*
Spring	0.5	15,768	140
Seep	0.1	3,154	60

The groundwater catchment area estimates can be checked using flow data recorded on site. A good proxy for spring flow is the record from VN2. As stated in Section 2.4.2 above, during the summer months all other springs dry up except for this spring – this is probably because groundwater levels drop at the other springs below ground level causing springs to dry up (the spring at VN2 has the lowest elevation). This suggests that flow through VN2 in summer reflects groundwater baseflow conditions. During August 2015, total flow from VN2 was 393m^3 over the month. By October, total flow had fallen to 82m^3 over the month; factored up for 12 months this equates to a baseflow range of between 984m^3/a and 4,716m^3/a.

Whilst these estimates of catchment area radius are approximate, they are likely to be conservative, as they have assumed 12 months of relatively high discharges. In reality, springs and seeps are only present for four to six months. The areas are therefore likely to be maxima and indicate that the seeps and springs are maintained by very small areas in close proximity to the SSSI. It is however recognised that the recharge areas of some of the seeps and flushes overlap with the result that the recharge areas for proximal flushes may be greater, but this is more than compensated for by the effect of a shorter discharge duration than that used for the calculations.

Although at best indicative and based on a number of assumptions, from this assessment it would not be unreasonable to assume that the main source of water to the springs and seeps comes from within approximately 50m to 150m of the SSSI.

2.5.5 Water levels in the peat

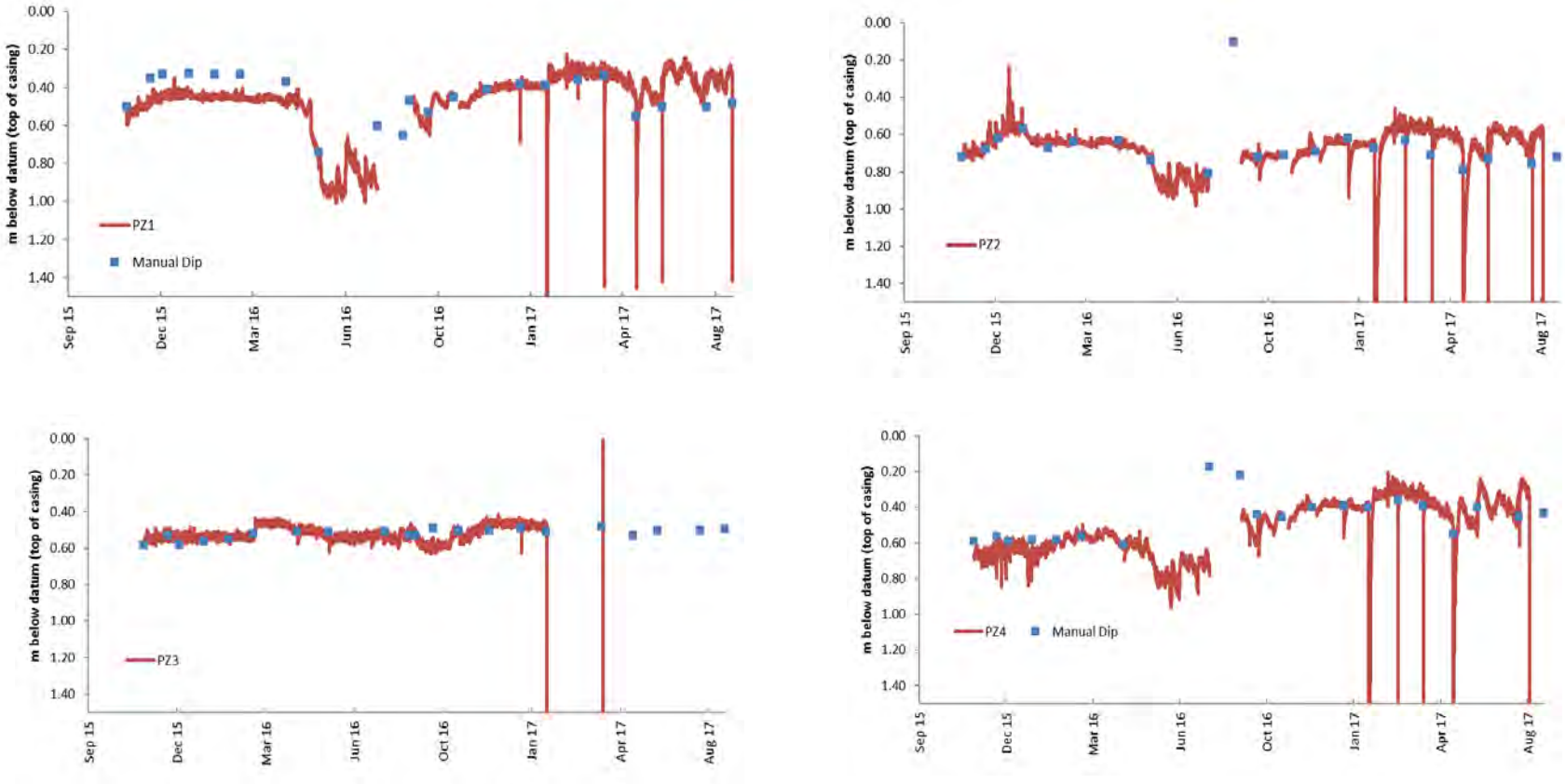
Piezometers were installed into the peat deposits in early November 2015. Groundwater-level loggers were installed at the same time, set to record water levels at 15-minute intervals. The data are shown graphically in figures 2-15 and 2-16 and summarised in table 2-9 below.

Table 2-9 Groundwater levels in piezometers installed in the Tre'r Gof SSSI (data from November 2015 to August 2017)

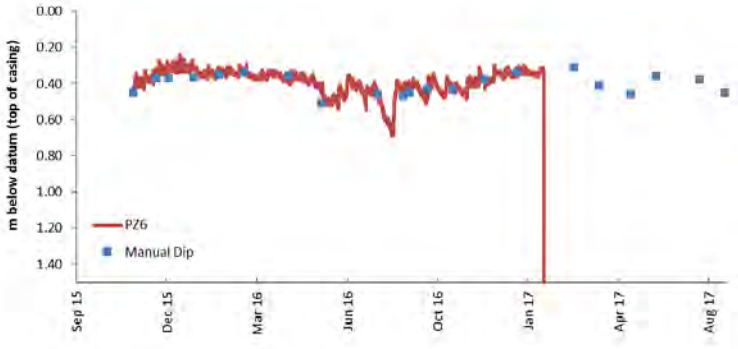
Piezometer	Target geology	Piezometer depth	Groundwater level (m AOD)		Range (m)
			Summer low	Winter high	
PZ1	Peat	2.33	5.40	6.35	0.95
PZ2	Peat	2.73	5.36	6.11	0.75
PZ3	Peat	2.91	4.55	6.11	1.56
PZ4	Peat	2.40	5.79	6.25	0.46
PZ5	Peat	2.19	5.77	6.19	0.42
PZ6	Peat	2.91	6.58	7.04	0.45
PZ7	Peat	2.92	6.34	6.64	0.31
PZ8 fixed	Peat	2.91	6.48	6.92	0.44
PZ8 floating	Peat	2.92	6.58	6.90	0.33
Summer Low is average water level from loggers from August 2016					
Winter High is average water level from loggers from December 2015					

Water levels in the peat are typically lower (around 6m AOD) than the level of mapped springs and diffuse seepages, which typically emerge around an elevation of 6–8m AOD. The springs and seeps are likely to be an important recharge mechanism to maintain saturation in the peat layer present across the SSSI.

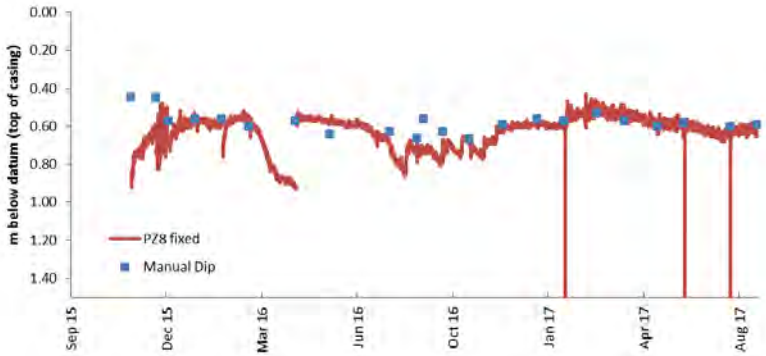
Figure 2-15 Hydrographs from piezometers – November 2015 to August 2017




m below datum (top of casing)
0.00
0.20
0.40
0.60
0.80
1.00
1.20
1.40
PZ5
Manual Dip
Sep 15
Dec 15
Mar 16
Jun 16
Oct 16
Jan 17
Apr 17
Aug 17


m below datum (top of casing)
0.00
0.20
0.40
0.60
0.80
1.00
1.20
1.40
PZ6
Manual Dip
Sep 15
Dec 15
Mar 16
Jun 16
Oct 16
Jan 17
Apr 17
Aug 17


m below datum (top of casing)
0.00
0.20
0.40
0.60
0.80
1.00
1.20
1.40
PZ7
Sep 15
Dec 15
Mar 16
Jun 16
Oct 16
Jan 17
Apr 17
Aug 17


m below datum (top of casing)
0.00
0.20
0.40
0.60
0.80
1.00
1.20
1.40
PZ8 fixed
Manual Dip
Sep 15
Dec 15
Mar 16
Jun 16
Oct 16
Jan 17
Apr 17
Aug 17

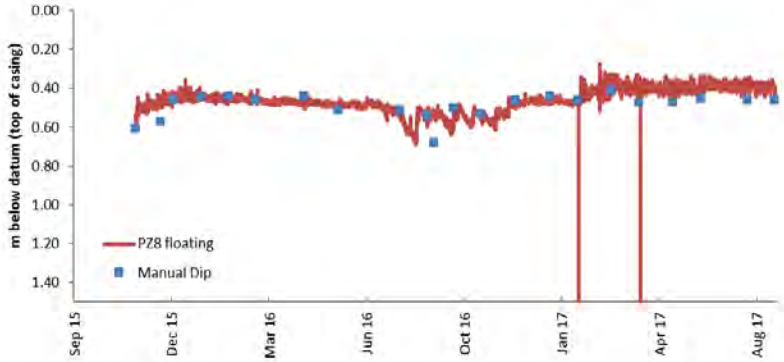
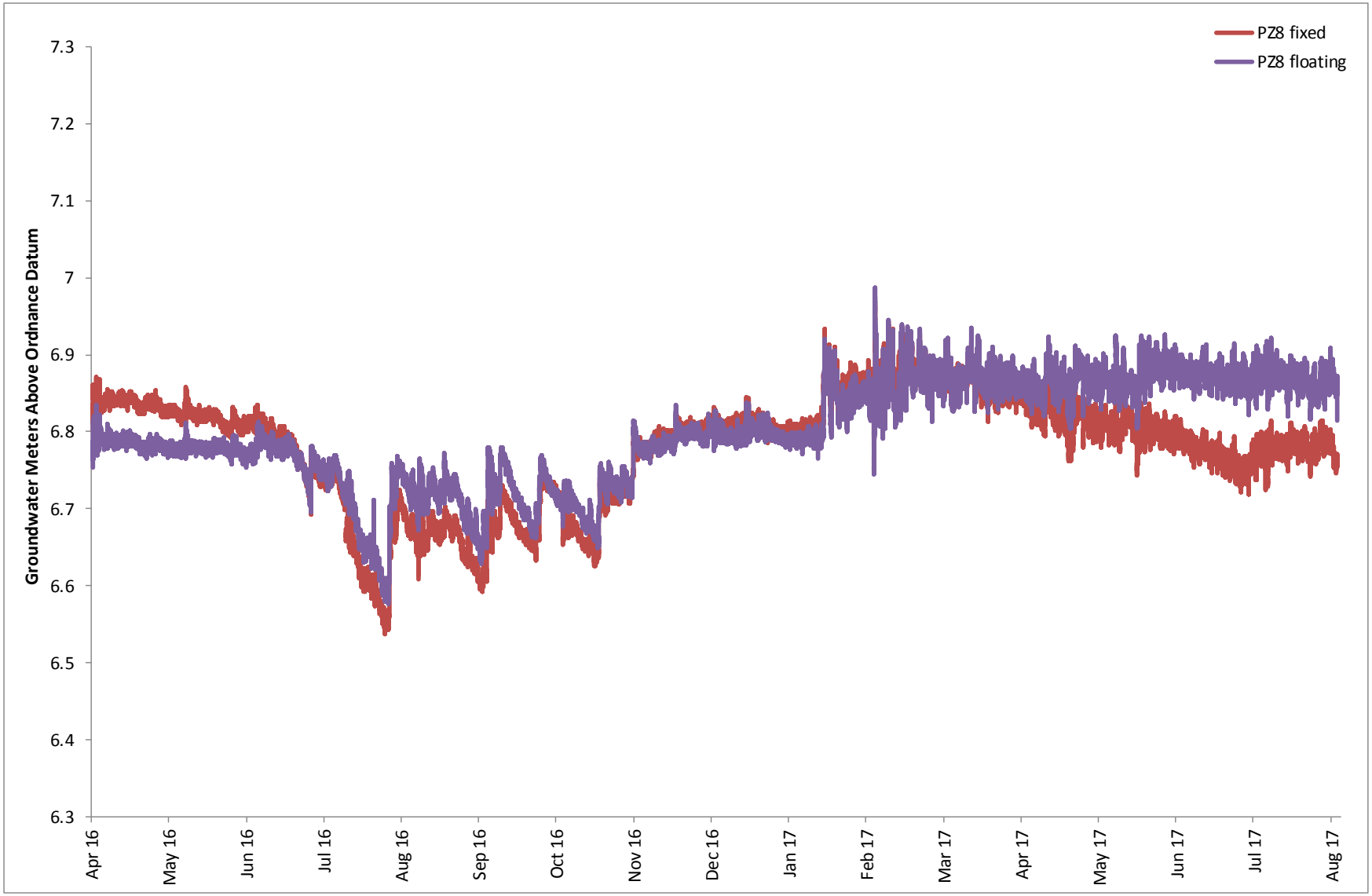

m below datum (top of casing)
0.00
0.20
0.40
0.60
0.80
1.00
1.20
1.40
PZ8 floating
Manual Dip
Sep 15
Dec 15
Mar 16
Jun 16
Oct 16
Jan 17
Apr 17
Aug 17

Figure 2-16 Comparison of water levels in fixed and floating piezometers at the Tre'r Gof SSSI



Water levels in the peat show a steady rise from the beginning of November through to mid-December 2015. The overall increase in water levels is in the order of 0.25 – 0.30m although short-lived peaks in water level of the order of 0.5 – 0.7m do occur following storm events. This response is attributed to the 'wetting up' phase of Tre'r Gof as groundwater levels rise in early autumn. A similar trend exists between August and December 2016, with a gradual increase in average monthly water levels of around 0.2m for the majority of piezometers, and 0.4m for piezometers PZ1 and PZ2. During the dry summer months, water levels in the peat drop due to drainage and evapotranspiration, creating a soil moisture deficit. From November onwards, all inflowing water (direct rain, runoff and groundwater) recharges the deficit in the peat soils. This is reflected in the water balance by the low net outflows via VN5 during the wetting up phase. From mid-December through to March, during both 2015 and 2016, groundwater levels in piezometers settle out showing no sustained increases in water level even following storm events.

In PZ2, PZ4 and PZ5, a peaky response to rainfall is observed with a recession period of 1–2 days for larger rainfall events. At these locations, water has been observed pooling at the ground surface following heavy rainfall. As winter progresses and the storage capacity of the peat is exceeded (because it is fully saturated), pooling of storm water occurs.

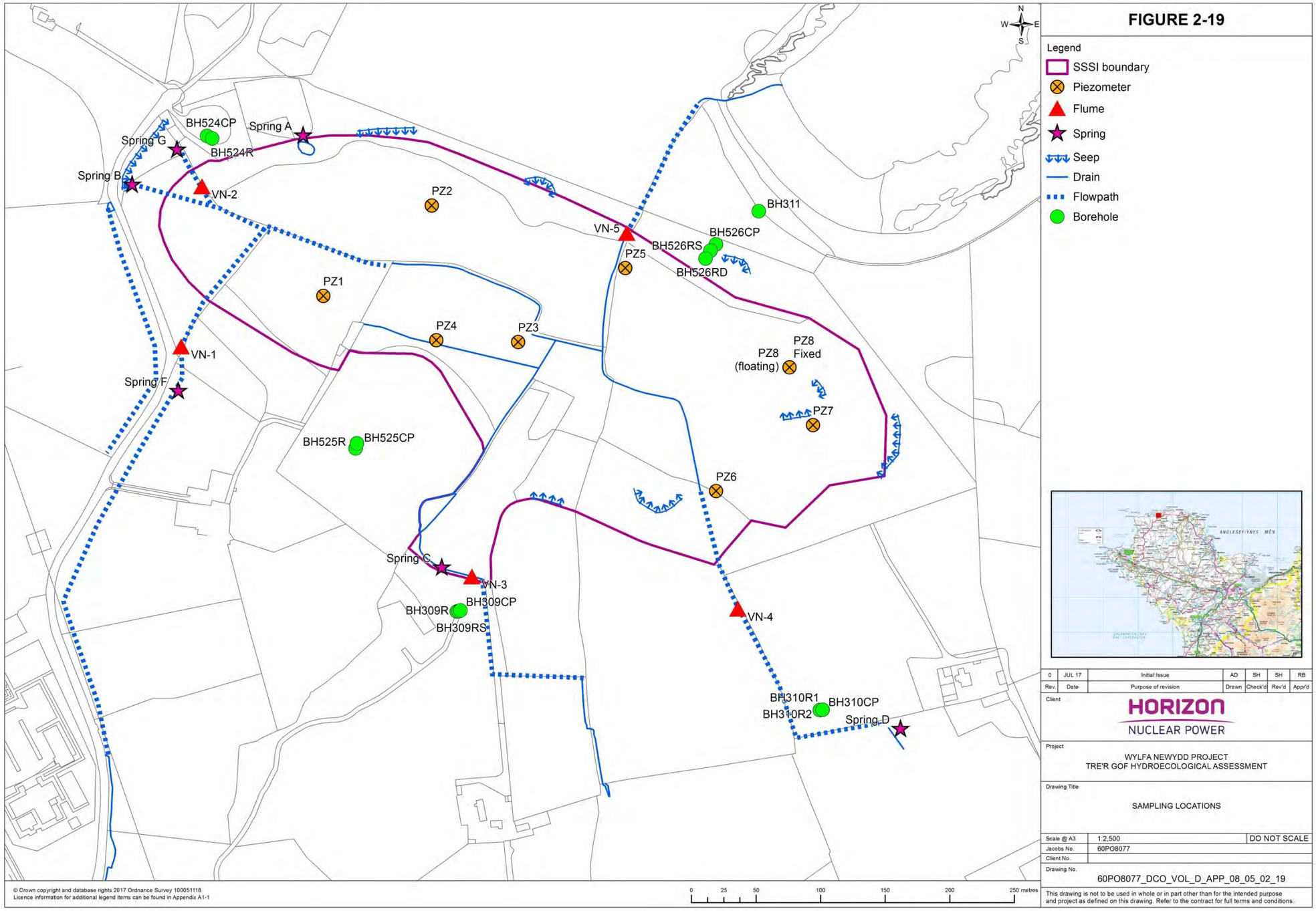
PZ8 fixed and PZ8 floating were installed to try to determine if a floating raft was present in the east of the SSSI. Figure 2.15 shows that there is a discrepancy of up to 0.5m between the water level recorded by the logger and the manual dips for PZ8 fixed. It was thought likely the reason for this discrepancy was logger drift and the logger was replaced in March 2016 to try to address this issue. Figure 2-16 compares the water levels in the two piezometers using the more recent data. The data from July to November 2016, which is when the fen is drying, does suggest that there may be a very slight floating raft with water levels in the fixed piezometer dropping more than those in the floating piezometer and then the two water levels become comparable once the winter rains commence in November. However, there is some uncertainty in this assessment.

2.6 Water quality

The quality of inflowing water is one of the key hydrological supporting conditions for the wetland; according to the SSSI citation (CCW), the special features of Tre'r Gof rely on nutrient-poor calcium-rich water inputs.

Regular water-quality sampling has been carried out in the Tre'r Gof surface water catchment since February 2015, results of which are presented in appendix H. All sampling locations around the Tre'r Gof SSSI are shown on figure 2-17.

Figure 2-17 Sampling locations



2.6.1 Field parameters

Field parameters have been recorded in surface water samples, summarised in table 2-10, with the full dataset in appendix H-1 of this report. Data collection is skewed towards the winter months; this is partly due to when the field-monitoring programme for Tre'r Gof began and partly because many of the springs/flumes only flow in winter. Field parameters are not routinely recorded in groundwater samples due to the sampling technique so lab measurements have been reported for comparison.

Table 2-3 Summary of field parameters recorded between November 2015 and August 2017

	pH (pH units)	Electrical conductivity (µS/cm)	Dissolved oxygen (%)	Redox (mV)	Temperature (°C)
Piezometers (PZ1–PZ8 fixed and floating)					
Min	5.4	200	9	-162	7.5
Max	8.4	980	100	428	22.1
Average	6.5	675	35	-1	11.6
Sample no.	133	134	109	127	117
Springs (Spring A, B, C, D, E and G)					
Min	5.6	213	35	-95	5.3
Max	7.9	735	132	494	20.6
Average	7.0	445	70	93	10.7
Sample No.	39	38	38	39	39
Inflowing flumes (VN1–4)					
Min	5.6	228	1	-14	4.2
Max	8.6	861	97	491	16.0
Average	6.8	507	61	110	9.6
Sample No.	41	41	29	40	41
Outfall flume (VN5)					
Min	5.9	262	7	-70	4.6
Max	7.8	755	97	336	19.16
Average	7.0	535	62	65	11.6
Sample No.	24	23	18	23	24
Bedrock**					
Min	6.5	34	-	-	-
Max	8.4	961	-	-	-
Average	7.6	572	-	-	-
Sample No.	56	56	-	-	-
Superficial**					
Min	6.3	15.6	-	-	-
Max	8.4	908	-	-	-
Average	7.5	552	-	-	-
Sample No.	70	70	-	-	-

- (-) indicates data not recorded.
- Water quality data for springs, flumes and piezometers recorded since November 2015.
- Water quality data from boreholes recorded since July 2014.

** Groundwater sampling from superficials and bedrock has been carried out using HydraSleeves, a passive sampling technique which requires no purging. Well head parameters not recorded. Lab results have been used for superficial and groundwater samples.

Table 2-3 indicates that the average pH of water from springs, flumes and boreholes is broadly neutral, whilst the average pH of samples from piezometers is very slightly acidic. However, in all cases there are pH maxima that indicate slightly alkaline conditions do occur (up to a maximum pH of 8.6 in the inflows) and these are important for some plant assemblages as discussed in section 4. According to *The Fen Management Handbook* [RD21], the threshold between base rich and base poor fens is approximately pH 5.5. The threshold being in the acidic range for pH is largely due to the influence of rainwater, which is slightly acidic. Electrical conductivity readings for all samples are within the range for fresh water. However, readings are higher in samples collected from piezometers, suggesting greater mineral enrichment of water in the peat compared to the influent water from groundwater and surface water sources. Spring water has a relatively low electrical conductivity which indicates a short residence time for groundwater. However, it is noted that these results are indicative of periods following prolonged rainfall and may not be fully representative of annual concentrations. The relatively low electrical conductivity of water at the outfall (VN5) confirms the importance of rainwater inputs sustaining Tre'r Gof.

Redox and dissolved oxygen levels are low in samples from piezometers compared to springs and flumes. *The Fen Management Handbook* states that redox values between 40 and -20mV are indicative of anaerobic conditions in peat bogs. This is consistent with slow-moving or event-stagnant waters. By contrast, redox and dissolved oxygen levels in spring and surface water flows are indicative of well aerated, fresh, flowing water. There were no clear seasonal variations in redox or dissolved oxygen concentrations in the piezometers and it is likely that variations are driven more by rainfall conditions in the days prior to sampling than any annual cycle.

2.6.2 Major ions and metals

All samples were scheduled for analysis of major ions (calcium, magnesium, sodium, potassium, nitrogenous compounds, bicarbonate alkalinity, chloride, carbonate alkalinity and sulphate) and nutrients (phosphorus and orthophosphate). Ionic balances have been completed for all samples collected during the study period using concentrations of calcium, magnesium, sodium, potassium, chloride, ammoniacal nitrogen, bicarbonate alkalinity, nitrate and sulphate. The results are summarised in table 2-11.

Table 2-4 Summary of ionic balances

Sample type	Max error (%)	Min error (%)	No. of positive errors	No. of negative errors	No. of errors >±10%	No. of errors >±10% (as % of total no. of samples)
Piezometers	100.0	-22.5	36	30	20	30
Springs	5.2	-29.8	2	26	4	14
Flumes	51.3	-12.4	5	25	7	23
Bedrock	4.5	-54.6	2	55	15	26
Superficial	56.5	-98.6	15	54	26	38

The majority of samples had an ion balance error within ±10% indicating that the water sample was stable and approaching equilibrium. Samples from bedrock and superficial boreholes displayed greater

error. However, the results are skewed by very large errors associated with data from BH524R and BH524CP (located in the Fisherman's Car Park to the west of Tre'r Gof), BH309R and BH309CP (to the north of Tyddyn Goronwy and south of Tre'r Gof) and BH526CP and BH526RS (adjacent to Porth y Wylfa and north-east of the SSSI).

In samples from springs, boreholes and flumes concentrations of major ions are generally low (total dissolved solids <675mg/l) – there is no evidence of brackish or ancient groundwater indicating residence times for groundwater are relatively short. Groundwater (springs and boreholes) and surface water quality (flumes) are also similar which may indicate that groundwater and surface water are also in connection.

Water quality is summarised in table 2-12 with raw data presented as appendix H-2 of this report.

Table 2-5 Summary of lab water quality analysis

All results expressed as mg/l		Alkalinity (total)	Total dissolved solids	Ammoniacal nitrogen as N	Chloride	Nitrite as N	Nitrate as N
Bedrock	Minimum	35.4	202.0	0.0	33.8	0.0	0.1
	Maximum	645.0	651.0	4.5	182.4	0.2	7.9
	Median	210.0	373.0	0.3	56.9	0.0	4.1
	Mean	209.3	374.9.4	0.7	67.1	-	4.0
	Std. Dev	87.83.25	75.43	1.10	25.85	0.03	2.2
Flume	Minimum	55.0	178.0	0.2	44.4	0.1	0.4
	Maximum	300.0	651.0	0.2	167.0	0.1	51.8
	Median	155.0	321.0	0.2	58.0	0.1	7.4
	Mean	158.2	367.6	0.2	78.1	0.1	13.8
	Std. Dev	60.9	133.5	0.0	38.2	0.0	15.1
Piezometer	Minimum	170	296	-	36	-	-
	Maximum	515	784	-	142	-	-
	Median	335.0	478.0	-	56.8	-	-
	Mean	336	486	-	64	-	-
	Std. Dev	73	98	-	25	-	-
Spring	Minimum	35.0	132.0	0.2	41.2	0.1	0.4
	Maximum	245.0	445.0	1.3	136.0	0.2	31.7
	Median	140.0	312.0	0.3	63.2	0.1	10.9
	Mean	117.0	304.7	0.5	69.5	0.1	13.5
	Std. Dev	61.9	93.1	0.4	26.5	0.1	10.6
Superficial	Minimum	23.5	135.0	-	30.5	0.0	0.1
	Maximum	1640.0	673.0	9.5	177.0	0.1	23.5
	Median	240.0	360.0	0.3	50.6	0.0	1.3
	Mean	246.4	365.9	1.2	55.2	0.0	3.0
	Std. Dev	212.5	116.6	2.0	20.3	0.0	3.9

All results expressed as mg/l		Phosphorus	Phosphate as PO4	Calcium	Total dissolved iron	Magnesium	Potassium	Sodium	Total suspended solids
Bedrock	Minimum	0.0	*NS*	8.9	0.0	5.5	1.0	19.2	2.0
	Maximum	0.2	*NS*	102.0	11.8	29.0	11.0	71.4	5080.0
	Median	0.0	*NS*	64.8	0.0	13.1	1.2	39.6	23.2
	Mean	0.1	*NS*	65.5	0.3	12.8	1.8	40.3	354.5
	Std. Dev	0.06	*NS*	17.59	1.63	4.46	1.79	9.12	936.49
Flume	Minimum	0.0	0.1	21.9	0.0	5.2	1.0	20.9	2.0
	Maximum	114.0	0.3	92.6	3.7	19.2	8.3	59.5	5080.0
	Median	0.3	0.1	68.0	0.0	12.7	2.6	31.7	23.2
	Mean	9.1	0.1	61.3	0.2	12.5	2.9	36.3	354.5
	Std. Dev	25.2	0.1	22.0	0.6	4.5	1.6	13.5	936.49
Piezometer	Minimum	0.0	0.1	61	0.0	7	1.0	18	2.0
	Maximum	646.0	0.6	199	33.8	31	4.5	69	5080.0
	Median	0.6	0.1	103.0	1.7	16.1	1.0	33.0	23.2
	Mean	42.1	0.1	109	6.5	16	1.3	35	354.5
	Std. Dev	111.0	0.1	29	8.3	4	0.7	11	936.49
Spring	Minimum	0.0	0.1	14.4	0.0	4.1	0.0	18.9	2.0
	Maximum	1010.0	1.2	86.5	2.2	16.6	22.7	70.7	5080.0
	Median	0.7	0.1	46.7	0.0	9.1	3.2	27.3	23.2
	Mean	3.2	0.2	45.5	0.2	9.1	4.9	34.5	354.5
	Std. Dev	250.4	0.3	19.5	0.4	3.0	5.5	15.9	936.49
Superficial	Minimum	0.0	*NS*	0.0	0.0	0.0	1.0	0.1	2.0
	Maximum	1.5	*NS*	174.0	54.2	399.0	68.6	68.9	5080.0
	Median	0.0	*NS*	65.3	0.0	17.6	3.3	29.1	23.2
	Mean	0.1	*NS*	58.0	1.5	25.3	11.2	32.9	354.5
	Std. Dev	0.3	*NS*	29.0	7.5	55.4	18.6	12.8	936.49

Std. Dev means one standard deviation from the mean. N/A means all samples below detection limit so standard deviation cannot be calculated. NS means sample was not scheduled for analysis. Groundwater and surface water sampling were carried out as different programmes, groundwater samples were scheduled for total phosphorus analysis whilst surface water samples were scheduled for orthophosphate (i.e. bioavailable) analysis.

Major ions have been used to produce Piper plots of water quality over time (see appendix H-3 of this report).

In general, plots for springs, flumes, superficial and bedrock boreholes suggest a carbonate dominated water type.

The carbonate dominated water type persists in springs, flumes, superficial and bedrock samples through the spring and summer of 2015 and 2016. As winter rainfall recharge starts in late November and early December, samples plot towards the centre of the quadrilateral of the Piper plots suggesting no water 'type' is dominant. This effect is most prominent in the springs and flumes samples and suggests dilution by rainfall.

Water quality in piezometers consistently plots towards the calcareous end of the Piper plots, again suggesting a carbonate dominated water type. The carbonate dominated water type persists into December 2015 and January 2016, long after rainfall recharge has begun to dilute the carbonate water in the surrounding groundwater. The first evidence for dilution of water in piezometers occurs in the February 2016 plot (see appendix H-3 of this report). The plots then go back to showing a consistently carbonate dominated water type between April 2016 and August 2017.

The site management statement for the Tre'r Gof SSSI identifies a source of 'lime rich water' as being a critical supporting condition for the SSSI. Figure 2-18 shows average concentrations of calcium in samples collected in and around the Tre'r Gof SSSI, whilst figure 2-19 shows the alkalinity (bicarbonate) concentrations.

Figure 2-18 and figure 2-19 show that, on average, some of the highest concentrations of calcium and bicarbonate are in fact found in piezometers, which are installed in the peat. The concentration of calcium and bicarbonate in groundwater in peat typically exceeds the concentrations of calcium and bicarbonate flowing into the SSSI from springs and groundwater. This distribution is also clearly demonstrated in the calcium and alkalinity plots presented in appendix H-4 of this report.

There are two possible explanations for this. The first is that organic soils have a high capacity for ion exchange and binding ions to the soil matrix. The high porosity and low permeability of the peat soils means that groundwater moves very slowly through them, giving time for ion exchange to take place. Springs and groundwater flush water with relatively low mineral concentrations into the SSSI, and this water seeps into the peat where it is stored for long periods of time allowing calcium and bicarbonate concentrations to build up through ion exchange with the peat.

There is a sizable body of research detailing the ion exchange properties of peat (including [RD22, RD23 and RD24]). Work by Sjors and Gunnarsson in Sweden [RD25] identifies the tendency of calcium to accumulate within peat soils with the result that vascular mire plants can be more dependent on chemical concentrations in the peat rather than in the water.

An alternative explanation is that there is a source of calcium within or directly beneath the peat and this is the source of the calcium and bicarbonate enrichment. Botterill [RD11] identifies the presence of marl deposits comprising flecks of calcium carbonate within peat deposits in the south east of the SSSI. The source of these deposits is unknown but could represent material washed out of the till, material which has precipitated out or deposition by shallow water plants and animals.

Figure 2-18 Average calcium concentrations (December 2015 to August 2017)

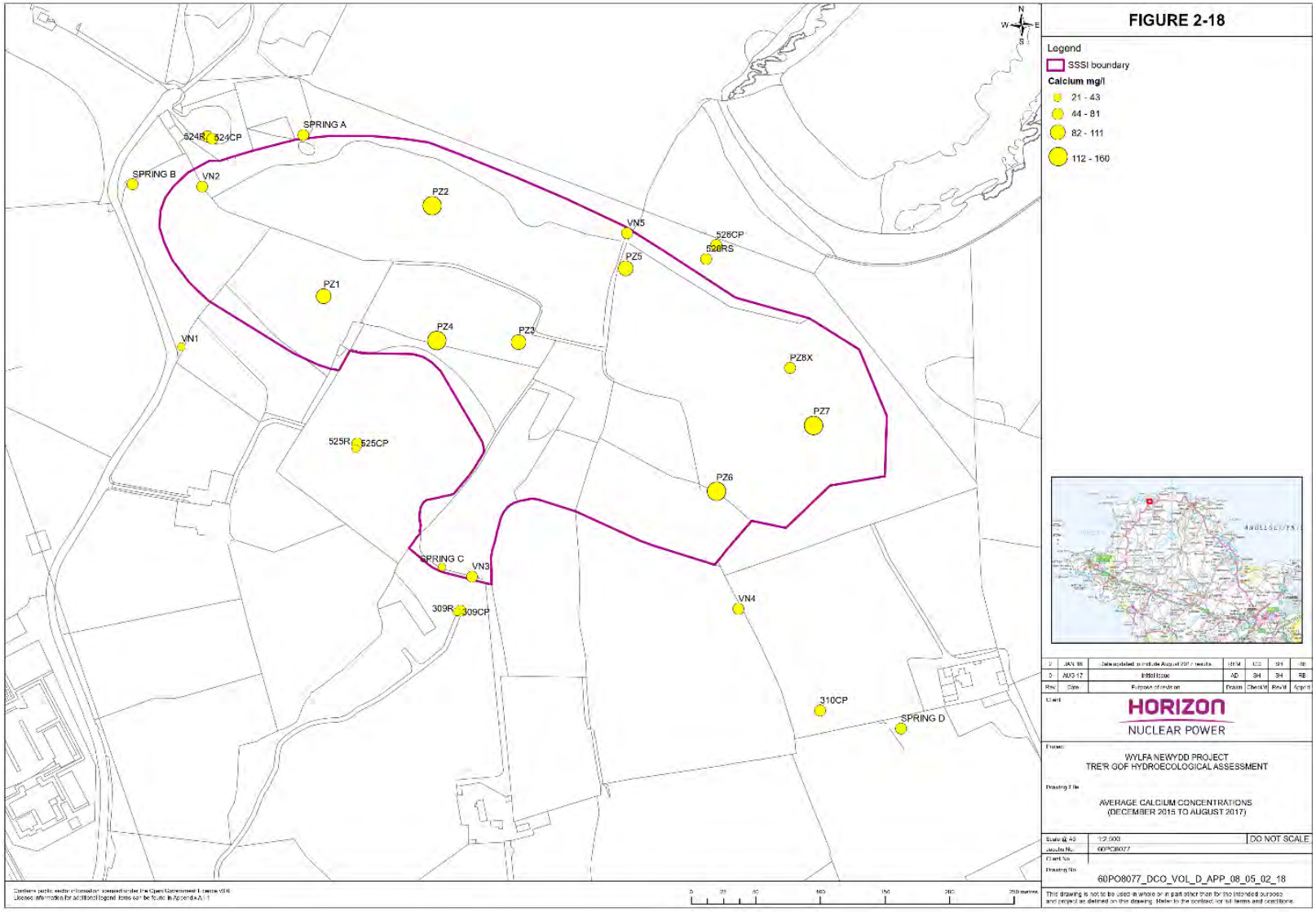
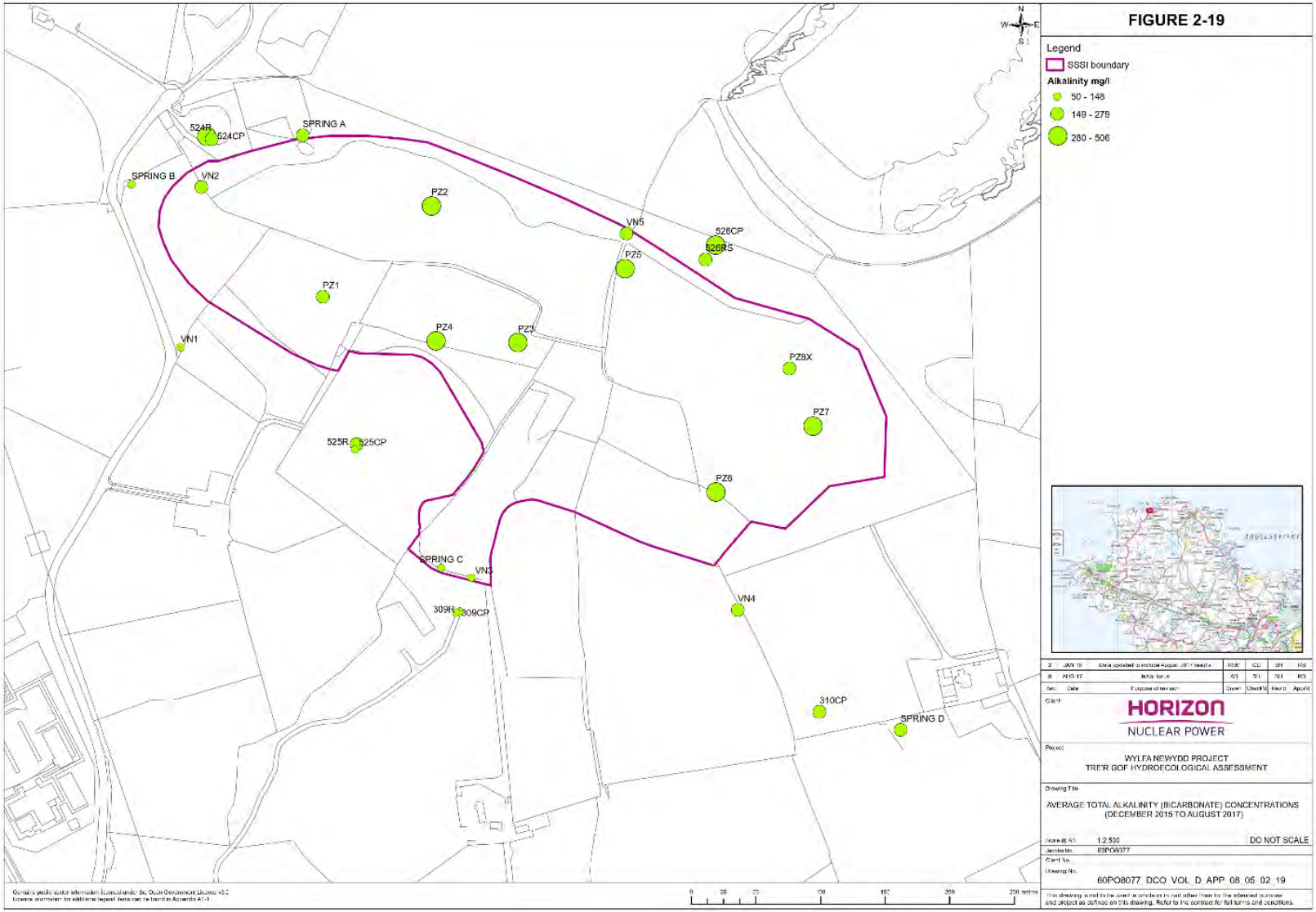


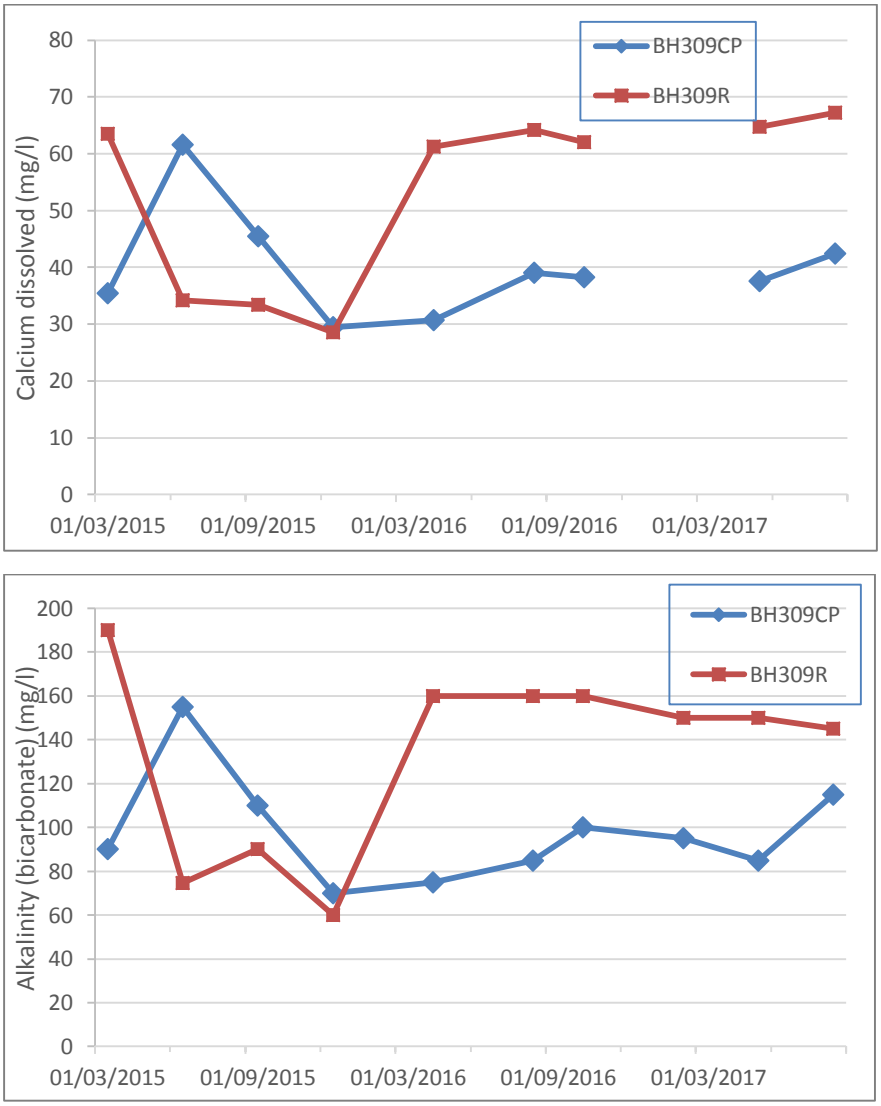
Figure 2-19 Average total alkalinity (bicarbonate) concentrations (December 2015 to August 2017)



In order to try to determine more regarding the source of the water, the variations in calcium and bicarbonate (alkalinity) concentrations for bedrock and drift deposits have been compared over time. This has been completed for the paired boreholes at BH309, BH525 and BH525 (there are insufficient data at BH526). The results are very variable and do not indicate a consistent picture such that no firm conclusions can be drawn.

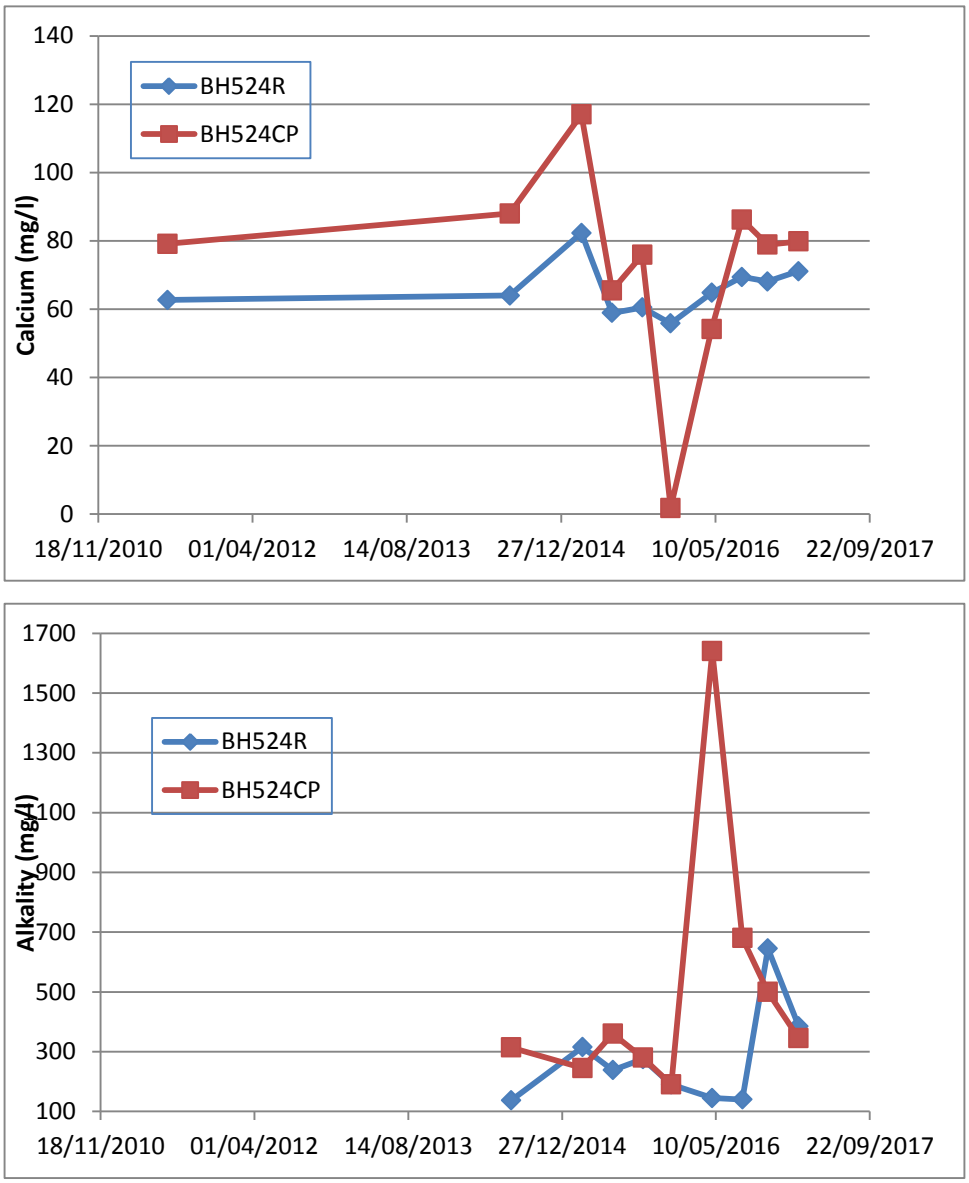
At BH309R and BH309CP, the data indicate a marked difference in concentrations between the bedrock and superficial boreholes, but with no consistent seasonal pattern (see figure 2-20). On some occasions the concentrations of calcium and bicarbonate in the bedrock borehole are higher than in the borehole into the superficial deposits, whilst on other occasions the concentrations are lower.

Figure 2-20 Calcium and alkalinity (bicarbonate) concentrations in BH309R and BH309CP to the south of the Tre'r Gof SSSI (February 2014 to August 2017)



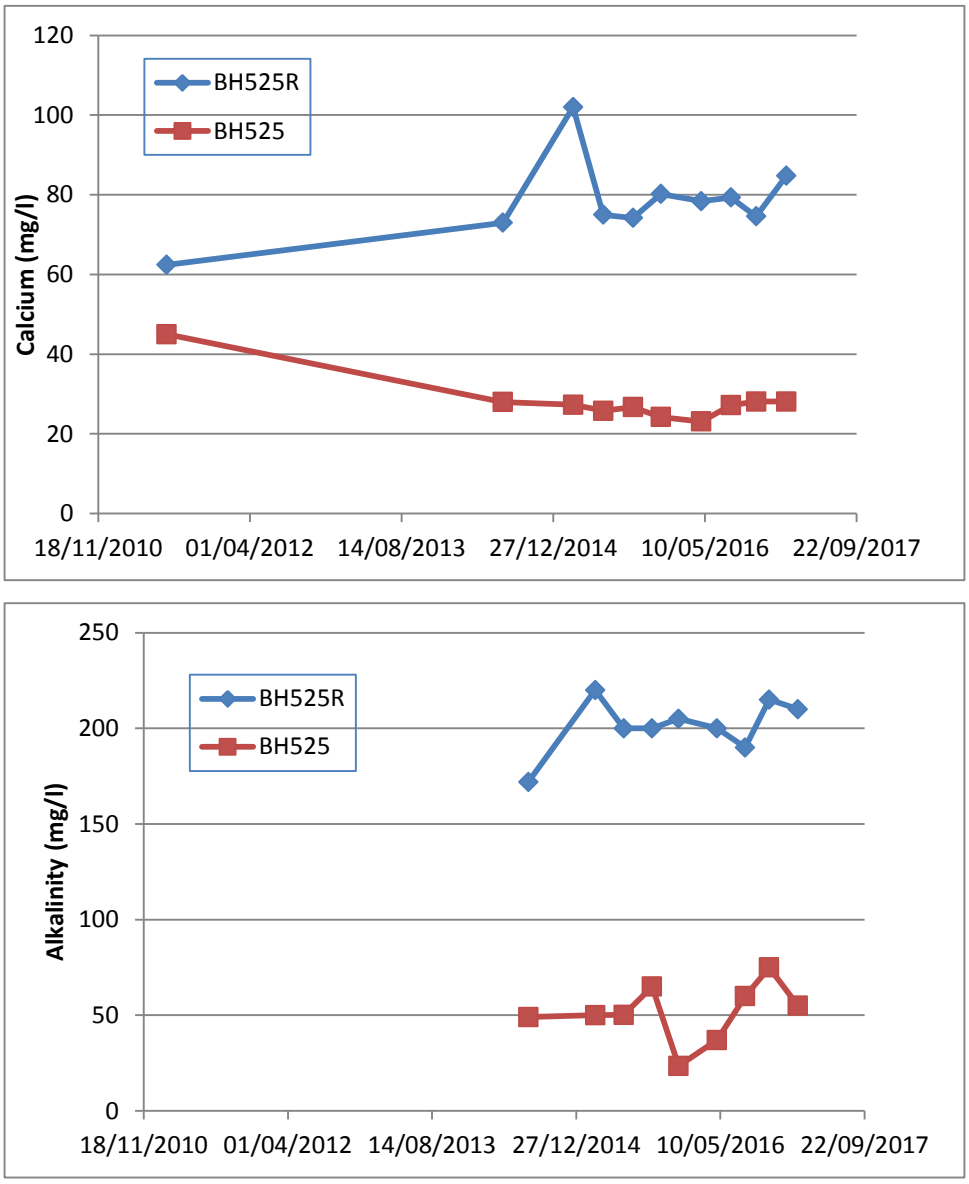
At BH524R and BH524CP the concentrations of calcium and bicarbonate are variable, although the concentrations of calcium in the superficial deposits are generally 10 to 20mg/l higher than in the bedrock (see figure 2-21). The alkalinity concentrations show much great variability.

Figure 2-2 Calcium and alkalinity (bicarbonate) concentrations in BH524R and BH524CP to the west of the Tre'r Gof SSSI (February 2014 to August 2017)



At BH525R and BH525CP (figure 2-22), there is a significant and consistent difference between the bedrock and superficial concentrations of calcium and alkalinity with the bedrock concentrations being consistently higher. The typical difference for calcium is 30 to 40mg/l, and 100 to 150mg/l for alkalinity.

Figure 2-22 Calcium and alkalinity (bicarbonate) concentrations in BH525R and BH525 to the south of the Tre'r Gof SSSI (February 2014 to August 2017)



2.6.3 Nutrients

Nutrient enrichment can be a significant pressure on the special features of a calcareous fen. Water samples were therefore scheduled for analysis of macronutrients including nitrates, phosphate and potassium in order to assess if enrichment was taking place.

To put the results into context, concentrations of nitrates have been screened against a threshold value (TV) of 2mg/l for a healthy wetland as described in the *Technical report on groundwater dependent terrestrial ecosystems threshold values* [RD26].

The average concentration of nitrates in samples collected from all boreholes, springs and flumes typically exceeds the threshold value of 2mg/l. By contrast, nitrate concentrations in samples collected in piezometers are well below the threshold value and are often below the limit of detection (<0.07mg/l). Figure 2-23 shows the distribution of average nitrate concentrations across Tre'r Gof.

Figure 2-23 shows that concentrations of nitrate are highest in groundwater samples collected along the southern and western edges of the SSSI, although all inflows contain concentrations of nitrates above the method detection limit. The source of the nitrate is likely to be agricultural as the surrounding land use is improved pasture for grazing. Nitrate concentrations are also high from springs that emerge from the base of Dame Sylvia Crowe's mound. The source of the nutrient enrichment at these locations is not clear. The absence of nitrate in samples from piezometers and the outfall at VN5 suggests all the nitrate is being utilised in some process within the SSSI.

TVs for phosphorus and/or potassium are not currently available. RD26 reports phosphate (as P) concentrations for fens in good condition (0.021mg/l as P or 0.054mg/l as PO_4) and in poor condition (0.064mg/l as P or 0.165mg/l as PO_4); these values can be used as a proxy TV for phosphates.

Figure 2-24 shows that average phosphate concentrations in inflows generally exceed the proxy TV for a fen in poor condition. The highest concentrations have been detected in samples from the south-east of the catchment near a farm; the lowest concentrations are found in piezometers and at the outfall at VN5. A similar distribution of potassium in the Tre'r Gof Catchment is shown in figure 2-25. The source of the potassium and phosphate nutrient enrichment is thought to be agricultural.

Figure 2-3 Average nitrate as N concentrations (December 2015 to August 2017)

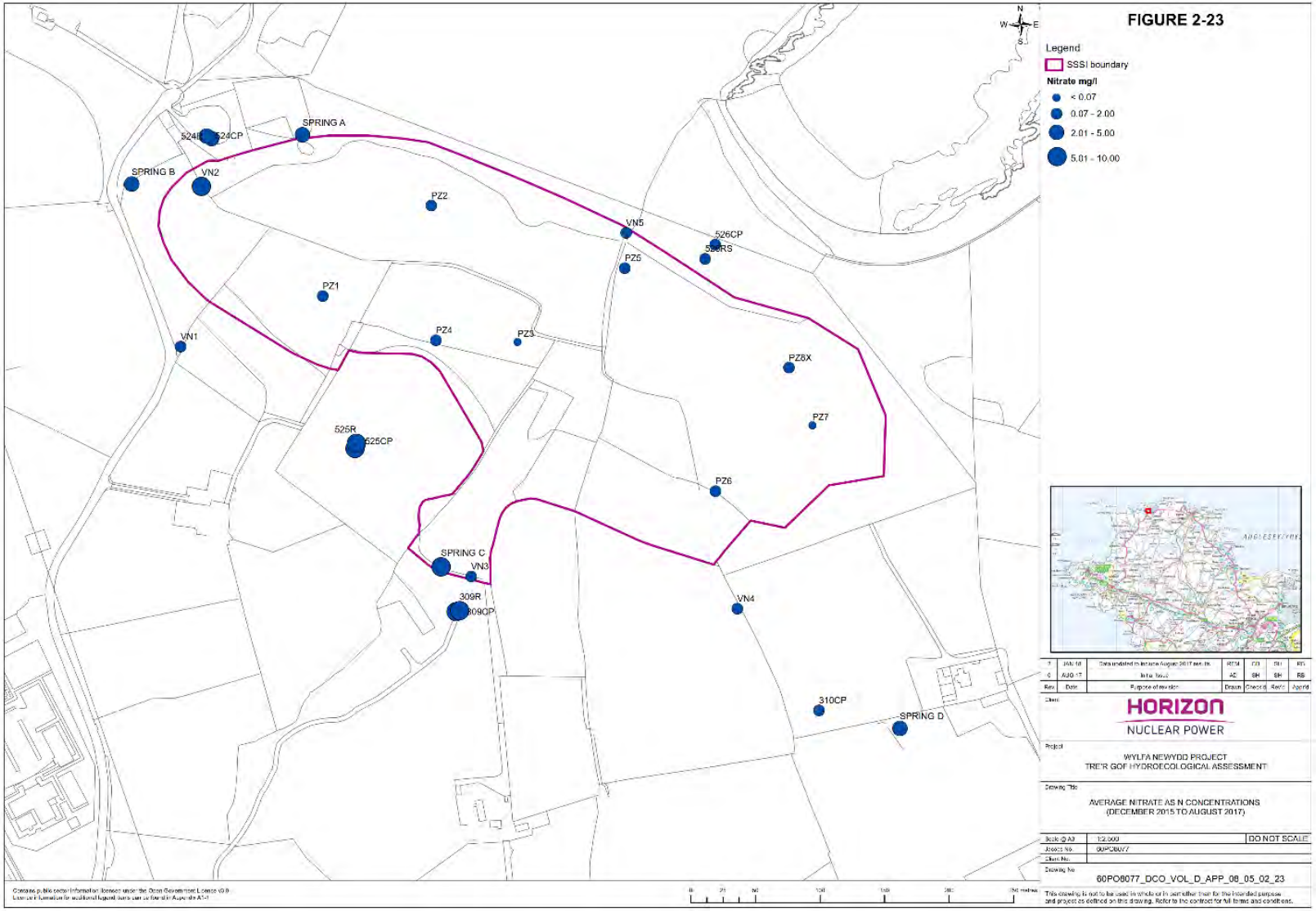


Figure 2-4 Average phosphate as PO_4 concentrations (December 2015 to August 2017)

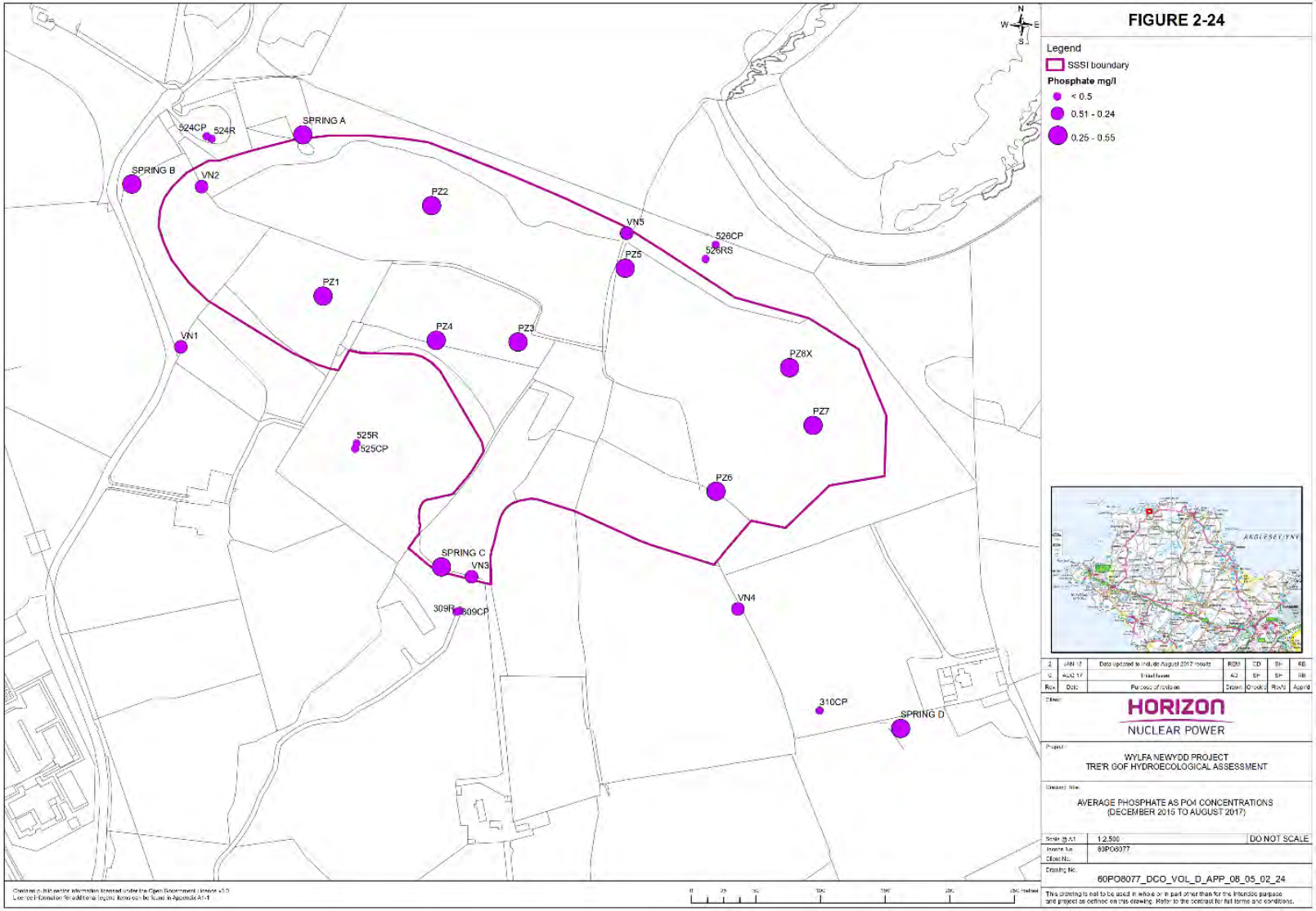
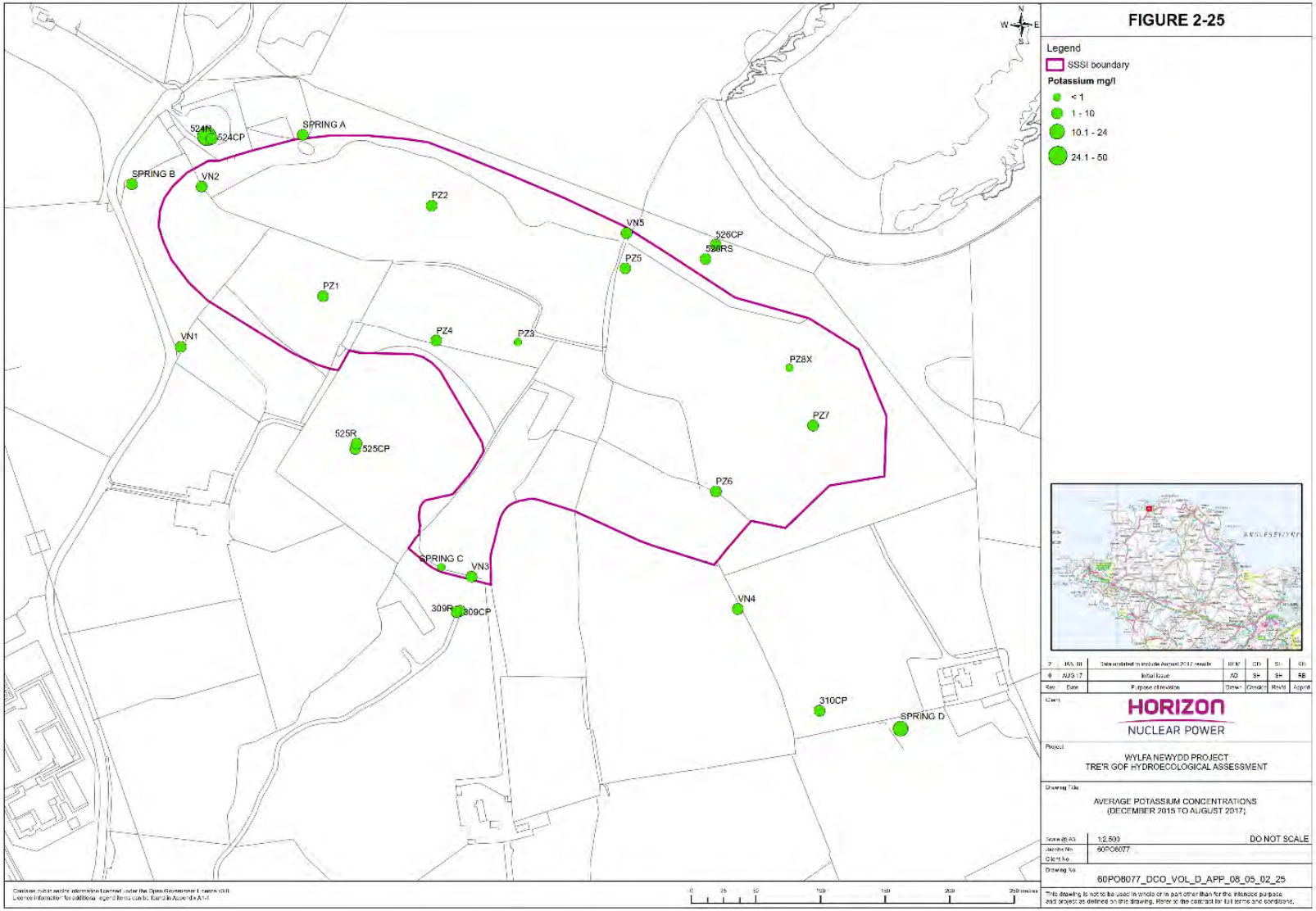


Figure 2.25 Average potassium concentrations (December 2015 to August 2017)



3 Conceptual site model

A CSM has been developed to describe the hydrological supporting conditions for the Tre'r Gof SSSI. The CSM has set out to address water flows, levels and quality, the three supporting conditions identified as critical for the maintenance of Tre'r Gof in the SSSI citation [RD6].

3.1 Water flow

The Tre'r Gof SSSI is situated in a drainage basin within a surface water catchment approximately 1km^2 in area. Most of the effective rainfall within this catchment moves into the basin, flowing into the Tre'r Gof SSSI as surface water runoff/overland flow, shallow groundwater flow (emerging as springs or seeps), and as shallow groundwater flow providing baseflow directly into the SSSI via throughflow in soils. There is potential for some recharge to, or discharge from, groundwater in the bedrock and some flow through the superficial deposits with discharge direct to the sea, but this is a relatively small proportion of the total water balance for the SSSI.

An analysis of hydrographs recorded on inflows (VN1, VN2, VN3 and VN4) and outflows (VN5) indicates a strong seasonality to the wetland and this is corroborated by observations made during the walkover surveys; during the drier summer/autumn months (June–October) there are virtually no surface water inflows into the SSSI. Walkover surveys confirmed that the groundwater springs and seeps dry up and groundwater levels decline to around 6m AOD. In the height of summer, the only inflow recorded was at VN2 which is sustained by spring G. This spring maintains a steady but small baseflow into the wetland throughout the summer (c.400m^3 during the month of August 2015 and c.900 m^3 during August 2016). Outflows recorded at VN5 during the summer, and evaporation/transpiration, suggest the wetland dries over the summer months. There is no evidence to suggest that there is another source of recharge into the wetland (e.g. significant inflow from deep bedrock baseflow).

Analysis of the timings and nature of peaks and troughs in flow during the summer reveals that the Tre'r Gof SSSI does not behave as one single, connected wetland; rather it comprises a series of hydrological compartments separated by drains (figure 3-1). During the winter months when the wetland is fully saturated it behaves more like a single hydrological unit with rapid transport of water across the SSSI to the outflow point at VN5.

3.1.1 The West Compartment

The 'West' compartment is sustained by direct rainfall, seeps, spring flows from springs A and B and via surface inflows from VN1 and VN2. There is likely to be significant inflow from 'ungauged' areas to the north and south of this compartment. Surface water flow direction is generally towards the east along a field drain, which eventually discharges into the sea via the outfall at VN5. Piezometers in this compartment include PZ1 and PZ2 and during the winter months, ponding of water has been observed in the lowest part of the SSSI near PZ2. The ground elevation at PZ2 recorded at the time the piezometers were installed indicates ground elevation is 5.63m AOD; this is 0.12m lower than the elevation of the outfall flume VN5 which is at 5.75m AOD and is over 1m lower than the ground level of piezometers located in the 'East' compartment. This is significant because it implies that during the summer months, baseflow from the spring upstream of VN2 cannot maintain wetness in the 'East' compartment. It also means that groundwater in the peat at PZ2 is not flowing towards VN5 (because VN5 is higher) and that the

northern portion of the SSSI is not fully drained, although it does lose water through evapotranspiration.

3.1.2 The South Compartment

The 'South' compartment receives inflows from direct rainfall and spring C, combined with surface water runoff and shallow groundwater baseflow via VN3 and surface water runoff from VN4. A pond area is located immediately to the north of spring C and this feature is present through much of the winter and spring months although it dries up in the summer. There are two sets of drains which channel water towards the north and the outfall at VN5.

3.1.3 The East Compartment

The 'East' compartment contains perhaps the most important wetland plants present in the Tre'r Gof SSSI, including S2, M13 and M9 species. The East compartment has a unique hydrological character compared to the South and West compartments; it receives no direct surface water inflows. There are no drains. Instead, shallow groundwater seeps have been identified emerging from the peat and around the margins of the SSSI (i.e. from "ungauged" areas to the east and north) and it receives recharge via direct rainfall. The conceptual understanding for this compartment is that the main recharge mechanism is shallow groundwater providing soligenous flows into the wetland via soils and Irish Sea Lodgement Till. The seeps identified are essentially patches of ground that are constantly wet. There is no discernible flow emanating from them, and so no direct estimates of flow can be made.

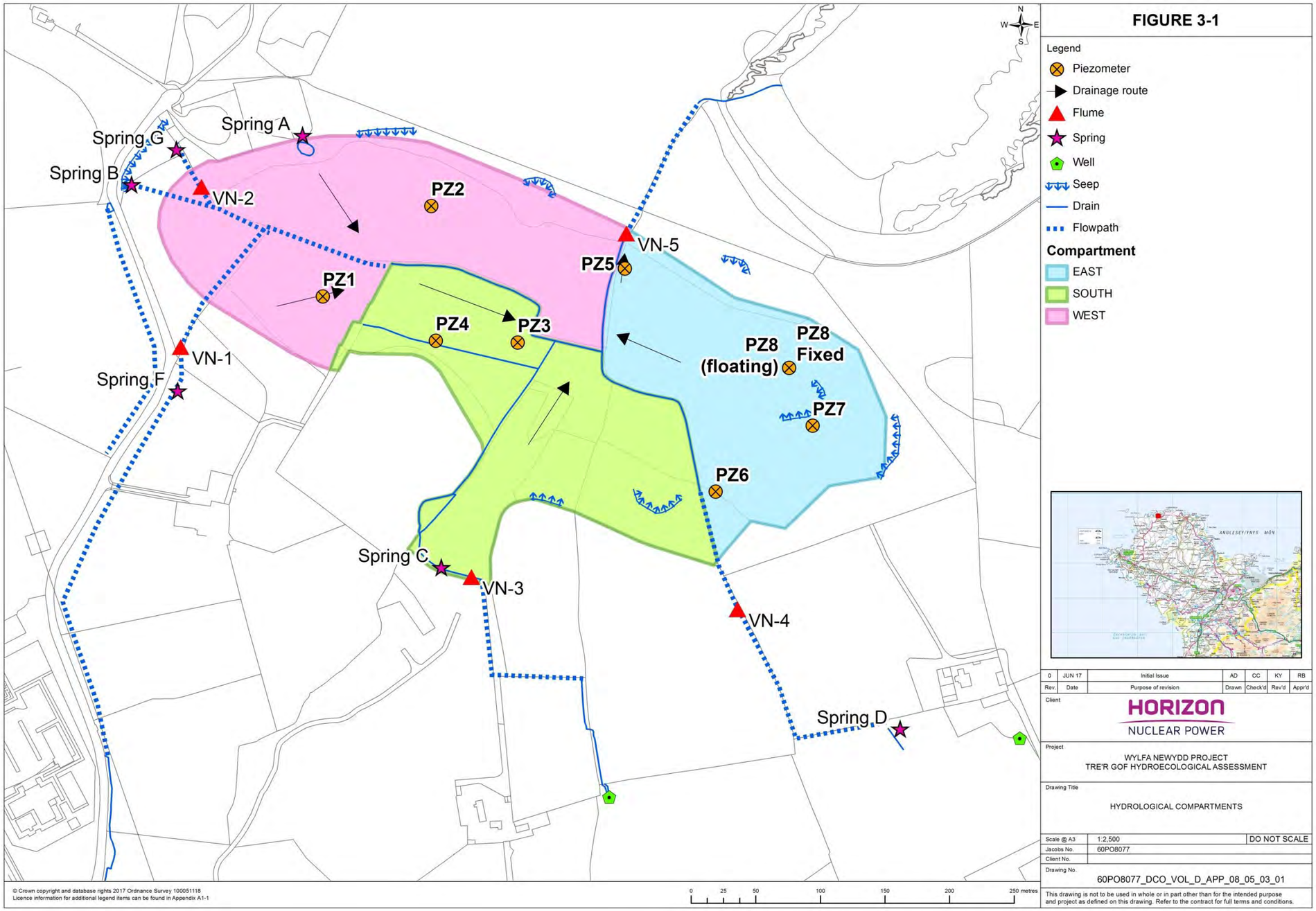
3.1.4 Hydrological supporting conditions

A critical hydrological supporting condition is the flow of shallow groundwater in the soils, superficial deposits and potentially the top of the bedrock into the SSSI and underlying peat deposits. This flux brings mineral enriched (in comparison to rainwater) water into the SSSI and emerges as springs in the western and southern compartments of the SSSI and as seeps in the eastern compartment. The peat soils appear to bind the calcium, allowing concentrations to build up over time. This notwithstanding, water sampling from the piezometers installed in peat across the basin does not indicate a substantial difference in average calcium concentrations in water from piezometers in each of the three compartments, nor is there substantially more calcium in water samples collected from piezometers adjacent to flushes. The highest average calcium concentration is in water from PZ4 which is on the south side of the basin away from the most significant seeps and flushes, and closest to one of the drains.

The storage capacity of the shallow groundwater system is minimal resulting in baseflow for a few weeks after storm events. This is evidenced in the hydrographs for flumes such as VN1 and VN3 which receive significant runoff components as well as groundwater baseflow, and from visual observations made during the monthly visits.

A semi-circular catchment area for 'typical' springs has been conservatively estimated to have a maximum radius of 140m whilst the catchment area for 'typical' seeps has been estimated to have a maximum radius of 60m. Due to the calculation method the actual recharge areas will likely be smaller. However, taking the various errors and uncertainties into account the recharge areas for the majority of seeps, flushes and small springs are likely to be of the order of 50 to 150m radius.

Figure 3-1 Hydrological compartments



3.2 Water levels

Groundwater levels in both the bedrock and superficial deposits around the margins of the SSSI fluctuate by up to 2.8m AOD over the course of a year. During the winter months, groundwater levels in boreholes on the southern and western margins of the SSSI are typically at between 7m AOD and 8m AOD, just below ground level at the boreholes, but above ground level downslope in towards the basin. This groundwater is seen in the winter and spring months emerging as springs and seeps along the southern and western margins of the SSSI. During the summer months groundwater levels drop with levels of approximately 6.5m AOD noted in BH525CP (ground level 10.85mAOD) and BH524CP (ground level 9.63m AOD). Summer groundwater levels at BH309CP (ground level 9.39m AOD) are approximately 8m AOD. This response coincides with springs and seeps on the margins of the basin drying out during the summer time.

As shown in appendix G, borehole hydrographs show a relatively rapid response to rainfall recharge. During November, significant groundwater level rises were recorded in response to heavy rainfall. Peak groundwater levels seem to be reached in December or January of each year on record indicating the wetting up phase is relatively short.

Water levels in the peat show a similar seasonality to the groundwater monitored in the boreholes although the range in water levels is less extreme. Groundwater loggers installed in the peat recorded a rise in water levels in November 2015, of the order of around 0.5m, significantly less than the corresponding rise in water levels recorded in groundwater boreholes. This is likely to be a function of the peat being more effective than the surrounding groundwater body at storing water (peat is 90–95% water) and the lack of hydraulic gradient or permeability in the peat which would allow water to be drained away quickly. The peat's ability to retain water likely plays a crucial role in maintaining wetness in Tre'r Gof through the dry summer months. Based on monitoring data collected to date (figure 2-15) and the current hydrological regime, it is unlikely that groundwater levels in the peat would drop more than 0.5m during a typical summer.

Water-quality sampling from piezometers suggests that the water that recharges the peat in November and December is in fact mineral-enriched groundwater rather than direct rainfall recharge. This is because no significant dilution is detected in major ion concentrations in water samples from piezometers until February.

The mineral-enriched groundwater flows into the SSSI via springs, seeps and as soligenous flows through superficial deposits and soil. Consideration of water flows and levels in the Tre'r Gof SSSI both indicate that the wetting up phase of Tre'r Gof in autumn and winter is a crucial recharge mechanism.

3.3 Water quality

The hydrochemistry of all water samples collected in and around the Tre'r Gof SSSI reflects fresh calcium bicarbonate water with a neutral to slightly acidic pH, albeit with maximum pH values that indicate slightly alkaline conditions on occasions. The total dissolved solids content is between 100 and 800 mg/l and the waters display temporary hardness with no brackish or saline components.

The presence of calcium bicarbonate/carbonate dominated water is cited as being an important supporting condition for rare plant communities such as S2, M13 and M9 which are all found in

the Tre'r Gof SSSI. Groundwater sampling from the peat indicates that high concentrations of calcium are present in the peat across the whole of the Tre'r Gof SSSI. The average concentrations of calcium and alkalinity (bicarbonate) for the 2015 to 2017 period are summarised in table 3.1. This shows that although the groundwater is enriched in comparison to surface water, it is the groundwater in the peat that has the highest concentrations. The springs have the lowest calcium and alkalinity concentrations, likely as a result of short residence times and short flow paths. The boreholes in the superficial deposits show the greatest variability, particularly with regard to alkalinity, and this is likely a reflection of the variable nature and thickness of the superficial deposits around the Tre'r Gof SSSI. It is not known if the concentrations in the water from the bedrock boreholes are from leaching of the bedrock or from leaching from superficial deposits and subsequent infiltration.

Table 3-1 Summary of average calcium and alkalinity concentrations

Source	Location	Range of Average Concentrations (to nearest 5mg/l)	
		Calcium	Alkalinity (bicarbonate)
Groundwater	Peat piezometers	75-155	245-435
	Superficial boreholes	25-75	55-500
	Bedrock boreholes	50-90	210-265
	Springs	20-70	55-185
Stream inflows	Inflows VN1-VN4	25-80	70-205

The relatively high concentrations of calcium and carbonates in the peat are thought to be the result of the hydraulic properties and behaviour of the peat itself. The peat has a very low permeability and low hydraulic gradient, which prevents flushing of the groundwater inflows. During the autumn, fresh groundwater recharges the peat. Once wetting up has occurred at the start of winter, the water is essentially stagnant or very slow moving, which allows calcium and carbonate ion exchange to take place and leads to the build-up of calcium and carbonate concentrations over time.

Inputs of macronutrients exceeding TVs have been identified across the Tre'r Gof SSSI. Concentrations of nitrates, potassium and phosphates seem particularly high in the shallow groundwater and in surface water runoff. The source of these nutrients is thought to be agricultural; the main land use within the Tre'r Gof surface water catchment is pasture that has been enriched for livestock grazing. Inputs of macronutrients over the long term will have a detrimental impact on the special interest of the SSSI – indeed these inputs may have already been occurring for some time as the NRW SSSI citation identifies the presence of nutrient-tolerant plants in and around the drains. The water quality data suggest the nutrients are being used by

the plants or there is significant dilution by nutrient-poor water as virtually no nutrients are found in waters at the outfall (VN5).

The East compartment of the Tre'r Gof SSSI contains some of the most interesting plant species. The combination of low nitrate inputs and high calcium and carbonate concentrations appears to be a key factor in the occurrence of S2, M13 and M9 communities in the eastern edge of the SSSI. High calcium and carbonate concentrations are encountered across the wetland but the special interest flora is only mapped in the eastern end. The absence of nutrient enrichment in this area may be linked to the lack of point source discharges in this area such as drains or springs.

3.4 Alignment of the CSM with WETMECS

A Wetland Framework for Impact Assessment at Statutory Sites in England and Wales was developed by a partnership between the Wetland Research Group at the University of Sheffield, the Environment Agency, English Nature (now Natural England) and CCW in 2009 [RD15]. This work comprised an investigation into the inter-relationships between water source, water quantity, water quality and vegetation type in sites supporting herbaceous wetland vegetation in lowland England and Wales. The core of the Wetland Framework is a typology of the main eco-hydrological units that occur within lowland wetlands, based on a synthesis of available data and analysis results. Twenty Wetland Water Supply Mechanisms (WETMECs) were identified in the Framework and described, along with the Ecological Types that are associated with them. In combination, the WETMECs and Ecological Types define eco-hydrological habitats.

A series of conceptual models of wetland types relating to the WETMECS have been developed that seek to describe typical wetland ecologies with specific water supply mechanisms. Utilising the CSM developed for the Tre'r Gof SSSI, it is considered that the site as a whole best fits with the scenario identified as WETMEC 16C, a groundwater-flushed bottom. The WETMEC description of 16C is as follows:

"…*part-drained, where the water table intersects with a topographic depression in a low-permeability, top-layer deposit (fen peat over silty sediments). It has a fluctuating water table, estimated at up to 2m. The basin receives surface water inflow from four main channels as well as significant ungauged run off and seepage. It is inundated periodically and levels are controlled by the drain outflow. There are soligenous seepages and flushes around the margins, supplemented by topogenous maintenance of the wetland through rainfall…*"

The catchment slopes and wetland margins are considered to function in a manner concomitant with WETMECs 10, 11 and 17, best described as permanent seepage slopes, intermittent and part-drained seepages and groundwater-flushed slopes.

4 Ecological sensitivity to changes in hydrology

The plant communities found within the Tre'r Gof SSSI are an outward expression of the environmental supporting conditions and the nature of the water supply and water quality found therein. The NVC survey noted that the variety of species mapped in the Tre'r Gof SSSI indicated a high variation of soil pH and the presence of both acidic and basic flushes adding to the diversity of the site. The composition of plant communities, diversity of species and the structure of the

wetland system all suggest long continuity. The results of the NVC mapping by CCW are shown in appendix A.

As identified in section 1 of this report, a fundamental objective of this investigation is to ascertain the dependence of the Tre'r Gof SSSI wetland system on the prevailing ground and surface water conditions. The NVC mapping has therefore been reviewed and the sensitivity of the critical plant communities, and individual plant species present within these communities, to changes in water level and water quality have been assessed. These assessments are summarised in table 4-1 for the plant communities and in table 4-2 for the most critical wetland species present at the Tre'r Gof SSSI. These tables indicate the conditions that need to be present and maintained to ensure that the SSSI does not become/remain in unfavourable condition.

Table 4-1 Critical vegetation communities at the Tre'r Gof SSSI and their known sensitivity to change

Nature conservation interest	Hydro-environmental supporting conditions	Sensitivity to change in water quantity	Sensitivity to change in water quality
(M9) *Carex rostrata – Calliergon cuspidatum/giganteum* mire	This community is characteristic of soft, spongy peats kept permanently moist by at least moderately base-rich and calcareous waters. Waters and substrates always have a pH above 5 and usually above 6. It is commonest in wetter parts of topogenous mires in hollows or old peat workings, but also around springs, edges of raised mires and mowing marshes. The community is limited by the sparse occurrence of suitable natural situations and in some situations by wetland drainage and the cessation of shallow peat digging [RD27].	Highly sensitive to changes in water levels. Water levels should be maintained at or close to the ground surface throughout the year. Drying conditions will soon lead to successional change and loss of this plant community. It is unknown if this plant community is located on a floating raft at Tre'r Gof, which would offer some adaptability.	A plant community which is confined to calcareous transition mires. There is some evidence to suggest that calcareous interactions at the root zone inhibit the effects of nutrient enrichment, but it is important to maintain alkaline conditions.
(M13) *Schoenus nigricans – Juncus subnodulosus* mire (M13a) *Festuca rubra – Juncus acutiflorus* sub-community (M13b) *Briza media – Pinguicula vulgaris* sub-community	(M13) This community is confined to peat or mineral soils, in and around lowland mires irrigated by base-rich, highly calcareous, and oligotrophic waters. It is often found below springs and seepage lines and on flushed margins of valley mires, but also extends into topogenous basins provided there is close contact with waters draining from lime-rich substrates. The flushing waters typically have a pH between 6.5 and 8. The structure and floristics of this community can be influenced by grazing and some stands have been affected by mowing and burning. Shallow peat-digging has been locally important in providing a suitable habitat for the community but more drastic treatment of mires, particularly draining and eutrophication, have reduced its extent and eliminated it from some areas [RD27].	Highly sensitive to changes in water levels. Water levels should be maintained at or close to the ground surface throughout the year. Drying conditions will soon lead to successional change and loss of this plant community.	A plant community dependent upon the flushing of calcareous water in an oligotrophic peat background. It is important to retain the juxtaposition of lime-rich and oligotrophic conditions.
(M15) *Scirpus cespitosus – Erica tetralix* wet heath	This wet heath community is characteristic of moist and generally acid and oligotrophic peats and peaty mineral soils. It is associated with thinner or better-drained areas of ombrogenous peat with a surface pH typically between 4 and 5 [RD27].	Moist acidic peat conditions are a prerequisite for this species throughout the year. Drying conditions will lead to successional change and	Acidic, oligotrophic conditions are a prerequisite. Eutrophication and nutrient enrichment of surface water feeding these areas will lead

Nature conservation interest	Hydro-environmental supporting conditions	Sensitivity to change in water quantity	Sensitivity to change in water quality
		initially the dominance of grass species over heather.	to the eventual loss of this community.
(M22) *Juncus subnodulosus – Cirsium palustre* fen-meadow (M22d) *Iris pseudacorus* sub-community	(M22) This community brings together secondary herbaceous vegetation developed over a variety of moist, base-rich and moderately mesotrophic peats. It can be found either in or around well-developed springs, flushes and mires, or marking out more ill-defined areas influenced by surface or groundwater. This community marks out soils which are kept moist for most of the year and have a moderate to high base-status, and usually a pH range of 6.5–7. [RD27].	Moist soils throughout the year in the mesotrophic peat areas of the site will be important to maintain this community. The appropriate management practices are also important.	Increased nutrient enrichment would have a significant negative impact on this community.
(M23) *Juncus effusus/acutiflorus – Galium palustre* rush-pasture (M23a) *Juncus effusus/acutiflorus – Galium palustre* rush-pasture, *Juncus acutiflorus* sub-community (M23b) *Juncus effusus* sub-community	M23 rush-pasture occurs over a variety of moist, moderately acid to neutral, peaty and mineral soils. It is a community found on gently sloping ground around the margins of soligenous flushes, as a zone around topogenous mires and wet heaths, and especially widespread in ill-drained, comparatively unimproved or reverted pasture. It is found on a variety of moderately acid to neutral soils that are kept moist to wet for most of the year with a pH in the range of 4–6. This habitat is kept wet throughout the year by flushing and seepage, and there can be some standing water in winter [RD14].	Draining or lowering of water levels would significantly affect this habitat. This habitat requires mowing or grazing to prevent encroachment of other habitat types and succession into woodland.	An increase in introduced nutrients would negatively affect these communities and greatly reduce their extent.
(M27) *Filipendula ulmaria – Angelica sylvestris* mire	This community is found where moist, reasonably rich, circumneutral soils occur in situations protected from grazing. It can be found in both topogenous and soligenous mires and is especially typical of silted margins of slow-moving streams and soakways, the edges of flushes and damp hollows, and also of artificial habitats such as along dykes and roadside ditches and around ponds. This community occurs throughout lowland Britain. Generally occurs in mosaics with other tall-herb mires and swamps, in glens and wet hollows, alongside slow-moving streams, at	Able to tolerate fluctuations in water levels throughout the year and able to persist in soils which retain moisture throughout this period.	Normally found in enriched locations, e.g. alluvial silts and found in such locations on the SSSI. Some evidence to suggest that this plant community is encroaching in the nutrient-enriched soils of the site.

Nature conservation interest	Hydro-environmental supporting conditions	Sensitivity to change in water quantity	Sensitivity to change in water quality
	the edges of lochs, and on flushed slopes close to sea-level. These are all places where the water-table fluctuates widely over the year [RD14].		
(M29) *Hypericum elodes – Potamogeton polygonifolius*	*Hypericum-Potamogeton* soakways occur where water emerges from the ground and flows more or less permanently over the surface in runnels and seepages. Some stands are associated with springs or stream edges and form isolated patches within a matrix of drier grasslands and heaths. Others occur within mosaics of different mire types or mark out the wettest places within valley bogs. The community also occurs in peaty pools within blanket bogs. A few stands are in situations that can become rather dry in summer. The soils are peats or peaty gleys, and the water is acid, with a pH between 4.0 and 5.5 [RD14].	This habitat type is characteristic of fluctuating water levels. This habitat is highly dependent on marshy and wet ground for most of the year and will be negatively affected if water levels are permanently lowered.	This habitat appears to be a stable vegetation type in the absence of nutrient enrichment. In situations where there is some nutrient enrichment, grazing and trampling may help to continually set back any tendency to succession. Long-term nutrient enrichment will negatively affect this habitat over time [RD14].
(S2*) Cladium mariscus* swamp and sedge-beds (S2a) *Cladium mariscus* sub-community (S2b) *Menyanthes trifoliata* sub-community	This is found in open water transition, flood-plain and especially basin fens. Usually found in calcareous and base-rich areas with shallow standing water tables [RD27].	Tolerant of the water level range -15 to +40cm below and above ground level.	Usually calcareous and base-rich, therefore relatively tolerant of small changes in nutrient levels.
(S3) *Carex paniculata* sedge-swamp	This habitat occurs in swampy areas besides lakes, canals and streams [RD27].	Able to tolerate a degree of seasonal water table movement.	Generally base-rich and calcareous. pH range 7–8, mesotrophic to eutrophic.
(S4b) *Phragmites australis* swamp, *Galium palustre* sub-community	Present in freshwater margins and wetland habitats. Widespread in open water transition and flood-plain fens, usually in hydroseral situations. No strict substrate preferences, but fertile alluvial soils optimal.	Able to tolerate significant seasonal change in water levels and ultimately the reed bed will elevate due to successional change if not	Able to tolerate enriched-nutrient situations.

Nature conservation interest	Hydro-environmental supporting conditions	Sensitivity to change in water quantity	Sensitivity to change in water quality
		managed appropriately. In this situation succession will be the primary determinant of change and hence sensitivity.	
(S10a) *Equisetum fluviatile* swamp, *Equisetum fluviatile* sub-community	This is a community of open water and is found in lochs, peaty pools, water tracks through bogs, and slow-moving streams. Stands of the *Equisetum* sub-community can grow in water more than a metre deep, and can extend into deeper water than *Carex rostrata* swamp. May form a floating raft or occur on mineral substrates. The optimal water chemistry for this community varies from acid to basic. Generally associated with open water transitions, mesotrophic to oligotrophic in character, shallow to moderately deep.	This plant community requires high water tables above ground surface throughout the year.	A wide range of water chemistry tolerance, but nutrient enrichment will lead to a change in species composition in this community.
(S12) *Typha latifolia* swamp (S12b) *Mentha aquatica* sub-community	Found in shallow water up to 15cm deep or on exposed mud at the edge of lakes, ponds, canals and ditches and (less frequently) by streams and rivers and favours nutrient-rich sites.	S12b is found in shallower water with little annual fluctuation, therefore sensitive to wider variations in seasonal water depths.	Waters tend to be mesotrophic to eutrophic, therefore relatively robust in a range of nutrient levels.
(S14a) *Sparganium erectum* swamp, *Sparganium erectum* sub-community	Present in shallow water in lakes, rivers, streams, canals and ditches. Usually occurs in a narrow band at the water's edge; it is sometimes found as larger stands in swamps. Occurs in standing or slow-moving water 20-80cm deep.	Requires a high water table near the ground surface for much of the year.	Substrate usually silt or clay. pH range 5.7–7.2 with a broad tolerance of nutrient levels.
(S22a*) Glyceria fluitans* water-margin vegetation, *Glyceria fluitans* sub-community	Present in still water margins and edges, often forming floating mats. Characteristic of shallow, standing or slow-moving water.	Requires a high water table near the ground surface for much of the year.	This habitat is found in mesotrophic and eutrophic areas and as such is generally very tolerant of changes in water quality.
(S27) *Carex rostrata – Potentilla palustris* tall-herb fen (S27b) *Lysimachia vulgaris* sub-community	Almost exclusively a topogenous community in basin and flood-plain mires and may occur as a floating mat. In the uplands, *Carex-Potentilla* tall-herb fen occurs around the margins of lochs and in pools and seepage lines within stands of blanket bog, rush-mire and sedge-mire [RD25].	Generally water levels are kept continuously high to maintain this vegetation type.	pH, bicarbonate and calcium levels are normally found to be low for rich-fen communities, but fertility levels are high.

Table 4-2 Critical plant species at the Tre'r Gof SSSI and their known sensitivity to change

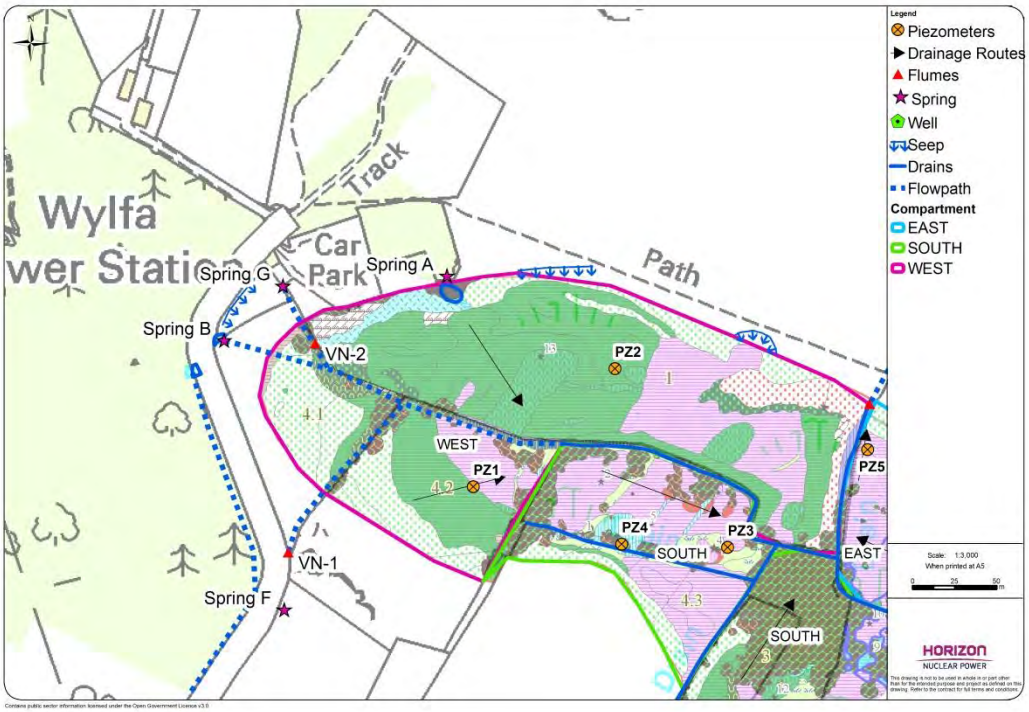
Notable plant species	Ecology	Habitat type	Sensitivity to changes in water quantity and quality
Marsh fern *Thelypteris palustris*	A perennial fern of open or recently wooded fen or open carr, where the soil is permanently wet and organic, but not too acidic. It seems to occur in either the transitional vegetation at the edges of mires, or in habitats of intermediate successional stages [RD28].	Abundant in (M13b) *Briza media – Pinguicula vulgaris* sub-community and (M15) *Erica tetralix* wet heath.	This species is sensitive to extreme changes in water level – prolonged drought and/or excessive inundation, e.g. development of conditions suitable for *Sphagnum* communities to develop, will lead to the loss of this species. It exists in transitional habitats and requires the presence of appropriate conditions somewhere on a site to colonise when successional change takes place. It can tolerate a degree of nutrient enrichment (Ellenberg indicator value for nitrogen of 5 which is an indicator for sites of intermediate fertility) hence being found in open woodland situations, but is intolerant of the effects of acidification. Also see requirements for NVC type M13b in table 4-1.
Great fen-sedge *Cladium mariscus*	A rhizomatous perennial of oligotrophic to mesotrophic habitats, usually growing on peat. It is found in swamps at the margins of lakes and ponds and along streams, and in tall-herb fens and open fen carr. In England and Wales it is largely restricted to calcareous sites [RD28].	Abundant in (S2) *Cladium mariscus* swamp and sedge-beds.	This species is sensitive to changes in water levels on a site and requires the presence of a high water table near or above ground surface. It also requires the presence of calcium within the substrate and/or ground/surface water and is intolerant of nutrient enrichment (Ellenberg indicator value for nitrogen of 4, which is an indicator of infertile sites). Also see requirements for NVC type S2 in table 4-1.
Black bog rush *Schoenus nigricans*	A tussock-forming perennial of calcareous and base-rich fens and peaty flushes, marshes and bogs [RD28].	Abundant in (M13) *Schoenus nigricans – Juncus subnodulosus* mire.	A species sensitive to change in both water quantity and quality. It requires a high water table throughout the year and is intolerant of nutrient enrichment (Ellenberg indicator value for nitrogen of 2 which indicates that

Notable plant species	Ecology	Habitat type	Sensitivity to changes in water quantity and quality
			this species persists within a low nitrogen environment). Increased nutrient enrichment would therefore have a significant negative impact on this species and the community it forms. Also see requirements for NVC type M13b in table 4-1.
Long-stalked yellow sedge *Carex viridula* ssp. *Brachyrrhyncha*	A perennial herb of fens and calcareous mires, especially in areas of winter flooding and frequent in base-rich flushes [RD28]	Frequent in M9/S27 intermediate mire.	A species with some tolerance of change in water quantity and quality, but extremes of change will affect this species. Inundation in winter and some drying in summer is characteristic of sites where this species is found. It requires the presence of calcium in the substrate and/or ground/surface water and is intolerant of excessive nutrient enrichment. Also see requirements for NVC type M9 in table 4-1.
Slender sedge *Carex lasiocarpa*	Found in reed-swamps and other vegetation at the edges of lakes, pools and slow-flowing streams and rivers, and in flushes and wet hollows in fens. [RD28].	Abundant in (M13b) *Briza media – Pinguicula vulgaris* sub-community and (M15) *Erica tetralix* wet heath.	This species requires the presence of a high water table and/or ground/surface water conditions throughout the year. This species generally occurs in nutrient-poor water, which may be base-rich or base-poor (Ellenberg indicator value for nitrogen of 3, which indicates presence in infertile sites). Also see requirements for NVC type M13b in table 4-1.

5 Hydrological supporting conditions

Baseline hydrological conditions with respect to water quality, levels and flows are summarised below. NRW has stated that the Tre'r Gof SSSI is in an unfavourable condition, which could suggest that it has less potential to absorb changes to any aspect of the hydrological supporting conditions so maintenance of these conditions is fundamental to preventing any further decline.

The following section seeks to define the 'baseline' conditions with respect to flows, levels and quality for each compartment and tie them in to the species which are present in each compartment. The legend for the NVC mapping is presented in appendix A.

<table>
<tr><th colspan="5">West Compartment hydroecological baseline</th></tr>
<tr><td>Map</td><td colspan="4"> 

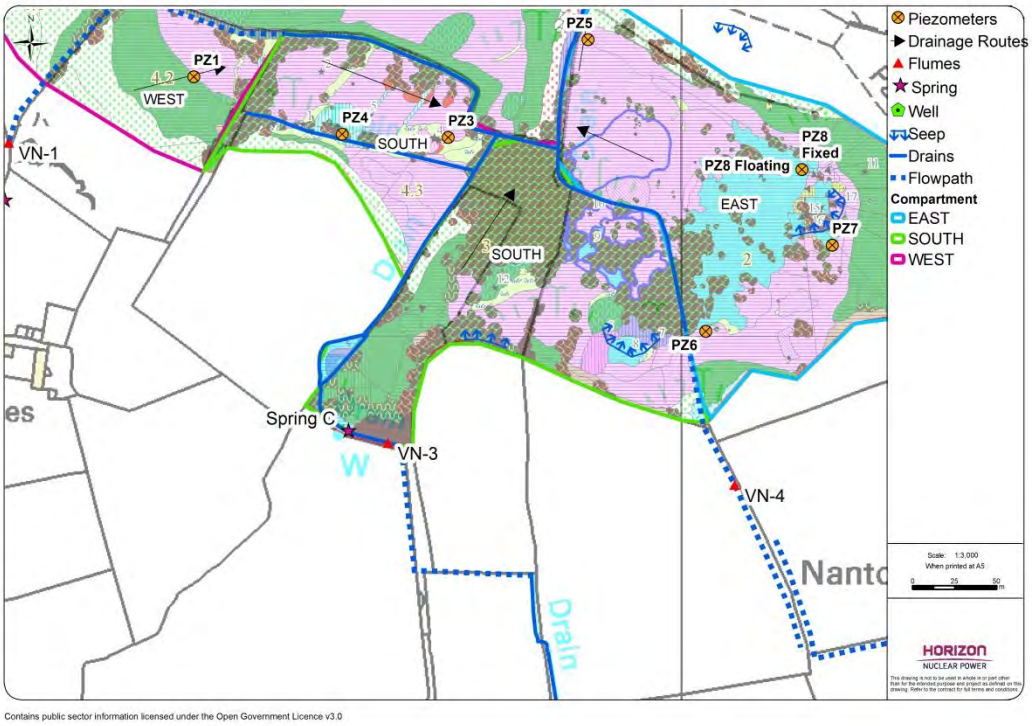
See appendix A for NVC mapping legend</td></tr>
<tr><td>Ecology</td><td colspan="4">This compartment is dominated by NVC rush pasture and wet grassland types: M23a Juncus effusus/acutiflorus – Galium palustre rush-pasture, Juncus acutiflorus sub-community and M22a Juncus subnodulosus – Cirsium palustre fen-meadow, and grades to drier conditions on the margins with damp semi-improved and improved grassland and willow scrub encroaching in some areas. There is evidence of nutrient enrichment along some of the ditches in this compartment, including the presence of Phragmites australis, Glyceria fluitans and Apium nodiflorum. There is also evidence of quaking conditions around springheads in the southern part of the area.</td></tr>
<tr><td>Sensitivity to change</td><td colspan="4">M22a – Needs a high water table. Sensitive to nutrient enrichment.
M23a – Needs a high water table. Sensitive to nutrient enrichment.</td></tr>
<tr><td>Flow</td><td>Dominated by spring flows and direct seepage of groundwater into peat. Some surface water inflow via VN1. Peak flows in VN1 in December and January.</td><td></td><td>Min</td><td>Max</td></tr>
<tr><td></td><td></td><td>VN1</td><td>0.00l/s</td><td>30.34l/s</td></tr>
<tr><td></td><td></td><td>VN2</td><td>0.00l/s</td><td>3.53l/s</td></tr>
<tr><td></td><td></td><td>Typical spring flow</td><td colspan="2">Conservatively estimated to be 0.5l/s, groundwater recharge radius 50-150m (semi-circular area).</td></tr>
<tr><td>Water levels</td><td>Groundwater levels rise up to intersect ground surface</td><td>BH 524 group</td><td>5.8m AOD</td><td>9.6m AOD</td></tr>
</table>

West Compartment hydroecological baseline									
	during winter time; this maintains baseflow to seeps and directly into peat. High water table maintained in peat.			**PZ1 and PZ2**		5.4m AOD	6.4m AOD		
Quality (mg/l)	**Piezometers (PZ1 & PZ2)**			**Springs (A & B)**			**Flumes (VN1 & VN2)**		
	Min	**Max**	**S.Dev**	**Min**	**Max**	**S.Dev**	**Min**	**Max**	**S.Dev**
pH	6.6	7.5	0.2	7.1	8.3	0.4	7.0	7.9	0.3
Nitrate	<0.07	0.7	0.2	<0.07	7.2	1.9	0.2	11.7	4.1
Potassium	<1	4.5	1.1	<1	8.7	2.5	<1	5.5	1.3
Phosphate	<0.05	0.62	0.2	<0.05	0.62	0.22	<0.05	0.08	0.01
Calcium	61	161	23.9	30	66	10	22	89	27
Total alkalinity	170	355	60.1	65	190	41	55	190	46

Note: S.Dev – standard deviation (assuming normally distributed data)

South Compartment hydroecological baseline

Map



See appendix A for NVC mapping legend

Ecology

The southern compartment is dominated by the NVC type M22a *Juncus subnodulosus* – *Cirsium palustre* fen-meadow and willow scrub and within the southern finger of the SSSI by M23a *Juncus effusus/acutiflorus* – *Galium palustre* rush-pasture, *Juncus acutiflorus* sub-community, and M23b *Juncus effusus/acutiflorus* – *Galium palustre* rush-pasture, *Juncus effusus* sub-community. There are also smaller areas, predominantly in the eastern area of the compartment, which support critical intermediate mire features (M9 *Carex rostrata* – *Calliergon cuspidatum/giganteum* mire, and S27 *Carex rostrata* – *Potentilla palustris* tall-herb fen), and S2 the *Cladium mariscus* swamp and sedge-beds vegetation type and *Iris (pseudacorus*)-dominated vegetation indicating wetter conditions. There is an apparent west to east/moist to wet gradient in this compartment.

Sensitivity to change

M22a – Needs a high water table. Sensitive to nutrient enrichment.

M23a – Needs a high water table. Sensitive to nutrient enrichment.

S2 – Tolerant of the water level range 0.15m below to 0.40m above ground level. Can tolerate small changes to nutrient enrichment. Requires high pH and calcium bicarbonate enriched waters.

S27 – Needs a high water table throughout the year. Requires low pH and calcium bicarbonate-enriched waters. Can tolerate high nutrient inputs.

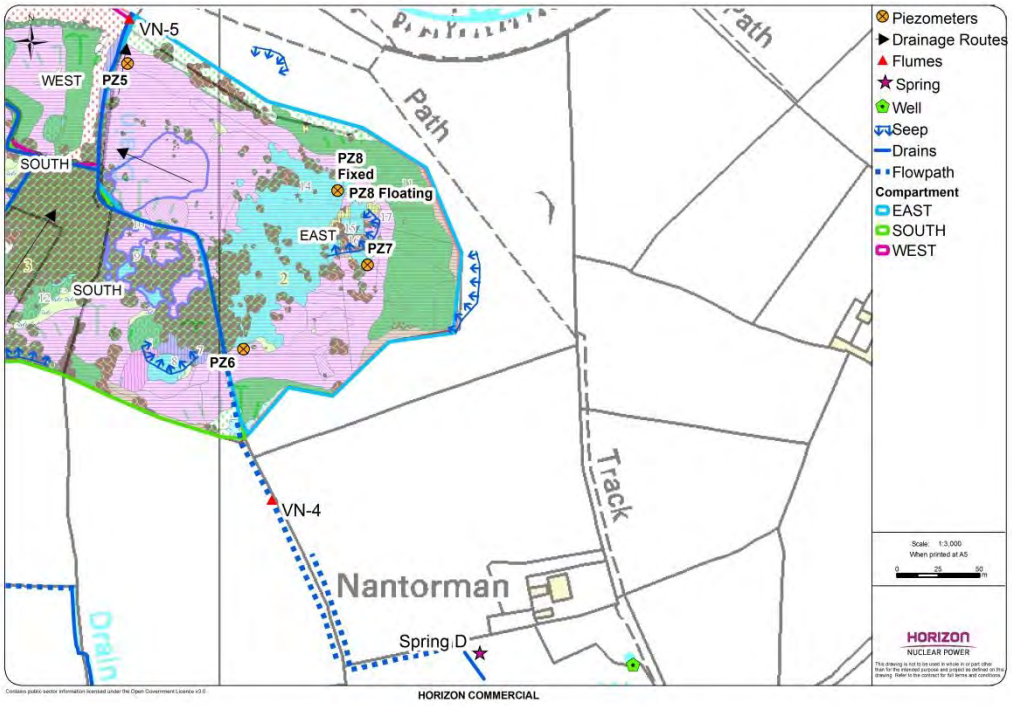
Flow

Flow comprises a combination of surface water runoff and groundwater baseflow via

	Min	Max
VN3	0.00l/s	30.96l/s

South Compartment hydroecological baseline									
	springs and seeps. Peak flows occur in December and January, low flows in August and September.			**VN4**		0.00l/s		60.12l/s	
				Typical spring flow		Conservatively estimated to be 0.5l/s, groundwater recharge radius 50-150m (semi-circular area).			
Water Levels	Artesian conditions occur along southern margin of SSSI in winter. Perched water table maintained in peat.			**309 Group**		6.34m AOD		10.02m AOD	
				525 Group		6.15m AOD		8.63m AOD	
				PZ3 & PZ4		5.79m AOD		6.25m AOD	
Quality	**Piezometers (PZ3 & 4)**			**Springs (C & D)**			**Flumes (VN3 & VN4)**		
	Min	**Max**	**S.Dev**	**Min**	**Max**	**S.Dev**	**Min**	**Max**	**S.Dev**
pH	6.8	8.1	0.4	6.8	7.8	0.3	7.2	8.1	0.3
Nitrate	<0.07	0.7	0.2	0.15	6.96	2.61	1.04	2.48	0.55
Potassium	<1	1.6	<1	<1	22.7	7.5	2.2	8.3	2.2
Phosphate	<0.05	<0.05	<0.05	<0.05	1.0	0.33	0.07	0.27	0.09
Calcium	90	199	36	28	86.5	20.73	29	72	15
Total alkalinity	268	515	81	50	245	69.13	80	245	50

Note: S.Dev – standard deviation (assuming normally distributed data)

East Compartment hydroecological baseline	
Map	 See appendix A for NVC mapping legend
Ecology	The eastern compartment supports the main area of NVC type S2a *Cladium mariscus* swamp and sedge-beds, *Cladium mariscus* sub-community (*Cladium*-dominated stand), as well as large areas to the west and east of the Cladium bed of the rush pasture types of M23a *Juncus effusus/acutiflorus – Galium palustre* rush-pasture, *Juncus acutiflorus* sub-community and M22a *Juncus subnodulosus – Cirsium palustre* fen-meadow. A significant stand of the rare marsh fern *Thelypteris palustris* is located in the central part of the M22a fen meadow. The compartment grades to a drier margin with damp semi-improved pasture and MG6a *Lolium perenne – Cynosurus cristatus* grassland, typical sub-community to the north and east. The compartment also includes small areas of M13a and M13b *Schoenus nigricans – Juncus subnodulosus* mire.
Sensitivity to change	M9a – Needs constantly high water table the year round. Requires low pH and calcium bicarbonate-enriched waters. There is some evidence to suggest that calcareous interactions at the root zone inhibit the effects of nutrient enrichment, but it is important to maintain alkaline conditions. M13 – Needs a high water table and flushing of calcareous water in an oligotrophic peat background. Sensitive to nutrient enrichment. M22a – Needs a high water table. Sensitive to nutrient enrichment. M23a – Needs a high water table. Sensitive to nutrient enrichment. S2 - Tolerant of the water level range 0.15m below to 0.40m above ground level. Can tolerate small changes to nutrient enrichment. Requires high pH and calcium bicarbonate-enriched waters.

East Compartment hydroecological baseline									
Flow	No point source inflows such as springs or drains. Recharge from shallow groundwater seepage and surface water runoff. Seep flows estimated.		**Summer Low**	**Winter High**					
		VN4	0.00l/s	60.12l/s					
		Seeps	Conservatively estimated to be 0.1l/s, groundwater recharge radius 50-150m						
Water levels	Groundwater levels rise up to intersect ground surface during winter time; this maintains baseflow to seeps and directly into peat. High water table maintained in peat.	**526CP**	5.48m AOD	9.31m AOD					
		310CP	7.98m AOD	11.47m AOD					
		PZ7 and PZ8 fixed & floating	6.34m AOD	6.92m AOD					
Quality	**Piezometers (PZ7 & PZ8 fixed)**			**Springs (D)**			**Flumes (VN4)**		
	Min	**Max**	**S.Dev**	**Min**	**Max**	**S.Dev**	**S.Dev**	**Max**	**Min**
pH	6.8	7.6	0.2	6.8	7.6	0.3	7.9	8.1	0.07
Nitrate	<0.07	0.08	<0.07	0.15	6.78	2.36	1.04	2.42	0.70
Potassium	<1	1.1	<1	7.9	22.7	5.71	5.3	8.3	1.6
Phosphate	<0.05	<0.05	<0.05	0.18	1.0	0.3	0.27	0.27	NA
Calcium	70	139	22.1	49	86.5	14.2	51	62	5
Total alkalinity	219	410	70	130	245	42.6	140	160	10

Note: S.Dev – standard deviation (assuming normally distributed data)

6 Conclusions

The Tre'r Gof SSSI has a complex geology and as no deep boreholes have been drilled through the SSSI basin, the geology has been interpreted based on the topography, shallow cores through the superficial deposits in the SSSI and the boreholes around its edges. The superficial deposits and bedrock are in hydraulic continuity in some areas, but function independently in others due to the varying composition of the glacial till. The hydroecology is also complex and there remains a degree of uncertainty regarding some aspects of water movement at the site and its role in supporting the vegetation communities present.

Although the SSSI is a seasonal GWDTE that is dependent on winter recharge by direct rainfall and groundwater flows, it is highly dependent on direct rainfall, surface water inflows and soil / sub-soil inflows. The groundwater inflows bring in mineral-enriched water (in comparison with rainwater) vital to the maintenance of the ecological interest in the SSSI. The essential lime content of the water supplying the wetland is believed to derive from contact of infiltrating water with the calcareous Irish Sea Lodgement Till, potentially in addition to other sources such as bedrock. The water in the watercourses that flow into the drainage system appears to pass through the SSSI with little water movement into the fen. However, maintaining a high water level in these watercourses is essential to prevent localised draining of the fen.

The low permeability and low hydraulic gradient in the peat soils play an important role in preventing water from being flushed rapidly through the soils. The retention time of water in the peat allows ion exchange to occur resulting in the build-up of calcium and bicarbonate/ carbonate ions which lime-loving plant species such as M13 require.

During the summer months, the water level in the peat drops below the surface elevation of the SSSI, and spring flow, seepage and baseflow in drains largely ceases. The presence of a deep peat soil across the wetland is crucial in maintaining high water levels throughout the summer months by storing winter recharge.

A water balance has been prepared for the Tre'r Gof Catchment in order to provide an indication of gross water movements to the site and in particular to try to identify the main sources of water moving into the SSSI. Although there are uncertainties in the water balance, it does suggest that the majority of groundwater inputs to the SSSI are derived from the shallow superficial deposits and weathered bedrock. The imbalance between inflows and outflows in the water balance suggests that less than about 70% of the 'ungauged' area (i.e. the area outside of the basin where there are no watercourses) of the catchment may contribute directly to water movement to the SSSI basin.

The shallow groundwater system has a low storage capacity and baseflow contribution to the SSSI is of the order of weeks; groundwater inputs cease quickly in the spring with the SSSI experiencing 'dry' conditions in the summer. The recharge radius for critical small winter-borne springs and seeps has been estimated to be approximately 50 to 150m, although these areas will be semi-circular rather than circular in shape.

The drains appear to function as "through routes" for surface water flow and although maintaining sufficient water in these is important in preventing localised draining of the fen, they are less important in supporting the fen than direct incident rainfall over the basin and the ungauged areas of the catchment.

The Tre'r Gof SSSI comprises three discrete hydrological compartments, West, South and East. There is little connectivity between these compartments during dry periods and flow from one compartment has little effect on another compartment. During the wet season, water may pond or pool at the ground surface leading to increased surface water connectivity, reflected in the distribution of plant species across the hydrological compartments and the flows recorded at the SSSI outfall (VN5). The compartments have largely been defined by looking at where and how surface flows are routed; the operation of the compartments is significant with respect to assessing impacts.

The distribution and composition of vegetation types and the distribution of critical wetland plant species across the SSSI is primarily determined by the hydrological conditions and, more specifically, the presence of appropriate hydro-environmental supporting conditions. However, whilst the hydrology is critical, the presence and distribution of vegetation and individual plant species is also a result of the variation in soil types and conditions across the site (e.g. the macro-scale variation in nutrients and specific chemical species) and the past and present management practices, including land drainage carried out in the 20th century.

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APPENDIX A NVC MAPPING

SH39-05P Tre'r Gof SSSI: vegetation map



Mapped by K. Birch & J Stevens, CCW HQ 2010

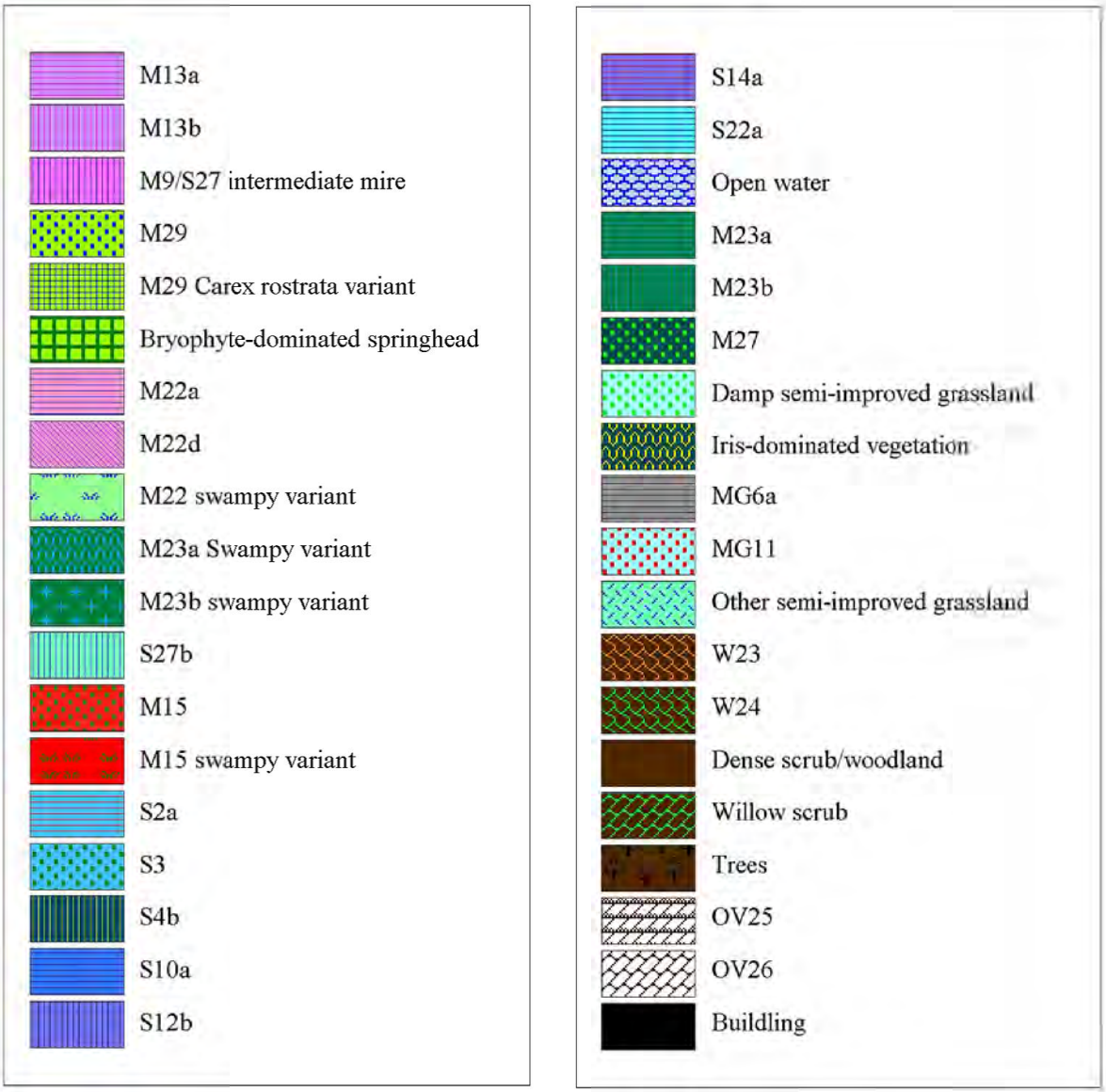
Scale 1:2500

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Atgynhyrchir y map hwn o ddeunydd yr Arolwg Ordnans gyda chaniatâd Arolwg Ordnans ar ran Rheolwr Llyfrfa Ei Mawrhydi © Hawlfraint y Goron. Mae atgynhyrchu heb ganiatâd yn torri hawlfraint y Goron a gall hyn arwain at erlyniad neu achos sifil. Cyngor Cefn Gwlad Cymru, 100018813 2009.

Cyngor Cefn Gwlad Cymru Countryside Council for Wales

SH39-05P Tre'r Gof SSSI: Legend to vegetation map



Chequered colours indicate vegetation mosaics.

Blue lines indicate area with abundant marsh fern Thelypteris plaustris.
Red line indicates SSSI boundary.

Stars and white-edged numbers indicate quadrat locations.
Triangles and red-edged numbers indicate photo locations.
Large yellow-edged numbers indicate comparmtnets.

Mapped by K. Birch & J. Stevens, CCW HQ 2010

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APPENDIX B GEOLOGICAL FAULTS MAP

DO NOT SCALE

HORIZON-COMMERCIAL

GIR PLANS AREA B

WYLFA HEAD

PORTH WNAL

PORTH YR OGOF

CEMEAS BAY

WYLFA A

GEOLOGICAL BOUNDARY

GWNA GROUP

NEW HARBOUR GROUP

PORTH-Y-WYLFA

GEOLOGY BOUNDARY

PENRHYN

OUTFALL TUNNELS

PORTH-Y-PISTYLL

TRE'R GOF SSSI

INTAKE STRUCTURES

WYLFA VISITOR CENTRE

UNIT 1

UNIT 2

CEMLYN ROAD

A5025

HORIZON-COMMERCIAL

NOTES

1. OS tiles provided by Horizon Nuclear Power Wylfa Ltd. Reproduced from Ordnance Survey map data by permission of Ordnance Survey, © Crown Copyright OS License 100051118.
2. For clarity, only the proposed positions of main buildings (100 series) and associated tunnels are shown. Proposed building positions have been taken from HGNE drawing provided in LE-UW-0165 Rev.0 Appendix-1 HGNE Borehole Location Requirement (2/3). A more detailed building layout is shown on drawing 5130177-ATK-XX-ZZ-DR-C-0002A.
3. This drawing should be read in conjunction with Atkins' Interim Interpretative GIR 5130177/301/009 (November) and later 5130177/301/010 (December).
4. The alignment of dykes has been taken from the Halcrow drawing TQHOWA/409 and their model produced at IOnGI stage (WYB0002, Feb 2012). Multiple dyke intersections have been observed at DOnGI stage; the dyke model has not been updated at Interim DOnGI GIR stage.
5. Interpreted plan locations of faults and dykes are shown at 0mOD. Faults and dykes have been extrapolated linearly to 0mOD from intersections in boreholes. Estimated fault dip angles are shown on the down dip side of the fault. In reality, such geological features may be curved, or include splays/branches.
6. A-series faults were identified by Arup & BGS in the fault rupture study (WYB0004, 2011). The Arup & BGS fault model has not been updated at Interim Interpretative GIR stage.
7. B-series potential faults have been tentatively identified by Atkins, initially based upon fault intersections in DOnGI HSP boreholes which have been inspected by Arup/BGS. Fault planes have subsequently been interpolated by Atkins between additional discrete fault picks from borehole televiewer data. These picks require verification by core inspection and correlation with ongoing ground investigation (See Atkins' Interim Interpretative GIR).

KEY

- SITE DEVELOPMENT BOUNDARY (AS DEFINED BY NPS)
- MAIN BUILDINGS FOOTPRINT AND TUNNEL ALIGNMENT (SEE NOTE 2)
- A63 — A63 — A SERIES FAULTS (SEE NOTE 6)
- B2 — B2 — B SERIES POTENTIAL FAULTS (SEE NOTE 7)
- 54° — ESTIMATED DIP ANGLE SHOWN ON DOWN DIP SIDE
- PALEOZOIC INTRUSIONS (SEE NOTE 4)
- TERTIARY DYKE

Rev.	Date	Description	By	Chk'd	App'd
P2	28 NOV 2014	FOR INTERIM GIR	DH	RH	MW
P1	14 NOV 2014	FOR DRAFT INTERIM GIR	DH	RH	MW

Drawing Status: FOR ISSUE

Suitability: S2

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Client: HORIZON NUCLEAR POWER WYLFA LTD

Project Title: WYLFA NEWYDD DETAILED ONSHORE GROUND INVESTIGATION

Drawing Title: FAULTS AND INTRUSIONS PLAN

Scale	Designed	Drawn	Checked	Authorised
1:4000	CB	DH	RH	MW
Original Size: A1	Date: 07 NOV 14	Date: 07 NOV 14	Date: 07 NOV 14	Date: 07 NOV 14

Drawing Number: 5130177-ATK-XX-ZZ-DR-C-0007

Revision: P 2

Scale 1:4000 @ A1
Scale 1:8000 @ A3

APPENDIX C PEAT CORE LOGS AND PROBE DATA

Core/Piezometer ID	Easting	Northing	Elevation (m AoD)	Piezometer Installation Depth (mbgl)
PZ1	235710	393654	5.87	1.5
Core Depth (m)	**Peat Depth (m)**	**Water table Depth (m bgl)**	**Acrotelm Depth (m)**	**Catotelm Depth (m)**
2.5	>2.5	0.10	0.2	>2.5
Von Post H Scores			**Von Post B Scores**	
Acrotelm	H6		B3	
Catotelm	H6-H9		B3-B4	



PZ1, 0-1m

General Comments:

Acrotelm not distinct and moderately decomposed, catotelm highly decomposed. Moderately saturated. Piezometer installed to 1.5m, unable to advance further.

Core/Piezometer ID	Easting	Northing	Elevation (m AoD)	Piezometer Installation Depth (mbgl)
PZ2	235794	393724	5.63	2.5
Core Depth (m)	**Peat Depth (m)**	**Water table Depth (m bgl)**	**Acrotelm Depth (m)**	**Catotelm Depth (m)**
2.5	>2.5	0.09	0.2	>2.5
Von Post H Scores			**Von Post B Scores**	
Acrotelm	H5		B4	
Catotelm	H8-H10		B5	



PZ2, 0-1m

General Comments:

Acrotelm partly decomposed, fibrous, catotelm highly decomposed. Heavily saturated. Piezometer installed to 2.5m.

Core/Piezometer ID	Easting	Northing	Elevation (m AoD)	Piezometer Installation Depth (mbgl)
PZ3	235861	393618	6.03	2.5
Core Depth (m)	**Peat Depth (m)**	**Water table Depth (m bgl)**	**Acrotelm Depth (m)**	**Catotelm Depth (m)**
3.0	>3.0	0.06	0.25	>3.0
Von Post H Scores			**Von Post B Scores**	
Acrotelm	H3-4		B3	
Catotelm	H7-H9		B4	



PZ3, 0-1m

General Comments:

Acrotelm light brown, very fibrous with much fresh root material, catotelm moderately to highly decomposed. Moderately saturated. Piezometer installed to 2.5m.

Core/Piezometer ID	Easting	Northing	Elevation (m AoD)	Piezometer Installation Depth (mbgl)
PZ4	235798	393620	6.08	2.5
Core Depth (m)	**Peat Depth (m)**	**Water table Depth (m bgl)**	**Acrotelm Depth (m)**	**Catotelm Depth (m)**
3.0	0.4	0.02	-	>2.5
Von Post H Scores			**Von Post B Scores**	
Acrotelm	-		-	
Catotelm	H7		B3	



PZ4, 0-1m

General Comments:

Acrotelm not identifiable. Substrata comprises grey very clayey organic silt with peaty lenses. Moderately saturated. Piezometer installed to 2.5m.

Core/Piezometer ID	Easting	Northing	Elevation (m AoD)	Piezometer Installation Depth (mbgl)
PZ5	235944	393676	5.90	2.5
Core Depth (m)	**Peat Depth (m)**	**Water table Depth (m bgl)**	**Acrotelm Depth (m)**	**Catotelm Depth (m)**
2.5	2.2	0.05	0.15	2.05
Von Post H Scores			**Von Post B Scores**	
Acrotelm	H4		B3-4	
Catotelm	H8-9		B3-5	



PZ5, 0-1m

General Comments:

Poor core recovery. Acrotelm light brown, very fibrous with much fresh root material. Catotelm dark brown, very decomposed, slightly clayey below 1.0m. Very soft grey organic silty clay between 2.2-2.5m. Piezometer installed to 2.5m.

Core/Piezometer ID	Easting	Northing	Elevation (m AoD)	Piezometer Installation Depth (mbgl)
PZ6	236014	393503	6.81	2.5
Core Depth (m)	**Peat Depth (m)**	**Water table Depth (m bgl)**	**Acrotelm Depth (m)**	**Catotelm Depth (m)**
3.0	>3.0	0.01	0.2	>2.5
Von Post H Scores			**Von Post B Scores**	
Acrotelm	H4		B3	
Catotelm	H6-H9		B3-4	



PZ6, 0-1m

General Comments:

Acrotelm light brown, very fibrous with much fresh root material. Catotelm dark brown, very decomposed, much wood material below 1.80m. Poor core recovery. Piezometer installed to 2.5m.

Core/Piezometer ID	Easting	Northing	Elevation (m AoD)	Piezometer Installation Depth (mbgl)
PZ7	236089	393554	6.51	2.5
Core Depth (m)	**Peat Depth (m)**	**Water table Depth (m bgl)**	**Acrotelm Depth (m)**	**Catotelm Depth (m)**
2.5	>2.5	0.0	0.2	>2.5
Von Post H Scores			**Von Post B Scores**	
Acrotelm	H4		B3	
Catotelm	H7-9		B3-B5	



PZ7, 0-1m

General Comments:

Acrotelm non-distinct although top 20cm more fibrous. Catotelm dark brown becoming light brown, highly amorphous and slightly clayey below 1.5m. Strong rotten egg odour in catotelm. Piezometer installed to 2.5m.

Core/Piezometer ID	Easting	Northing	Elevation (m AoD)	Piezometer Installation Depth (mbgl)
PZ8	235710	393654	6.79	2.5
Core Depth (m)	**Peat Depth (m)**	**Water table Depth (m bgl)**	**Acrotelm Depth (m)**	**Catotelm Depth (m)**
2.5	>2.5	0.0	0.1	>2.5
Von Post H Scores			**Von Post B Scores**	
Acrotelm	H5		B3	
Catotelm	H9-10		B4-5	



PZ8, 0-1m

General Comments:

Poor core recovery, highly saturated, catotelm entirely decomposed, strong rotten egg odour. Piezometer installed to 2.5m.

APPENDIX D WATER BALANCE

Based on the flow data collected and described in section 2.4 of the main report, and meteorological data collected in the Wylfa Newydd Development Area, a water balance for the Tre'r Gof SSSI has been undertaken for the period between April 2015 and November 2016. Although some of the data extends beyond November there is not a full dataset so the water balance has only been calculated to 30 November 2016. It is noted that quality assured meteorological data was not recorded at the Wylfa site after this point. The water balance is presented graphically at a daily time step in appendix D and in tabular and graphical format on a monthly basis in table 1 and figure 1.

The water balance has been prepared to provide an indication of likely water movements at the catchment scale rather than looking at individual parts of the SSSI associated with particular plant assemblages. Its purpose is to try to identify the most significant water inputs for the maintenance of the SSSI as a whole and it is designed to be used with other lines of evidence in preparing a conceptual site model. One of the main purposes of the water balance is to determine if there is significant groundwater inflow to the SSSI that is not accounted for. Due to the nature of the water balance and the available data there are a number of inherent uncertainties and these need to be taken into account when interpreting the assessment. It is also recognised that there may be discrete groundwater inputs to seeps and flushes that are not included in the water balance, but which are important for the maintenance of some plant assemblages.

The key components and potential uncertainties of the water balance, and associated assumptions, are detailed below.

Inflows

VN1

Flows as monitored. The accuracy of a correctly installed rectangular flume, such as installed in VN1 to VN5 at the Tre'r Gof SSSI, is typically around 2% [RD29]. However, the presence of any debris such as vegetation (e.g. leaves and sticks) in the flume can reduce the accuracy. In addition, equipment failures mean that there are periods of time when data are missing from one flume or another and in these cases an estimate of flow is made based on the available record and rainfall response at other flumes.

It is noted that the level of this flume may be not be low enough to capture all groundwater inflows

VN2

Flows as monitored; however, corrections have been made to account for diurnal oscillations in the early part of the record caused by direct sunlight on the probe (subsequently stopped by modification to the probe housing). The corrections involved observing the differences between the day and night time flows and rainfall patterns and manually adjusting the day time flows using professional judgement. The flows in April and May 2015 appeared to be erroneously high (figure 2.5) as they were over double the flow volumes recorded in December 2015 and January 2016. The data were checked and no obvious

	correction could be applied; it has been left in for record completeness but interpretation of this part of the hydrograph and water balance should be treated with caution.
VN3	Flows as monitored. It is noted that the level of this flume may be not be low enough to capture all groundwater inflows
VN4	Flows as monitored. It is noted that the level of this flume may be not be low enough to capture all groundwater inflows
Direct rainfall inputs	Uniform rainfall across the 0.1km^2 of the Tre'r Gof SSSI was assumed at the rate observed by the rain gauge located 500m to the west [RD30]. Rainfall is notoriously difficult to measure accurately with the siting of a gauge and micro climatic changes caused by topography, trees and any structures being critical. Wind is a key issue in accurate measurement. It is not possible to set an accuracy on the gauge used for the Tre'r Gof SSSI water balance, but values cited in the literature [RD31] range from 2% to 20%.
Runoff from ungauged areas	A simple model of soil moisture deficit (SMD) (area multiplied by rainfall minus actual evapotranspiration) was developed and applied to the ungauged parts of the Tre'r Gof Catchment (0.33km^2 in total). The actual evapotranspiration (AE) was calculated from the potential evapotranspiration (PE) depending upon the SMD (AE=PE so long as the SMD remained greater than 75mm, the root constant for grass [RD29]). Based on the assumption that till has a low vertical permeability, the runoff to the Tre'r Gof SSSI was set at 90% of net rainfall with the remaining 10% assumed to feed deeper groundwater recharge or to move directly towards the coast rather than towards the SSSI. This is a significant uncertainty in the model from two perspectives, the first being the estimation of AE and the second the estimation of the proportion of effective rainfall moving into the Tre'r Gof SSSI. Both are discussed further below.
Outflows	
VN5	Flows as monitored; however, corrections have been made to account for diurnal oscillations in the early part of the record caused by direct sunlight on the probe (as at VN2). These corrections involved taking the night time readings and interpolating the day time readings between these using professional judgement.

Potential Evaporation

PE was estimated using the Reference evapotranspiration (ETo) calculator published by the Food and Agriculture Organization (FAO) of the United Nations [RD32], and meteorological data collected from a weather station within the Wylfa Newydd Development Area. A review of the data recorded showed that there were large gaps in the wind speed and solar radiation records. Where gaps existed in the meteorological dataset, reasonable estimates appropriate to seasonal observed conditions were applied. Actual evaporation from a 'normal' grassed surface was estimated using the SMD model described above. An estimate of evaporative losses from the wetland was then derived assuming that 50% of the wetland was permanently saturated (PE) and 50% was able to develop a soil moisture deficit (AE). For the majority of the time PE=AE so the model is not particularly sensitive to these changes. RD32 does not give an estimate of the accuracy of the assessment method, but given the number of meteorological elements it relies on, the assumptions of the method and the variations even within a small catchment such as Tre'r Gof, the accuracy is not going to be high.

It is not possible to put an absolute value on the accuracy of the water balance, but the results are likely to be the correct order of magnitude. Given the limitations to the accuracy of the water balance and uncertainty in many of the parameters, the water balance only provides an indication of likely bulk water movements to and from the SSSI. It is used in conjunction with other lines of evidence in developing the conceptual model for the Tre'r Gof SSSI.

Groundwater inflows that enter the wetland directly or otherwise bypasses the flumes and/or losses of water from the wetland to deeper groundwater are not specifically included within the water balance (with the exception of the 10% from the ungauged area as detailed above). If such flows exist these may be apparent as a discrepancy between inflows and outflows. As two full years of data are not available an annual water balance has been calculated for two separate one-year periods, May 2015 to April 2016 and December 2015 to November 2016. The differences between these two periods indicates the sensitivity of the model to annual variations in rainfall.

The overall annual water balance (table 1) for the periods May 2015 to April 2016 and December 2015 to November 2016 suggest that total inflows to the SSSI were greater than total outflows by approximately 131,791m^3 and 102,189m^3, respectively (equivalent to inflows being 141% and 131% of outflows respectively). This difference suggests that either the inflows are significantly in error, that there is an unaccounted for outflow(s) from the Tre'r Gof SSSI, or that during periods of high flow the VN5 weir does not capture all outflowing water (or a combination of these). There are also inherent uncertainties in the model which will have an effect.

It is unlikely that there is an unaccounted-for outflow from the SSSI basin as although water could infiltrate from the fen to the underlying groundwater, the thick sequence of clays and silts (figure 2-1 of the main report) and the year-round high water levels in the peat (see section 2.5 and figure 2-17 of the main report) indicate that this is not the case.

The proportion of incident rainfall over the ungauged area that moves into the SSSI basin has a significant degree of uncertainty associated with it. The water balance assumes that 90% of this water enters the basin as overland flow or shallow throughflow to seeps and springs. However, given the proximity of the area to the coast, and the complex geology, it could be that more of the incident rainfall over the ungauged area of the catchment infiltrates into the ground and/or moves towards the sea, rather than into the Tre'r Gof SSSI basin. Reducing the proportion of water in the model for the ungauged area that moves into the basin from 90% to 40% results in a good water balance. For the May 2015 to April 2016 period the inflows would only be 9,100m^3 greater than the outflows (i.e. 103%), whilst for the December 2015 to November 2016 period the situation is reversed and inflows would be 11,200m^3 less than the outflows (i.e. 97%). This revised '40%' water balance, which is shown graphically in figure 2-11, indicates that during December 2015 and January 2016 the outflows at VN5 would exceed the inflows suggesting that the fen is draining. Conceptually this is highly unlikely and it is only when the proportion of rainfall over the ungauged catchment that moves into the Tre'r Gof SSSI exceeds 70% that the inflow and outflow in these months balances. This '70%' model is shown in figure 2-12. In this scenario the annual inflows are still 126% and 117% of outflows (for the two assessment periods), suggesting that there are still errors in the water balance and some water is not accounted for. However, it does produce an output that is closer to that expected from the conceptual model.

Key conclusions that can be made with regards to the water balance are:

1. The proportion of rain that falls over the ungauged areas that flows to the Tre'r Gof SSSI, is likely to be of the order of 70%, albeit with a very high degree of uncertainty.

2. The water balance indicates that during late spring and summer the inflows and outflows more or less balance (figure 1 and figure 3), albeit that outflows, as expected, are greater than inflows. However, during the winter months there tends to be much greater inflow to the catchment than outflow (under the 90% and 65% runoff models shown in figure 1 and figure 3 respectively), suggesting that water moves into storage at this time and the fen becomes saturated. The largest difference between inflows and outflows occurs at the end of the summer in November 2015, with November 2016 also showing a significant difference, supporting this conclusion.

3. Inflow from the ungauged areas of the catchment, which flow into the basin via springs and seeps, plays a significant role in recharging the fen, along with direct rainfall. The proportion of the total inflow that is due to flows in the drainage ditches, as measured in VN1, VN2 and VN4, is not significant at only 1% to 5% of the total inflow (table 2-2). The inflow from VN3 is more important, but this still only comprises of the order of 13% of the total inflow to the fen. VN1 to VN4 combined only comprise some 22% of the total inflows. These figures assume 90% of the rainfall over the ungauged areas becomes runoff. Even if this is reduced to 40%, so that the model is in balance, the total input from the four streams is only about 29% of the total inflow and about 31% of the outflow. This suggests that the streams flowing into the fen are not the most important factor in maintaining its status as a wetland.

4. The near balance between inflows and outflows in spring and summer suggests that the drainage channels through the fen act largely as a throughflow system with limited interaction with the fen. When water levels in the ditches are low this will result in localised

drainage from the fen (hence outflows are slightly greater than inflows), but due to the low permeability of the peat this is likely limited to areas in the immediate vicinity of the ditches and only has a limited effect.

5. During dry periods outflows were greater than inflows, indicating that the SSSI was drying out. However, under both the 70% and 90% flow models there are typically only two months of the year when outflows significantly exceed inflows and the peat fen can be considered to be drying. Clearly this will vary from one year to the next, but it does suggest that there is sufficient water within the fen to maintain its current wetland status.

6. After the SSSI has re-saturated in the wet winter months (i.e. December onwards), inputs of rainfall showed a rapid response in discharge peaks via VN5 (figure 2-9) indicating that the fen had become saturated with direct rainfall, resulting in rapid overland flow and throughflow to the drainage ditches.

7. During dry periods when recorded flows into the wetland were low, observed inputs of water from direct rainfall did not correspond to any discernible increase in discharge via VN5 (figure 2-9 of the main report). This indicates that saturated areas of the wetland were not in direct continuity with this outflow channel and that direct rainfall was being stored in the wetland within the peat deposits.

Clearly the observations made are specific to the meteorological and hydrological conditions encountered during the 2015 to 2016 monitoring period and subject to a range of uncertainties and unknowns. However, the water balance does give a reasonable indication of the hydrology of the fen at a catchment scale, particularly when used with other lines of evidence. It is noted that minor groundwater flows which may make critical contributions in terms of water chemistry to specific areas of Tre r' Gof cannot be identified using this approach.

References

ID	Reference
RD29	Shaw, E.M. 1994. *Hydrology in Practice* (third edition), Chapman & Hall, London.
RD30	Horizon Nuclear Power. 2016a. *Meteorological data from the Salt Survey Weather station installed on the Wylfa Newydd Development Site*, February 2015 – November 2016.
RD31	Gregory, K.J and D.E.Walling. 1973. *Drainage basin form and process, a geomorphological approach*. Edward Arnold, London.
RD32	Food and Agricultural Organisation. 2012. *The ETO Calculator, Evapotranspiration from a reference surface, Reference Manual Version 3.2*. Food and Agriculture Organization of the United Nations - Land and Water Division.

Table 1 Monthly water balance summary (assuming 90% of effective rainfall over ungauged areas moves into the Tre'r Gof SSSI).

Month	Inflows (m^3)							Outflows (m^3)			Balance (m^3)	Notes
	VN1	**VN2**	**VN3**	**VN4**	**Direct rain input**	**Ungauged areas**	**Total inflow**	**VN5**	**Evaporation**	**Total outflow**		
May-15	402	3,358	402	77	14,948	23,899	**43,086**	7,742	6,932	**14,674**	28,412	
Jun-15	9	3,089	1	0	4,282	4,039	**11,421**	1,687	9,445	**11,131**	290	VN5 2 day outage.
Jul-15	1	374	15	7	8,221	0	**8,620**	1,003	9,932	**10,935**	-2,316	VN5 outage.
Aug-15	4	367	12	0	8,928	0	**9,311**	1,238	8,872	**10,110**	-800	VN5 14 day outage.
Sep-15	2	281	0	2	4,545	0	**4,830**	1,666	7,802	**9,467**	-4,638	
Oct-15	1	477	0	5	8,423	0	**8,907**	2,095	4,925	**7,020**	1,887	
Nov-15	37	537	2	1	17,170	21,608	**39,356**	3,689	3,710	**7,399**	31,956	
Dec-15	7,708	835	22,908	3,380	25,412	72,877	**133,120**	113,248	3,572	**116,820**	16,300	VN5 11 day outage. Flows +25%.
Jan-16	6,076	558	14,702	1,080	12,766	34,273	**69,455**	63,003	3,339	**66,342**	3,112	VN5 uncertainty.
Feb-16	2,789	563	9,673	235	9,262	21,896	**44,418**	27,239	3,890	**31,130**	13,288	VN5 uncertainty.
Mar-16	2,101	1,734	7,480	171	10,666	20,836	**42,986**	15,881	4,675	**20,555**	22,431	VN5 uncertainty for first 8 days.
Apr-16	1,309	1,474	4,230	0	10,060	21,408	**38,480**	10,168	6,445	**16,613**	21,867	
May-16	152	1,294	5	0	5,636	0	**7,087**	4,763	8,628	**13,391**	-6,305	
Jun-16	6	1,432	6	0	9,292	0	**10,735**	2,617	8,501	**11,118**	-382	
Jul-16	1	1,503	5	0	9,332	0	**10,841**	2,811	8,946	**11,758**	-917	
Aug-16	3	895	0	0	8,403	0	**9,301**	2,834	8,692	**11,526**	-2,224	
Sep-16	1	759	15	0	10,484	4,100	**15,359**	3,409	6,222	**9,632**	5,728	
Oct-16	0	254	0	0	6,767	8,018	**15,039**	3,761	5,300	**9,061**	5,978	
Nov-16	418	955	33	64	10,221	20,667	**32,359**	5,041	4,007	**9,047**	23,312	
Total[1]	20,439	13,648	59,425	4,957	134,684	220,835	**453,988**	248,658	73,539	**322,197**	131,791	(Excludes July 2015 outflow data)
Total[2]	20,565	12,255	59,057	4,930	128,300	204,074	**429,181**	254,774	72,218	**326,992**	102,189	
% of inflow	5%	3%	13%	1%	30%	49%						
% of outflow								77%	23%			

Notes: Total[1]: May-15 to Apr-16, Total[2]: Dec-15 to Nov-16. Green shading indicates inflow greater than outflow, brown shading indicates converse. The darker the shading the greater the difference. The data have been provided as calculated and have not been rounded, although due to the limitations on accuracy the values should be treated as order of magnitude estimates.

Figure 1 Monthly water balance (90% of runoff from ungauged areas moves into the Tre'r Gof SSSI and flows out through VN5)

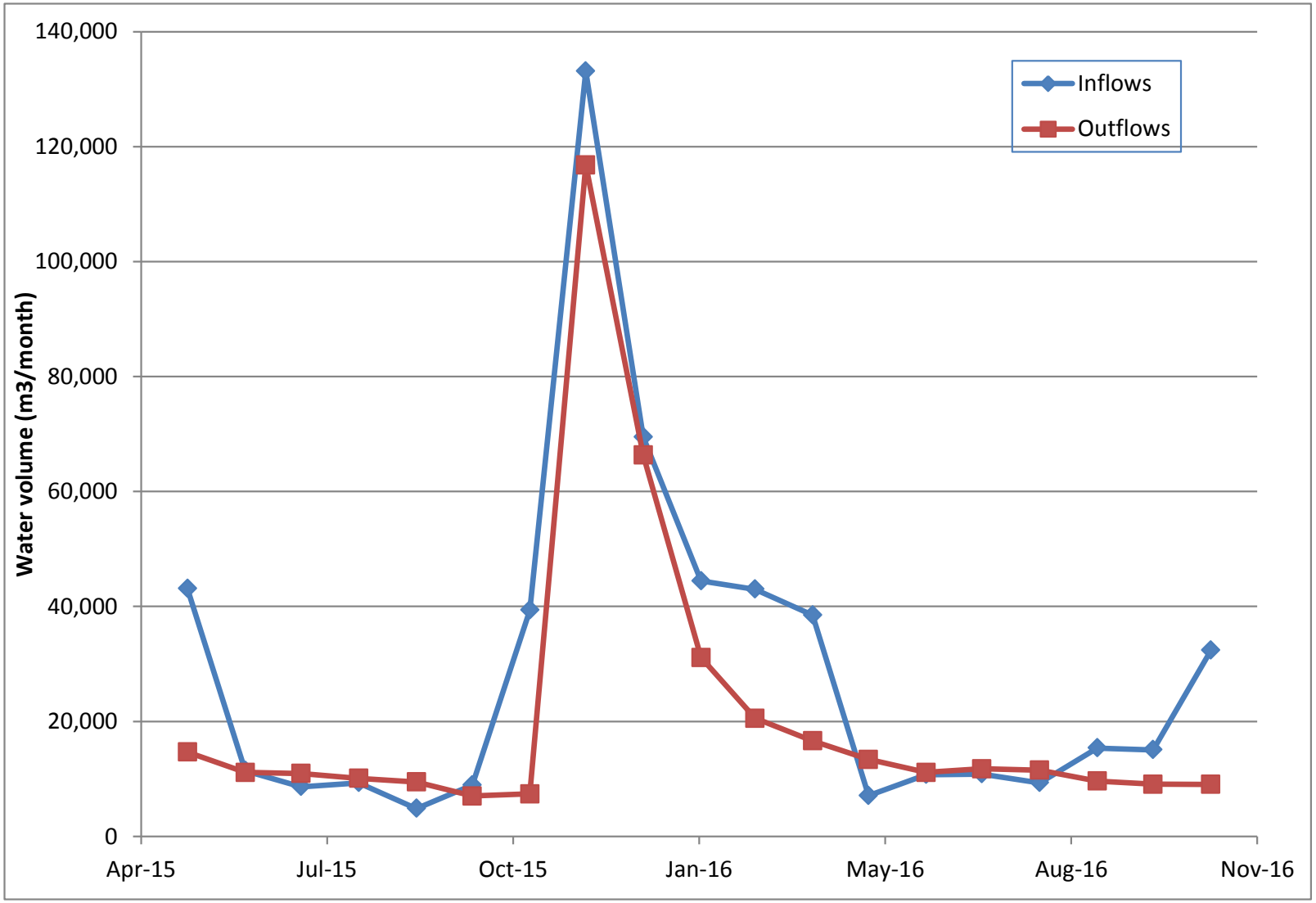


Figure 2 Monthly water balance (40% of runoff from ungauged areas moves into the Tre'r Gof SSSI and flows out through VN5)

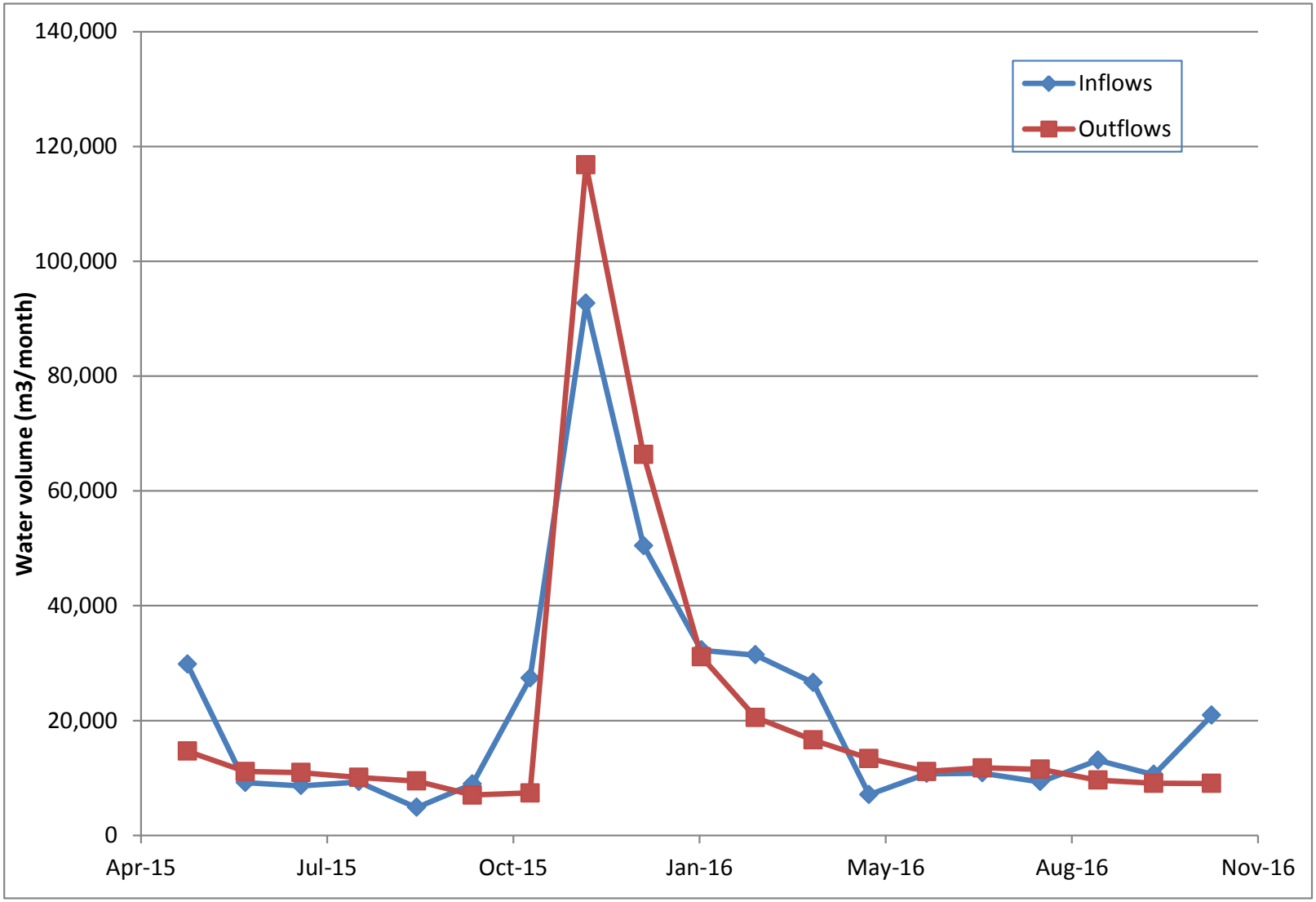
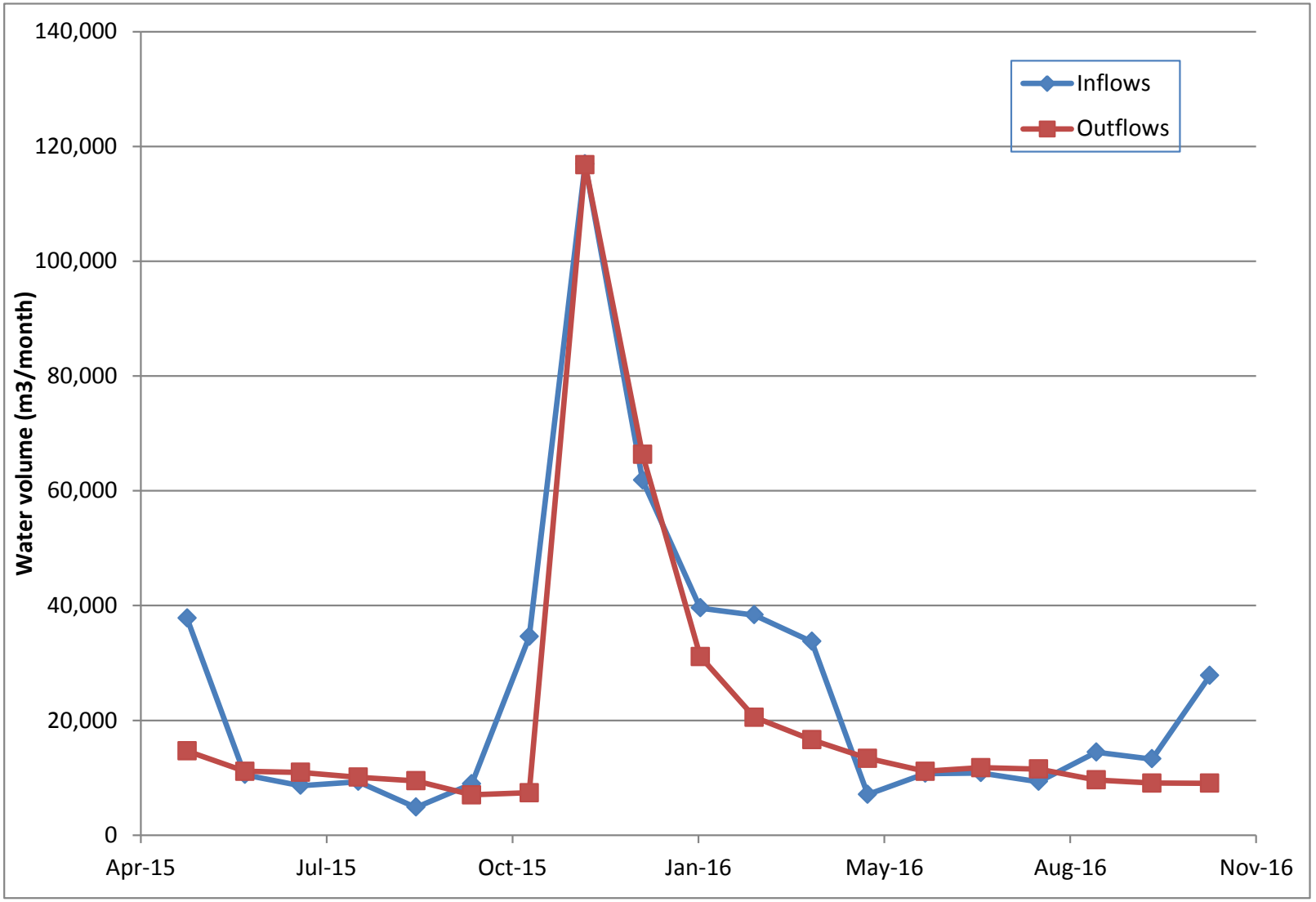


Figure3 Monthly water balance (70% of runoff from ungauged areas moves into the Tre'r Gof SSSI and flows out through VN5)



APPENDIX E BOREHOLE LOGS

Borehole ID	Elevation (m AOD)	Installation depth (m BGL)	Installed geology	Comment
Sentinel boreholes				
RGM BH1	21.00	2.0 – 10.0	Superficial	Borehole drilled to 31.7mbgl
RGM BH2	25.60	5.0 – 14.0	Weathered Bedrock	Borehole drilled to 15.0mbgl
RGM BH4	13.90	1.0 – 4.0	Superficial	Borehole drilled to 4.2mbgl
RGM BH4A	14.84	6.0 – 15.0	Bedrock	Borehole drilled to 15.9mbgl
RGM BH6	25.50	4.5 – 13.5	Bedrock	Borehole drilled to 14.3mbgl
BH536R	16.73	1.5 – 10.5	Bedrock	Borehole drilled to 50.4mbgl
Tre'r Gof SSSI monitoring boreholes				
BH309(CP)	9.39	5.0 – 7.0	Superficial	Borehole drilled to 7.7mbgl
BH309D	9.54	1.7 – 2.5	Superficial	Borehole drilled to 3.0mbgl
BH310(CP)	11.86	4.6 – 5.1	Superficial	Borehole drilled to 5.2mbgl
BH311(CP)	11.96	23-25	Superficial	Borehole drilled to 25.0mbgl
BH309RS **BH309RD**	9.45	5.0 – 7.0 30.0 – 35.0	Moderately weathered psammite	Borehole drilled to 40mbgl. Dual installation – both installations into bedrock, the shallower installation is into the shallow weathered bedrock, the deeper installation is in the more competent bedrock at depth.
BH310R1 **BH310R2**	11.98	18.0 – 20.0 25.0 – 29.0	Moderately weathered psammite	Borehole drilled to 40mbgl Dual installation – both installations into bedrock, the shallower installation is into the shallow weathered bedrock, the deeper installation is in the more competent bedrock at depth.

Borehole ID	Elevation (m AOD)	Installation depth (m BGL)	Installed geology	Comment
BH524(CP)	9.63	3.05 – 6.50	Fine sandy clay	Borehole drilled to 7.4mbgl
BH524R	9.56	7.50 – 19.00	Moderately weathered psammite	Borehole drilled to 25.0mbgl
BH525(CP)	10.85	3.40 – 5.30	Gravelly clay	Borehole drilled to 6.2mbgl
BH525R	10.76	6.6 – 12.5	Slightly weathered phyllite	Borehole drilled to 25.5mbgl
BH526(CP)	9.75	5.2 – 11.8	Gravelly sandy clay	Borehole drilled to 23.0mbgl
BH526RS **BH526RD**	7.89	17.00 – 23.0 26.5 – 39.0	Clay and gravel Psammite and phyllite	Borehole drilled to 41.5mbgl. Dual installation – both installations into bedrock, the shallower installation is into the shallow weathered bedrock, the deeper installation is in the more competent bedrock at depth.

[DI-126] - Issued to client for approval

STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH1**

Contract Ref:	Start: **30.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**1** of **5**

Samples and In-situ Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	Ref	Type	Results						
0.00	1A	EW				Grass over soft dark brown sandy CLAY. Sand is fine to medium.	20.85	0.15	
0.00	IP1	B				(Topsoil)			
0.00	RAD1	D				Soft to firm brown orangish-brown and pale grey mottled sandy slightly gravelly CLAY with a low cobble content. Gravel is angular to subrounded fine to coarse weathered psammite, occasional quartzite, mudstone. Gravel and cobbles are flat and cubic.			
0.50	IP1	D							
0.50	IP2	B							
0.50	RAD2	D				(Superficial Deposits - Locally derived lodgement till)		(1.25)	
1.00	IP2	D					19.60	1.40	
1.40-1.70	1	B				Very soft light brown mottled grey slightly sandy slightly gravelly silty CLAY. Gravel is subangular medium to coarse Psammite. Gravel content <5% and local. Frequent pockets of yellowish brown medium sand..			
1.50-2.20	2	D							
1.50-1.95	3	SPT(c)	N=3			(Superficial Deposits - Locally derived lodgement till)		(0.50)	
1.90	4	B				Soft to firm light brownish grey slightly gravelly very silty CLAY. Gravel is subrounded coarse Dolerite. Gravel content ~5-10%.	19.10	1.90	
2.00	5	D							
2.00-2.45	6	SPT(c)	N=10			(Superficial Deposits - Locally derived lodgement till)		(0.40)	
2.75-3.20	7	$U_{(100)}$	15 blows			Firm brownish grey silty CLAY. (Superficial Deposits - Locally derived lodgement till)	18.70	2.30	
3.20-3.65	8	SPT(c)	N=9					(1.40)	
3.70-4.00	9	B				Soft brownish grey slightly gravelly CLAY. Gravel is subangular fine Psammite and dolerite. Gravel content ~5-10%. (Superficial Deposits - Locally derived lodgement till)	17.30	3.70	
4.00	10	D							
4.15-4.60	11	$U_{(100)}$	16 blows					(1.10)	

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
03/11/14	12:30	7.45	3.00	200	4.20
05/11/14	08:00	14.40	12.00	200	13.60
05/11/14	16:35	18.20	18.00	200	17.60
06/11/14	08:00	18.20	18.00	200	14.70

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

1. Location CAT and Genny scanned prior to commencement.
2. Hand dug inspection pit GL to 1.20m depth.(IP)
3. Perched water entering inspection pit.
4. Inspection pit remained stable during excavation.
5. Archaeology pit excavated in same location.
6. Cable percussion boring using 200mm diameter tools to 18.20m depth between 30/10/2014 and 11/12/2014.
7. Water added to assist boring from 1.20m to 11.65m depth.
8. Rotary open hole drilling from 18.20m to 18.80m depth on 26/11/2014.
9. Rotary cored drilling from 18.80m to 31.70m depth with air mist flush from 18.80m to 19.55m depth and 22.50m to 31.70m depth, water flush from 19.55m to 22.50m depth between 26

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable percussion	**Dando 2000**	**Gavin James**	**MNaisbitt + WDixon**	**ADingle**

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STRUCTURAL SOILS

[DI-126] - Issued to client for approval

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH1**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**2** of **5**

Samples and In-situ Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	Ref	Type	Results						
4.60-4.80	12	D					16.20	4.80	
4.80-5.25	13	SPT	N=12			Firm grey mottled light brown slightly gravelly CLAY. Gravel is subangular fine Psammite and dolerite. Gravel content <5%. (Superficial Deposits - Locally derived lodgement till)			
4.90-5.20	14	B							
5.00	15	D							
5.25-5.70	16	$U_{(100)}$	17 blows						
5.70-5.90	17	D							
5.90-6.35	18	SPT	N=15						
5.90-6.20	19	B							
6.00	20	D						(3.10)	
6.35-6.35	21	$U_{(100)}$	27 blows						
6.80-7.00	22	D							
6.90-7.20	24	B							
7.00-7.45	23	SPT	N=12						
7.00	25	D							
7.45-7.90	26	$U_{(100)}$	29 blows				13.10	7.90	
7.90-8.35	27	SPT	N=15			Firm grey mottled light brown CLAY. (Superficial Deposits - Locally derived lodgement till)			
7.90-8.20	28	B							
8.00	29	D							
8.35-8.80	30	$U_{(100)}$	23 blows						
8.80-9.00	31	D							
8.90-9.45	33	B							

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

10. Groundwater monitoring standpipe installed as shown upon completion.
11. SPT hammer EQU166-2013 (E_i = 80.05%) used.

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable percussion	**Dando 2000**	**Gavin James**	**MNaisbitt + WDixon**	**ADingle**

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STRUCTURAL SOILS

[DI-126] - Issued to client for approval

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH1**

Contract Ref:	Start: **30.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**3** of **5**

Samples and In-situ Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	Ref	Type	Results						
9.00-9.45	32	SPT	N=17			9.00m : Becoming stiff.			
9.45-9.90	35	$U_{(100)}$	23 blows					(4.00)	
9.90-10.10	36	D							
9.90-10.20	38	B							
10.00	39	D							
10.10-10.55	37	SPT	N=20						
10.55-11.00	40	$U_{(100)}$	36 blows						
10.90-11.20	43	B							
11.00-11.20	41	D							
11.00	44	D							
11.20-11.65	42	SPT	N=23						
11.65-12.10	45	$U_{(100)}$	43 blows				9.10	11.90	
11.90-12.20	47	B				Stiff brownish grey slightly gravelly CLAY. Gravel is subangular fine Dolerite. Gravel content ~5%. (Superficial Deposits - Locally derived lodgement till)			
12.00	48	D							
12.10-12.55	46	SPT(c)	N=27						
12.55-13.00	49	$U_{(100)}$	50 blows					(2.00)	
12.90-13.20	51	B							
13.00-13.45	50	SPT	N=24						
13.00	52	D							

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable percussion	**Dando 2000**	**Gavin James**	**MNaisbitt + WDixon**	**ADingle**

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH1**

Contract Ref:	Start: **30.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**4** of **5**

Samples and In-situ Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	Ref	Type	Results						
13.45-13.90	53	$U_{(100)}$	37 blows				7.10	13.90	
13.90-14.35	54	SPT	N=21			Stiff brownish grey CLAY. (Superficial Deposits - Locally derived lodgement till)			
13.90-14.20	55	B							
14.00	56	D							
14.40-14.85	57	$U_{(100)}$	38 blows						
14.85-15.05	58	D							
14.90-15.20	60	B							
15.00	61	D							
15.05-15.50	59	SPT	N=25						
15.50-15.95	62	$U_{(100)}$	36 blows						
15.90-16.20	65	B						(4.30)	
15.95-16.15	63	D							
16.00	66	D							
16.40-16.85	64	SPT	N=23						
16.90-17.20	69	B							
17.00	70	D							
17.30-17.75	67	$U_{(100)}$	32 blows						
17.75-18.20	68	SPT	N=26						
17.90-18.20	72	B							

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)

General Remarks

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable percussion	**Dando 2000**	**Gavin James**	**MNaisbitt + WDixon**	**ADingle**

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH1**

Contract Ref:	Start: **30.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**5** of **5**

Samples and In-situ Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	Ref	Type	Results						
18.00	71	D					2.80	18.20	
						Cable percussion borehole continued using rotary drilling techniques from 18.20m depth.			

Boring Progress and Water Observations						Chiselling / Slow Progress			General Remarks
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	From	To	Duration (hh:mm)	

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable percussion	**Dando 2000**	**Gavin James**	**MNaisbitt + WDixon**	**ADingle**

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STANDARD PENETRATION TEST SUMMARY TABLE

Exploratory Position ID	Depth (m)	Hole Dia (mm)	Casing Depth (m)	Water Depth (m)	Seating Drive		Test Drive			Hammer ID	Calibration Date	Energy Ratio (%)	N_{60}	Comments
					Blows	Pen (mm)	Blows	R (mm)	Result					
RGM-BH1	1.50	200	1.40	Damp	0,1	150	1,0,1,1		N=3	EQU166-2013	12/11/2013	80.05	4	SPT(c)
	2.00	200	1.90	Damp	2,1	150	2,2,3,3		N=10	EQU166-2013	12/11/2013	80.05	13	SPT(c)
	3.20	200	2.90	Damp	2,1	150	2,2,2,3		N=9	EQU166-2013	12/11/2013	80.05	12	SPT(c)
	4.80	200	3.00	Damp	2,1	150	3,3,3,3		N=12	EQU166-2013	12/11/2013	80.05	16	
	5.90	200	3.00	Damp	1,3	150	3,3,4,5		N=15	EQU166-2013	12/11/2013	80.05	20	
	7.00	200	3.00	Damp	2,1	150	3,2,3,4		N=12	EQU166-2013	12/11/2013	80.05	16	
	7.90	200	3.00	Damp	1,3	150	2,4,5,4		N=15	EQU166-2013	12/11/2013	80.05	20	
	9.00	200	3.00	Damp	3,4	150	3,5,4,5		N=17	EQU166-2013	12/11/2013	80.05	23	
	10.10	200	3.00	Damp	3,4	150	4,4,5,7		N=20	EQU166-2013	12/11/2013	80.05	27	
	11.20	200	3.00	Damp	4,5	150	5,4,7,7		N=23	EQU166-2013	12/11/2013	80.05	31	
	12.10	200	3.00	Damp	3,3	150	4,7,8,8		N=27	EQU166-2013	12/11/2013	80.05	36	SPT(c)
	13.00	200	12.00	Damp	5,5	150	4,5,9,6		N=24	EQU166-2013	12/11/2013	80.05	32	
	13.90	200	12.00	Damp	3,5	150	5,6,5,5		N=21	EQU166-2013	12/11/2013	80.05	28	
	15.05	200	13.50	Damp	3,5	150	4,7,7,7		N=25	EQU166-2013	12/11/2013	80.05	33	
	16.40	200	15.00	Damp	2,4	150	5,5,7,6		N=23	EQU166-2013	12/11/2013	80.05	31	
	17.75	200	18.00	Damp	3,4	150	5,6,7,8		N=26	EQU166-2013	12/11/2013	80.05	35	
	18.20	200	18.00		3,4	150	6,6,8,10		N=30	EQU166-2013	12/11/2013	80.05	40	SPT(c)

Notes:
1. Tests carried out in general accordance with BS EN ISO 22476-3:2005, including amendment A1 (2011).
2. Reported blows are for 75mm penetration unless indicated "+".
3. Where full test drive was not achieved, actual penetration (R) and extrapolated N value (N*) reported.
4. Tests carried out using a split spoon sampler unless noted as SPT(c) (denotes use of solid cone method) in the comments column.
5. Entries in the water depth column reflects the measured water depth at time of test.

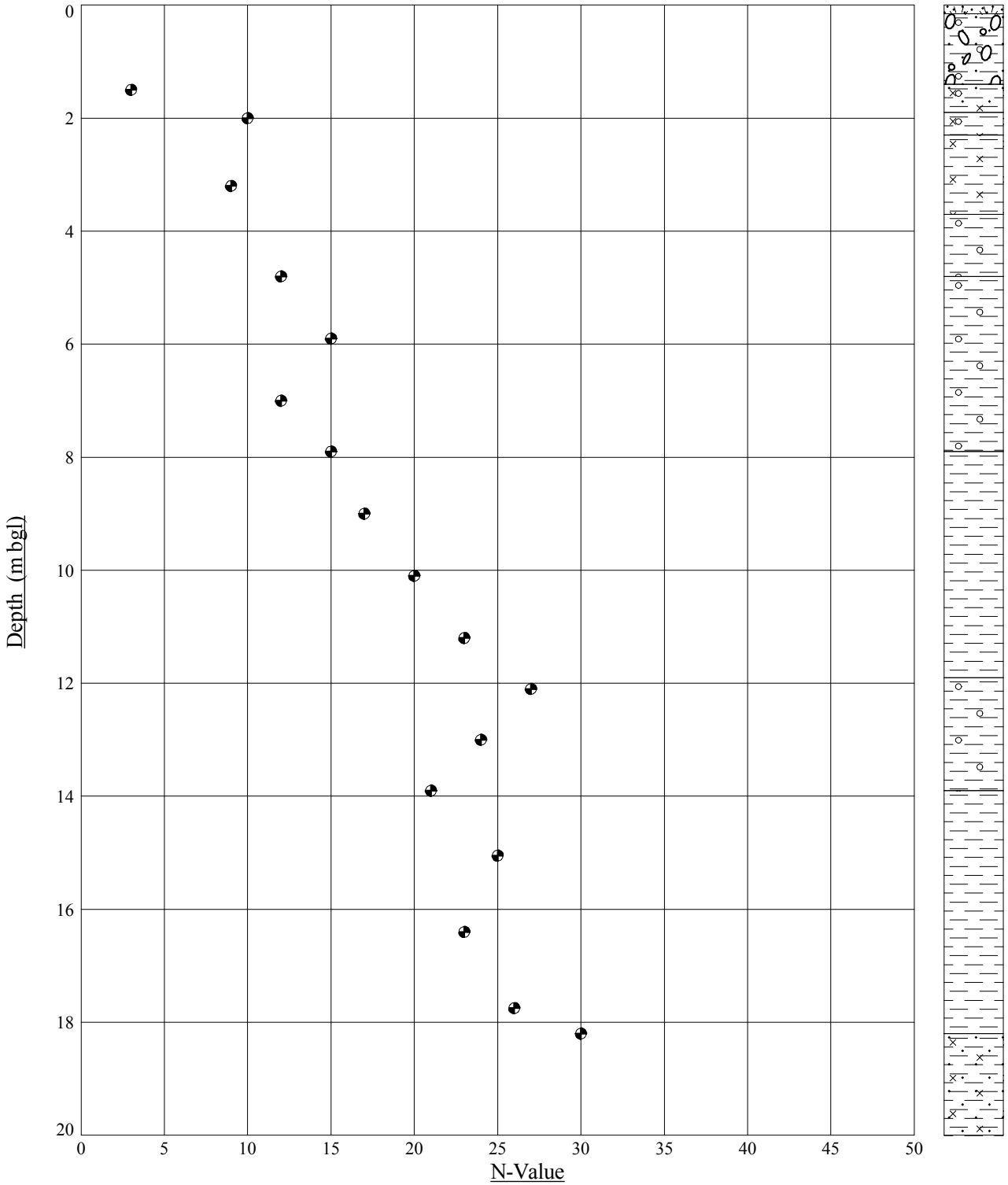
N_{60} = (Measured hammer energy ratio / 60) x N value

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The Old School
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Bristol BS3 4EB

Compiled By		Date	Contract Ref:
[redacted]	**ALUMBER**	**30.01.15**	**728599**
Contract: **Wylfa Newydd Detailed Onshore Ground Investigation**			Page: **1** of **1**

STANDARD PENETRATION TEST (SPT N-Value)
vs
DEPTH

Exploratory Hole : **RGM-BH1**.

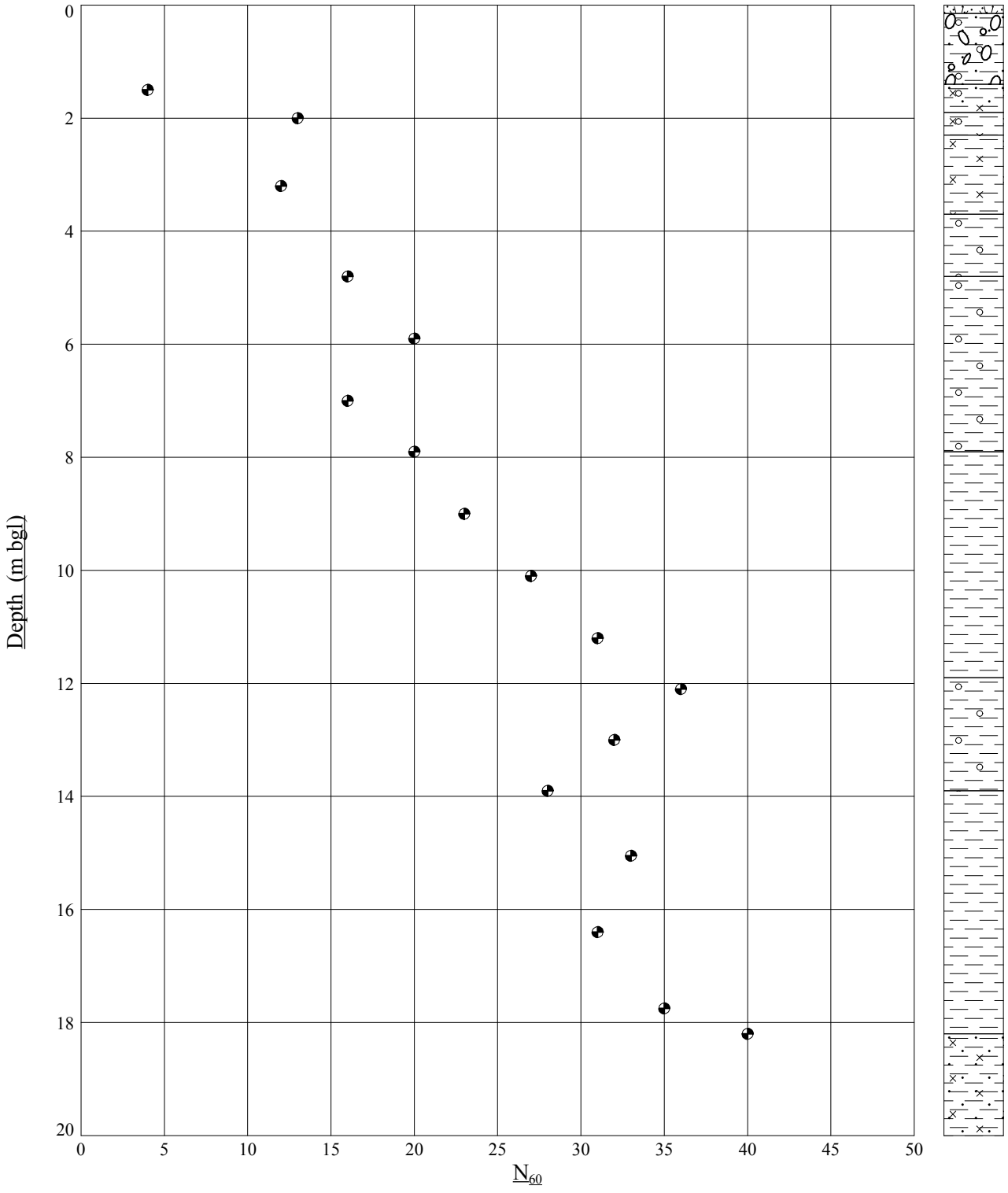


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	Client **Horizon Nuclear Power Wylfa Limited**	Contract Ref: **728599**	AGS

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STANDARD PENETRATION TEST (SPT N_{60})
vs
DEPTH

Exploratory Hole : **RGM-BH1**.



STRUCTURAL SOILS The Old School Stillhouse Lane Bedminster Bristol BS3 4EB	Contract **Wylfa Newydd Detailed Onshore Ground Investigation**	Date **29.01.15**	Compiled By AML
	Client **Horizon Nuclear Power Wylfa Limited**	Contract Ref: **728599**	AGS

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH1**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**1** of **8**

Depth	Mechanical Log: TCR %	SCR %	RQD %	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
0.00									Grass over soft dark brown sandy CLAY. (Topsoil)		20.85	0.15	
									Soft to firm brown orangish-brown and pale grey mottled sandy slightly gravelly CLAY with a low cobble content. (Superficial Deposits - Locally derived lodgement till)		20	(1.25) 1	
1.00											19.60	1.40	
									Very soft light brown mottled grey slightly sandy slightly gravelly silty CLAY. (Superficial Deposits - Locally derived lodgement till)		19.10	(0.50) 1.90	
2.00									Soft to firm light brownish grey slightly gravelly very silty CLAY. (Superficial Deposits - Locally derived lodgement till)		19	2 (0.40)	
									Firm brownish grey silty CLAY. (Superficial Deposits - Locally derived lodgement till)		18.70	2.30	
3.00											18	(1.40) 3	
									Soft brownish grey slightly gravelly CLAY. (Superficial Deposits - Locally derived lodgement till)		17.30	3.70	
4.00											17	4 (1.10)	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
03/11/14	12:30	7.45	3.00	200	4.20
05/11/14	08:00	14.40	12.00	200	13.60
05/11/14	16:35	18.20	18.00	200	17.60
06/11/14	08:00	18.20	18.00	200	14.70
26/11/14	08:00	18.20	18.00	146	0.00
26/11/14	16:15	25.50	25.50	146	14.80
27/11/14	08:15	25.50	25.50	146	8.10
27/11/14	16:30	31.70	31.70	146	14.80

General Remarks

1. Location CAT and Genny scanned prior to commencement.
2. Hand dug inspection pit GL to 1.20m depth.(IP)
3. Perched water entering inspection pit.
4. Inspection pit remained stable during excavation.
5. Archaeology pit excavated in same location.
6. Cable percussion boring using 200mm diameter tools to 18.20m depth between 30/10/2014 and 11/12/2014.
7. Water added to assist boring from 1.20m to 11.65m depth.
8. Rotary open hole drilling from 18.20m to 18.80m depth on 26/11/2014.
9. Rotary cored drilling from 18.80m to 31.70m depth with air mist flush from 18.80m to 19.55m depth and 22.50m to 31.70m depth, water flush from 19.55m to 22.50m depth between 26
10. Groundwater monitoring standpipe installed as shown upon completion.

All dimensions in metres	Scale: **1:25**	Inclination: **Vertical**	Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + WDixon + MVincent**	**ADingle + ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH1**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**2** of **8**

Mechanical Log: Depth	TCR %	SCR %	RQD %	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
											16.20	4.80	
									Firm grey mottled light brown slightly gravelly CLAY. (Superficial Deposits - Locally derived lodgement till)		16	5	
5.00													
6.00											15	6	
												(3.10)	
7.00											14	7	
											13.10	7.90	
8.00									Firm grey mottled light brown CLAY. (Superficial Deposits - Locally derived lodgement till)		13	8	
											12	9	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

11. SPT hammer EQU166-2013 (E_t = 80.05%) used.

All dimensions in metres | Scale: **1:25** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + WDixon + MVincent**	**ADingle + ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH1**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**30.10.14** End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**3** of **8**

Mechanical Log												
Depth	TCR %	SCR %	RQD %	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
9.00													
												(4.00)	
10.00											11	10	
11.00											10	11	
											9.10	11.90	
12.00									Stiff brownish grey slightly gravelly CLAY. (Superficial Deposits - Locally derived lodgement till)		9	12	
												(2.00)	
13.00											8	13	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:25** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + WDixon + MVincent**	**ADingle + ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH1**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**30.10.14** End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**4** of **8**

Mechanical Log: Depth	TCR %	SCR %	RQD %	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
											7.10	13.90	
14.00									Stiff brownish grey CLAY. (Superficial Deposits - Locally derived lodgement till)		7	14	
15.00											6	15	
16.00											5	(4.30) 16	
17.00											4	17	
											3	18	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:25** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + WDixon + MVincent**	**ADingle + ADingle + ADingle**

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH1**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**30.10.14** End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**5** of **8**

Mechanical Log: Depth	TCR %	SCR %	RQD %	If (mm)	Flush Returns & Details	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
18.00											2.80	18.20	
					Air+Mist (Grey)				Stiff to very stiff dark greyish brown slightly sandy slightly silty CLAY. (Superficial Deposits - Locally derived lodgement till)				
19.00											2	19	
												(2.70)	
20.00					Water (Grey)						1	20	
											0.10	20.90	
21.00				10 15 20	Water (Grey)				Medium strong to strong very narrowly to narrowly banded foliated greenish grey fine grained slightly weathered PHYLLITE with medium strong to strong extremely closely spaced to very closely spaced very narrow to very thin bands of foliated greenish grey fine to medium grained PSAMMITE. (New Harbour Group - PHYLLITE)		0	21	
												(1.20)	
22.00				30 60 90	Water (Grey)						-1	22	
											-1.11	22.10	
									Medium strong to strong very narrowly to narrowly banded foliated greenish grey slightly weathered PHYLLITE with medium strong to strong extremely closely spaced to very closely spaced very narrow to very thin bands of foliated				

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:25** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + WDixon + MVincent**	**ADingle + ADingle + ADingle**

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH1**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**6** of **8**

Mechanical Log												
Depth	TCR %	SCR %	RQD %	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
23.00				30 60 90	Air+Mist (Grey)				greenish grey fine to medium grained PSAMMITE. (New Harbour Group - PHYLLITE)		-2	23	
												(3.40)	
24.00				30 75 120	Air+Mist (Grey)						-3	24	
25.00											-4	25	
											-4.51	25.50	
26.00				120 195 270	Air+Mist (Grey)				Medium strong to strong very narrowly to narrowly banded foliated greenish grey to dark reddish purple slightly weathered PHYLLITE with medium strong to strong extremely closely spaced to very closely spaced very narrow to narrow bands of foliated greenish grey fine to medium grained PSAMMITE. (New Harbour Group - PHYLLITE)		-5	26	
											-6	27	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:25** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + WDixon + MVincent**	**ADingle + ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH1**

Contract Ref:	Start: **30.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**7** of **8**

Depth	Mechanical Log: TCR %	SCR %	RQD %	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
27.00				120 195 270	Air+Mist (Grey)								
				210 330 450							-7	28	
28.00												(5.88)	
				80 105 130									
29.00				460 460 460	Air+Mist (Grey)						-8	29	
30.00											-9	30	
				140 255 370	Air+Mist (Grey)						-10	31	
31.00									*Description on next sheet*		-10.39	31.38	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:25** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + WDixon + MVincent**	**ADingle + ADingle + ADingle**

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BOREHOLE LOG

Contract:	Client:	Borehole:
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Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**30.10.14** End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**8** of **8**

Mechanical Log: Depth	TCR %	SCR %	RQD %	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
									Dropped core. (New Harbour Group - PHYLLITE)			(0.32)	
											-10.71	31.70	
									Borehole terminated at 31.70m depth.			32	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:25** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + WDixon + MVincent**	**ADingle + ADingle + ADingle**

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BOREHOLE LOG

Contract:	Client:	Borehole:
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Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**1** of **39**

Mechanical Log						Samples and Testing								
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	No	Type	Results	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
0.00 0.00 0.00						1A IP1 RAD1	EW B D				Grass over soft dark brown sandy CLAY. Sand is fine to medium. (Topsoil)			(0.15)	
													20.85	0.15	
											Soft to firm brown orangish-brown and pale grey mottled sandy slightly gravelly CLAY with a low cobble content. Gravel is angular to subrounded fine to coarse weathered psammite, occasional quartzite, mudstone. Gravel and cobbles are flat and cubic. (Superficial Deposits - Locally derived lodgement till)				
0.50 0.50 0.50						IP1 IP2 RAD2	D B D							(1.25)	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
03/11/14	12:30	7.45	3.00	200	4.20
05/11/14	08:00	14.40	12.00	200	13.60
05/11/14	16:35	18.20	18.00	200	17.60
06/11/14	08:00	18.20	18.00	200	14.70
26/11/14	08:00	18.20	18.00	146	0.00
26/11/14	16:15	25.50	25.50	146	14.80
27/11/14	08:15	25.50	25.50	146	8.10
27/11/14	16:30	31.70	31.70	146	14.80

General Remarks

1. Location CAT and Genny scanned prior to commencement.
2. Hand dug inspection pit GL to 1.20m depth.(IP)
3. Perched water entering inspection pit.
4. Inspection pit remained stable during excavation.
5. Archaeology pit excavated in same location.
6. Cable percussion boring using 200mm diameter tools to 18.20m depth between 30/10/2014 and 11/12/2014.
7. Water added to assist boring from 1.20m to 11.65m depth.
8. Rotary open hole drilling from 18.20m to 18.80m depth on 26/11/2014.
9. Rotary cored drilling from 18.80m to 31.70m depth with air mist flush from 18.80m to 19.55m depth and 22.50m to 31.70m depth, water flush from 19.55m to 22.50m depth between 26
10. Groundwater monitoring standpipe installed as shown upon completion.

20

All dimensions in metres	Scale: **1:5**	Inclination: **Vertical**	Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + WDixon + MVincent**	**ADingle + ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH1**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**30.10.14** End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**2** of **39**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
1.00						IP2	D						20	1	
1.40-1.70						1	B				Very soft light brown mottled grey slightly sandy slightly gravelly silty CLAY. Gravel is subangular medium to coarse Psammite. Gravel content <5% and local. Frequent pockets of yellowish brown medium sand.. (Superficial Deposits - Locally derived lodgement till)		19.60	1.40	
1.50-2.20						2	D							(0.50)	
1.50-1.95						3	SPT(c)	N=3							

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

11. SPT hammer EQU166-2013 (E_t = 80.05%) used.

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + WDixon + MVincent**	**ADingle + ADingle + ADingle**

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Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**3** of **39**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Samples and Testing: No	Type	Results	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
													19.10	1.90	
1.90						4	B				Soft to firm light brownish grey slightly gravelly very silty CLAY. Gravel is subrounded coarse Dolerite. Gravel content ~5-10%. (Superficial Deposits - Locally derived lodgement till)				
2.00						5	D						19	2	
2.00-2.45						6	SPT(c)	N=10						(0.40)	
													18.70	2.30	
											Firm brownish grey silty CLAY. (Superficial Deposits - Locally derived lodgement till)				

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + WDixon + MVincent**	**ADingle + ADingle + ADingle**

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Contract Ref:	Start: **30.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**4** of **39**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
2.75-3.20						7	$U_{(100)}$	15 blows							
													18	(1.40) 3	
3.20-3.65						8	SPT(c)	N=9							

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + WDixon + MVincent**	**ADingle + ADingle + ADingle**

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH1**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**5** of **39**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
													17.30	3.70	
3.70-4.00						9	B				Soft brownish grey slightly gravelly CLAY. Gravel is subangular fine Psammite and dolerite. Gravel content ~5-10%. (Superficial Deposits - Locally derived lodgement till)				
4.00						10	D						17	4	
4.15-4.60						11	$U_{(100)}$	16 blows						(1.10)	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + WDixon + MVincent**	**ADingle + ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH1**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**30.10.14** End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**6** of **39**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
4.60-4.80						12	D								
4.80-5.25						13	SPT	N=12			Firm grey mottled light brown slightly gravelly CLAY. Gravel is subangular fine Psammite and dolerite. Gravel content <5%. (Superficial Deposits - Locally derived lodgement till)		16.20	4.80	
4.90-5.20						14	B								
5.00						15	D						16	5	
5.25-5.70						16	$U_{(100)}$	17 blows							

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + WDixon + MVincent**	**ADingle + ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH1**

Contract Ref:	Start: **30.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**7** of **39**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
5.70-5.90						17	D								
5.90-6.35						18	SPT	N=15							
5.90-6.20						19	B								
6.00						20	D						15	6	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	**Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored**	Plant Used:	**Dando 2000 + Comacchio GEO 601**	Drilled By:	**Gavin James + Scott Pincher**	Logged By:	**MNaisbitt + WDixon + MVincent**	Reviewed By:	**ADingle + ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH1**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**30.10.14** End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**8** of **39**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
6.35-6.35						21	$U_{(100)}$	27 blows						(3.10)	
6.80-7.00						22	D								
6.90-7.20						24	B								
7.00-7.45						23	SPT	N=12					14	7	
7.00						25	D								

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + WDixon + MVincent**	**ADingle + ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH1**

Contract Ref:	Start: **30.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**9** of **39**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
7.45-7.90						26	$U_{(100)}$	29 blows							
													13.10	7.90	
7.90-8.35						27	SPT	N=15			Firm grey mottled light brown CLAY. (Superficial Deposits - Locally derived lodgement till)				
7.90-8.20						28	B								
8.00						29	D						13	8	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + WDixon + MVincent**	**ADingle + ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH1**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**30.10.14** End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**10** of **39**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
8.35-8.80						30	$U_{(100)}$	23 blows							
8.80-9.00						31	D								
8.90-9.45						33	B								
													12	9	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + WDixon + MVincent**	**ADingle + ADingle + ADingle**

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH1**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Samples and Testing: No	Type	Results	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
9.00-9.45						32	SPT	N=17			9.00m : Becoming stiff.				
9.45-9.90						35	$U_{(100)}$	23 blows						(4.00)	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

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All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + WDixon + MVincent**	**ADingle + ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH1**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**30.10.14** End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**12** of **39**

Mechanical Log						Samples and Testing									
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	No	Type	Results	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
9.90-10.10						36	D								
9.90-10.20						38	B								
10.00						39	D						11	10	
10.10-10.55						37	SPT	N=20							
10.55-11.00						40	$U_{(100)}$	36 blows							

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + WDixon + MVincent**	**ADingle + ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH1**

Contract Ref:	Start: **30.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**13** of **39**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
10.90-11.20						43	B								
11.00-11.20						41	D						10	11	
11.00						44	D								
11.20-11.65						42	SPT	N=23							
11.65-12.10						45	$U_{(100)}$	43 blows							

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	**Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored**	Plant Used:	**Dando 2000 + Comacchio GEO 601**	Drilled By:	**Gavin James + Scott Pincher**	Logged By:	**MNaisbitt + WDixon + MVincent**	Reviewed By:	**ADingle + ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH1**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**14** of **39**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
													9.10	11.90	
11.90-12.20						47	B				Stiff brownish grey slightly gravelly CLAY. Gravel is subangular fine Dolerite. Gravel content ~5%. (Superficial Deposits - Locally derived lodgement till)				
12.00						48	D						9	12	
12.10-12.55						46	SPT(c)	N=27							
12.55-13.00						49	$U_{(100)}$	50 blows							

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + WDixon + MVincent**	**ADingle + ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH1**

Contract Ref:	Start: **30.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**15** of **39**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
12.90-13.20						51	B							(2.00)	
13.00-13.45						50	SPT	N=24					8	13	
13.00						52	D								
13.45-13.90						53	$U_{(100)}$	37 blows							

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + WDixon + MVincent**	**ADingle + ADingle + ADingle**

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[DI-126] - **Issued to client for approval**

STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH1**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**30.10.14** End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**16** of **39**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
													7.10	13.90	
13.90-14.35 13.90-14.20						54 55	SPT B	N=21			Stiff brownish grey CLAY. (Superficial Deposits - Locally derived lodgement till)				
14.00						56	D						7	14	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + WDixon + MVincent**	**ADingle + ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH1**

Contract Ref:	Start: **30.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**17** of **39**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
14.40-14.85						57	$U_{(100)}$	38 blows							
14.85-15.05						58	D								
14.90-15.20						60	B								
15.00						61	D						6	15	
15.05-15.50						59	SPT	N=25							

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + WDixon + MVincent**	**ADingle + ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH1**

Contract Ref:	Start: **30.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**18** of **39**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
15.50-15.95						62	$U_{(100)}$	36 blows							
15.90-16.20						65	B								
15.95-16.15						63	D								
16.00						66	D						5	16 (4.30)	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + WDixon + MVincent**	**ADingle + ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH1**

Contract Ref:	Start: **30.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**19** of **39**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
16.40-16.85						64	SPT	N=23							
16.90-17.20						69	B								
17.00						70	D						4	17	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + WDixon + MVincent**	**ADingle + ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH1**

Contract Ref:	Start: **30.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**20** of **39**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
17.30-17.75						67	$U_{(100)}$	32 blows							
17.75-18.20						68	SPT	N=26							
17.90-18.20						72	B								
													3	18	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + WDixon + MVincent**	**ADingle + ADingle + ADingle**

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH1**

Contract Ref:	Start: **30.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**21** of **39**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
18.00						71	D						2.80	18.20	
18.20-19.55 (0:25) 18.20-18.65						69	SPT(c)	N=30			Stiff to very stiff dark greyish brown slightly sandy slightly silty CLAY. (Superficial Deposits - Locally derived lodgement till)				
18.50-18.65	100	0	0		Air+Mist (Grey)	73	D								

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

2

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	**Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored**	Plant Used:	**Dando 2000 + Comacchio GEO 601**	Drilled By:	**Gavin James + Scott Pincher**	Logged By:	**MNaisbitt + WDixon + MVincent**	Reviewed By:	**ADingle + ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH1**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**30.10.14** End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**22** of **39**

Mechanical Log						Samples and Testing							Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	No	Type	Results	Backfill & Instrumentation	Water	Description of Strata	Fracture Log			
19.00-19.15					Air+Mist (Grey)	74	D						2	19	
	100	0	0												
19.55-21.05 (0:18) 19.55-19.70						75	D							(2.70)	
	100	0	0		Water (Grey)										

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + WDixon + MVincent**	**ADingle + ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH1**

Contract Ref:	Start: **30.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**23** of **39**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
20.00-20.15	100	0	0		Water (Grey)	76	D						1	20	
20.50-20.65						77	D								

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + WDixon + MVincent**	**ADingle + ADingle + ADingle**

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH1**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**30.10.14** End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**24** of **39**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
	100	0	0		Water (Grey)								0.10	20.90	
21.05-21.60 (0:25)	100	18	0	10 15 20	Water (Grey)						Medium strong to strong very narrowly to narrowly banded foliated greenish grey fine grained slightly weathered PHYLLITE with medium strong to strong extremely closely spaced to very closely spaced very narrow to very thin bands of foliated greenish grey fine to medium grained PSAMMITE. Recovered non-intact as angular fine to coarse gravel and occasional disturbed core cobble sized fragments of phyllite with psammite. (New Harbour Group - PHYLLITE)		0	21 (1.20)	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + WDixon + MVincent**	**ADingle + ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

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Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH1**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**30.10.14** End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**25** of **39**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
21.60-22.50 (0:10)	100	48	11	30 60 90	Water (Grey)						Medium strong to strong very narrowly to narrowly banded foliated greenish grey slightly weathered PHYLLITE with medium strong to strong extremely closely spaced to very closely spaced very narrow to very thin bands of foliated greenish grey fine to medium grained PSAMMITE. Foliation is sub-horizontal to shallowly dipping. Occasional locally frequent shallowly to steeply dipping ptygmatic light green chlorite veins. Occasional steeply dipping lenticular dissolution voids. Foliation fractures are shallowly dipping extremely closely to closely spaced undulating smooth partly open to open dark brown staining. (New Harbour Group - PHYLLITE) 22.30-22.50m : Occasional shallowly to steeply dipping ptygmatic green chlorite veins.		-1 -1.11	22 22.10	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + WDixon + MVincent**	**ADingle + ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

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Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH1**

Contract Ref:	Start: **30.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**26** of **39**

Mechanical Log						Samples and Testing								
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	No	Type	Results	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
22.50-23.90 (0:18)	100	77	0	30 60 90	Air+Mist (Grey)						22.90-23.74m : Possible fault: steeply dipping stepped undulating partly open to open black staining with localised infill soft reddish brown clay. (Maybe DI re-activation rotational jarring)	1 FF 2 FF[i] 3 FF[i] 5 FF[i] 6 FF[i]	-2	23	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	**Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored**	Plant Used:	**Dando 2000 + Comacchio GEO 601**	Drilled By:	**Gavin James + Scott Pincher**	Logged By:	**MNaisbitt + WDixon + MVincent**	Reviewed By:	**ADingle + ADingle + ADingle**

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BOREHOLE LOG

Contract:	Client:	Borehole:
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Contract Ref:	Start: **30.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**27** of **39**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
23.90-25.50 (0:22)	100	77	0	30 60 90	Air+Mist (Grey)						23.74-23.90m : Non-intact recovered as angular core cobble fragments. 23.75-24.12m : Non-intact.	7 FF[i] 4 PF[i] 8 FF[i]	-3	(3.40) 24	
	100	87	9	30 75 120	Air+Mist (Grey)							9 FF[i] 10 FF[i]			

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + WDixon + MVincent**	**ADingle + ADingle + ADingle**

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	RGM-BH1

Contract Ref:	Start: 30.10.14	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: 27.11.14	21.00	E:236525.5 N:393417.7	28 of 39

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
	100	87	9	30 75 120	Air+Mist (Grey)							11 FF[i] 12 FF[i] 13 FF[i] 14 FF[i] 15 FF[i] 16 FF[i] 17 FF[i] 18 FF[i] 19 J[i]	-4	25	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: 1:5 | Inclination: Vertical | Azimuth: NA

Method Used:	Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored	Plant Used:	Dando 2000 + Comacchio GEO 601	Drilled By:	Gavin James + Scott Pincher	Logged By:	MNaisbitt + WDixon + MVincent	Reviewed By:	ADingle + ADingle + ADingle

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH1**

Contract Ref:	Start: **30.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**29** of **39**

Depth	Mechanical Log: TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Samples and Testing: No	Type	Results	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
	100	87	9	30 75 120	Air+Mist (Grey)							20 FF[i] 21 FF[i]			
											25.45-25.50m : Rare steeply dipping sigmoidal calcite veins (<2mm wide)		-4.51	25.50	
25.50-27.10 (0:28)	100	100	86	120 195 270	Air+Mist (Grey)						Medium strong to strong very narrowly to narrowly banded foliated greenish grey to dark reddish purple slightly weathered PHYLLITE with medium strong to strong extremely closely spaced to very closely spaced very narrow to narrow bands of foliated greenish grey fine to medium grained PSAMMITE. Foliation is sub-horizontal to shallowly dipping. Occasional shallowly dipping ptygmatic green chlorite veins. Occasional shallowly to steeply dipping thin lenticular calcite veins locally concentrated in psammite bands. Occasional steeply dipping en-echelon calcite veins. Foliation fractures are shallowly dipping closely to medium spaced undulating smooth partly open to open reddish brown staining specks dendrites. (New Harbour Group - PHYLLITE) 25.75-25.94m : Occasional steeply dipping lenticular calcite veins locally enclosed in psammite bands.	22 FF[i] 23 F[i] 24 FF[i]	-5	26	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + WDixon + MVincent**	**ADingle + ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH1**

Contract Ref:	Start: **30.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**30** of **39**

Mechanical Log						Samples and Testing								
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	No	Type	Results	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
	100	100	86	120 195 270	Air+Mist (Grey)						26.10-26.30m : Steeply dipping en-echelon occasional lenticular calcite veins. 26.40-27.60m : Steeply dipping sub-parallel en-echelon calcite veins.	25 FF[i]	-6	27	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + WDixon + MVincent**	**ADingle + ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH1**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**30.10.14** End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**31** of **39**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
27.10-28.60 (0:25)	100	100	86	120 195 270	Air+Mist (Grey)										
	100	100	93	210 330 450							27.80-28.70m : Steeply dipping sub-parallel lenticular calcite veins. Occasional steeply dipping en-echelon calcite veins.	26 J[i]			

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

-7

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + WDixon + MVincent**	**ADingle + ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH1**

Contract Ref:	Start: **30.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**32** of **39**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
				210 330 450	Air+Mist (Grey)								-7	28	
	100	100	93												
				80 105 130											
28.60-30.20 (0:26)												27 J[i]		(5.88)	
	100	100	75		Air+Mist (Grey)										

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + WDixon + MVincent**	**ADingle + ADingle + ADingle**

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH1**

Contract Ref:	Start: **30.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**33** of **39**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
				80 105 130								28 FF[i]			
											28.90-29.85m : Steeply dipping to sub-vertical lenticular locally sigmoidal, en-echelon calcite veins.	29 PF[i]			
				460 460 460									-8	29	
	100	100	75		Air+Mist (Grey)										
				140 255 370								30 J[i]			
												31 J[i]			

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	**Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored**	Plant Used:	**Dando 2000 + Comacchio GEO 601**	Drilled By:	**Gavin James + Scott Pincher**	Logged By:	**MNaisbitt + WDixon + MVincent**	Reviewed By:	**ADingle + ADingle + ADingle**

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	RGM-BH1

Contract Ref:	Start: 30.10.14	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: 27.11.14	21.00	E:236525.5 N:393417.7	34 of 39

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
	100	100	75		Air+Mist (Grey)								-9	30	
				140 255 370								32 J[i]			
30.20-31.70 (0:28)	77	63	63		Air+Mist (Grey)										

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: 1:5 | Inclination: Vertical | Azimuth: NA

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored	Dando 2000 + Comacchio GEO 601	Gavin James + Scott Pincher	MNaisbitt + WDixon + MVincent	ADingle + ADingle + ADingle

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH1**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**30.10.14** End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**35** of **39**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
				140 255 370	Air+Mist (Grey)						30.90-31.30m : Steeply dipping sub-parallel en-echelon locally sigmoidal calcite veins.	33 FF[i] 34 J[i] 35 FF[i]	-10	31	
	77	63	63												
											Dropped core. (New Harbour Group - PHYLLITE)		-10.39	31.38	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + WDixon + MVincent**	**ADingle + ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
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Contract Ref:	Start: **30.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Mechanical Log						Samples and Testing							Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	No	Type	Results	Backfill & Instrumentation	Water	Description of Strata	Fracture Log			
	77	63	63		Air+Mist (Grey)									(0.32)	
											Borehole terminated at 31.70m depth.		-10.71	31.70	
														32	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + WDixon + MVincent**	**ADingle + ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:		Client:		Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation		**Horizon Nuclear Power Wylfa Limited**		**RGM-BH1**
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RGM-BH1 Box 1-2 18.20m - 21.05m depth





RGM-BH1 Box 3-4 21.05m - 22.50m depth

Method Used:	Inspection pit + Cable Percussion + Rotary open hole + ~~Rotary Cored~~	Plant Used:	Dando 2000 + Comacchio GEO 601	Drilled By:	Gavin James + Scott Pincher	Logged By:	MNaisbitt + WDixon + MVincent	Reviewed By:	ADingle + ADingle + ADingle

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	RGM-BH1

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RGM-BH1 Box 5-6 22.50m - 25.50m depth





RGM-BH1 Box 7-8 25.50m - 28.60m depth

Method Used:	Inspection pit + Cable Percussion + Rotary open hole + Rotary Cored	Plant Used:	Dando 2000 + Comacchio GEO 601	Drilled By:	Gavin James + Scott Pincher	Logged By:	MNaisbitt + WDixon + MVincent	Reviewed By:	ADingle + ADingle + ADingle

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH1**

Contract Ref:	Start: **30.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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RGM-BH1 Box 9-10 28.60m - 31.70m depth



Method Used:	Inspection pit + Cable Percussion + Rotary open hole + ~~Rotary Cored~~	Plant Used:	Dando 2000 + Comacchio GEO 601	Drilled By:	Gavin James + Scott Pincher	Logged By:	MNaisbitt + WDixon + MVincent	Reviewed By:	ADingle + ADingle + ADingle

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SUMMARY OF DISCONTINUITIES - RGM-BH1

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
1	22.60	FF	40	U-SM	Partly open	-		New Harbour Group	PHYLLITE
2	22.72	FF	35	U-SM	Open	Thin reddish brown clay films localised		New Harbour Group	PHYLLITE
						black staining.			
3	23.12	FF	35	U-SM	Partly open	Dark brown staining		New Harbour Group	PHYLLITE
4	23.14-23.74	PF	90	U-R	-	Thin reddish brown clay films		New Harbour Group	PHYLLITE
5	23.24	FF	35	U-SM	Partly open	Dark brown staining		New Harbour Group	PHYLLITE
6	23.34	FF	35	U-SM	Partly open	Dark brown staining		New Harbour Group	PHYLLITE
7	23.42	FF	35	U-SM	Partly open	Dark brown staining		New Harbour Group	PHYLLITE
8	23.61	FF	35	U-SM	Partly open	Localised black staining		New Harbour Group	PHYLLITE
9	24.10	FF	35	U-SM	Open	Black staining		New Harbour Group	PHYLLITE
10	24.25	FF	40	U-SM	Partly open	Localised black staining clay films		New Harbour Group	PHYLLITE
11	24.32	FF	30	U-SM	Partly open	Dark brown staining		New Harbour Group	PHYLLITE
12	24.40	FF	30	U-SM	Partly open	Dark brown staining		New Harbour Group	PHYLLITE
13	24.50	FF	30	U-SM	Partly open	Dark brown staining		New Harbour Group	PHYLLITE
14	24.63	FF	30	U-SM	Partly open	Yellow brown staining		New Harbour Group	PHYLLITE
15	24.70	FF	30	U-SM	Open	Black staining		New Harbour Group	PHYLLITE

Key:
Type codes: F = Fault, FF = Foliation fracture, J = Joint, PF = Possible Fault.
Small-scale roughness codes: P-SM = Planar - smooth, S-R = Stepped - rough, U-R = Undulating - rough, U-SM = Undulating - smooth.
Aperture description codes: Moderately wide = Moderately wide (2.5mm - 10mm), Open = Open (0.5mm - 2.5mm), Partly open = Partly open (0.25mm - 0.5mm).

SUMMARY OF DISCONTINUITIES - RGM-BH1

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
16	24.88	FF	30	U-SM	Moderately wide	Fine gravel sized phyllite fragments		New Harbour Group	PHYLLITE
17	25.03	FF	30	U-SM	Partly open	Reddish brown staining		New Harbour Group	PHYLLITE
18	25.09	FF	25	U-SM	Partly open	Localised yellow brown staining specks		New Harbour Group	PHYLLITE
						dendrites thin clay films.			
19	25.13-25.26	J	50	U-R	Open	Strong reddish brown staining		New Harbour Group	PHYLLITE
20	25.30	FF	25	U-SM	Open	Thin clay films fine gravel sized phyllite		New Harbour Group	PHYLLITE
						fragments localised dark brown specks			
						dendrites.			
21	25.40	FF	25	U-SM	Partly open	Thin calcite films localised brown		New Harbour Group	PHYLLITE
						staining specks and dendrites.			
22	25.66	FF	30	P-SM	Partly open	Dark brown staining		New Harbour Group	PHYLLITE
23	25.67-25.86	F	70	S-R	Open	Reddish brown staining		New Harbour Group	PHYLLITE
24	25.86	FF	35	U-SM	Open	Dark brown staining		New Harbour Group	PHYLLITE
25	26.16	FF	30	U-SM	Open	Localised black staining		New Harbour Group	PHYLLITE
26	27.55-28.05	J	80	S-R	Open	Localised brown staining		New Harbour Group	PHYLLITE
27	28.48	J	45	S-R	Open	Fine gravel sized phyllite fragments clay		New Harbour Group	PHYLLITE

Key:
Type codes: F = Fault, FF = Foliation fracture, J = Joint, PF = Possible Fault.
Small-scale roughness codes: P-SM = Planar - smooth, S-R = Stepped - rough, U-R = Undulating - rough, U-SM = Undulating - smooth.
Aperture description codes: Moderately wide = Moderately wide (2.5mm - 10mm), Open = Open (0.5mm - 2.5mm), Partly open = Partly open (0.25mm - 0.5mm).

SUMMARY OF DISCONTINUITIES - RGM-BH1

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
						films			
28	28.80	FF	40	S-R	Open	Localised brown staining fine gravel		New Harbour Group	PHYLLITE
						sized phyllite fragments			
29	28.90	PF	25	U-SM	Open	Fine gravel sized phyllite fragments		New Harbour Group	PHYLLITE
30	29.53	J	35	S-R	Open	Black staining occasional thin clay films		New Harbour Group	PHYLLITE
31	29.62-29.75	J	65	S-R	Open	Reddish brown staining exiting calcite		New Harbour Group	PHYLLITE
						veins			
32	30.00-30.17	J	65	S-R	-	Reddish brown staining		New Harbour Group	PHYLLITE
33	30.71	FF	35	U-SM	Partly open	Black staining		New Harbour Group	PHYLLITE
34	30.73-30.84	J	70	U-R	Open	Dark brown staining		New Harbour Group	PHYLLITE
35	30.84	FF	40	U-SM	Open	Yellow brown staining		New Harbour Group	PHYLLITE

Key:
Type codes: F = Fault, FF = Foliation fracture, J = Joint, PF = Possible Fault.
Small-scale roughness codes: P-SM = Planar - smooth, S-R = Stepped - rough, U-R = Undulating - rough, U-SM = Undulating - smooth.
Aperture description codes: Moderately wide = Moderately wide (2.5mm - 10mm), Open = Open (0.5mm - 2.5mm), Partly open = Partly open (0.25mm - 0.5mm).

STRUCTURAL SOILS
The Old School
Stillhouse Lane
Bedminster
Bristol BS3 4EB

Compiled By: [redacted] JTAYLOR

Date: 29.1.15

Contract Ref: 728599

Contract: Wylfa Newydd Detailed Onshore Ground Investigation

SUMMARY OF FAULTS AND POSSIBLE FAULTS - RGM-BH1

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
4	23.14-23.74	PF	90	U-R	-	Thin reddish brown clay films		New Harbour Group	PHYLLITE
23	25.67-25.86	F	70	S-R	Open	Reddish brown staining		New Harbour Group	PHYLLITE
29	28.90	PF	25	U-SM	Open	Fine gravel sized phyllite fragments		New Harbour Group	PHYLLITE

Key:
Type codes: F = Fault, PF = Possible Fault.
Small-scale roughness codes: S-R = Stepped - rough, U-R = Undulating - rough, U-SM = Undulating - smooth.
Aperture description codes: Open = Open (0.5mm - 2.5mm).

STRUCTURAL SOILS
The Old School
Stillhouse Lane
Bedminster
Bristol BS3 4EB

Compiled By: [redacted] JTAYLOR

Date: 29.1.15

Contract Ref: 728599

Contract: Wylfa Newydd Detailed Onshore Ground Investigation

GINT_LIBRARY_V8_05.GLB : XCUSTOM - SSL - 728599 - FAULTS : 728599_LOW_PRIORITY_WYLFA_NEWYDD_DETAILED_ONSHORE_GROUND_INVESTIGATION.GPJ : 29/1/15 18:50 : JT : DI-126

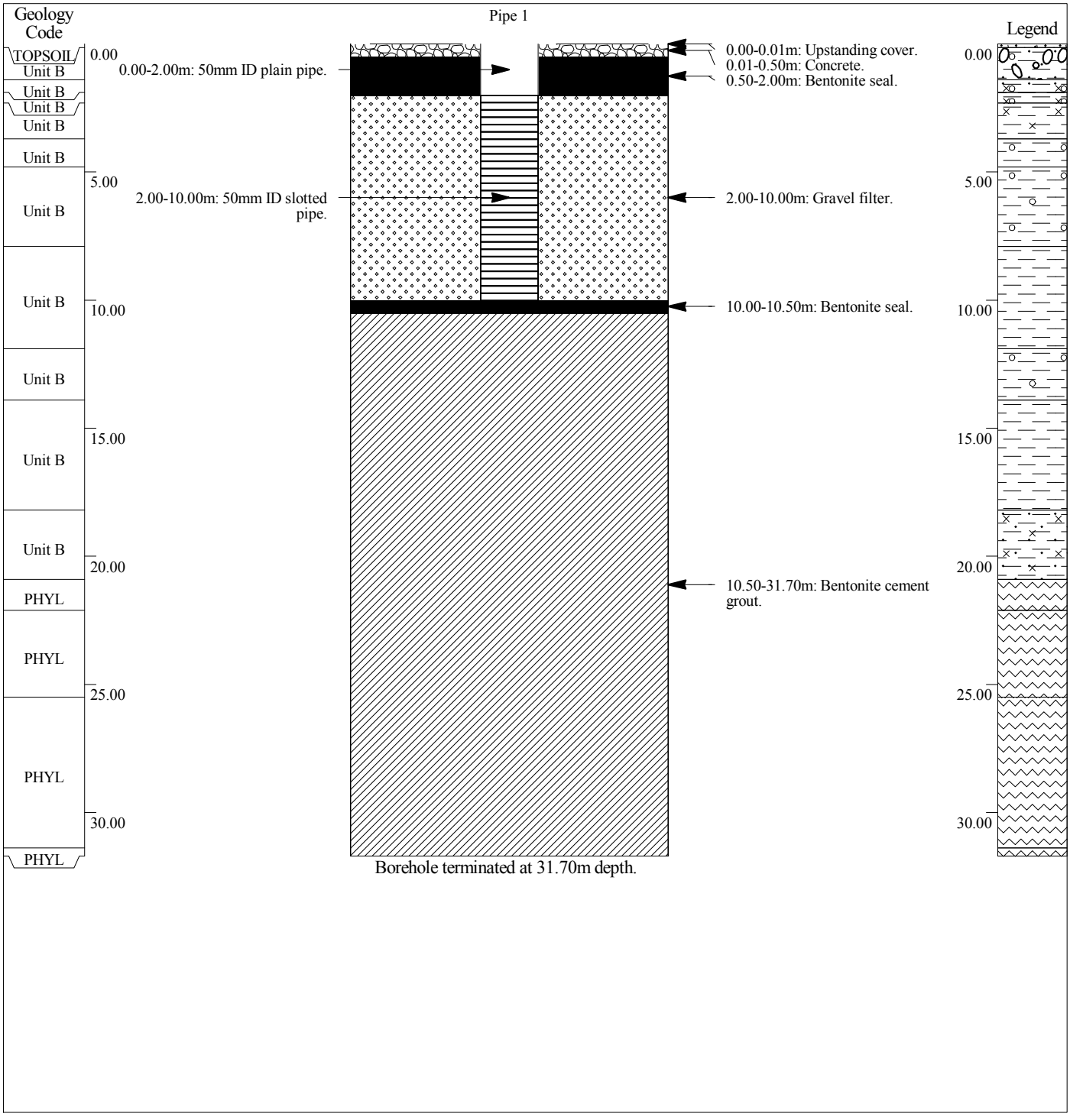
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STRUCTURAL SOILS

INSTALLATION LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH1**

Contract Ref:	Start: **30.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**1** of **2**



General Remarks

Geology code details:

PHYL=PHYLLITE, TOPSOIL=Topsoil, Unit B=Locally derived lodgement till

1. Location CAT and Genny scanned prior to commencement.
2. Hand dug inspection pit GL to 1.20m depth.(IP)
3. Perched water entering inspection pit.
4. Inspection pit remained stable during excavation.
5. Archaeology pit excavated in same location.
6. Cable percussion boring using 200mm diameter tools to 18.20m depth between 30/10/2014 and 11/12/2014.
7. Water added to assist boring from 1.20m to 11.65m depth.
8. Rotary open hole drilling from 18.20m to 18.80m depth on 26/11/2014.

Note: Graphical representation of well installation is scaled vertically, but exaggerated in the horizontal to aid interpretation.

All dimensions in metres	Installation	Installation	Installed
Scale **1:225**	Date -	Type -	By -

GINT_LIBRARY_V8_05.GLB LibVersion: v8_05 - Lib0006 PrjVersion: | Log XCUSTOM - SSL - 728599 - INSTALLATIONS | 728599_LOW_PRIORITY_WYLFA_NEWYDD_DETAILED_ONSHORE_GROUND_INVESTIGATION.GPJ - v8_05.
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STRUCTURAL SOILS

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INSTALLATION LOG

Contract:		Client:		Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation		**Horizon Nuclear Power Wylfa Limited**		**RGM-BH1**
Contract Ref:	Start: **30.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **27.11.14**	**21.00**	**E:236525.5 N:393417.7**	**2** of **2**

Geology Code | Pipe 1 | Legend

General Remarks

9. Rotary cored drilling from 18.80m to 31.70m depth with air mist flush from 18.80m to 19.55m depth and 22.50m to 31.70m depth, water flush from 19.55m to 22.50m depth between 26
10. Groundwater monitoring standpipe installed as shown upon completion.
11. SPT hammer EQU166-2013 (E_t = 80.05%) used.

Note: Graphical representation of well installation is scaled vertically, but exaggerated in the horizontal to aid interpretation.

All dimensions in metres	Installation	Installation	Installed
Scale **1:225**	Date -	Type -	By -

GINT_LIBRARY_V8_05.GLB LibVersion: v8_05 - Lib0006 PrjVersion: | Log XCUSTOM - SSL - 728599 - INSTALLATIONS | 728599_LOW_PRIORITY_WYLFA_NEWYDD_DETAILED_ONSHORE_GROUND_INVESTIGATION.GPJ - v8_05.
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STANDARD PENETRATION TEST SUMMARY TABLE

Exploratory Position ID	Depth (m)	Hole Dia (mm)	Casing Depth (m)	Water Depth (m)	Seating Drive		Test Drive			Hammer ID	Calibration Date	Energy Ratio (%)	N_{60}	Comments
					Blows	Pen (mm)	Blows	R (mm)	Result					
RGM-BH2	0.40	200			25	20	50+	15	N=1000*	EQU166-2013	12/11/2013	80.05	1334	

Notes:
1. Tests carried out in general accordance with BS EN ISO 22476-3:2005, including amendment A1 (2011).
2. Reported blows are for 75mm penetration unless indicated "+".
3. Where full test drive was not achieved, actual penetration (R) and extrapolated N value (N*) reported.
4. Tests carried out using a split spoon sampler unless noted as SPT(c) (denotes use of solid cone method) in the comments column.
5. Entries in the water depth column reflects the measured water depth at time of test.

N_{60} = (Measured hammer energy ratio / 60) x N value

STRUCTURAL SOILS
The Old School
Stillhouse Lane
Bedminster
Bristol BS3 4EB

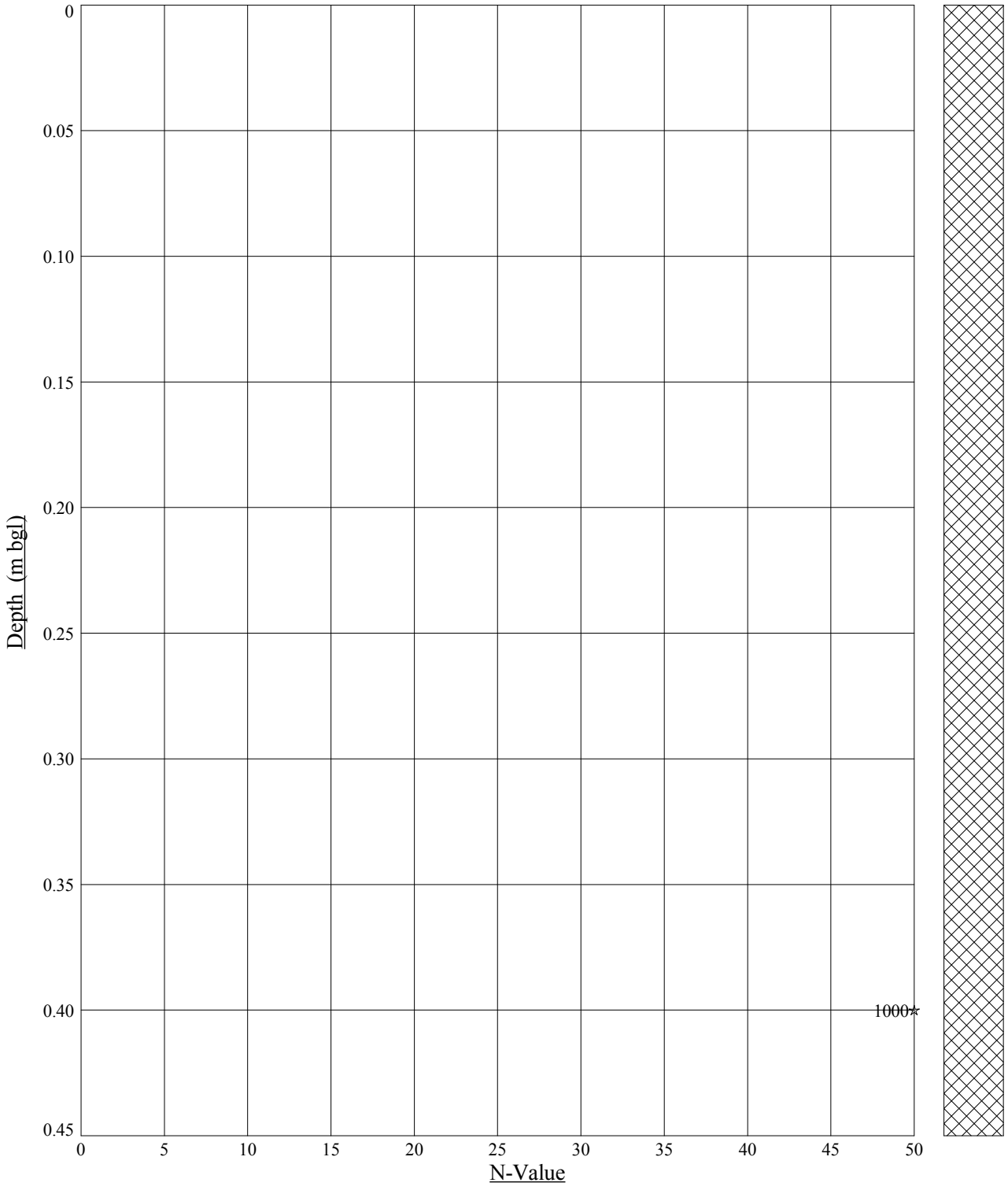
Compiled By		Date	Contract Ref:
[redacted]	**ALUMBER**	**30.01.15**	**728599**

Contract:
Wylfa Newydd Detailed Onshore Ground Investigation

GINT_LIBRARY_V8_05.GLB : XCUSTOM - SSL - 728599 - SPT TABLE : 728599_LOW_PRIORITY_WYLFA_NEWYDD_DETAILED_ONSHORE_GROUND_INVESTIGATION.GPJ : 30/01/15 08:00 : AML :

STANDARD PENETRATION TEST (SPT N-Value)
vs
DEPTH

Exploratory Hole : **RGM-BH2**.

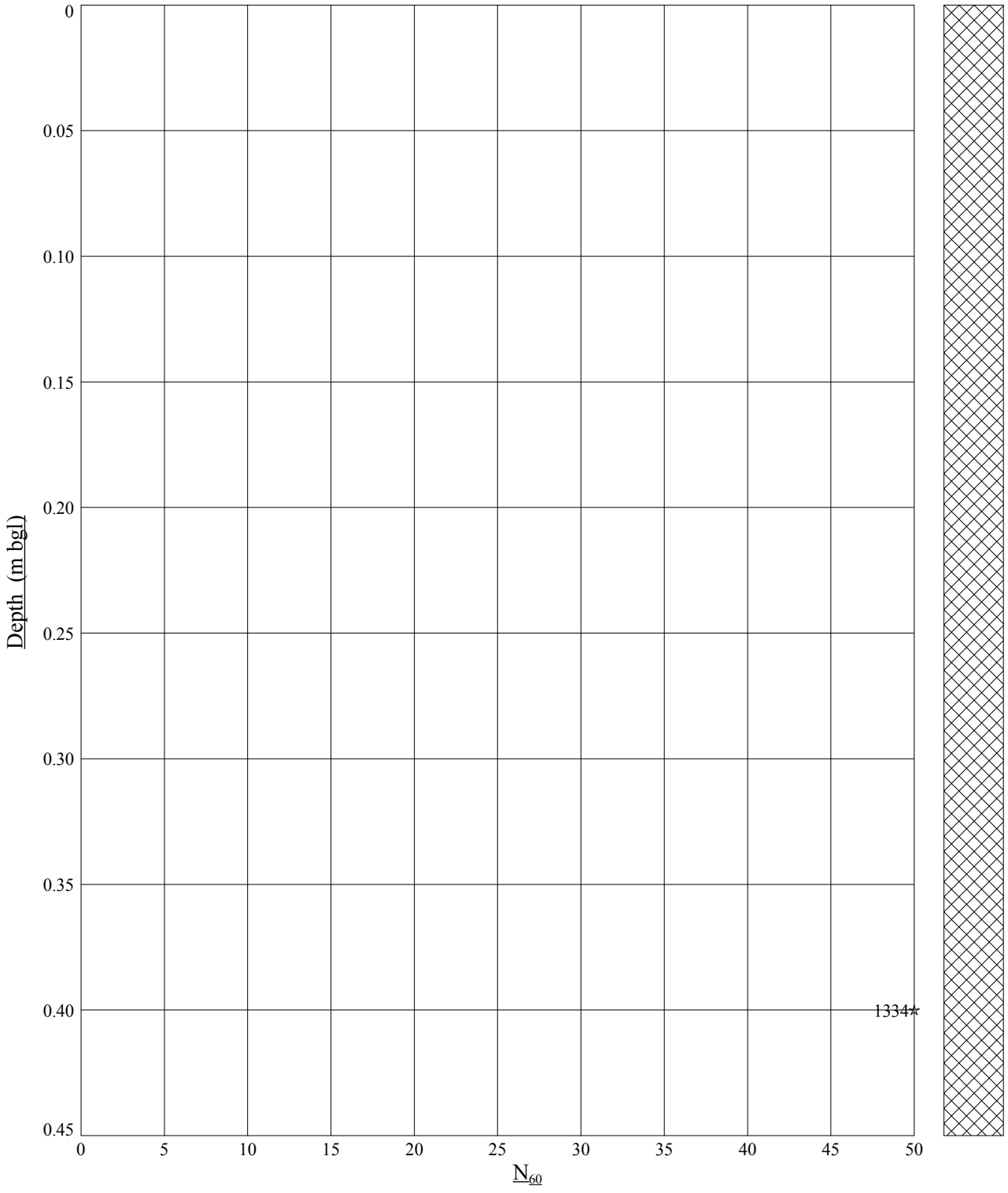


STRUCTURAL SOILS The Old School Stillhouse Lane Bedminster Bristol BS3 4EB	Contract **Wylfa Newydd Detailed Onshore Ground Investigation**	Date **30.1.15**	Compiled By
	Client **Horizon Nuclear Power Wylfa Limited**	Contract Ref: **728599**	AGS

GINT_LIBRARY_V8_05.GLB LibVersion: v8_05 - Lib0006 PrjVersion: | Graph XCUSTOM - SSL - 728599 - SPT N DEPTH| 728599_LOW_PRIORITY_WYLFA_NEWYDD_DETAILED_ONSHORE_GROUND_INVESTIGATION.GPJ - v8_05. | 30/1/15 - 12:24 | DF |

STANDARD PENETRATION TEST (SPT N_{60})
vs
DEPTH

Exploratory Hole : **RGM-BH2**.



STRUCTURAL SOILS The Old School Stillhouse Lane Bedminster Bristol BS3 4EB	Contract **Wylfa Newydd Detailed Onshore Ground Investigation**	Date **29.01.15**	Compiled By AML
	Client **Horizon Nuclear Power Wylfa Limited**	Contract Ref: **728599**	AGS

GINT_LIBRARY_V8_05.GLB LibVersion: v8_05 - Lib0006 PrjVersion: | Graph XCUSTOM - SSL - 728599 - SPT N60 DEPTH | 728599_LOW_PRIORITY_WYLFA_NEWYDD_DETAILED_ONSHORE_GROUND_INVESTIGATION.GPJ - v8_05. | 29/01/15 - 17:56 | AML |

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH2**

Contract Ref:	Start: **26.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **28.10.14**	**25.63**	**E:235788.7 N:392937.3**	**1** of **4**

Mechanical Log: Depth	TCR %	SCR %	RQD %	If (mm)	Flush Returns & Details	Drill Time (hh:mm:ss)	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
0.00										MADE GROUND: Grass over dark brown gravelly SAND with occasional rootlets. (Made Ground)		25	(1.55)	
1.00					Air+Mist (Brown)	(00:30:00)							1	
												24.08	1.55	
				80 130 280						Medium strong very narrowly banded greenish grey fine to medium grained slightly weathered PSAMMITE with medium strong extremely closely to closely spaced very narrow to narrow bands of very narrowly foliated light greenish grey PHYLLITE. (New Harbour Group - PSAMMITE)		24	(1.10)	
2.00					Air+Mist (Green)	(0:50:00)							2	
				10 40 90								22.98	2.65	
				50 130 190						Weak very narrowly banded very narrowly foliated brownish purple slightly weathered PHYLLITE with weak extremely closely spaced very narrow lenticular bands of greenish grey fine to medium grained PSAMMITE. (New Harbour Group - PHYLLITE)				
				30 60 80								22	(1.18)	
3.00					Air+Mist (Red)	(0:38:00)							3	
				NI NI NI								21.80	3.83	
										Medium strong thinly to medium banded greenish grey medium to coarse grained slightly weathered PSAMMITE with medium strong medium spaced narrow bands of very narrowly foliated brownish purple and greenish grey PHYLLITE. (New Harbour Group - PSAMMITE)			(0.63)	
4.00				210 220 230	Air+Mist (Green)	(0:42:00)						21.17	4.46	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
27/10/14	08:30	5.25	1.50	99	4.90
27/10/14	13:47	12.35	1.50	99	5.08
27/10/14	16:45	14.95	1.50	99	6.30
28/10/14	08:30	14.95	1.50	99	4.90
28/10/14	11:00	14.95	1.50	99	-

General Remarks

1. Location CAT and Genny scanned prior to commencement.
2. Hand dug inspection pit GL to 0.40m depth.(IP)
3. Inspection pit remained stable during excavation.
4. Rotary open hole drilling from 0.40m to 1.55m depth on 26/10/2014.
5. Rotary cored drilling from 1.55m to 14.95m depth with air mist flush between 26/10/2014 and 28/10/2014.
6. Groundwater monitoring standpipe installed as shown upon completion.

All dimensions in metres	Scale: **1:25**	Inclination: **Vertical**	Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Rotary open hole + Rotary Cored	**Beretta T44**	**Daniel Price**	**SParkes + RNewbury**	**ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	RGM-BH2

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	26.10.14 End: 28.10.14	25.63	E:235788.7 N:392937.3	2 of 4

Depth	TCR %	SCR %	RQD %	If (mm)	Flush Returns & Details	Drill Time (hh:mm:ss)	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
5.00				30 75 160 NI NI NI	Air+Mist (Green)	(0:42:00)				Weak to medium strong very narrowly to very thinly banded greenish grey fine grained slightly to moderately weathered PSAMMITE with weak extremely closely to very closely spaced very narrow to narrow bands of very narrowly foliated light greenish grey PHYLLITE. (New Harbour Group - PSAMMITE)		21 20.53	(0.64) 5.10	5
6.00				20 60 110 100 190 300 80 100 140	Air+Mist (Green)	(0:22:00)				Very weak to weak very narrowly to narrowly banded very narrowly foliated brownish purple slightly to moderately weathered PHYLLITE with very weak to weak very narrow lenticular bands of greenish grey fine to medium grained PSAMMITE. (New Harbour Group - PHYLLITE) Medium strong very narrowly to thinly banded greenish grey fine to medium grained slightly weathered PSAMMITE with weak to medium strong extremely closely spaced to closely spaced very narrow to very thin bands of very narrowly foliated light greenish grey and greyish purple PHYLLITE. (New Harbour Group - PSAMMITE)		20.28 20 19	5.35 (2.22)	6
7.00				10 50 90 100 140 170 70 95 140	Air+Mist (Green)	(0:20:00)						18.06 18	7.57	7
8.00				20 60 90 80 100 110 130 210	Air+Mist (Green/Red)	(0:23:00)				Weak to medium strong very narrowly to narrowly banded very narrowly foliated greyish purple slightly weathered PHYLLITE with weak to medium strong extremely closely spaced very narrow lenticular bands of greenish grey fine to medium grained PSAMMITE. (New Harbour Group - PHYLLITE) Medium strong thinly banded greenish grey fine to medium grained slightly weathered PSAMMITE with weak to medium strong closely spaced narrow bands of very narrowly foliated greyish		17.02 17	(1.04) 8.61 (0.58)	8 9

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
27/10/14	08:30	5.25	1.50	99	4.90
27/10/14	13:47	12.35	1.50	99	5.08
27/10/14	16:45	14.95	1.50	99	6.30
28/10/14	08:30	14.95	1.50	99	4.90
28/10/14	11:00	14.95	1.50	99	-

General Remarks

7. SPT hammer EQU166-2013 (E_r = 80.05%) used.

All dimensions in metres | Scale: **1:25** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Rotary open hole + Rotary Cored	**Beretta T44**	**Daniel Price**	**SParkes + RNewbury**	**ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	RGM-BH2

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	26.10.14 End: 28.10.14	25.63	E:235788.7 N:392937.3	3 of 4

Depth	TCR %	SCR %	RQD %	If (mm)	Flush Returns & Details	Drill Time (hh:mm:ss)	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
9.00				300						purple and PHYLLITE. (New Harbour Group - PSAMMITE)		16.44	9.19	
				130						Medium strong very narrowly to narrowly banded very narrowly foliated reddish purple and greyish purple slightly weathered PHYLLITE with medium strong extremely closely to very closely spaced very narrow lenticular bands of greenish grey fine to medium grained PSAMMITE. (New Harbour Group - PHYLLITE)		16	(0.93)	
				210										
				300	Air+Mist (Green)	(0:23:00)							10	
10.00				10								15.51	10.12	
				30						Medium strong to strong very thinly to medium banded greenish grey fine grained slightly weathered PSAMMITE with medium strong to strong extremely closely to medium spaced very narrow to thin bands of very narrowly foliated purple PHYLLITE. (New Harbour Group - PSAMMITE)		15		
				60										
				120										
				130										
				140										
				60										
				140										
				190	Air+Mist (Green)	(0:25:00)							11	
11.00				300									(2.07)	
				380								14		
				440										
				300									12	
12.00				10								13.44	12.19	
				130						Medium strong very thinly to medium banded greenish grey fine and medium grained slightly weathered PSAMMITE with medium strong very closely spaced to closely spaced very narrow to very thin bands of very narrowly foliated greyish purple and light greenish grey PHYLLITE. (New Harbour Group - PSAMMITE)		13		
				290										
				30										
				40										
				50										
				10										
				80										
13.00				150	Air+Mist (Green)	(0:28:00)							13	
				70										
				110										
				150										

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
27/10/14	08:30	5.25	1.50	99	4.90
27/10/14	13:47	12.35	1.50	99	5.08
27/10/14	16:45	14.95	1.50	99	6.30
28/10/14	08:30	14.95	1.50	99	4.90
28/10/14	11:00	14.95	1.50	99	-

General Remarks

All dimensions in metres | Scale: **1:25** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Rotary open hole + Rotary Cored	**Beretta T44**	**Daniel Price**	**SParkes + RNewbury**	**ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	RGM-BH2

Contract Ref:	Start: 26.10.14	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: 28.10.14	25.63	E:235788.7 N:392937.3	4 of 4

Mechanical Log: Depth	TCR %	SCR %	RQD %	If (mm)	Flush Returns & Details	Drill Time (hh:mm:ss)	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
14.00				70 130 180 NI NI NI 90 125 210 40 60 80	Air+Mist (Green)	(0:31:00)				Borehole terminated at 14.95m depth.		12 11 10.68	(2.76) 14 14.95	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
27/10/14	08:30	5.25	1.50	99	4.90
27/10/14	13:47	12.35	1.50	99	5.08
27/10/14	16:45	14.95	1.50	99	6.30
28/10/14	08:30	14.95	1.50	99	4.90
28/10/14	11:00	14.95	1.50	99	-

General Remarks

All dimensions in metres | Scale: **1:25** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Rotary open hole + Rotary Cored	**Beretta T44**	**Daniel Price**	**SParkes + RNewbury**	**ADingle + ADingle**

GINT_LIBRARY_V8_05.GLB LibVersion: v8_05 - Lib0006 PrjVersion: | Log XCUSTOM - SSL - 728599 - SUMMARY LOG | 728599_LOW_PRIORITY_WYLFA_NEWYDD_DETAILED_ONSHORE_GROUND_INVESTIGATION.GPJ - v8_05.
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STRUCTURAL SOILS

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH2**

Contract Ref:	Start: **26.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **28.10.14**	**25.63**	**E:235788.7 N:392937.3**	**1** of **20**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
0.00						1A	EW				MADE GROUND: Grass over dark brown gravelly SAND with occasional rootlets. Sand is fine. Gravel is angular to rounded fine to coarse of mixed lithologies. Rare rope. (TOPSOIL) (Made Ground)				
0.00-0.40						IP1	D								
0.00-0.40						IP1	B								
0.00-0.40						RAD1	D								
0.40-0.44					Air+Mist (Brown)	1	SPT	N=1000*					25	(1.55)	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
27/10/14	08:30	5.25	1.50	99	4.90
27/10/14	13:47	12.35	1.50	99	5.08
27/10/14	16:45	14.95	1.50	99	6.30
28/10/14	08:30	14.95	1.50	99	4.90
28/10/14	11:00	14.95	1.50	99	-

General Remarks

1. Location CAT and Genny scanned prior to commencement.
2. Hand dug inspection pit GL to 0.40m depth.(IP)
3. Inspection pit remained stable during excavation.
4. Rotary open hole drilling from 0.40m to 1.55m depth on 26/10/2014.
5. Rotary cored drilling from 1.55m to 14.95m depth with air mist flush between 26/10/2014 and 28/10/2014.
6. Groundwater monitoring standpipe installed as shown upon completion.

All dimensions in metres	Scale: **1:5**	Inclination: **Vertical**	Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Rotary open hole +	**Beretta T44**	**Daniel Price**	**SParkes + RNewbury**	**ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH2**

Contract Ref:	Start: **26.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **28.10.14**	**25.63**	**E:235788.7 N:392937.3**	**2** of **20**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
					Air+Mist (Brown)									1	
1.55-2.65 (0:50)	100	95	60	80 130 280	Air+Mist (Green)						Medium strong very narrowly banded greenish grey fine to medium grained slightly weathered PSAMMITE with medium strong extremely closely to closely spaced very narrow to narrow bands of very narrowly foliated light greenish grey PHYLLITE. Foliation is shallowly dipping. Occasional randomly orientated ptygmatic chlorite veins (up to 2mm thick). Rare steeply dipping calcite veins (up to 6mm thick). Joints are shallowly to sub-vertically dipping closely to medium spaced planar rough open clean. (New Harbour Group - PSAMMITE) 1.55-1.64m : Zone of non-intact core recovered as angular to subangular medium to coarse	1 J[i] 2 IcF	24.08 24	1.55	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
27/10/14	08:30	5.25	1.50	99	4.90
27/10/14	13:47	12.35	1.50	99	5.08
27/10/14	16:45	14.95	1.50	99	6.30
28/10/14	08:30	14.95	1.50	99	4.90
28/10/14	11:00	14.95	1.50	99	-

General Remarks

7. SPT hammer EQU166-2013 (E_r = 80.05%) used.

All dimensions in metres	Scale: **1:5**	Inclination: **Vertical**	Azimuth: **NA**

Method Used:	**Inspection pit + Rotary open hole +**	Plant Used:	**Beretta T44**	Drilled By:	**Daniel Price**	Logged By:	**SParkes + RNewbury**	Reviewed By:	**ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH2**

Contract Ref:	Start: **26.10.14** End: **28.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599		**25.63**	**E:235788.7 N:392937.3**	**3** of **20**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
				80 130 280	Air+Mist (Green)						gravel size fragments of greenish grey psammite.	3 J[i] 4 J[i]		2	
	100	95	60	10 40 90								5 J[i] 6 IcF 8 J[i] 7 J[i]		(1.10)	
				50 130 190								9 J[i]			
2.65-3.90 (0:38)	100	54	0								Weak very narrowly banded very narrowly foliated brownish purple slightly weathered PHYLLITE with weak extremely	10 FF[i]	22.98	2.65	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
27/10/14	08:30	5.25	1.50	99	4.90
27/10/14	13:47	12.35	1.50	99	5.08
27/10/14	16:45	14.95	1.50	99	6.30
28/10/14	08:30	14.95	1.50	99	4.90
28/10/14	11:00	14.95	1.50	99	-

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	**Inspection pit + Rotary open hole +**	Plant Used:	**Beretta T44**	Drilled By:	**Daniel Price**	Logged By:	**SParkes + RNewbury**	Reviewed By:	**ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH2**

Contract Ref:	Start: **26.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **28.10.14**	**25.63**	**E:235788.7 N:392937.3**	**4** of **20**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
				30 60 80	Air+Mist (Red)						closely spaced very narrow lenticular bands of greenish grey fine to medium grained PSAMMITE. Foliation is shallowly dipping. Rare sub-horizontal calcite veins (up to 10mm thick). Foliation fractures are located at top of strata and rare shallowly dipping closely spaced. Joints are steeply dipping undulating rough open clean. (New Harbour Group - PHYLLITE) 2.83m : Visible signs of dissolution along calcite vein.	12 FF[i] 11 J[i] 13 FF[i] 14 FF[i] 15 FF[i] 16 FF[i]		3	
	100	54	0	NI NI NI							3.07-3.90m : Zone of non-intact core recovered as medium to coarse gravel and cobble size fragments of reddish purple phyllite.			(1.18)	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
27/10/14	08:30	5.25	1.50	99	4.90
27/10/14	13:47	12.35	1.50	99	5.08
27/10/14	16:45	14.95	1.50	99	6.30
28/10/14	08:30	14.95	1.50	99	4.90
28/10/14	11:00	14.95	1.50	99	-

General Remarks

22

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used: **Inspection pit + Rotary open hole +** | Plant Used: **Beretta T44** | Drilled By: **Daniel Price** | Logged By: **SParkes + RNewbury** | Reviewed By: **ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH2**

Contract Ref:	Start: **26.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **28.10.14**	**25.63**	**E:235788.7 N:392937.3**	**5** of **20**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
3.90-5.30 (0:42)	100	54	0	NI NI NI	Air+Mist (Red)						Medium strong thinly to medium banded greenish grey medium to coarse grained slightly weathered PSAMMITE with medium strong medium spaced narrow bands of very narrowly foliated brownish purple and greenish grey PHYLLITE. Foliation is shallowly dipping locally poor. Abundant randomly orientated ptygmatic chlorite veins (up to 2mm thick). Occasional shallowly dipping chlorite veins (up to 6mm thick). Joints are shallowly to steeply dipping closely spaced undulating rough open clean. (New Harbour Group - PSAMMITE)	17 J[i]	22		
	100	69	39	210 220 230	Air+Mist (Green)							18 J[i]	21.80	3.83	
				30 75 160								19 J[i] 20 J[i]	21.17	4.46	
											Weak to medium strong very narrowly to very thinly banded greenish grey fine grained				

4

(0.63)

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
27/10/14	08:30	5.25	1.50	99	4.90
27/10/14	13:47	12.35	1.50	99	5.08
27/10/14	16:45	14.95	1.50	99	6.30
28/10/14	08:30	14.95	1.50	99	4.90
28/10/14	11:00	14.95	1.50	99	-

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	**Inspection pit + Rotary open hole +**	Plant Used:	**Beretta T44**	Drilled By:	**Daniel Price**	Logged By:	**SParkes + RNewbury**	Reviewed By:	**ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	RGM-BH2

Contract Ref:	Start: 26.10.14	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: 28.10.14	25.63	E:235788.7 N:392937.3	6 of 20

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
				30 75 160	Air+Mist (Green)						slightly to moderately weathered PSAMMITE with weak extremely closely to very closely spaced very narrow to narrow bands of very narrowly foliated light greenish grey PHYLLITE. Foliation is shallowly dipping Frequent randomly orientated chlorite veins (up to 2mm thick). Joints are shallowly to steeply dipping closely spaced planar rough open clean. (New Harbour Group - PSAMMITE)	21 J[i]	21		
												22 J[i]			
												23 J[i]		(0.64)	
	100	69	39	NI NI NI							4.79-5.30m : Zone of non-intact core recovered as angular to subrounded fine to coarse gravel and cobble sized fragments of greenish grey psammite and phyllite.			5	
													20.53	5.10	
5.30-6.80 (0:22)											Very weak to weak very narrowly to narrowly banded very narrowly foliated brownish purple slightly to moderately weathered PHYLLITE with very weak to weak very narrow lenticular bands of greenish grey fine to medium grained PSAMMITE. Unit non-intact. (New Harbour Group - PHYLLITE)			(0.25)	
	100	92	51	20 60 110									20.28	5.35	
											Medium strong very narrowly to thinly banded greenish grey fine to medium grained slightly weathered PSAMMITE with				

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
27/10/14	08:30	5.25	1.50	99	4.90
27/10/14	13:47	12.35	1.50	99	5.08
27/10/14	16:45	14.95	1.50	99	6.30
28/10/14	08:30	14.95	1.50	99	4.90
28/10/14	11:00	14.95	1.50	99	-

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Rotary open hole +	**Beretta T44**	**Daniel Price**	**SParkes + RNewbury**	**ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH2**

Contract Ref:	Start: **26.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **28.10.14**	**25.63**	**E:235788.7 N:392937.3**	**7** of **20**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
				20 60 110	Air+Mist (Green)						weak to medium strong extremely closely spaced to closely spaced very narrow to very thin bands of very narrowly foliated light greenish grey and greyish purple PHYLLITE. Foliation is shallowly dipping Frequent randomly orientated ptygmatic chlorite veins (up to 2mm thick). Occasional sub-horizontal to shallowly dipping calcite veins (up to 6mm thick). Foliation fractures are shallowly dipping planar rough open clean. Joints are shallowly to steeply dipping closely to medium spaced planar rough open clean. (New Harbour Group - PSAMMITE) 5.44-5.49m : Zone of non-intact core recovered as subangular to subrounded medium to coarse gravel sized fragments of greenish grey psammite.	24 FF[i] 25 J[i] 26 J[i] 27 J[i] 28 J[i] 29 J[i] 30 J[i]	20	6	
	100	92	51	100 190 300											

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
27/10/14	08:30	5.25	1.50	99	4.90
27/10/14	13:47	12.35	1.50	99	5.08
27/10/14	16:45	14.95	1.50	99	6.30
28/10/14	08:30	14.95	1.50	99	4.90
28/10/14	11:00	14.95	1.50	99	-

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Rotary open hole +	**Beretta T44**	**Daniel Price**	**SParkes + RNewbury**	**ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	RGM-BH2

Contract Ref:	Start: 26.10.14	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: 28.10.14	25.63	E:235788.7 N:392937.3	8 of 20

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
6.80-8.00 (0:20)	100	92	51	100 190 300 80 100 140 10 50 90	Air+Mist (Green)							31 J[i] 32 FF[i] 33 J[i] 34 J[i] 35 J[i] 36 J[i] 37 J[i] 38 J[i] 39 J[i] 40 J[i] 41 J[i] 42 J[i]	19	(2.22)	
	100	94	40	100 140 170	Air+Mist (Green)										

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
27/10/14	08:30	5.25	1.50	99	4.90
27/10/14	13:47	12.35	1.50	99	5.08
27/10/14	16:45	14.95	1.50	99	6.30
28/10/14	08:30	14.95	1.50	99	4.90
28/10/14	11:00	14.95	1.50	99	-

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Rotary open hole +	**Beretta T44**	**Daniel Price**	**SParkes + RNewbury**	**ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH2**

Contract Ref:	Start: **26.10.14** End: **28.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599		**25.63**	**E:235788.7 N:392937.3**	**9** of **20**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
8.00-9.55 (0:23)	100 97	94 94	40 36	100 140 170 70 95 140	Air+Mist (Green)						Weak to medium strong very narrowly to narrowly banded very narrowly foliated greyish purple slightly weathered PHYLLITE with weak to medium strong extremely closely spaced very narrow lenticular bands of greenish grey fine to medium grained PSAMMITE. Foliation is shallowly dipping. Occasional randomly orientated ptygmatic chlorite veins (up to 1mm thick). Foliation fractures are shallowly dipping closely spaced planar rough open clean. (New Harbour Group - PHYLLITE)	43 J[i] 44 J[i] 45 J[i] 46 FF[i] 47 FF[i] 48 FF[i] 49 FF[i] 50 FF[i]	18.06	7.57 18 8 (1.04)	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
27/10/14	08:30	5.25	1.50	99	4.90
27/10/14	13:47	12.35	1.50	99	5.08
27/10/14	16:45	14.95	1.50	99	6.30
28/10/14	08:30	14.95	1.50	99	4.90
28/10/14	11:00	14.95	1.50	99	-

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Rotary open hole +	**Beretta T44**	**Daniel Price**	**SParkes + RNewbury**	**ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	RGM-BH2

Contract Ref:	Start: 26.10.14	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: 28.10.14	25.63	E:235788.7 N:392937.3	10 of 20

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
				20 60 90	Air+Mist (Green/Red)							51 FF[i] 52 FF[i] 53 FF[i] 54 FF[i] 55 FF[i] 56 FF[i]			
	97	94	36	80 100 110								57 J[i] 58 J[i] 59 J[i]	17.02 17	8.61 (0.58)	
				130 210 300							Medium strong thinly banded greenish grey fine to medium grained slightly weathered PSAMMITE with weak to medium strong closely spaced narrow bands of very narrowly foliated greyish purple and PHYLLITE. Foliation is shallowly dipping. Abundant randomly orientated ptygmatic chlorite veins (up to 2mm thick). Joints are shallowly to steeply dipping closely spaced planar rough open clean. (New Harbour Group - PSAMMITE)			9	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
27/10/14	08:30	5.25	1.50	99	4.90
27/10/14	13:47	12.35	1.50	99	5.08
27/10/14	16:45	14.95	1.50	99	6.30
28/10/14	08:30	14.95	1.50	99	4.90
28/10/14	11:00	14.95	1.50	99	-

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Rotary open hole +	**Beretta T44**	**Daniel Price**	**SParkes + RNewbury**	**ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH2**

Contract Ref:	Start: **26.10.14** End: **28.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599		**25.63**	**E:235788.7 N:392937.3**	**11** of **20**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
9.55-10.85 (0:25)	97 100	94 71	36 31	130 210 300	Air+Mist (Green/Red) Air+Mist (Green)						Medium strong very narrowly to narrowly banded very narrowly foliated reddish purple and greyish purple slightly weathered PHYLLITE with medium strong extremely closely to very closely spaced very narrow lenticular bands of greenish grey fine to medium grained PSAMMITE. Foliation is shallowly dipping. Frequent shallowly to steeply dipping quartz veins (up to 10mm thick) occasionally truncated and with small quantities of calcite and rare green malachite present. Abundant ptygmatic chlorite veins up to 1mm within psammite bands. Foliation fractures are shallowly dipping closely to medium spaced planar rough open clean. Joints are shallowly to steeply dipping medium spaced planar rough open clean. (New Harbour Group - PHYLLITE)	60 J[i] 61 J[i] 62 FF[i] 63 FF[i] 64 J[i]	16.44 16	9.19 (0.93)	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
27/10/14	08:30	5.25	1.50	99	4.90
27/10/14	13:47	12.35	1.50	99	5.08
27/10/14	16:45	14.95	1.50	99	6.30
28/10/14	08:30	14.95	1.50	99	4.90
28/10/14	11:00	14.95	1.50	99	-

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	**Inspection pit + Rotary open hole +**	Plant Used:	**Beretta T44**	Drilled By:	**Daniel Price**	Logged By:	**SParkes + RNewbury**	Reviewed By:	**ADingle + ADingle**

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STRUCTURAL SOILS

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH2**

Contract Ref:	Start: **26.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **28.10.14**	**25.63**	**E:235788.7 N:392937.3**	**12** of **20**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
				130 210 300	Air+Mist (Green)						10.06-10.15m : Cavity mineralised with orange Jasper	65 J[i] 66 J[i]	15.51	10.12	
				10 30 60							Medium strong to strong very thinly to medium banded greenish grey fine grained slightly weathered PSAMMITE with medium strong to strong extremely closely to medium spaced very narrow to thin bands of very narrowly foliated purple PHYLLITE. Foliation is shallowly dipping to poor. Pyrite and malachite present within veins. Mineralised calcite abundant within phyllite bands. Frequent randomly orientated calcite veins (up to 6mm thick). Joints are randomly orientated closely to medium spaced generally undulating rough open clean. (New Harbour Group - PSAMMITE) 10.18-10.22m : Scar of dissolved mineral vein containing pyrite and malachite. 10.29-10.42m : Cavity mineralised with orange possible Jasper. 10.47-10.54m : Scar of dissolved mineral vein containing pyrite and probably malachite.	67 J[i] 68 J[i] 69 J[i] 70 J[i] 71 J[i] 72 J[i] 73 J[i]			
	100	71	31												
				120 130 140									15		
				60 140 190							10.69-10.85m : Zone of non-intact core recovered as angular to subrounded fine to coarse gravel and cobble sized fragments of psammite and phyllite.				

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
27/10/14	08:30	5.25	1.50	99	4.90
27/10/14	13:47	12.35	1.50	99	5.08
27/10/14	16:45	14.95	1.50	99	6.30
28/10/14	08:30	14.95	1.50	99	4.90
28/10/14	11:00	14.95	1.50	99	-

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	**Inspection pit + Rotary open hole +**	Plant Used:	**Beretta T44**	Drilled By:	**Daniel Price**	Logged By:	**SParkes + RNewbury**	Reviewed By:	**ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	RGM-BH2

Contract Ref:	Start: 26.10.14	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: 28.10.14	25.63	E:235788.7 N:392937.3	13 of 20

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
10.85-12.35 (0:26)	100	71	31	60 140 190	Air+Mist (Green)							74 J[i]		11	
	100	100	89	300 380 440								75 J[i]		(2.07)	
													14		

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
27/10/14	08:30	5.25	1.50	99	4.90
27/10/14	13:47	12.35	1.50	99	5.08
27/10/14	16:45	14.95	1.50	99	6.30
28/10/14	08:30	14.95	1.50	99	4.90
28/10/14	11:00	14.95	1.50	99	-

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Rotary open hole +	**Beretta T44**	**Daniel Price**	**SParkes + RNewbury**	**ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH2**

Contract Ref:	Start: **26.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **28.10.14**	**25.63**	**E:235788.7 N:392937.3**	**14** of **20**

Mechanical Log						Samples and Testing								
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	No	Type	Results	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
12.35-13.72 (0:28)	100 100	100 85	89 44	300 380 440 10 130 290	Air+Mist (Green) Air+Mist (Green)						Medium strong very thinly to medium banded greenish grey fine and medium grained slightly weathered PSAMMITE with medium strong very closely spaced to closely spaced very narrow to very thin bands of very narrowly foliated greyish purple and light greenish grey PHYLLITE. Foliation is shallowly dipping. Occasional randomly orientated calcite veins (up to 50mm thick). Occasional pyrite within veins. Rare green malachite crystals (up to 1mm thick). Joints are randomly orientated closely to medium spaced generally undulating rough open clean. (New Harbour Group - PSAMMITE) 12.52-12.60m : Visible signs of dissolution of calcite.	76 J[i] 78 J[i] 77 J[i] 79 J[i] 80 J[i]	13.44	12.19 12	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
27/10/14	08:30	5.25	1.50	99	4.90
27/10/14	13:47	12.35	1.50	99	5.08
27/10/14	16:45	14.95	1.50	99	6.30
28/10/14	08:30	14.95	1.50	99	4.90
28/10/14	11:00	14.95	1.50	99	-

General Remarks

13

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Rotary open hole +	**Beretta T44**	**Daniel Price**	**SParkes + RNewbury**	**ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH2**

Contract Ref:	Start: **26.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **28.10.14**	**25.63**	**E:235788.7 N:392937.3**	**15** of **20**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
				10 130 290 30 40 50 10 80 150 70 110 150	Air+Mist (Green)						13.17-13.50m : Pyrite frequently filling veins. 13.47-13.54m : Zone of non-intact core recovered as	81 J[i] 82 J[i] 83 J[i] 84 J[i] 85 J[i] 87 J[i] 86 J[i] 88 J[i] 89 J[i] 90 J[i]	13	13	
	100	85	44												

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
27/10/14	08:30	5.25	1.50	99	4.90
27/10/14	13:47	12.35	1.50	99	5.08
27/10/14	16:45	14.95	1.50	99	6.30
28/10/14	08:30	14.95	1.50	99	4.90
28/10/14	11:00	14.95	1.50	99	-

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Rotary open hole +	**Beretta T44**	**Daniel Price**	**SParkes + RNewbury**	**ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH2**

Contract Ref:	Start: **26.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **28.10.14**	**25.63**	**E:235788.7 N:392937.3**	**16** of **20**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
13.72-14.95 (0:31)	100 90	85 36	44 0	70 130 180 NI NI NI 90 125 210	Air+Mist (Green) Air+Mist (Green)						angular to subrounded coarse gravel size fragments of psammite. 13.72-14.15m : Zone of non-intact core recovered as angular medium to coarse gravel and cobble sized fragments of psammite and phyllite. 14.35-14.56m : Possible minor fault within zone of non-intact core recovered as crushed angular fine to coarse gravel	91 J[i]	12 14	(2.76)	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
27/10/14	08:30	5.25	1.50	99	4.90
27/10/14	13:47	12.35	1.50	99	5.08
27/10/14	16:45	14.95	1.50	99	6.30
28/10/14	08:30	14.95	1.50	99	4.90
28/10/14	11:00	14.95	1.50	99	-

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	**Inspection pit + Rotary open hole +**	Plant Used:	**Beretta T44**	Drilled By:	**Daniel Price**	Logged By:	**SParkes + RNewbury**	Reviewed By:	**ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH2**

Contract Ref:	Start: **26.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **28.10.14**	**25.63**	**E:235788.7 N:392937.3**	**17** of **20**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
	90	36	0	90 125 210 40 60 80	Air+Mist (Green)						sized fragments of psammite and phyllite. 14.38-14.56m : Possible minor fault within zone of non-intact core recovered as crushed angular fine to coarse gravel sized fragments of psammite and phyllite.	92 PF[i] 93 J[i] 94 J[i] 95 J[i] 96 J[i]	11		
											Borehole terminated at 14.95m depth.		10.68	14.95 15	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
27/10/14	08:30	5.25	1.50	99	4.90
27/10/14	13:47	12.35	1.50	99	5.08
27/10/14	16:45	14.95	1.50	99	6.30
28/10/14	08:30	14.95	1.50	99	4.90
28/10/14	11:00	14.95	1.50	99	-

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Rotary open hole +	**Beretta T44**	**Daniel Price**	**SParkes + RNewbury**	**ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:		Client:		Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation		Horizon Nuclear Power Wylfa Limited		RGM-BH2
Contract Ref:	Start: 26.10.14	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: 28.10.14	25.63	E:235788.7 N:392937.3	18 of 20

RGM-BH2 Box 1 1.50m - 3.95m depth





RGM-BH2 Box 2 3.95m - 6.75m depth

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Rotary open hole + Rotary Cored	Beretta T44	Daniel Price	SParkes + RNewbury	ADingle + ADingle

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BOREHOLE LOG

Contract:		Client:		Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation		Horizon Nuclear Power Wylfa Limited		RGM-BH2
Contract Ref:	Start: 26.10.14	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: 28.10.14	25.63	E:235788.7 N:392937.3	19 of 20

RGM-BH2 Box 3 6.75m - 9.45m depth





RGM-BH2 Box 4 9.45m - 12.35m depth

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Rotary open hole + Rotary Cored	Beretta T44	Daniel Price	SParkes + RNewbury	ADingle + ADingle

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH2**

Contract Ref:	Start: **26.10.14** End: **28.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599		**25.63**	**E:235788.7 N:392937.3**	**20** of **20**

RGM-BH2 Box 5 12.35m - 14.95m depth



Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Rotary open hole + Rotary Cored	**Beretta T44**	**Daniel Price**	**SParkes + RNewbury**	**ADingle + ADingle**

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SUMMARY OF DISCONTINUITIES - RGM-BH2

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
1	1.66	J	40	U-R	-	Upper wall rock non intact		New Harbour Group	PSAMMITE
2	1.74-1.84	IcF	90	-	Tight	-		New Harbour Group	PSAMMITE
3	1.85	J	20	P-R	Open	Clean		New Harbour Group	PSAMMITE
4	1.95	J	20	P-R	Open	Clean		New Harbour Group	PSAMMITE
5	2.23	J	20	U-R	Open	Clean		New Harbour Group	PSAMMITE
6	2.24-2.33	IcF	90	-	Tight	-		New Harbour Group	PSAMMITE
7	2.33-2.39	J	70	U-R	Open	Clean		New Harbour Group	PSAMMITE
8	2.34	J	30	U-R	Open	Clean		New Harbour Group	PSAMMITE
9	2.48	J	15	U-R	Open	Clean		New Harbour Group	PSAMMITE
10	2.67	FF	25	P-R	Open	Clean		New Harbour Group	PHYLLITE
11	2.72-2.83	J	75	U-R	Open	Clean		New Harbour Group	PHYLLITE
12	2.75	FF	25	P-R	Open	Clean		New Harbour Group	PHYLLITE
13	2.81	FF	25	U-R	Open	Clean		New Harbour Group	PHYLLITE
14	2.88	FF	30	P-R	Open	Clean		New Harbour Group	PHYLLITE
15	2.96	FF	30	P-R	Open	Clean		New Harbour Group	PHYLLITE
16	3.01	FF	30	P-R	Open	Clean		New Harbour Group	PHYLLITE

Key:
Type codes: FF = Foliation fracture, IcF = Incipient fracture, J = Joint, PF = Possible Fault.
Small-scale roughness codes: P-R = Planar - rough, S-R = Stepped - rough, U-R = Undulating - rough.
Aperture description codes: Open = Open (0.5mm - 2.5mm), Tight = Tight (0.1mm - 0.25mm), Wide = Wide (0.01m - 0.1m).

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The Old School
Stillhouse Lane
Bedminster
Bristol BS3 4EB

Compiled By	Date	Contract Ref:
DFAULKNER	30.1.15	728599

Contract: **Wylfa Newydd Detailed Onshore Ground Investigation**

GINT_LIBRARY_V8_05.GLB : XCUSTOM - SSL - 728599 - DISCONTINUITIES : 728599_LOW_PRIORITY_WYLFA_NEWYDD_DETAILED_ONSHORE_GROUND_INVESTIGATION.GPJ : 30/1/15 12:26 : DF : DI-126

SUMMARY OF DISCONTINUITIES - RGM-BH2

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
17	4.11-4.18	J	60	U-R	Open	Clean		New Harbour Group	PSAMMITE
18	4.34	J	15	U-R	Open	Clean		New Harbour Group	PSAMMITE
19	4.40-4.45	J	35	P-R	-	Clean	Lower wall rock non intact	New Harbour Group	PSAMMITE
20	4.45	J	15	P-R	Open	Clean		New Harbour Group	PSAMMITE
21	4.51-4.56	J	50	P-R	Open	Clean		New Harbour Group	PSAMMITE
22	4.67-4.73	J	35	P-R	Open	Clean		New Harbour Group	PSAMMITE
23	4.76-4.79	J	35	P-R	Open	Clean		New Harbour Group	PSAMMITE
24	5.41	FF	30	P-R	Open	Clean		New Harbour Group	PSAMMITE
25	5.51	J	10	P-R	Open	Clay smear		New Harbour Group	PSAMMITE
26	5.61	J	20	P-R	Open	Clean		New Harbour Group	PSAMMITE
27	5.62	J	15	P-R	Open	Clean		New Harbour Group	PSAMMITE
28	5.69	J	20	P-R	Open	Clean		New Harbour Group	PSAMMITE
29	5.99	J	35	P-R	Open	Clay smear		New Harbour Group	PSAMMITE
30	6.10	J	10	P-R	Open	Clean		New Harbour Group	PSAMMITE
31	6.36	J	5	P-R	Open	Clean		New Harbour Group	PSAMMITE
32	6.46	FF	20	P-R	Open	Clean		New Harbour Group	PSAMMITE

Key:
Type codes: FF = Foliation fracture, IcF = Incipient fracture, J = Joint, PF = Possible Fault.
Small-scale roughness codes: P-R = Planar - rough, S-R = Stepped - rough, U-R = Undulating - rough.
Aperture description codes: Open = Open (0.5mm - 2.5mm), Tight = Tight (0.1mm - 0.25mm), Wide = Wide (0.01m - 0.1m).

SUMMARY OF DISCONTINUITIES - RGM-BH2

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
33	6.54-6.68	J	70	U-R	Open	Clean		New Harbour Group	PSAMMITE
34	6.68	J	25	P-R	Open	Clean		New Harbour Group	PSAMMITE
35	6.76	J	10	P-R	Open	Clean		New Harbour Group	PSAMMITE
36	6.82	J	5	U-R	Open	Clean		New Harbour Group	PSAMMITE
37	6.83-6.88	J	45	P-R	Open	Clean		New Harbour Group	PSAMMITE
38	6.92-6.96	J	40	P-R	Open	Clean		New Harbour Group	PSAMMITE
39	6.92-6.96	J	40	P-R	Open	Clean		New Harbour Group	PSAMMITE
40	6.96-7.00	J	30	U-R	Open	Clean		New Harbour Group	PSAMMITE
41	7.00-7.05	J	45	S-R	Open	Clean		New Harbour Group	PSAMMITE
42	7.10	J	10	U-R	Open	Clay smear	Upper wall rock non intact	New Harbour Group	PSAMMITE
43	7.25-7.30	J	60	P-R	Open	Clean		New Harbour Group	PSAMMITE
44	7.42	J	5	P-R	-	Clean		New Harbour Group	PSAMMITE
45	7.55-7.60	J	35	P-R	Open	Clay smear		New Harbour Group	PSAMMITE
46	7.71	FF	30	P-R	Open	Clean		New Harbour Group	PHYLLITE
47	7.79	FF	25	P-R	Open	Clean		New Harbour Group	PHYLLITE
48	7.93	FF	20	P-R	Open	Clean		New Harbour Group	PHYLLITE

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Aperture description codes: Open = Open (0.5mm - 2.5mm), Tight = Tight (0.1mm - 0.25mm), Wide = Wide (0.01m - 0.1m).

SUMMARY OF DISCONTINUITIES - RGM-BH2

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
49	8.00	FF	30	P-R	Open	Clean		New Harbour Group	PHYLLITE
50	8.09	FF	30	P-R	Open	Clean		New Harbour Group	PHYLLITE
51	8.11	FF	30	P-R	Open	Clay smear		New Harbour Group	PHYLLITE
52	8.17	FF	30	P-R	Open	Clay smear		New Harbour Group	PHYLLITE
53	8.26	FF	30	P-R	Open	Clay smear		New Harbour Group	PHYLLITE
54	8.32	FF	30	P-R	Open	Clay smear		New Harbour Group	PHYLLITE
55	8.42	FF	30	P-R	Open	Clay smear		New Harbour Group	PHYLLITE
56	8.53	FF	30	P-R	Open	Clay smear		New Harbour Group	PHYLLITE
57	8.61	J	35	P-R	Open	Clean		New Harbour Group	PSAMMITE
58	8.71	J	15	P-R	Open	Clean		New Harbour Group	PSAMMITE
59	8.82-8.89	J	50	P-R	Open	Clay smear		New Harbour Group	PSAMMITE
60	9.02	J	25	P-R	Open	Clean		New Harbour Group	PSAMMITE
61	9.24-9.30	J	45	U-R	Open	Clean		New Harbour Group	PHYLLITE
62	9.37	FF	30	P-R	Open	Clean		New Harbour Group	PHYLLITE
63	9.58	FF	25	U-R	Open	Clean		New Harbour Group	PHYLLITE
64	9.88	J	20	P-R	Open	Clean		New Harbour Group	PHYLLITE

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Aperture description codes: Open = Open (0.5mm - 2.5mm), Tight = Tight (0.1mm - 0.25mm), Wide = Wide (0.01m - 0.1m).

SUMMARY OF DISCONTINUITIES - RGM-BH2

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
65	10.06-10.11	J	35	P-R	Open	Clean		New Harbour Group	PHYLLITE
66	10.11	J	15	P-R	Open	Clean		New Harbour Group	PHYLLITE
67	10.13-10.18	J	35	P-R	Open	Clean		New Harbour Group	PSAMMITE
68	10.16-10.23	J	65	U-R	Open	Clean		New Harbour Group	PSAMMITE
69	10.17-10.27	J	50	U-R	Open	Clean		New Harbour Group	PSAMMITE
70	10.23-10.39	J	90	U-R	Open	Clean		New Harbour Group	PSAMMITE
71	10.35-10.44	J	45	U-R	Open	Clean		New Harbour Group	PSAMMITE
72	10.49-10.55	J	15	U-R	Open	Clean		New Harbour Group	PSAMMITE
73	10.63	J	30	P-R	Open	Clean		New Harbour Group	PSAMMITE
74	11.04	J	20	U-R	Open	Clean		New Harbour Group	PSAMMITE
75	11.43	J	25	P-R	Open	Clean		New Harbour Group	PSAMMITE
76	11.73	J	20	U-R	Open	Clean		New Harbour Group	PSAMMITE
77	12.17-12.42	J	85	U-R	Open	Clean		New Harbour Group	PSAMMITE
78	12.18	J	5	U-R	Open	Clean		New Harbour Group	PSAMMITE
79	12.37	J	5	P-R	Open	Clean		New Harbour Group	PSAMMITE
80	12.40	J	20	P-R	Open	Clean		New Harbour Group	PSAMMITE

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Aperture description codes: Open = Open (0.5mm - 2.5mm), Tight = Tight (0.1mm - 0.25mm), Wide = Wide (0.01m - 0.1m).

SUMMARY OF DISCONTINUITIES - RGM-BH2

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
81	12.69	J	10	P-R	Open	Clean		New Harbour Group	PSAMMITE
82	12.72	J	5	P-R	Open	Clean		New Harbour Group	PSAMMITE
83	12.76-12.81	J	30	U-R	Open	Clay smear		New Harbour Group	PSAMMITE
84	12.81	J	5	U-R	Open	Clean		New Harbour Group	PSAMMITE
85	12.96	J	5	P-R	Open	Clean		New Harbour Group	PSAMMITE
86	13.04-13.18	J	70	U-R	Open	Clean		New Harbour Group	PSAMMITE
87	13.05	J	10	U-R	Open	Clean		New Harbour Group	PSAMMITE
88	13.18	J	20	U-R	Open	Clean		New Harbour Group	PSAMMITE
89	13.32-13.38	J	20	U-R	-	Clean	Lower wall rock non intact	New Harbour Group	PSAMMITE
90	13.47	J	5	P-R	Open	Clean		New Harbour Group	PSAMMITE
91	14.26	J	10	S-R	Open	Clean		New Harbour Group	PSAMMITE
92	14.35-14.56	PF	15	U-R	Wide	Crushed fine to coarse gravel sized	Dip angle estimated from optical log.	New Harbour Group	PSAMMITE
						fragments of psammite.			
93	14.56	J	20	P-R	-	brown discolouration	Upper wall rock non intact	New Harbour Group	PSAMMITE
94	14.65	J	30	U-R	Open	Clean		New Harbour Group	PSAMMITE
95	14.69-14.75	J	30	U-R	Open	Clean		New Harbour Group	PSAMMITE

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Aperture description codes: Open = Open (0.5mm - 2.5mm), Tight = Tight (0.1mm - 0.25mm), Wide = Wide (0.01m - 0.1m).

SUMMARY OF DISCONTINUITIES - RGM-BH2

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
96	14.77-14.83	J	35	U-R	Open	Clean		New Harbour Group	PSAMMITE

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Aperture description codes: Open = Open (0.5mm - 2.5mm), Tight = Tight (0.1mm - 0.25mm), Wide = Wide (0.01m - 0.1m).

STRUCTURAL SOILS
The Old School
Stillhouse Lane
Bedminster
Bristol BS3 4EB

Compiled By	Date	Contract Ref:
DFAULKNER	30.1.15	728599

Contract:
Wylfa Newydd Detailed Onshore Ground Investigation

GINT_LIBRARY_V8_05.GLB : XCUSTOM - SSL - 728599 - DISCONTINUITIES : 728599_LOW_PRIORITY_WYLFA_NEWYDD_DETAILED_ONSHORE_GROUND_INVESTIGATION.GPJ : 30/1/15 12:26 : DF : DI-126

SUMMARY OF FAULTS AND POSSIBLE FAULTS - RGM-BH2

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
92	14.35-14.56	PF	15	U-R	Wide	Crushed fine to coarse gravel sized	Dip angle estimated from optical log.	New Harbour Group	PSAMMITE
						fragments of psammite.			

Key:
Type codes: PF = Possible Fault.
Small-scale roughness codes: U-R = Undulating - rough.
Aperture description codes: Wide = Wide (0.01m - 0.1m).

STRUCTURAL SOILS
The Old School
Stillhouse Lane
Bedminster
Bristol BS3 4EB

Compiled By	Date	Contract Ref:
DFAULKNER	**30.1.15**	**728599**

Contract:
Wylfa Newydd Detailed Onshore Ground Investigation

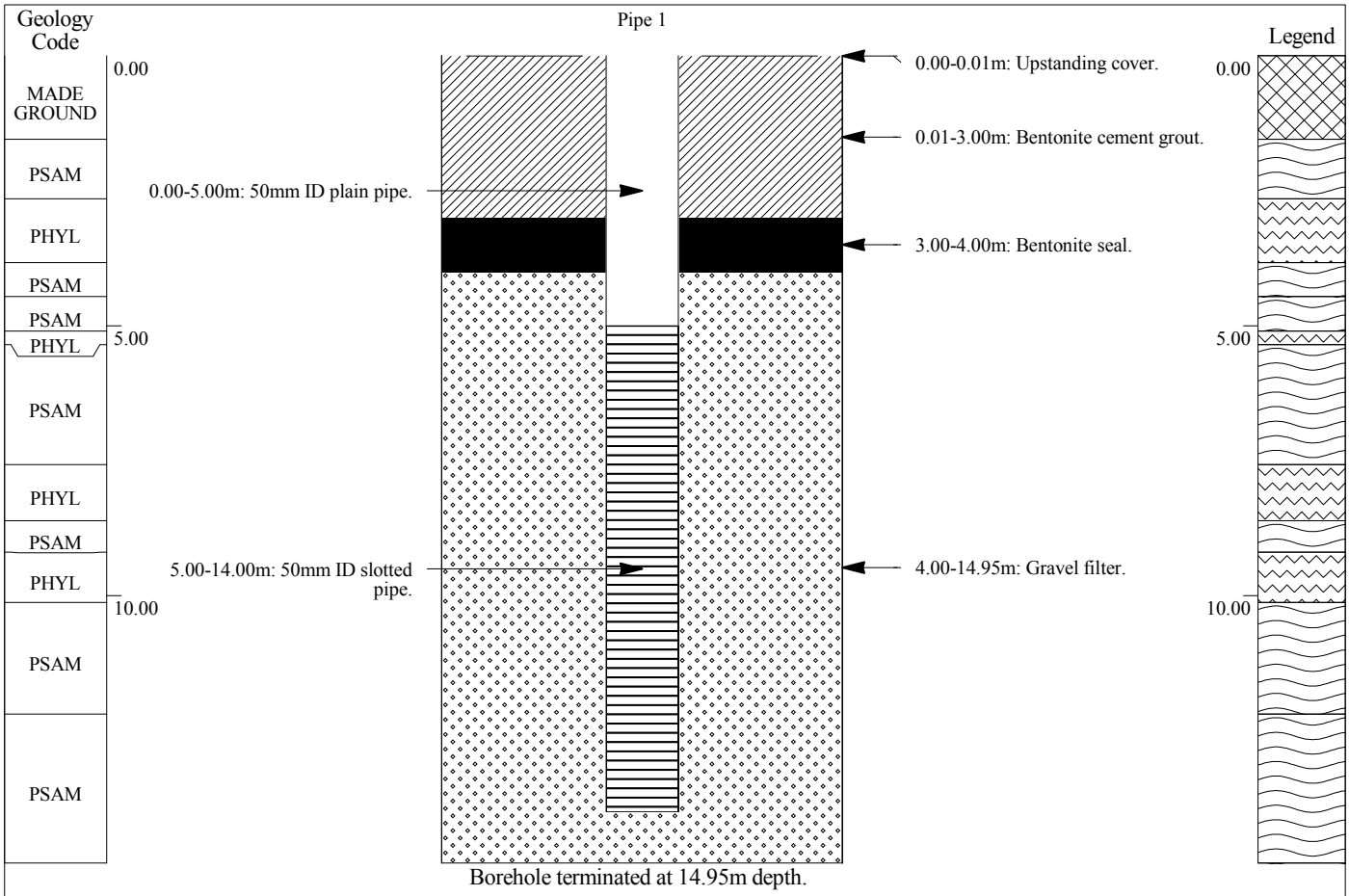
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STRUCTURAL SOILS

[DI-126] - Issued to client for approval

INSTALLATION LOG

Contract:		Client:		Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation		**Horizon Nuclear Power Wylfa Limited**		**RGM-BH2**
Contract Ref:	Start: **26.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **28.10.14**	**25.63**	**E:235788.7 N:392937.3**	**1** of **2**



General Remarks

Geology code details:

MADE GROUND=MADE GROUND, PHYL=PHYLLITE, PSAM=PSAMMITE

1. Location CAT and Genny scanned prior to commencement.
2. Hand dug inspection pit GL to 0.40m depth.(IP)
3. Inspection pit remained stable during excavation.
4. Rotary open hole drilling from 0.40m to 1.55m depth on 26/10/2014.

Note: Graphical representation of well installation is scaled vertically, but exaggerated in the horizontal to aid interpretation.

All dimensions in metres	Installation	Installation	Installed
Scale **1:135**	Date -	Type -	By -

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STRUCTURAL SOILS

[DI-126] - Issued to client for approval

INSTALLATION LOG

Contract:		Client:		Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation		**Horizon Nuclear Power Wylfa Limited**		**RGM-BH2**
Contract Ref:	Start: **26.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **28.10.14**	**25.63**	**E:235788.7 N:392937.3**	**2** of **2**

Geology Code

Pipe 1

Legend

General Remarks

5. Rotary cored drilling from 1.55m to 14.95m depth with air mist flush between 26/10/2014 and 28/10/2014.
6. Groundwater monitoring standpipe installed as shown upon completion.
7. SPT hammer EQU166-2013 (E_r = 80.05%) used.

Note: Graphical representation of well installation is scaled vertically, but exaggerated in the horizontal to aid interpretation.

All dimensions in metres	Installation	Installation	Installed
Scale **1:135**	Date -	Type -	By -

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH4A**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**4.11.14** End: **5.11.14**	**14.84**	**E:234133.3 N:392855.5**	**1** of **4**

Depth	TCR %	SCR %	RQD %	If (mm)	Flush Returns & Details	Drill Time (hh:mm:ss)	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
0.00										Grass over soft brown sandy CLAY. (Topsoil)		14.69	0.15	
										Firm brown orangish brown slightly sandy gravelly CLAY with a low cobble content. (Superficial Deposits - Locally derived lodgement till)		14	(1.05)	
1.00												13.64	1.20	
										Medium dense becoming loose greyish brown slightly clayey GRAVEL with a low cobble content. (Superficial Deposits - Locally derived lodgement till)		13	(1.70)	
2.00					Water (Grey)	(00:15:00)						12		
												11.94	2.90	
3.00										Loose greyish brown GRAVEL. (Superficial Deposits - Locally derived lodgement till)		11	(1.00)	
												10.94	3.90	
4.00										Brownish purple slightly weathered to moderately weathered PHYLLITE. (New Harbour Group - PHYLLITE)			(0.80)	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
04/11/14	16:10	9.90	9.90	146	0.40
05/11/14	08:00	9.90	9.90	146	0.10
05/11/14	13:15	15.90	4.50	146	0.90

General Remarks

1. Location CAT and Genny scanned prior to commencement.
2. Hand dug inspection pit GL to 1.20m depth. (IP)
3. Archaeology pit excavated in same location.
4. Perched water entering inspection pit.
5. Strata unsuitable for Hand Vane tests.
6. Rotary open hole drilling from 1.20m to 4.70m depth on 04/11/2014.
7. Rotary cored drilling from 4.70m to 15.90m depth with water flush between

All dimensions in metres | Scale: **1:25** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Rotary open hole + Rotary Cored	**Unknown**	**Scott Pincher**	**MNaisbitt + MVincent**	**ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH4A**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**4.11.14** End: **5.11.14**	**14.84**	**E:234133.3 N:392855.5**	**2** of **4**

Depth	TCR %	SCR %	RQD %	If (mm)	Flush Returns & Details	Drill Time (hh:mm:ss)	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
					Water (Grey)	(0:05:00)						10.14	4.70	
				NI NI NI	Water (Grey)	(0:10:00)				Recovered non-intact angular fine to coarse gravel and occasional cobble sized greyish green PHYLLITE fragments. (New Harbour Group - PHYLLITE)		10	(0.40)	
5.00												9.74	5.10	
				20 60 100	Water (Grey)	(0:28:00)				Medium strong to strong very narrowly to very thinly banded greenish grey fine to medium grained slightly weathered PSAMMITE with medium strong to strong extremely closely spaced to very closely spaced very narrow to very thin bands of very narrowly foliated greenish grey to greyish brown PHYLLITE. (New Harbour Group - PSAMMITE)				
6.00				260 260 260										
7.00				NI 50 80	Water (Grey)	(0:30:00)							(4.75)	
8.00				110 155 200	Water (Grey)	(0:25:00)								

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
04/11/14	16:10	9.90	9.90	146	0.40
05/11/14	08:00	9.90	9.90	146	0.10
05/11/14	13:15	15.90	4.50	146	0.90

General Remarks

04/11/2014 and 05/11/2014.
8. Groundwater monitoring standpipe installed as shown upon completion.

All dimensions in metres | Scale: **1:25** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Rotary open hole + Rotary Cored	**Unknown**	**Scott Pincher**	**MNaisbitt + MVincent**	**ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH4A**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**4.11.14** End: **5.11.14**	**14.84**	**E:234133.3 N:392855.5**	**3** of **4**

Depth	TCR %	SCR %	RQD %	If (mm)	Flush Returns & Details	Drill Time (hh:mm:ss)	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
9.00				20 30 40	Water (Grey)	(0:25:00)								
				40 110 180						Medium strong to strong very narrowly to narrowly banded very narrowly foliated greenish grey to reddish purple slightly weathered PHYLLITE with medium strong to strong extremely closely spaced to very closely spaced very narrow to very thin bands of greenish grey fine to medium grained PSAMMITE. (New Harbour Group - PHYLLITE)		4.99	9.85	
10.00				25 72 120	Water (Grey)	(0:27:00)						4	10 11 (2.87)	
11.00				NI NI NI										
				80 105 130	Water (Grey)	(0:29:00)						3	12	
12.00				50 107 165										
				70 145 220	Water (Grey)	(0:22:00)				Medium strong to strong very narrowly to very thinly banded greenish grey fine to medium grained slightly weathered PSAMMITE with medium strong to strong extremely closely spaced to very closely spaced very narrow to very thin bands of very narrowly foliated greenish grey PHYLLITE. (New Harbour Group - PSAMMITE)		2.12	12.72	
13.00												2	13	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
04/11/14	16:10	9.90	9.90	146	0.40
05/11/14	08:00	9.90	9.90	146	0.10
05/11/14	13:15	15.90	4.50	146	0.90

General Remarks

All dimensions in metres | Scale: **1:25** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Rotary open hole + Rotary Cored	**Unknown**	**Scott Pincher**	**MNaisbitt + MVincent**	**ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH4A**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**4.11.14** End: **5.11.14**	**14.84**	**E:234133.3 N:392855.5**	**4** of **4**

Mechanical Log: Depth	TCR %	SCR %	RQD %	If (mm)	Flush Returns & Details	Drill Time (hh:mm:ss)	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
14.00				70 145 220 30 40 50 150 150 150 NI NI NI	Water (Grey)	(0:22:00)						1	14 (3.18)	
15.00				50 105 160 20 85 150	Water (Grey)	(0:28:00)				Borehole terminated at 15.90m depth.		0 -1.06	15 15.90	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
04/11/14	16:10	9.90	9.90	146	0.40
05/11/14	08:00	9.90	9.90	146	0.10
05/11/14	13:15	15.90	4.50	146	0.90

General Remarks

All dimensions in metres | Scale: **1:25** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Rotary open hole + Rotary Cored	**Unknown**	**Scott Pincher**	**MNaisbitt + MVincent**	**ADingle + ADingle**

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STRUCTURAL SOILS

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH4A**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**4.11.14** End: **5.11.14**	**14.84**	**E:234133.3 N:392855.5**	**1** of **20**

Mechanical Log						Samples and Testing									
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	No	Type	Results	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
0.00 0.00-0.50 0.00-0.50						1A IP1 RAD1	EW B D				Grass over soft brown sandy CLAY. (Topsoil)			(0.15)	
											Firm brown orangish brown slightly sandy gravelly CLAY with a low cobble content. Gravel is angular to subangular fine to coarse flat and cubic psammite and phyllite. cobbles are similar (up to 150mm diameter). (Superficial Deposits - Locally derived lodgement till)		14.69	0.15	
0.50 0.50-1.00 0.50-1.00					Water (Grey)	IP1 IP2 RAD2	D B D							(1.05)	
													14		

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
04/11/14	16:10	9.90	9.90	146	0.40
05/11/14	08:00	9.90	9.90	146	0.10
05/11/14	13:15	15.90	4.50	146	0.90

General Remarks

1. Location CAT and Genny scanned prior to commencement.
2. Hand dug inspection pit GL to 1.20m depth. (IP)
3. Archaeology pit excavated in same location.
4. Perched water entering inspection pit.
5. Strata unsuitable for Hand Vane tests.
6. Rotary open hole drilling from 1.20m to 4.70m depth on 04/11/2014.
7. Rotary cored drilling from 4.70m to 15.90m depth with water flush between

All dimensions in metres	Scale: **1:5**	Inclination: **Vertical**	Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Rotary open hole + Rotary Cored	**Unknown**	**Scott Pincher**	**MNaisbitt + MVincent**	**ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH4A**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**4.11.14** End: **5.11.14**	**14.84**	**E:234133.3 N:392855.5**	**2** of **20**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
1.00					Water (Grey)	IP2	D				Medium dense becoming loose greyish brown slightly clayey GRAVEL with a low cobble content. Cobbles are subrounded to subangular up to 80mm in diameter Psammite. Gravel is subangular fine to coarse Psammite and phyllite. (Superficial Deposits - Locally derived lodgement till)		13.64	1.20	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
04/11/14	16:10	9.90	9.90	146	0.40
05/11/14	08:00	9.90	9.90	146	0.10
05/11/14	13:15	15.90	4.50	146	0.90

General Remarks

13

04/11/2014 and 05/11/2014.

8. Groundwater monitoring standpipe installed as shown upon completion.

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Rotary open hole + Rotary Cored	**Unknown**	**Scott Pincher**	**MNaisbitt + MVincent**	**ADingle + ADingle**

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STRUCTURAL SOILS

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH4A**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**4.11.14** End: **5.11.14**	**14.84**	**E:234133.3 N:392855.5**	**3** of **20**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
					Water (Grey)								13	(1.70)	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
04/11/14	16:10	9.90	9.90	146	0.40
05/11/14	08:00	9.90	9.90	146	0.10
05/11/14	13:15	15.90	4.50	146	0.90

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Rotary open hole + Rotary Cored	**Unknown**	**Scott Pincher**	**MNaisbitt + MVincent**	**ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH4A**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**4.11.14** End: **5.11.14**	**14.84**	**E:234133.3 N:392855.5**	**4** of **20**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
					Water (Grey)								12		
													11.94	2.90	
											Loose greyish brown GRAVEL. Gravel is subangular fine to medium Phyllite. (Superficial Deposits - Locally derived lodgement till)			3	
														(1.00)	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
04/11/14	16:10	9.90	9.90	146	0.40
05/11/14	08:00	9.90	9.90	146	0.10
05/11/14	13:15	15.90	4.50	146	0.90

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Rotary open hole + Rotary Cored	**Unknown**	**Scott Pincher**	**MNaisbitt + MVincent**	**ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH4A**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**4.11.14** End: **5.11.14**	**14.84**	**E:234133.3 N:392855.5**	**5** of **20**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
					Water (Grey)								11		
													10.94	3.90	
											Brownish purple slightly weathered to moderately weathered PHYLLITE. Recovered as angular cobbles due to chiselling. (New Harbour Group - PHYLLITE)			4	
														(0.80)	
					Water (Grey)										

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
04/11/14	16:10	9.90	9.90	146	0.40
05/11/14	08:00	9.90	9.90	146	0.10
05/11/14	13:15	15.90	4.50	146	0.90

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Rotary open hole + Rotary Cored	**Unknown**	**Scott Pincher**	**MNaisbitt + MVincent**	**ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH4A**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**4.11.14** End: **5.11.14**	**14.84**	**E:234133.3 N:392855.5**	**6** of **20**

Depth	Mechanical Log: TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Samples and Testing: No	Type	Results	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
					Water (Grey)								10.14	4.70	
4.70-5.30 (0:10)	100	30	0	NI NI NI	Water (Grey)						Recovered non-intact angular fine to coarse gravel and occasional cobble sized greyish green PHYLLITE fragments. Fragments appear slightly weathered. (New Harbour Group - PHYLLITE)		10	(0.40)	
5.30-6.80 (0:28)	100	57	16	20 60 100	Water (Grey)						Medium strong to strong very narrowly to very thinly banded greenish grey fine to medium grained slightly weathered PSAMMITE with medium strong to strong extremely closely spaced to very closely spaced very narrow to very thin bands of very narrowly foliated greenish grey to greyish brown PHYLLITE. Foliation is sub-horizontal to shallowly dipping. Occasional shallowly to steeply dipping ptygmatic green chlorite veins. Occasional shallowly to steeply dipping lenticular calcite veins locally concentrated in psammite bands. Foliation fractures are shallowly dipping rarely sub-horizontal closely to medium spaced locally very closely spaced undulating smooth locally rough partly open to open localised yellow brown stain and rare fine gravel size		9.74	5.10	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
04/11/14	16:10	9.90	9.90	146	0.40
05/11/14	08:00	9.90	9.90	146	0.10
05/11/14	13:15	15.90	4.50	146	0.90

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Rotary open hole + Rotary Cored	**Unknown**	**Scott Pincher**	**MNaisbitt + MVincent**	**ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH4A**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**4.11.14** End: **5.11.14**	**14.84**	**E:234133.3 N:392855.5**	**7** of **20**

Mechanical Log						Samples and Testing								
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	No	Type	Results	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
	100	57	16	20 60 100	Water (Grey)						phyllite fragments. Joints are steeply dipping to sub-vertical closely spaced to widely spaced undulating rough and smooth open reddish brown/yellow brown staining. Possible minor fault at 5.69m depth. (New Harbour Group - PSAMMITE) 5.10m : Shallowly dipping sub-parallel quartz veins (<5mm wide). 5.60-5.87m : Possible minor fault. Shallowy dipping (15°) undulating rough moderately wide with soft light grey clay gouge (<2mm thick) and lenticular void (<10mm wide) adjacent. 6.00-6.40m : Steeply dipping lenticular dissolution voids formed along extremely closely spaced steeply dipping incipient joints with localised soft light grey clay possible gouge infill, occasional fine gravel sized phyllite fragments.	1 J[i] 2 J[i] 3 FF[i] 4 FF[i] 5 FF[i] 6 FF[i] 7 FF[i] 8 FF[i] 9 FF[i] 10 J[i] 11 FF[i] 12 FF[i] 13 FF[i] 14 J[i]	9	6	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
04/11/14	16:10	9.90	9.90	146	0.40
05/11/14	08:00	9.90	9.90	146	0.10
05/11/14	13:15	15.90	4.50	146	0.90

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Rotary open hole + Rotary Cored	**Unknown**	**Scott Pincher**	**MNaisbitt + MVincent**	**ADingle + ADingle**

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STRUCTURAL SOILS

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH4A**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**4.11.14** End: **5.11.14**	**14.84**	**E:234133.3 N:392855.5**	**8** of **20**

Depth	Mechanical Log: TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Samples and Testing: No	Type	Results	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
6.80-8.30 (0:30)	100	57	16	20 60 100 260 260 260	Water (Grey)						6.60-6.80m : Shallowly to steeply dipping lenticular calcite veins with localised en-echelon fabric. 6.80-7.40m : Recovered predominately non-intact as angular fine to coarse psammite/phyllite fragments. Fracture inclination hard to discern.	15 J[i] 16 FF[i] 17 FF[i] 18 J[i]	8	7	
	100	63	45	NI 50 80	Water (Grey)										

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
04/11/14	16:10	9.90	9.90	146	0.40
05/11/14	08:00	9.90	9.90	146	0.10
05/11/14	13:15	15.90	4.50	146	0.90

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Rotary open hole + Rotary Cored	**Unknown**	**Scott Pincher**	**MNaisbitt + MVincent**	**ADingle + ADingle**

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STRUCTURAL SOILS

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH4A**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**4.11.14** End: **5.11.14**	**14.84**	**E:234133.3 N:392855.5**	**9** of **20**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
				NI 50 80											
	100	63	45		Water (Grey)						7.40-7.53m : Steeply dipping micro-fault displacing steeply dipping irregular quartz vein(<4mm wide)			(4.75)	
				110 155 200							7.70-7.98m : Occasional shallowly to steeply dipping lenticular calcite veins (<3mm wide) concentrated locally within psammite band.	19 FF[i] 20 FF[i] 21 FF[i]	7 8		

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
04/11/14	16:10	9.90	9.90	146	0.40
05/11/14	08:00	9.90	9.90	146	0.10
05/11/14	13:15	15.90	4.50	146	0.90

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Rotary open hole + Rotary Cored	**Unknown**	**Scott Pincher**	**MNaisbitt + MVincent**	**ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH4A**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**4.11.14** End: **5.11.14**	**14.84**	**E:234133.3 N:392855.5**	**10** of **20**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
8.30-9.90 (0:25)	100	63	45	110 155 200	Water (Grey)						8.15-8.25m : Occasional steeply dipping incipient joints with localised partly open to open lenticular voids with quartz infill.	23 FF[i] 22 J[i]			
	100	84	47	20 30 40	Water (Grey)						8.43-8.60m : Occasional steeply dipping lenticular calcite veins (<5mm wide) locally concentrated within psammite bands. 8.84-9.24m : Zone of extremely closely spaced shallowly dipping to steeply dipping incipient fractures occasional intersecting. 8.86-9.20m : 2 no. Steeply dipping thin quartz/calcite veins (<5mm wide) with occasional open lenticular dissolution voids.	24 FF[i] 25 FF[i] 26 FF[i] 27 FF[i] 28 J[i]	6	9	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
04/11/14	16:10	9.90	9.90	146	0.40
05/11/14	08:00	9.90	9.90	146	0.10
05/11/14	13:15	15.90	4.50	146	0.90

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Rotary open hole + Rotary Cored	**Unknown**	**Scott Pincher**	**MNaisbitt + MVincent**	**ADingle + ADingle**

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STRUCTURAL SOILS

[DI-126] - Issued to client for approval

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH4A**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**4.11.14** End: **5.11.14**	**14.84**	**E:234133.3 N:392855.5**	**11** of **20**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
	100	84	47	20 30 40 40 110 180	Water (Grey)						Medium strong to strong very narrowly to narrowly banded very narrowly foliated greenish grey to reddish purple slightly	29 FF[i] 30 J[i] 31 FF[i] 32 J[i] 33 FF[i] 34 FF[i] 35 FF[i]	4.99	9.85	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
04/11/14	16:10	9.90	9.90	146	0.40
05/11/14	08:00	9.90	9.90	146	0.10
05/11/14	13:15	15.90	4.50	146	0.90

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Rotary open hole + Rotary Cored	**Unknown**	**Scott Pincher**	**MNaisbitt + MVincent**	**ADingle + ADingle**

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH4A**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**4.11.14** End: **5.11.14**	**14.84**	**E:234133.3 N:392855.5**	**12** of **20**

Depth	Mechanical Log: TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Samples and Testing: No	Type	Results	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
9.90-11.30 (0:27)	100	75	34	40 110 180 25 72 120	Water (Grey)						weathered PHYLLITE with medium strong to strong extremely closely spaced to very closely spaced very narrow to very thin bands of greenish grey fine to medium grained PSAMMITE. Foliation is sub-horizontal to shallowly dipping. Occasional to locally frequent shallowly to steeply dipping ptygmatic green chlorite veins. Occasional shallowly to steeply dipping lenticular calcite veins locally concentrated within psammite bands. Foliation fractures are sub-horizontal to shallowly dipping very closely to closely spaced undulating smooth locally rough open yellow brown staining. Joints are steeply dipping medium to widely spaced locally closely spaced undulating rough and smooth partly open to open brown staining quartz traces. (New Harbour Group - PHYLLITE)	36 J[i] 37 FF[i] 38 FF[i] 39 FF[i] 41 FF[i] 40 J[i] 42 FF[i] 43 FF[i] 44 FF[i] 45 FF[i] 46 FF[i] 47 FF[i] 48 FF[i] 49 J[i]		10	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
04/11/14	16:10	9.90	9.90	146	0.40
05/11/14	08:00	9.90	9.90	146	0.10
05/11/14	13:15	15.90	4.50	146	0.90

General Remarks

4

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Rotary open hole + Rotary Cored	**Unknown**	**Scott Pincher**	**MNaisbitt + MVincent**	**ADingle + ADingle**

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STRUCTURAL SOILS

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH4A**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**4.11.14** End: **5.11.14**	**14.84**	**E:234133.3 N:392855.5**	**13** of **20**

Depth	Mechanical Log: TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Samples and Testing: No	Type	Results	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
11.30-12.90 (0:29)	100	75	34	25 72 120	Water (Grey)						11.30-11.55m : Non-intact recovered as angular coarse phyllite/psammite gravel fragments.	50 J 51 FF[i] 52 J[i] 53 FF[i] 54 J[i]	4	11 (2.87)	
	100	77	58	NI NI NI	Water (Grey)										
				80 105 130											

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
04/11/14	16:10	9.90	9.90	146	0.40
05/11/14	08:00	9.90	9.90	146	0.10
05/11/14	13:15	15.90	4.50	146	0.90

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Rotary open hole + Rotary Cored	**Unknown**	**Scott Pincher**	**MNaisbitt + MVincent**	**ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH4A**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**4.11.14** End: **5.11.14**	**14.84**	**E:234133.3 N:392855.5**	**14** of **20**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
	100	77	58	80 105 130 50 107 165 70 145 220	Water (Grey)						11.90-12.40m : Occasional shallowly to steeply dipping branching lenticular calcite veins (<2mm wide) with localised minor micro-faults displaying sinistral displacement.	55 FF[i] 56 FF[i] 57 FF[i] 58 FF[i] 59 FF[i] 60 IcF[i] 61 FF[i] 62 J[i]	3	12	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
04/11/14	16:10	9.90	9.90	146	0.40
05/11/14	08:00	9.90	9.90	146	0.10
05/11/14	13:15	15.90	4.50	146	0.90

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Rotary open hole + Rotary Cored	**Unknown**	**Scott Pincher**	**MNaisbitt + MVincent**	**ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH4A**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**4.11.14** End: **5.11.14**	**14.84**	**E:234133.3 N:392855.5**	**15** of **20**

Mechanical Log						Samples and Testing							
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	No	Type	Results	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
12.90-14.30 (0:22)	100	77	58	70 145 220	Water (Grey)						Medium strong to strong very narrowly to very thinly banded greenish grey fine to medium grained slightly weathered PSAMMITE with medium strong to strong extremely closely spaced to very closely spaced very narrow to very thin bands of very narrowly foliated greenish grey PHYLLITE. Foliation is sub-horizontal to shallowly dipping. Occasional shallowly to steeply dipping ptygmatic green chlorite veins. Occasional shallowly to steeply dipping thin lenticular calcite veins locally concentrated within psammite bands. Occasional isolated lenses of calcite. Foliation fractures are shallowly dipping closely to medium spaced locally very closely spaced undulating smooth locally striated open red brown stain occasional localised clay traces and fine gravel size phyllite fragments. Joints are shallowly dipping to sub-vertical undulating rough and smooth open black staining. (New Harbour Group - PSAMMITE) 13.30-13.33m : Occasional shallowly dipping thin calcite veins locally within psammite band.	63 FF[i] 64 J[i] 65 FF[i] 66 FF[i] 67 FF[i] 68 J[i] 70 J[i]	2.12 2	12.72 13	
	100	89	71		Water (Grey)										

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
04/11/14	16:10	9.90	9.90	146	0.40
05/11/14	08:00	9.90	9.90	146	0.10
05/11/14	13:15	15.90	4.50	146	0.90

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Rotary open hole + Rotary Cored	**Unknown**	**Scott Pincher**	**MNaisbitt + MVincent**	**ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH4A**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**4.11.14** End: **5.11.14**	**14.84**	**E:234133.3 N:392855.5**	**16** of **20**

Mechanical Log						Samples and Testing							
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	No	Type	Results	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
				70 145 220								69 IcF[i] 71 J[i]			
	100	89	71		Water (Grey)							72 FF[i]	1		
				30 40 50								73 J[i] 74 J[i]		14	
				150 150 150								75 J[i] 76 FF[i]			
												77 FF[i]			
14.30-15.90 (0:28)	100	83	53	NI NI NI	Water (Grey)						14.25-14.30m : Steeply dipping calcite vein (2mm wide). 14.30-14.50m : Non-intact recovered as coarse angular psammite/phyllite gravel.			(3.18)	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
04/11/14	16:10	9.90	9.90	146	0.40
05/11/14	08:00	9.90	9.90	146	0.10
05/11/14	13:15	15.90	4.50	146	0.90

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Rotary open hole + Rotary Cored	**Unknown**	**Scott Pincher**	**MNaisbitt + MVincent**	**ADingle + ADingle**

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH4A**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**4.11.14** End: **5.11.14**	**14.84**	**E:234133.3 N:392855.5**	**17** of **20**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
				NI NI NI							14.50-14.80m : Occasional shallowly to steeply dipping lenticular calcite veins (<5mm wide) locally within psammite bands.	78 FF[i] 79 J[i] 80 FF[i] 81 FF[i]	0	15	
	100	83	53	50 105 160	Water (Grey)										

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
04/11/14	16:10	9.90	9.90	146	0.40
05/11/14	08:00	9.90	9.90	146	0.10
05/11/14	13:15	15.90	4.50	146	0.90

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Rotary open hole + Rotary Cored	**Unknown**	**Scott Pincher**	**MNaisbitt + MVincent**	**ADingle + ADingle**

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH4A**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**4.11.14** End: **5.11.14**	**14.84**	**E:234133.3 N:392855.5**	**18** of **20**

Mechanical Log						Samples and Testing								
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	No	Type	Results	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
	100	83	53	20 85 150	Water (Grey)						15.75-15.90m : Rare shallowly to steeply dipping thin calcite veins (<1mm wide).	82 FF[i] 83 FF[i] 84 FF[i] 85 FF[i]	-1		
											Borehole terminated at 15.90m depth.		-1.06	15.90	
														16	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
04/11/14	16:10	9.90	9.90	146	0.40
05/11/14	08:00	9.90	9.90	146	0.10
05/11/14	13:15	15.90	4.50	146	0.90

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Rotary open hole + Rotary Cored	**Unknown**	**Scott Pincher**	**MNaisbitt + MVincent**	**ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:		Client:		Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation		**Horizon Nuclear Power Wylfa Limited**		**RGM-BH4A**
Contract Ref:	Start: **4.11.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **5.11.14**	**14.84**	**E:234133.3 N:392855.5**	**19** of **20**

RGM-BH4A Box 1-2 4.70m - 6.80m depth





RGM-BH4A Box 3-4 6.80m - 9.90m depth

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Rotary open hole + Rotary Cored	**Unknown**	**Scott Pincher**	**MNaisbitt + MVincent**	**ADingle + ADingle**

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BOREHOLE LOG

Contract:		Client:		Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation		**Horizon Nuclear Power Wylfa Limited**		**RGM-BH4A**
Contract Ref:	Start: **4.11.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **5.11.14**	**14.84**	**E:234133.3 N:392855.5**	**20** of **20**

RGM-BH4A Box 5-6 9.90m - 12.90m depth





RGM-BH4A Box 7-8 12.90m - 15.90m depth

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Rotary open hole + Rotary Cored	**Unknown**	**Scott Pincher**	**MNaisbitt + MVincent**	**ADingle + ADingle**

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SUMMARY OF DISCONTINUITIES - RGM-BH4A

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
1	5.40	J	40	U-SM	Open	Yellow brown staining		New Harbour Group	PSAMMITE
2	5.44	J	40	U-SM	Open	Reddish brown staining		New Harbour Group	PSAMMITE
3	5.53	FF	30	U-SM	Open	Clean		New Harbour Group	PSAMMITE
4	5.59	FF	30	U-SM	Open	Localised brown staining/exiting calcite		New Harbour Group	PSAMMITE
						veins			
5	5.69	PF	15	U-R	Moderately wide	Soft light grey clay gouge (<2mm		New Harbour Group	PSAMMITE
						thick).			
6	5.75	FF	30	U-SM	Open	Clean		New Harbour Group	PSAMMITE
7	5.81	FF	30	U-SM	Partly open	Light yellow brown staining		New Harbour Group	PSAMMITE
8	5.84	FF	30	U-SM	Partly open	Yellow brown staining		New Harbour Group	PSAMMITE
9	5.86	FF	30	U-SM	Partly open	Clean		New Harbour Group	PSAMMITE
10	5.87-5.92	J	60	S-R	Open	Black brown staining		New Harbour Group	PSAMMITE
11	6.00	FF	10	U-SM	Tight	Clean		New Harbour Group	PSAMMITE
12	6.08	FF	5	U-R	Partly open	Exiting quartz vein		New Harbour Group	PSAMMITE
13	6.14	FF	15	U-R	Partly open	Clean		New Harbour Group	PSAMMITE
14	6.15-6.25	J	60	U-R	Open	Yellow brown staining		New Harbour Group	PSAMMITE

Key:
Type codes: FF = Foliation fracture, IcF = Incipient fracture, J = Joint, PF = Possible Fault.
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Aperture description codes: Moderately wide = Moderately wide (2.5mm - 10mm), Open = Open (0.5mm - 2.5mm), Partly open = Partly open (0.25mm - 0.5mm), Tight = Tight (0.1mm - 0.25mm).

STRUCTURAL SOILS
The Old School
Stillhouse Lane
Bedminster
Bristol BS3 4EB

Compiled By: [redacted] JTAYLOR

Date: 29.1.15

Contract Ref: 728599

Contract: Wylfa Newydd Detailed Onshore Ground Investigation

GINT_LIBRARY_V8_05.GLB : XCUSTOM - SSL - 728599 - DISCONTINUITIES : 728599_LOW_PRIORITY_WYLFA_NEWYDD_DETAILED_ONSHORE_GROUND_INVESTIGATION.GPJ : 29/1/15 18:55 : JT : DI-126

SUMMARY OF DISCONTINUITIES - RGM-BH4A

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
15	6.25-6.48	J	60	U-R	Open	Reddish yellow brown staining		New Harbour Group	PSAMMITE
16	6.48	FF	30	U-SM	Open	Clean		New Harbour Group	PSAMMITE
17	6.55	FF	25	U-SM	Open	Minor yellow brown staining/fine gravel		New Harbour Group	PSAMMITE
						sized phyllite fragments			
18	6.56-6.61	J	80	U-R	Partly open	Black brown staining		New Harbour Group	PSAMMITE
19	7.61	FF	35	U-SM	Open	Exiting quartz calcite veins/calcite		New Harbour Group	PSAMMITE
						traces			
20	7.77	FF	35	U-SM	Open	Clean		New Harbour Group	PSAMMITE
21	7.95	FF	35	U-SM	Open	Clean		New Harbour Group	PSAMMITE
22	8.10-8.25	J	55	U-R	Open	Reddish yellow brown staining/exiting		New Harbour Group	PSAMMITE
						quartz calcite veins			
23	8.11	FF	35	U-SM	Open	Fine gravel sized phyllite fragments		New Harbour Group	PSAMMITE
24	8.40	FF	40	U-SM	Partly open	Clay traces		New Harbour Group	PSAMMITE
25	8.60	FF	40	U-SM	Partly open	Clean		New Harbour Group	PSAMMITE
26	8.66	FF	40	U-SM	Open	Clean		New Harbour Group	PSAMMITE
27	8.84	FF	40	U-SM	Open	Clean		New Harbour Group	PSAMMITE

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Type codes: FF = Foliation fracture, IcF = Incipient fracture, J = Joint, PF = Possible Fault.
Small-scale roughness codes: S-R = Stepped - rough, U-R = Undulating - rough, U-SM = Undulating - smooth.
Aperture description codes: Moderately wide = Moderately wide (2.5mm - 10mm), Open = Open (0.5mm - 2.5mm), Partly open = Partly open (0.25mm - 0.5mm), Tight = Tight (0.1mm - 0.25mm).

SUMMARY OF DISCONTINUITIES - RGM-BH4A

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
28	8.90-9.00	J	55	U-R	Open	Clean		New Harbour Group	PSAMMITE
29	9.03-9.20	FF	40	U-R	Open	Black brown staining		New Harbour Group	PSAMMITE
30	9.13-9.23	J	55	U-SM	Open	Clean		New Harbour Group	PSAMMITE
31	9.22-9.30	FF	40	U-R	Open	Clean		New Harbour Group	PSAMMITE
32	9.30-9.42	J	50	U-SM	Open	Black brown staining		New Harbour Group	PSAMMITE
33	9.50	FF	40	U-SM	Partly open	Clean locally stepped		New Harbour Group	PSAMMITE
34	9.60	FF	40	U-SM	Open	Clean locally stepped		New Harbour Group	PSAMMITE
35	9.79	FF	30	U-SM	Partly open	Exiting calcite vein/striae locally		New Harbour Group	PSAMMITE
						stepped			
36	10.02	J	50	U-SM	Partly open	Thin clay traces/localised yellow brown		New Harbour Group	PHYLLITE
						staining			
37	10.08	FF	35	U-SM	Open	Localised reddish brown staining		New Harbour Group	PHYLLITE
38	10.12	FF	35	U-SM	Open	Reddish yellow brown staining		New Harbour Group	PHYLLITE
39	10.15	FF	35	U-SM	Open	Grey brown staining exiting incipient		New Harbour Group	PHYLLITE
						quartz veins			
40	10.16-10.29	J	75	U-R	Open	Grey brown staining/quartz traces		New Harbour Group	PHYLLITE

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Aperture description codes: Moderately wide = Moderately wide (2.5mm - 10mm), Open = Open (0.5mm - 2.5mm), Partly open = Partly open (0.25mm - 0.5mm), Tight = Tight (0.1mm - 0.25mm).

SUMMARY OF DISCONTINUITIES - RGM-BH4A

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
41	10.22	FF	10	U-SM	Open	Clean		New Harbour Group	PHYLLITE
42	10.34	FF	35	U-SM	Moderately wide	Clean		New Harbour Group	PHYLLITE
43	10.42	FF	35	U-SM	Open	Clean		New Harbour Group	PHYLLITE
44	10.47	FF	35	U-SM	Open	Clean		New Harbour Group	PHYLLITE
45	10.57	FF	35	U-SM	Open	Localised black staining		New Harbour Group	PHYLLITE
46	10.59	FF	30	U-SM	Open	Localised black staining		New Harbour Group	PHYLLITE
47	10.66	FF	35	U-SM	Open	Clean		New Harbour Group	PHYLLITE
48	10.68	FF	15	U-SM	Open	Reddish brown staining		New Harbour Group	PHYLLITE
49	10.74-10.79	J	65	U-R	Partly open	Calcite veins localised yellow brown		New Harbour Group	PHYLLITE
						staining.			
50	10.89	J	5	U-R	Open	-		New Harbour Group	PHYLLITE
51	10.93	FF	40	U-SM	Open	Clean		New Harbour Group	PHYLLITE
52	10.98-11.06	J	55	U-R	Partly open	Reddish brown staining exiting calcite		New Harbour Group	PHYLLITE
						vein			
53	11.06	FF	30	U-R	Open	Clay traces/fine gravel sized phyllite		New Harbour Group	PHYLLITE
						fragments			

Key:
Type codes: FF = Foliation fracture, IcF = Incipient fracture, J = Joint, PF = Possible Fault.
Small-scale roughness codes: S-R = Stepped - rough, U-R = Undulating - rough, U-SM = Undulating - smooth.
Aperture description codes: Moderately wide = Moderately wide (2.5mm - 10mm), Open = Open (0.5mm - 2.5mm), Partly open = Partly open (0.25mm - 0.5mm), Tight = Tight (0.1mm - 0.25mm).

SUMMARY OF DISCONTINUITIES - RGM-BH4A

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
54	11.08-11.15	J	45	U-R	Partly open	Reddish brown staining		New Harbour Group	PHYLLITE
55	11.70	FF	15	U-SM	Open	Clean		New Harbour Group	PHYLLITE
56	11.83	FF	15	U-SM	Open	Clean		New Harbour Group	PHYLLITE
57	11.94	FF	15	U-SM	Open	Clean localised striae		New Harbour Group	PHYLLITE
58	12.01	FF	15	U-SM	Open	Localised brown black staining		New Harbour Group	PHYLLITE
59	12.14	FF	15	U-R	Open	Localised dark brown staining/striae		New Harbour Group	PHYLLITE
60	12.19	IcF	15	U-SM	Moderately wide	Clean		New Harbour Group	PHYLLITE
61	12.33	FF	15	U-SM	Open	Clean		New Harbour Group	PHYLLITE
62	12.40-12.51	J	50	U-SM	Open	Greyish brown staining/polished		New Harbour Group	PHYLLITE
						striae/fine gravel sized phyllite			
						fragments.			
63	12.64	FF	25	U-SM	Partly open	Clean		New Harbour Group	PHYLLITE
64	12.90-12.98	J	55	S-R	Partly open	Yellow brown staining		New Harbour Group	PSAMMITE
65	12.98	FF	25	U-SM	Partly open	Clean locally stepped striae		New Harbour Group	PSAMMITE
66	13.20	FF	25	U-SM	Partly open	Clean locally stepped		New Harbour Group	PSAMMITE
67	13.22	FF	30	U-SM	Open	Clean		New Harbour Group	PSAMMITE

Key:
Type codes: FF = Foliation fracture, IcF = Incipient fracture, J = Joint, PF = Possible Fault.
Small-scale roughness codes: S-R = Stepped - rough, U-R = Undulating - rough, U-SM = Undulating - smooth.
Aperture description codes: Moderately wide = Moderately wide (2.5mm - 10mm), Open = Open (0.5mm - 2.5mm), Partly open = Partly open (0.25mm - 0.5mm), Tight = Tight (0.1mm - 0.25mm).

SUMMARY OF DISCONTINUITIES - RGM-BH4A

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
68	13.23-13.53	J	80	U-R	Open	Light reddish brown staining locally		New Harbour Group	PSAMMITE
						stepped			
69	13.44-13.59	IcF	80	U-R	Tight	Strong reddish brown staining		New Harbour Group	PSAMMITE
70	13.47	J	30	U-SM	Partly open	Localised yellow brown and black		New Harbour Group	PSAMMITE
						staining exiting incipient fractures			
71	13.53-13.59	J	35	U-R	Partly open	Clean		New Harbour Group	PSAMMITE
72	13.80	FF	25	U-SM	Open	Localised reddish clay traces		New Harbour Group	PSAMMITE
73	13.95	J	20	U-SM	Open	Yellow brown staining/minute brown		New Harbour Group	PSAMMITE
						specks/striae.			
74	13.96-14.02	J	20	U-R	Open	Minor localised yellow brown		New Harbour Group	PSAMMITE
						staining/striae			
75	14.00-14.11	J	55	U-SM	Open	Localized black staining/polished striae		New Harbour Group	PSAMMITE
76	14.07	FF	20	U-SM	Open	Fine gravel sized phyllite		New Harbour Group	PSAMMITE
						fragments/locally stepped striae			
77	14.23	FF	20	U-SM	Open	Clean locally striated		New Harbour Group	PSAMMITE
78	14.64	FF	38	U-SM	Open	Clean		New Harbour Group	PSAMMITE

Key:
Type codes: FF = Foliation fracture, IcF = Incipient fracture, J = Joint, PF = Possible Fault.
Small-scale roughness codes: S-R = Stepped - rough, U-R = Undulating - rough, U-SM = Undulating - smooth.
Aperture description codes: Moderately wide = Moderately wide (2.5mm - 10mm), Open = Open (0.5mm - 2.5mm), Partly open = Partly open (0.25mm - 0.5mm), Tight = Tight (0.1mm - 0.25mm).

SUMMARY OF DISCONTINUITIES - RGM-BH4A

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
79	14.71	J	20	U-SM	Open	Localised minor yellow brown staining		New Harbour Group	PSAMMITE
80	14.86	FF	20	U-SM	Open	Thin clay traces/strong yellow brown		New Harbour Group	PSAMMITE
						staining			
81	14.96	FF	30	U-SM	Open	Localised minor red brown		New Harbour Group	PSAMMITE
						staining/locally stepped			
82	15.30	FF	30	U-SM	Open	Localised black staining		New Harbour Group	PSAMMITE
83	15.44	FF	30	U-SM	Moderately wide	Powdered clay traces		New Harbour Group	PSAMMITE
84	15.51	FF	30	U-SM	Open	Thin clay traces		New Harbour Group	PSAMMITE
85	15.60	FF	30	U-SM	Open	Thin clay traces/fine gravel sized		New Harbour Group	PSAMMITE
						phyllite fragments			

Key:
Type codes: FF = Foliation fracture, IcF = Incipient fracture, J = Joint, PF = Possible Fault.
Small-scale roughness codes: S-R = Stepped - rough, U-R = Undulating - rough, U-SM = Undulating - smooth.
Aperture description codes: Moderately wide = Moderately wide (2.5mm - 10mm), Open = Open (0.5mm - 2.5mm), Partly open = Partly open (0.25mm - 0.5mm), Tight = Tight (0.1mm - 0.25mm).

STRUCTURAL SOILS
The Old School
Stillhouse Lane
Bedminster
Bristol BS3 4EB

Compiled By: [redacted] JTAYLOR

Date: 29.1.15

Contract Ref: 728599

Contract: Wylfa Newydd Detailed Onshore Ground Investigation

AGS

SUMMARY OF FAULTS AND POSSIBLE FAULTS - RGM-BH4A

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
5	5.69	PF	15	U-R	Moderately wide	Soft light grey clay gouge (<2mm		New Harbour Group	PSAMMITE
						thick).			

Key:
Type codes: PF = Possible Fault.
Small-scale roughness codes: U-R = Undulating - rough.
Aperture description codes: Moderately wide = Moderately wide (2.5mm - 10mm).

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Bristol BS3 4EB

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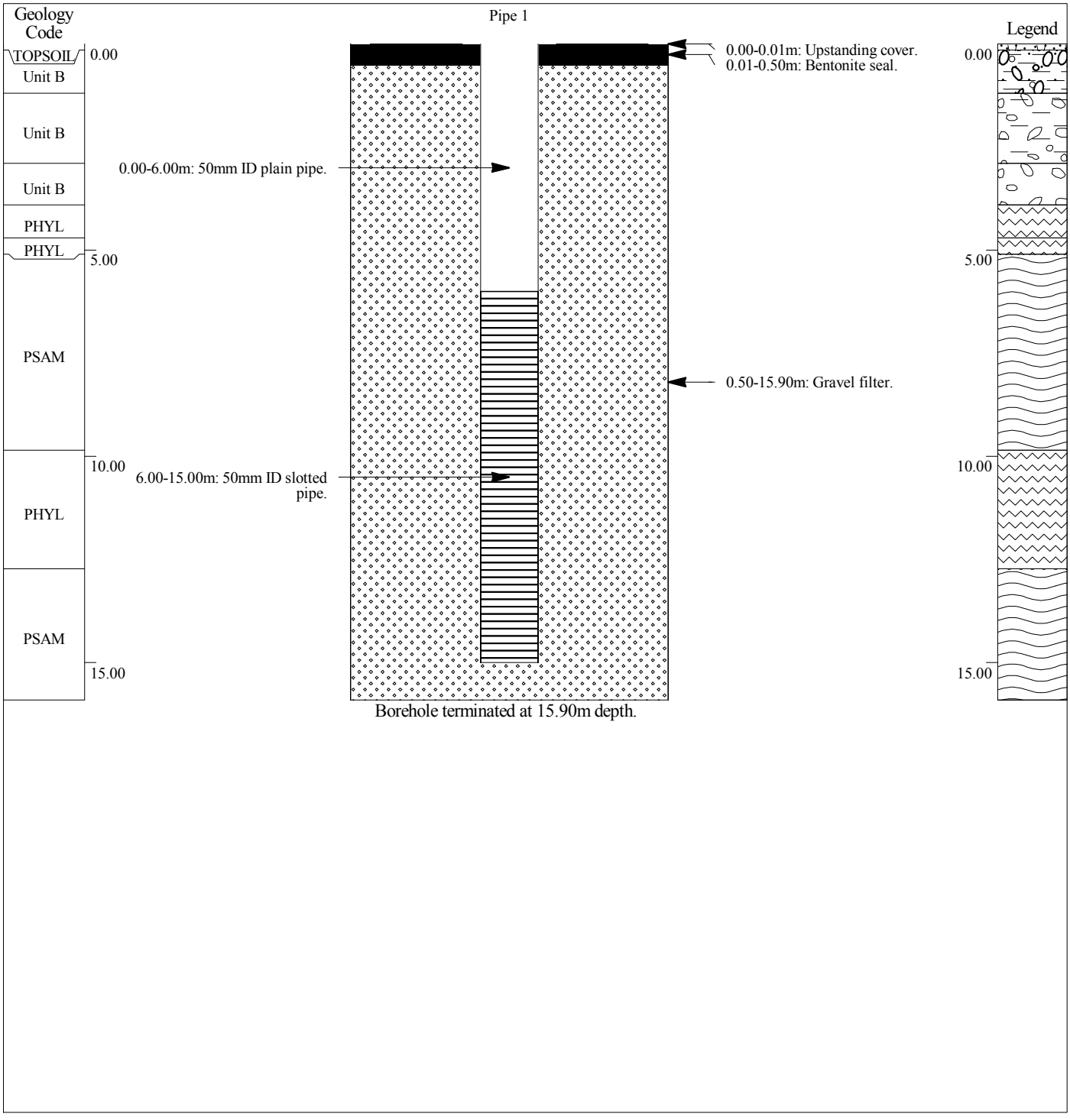
AGS

STRUCTURAL SOILS

[DI-126] - Issued to client for approval

INSTALLATION LOG

Contract:		Client:		Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation		**Horizon Nuclear Power Wylfa Limited**		**RGM-BH4A**
Contract Ref:	Start: **4.11.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **5.11.14**	**14.84**	**E:234133.3 N:392855.5**	**1** of **2**



General Remarks

Geology code details:

PHYL=PHYLLITE, PSAM=PSAMMITE, TOPSOIL=Topsoil, Unit B=Locally derived lodgement till

1. Location CAT and Genny scanned prior to commencement.
2. Hand dug inspection pit GL to 1.20m depth. (IP)
3. Archaeology pit excavated in same location.
4. Perched water entering inspection pit.

Note: Graphical representation of well installation is scaled vertically, but exaggerated in the horizontal to aid interpretation.

All dimensions in metres	Installation	Installation	Installed
Scale **1:140**	Date **05/11/2015**	Type **-**	By **-**

GINT_LIBRARY_V8_05.GLB LibVersion: v8_05 - Lib0006 PrjVersion: | Log XCUSTOM - SSL - 728599 - INSTALLATIONS | 728599_LOW_PRIORITY_WYLFA_NEWYDD_DETAILED_ONSHORE_GROUND_INVESTIGATION.GPJ - v8_05.
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STRUCTURAL SOILS

[DI-126] - Issued to client for approval

INSTALLATION LOG

Contract:		Client:		Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation		**Horizon Nuclear Power Wylfa Limited**		**RGM-BH4A**
Contract Ref:	Start: **4.11.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **5.11.14**	**14.84**	**E:234133.3 N:392855.5**	**2** of **2**

Geology Code

Pipe 1

Legend

General Remarks

5. Strata unsuitable for Hand Vane tests.
6. Rotary open hole drilling from 1.20m to 4.70m depth on 04/11/2014.
7. Rotary cored drilling from 4.70m to 15.90m depth with water flush between 04/11/2014 and 05/11/2014.
8. Groundwater monitoring standpipe installed as shown upon completion.

Note: Graphical representation of well installation is scaled vertically, but exaggerated in the horizontal to aid interpretation.

All dimensions in metres	Installation	Installation	Installed
Scale **1:140**	Date **05/11/2015**	Type **-**	By **-**

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STRUCTURAL SOILS

[DI-126] - Issued to client for approval

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH4**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **29.10.14**	**13.90**	**E:234153.4 N:392851.3**	**1** of **1**

Samples and In-situ Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	Ref	Type	Results						
0.00	1A	EW				Grass over soft brown sandy slightly gravelly CLAY. Sand is fine to medium.			
0.00-0.50	IP1	B					13.75	0.15	
0.00-0.50	RAD1	D				(Topsoil)			
0.50	IP1	D				Soft to firm brown orangish-brown mottled sandy gravelly CLAY with low cobble content. Gravel is angular to subangular fine to coarse weathered psammite, phyllite. sand is fine to medium. Gravel and cobbles are flat and cubic.		(0.75)	
0.50-1.00	IP2	B				(Superficial Deposits - Locally derived lodgement till)			
0.50-1.00	RAD2	D				0.30m : Layer of tabular flat cobbles (possible land drain).	13.00	0.90	
0.90-1.20	1	B				Firm light brown slightly sandy gravelly CLAY with a low cobble content. Cobbles are subangular up to 79mm in diameter Psammite. Gravel is subrounded to subangular fine to coarse Psammite, phyllite and dolerite.		(0.30)	
1.00-1.45	3	SPT(c)	N=20			(Superficial Deposits - Locally derived lodgement till)	12.70	1.20	
1.90-2.20	4	B				Medium dense becoming loose greyish brown slightly clayey GRAVEL with a low cobble content. Cobbles are subrounded to subangular up to 80mm in diameter Psammite. Gravel is subangular fine to coarse Psammite and phyllite.			
2.00	5	D				(Superficial Deposits - Locally derived lodgement till)		(1.70)	
2.00-2.45	6	SPT(c)	N=6	1.1			11.00	2.90	
2.90-3.20	7	B				Loose greyish brown GRAVEL. Gravel is subangular fine to medium Phyllite.			
3.00	8	D				(Superficial Deposits - Locally derived lodgement till)			
3.00-3.45	9	SPT(c)	N=5					(1.00)	
3.90-4.20	10	B				Brownish purple slightly weathered to moderately weathered PHYLLITE. Recovered as angular cobbles due to chiselling.	10.00	3.90	
4.00	11	D				(New Harbour Group - PHYLLITE)		(0.30)	
4.00-4.19	12	SPT(c)	N=375*				9.70	4.20	
						Cable percussion borehole terminated at 4.20m depth.			

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
29/10/15	10:20	2.40	2.40	200	2.25

Chiselling / Slow Progress		
From	To	Duration (hh:mm)
1.45	1.60	00:35
4.10	4.20	01:00

General Remarks

1. Location CAT and Genny scanned prior to commencement.
2. Hand dug inspection pit GL to 1.20m depth.(IP)
3. Archaeology pit excavated in same location.
4. Inspection pit remained stable during excavation.
5. Water strike at 2.40m depth.
6. Perched water entering inspection pit.
7. Strata unsuitable for Hand Vane tests.
8. Cable percussion boring using 200mm diameter tools to 4.2m depth between 29/10/2014 and 29/10/2014.
9. Water added to assist boring from 1.20m to 4.20m depth.
10. Groundwater monitoring standpipe installed as shown upon completion.
11. SPT hammer EQU166-2013 (E_r = 80.05%) used.

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable percussion	**Dando 2000**	**Gavin James**	**MNaisbitt + WDixon**	**ADingle**

GINT_LIBRARY_V8_05.GLB LibVersion: v8_05 - Lib0006 PrjVersion: | Log XCUSTOM - SSL - 728599 - CP LOG | 728599 LOW PRIORITY WYLFA NEWYDD DETAILED ONSHORE GROUND INVESTIGATION.GPJ - v8_05.
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STANDARD PENETRATION TEST SUMMARY TABLE

Exploratory Position ID	Depth (m)	Hole Dia (mm)	Casing Depth (m)	Water Depth (m)	Seating Drive		Test Drive			Hammer ID	Calibration Date	Energy Ratio (%)	N_{60}	Comments
					Blows	Pen (mm)	Blows	R (mm)	Result					
RGM-BH4	1.00	200	0.90	Wet	7,10	150	5,8,3,4		N=20	EQU166-2013	12/11/2013	80.05	27	SPT(c)
	2.00	200	1.90	Wet	3,2	150	1,2,2,1		N=6	EQU166-2013	12/11/2013	80.05	8	SPT(c)
	3.00	200	2.90	Wet	2,1	150	1,2,1,1		N=5	EQU166-2013	12/11/2013	80.05	7	SPT(c)
	4.00	200	3.90	Wet	9,16	145	50+	40	N=375*	EQU166-2013	12/11/2013	80.05	500	SPT(c)

Notes:
1. Tests carried out in general accordance with BS EN ISO 22476-3:2005, including amendment A1 (2011).
2. Reported blows are for 75mm penetration unless indicated "+".
3. Where full test drive was not achieved, actual penetration (R) and extrapolated N value (N*) reported.
4. Tests carried out using a split spoon sampler unless noted as SPT(c) (denotes use of solid cone method) in the comments column.
5. Entries in the water depth column reflects the measured water depth at time of test.

N_{60} = (Measured hammer energy ratio / 60) x N value

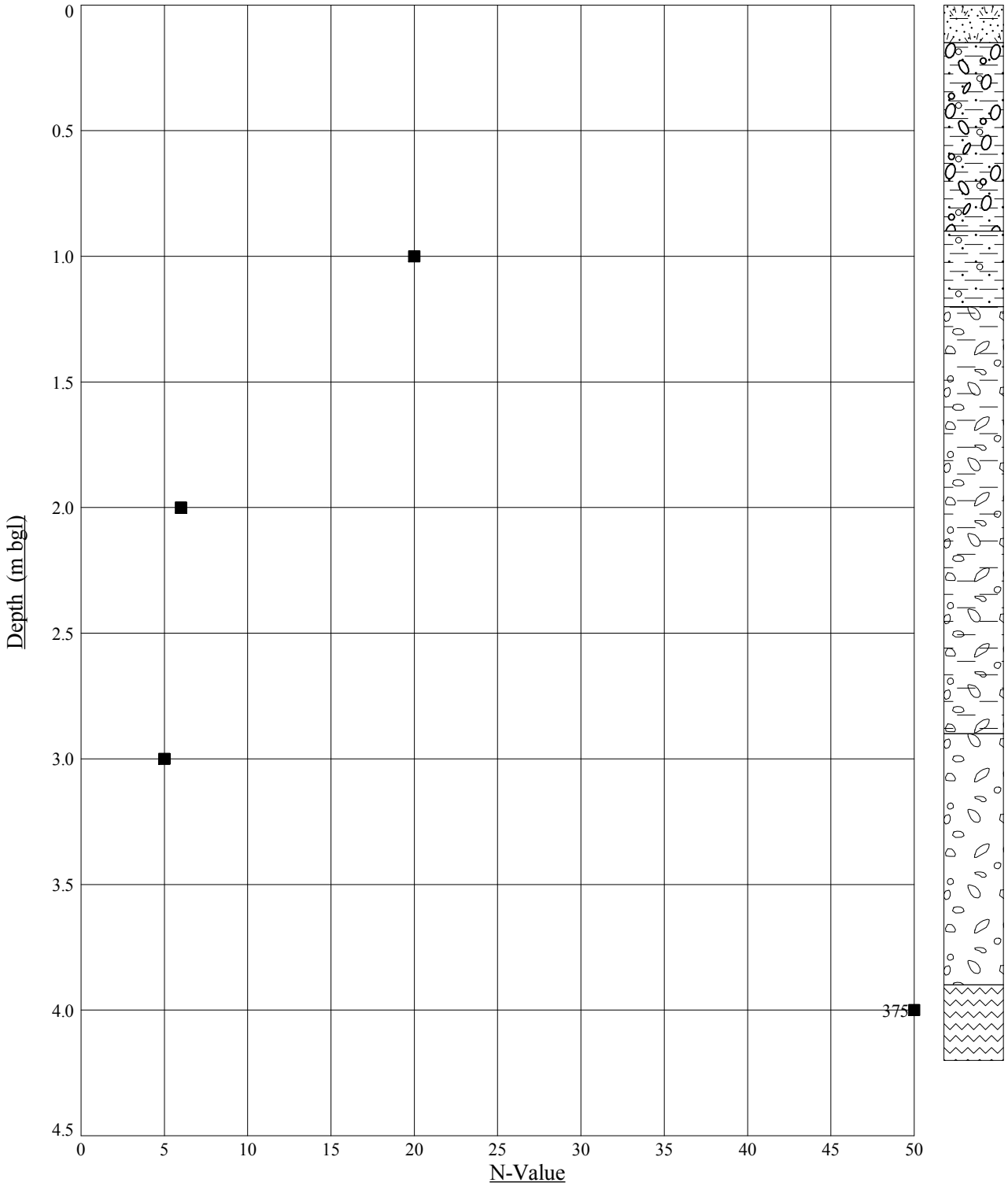
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The Old School
Stillhouse Lane
Bedminster
Bristol BS3 4EB

Compiled By		Date	Contract Ref:
[redacted]	**ALUMBER**	**30.01.15**	**728599**

Contract:
Wylfa Newydd Detailed Onshore Ground Investigation

STANDARD PENETRATION TEST (SPT N-Value)
vs
DEPTH

Exploratory Hole : **RGM-BH4**.

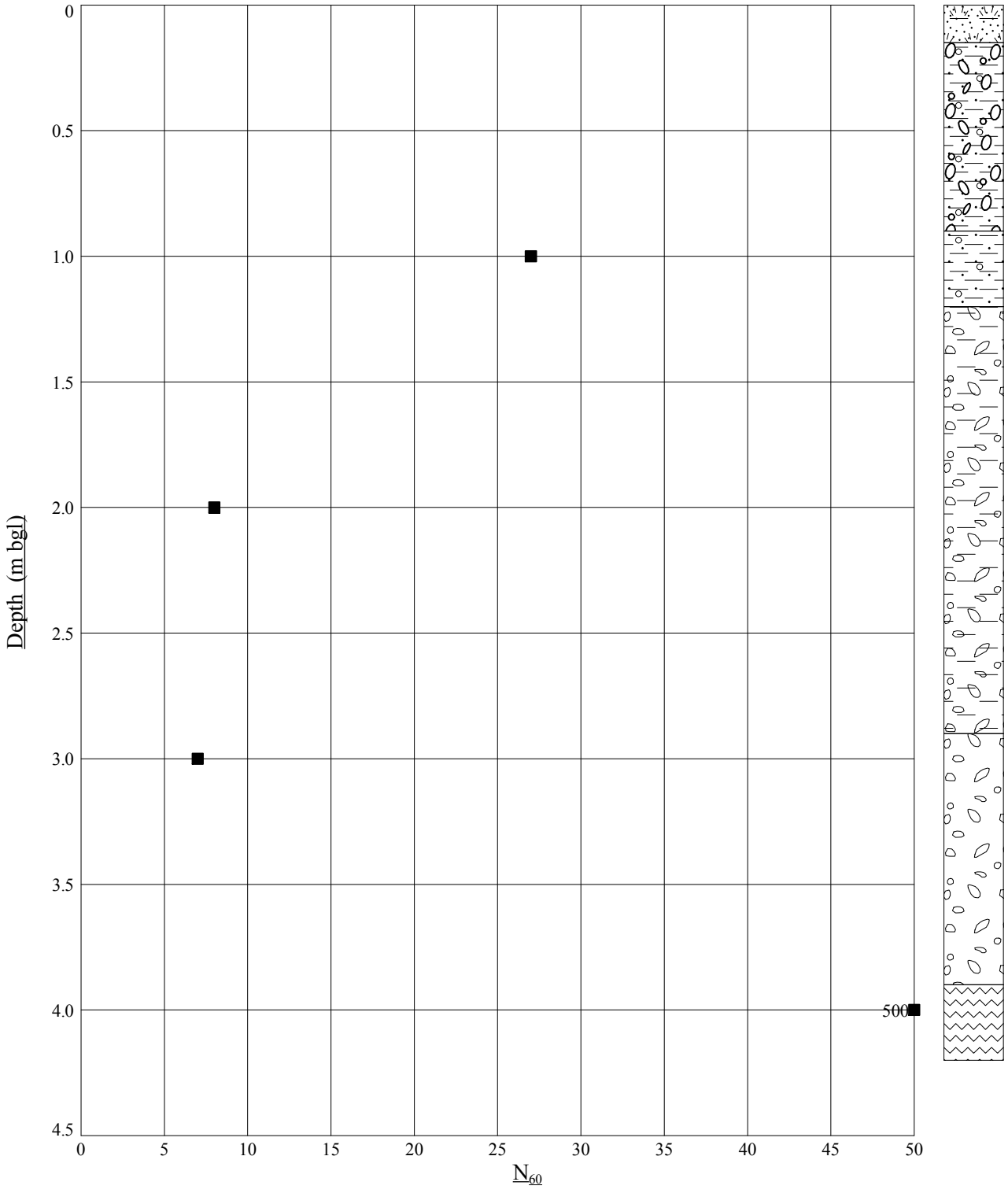


STRUCTURAL SOILS The Old School Stillhouse Lane Bedminster Bristol BS3 4EB	Contract **Wylfa Newydd Detailed Onshore Ground Investigation**	Date **30.1.15**	Compiled By
	Client **Horizon Nuclear Power Wylfa Limited**	Contract Ref: **728599**	AGS

GINT_LIBRARY_V8_05.GLB LibVersion: v8_05 - Lib0006 PrjVersion: | Graph XCUSTOM - SSL - 728599 - SPT N DEPTH| 728599_LOW_PRIORITY_WYLFA_NEWYDD_DETAILED_ONSHORE_GROUND_INVESTIGATION.GPJ - v8_05. | 30/1/15 - 09:16 | DF |

STANDARD PENETRATION TEST (SPT N_{60})
vs
DEPTH

Exploratory Hole : **RGM-BH4**.



STRUCTURAL SOILS The Old School Stillhouse Lane Bedminster Bristol BS3 4EB	Contract **Wylfa Newydd Detailed Onshore Ground Investigation**	Date **29.01.15**	Compiled By AML
	Client **Horizon Nuclear Power Wylfa Limited**	Contract Ref: **728599**	AGS

GINT_LIBRARY_V8_05.GLB LibVersion: v8_05 - Lib0006 PrjVersion: | Graph XCUSTOM - SSL - 728599 - SPT N60 DEPTH | 728599_LOW_PRIORITY_WYLFA_NEWYDD_DETAILED_ONSHORE_GROUND_INVESTIGATION.GPJ - v8_05. | 29/01/15 - 17:56 | AML |

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH4**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**29.10.14** End: **29.10.14**	**13.90**	**E:234153.4 N:392851.3**	**1** of **1**

Depth	TCR %	SCR %	RQD %	If (mm)	Drill Time (hh:mm:ss)	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
0.00									Grass over soft brown sandy slightly gravelly CLAY. (Topsoil)		13.75	0.15	
									Soft to firm brown orangish-brown mottled sandy gravelly CLAY with low cobble content. (Superficial Deposits - Locally derived lodgement till)			(0.75)	
											13.00	0.90	
1.00									Firm light brown slightly sandy gravelly CLAY with a low cobble content. (Superficial Deposits - Locally derived lodgement till)		12.70	(0.30)	
												1.20	
									Medium dense becoming loose greyish brown slightly clayey GRAVEL with a low cobble content. (Superficial Deposits - Locally derived lodgement till)		12	(1.70)	
2.00								1					
											11.00	2.90	
3.00									Loose greyish brown GRAVEL. (Superficial Deposits - Locally derived lodgement till)			(1.00)	
											10.00	3.90	
4.00									Brownish purple slightly weathered to moderately weathered PHYLLITE. (New Harbour Group - PHYLLITE)			(0.30)	
											9.70	4.20	
									Cable percussion borehole terminated at 4.20m depth.				

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
29/10/15	10:20	2.40	2.40	200	2.25

General Remarks

1. Location CAT and Genny scanned prior to commencement.
2. Hand dug inspection pit GL to 1.20m depth.(IP)
3. Archaeology pit excavated in same location.
4. Inspection pit remained stable during excavation.
5. Water strike at 2.40m depth.
6. Perched water entering inspection pit.
7. Strata unsuitable for Hand Vane tests.
8. Cable percussion boring using 200mm diameter tools to 4.2m depth between 29/10/2014 and 29/10/2014.
9. Water added to assist boring from 1.20m to 4.20m depth.
10. Groundwater monitoring standpipe installed as shown upon completion.
11. SPT hammer EQU166-2013 (E_t = 80.05%) used.

All dimensions in metres | Scale: **1:25** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion	**Dando 2000**	**Gavin James**	**MNaisbitt + WDixon**	**ADingle**

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STRUCTURAL SOILS

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH4**

Contract Ref:	Start: **29.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **29.10.14**	**13.90**	**E:234153.4 N:392851.3**	**1** of **5**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Samples and Testing: No	Type	Results	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
0.00 0.00-0.50 0.00-0.50						1A IP1 RAD1	EW B D				Grass over soft brown sandy slightly gravelly CLAY. Sand is fine to medium. (Topsoil)			(0.15)	
													13.75	0.15	
											Soft to firm brown orangish-brown mottled sandy gravelly CLAY with low cobble content. Gravel is angular to subangular fine to coarse weathered psammite, phyllite. sand is fine to medium. Gravel and cobbles are flat and cubic. (Superficial Deposits - Locally derived lodgement till) 0.30m : Layer of tabular flat cobbles (possible land drain).				
0.50 0.50-1.00 0.50-1.00						IP1 IP2 RAD2	D B D							(0.75)	
													13.00	0.90	

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Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
29/10/15	10:20	2.40	2.40	200	2.25

General Remarks

1. Location CAT and Genny scanned prior to commencement.
2. Hand dug inspection pit GL to 1.20m depth.(IP)
3. Archaeology pit excavated in same location.
4. Inspection pit remained stable during excavation.
5. Water strike at 2.40m depth.
6. Perched water entering inspection pit.
7. Strata unsuitable for Hand Vane tests.
8. Cable percussion boring using 200mm diameter tools to 4.2m depth between 29/10/2014 and 29/10/2014.
9. Water added to assist boring from 1.20m to 4.20m depth.
10. Groundwater monitoring standpipe installed as shown upon completion.
11. SPT hammer EQU166-2013 (E_t = 80.05%) used.

All dimensions in metres	Scale: **1:5**	Inclination: **Vertical**	Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion	**Dando 2000**	**Gavin James**	**MNaisbitt + WDixon**	**ADingle**

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STRUCTURAL SOILS

[DI-126] - Issued to client for approval

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH4**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**29.10.14** End: **29.10.14**	**13.90**	**E:234153.4 N:392851.3**	**2** of **5**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
0.90-1.20						1	B				Firm light brown slightly sandy gravelly CLAY with a low cobble content. Cobbles are subangular up to 79mm in diameter Psammite. Gravel is subrounded to subangular fine to coarse Psammite, phyllite and dolerite. (Superficial Deposits - Locally derived lodgement till)			1	
1.00-1.45						3	SPT(c)	N=20						(0.30)	
													12.70	1.20	
											Medium dense becoming loose greyish brown slightly clayey GRAVEL with a low cobble content. Cobbles are subrounded to subangular up to 80mm in diameter Psammite. Gravel is subangular fine to coarse Psammite and phyllite. (Superficial Deposits - Locally derived lodgement till)				

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
29/10/15	10:20	2.40	2.40	200	2.25

General Remarks

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All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion	**Dando 2000**	**Gavin James**	**MNaisbitt + WDixon**	**ADingle**

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STRUCTURAL SOILS

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH4**

Contract Ref:	Start: **29.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **29.10.14**	**13.90**	**E:234153.4 N:392851.3**	**3** of **5**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
1.90-2.20						4	B						12		
2.00						5	D							2	
2.00-2.45						6	SPT(c)	N=6						(1.70)	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
29/10/15	10:20	2.40	2.40	200	2.25

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion	**Dando 2000**	**Gavin James**	**MNaisbitt + WDixon**	**ADingle**

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STRUCTURAL SOILS

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH4**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **29.10.14**	**13.90**	**E:234153.4 N:392851.3**	**4** of **5**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Samples and Testing: No	Type	Results	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
													11.00	2.90	
2.90-3.20						7	B				Loose greyish brown GRAVEL. Gravel is subangular fine to medium Phyllite. (Superficial Deposits - Locally derived lodgement till)		11		
3.00						8	D							3	
3.00-3.45						9	SPT(c)	N=5						(1.00)	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
29/10/15	10:20	2.40	2.40	200	2.25

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion	**Dando 2000**	**Gavin James**	**MNaisbitt + WDixon**	**ADingle**

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH4**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**29.10.14** End: **29.10.14**	**13.90**	**E:234153.4 N:392851.3**	**5** of **5**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
													10.00	3.90	
3.90-4.20						10	B				Brownish purple slightly weathered to moderately weathered PHYLLITE. Recovered as angular cobbles due to chiselling. (New Harbour Group - PHYLLITE)		10		
4.00						11	D							4	
4.00-4.19						12	SPT(c)	N=375*						(0.30)	
													9.70	4.20	
											Cable percussion borehole terminated at 4.20m depth.				

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
29/10/15	10:20	2.40	2.40	200	2.25

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion	**Dando 2000**	**Gavin James**	**MNaisbitt + WDixon**	**ADingle**

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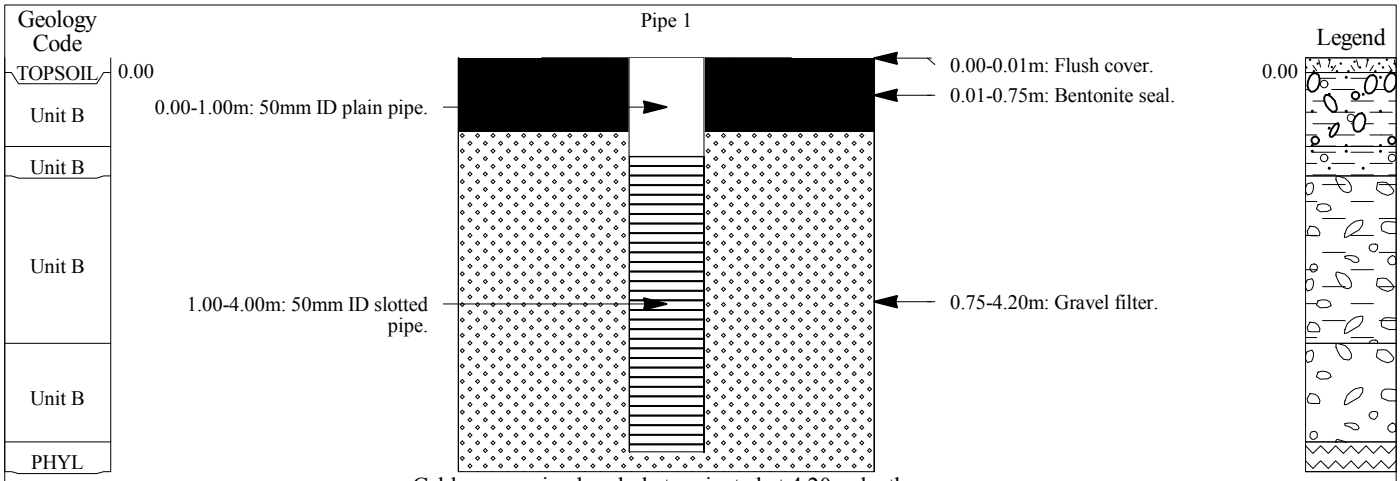
STRUCTURAL SOILS

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INSTALLATION LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH4**

Contract Ref:	Start: **29.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **29.10.14**	**13.90**	**E:234153.4 N:392851.3**	**1** of **2**



Cable percussion borehole terminated at 4.20m depth.

General Remarks

Geology code details:

PHYL=PHYLLITE, TOPSOIL=Topsoil, Unit B=Locally derived lodgement till

1. Location CAT and Genny scanned prior to commencement.
2. Hand dug inspection pit GL to 1.20m depth.(IP)
3. Archaeology pit excavated in same location.
4. Inspection pit remained stable during excavation.
5. Water strike at 2.40m depth.
6. Perched water entering inspection pit.
7. Strata unsuitable for Hand Vane tests.
8. Cable percussion boring using 200mm diameter tools to 4.2m depth between 29/10/2014 and 29/10/2014.

Note: Graphical representation of well installation is scaled vertically, but exaggerated in the horizontal to aid interpretation.

All dimensions in metres	Installation Date	Installation Type	Installed By
Scale **1:77**	-	-	-

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STRUCTURAL SOILS

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INSTALLATION LOG

Contract:		Client:		Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation		**Horizon Nuclear Power Wylfa Limited**		**RGM-BH4**
Contract Ref:	Start: **29.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **29.10.14**	**13.90**	**E:234153.4 N:392851.3**	**2** of **2**

Geology Code

Pipe 1

Legend

General Remarks

9. Water added to assist boring from 1.20m to 4.20m depth.
10. Groundwater monitoring standpipe installed as shown upon completion.
11. SPT hammer EQU166-2013 (E_r = 80.05%) used.

Note: Graphical representation of well installation is scaled vertically, but exaggerated in the horizontal to aid interpretation.

All dimensions in metres	Installation	Installation	Installed
Scale **1:77**	Date -	Type -	By -

GINT_LIBRARY_V8_05.GLB LibVersion: v8_05 - Lib0006 PrjVersion: | Log XCUSTOM - SSL - 728599 - INSTALLATIONS | 728599_LOW_PRIORITY_WYLFA_NEWYDD_DETAILED_ONSHORE_GROUND_INVESTIGATION.GPJ - v8_05.
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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH6**

Contract Ref:	Start: **26.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **28.10.14**	**25.50**	**E:235484.6 N:392612.0**	**1** of **1**

Samples and In-situ Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	Ref	Type	Results						
0.00-0.50	IP1	B				Soft dark brown sandy CLAY. (Topsoil)	25.30	0.20	
0.00-0.50	RAD1	D							
0.50	IP1	D				Soft to firm brown to orangish brown and grey mottled slightly sandy gravelly CLAY with a low cobble content. Sand is fine to medium. Gravel is angular to subangular fine to coarse weathered psammite. Cobbles are flat and tabular. (Superficial Deposits - Locally derived lodgement till)		(1.00)	
0.50	IP2	D							
0.50-1.00	IP2	B							
0.50-1.00	RAD2	D							
0.60-0.85	1	B							
0.85-0.89	2	SPT(c)	N=1500*				24.30	1.20	
						Cable percussion borehole continued using rotary drilling techniques from 1.20m depth.			

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling / Slow Progress		
From	To	Duration (hh:mm)
0.60	0.85	01:00

General Remarks

1. Location CAT and Genny scanned prior to commencement.
2. Hand dug inspection pit GL to 1.20m depth.(IP)
3. Inspection pit remained stable during excavation.
4. No groundwater encountered.
5. Strata unsuitable for Hand Vane tests.
6. Cable percussion boring using 200mm diameter tools to 1.2m depth on 26/10/2014.

All dimensions in metres | Scale: **1:25**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable percussion	**Dando 2000**	**Gavin James**	**MNaisbitt + NBeckett**	**ADingle**

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STANDARD PENETRATION TEST SUMMARY TABLE

Exploratory Position ID	Depth (m)	Hole Dia (mm)	Casing Depth (m)	Water Depth (m)	Seating Drive		Test Drive			Hammer ID	Calibration Date	Energy Ratio (%)	N_{60}	Comments
					Blows	Pen (mm)	Blows	R (mm)	Result					
RGM-BH6	0.85	200	0.60	Wet	25	30	50+	10	N=1500*	EQU166-2013	12/11/2013	80.05	2001	SPT(c)

Notes:
1. Tests carried out in general accordance with BS EN ISO 22476-3:2005, including amendment A1 (2011).
2. Reported blows are for 75mm penetration unless indicated "+".
3. Where full test drive was not achieved, actual penetration (R) and extrapolated N value (N*) reported.
4. Tests carried out using a split spoon sampler unless noted as SPT(c) (denotes use of solid cone method) in the comments column.
5. Entries in the water depth column reflects the measured water depth at time of test.

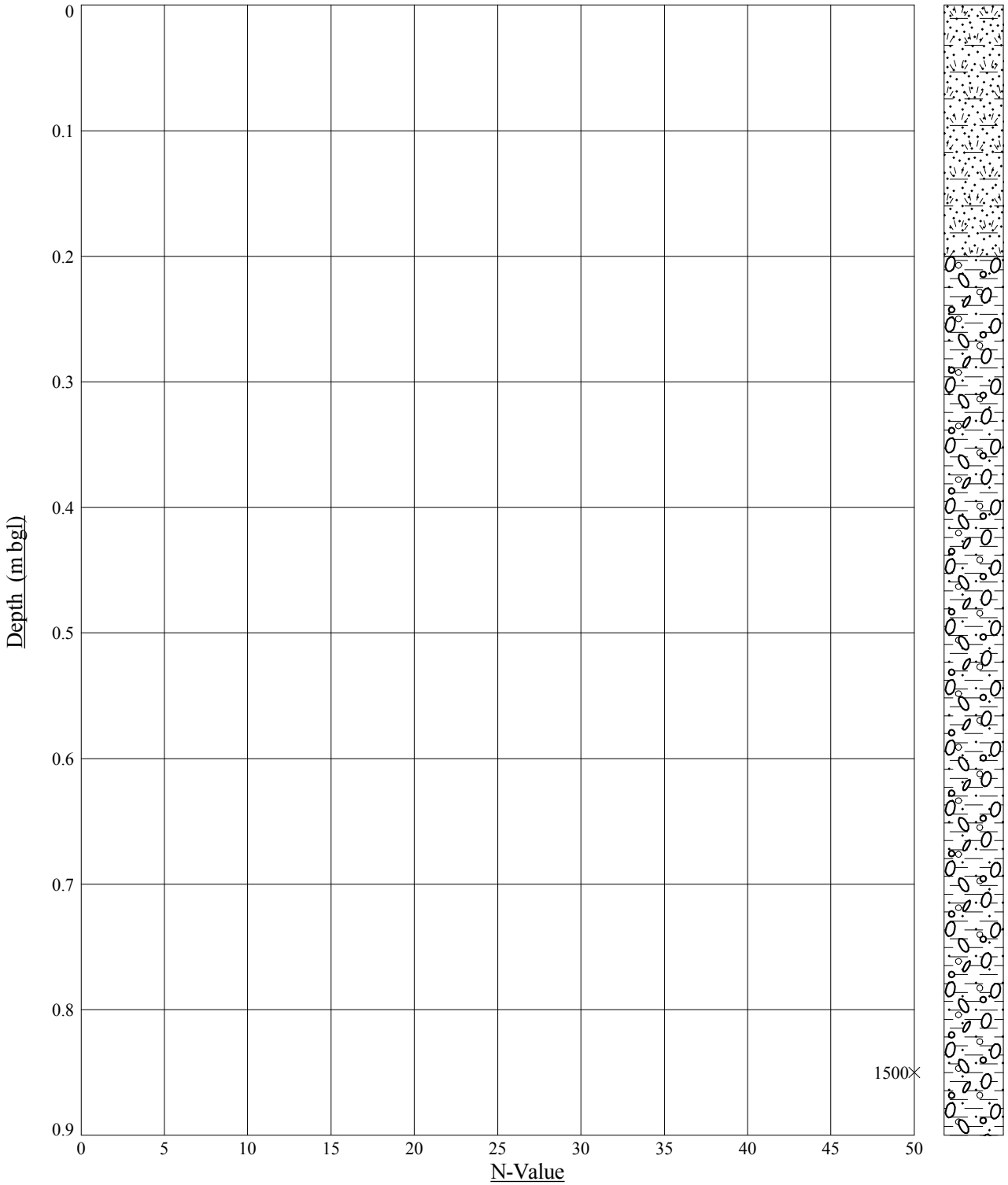
N_{60} = (Measured hammer energy ratio / 60) x N value

STRUCTURAL SOILS
The Old School
Stillhouse Lane
Bedminster
Bristol BS3 4EB

Compiled By		Date	Contract Ref:
[redacted]	**ALUMBER**	**30.01.15**	**728599**
Contract: **Wylfa Newydd Detailed Onshore Ground Investigation**			Page: **1** of **1**

STANDARD PENETRATION TEST (SPT N-Value)
vs
DEPTH

Exploratory Hole : **RGM-BH6**.

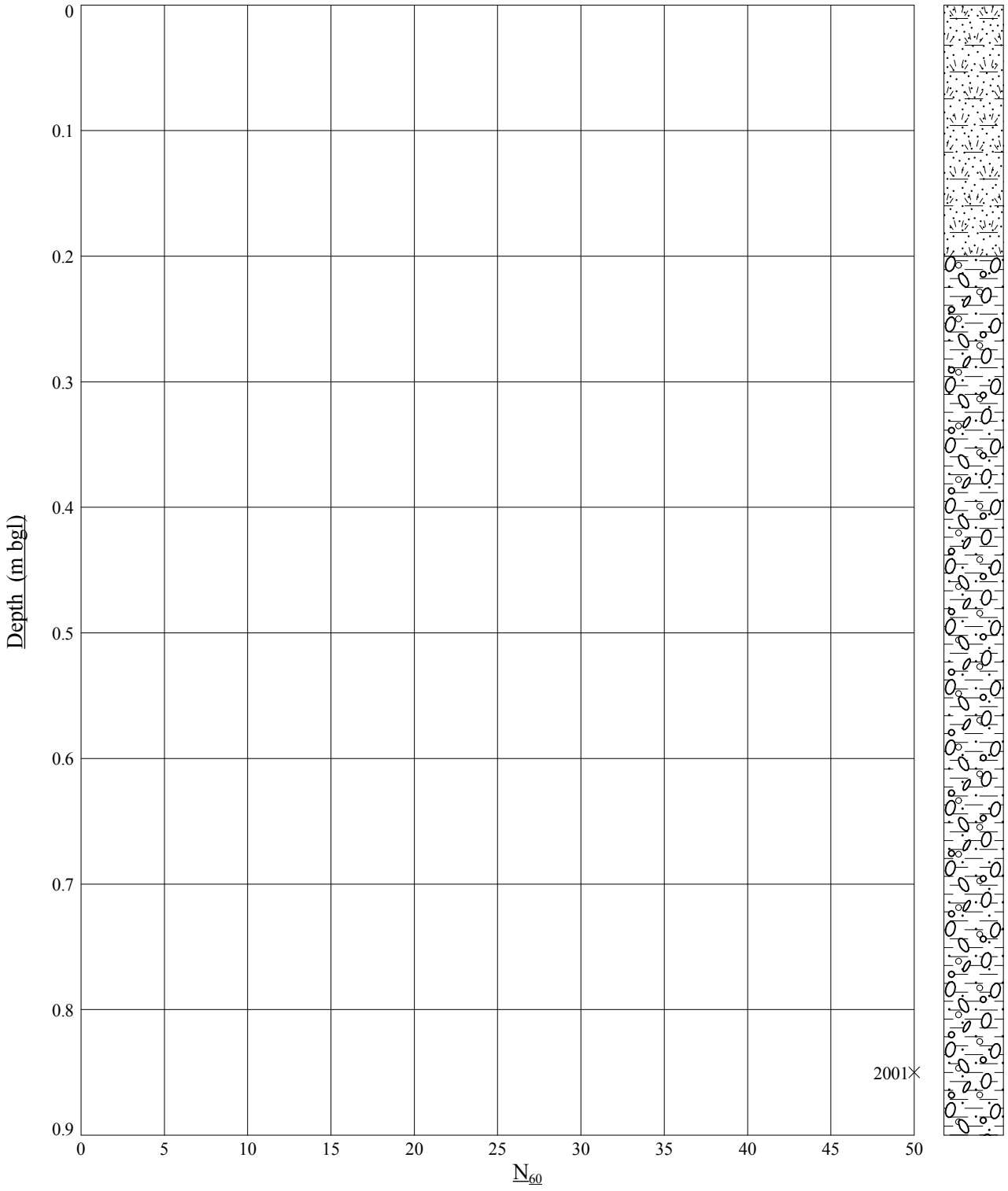


STRUCTURAL SOILS The Old School Stillhouse Lane Bedminster Bristol BS3 4EB	Contract **Wylfa Newydd Detailed Onshore Ground Investigation**	Date **29.1.15**	Compiled By
	Client **Horizon Nuclear Power Wylfa Limited**	Contract Ref: **728599**	AGS

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STANDARD PENETRATION TEST (SPT N_{60})
vs
DEPTH

Exploratory Hole : **RGM-BH6**.



STRUCTURAL SOILS The Old School Stillhouse Lane Bedminster Bristol BS3 4EB	Contract **Wylfa Newydd Detailed Onshore Ground Investigation**	Date **29.01.15**	Compiled By AML
	Client **Horizon Nuclear Power Wylfa Limited**	Contract Ref: **728599**	AGS

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH6**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**26.10.14** End: **28.10.14**	**25.50**	**E:235484.6 N:392612.0**	**1** of **4**

Depth	Mechanical Log: TCR %	SCR %	RQD %	If (mm)	Flush Returns & Details	Drill Time (hh:mm:ss)	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
0.00										Soft dark brown sandy CLAY. (Topsoil)		25.30	0.20	
										Soft to firm brown to orangish brown and grey mottled slightly sandy gravelly CLAY with a low cobble content. (Superficial Deposits - Locally derived lodgement till)		25	(1.00)	
1.00												24.30	1.20	
				NI 30 60	Water (Grey)	(0:12:00)				Weak to medium strong narrowly to thinly banded greenish grey fine to medium grained slightly weathered to moderately weathered PSAMMITE with weak extremely closely spaced to closely spaced very narrow to very thin bands of very narrowly foliated reddish brown PHYLLITE. (New Harbour Group - PSAMMITE)		24		
2.00														
				10 40 190	Water (Grey)	(0:20:00)						23	(2.90)	
3.00														
					Water (Grey)	(0:25:00)						22		
4.00												21.40	4.10	
				10 50 480						Medium strong narrowly to thickly banded greenish grey fine to medium grained fresh to slightly weathered PSAMMITE with medium strong extremely closely spaced to closely spaced very narrow bands of				

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
27/10/14	16:45	3.50	3.50	146	0.50
28/10/14	08:00	3.50	3.50	146	3.40
28/10/14	16:45	14.20	14.20	146	4.80

General Remarks

1. Location CAT and Genny scanned prior to commencement.
2. Hand dug inspection pit GL to 1.20m depth.(IP)
3. Inspection pit remained stable during excavation.
4. No groundwater encountered.
5. Strata unsuitable for Hand Vane tests.
6. Cable percussion boring using 200mm diameter tools to 1.2m depth on 26/10/2014.

All dimensions in metres | Scale: **1:25** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + NBeckett**	**ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH6**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**26.10.14** End: **28.10.14**	**25.50**	**E:235484.6 N:392612.0**	**2** of **4**

Depth	Mechanical Log: TCR %	SCR %	RQD %	If (mm)	Flush Returns & Details	Drill Time (hh:mm:ss)	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
5.00					Water (Grey)	(0:25:00)				sheared greenish brown and brownish purple PHYLLITE. (New Harbour Group - PSAMMITE)			(1.18)	
												20.22	5.28	
					Water (Grey)	(0:28:00)				Weak to medium strong narrowly to very thinly banded disturbed greenish grey fine to medium grained slightly weathered PSAMMITE with weak to medium strong extremely closely spaced to closely spaced very narrow to very thin bands of disturbed reddish brown PHYLLITE. (New Harbour Group - PSAMMITE)				
6.00				10 50 480									(1.72)	
												18.50	7.00	
7.00					Water (Purple)	(0:30:00)				Medium strong thinly to medium banded greyish green fine to medium grained fresh to slightly weathered PSAMMITE with weak to medium strong closely spaced to medium spaced very narrow to narrow bands of very narrowly foliated reddish purple PHYLLITE. (New Harbour Group - PSAMMITE)			(1.00)	
8.00												17.50	8.00	
				NI 200 310	Water (Purple)	(0:25:00)				Medium strong very narrowly to thinly banded sheared dark green fine to medium grained fresh PSAMMITE with medium strong extremely closely spaced to closely spaced very narrow to very thin bands of disturbed dark reddish brown PHYLLITE. (New Harbour Group - PSAMMITE)			(0.72)	
												16.78	8.72	
										Medium strong narrowly to very thinly banded disturbed light green and greyish green fine grained fresh PSAMMITE with				

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
27/10/14	16:45	3.50	3.50	146	0.50
28/10/14	08:00	3.50	3.50	146	3.40
28/10/14	16:45	14.20	14.20	146	4.80

General Remarks

7. Water added to assist boring from 0.00m to 0.85m depth.
8. Rotary cored drilling from 1.20m to 14.30m depth with water flush between 27/10/2014 and 28/10/2014.
9. Groundwater monitoring standpipe installed as shown upon completion.
10. SPT hammer EQU166-2013 (E_r = 80.05%) used.

All dimensions in metres | Scale: **1:25** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + NBeckett**	**ADingle + ADingle**

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH6**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**26.10.14** End: **28.10.14**	**25.50**	**E:235484.6 N:392612.0**	**3** of **4**

Depth	Mechanical Log: TCR %	SCR %	RQD %	If (mm)	Flush Returns & Details	Drill Time (hh:mm:ss)	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
9.00					Water (Purple)	(0:25:00)				medium strong very closely spaced to closely spaced very narrow to narrow bands of disturbed reddish purple and reddish brown PHYLLITE. (New Harbour Group - PSAMMITE)		16	(1.18)	
												15.60	9.90	
10.00					Water (Purple)	(0:28:00)				Medium strong narrowly to thinly banded disturbed light green and dark greyish green fine grained fresh PSAMMITE with medium strong very closely spaced to closely spaced very narrow to medium bands of disturbed reddish purple to brownish purple PHYLLITE. (New Harbour Group - PSAMMITE)		15	10 (2.15)	
11.00				NI 200 310								14	11	
12.00					Water (Purple)	(0:45:00)						13.45	12.05 12	
										Medium strong very narrowly to very thinly banded dark reddish brown and green fine grained fresh PSAMMITE with medium strong extremely closely spaced to very closely spaced very narrow to narrow bands of disturbed reddish brown and brownish purple PHYLLITE. (New Harbour Group - PSAMMITE)		13	13 (2.25)	
13.00					Water (Purple)	(0:40:00)								

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
27/10/14	16:45	3.50	3.50	146	0.50
28/10/14	08:00	3.50	3.50	146	3.40
28/10/14	16:45	14.20	14.20	146	4.80

General Remarks

All dimensions in metres | Scale: **1:25** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + NBeckett**	**ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH6**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**26.10.14** End: **28.10.14**	**25.50**	**E:235484.6 N:392612.0**	**4** of **4**

Mechanical Log: Depth	TCR %	SCR %	RQD %	If (mm)	Flush Returns & Details	Drill Time (hh:mm:ss)	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
14.00				NI 200 310	Water (Purple)	(0:40:00)				Borehole terminated at 14.30m depth.		11.20	14.30	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
27/10/14	16:45	3.50	3.50	146	0.50
28/10/14	08:00	3.50	3.50	146	3.40
28/10/14	16:45	14.20	14.20	146	4.80

General Remarks

All dimensions in metres | Scale: **1:25** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + NBeckett**	**ADingle + ADingle**

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STRUCTURAL SOILS

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH6**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **28.10.14**	**25.50**	**E:235484.6 N:392612.0**	**1** of **19**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
0.00-0.50						IP1	B				Soft dark brown sandy CLAY. (Topsoil)			(0.20)	
0.00-0.50						RAD1	D								
													25.30	0.20	
											Soft to firm brown to orangish brown and grey mottled slightly sandy gravelly CLAY with a low cobble content. Sand is fine to medium. Gravel is angular to subangular fine to coarse weathered psammite. Cobbles are flat and tabular. (Superficial Deposits - Locally derived lodgement till)				
0.50						IP1	D						25		
0.50						IP2	D								
0.50-1.00						IP2	B								
0.50-1.00						RAD2	D								
0.60-0.85						1	B							(1.00)	
0.85-0.89						2	SPT(c)	N=1500*							

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
27/10/14	16:45	3.50	3.50	146	0.50
28/10/14	08:00	3.50	3.50	146	3.40
28/10/14	16:45	14.20	14.20	146	4.80

General Remarks

1. Location CAT and Genny scanned prior to commencement.
2. Hand dug inspection pit GL to 1.20m depth.(IP)
3. Inspection pit remained stable during excavation.
4. No groundwater encountered.
5. Strata unsuitable for Hand Vane tests.
6. Cable percussion boring using 200mm diameter tools to 1.2m depth on 26/10/2014.

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + NBeckett**	**ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH6**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**26.10.14** End: **28.10.14**	**25.50**	**E:235484.6 N:392612.0**	**2** of **19**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
1.20-2.05 (0:12)	100	25	0	NI 30 60	Water (Grey)						Weak to medium strong narrowly to thinly banded greenish grey fine to medium grained slightly weathered to moderately weathered PSAMMITE with weak extremely closely spaced to closely spaced very narrow to very thin bands of very narrowly foliated reddish brown PHYLLITE. Foliation is sub-horizontal to shallowly dipping. Occasional randomly orientated ptygmatic chlorite veins concentrated within psammite bands. Foliation fractures are shallowly dipping closely to widely spaced undulating rough partly open with dark brown staining. Joints are sub-horizontal to sub-vertical occasional incipient very closely to medium spaced undulating rough and striated partly open to open with dark brown staining and locally with brown clay smearing. Multiple possible fault throughout. (New Harbour Group - PSAMMITE) 1.45-1.70m : Possible multiple faults. Highly fractured with frequent brown clay infill (<10mm thick). Locally recovered non-intact as angular fine to coarse gravel and clay. Locally with brown staining on fracture surfaces.	1_J 2_J 3_J	24.30 24	1.20	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
27/10/14	16:45	3.50	3.50	146	0.50
28/10/14	08:00	3.50	3.50	146	3.40
28/10/14	16:45	14.20	14.20	146	4.80

General Remarks

7. Water added to assist boring from 0.00m to 0.85m depth.
8. Rotary cored drilling from 1.20m to 14.30m depth with water flush between 27/10/2014 and 28/10/2014.
9. Groundwater monitoring standpipe installed as shown upon completion.
10. SPT hammer EQU166-2013 (E_r = 80.05%) used.

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + NBeckett**	**ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH6**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**26.10.14** End: **28.10.14**	**25.50**	**E:235484.6 N:392612.0**	**3** of **19**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
2.05-3.65 (0:20)	100 88	25 68	0 36	NI 30 60 10 40 190	Water (Grey) Water (Grey)						1.84-1.86m : Weak highly fractured zone. Possible fault. Sub-horizontal (10°) undulating open with <1mm orange brown clay infill (<1mm thick). 1.92-2.00m : Possible fault. Recovered non-intact as angular fine to coarse gravel and brown clay. 2.00-2.23m : Non-intact. Recovered as angular fine to coarse gravel. 2.23-2.34m : Weak highly fractured zone. Possible fault. Steeply dipping (85°) undulating rough partly open <1mm orange brown clay infill. 2.53-2.57m : Locally weak highly fractured with slight orange brown clay infill.	4 PF[i] 5 PF[i] 6 J[i] 7 J 8 FF 9 J[i] 10 FF[i] 11 FF	23	2 (2.90)	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
27/10/14	16:45	3.50	3.50	146	0.50
28/10/14	08:00	3.50	3.50	146	3.40
28/10/14	16:45	14.20	14.20	146	4.80

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + NBeckett**	**ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH6**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**26.10.14** End: **28.10.14**	**25.50**	**E:235484.6 N:392612.0**	**4** of **19**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
	88	68	36	10 40 190	Water (Grey)						2.86-2.88m : Locally weak highly fractured. Possible fault at 2.87m depth. Shallowly dipping (15°) undulating rough open with slight orange brown clay infill (<1mm thick). 3.20-3.37m : 3 no. possible faults sub-horizontal to steepy dipping (10-60°) very closely to closely spaced undulating rough partly open to open with <1mm orange brown clay infill. Locally weak and highly fractured.	12 IcF 13 PF[i] 14 FF 15 FF 16 IcF 17 FF 18 PF[i] 19 J 20 PF[i] 22 PF[i] 21 PF[i] 23 J[i]	22	3	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
27/10/14	16:45	3.50	3.50	146	0.50
28/10/14	08:00	3.50	3.50	146	3.40
28/10/14	16:45	14.20	14.20	146	4.80

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + NBeckett**	**ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH6**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**26.10.14** End: **28.10.14**	**25.50**	**E:235484.6 N:392612.0**	**5** of **19**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
3.65-5.15 (0:25)	88	68	36	10 40 190	Water (Grey)						3.82-3.88m : Weak highly fractured. Possible fault. Shallowly dipping (20°) undulating rough open <1mm orange brown clay infill.	24 IcF[i] 25 IcF[i] 26 J 28 PF[i] 27 IcF[i] 29 FF 30 IcF[i]		4	
	100	96	51	10 50 480							4.02-4.04m : Possible fault. Sub-horizontal (5°) undulating moderately wide with tabular fine to coarse gravel and slight clay infill (40mm thick). Medium strong narrowly to thickly banded greenish grey fine to medium grained fresh to slightly weathered PSAMMITE with medium strong extremely closely spaced to closely spaced very narrow bands of sheared greenish brown and brownish purple PHYLLITE. Foliation is sub-horizontal to shallowly dipping. Occasional randomly orientated ptygmatic chlorite veins concentrated within psammite bands. Rare randomly orientated sigmoidal and lenticular calcite veins. Foliation fractures are sub-horizontal to shallowly dipping medium spaced undulating rough partly open with brown staining. Joints are steeply dipping closely to widely spaced undulating rough partly open with brown and reddish brown staining. (New Harbour Group - PSAMMITE) 4.15-4.22m : Occasional steeply dipping calcite dissolution voids (<3mm diameter).	31 PF[i] 32 IcF 33 IcF 34 IcF 35 IcF	21.40	4.10	

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Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
27/10/14	16:45	3.50	3.50	146	0.50
28/10/14	08:00	3.50	3.50	146	3.40
28/10/14	16:45	14.20	14.20	146	4.80

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + NBeckett**	**ADingle + ADingle**

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STRUCTURAL SOILS

[DI-126] - Issued to client for approval

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH6**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**26.10.14** End: **28.10.14**	**25.50**	**E:235484.6 N:392612.0**	**6** of **19**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
5.15-6.69 (0:28)	100 97	96 87	51 20	10 50 480	Water (Grey) Water (Grey)						Weak to medium strong narrowly to very thinly banded disturbed greenish grey fine to medium grained slightly weathered PSAMMITE with weak to medium strong extremely closely spaced to closely spaced very narrow to very thin bands of disturbed reddish brown PHYLLITE.	37 FF 36 IcF 38 J 39 FF 40 J 41 J	20.22	(1.18) 5.28	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
27/10/14	16:45	3.50	3.50	146	0.50
28/10/14	08:00	3.50	3.50	146	3.40
28/10/14	16:45	14.20	14.20	146	4.80

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + NBeckett**	**ADingle + ADingle**

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH6**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**26.10.14** End: **28.10.14**	**25.50**	**E:235484.6 N:392612.0**	**7** of **19**

Mechanical Log						Samples and Testing							
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	No	Type	Results	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
	97	87	20	10 50 480	Water (Grey)						Foliation is sub-horizontal to shallowly dipping. Rare randomly orientated ptygmatic chlorite veins locally concentrated within psammite bands. Foliation fractures are sub-horizontal to shallowly dipping widely spaced undulating rough partly open to open with brown staining and locally weak wall strength. Joints are shallowly to steeply dipping closely to widely spaced partly open with dark brown staining. Locally abundant incipient fractures occasional sub-horizontal to steeply dipping undulating tight. Occasional possible faults. (New Harbour Group - PSAMMITE) 5.61-5.63m : Possible fault. Shallowly dipping (30°) undulating rough open with <4mm orange brown clay infill. Locally weak and highly fractured. 5.65-5.80m : Joint is steeply dipping undulating rough open with brown surface staining. Locally weak and highly fractured adjacent to joint. 5.82-5.90m : Possible fault at 5.87m depth. Shallowly dipping (30°) undulating rough open with <1mm orange brown clay infill. Locally weak and highly fractured.	42 PF[i] 44 IcF 46 IcF 45 IcF 47 PF[i] 43 J 48 PF[i] 50 IcF 49 J 52 IcF 53 IcF 51 J 54 IcF 55 IcF	20	(1.72)	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
27/10/14	16:45	3.50	3.50	146	0.50
28/10/14	08:00	3.50	3.50	146	3.40
28/10/14	16:45	14.20	14.20	146	4.80

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + NBeckett**	**ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH6**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**26.10.14** End: **28.10.14**	**25.50**	**E:235484.6 N:392612.0**	**8** of **19**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
6.69-8.11 (0:30)	97 100	87 94	20 41	10 50 480	Water (Grey) Water (Purple)						6.34-6.36m : Narrow band of disturbed yellowish brown to brown phyllite. 6.50-6.56m : Locally metaconglomerate texture with rounded elongate fine gravel size clasts within a psammite matrix. Medium strong thinly to medium banded greyish green fine to medium grained fresh to slightly weathered PSAMMITE with weak to medium strong closely spaced to medium spaced very narrow to narrow bands of very narrowly foliated reddish purple PHYLLITE. Foliation is sub-horizontal to shallowly dipping. Occasional shallowly to steeply dipping en-echelon and lenticular calcite veins with possible chlorite replacement at boundaries. Foliation fractures are sub-horizontal to shallowly dipping very closely to medium	56J 57J 58J[i] 59FF 60J 61FF 62J[i] 63J	19 18.50	7.00	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
27/10/14	16:45	3.50	3.50	146	0.50
28/10/14	08:00	3.50	3.50	146	3.40
28/10/14	16:45	14.20	14.20	146	4.80

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + NBeckett**	**ADingle + ADingle**

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Contract:	Client:	Borehole:
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Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**26.10.14** End: **28.10.14**	**25.50**	**E:235484.6 N:392612.0**	**9** of **19**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
				10 50 480	Water (Purple)						spaced undulating rough partly open with reddish brown and speckled brown staining. Joints are shallowly dipping to sub-vertical closely spaced undulating rough partly open with brown staining and locally reddish brown clay smearing. (New Harbour Group - PSAMMITE)	64 FF 66 FF[i] 65 J 68 J[i] 67 J[i] 69 FF[i] 70 FF 71 J[i] 72 J[i]	18	(1.00)	
100	94	41													
				NI 200 310							Medium strong very narrowly to thinly banded sheared dark green fine to medium grained fresh PSAMMITE with medium strong extremely closely spaced to closely spaced very narrow to very thin bands of disturbed dark reddish brown		17.50	8.00	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
27/10/14	16:45	3.50	3.50	146	0.50
28/10/14	08:00	3.50	3.50	146	3.40
28/10/14	16:45	14.20	14.20	146	4.80

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + NBeckett**	**ADingle + ADingle**

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STRUCTURAL SOILS

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Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH6**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**26.10.14** End: **28.10.14**	**25.50**	**E:235484.6 N:392612.0**	**10** of **19**

Mechanical Log						Samples and Testing									
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	No	Type	Results	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
8.11-9.63 (0:25)	100	95	45	NI 200 310	Water (Purple)						PHYLLITE. Foliation is disturbed. Occasional randomly orientated en-echelon lenticular and sigmoidal quartz and calcite veins. Joints are shallowly to steeply dipping very closely to closely spaced undulating rough partly open with reddish brown staining and clay smearing. (New Harbour Group - PSAMMITE) 8.05-8.13m : Non-intact recovered as angular coarse gravel with reddish brown clay smearing on fracture surfaces. 8.38-8.46m : Very thin disturbed band of light green psammite with strong chlorite overprinting and very narrow bands of highly disturbed phyllite with irregular quartz/calcite vein (<22mm thick) locally with bright green malachite. Medium strong narrowly to very thinly banded disturbed light green and greyish green fine grained fresh PSAMMITE with medium strong very closely spaced to closely spaced very narrow to narrow bands of disturbed reddish purple and reddish brown PHYLLITE. Foliation is disturbed. Locally abundant randomly orientated ptygmatic chlorite veins and chlorite overprinting. Occasional randomly orientated sigmoidal to irregular quartz and calcite veins. Joints are shallowly to steeply dipping very closely to closely spaced undulating rough partly open with reddish brown staining and clay smearing. (New Harbour Group - PSAMMITE)	73J 74J[i] 75J 76J 77IcF 78J 79J	17 16.78	(0.72) 8.72	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
27/10/14	16:45	3.50	3.50	146	0.50
28/10/14	08:00	3.50	3.50	146	3.40
28/10/14	16:45	14.20	14.20	146	4.80

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + NBeckett**	**ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH6**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**26.10.14** End: **28.10.14**	**25.50**	**E:235484.6 N:392612.0**	**11** of **19**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
9.63-11.21 (0:28)	100 100	95 85	45 62	NI 200 310	Water (Purple) Water (Purple)						9.35-9.83m : Steeply dipping to sub-vertical lenticular quartz vein (<55mm diameter).	80J 81J 82J 83J 84J 85J 87J 88J 86J[i] 89J 90J 91IcF	16 15.60	(1.18) 9.90	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
27/10/14	16:45	3.50	3.50	146	0.50
28/10/14	08:00	3.50	3.50	146	3.40
28/10/14	16:45	14.20	14.20	146	4.80

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + NBeckett**	**ADingle + ADingle**

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BOREHOLE LOG

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Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**26.10.14** End: **28.10.14**	**25.50**	**E:235484.6 N:392612.0**	**12** of **19**

Mechanical Log						Samples and Testing								
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	No	Type	Results	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
10.00	100	85	62	NI 200 310	Water (Purple)	1A	EW				Medium strong narrowly to thinly banded disturbed light green and dark greyish green fine grained fresh PSAMMITE with medium strong very closely spaced to closely spaced very narrow to medium bands of disturbed reddish purple to brownish purple PHYLLITE. Foliation is disturbed. Locally abundant randomly orientated ptygmatic chlorite veins and overprinting. Frequent randomly orientated en-echelon and sigmoidal to irregular quartz and calcite veins. Joints are shallowly to steeply dipping extremely closely to medium spaced undulating rough partly open with reddish brown staining. (New Harbour Group - PSAMMITE) 10.04-10.36m : Frequent randomly orientated disturbed sigmoidal and lenticular quartz veins (<45mm thick) with calcite. Locally dark green possible chlorite at boundaries. 10.49-10.56m : Sub-horizontal disturbed irregular quartz vein (<60mm thick) with calcite and purple mineralisation encompassing a light green lenticular band of psammite. 10.56-10.77m : Very thin lenticular bands of psammite with green overprinting becoming bright green at boundaries. Cross cut by shallowly to steeply dipping stepped to en-echelon calcite vein (<6mm thick).	92J 93J 94J 95J 96IcF 97J 98J	15	10	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
27/10/14	16:45	3.50	3.50	146	0.50
28/10/14	08:00	3.50	3.50	146	3.40
28/10/14	16:45	14.20	14.20	146	4.80

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + NBeckett**	**ADingle + ADingle**

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STRUCTURAL SOILS

[DI-126] - Issued to client for approval

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH6**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**26.10.14** End: **28.10.14**	**25.50**	**E:235484.6 N:392612.0**	**13** of **19**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
11.21-12.76 (0:45)	100	85	62	NI 200 310	Water (Purple)						11.50-11.73m : Sub-vertical and sub-horizontal lenticular quartz veins (<50mm thick).	99 J 100 IcF 101 J 102 J	14	(2.15) 11	
	100	97	57		Water (Purple)										

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
27/10/14	16:45	3.50	3.50	146	0.50
28/10/14	08:00	3.50	3.50	146	3.40
28/10/14	16:45	14.20	14.20	146	4.80

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + NBeckett**	**ADingle + ADingle**

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Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH6**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**26.10.14** End: **28.10.14**	**25.50**	**E:235484.6 N:392612.0**	**14** of **19**

Mechanical Log						Samples and Testing								
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	No	Type	Results	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
	100	97	57	NI 200 310	Water (Purple)						11.80-11.93m : Light green chlorite overprinting crosscut by shallowly to steeply dipping lenticular and sigmoidal quartz veins.	103 J[i] 104 IcF 105 J[i]		12	
											Medium strong very narrowly to very thinly banded dark reddish brown and green fine grained fresh PSAMMITE with medium strong extremely closely spaced to very closely spaced very narrow to narrow bands of disturbed reddish brown and brownish purple PHYLLITE. Foliation is shallowly dipping to disturbed. Frequent randomly orientated en-echelon and sigmoidal calcite veins and occasional randomly orientated ptygmatic chlorite veins. Occasional randomly orientated en-echelon sigmoidal and ptygmatic quartz veins. Joints are sub-horizontal to steeply dipping occasional incipient very closely to medium spaced undulating rough with brown staining. (New Harbour Group - PSAMMITE)	106 J 107 IcF 108 IcF 109 IcF	13.45	12.05	
											12.49-12.60m : Very thin bands of light brown and greyish brown fine grained psammite.	110 IcF 111 IcF 112 IcF	13		

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
27/10/14	16:45	3.50	3.50	146	0.50
28/10/14	08:00	3.50	3.50	146	3.40
28/10/14	16:45	14.20	14.20	146	4.80

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + NBeckett**	**ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH6**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**26.10.14** End: **28.10.14**	**25.50**	**E:235484.6 N:392612.0**	**15** of **19**

Mechanical Log					Flush Returns & Details	Samples and Testing			Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)		No	Type	Results							
12.76-14.30 (0:40)	100 99	97 95	57 64	NI 200 310	Water (Purple) Water (Purple)						13.20-13.30m : Thin band of light brown and greyish brown fine grained psammite. 13.44-13.52m : Steeply dipping en-echelon calcite vein (<5mm thick).	113 IcF 114 J 115 J 116 IcF 117 IcF	13 12	(2.25)	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
27/10/14	16:45	3.50	3.50	146	0.50
28/10/14	08:00	3.50	3.50	146	3.40
28/10/14	16:45	14.20	14.20	146	4.80

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + NBeckett**	**ADingle + ADingle**

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STRUCTURAL SOILS

[DI-126] - Issued to client for approval

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH6**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	**26.10.14** End: **28.10.14**	**25.50**	**E:235484.6 N:392612.0**	**16** of **19**

Mechanical Log						Samples and Testing							
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	No	Type	Results	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
	99	95	64	NI 200 310	Water (Purple)						13.58-13.70m : Very thin bands of light brown and brownish grey fine grained psammite with calcite overprinting.	118 J 119 J 120 IcF 121 IcF 122 J 123 J 124 J 125 J[i]	11.20	14.30	
											Borehole terminated at 14.30m depth.				

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
27/10/14	16:45	3.50	3.50	146	0.50
28/10/14	08:00	3.50	3.50	146	3.40
28/10/14	16:45	14.20	14.20	146	4.80

General Remarks

All dimensions in metres | Scale: **1:5** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + NBeckett**	**ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:		Client:		Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation		**Horizon Nuclear Power Wylfa Limited**		**RGM-BH6**
Contract Ref:	Start: **26.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **28.10.14**	**25.50**	**E:235484.6 N:392612.0**	**17** of **19**

RGM-BH6 Box 1-2 1.20m - 3.50m depth





RGM-BH6 Box 3-4 3.50m - 6.50m depth

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + NBeckett**	**ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:		Client:		Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation		**Horizon Nuclear Power Wylfa Limited**		**RGM-BH6**
Contract Ref:	Start: **26.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **28.10.14**	**25.50**	**E:235484.6 N:392612.0**	**18** of **19**

RGM-BH6 Box 5-6 6.50m - 9.50m depth





RGM-BH6 Box 7-8 9.50m - 12.60m depth

Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + NBeckett**	**ADingle + ADingle**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH6**

Contract Ref:	Start: **26.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **28.10.14**	**25.50**	**E:235484.6 N:392612.0**	**19** of **19**

RGM-BH6 Box 9 12.60m - 14.20m depth



Method Used:	Plant Used:	Drilled By:	Logged By:	Reviewed By:
Inspection pit + Cable Percussion + Rotary Cored	**Dando 2000 + Comacchio GEO 601**	**Gavin James + Scott Pincher**	**MNaisbitt + NBeckett**	**ADingle + ADingle**

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SUMMARY OF DISCONTINUITIES - RGM-BH6

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
1	1.20-1.27	J	65	U-R	Open	-	Orange brown surface staining.	New Harbour Group	PSAMMITE
2	1.37	J	30	U-R	Open	-	Orange brown surface staining.	New Harbour Group	PSAMMITE
3	1.42	J	20	U-R	Open	-	Orange brown surface staining.	New Harbour Group	PSAMMITE
4	1.85	PF	10	U-R	Open	<1mm brown clay infill/fault gouge.	Brown surface staining. Locally weak highly fractured	New Harbour Group	PSAMMITE
							wall.		
5	2.20-2.36	PF	30	U-R	Open	<1mm brown clay infill/fault gouge.	Brown surface staining. Locally weak highly fractured	New Harbour Group	PSAMMITE
							wall.		
6	2.23-2.34	J	85	U-R	Partly open	Slight brown clay smearing.	Orange brown surface staining.	New Harbour Group	PSAMMITE
7	2.31-2.38	J	30	U-R	Open	-	Brown surface staining.	New Harbour Group	PSAMMITE
8	2.42-2.44	FF	20	U-R	Partly open	-	Brown surface staining.	New Harbour Group	PSAMMITE
9	2.44-2.54	J	60	U-R	Partly open	Slight brown clay smearing.	Orange brown surface staining.	New Harbour Group	PSAMMITE
10	2.55	FF	15	U-R	Partly open	Slight brown clay smearing.	Brown surface staining.	New Harbour Group	PSAMMITE
11	2.66	FF	15	U-R	Partly open	-	Brown surface staining.	New Harbour Group	PSAMMITE
12	2.75	IcF	15	U-R	Tight	-	Brown surface staining.	New Harbour Group	PSAMMITE
13	2.87	PF	15	U-R	Open	<1mm brown clay infill/fault gouge.	Brown surface staining. Locally weak highly fractured	New Harbour Group	PSAMMITE
							wall.		

Key:
Type codes: FF = Foliation fracture, IcF = Incipient fracture, J = Joint, PF = Possible Fault.
Small-scale roughness codes: S-R = Stepped - rough, U-R = Undulating - rough, U-ST = Undulating - striated.
Aperture description codes: Moderately wide = Moderately wide (2.5mm - 10mm), Open = Open (0.5mm - 2.5mm), Partly open = Partly open (0.25mm - 0.5mm), Tight = Tight (0.1mm - 0.25mm).

STRUCTURAL SOILS
The Old School
Stillhouse Lane
Bedminster
Bristol BS3 4EB

Compiled By: [redacted] JTAYLOR
Date: 29.1.15
Contract Ref: 728599
Contract: Wylfa Newydd Detailed Onshore Ground Investigation

SUMMARY OF DISCONTINUITIES - RGM-BH6

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
14	2.94	FF	20	U-R	Partly open	-	Dark brown surface staining.	New Harbour Group	PSAMMITE
15	3.00	FF	15	U-R	Partly open	-	Dark brown surface staining.	New Harbour Group	PSAMMITE
16	3.01-3.06	IcF	55	S-R	Tight	-	Brown surface staining.	New Harbour Group	PSAMMITE
17	3.17	FF	15	U-R	Partly open	-	Dark brown surface staining.	New Harbour Group	PSAMMITE
18	3.23	PF	20	U-R	Open	<1mm brown clay infill/fault gouge.	Brown surface staining. Locally weak highly fractured	New Harbour Group	PSAMMITE
							wall.		
19	3.24-3.30	J	35	U-R	Open	-	Brown staining. Wall strength is locally weak highly	New Harbour Group	PSAMMITE
							fractured.		
20	3.33	PF	10	U-R	Partly open	<0.5mm brown clay infill/fault gouge.	Brown surface staining. Locally weak highly fractured	New Harbour Group	PSAMMITE
							wall.		
21	3.34-3.54	PF	60	U-R	Open	Slight brown clay infill/smearing with	Brown surface staining. Wall is locally weak and	New Harbour Group	PSAMMITE
						fine gravel.	highly fractured.		
22	3.36	PF	10	U-R	Partly open	<0.5mm brown clay infill/fault gouge.	Brown surface staining. Locally weak highly fractured	New Harbour Group	PSAMMITE
							wall.		
23	3.55	J	30	U-R	Open	Reddish brown clay smearing.	Locally dark brown surface staining.	New Harbour Group	PSAMMITE
24	3.60-3.74	IcF	55	U-R	Tight	Slight black silt smearing.	Dark brown to black surface staining.	New Harbour Group	PSAMMITE

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SUMMARY OF DISCONTINUITIES - RGM-BH6

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
25	3.61-3.79	IcF	75	U-R	Tight	Slight black silt smearing.	Dark brown to black surface staining.	New Harbour Group	PSAMMITE
26	3.80	J	10	U-ST	Open	-	Dark brown surface staining.	New Harbour Group	PSAMMITE
27	3.81-3.90	IcF	85	U-R	Open	Slight black silt smearing.	Dark brown to black surface staining. Possibly	New Harbour Group	PSAMMITE
							opened by drilling.		
28	3.83	PF	20	U-R	Open	<1mm brown clay infill/fault gouge.	Brown surface staining. Locally weak highly fractured	New Harbour Group	PSAMMITE
							wall.		
29	3.88	FF	20	U-R	Partly open	-	Orange brown staining. Wall strength is weak.	New Harbour Group	PSAMMITE
30	3.93-3.98	IcF	30	U-R	Open	Slight black silt smearing.	Dark brown to black surface staining. Possibly	New Harbour Group	PSAMMITE
							opened by drilling.		
31	4.02-4.04	PF	5	U-R	Moderately wide	<10mm tabular fine gravel and slight	Locally weak highly fractured wall.	New Harbour Group	PSAMMITE
						clay infill.			
32	4.07	IcF	5	U-R	Open	-	Dark brown to black surface staining. Possibly	New Harbour Group	PSAMMITE
							opened by drilling.		
33	4.11	IcF	5	U-R	Open	-	Dark brown to black surface staining. Possibly	New Harbour Group	PSAMMITE
							opened by drilling.		
34	4.12	IcF	5	U-R	Open	-	Dark brown to black surface staining. Possibly	New Harbour Group	PSAMMITE

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Small-scale roughness codes: S-R = Stepped - rough, U-R = Undulating - rough, U-ST = Undulating - striated.
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SUMMARY OF DISCONTINUITIES - RGM-BH6

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
							opened by drilling.		
35	4.33	IcF	30	U-R	Tight	-	Brown surface staining.	New Harbour Group	PSAMMITE
36	4.54-4.70	IcF	55	U-R	Open	-	Brown surface staining. Possibly opened by drilling.	New Harbour Group	PSAMMITE
37	4.57	FF	15	U-R	Partly open	-	Dark brown surface staining.	New Harbour Group	PSAMMITE
38	4.74-4.96	J	70	U-R	Partly open	-	Reddish brown surface staining.	New Harbour Group	PSAMMITE
39	4.96	FF	15	U-R	Partly open	-	Brown surface staining.	New Harbour Group	PSAMMITE
40	5.04-5.14	J	50	U-R	Partly open	-	Brown surface staining.	New Harbour Group	PSAMMITE
41	5.30-5.47	J	60	U-R	Open	-	Dark brown staining.	New Harbour Group	PSAMMITE
42	5.46	FF	15	U-R	Partly open	Slight brown clay smearing.	Dark brown surface staining.	New Harbour Group	PSAMMITE
43	5.50-5.85	J	70	U-R	Open	-	Brown surface staining. Locally wall strength is weak	New Harbour Group	PSAMMITE
							and highly fractured.		
44	5.52	IcF	10	U-R	Open	-	Brown surface staining. Possibly opened by drilling.	New Harbour Group	PSAMMITE
45	5.56-5.61	IcF	35	U-R	Open	-	Brown surface staining. Possibly opened by drilling.	New Harbour Group	PSAMMITE
46	5.57	IcF	10	U-R	Open	-	Brown surface staining. Possibly opened by drilling.	New Harbour Group	PSAMMITE
47	5.61-5.63	PF	30	U-R	Open	<4mm brown clay infill/fault gouge.	Brown surface staining. Locally wall strength is weak	New Harbour Group	PSAMMITE
							highly fractured.		

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Type codes: FF = Foliation fracture, IcF = Incipient fracture, J = Joint, PF = Possible Fault.
Small-scale roughness codes: S-R = Stepped - rough, U-R = Undulating - rough, U-ST = Undulating - striated.
Aperture description codes: Moderately wide = Moderately wide (2.5mm - 10mm), Open = Open (0.5mm - 2.5mm), Partly open = Partly open (0.25mm - 0.5mm), Tight = Tight (0.1mm - 0.25mm).

SUMMARY OF DISCONTINUITIES - RGM-BH6

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
48	5.87	PF	30	U-R	Open	<4mm brown clay infill/fault gouge.	Brown surface staining. Locally wall strength is weak	New Harbour Group	PSAMMITE
							highly fractured.		
49	5.93-6.15	J	70	U-R	Open	-	Brown surface staining. Locally wall strength is weak	New Harbour Group	PSAMMITE
							and highly fractured.		
50	5.98	IcF	10	U-R	Open	-	Brown surface staining. Possibly opened by drilling.	New Harbour Group	PSAMMITE
51	6.05-6.28	J	70	U-R	Open	-	Brown surface staining. Locally wall strength is weak.	New Harbour Group	PSAMMITE
52	6.06	IcF	15	U-R	Open	-	Brown surface staining. Possibly opened by drilling.	New Harbour Group	PSAMMITE
53	6.11	IcF	15	U-R	Open	-	Brown surface staining. Possibly opened by drilling.	New Harbour Group	PSAMMITE
54	6.18	IcF	20	U-R	Open	-	Brown surface staining. Possibly opened by drilling.	New Harbour Group	PSAMMITE
55	6.24	IcF	15	U-R	Open	-	Brown surface staining. Possibly opened by drilling.	New Harbour Group	PSAMMITE
56	6.37	J	15	U-R	Open	-	Brown surface staining. Locally wall strength is weak.	New Harbour Group	PSAMMITE
57	6.39-6.50	J	70	U-R	Open	-	Brown surface staining.	New Harbour Group	PSAMMITE
58	6.44-6.54	J	45	U-R	Open	Reddish brown clay smearing.	Reddish brown surface staining.	New Harbour Group	PSAMMITE
59	6.97	FF	15	U-R	Partly open	-	Reddish brown surface staining.	New Harbour Group	PSAMMITE
60	6.98-7.01	J	45	S-R	Open	-	Reddish brown surface staining.	New Harbour Group	PSAMMITE
61	7.00	FF	15	U-R	Partly open	-	Reddish brown surface staining.	New Harbour Group	PSAMMITE

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Type codes: FF = Foliation fracture, IcF = Incipient fracture, J = Joint, PF = Possible Fault.
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Aperture description codes: Moderately wide = Moderately wide (2.5mm - 10mm), Open = Open (0.5mm - 2.5mm), Partly open = Partly open (0.25mm - 0.5mm), Tight = Tight (0.1mm - 0.25mm).

SUMMARY OF DISCONTINUITIES - RGM-BH6

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
62	7.05	J	35	U-R	Partly open	Reddish brown sandy clay smearing.	Reddish brown surface staining.	New Harbour Group	PSAMMITE
63	7.12	J	35	U-R	Partly open	-	Reddish brown surface staining.	New Harbour Group	PSAMMITE
64	7.29	FF	20	U-R	Partly open	-	Slight brown surface staining.	New Harbour Group	PSAMMITE
65	7.30-7.56	J	80	U-R	Partly open	-	Dark brown surface staining.	New Harbour Group	PSAMMITE
66	7.35	FF	10	U-R	Partly open	Slight brown clay smearing.	Dark brown speckled surface staining.	New Harbour Group	PSAMMITE
67	7.44-7.59	J	50	U-R	Partly open	Reddish brown clay smearing.	Reddish brown surface staining.	New Harbour Group	PSAMMITE
68	7.45-7.53	J	35	U-R	Partly open	Reddish brown clay smearing.	Speckled dark brown surface staining.	New Harbour Group	PSAMMITE
69	7.56	FF	10	U-R	Partly open	Slight brown clay smearing.	Slight brown surface staining.	New Harbour Group	PSAMMITE
70	7.71	FF	10	U-R	Partly open	-	Slight brown surface staining.	New Harbour Group	PSAMMITE
71	7.84-8.05	J	60	U-R	Partly open	Reddish brown clay smearing.	Reddish brown surface staining.	New Harbour Group	PSAMMITE
72	7.95-8.00	J	35	U-R	Partly open	Reddish brown clay smearing.	Brown surface staining.	New Harbour Group	PSAMMITE
73	8.16-8.28	J	75	U-R	Partly open	-	Dark brown surface staining.	New Harbour Group	PSAMMITE
74	8.19-8.37	J	75	U-R	Partly open	Reddish brown clay smearing.	Brown surface staining.	New Harbour Group	PSAMMITE
75	8.33-8.39	J	35	U-R	Partly open	-	Brown surface staining.	New Harbour Group	PSAMMITE
76	8.53	J	10	U-R	Partly open	-	Brown surface staining.	New Harbour Group	PSAMMITE
77	8.59	IcF	10	U-R	Tight	-	Brown surface staining.	New Harbour Group	PSAMMITE

Key:
Type codes: FF = Foliation fracture, IcF = Incipient fracture, J = Joint, PF = Possible Fault.
Small-scale roughness codes: S-R = Stepped - rough, U-R = Undulating - rough, U-ST = Undulating - striated.
Aperture description codes: Moderately wide = Moderately wide (2.5mm - 10mm), Open = Open (0.5mm - 2.5mm), Partly open = Partly open (0.25mm - 0.5mm), Tight = Tight (0.1mm - 0.25mm).

SUMMARY OF DISCONTINUITIES - RGM-BH6

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
78	8.67	J	35	U-R	Partly open	-	Brown surface staining.	New Harbour Group	PSAMMITE
79	8.75	J	35	U-R	Partly open	-	Brown surface staining.	New Harbour Group	PSAMMITE
80	8.94-9.11	J	60	U-R	Partly open	-	Reddish brown surface staining on calcite vein.	New Harbour Group	PSAMMITE
81	9.05	J	35	U-R	Partly open	-	Brown surface staining.	New Harbour Group	PSAMMITE
82	9.06-9.34	J	75	U-R	Partly open	-	Brown surface staining.	New Harbour Group	PSAMMITE
83	9.35-9.41	J	55	U-R	Partly open	-	Slight brown surface staining.	New Harbour Group	PSAMMITE
84	9.42	J	35	U-R	Partly open	-	Brown surface staining.	New Harbour Group	PSAMMITE
85	9.45	J	35	U-R	Partly open	-	Brown surface staining.	New Harbour Group	PSAMMITE
86	9.46-9.87	J	85	U-R	Partly open	Reddish brown clay smearing.	Brown surface staining.	New Harbour Group	PSAMMITE
87	9.52	J	15	U-R	Partly open	-	Brown surface staining.	New Harbour Group	PSAMMITE
88	9.55	J	15	U-R	Partly open	-	Brown surface staining.	New Harbour Group	PSAMMITE
89	9.77	J	30	U-R	Partly open	-	Reddish brown surface staining.	New Harbour Group	PSAMMITE
90	9.77	J	30	U-R	Partly open	-	Reddish brown surface staining.	New Harbour Group	PSAMMITE
91	9.79-9.95	IcF	55	U-R	Open	-	Reddish brown surface staining.	New Harbour Group	PSAMMITE
92	10.10	J	25	U-R	Partly open	-	Brown surface staining. Wall strength is locally weak.	New Harbour Group	PSAMMITE
93	10.11	J	25	U-R	Partly open	-	Brown surface staining. Wall strength is locally weak.	New Harbour Group	PSAMMITE

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Type codes: FF = Foliation fracture, IcF = Incipient fracture, J = Joint, PF = Possible Fault.
Small-scale roughness codes: S-R = Stepped - rough, U-R = Undulating - rough, U-ST = Undulating - striated.
Aperture description codes: Moderately wide = Moderately wide (2.5mm - 10mm), Open = Open (0.5mm - 2.5mm), Partly open = Partly open (0.25mm - 0.5mm), Tight = Tight (0.1mm - 0.25mm).

SUMMARY OF DISCONTINUITIES - RGM-BH6

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
94	10.17	J	25	U-R	Partly open	-	Brown surface staining.	New Harbour Group	PSAMMITE
95	10.21	J	15	U-R	Partly open	-	Brown surface staining.	New Harbour Group	PSAMMITE
96	10.30-10.50	IcF	55	U-R	Open	-	Brown surface staining.	New Harbour Group	PSAMMITE
97	10.49	J	10	U-R	Partly open	-	Brown surface staining.	New Harbour Group	PSAMMITE
98	10.77	J	10	U-R	Partly open	-	Brown surface staining.	New Harbour Group	PSAMMITE
99	10.94	J	15	U-R	Partly open	-	Brown surface staining on patchy calcite vein.	New Harbour Group	PSAMMITE
100	11.04	IcF	55	U-R	Open	-	Brown surface staining.	New Harbour Group	PSAMMITE
101	11.42	J	5	U-R	Partly open	-	Brown surface staining.	New Harbour Group	PSAMMITE
102	11.50	J	15	U-R	Partly open	-	Brown surface staining.	New Harbour Group	PSAMMITE
103	11.78	J	15	U-R	Partly open	Slight grey clay smearing.	Brown surface staining.	New Harbour Group	PSAMMITE
104	11.87	IcF	15	U-R	Partly open	-	Brown surface staining.	New Harbour Group	PSAMMITE
105	11.93-12.05	J	50	U-R	Partly open	Reddish brown clay smearing.	Brown surface staining. Wall strength is weak.	New Harbour Group	PSAMMITE
106	12.07	J	15	U-R	Partly open	-	Brown surface staining.	New Harbour Group	PSAMMITE
107	12.21	IcF	55	U-R	Open	-	Calcite vein. Possibly opened by drilling.	New Harbour Group	PSAMMITE
108	12.27	IcF	25	U-R	Open	-	Calcite vein. Possibly opened by drilling.	New Harbour Group	PSAMMITE
109	12.34	IcF	50	U-R	Open	-	Clean. Possibly opened by drilling.	New Harbour Group	PSAMMITE

Key:
Type codes: FF = Foliation fracture, IcF = Incipient fracture, J = Joint, PF = Possible Fault.
Small-scale roughness codes: S-R = Stepped - rough, U-R = Undulating - rough, U-ST = Undulating - striated.
Aperture description codes: Moderately wide = Moderately wide (2.5mm - 10mm), Open = Open (0.5mm - 2.5mm), Partly open = Partly open (0.25mm - 0.5mm), Tight = Tight (0.1mm - 0.25mm).

SUMMARY OF DISCONTINUITIES - RGM-BH6

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
110	12.46	IcF	25	U-R	Partly open	-	Slight brown surface staining on calcite vein.	New Harbour Group	PSAMMITE
111	12.48	IcF	25	U-R	Partly open	-	Slight brown surface staining on calcite vein.	New Harbour Group	PSAMMITE
112	12.57	IcF	25	U-R	Partly open	-	Slight reddish brown surface staining.	New Harbour Group	PSAMMITE
113	12.79-12.89	IcF	70	U-R	Tight	-	Reddish brown surface staining.	New Harbour Group	PSAMMITE
114	12.88-12.98	J	45	U-R	Partly open	-	Reddish brown surface staining. On calcite vein.	New Harbour Group	PSAMMITE
115	13.08	J	15	U-R	Partly open	-	Brown surface staining.	New Harbour Group	PSAMMITE
116	13.25	IcF	20	U-R	Open	-	Brown surface staining. Possibly opened by drilling.	New Harbour Group	PSAMMITE
117	13.31	IcF	10	U-R	Open	-	Brown surface staining. Possibly opened by drilling.	New Harbour Group	PSAMMITE
118	13.59	J	15	U-R	Partly open	-	Speckled brown surface staining.	New Harbour Group	PSAMMITE
119	13.76	J	35	U-R	Partly open	-	Locally dark brown surface staining. Wall strength is	New Harbour Group	PSAMMITE
							locally weak.		
120	13.85	IcF	25	U-R	Tight	-		New Harbour Group	PSAMMITE
121	13.94	IcF	30	U-R	Open	-	Possibly opened by drilling.	New Harbour Group	PSAMMITE
122	14.03	J	10	U-R	Partly open	-	Brown surface staining.	New Harbour Group	PSAMMITE
123	14.14	J	10	U-R	Partly open	-	Brown surface staining.	New Harbour Group	PSAMMITE
124	14.20	J	35	U-R	Partly open	-	Brown surface staining.	New Harbour Group	PSAMMITE

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Type codes: FF = Foliation fracture, IcF = Incipient fracture, J = Joint, PF = Possible Fault.
Small-scale roughness codes: S-R = Stepped - rough, U-R = Undulating - rough, U-ST = Undulating - striated.
Aperture description codes: Moderately wide = Moderately wide (2.5mm - 10mm), Open = Open (0.5mm - 2.5mm), Partly open = Partly open (0.25mm - 0.5mm), Tight = Tight (0.1mm - 0.25mm).

SUMMARY OF DISCONTINUITIES - RGM-BH6

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
125	14.27	J	40	U-R	Partly open	Slight brown clay smearing.	Brown surface staining.	New Harbour Group	PSAMMITE

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Type codes: FF = Foliation fracture, IcF = Incipient fracture, J = Joint, PF = Possible Fault.
Small-scale roughness codes: S-R = Stepped - rough, U-R = Undulating - rough, U-ST = Undulating - striated.
Aperture description codes: Moderately wide = Moderately wide (2.5mm - 10mm), Open = Open (0.5mm - 2.5mm), Partly open = Partly open (0.25mm - 0.5mm), Tight = Tight (0.1mm - 0.25mm).

STRUCTURAL SOILS
The Old School
Stillhouse Lane
Bedminster
Bristol BS3 4EB

Compiled By		Date	Contract Ref:
[redacted]	JTAYLOR	29.1.15	728599

Contract: **Wylfa Newydd Detailed Onshore Ground Investigation**

SUMMARY OF FAULTS AND POSSIBLE FAULTS - RGM-BH6

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
4	1.85	PF	10	U-R	Open	<1mm brown clay infill/fault gouge.	Brown surface staining. Locally weak highly fractured	New Harbour Group	PSAMMITE
							wall.		
5	2.20-2.36	PF	30	U-R	Open	<1mm brown clay infill/fault gouge.	Brown surface staining. Locally weak highly fractured	New Harbour Group	PSAMMITE
							wall.		
13	2.87	PF	15	U-R	Open	<1mm brown clay infill/fault gouge.	Brown surface staining. Locally weak highly fractured	New Harbour Group	PSAMMITE
							wall.		
18	3.23	PF	20	U-R	Open	<1mm brown clay infill/fault gouge.	Brown surface staining. Locally weak highly fractured	New Harbour Group	PSAMMITE
							wall.		
20	3.33	PF	10	U-R	Partly open	<0.5mm brown clay infill/fault gouge.	Brown surface staining. Locally weak highly fractured	New Harbour Group	PSAMMITE
							wall.		
21	3.34-3.54	PF	60	U-R	Open	Slight brown clay infill/smearing with	Brown surface staining. Wall is locally weak and	New Harbour Group	PSAMMITE
						fine gravel.	highly fractured.		
22	3.36	PF	10	U-R	Partly open	<0.5mm brown clay infill/fault gouge.	Brown surface staining. Locally weak highly fractured	New Harbour Group	PSAMMITE
							wall.		
28	3.83	PF	20	U-R	Open	<1mm brown clay infill/fault gouge.	Brown surface staining. Locally weak highly fractured	New Harbour Group	PSAMMITE
							wall.		

Key:
Type codes: PF = Possible Fault.
Small-scale roughness codes: U-R = Undulating - rough.
Aperture description codes: Moderately wide = Moderately wide (2.5mm - 10mm), Open = Open (0.5mm - 2.5mm), Partly open = Partly open (0.25mm - 0.5mm).

STRUCTURAL SOILS
The Old School
Stillhouse Lane
Bedminster
Bristol BS3 4EB

Compiled By: [redacted] JTAYLOR
Date: 29.1.15
Contract Ref: 728599
Contract: Wylfa Newydd Detailed Onshore Ground Investigation

SUMMARY OF FAULTS AND POSSIBLE FAULTS - RGM-BH6

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
31	4.02-4.04	PF	5	U-R	Moderately wide	<10mm tabular fine gravel and slight	Locally weak highly fractured wall.	New Harbour Group	PSAMMITE
						clay infill.			
47	5.61-5.63	PF	30	U-R	Open	<4mm brown clay infill/fault gouge.	Brown surface staining. Locally wall strength is weak	New Harbour Group	PSAMMITE
							highly fractured.		
48	5.87	PF	30	U-R	Open	<4mm brown clay infill/fault gouge.	Brown surface staining. Locally wall strength is weak	New Harbour Group	PSAMMITE
							highly fractured.		

Key:
Type codes: PF = Possible Fault.
Small-scale roughness codes: U-R = Undulating - rough.
Aperture description codes: Moderately wide = Moderately wide (2.5mm - 10mm), Open = Open (0.5mm - 2.5mm), Partly open = Partly open (0.25mm - 0.5mm).

STRUCTURAL SOILS
The Old School
Stillhouse Lane
Bedminster
Bristol BS3 4EB

Compiled By: [redacted] JTAYLOR

Date: 29.1.15

Contract Ref: 728599

Contract: Wylfa Newydd Detailed Onshore Ground Investigation

AGS

GINT_LIBRARY_V8_05.GLB : XCUSTOM - SSL - 728599 - FAULTS : 728599_LOW_PRIORITY_WYLFA_NEWYDD_DETAILED_ONSHORE_GROUND_INVESTIGATION.GPJ : 29/1/15 18:58 : JT : DI-126

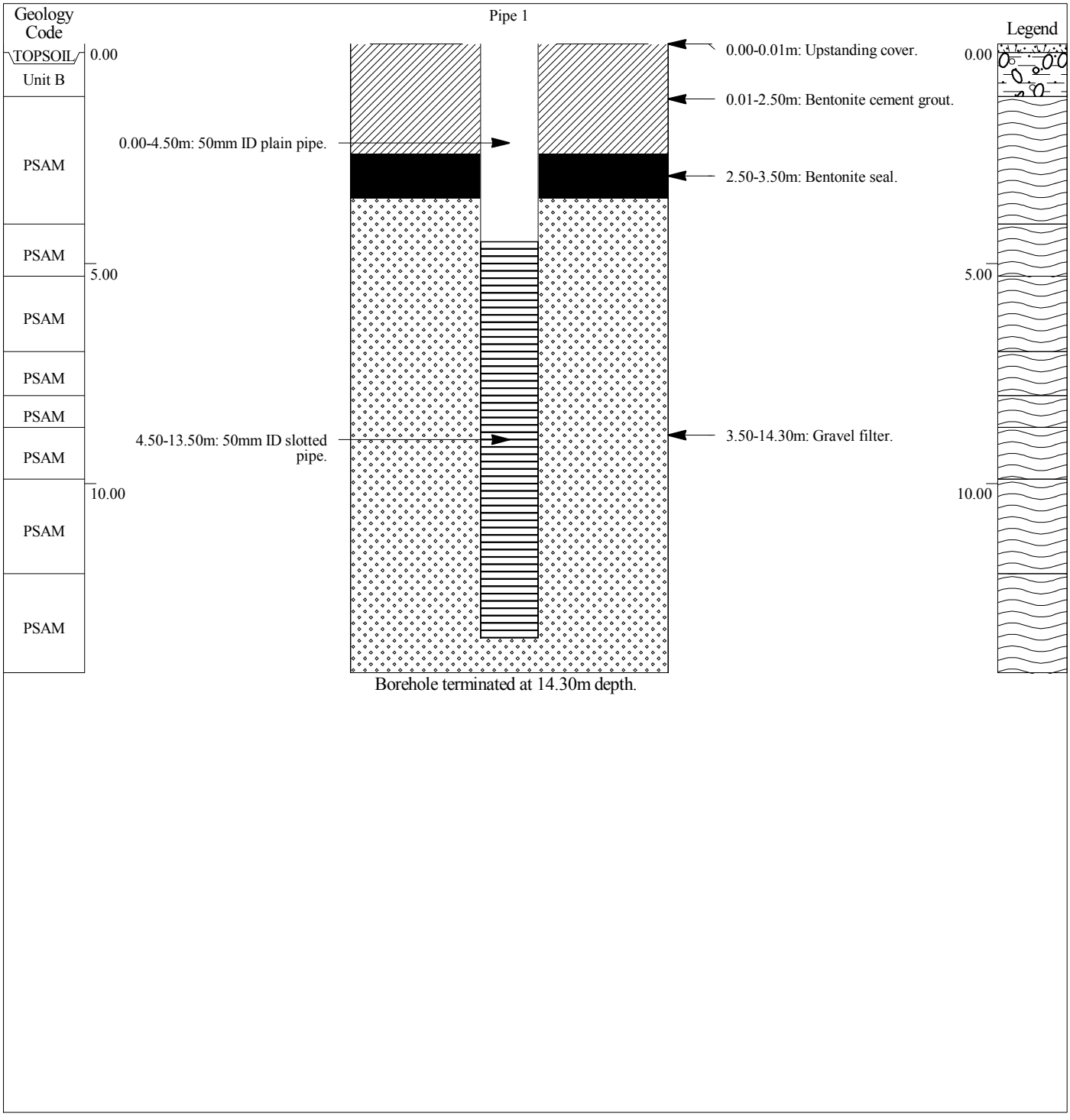
[DI-126] - Issued to client for approval

STRUCTURAL SOILS

INSTALLATION LOG

Contract:	Client:	Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**RGM-BH6**

Contract Ref:	Start: **26.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **28.10.14**	**25.50**	**E:235484.6 N:392612.0**	**1** of **2**



General Remarks

Geology code details:

PSAM=PSAMMITE, TOPSOIL=Topsoil, Unit B=Locally derived lodgement till

1. Location CAT and Genny scanned prior to commencement.
2. Hand dug inspection pit GL to 1.20m depth.(IP)
3. Inspection pit remained stable during excavation.
4. No groundwater encountered.

Note: Graphical representation of well installation is scaled vertically, but exaggerated in the horizontal to aid interpretation.

All dimensions in metres	Installation	Installation	Installed
Scale **1:131**	Date -	Type -	By -

GINT_LIBRARY_V8_05.GLB LibVersion: v8_05 - Lib0006 PrjVersion: | Log XCUSTOM - SSL - 728599 - INSTALLATIONS | 728599_LOW_PRIORITY_WYLFA_NEWYDD_DETAILED_ONSHORE_GROUND_INVESTIGATION.GPJ - v8_05.
Structural Soils Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.soils.co.uk, Email: ask@soils.co.uk | 29/1/15 - 18:58 | JT | DI-126

STRUCTURAL SOILS

[DI-126] - Issued to client for approval

INSTALLATION LOG

Contract:		Client:		Borehole:
Wylfa Newydd Detailed Onshore Ground Investigation		**Horizon Nuclear Power Wylfa Limited**		**RGM-BH6**
Contract Ref:	Start: **26.10.14**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
728599	End: **28.10.14**	**25.50**	**E:235484.6 N:392612.0**	**2** of **2**

Geology Code | Pipe 1 | Legend

General Remarks

5. Strata unsuitable for Hand Vane tests.
6. Cable percussion boring using 200mm diameter tools to 1.2m depth on 26/10/2014.
7. Water added to assist boring from 0.00m to 0.85m depth.
8. Rotary cored drilling from 1.20m to 14.30m depth with water flush between 27/10/2014 and 28/10/2014.
9. Groundwater monitoring standpipe installed as shown upon completion.
10. SPT hammer EQU166-2013 (E_r = 80.05%) used.

Note: Graphical representation of well installation is scaled vertically, but exaggerated in the horizontal to aid interpretation.

All dimensions in metres	Installation	Installation	Installed
Scale **1:131**	Date -	Type -	By -

GINT_LIBRARY_V8_05.GLB LibVersion: v8_05 - Lib0006 PrjVersion: | Log XCUSTOM - SSL - 728599 - INSTALLATIONS | 728599_LOW_PRIORITY_WYLFA_NEWYDD_DETAILED_ONSHORE_GROUND_INVESTIGATION.GPJ - v8_05.
Structural Soils Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.soils.co.uk, Email: ask@soils.co.uk | 29/1/15 - 18:58 | JT | DI-126

STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00005

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH536R

Contract Ref:	Start: 26.05.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 30.05.11	16.732	E:234707.7 N:393238.2	1 of 11

Depth	TCR %	SCR %	RQD %	If (mm)	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
0.00								Grass over TOPSOIL consisting of soft dark brown sandy slightly gravelly CLAY. (Topsoil)		16.432	(0.30) 0.30	
								Soft dark brown to dark grey sandy gravelly CLAY. (Drift Deposits - Unit B1)		16	(0.90) 1	
1.00										15.532	1.20	
								Dark brown sandy clayey fine to medium subangular to angular GRAVEL of phyllite (description from drilled cuttings). (Drift Deposits)		15.132	(0.40) 1.60	
								Strong to medium strong bluish grey fine to coarse medium grained slightly weathered to fresh PSAMMITE with closely to very closely spaced narrow to very thin bands of very narrowly foliated reddish purple phyllite. (New Harbour Group - Psammite)		15	(0.42) 2.02 2	
2.00				50 140 350				Medium strong to strong narrowly foliated light green locally pink and brown fresh to slightly weathered PHYLLITE with very closely to closely spaced narrow bands of green fine and medium grained psammite. (New Harbour Group - Phyllite)		14.712	(0.63) 2.65	
								Medium strong to strong narrow to very thin bands of green grey fine grained fresh to slightly weathered PSAMMITE with extremely closely to very closely spaced narrow to very thin bands of very narrowly foliated greenish grey phyllite. (New Harbour Group - Psammite)		14.082	(0.55) 3.20	
3.00				20 390 1080				Medium strong to strong narrow to very thin bands of reddish brown and purplish brown very narrowly foliated fresh to slightly weathered PHYLLITE with extremely to very closely spaced narrow to very thin bands of green grey fine grained psammite. (New Harbour Group - Phyllite)		13.532	(2.33) 5.53	
4.00										13	4	
										12		

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
26/05/11	17:20	3.50	1.30	101	1.60
27/05/11	08:15	3.50	1.30	101	1.71
27/05/11	18:00	25.80	1.30	101	14.50
28/05/11	09:00	25.80	1.30	101	3.30
28/05/11	16:02	33.85	1.30	101	12.00
29/05/11	08:45	33.85	1.30	101	3.20
29/05/11	16:00	42.50	1.30	101	8.80
30/05/11	09:00	42.50	1.30	101	3.20

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:28** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

GINT_LIBRARY_V8_04.GLB!XCUSTOM - SSL - 725061 - SUMMARY LOG | 725061_WYLFA.GPJ - v8_04 | 17/12/11 - 22:46 | MJB
Structural Soils Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.soils.co.uk, Email:admin@soils.co.uk.

STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00005

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH536R

Contract Ref:	Start: 26.05.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 30.05.11	16.732	E:234707.7 N:393238.2	2 of 11

Depth	TCR %	SCR %	RQD %	If (mm)	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
5.00										11.202	5.53	
								Strong medium bands of green grey fine to coarse grained fresh to slightly weathered METACONGLOMERATE. (New Harbour Group - METACONGLOMERATE)		11	(0.47)	
6.00				20 390 1080						10.732	6.00	6
								Strong disturbed narrow to very thin bands of green grey fine to coarse grained fresh PSAMMITE with extremely closely spaced highly disturbed narrow bands of very narrowly foliated reddish brown phyllite. (New Harbour Group - Psammite)			(0.45)	
								Medium strong narrow to very thin bands of reddish brown very narrowly foliated fresh PHYLLITE interbanded with extremely closely to closely spaced narrow to thin bands of green grey and red-brown fine to medium grained PSAMMITE. (New Harbour Group - Interbedded PHYLLITE & PSAMMITE)		10.282	6.45	
										10	(0.47)	
										9.812	6.92	
7.00								Medium strong to strong narrow to very thin lenticular bands of green grey fine to coarse grained fresh PSAMMITE with extremely closely to very closely spaced narrow to very thin bands of very narrowly foliated greenish grey and greenish brown disturbed phyllite. (New Harbour Group - Psammite)				7
											(1.08)	
										9		
										8.732	8.00	8
8.00				3600				Strong thin to medium bands of green grey fine to coarse grained fresh PSAMMITE with locally moderately disturbed very narrow lenticular bands of brown phyllite. (New Harbour Group - Psammite)				
										8	(1.32)	
												9
9.00										7.412	9.32	
								Strong very thin to thin lenticular bands of green grey fine to coarse grained fresh PSAMMITE with very closely to medium spaced narrow disturbed bands of very narrowly foliated green grey and green brown phyllite. (New Harbour Group - Psammite)		7	(0.72)	
												10

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
30/05/11	16:00	50.40	1.30	101	15.00

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:28** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

GINT_LIBRARY_V8_04.GLB!XCUSTOM - SSL - 725061 - SUMMARY LOG | 725061_WYLFA.GPJ - v8_04 | 17/12/11 - 22:46 | MJB
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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00005

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH536R

Contract Ref:	Start: 26.05.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 30.05.11	16.732	E:234707.7 N:393238.2	3 of 11

Depth	Mechanical Log TCR %	SCR %	RQD %	If (mm)	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
10.00				3600				Strong narrow to thin lenticular bands of green grey fine to coarse grained fresh PSAMMITE with extremely closely to closely spaced narrow disturbed bands of very narrowly foliated purple-brown and green brown phyllite. (New Harbour Group - Psammite)		6.692	10.04	
11.00											(2.04) 11	
12.00				60 1350 1670				Medium strong to strong narrow to very thin bands of green grey fine to coarse grained fresh PSAMMITE with extremely closely to very closely spaced narrow to very thin bands of very thinly foliated purplish grey and purplish brown phyllite. (New Harbour Group - Psammite)		4.652	12.08 12	
13.00										2.932	13.80	
14.00								Strong thin to medium bands of greenish grey fine to coarse grained fresh PSAMMITE. (New Harbour Group - Psammite)			(0.76) 14	
								Medium strong to strong narrow bands of very narrowly foliated light green fresh PHYLLITE with extremely closely spaced narrow lenticular bands of greenish grey fine to medium grained psammite. (New Harbour Group - Phyllite)		2.172	14.56	
										1.782	(0.39) 2 14.95 15	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: 1:28 | Inclination: Vertical | Azimuth: NA

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	Comacchio MC405	SP	ADingle + JWickenden	GS+BNS

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WYL-SSL-SDT-LOG-00005

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH536R

Contract Ref:	Start: 26.05.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 30.05.11	16.732	E:234707.7 N:393238.2	4 of 11

Depth	TCR %	SCR %	RQD %	If (mm)	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
15.00								Medium strong to strong narrow to thin bands of greenish grey fine to coarse grained fresh PSAMMITE with extremely closely to very closely spaced narrow to very thin disturbed bands of very narrowly foliated greenish grey and greenish brown phyllite. (New Harbour Group - Psammite)		1	(1.35) 16	
16.00				20 480 1090						0.432	16.30	
								Medium strong to strong narrow disturbed bands of purplish brown very narrowly foliated fresh PHYLLITE with extremely closely spaced narrow to very thin lenticular bands of locally disturbed greenish grey fine to medium grained psammite. (New Harbour Group - Phyllite)		0	(0.53)	
										-0.098	16.83	
								Medium strong to strong narrow to very thin bands of greenish grey fine to coarse grained fresh PSAMMITE with extremely closely to very closely spaced narrow bands of very narrowly foliated green grey and purplish grey phyllite. (New Harbour Group - Psammite)		-1	17 (1.22)	
17.00										-1.318	18.05	
18.00				3330				Medium strong to strong narrow to very thin bands of purplish grey very narrowly foliated fresh PHYLLITE with extremely closely to very closely spaced narrow lenticular bands of greenish grey fine grained psammite. (New Harbour Group - Phyllite)			(0.55)	
										-1.868	18.60	
								Medium strong to strong very thin to thin bands of greenish grey fine to medium grained fresh PSAMMITE with very closely to closely spaced narrow to very thin bands of very narrowly foliated greenish grey phyllite. (New Harbour Group - Psammite)		-2	(0.36)	
										-2.228	18.96	
19.00								Medium strong narrow bands of very narrowly foliated purple fresh PHYLLITE with extremely closely spaced very narrow to narrow lenticular and locally very thin bands of bluish grey fine to medium grained psammite. (New Harbour Group - Phyllite)			19 (0.50)	
										-2.728	19.46	
								Medium strong to strong thin to narrow bands of greenish grey fine to medium grained fresh PSAMMITE with extremely closely to very closely spaced very narrow to narrow bands of		-3		
											20	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:28** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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WYL-SSL-SDT-LOG-00005

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH536R

Contract Ref:	Start: 26.05.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Depth	Mechanical Log TCR %	SCR %	RQD %	If (mm)	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
20.00								purplish-brown, green and brown phyllite. (New Harbour Group - Psammite)		-3.888	(1.16) 20.62	
								Medium strong narrow to very thin bands of grey-green fine to medium grained fresh PSAMMITE with extremely closely to very closely spaced very narrow to narrow bands of very narrowly foliated green-brown and occasional brownish purple phyllite. (New Harbour Group - Psammite)		-4	21 (1.07)	
21.00				370 480 840						-4.958	21.69	
								Medium strong very narrow to thin bands of very narrowly foliated purple fresh PHYLLITE with extremely closely to very closely spaced very narrow to narrow lenticular bands of green-grey fine grained psammite. (New Harbour Group - Phyllite)		-5 -5.208	21.94	
22.00								Medium strong very narrow to very thin bands of grey-green fine to medium grained fresh PSAMMITE with extremely closely to very closely spaced very narrow to narrow bands of cream, green-brown and purplish-brown narrowly foliated phyllite. (New Harbour Group - Psammite)		-6 -6.218	22 (1.01) 22.95	
23.00								Medium strong to strong very narrow to very thin bands of very narrowly foliated purple locally greyish-purple fresh PHYLLITE with closely to locally extremely closely spaced very narrow to narrow bands and lenticular blue-grey fine to coarse grained psammite. (New Harbour Group - Phyllite)		-7	23 (1.81) 24	
24.00				3200						-8.0288	24.76	
								Strong very narrow to thin bands of grey fine to coarse grained fresh PSAMMITE with extremely closely to			(0.50) 25	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:28** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH536R

Contract Ref:	Start: 26.05.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Depth	Mechanical Log TCR %	SCR %	RQD %	If (mm)	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
25.00								very closely spaced very narrow bands of very narrowly foliated brownish-purple and green-brown phyllite. (New Harbour Group - Psammite)		-8.528	25.26	
				3200				Strong very narrow to very thin bands of grey-green fine to locally coarse grained fresh PSAMMITE with a highly disturbed extremely closely to very closely spaced narrowly foliated green and locally brownish-purple phyllite. (New Harbour Group - Psammite)		-9	26 (2.03)	
26.00										-10	27	
27.00										-10.558	27.29	
				310 620 1700				Medium strong very narrow to thin bands of very narrowly foliated purple fresh PHYLLITE interbanded with extremely closely to very closely spaced very thin bands of dark grey fine to coarse grained PSAMMITE. (New Harbour Group - Interbedded PHYLLITE & PSAMMITE)		-11	(1.04) 28	
28.00										-11.598	28.33	
								Strong narrow to thin bands of greenish-dark grey fine to coarse grained fresh PSAMMITE with closely to locally very closely spaced narrow to very thin bands of very narrowly foliated brownish purple phyllite. (New Harbour Group - Psammite)		-12	29	
29.00										-13	(2.73) 30	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:28** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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BOREHOLE LOG

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Contract Ref:	Start: 26.05.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Depth	Mechanical Log TCR %	SCR %	RQD %	If (mm)	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
30.00												
				310 620 1700						-14		
31.00								Strong very thin to thin bands of green-grey fine to medium to locally coarse grained fresh PSAMMITE with closely spaced narrow to very thin bands of very narrowly foliated purple phyllite. (New Harbour Group - Psammite)		-14.328	31.06 (0.66)	
								Medium very narrow to very thin bands of strong very narrowly foliated brownish purple fresh PHYLLITE with extremely closely spaced very narrow occasionally narrow lenticular bands of grey fine to medium grained psammite. (New Harbour Group - Phyllite)		-14.988 -15	31.72 (0.41)	
32.00								Strong very narrow to very thin bands of grey-green fine to locally coarse fresh PSAMMITE with extremely closely to closely spaced very narrow bands of very narrowly foliated purple and green phyllite. (New Harbour Group - Psammite)		-15.398	32.13 (0.62)	
								Medium strong very narrow to very thin bands of very narrowly foliated purple fresh PHYLLITE with extremely closely to very closely spaced very narrow lenticular bands of grey fine grained psammite. (New Harbour Group - Phyllite)		-16.018 -16	32.75	
33.00								Medium strong to strong greyish green fine grained fresh PSAMMITE breccia with a white calcite matrix. (New Harbour Group - Psammite)		-16.258	32.99 (0.51)	
				300 1100 1340				Strong very narrow to very thin bands of greenish-grey fine to medium, locally coarse grained fresh PSAMMITE with extremely closely to closely spaced narrow to very thin bands of very narrowly foliated purple phyllite. (New Harbour Group - Psammite)		-16.768 -17	33.50 (0.90)	
34.00								Medium strong greenish grey and diffuse purple fine grained weakly foliated fresh PSAMMITE. (New Harbour Group - Psammite)		-17.668 -18	34.40 (0.41)	
								Medium strong to strong very narrow to very thin bands of very narrowly foliated purplish-greyish		-18.078	34.81	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:28** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH536R

Contract Ref:	Start: 26.05.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Depth	TCR %	SCR %	RQD %	If (mm)	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
35.00								becoming purple fresh PHYLLITE with extremely closely to very closely spaced very narrow lenticular bands of grey fine grained psammite. (New Harbour Group - Phyllite)			(0.76)	
										-18.838	35.57	
								Strong very narrow to very thin bands of greenish grey fine to medium to locally coarse grained fresh PSAMMITE with extremely closely to closely spaced very narrow to very thin bands of brown-green and brownish-purple very narrowly foliated phyllite. (New Harbour Group - Psammite)		-19	(0.65)	
36.00											36	
										-19.488	36.22	
								Strong very thin to thin bands of grey locally greenish grey fine to coarse grained fresh PSAMMITE with closely to medium spaced very narrow to narrow bands of very narrowly foliated purple phyllite. (New Harbour Group - Psammite)		-20	(1.32)	
37.00											37	
				300 1100 1340						-20.808	37.54	
								Medium strong to strong very narrow to very thin bands of very narrowly foliated purple fresh PHYLLITE with extremely closely to very closely spaced very narrow to very thin lenticular bands of grey fine to medium grained psammite. (New Harbour Group - Phyllite)		-21	(0.57)	
38.00											38	
								Strong disturbed and brecciated green fine grained fresh PSAMMITE with irregularly spaced very narrow to narrow clasts of green phyllite, locally set within a matrix of calcite and quartz. (New Harbour Group - Psammite)		-21.378	38.11	
											(0.93)	
										-22		
39.00										-22.308	39.04	
								Medium strong to strong narrow to very thin bands of very narrowly foliated greyish purple to purple fresh PHYLLITE with extremely closely to very closely spaced very narrow to narrow lenticular bands of grey fine to medium grained psammite. (New Harbour Group - Phyllite)			(0.55)	
										-22.858	39.59	
								Strong thin bands of green fine grained fresh PSAMMITE with rare very narrow bands of green-brown poorly foliated phyllite. (New Harbour Group - Psammite)		-23		
											40	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:28** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH536R

Contract Ref:	Start: 26.05.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Mechanical Log					Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR %	SCR %	RQD %	If (mm)								
40.00												
										-24		
41.00				300 1100 1340							41 (3.76)	
										-25		
42.00											42	
										-26		
43.00											43	
										-26.618	43.35	
				4050				Strong very narrow to very thin bands of bluish grey fine to coarse grained fresh PSAMMITE with extremely closely to closely spaced very narrow to narrow bands of very narrowly foliated purple phyllite. (New Harbour Group - Psammite)		-27	44 (2.03)	
44.00										-28		
											45	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres	Scale: 1:28	Inclination: Vertical	Azimuth: NA

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	Comacchio MC405	SP	ADingle + JWickenden	GS+BNS

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BOREHOLE LOG

Contract:	Client:	Borehole:
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Contract Ref:	Start: 26.05.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 30.05.11	16.732	E:234707.7 N:393238.2	10 of 11

Depth	Mechanical Log: TCR %	SCR %	RQD %	If (mm)	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
45.00										-28.648	45.38	
				4050				Strong very thin to thin bands of grey fine to coarse grained fresh PSAMMITE with medium to locally very closely spaced very narrow to narrow bands of narrowly foliated purple phyllite. (New Harbour Group - Psammite)		-29	46 (1.72)	
46.00										-30		
47.00										-30.368	47.10	
								Strong to medium strong disturbed very narrow to thin bands of green-grey fine to medium grained fresh PSAMMITE with very closely spaced very narrow to narrow lenticular bands of very narrowly foliated purple phyllite. (New Harbour Group - Psammite)		-30.808	47.54 (0.44)	
				NI 960 1480				Medium strong to strong very narrow to very thin bands of greenish grey fine to locally coarse grained fresh PSAMMITE with extremely closely to closely spaced very narrow to narrow bands of very narrowly foliated purple and brownish-purple phyllite. (New Harbour Group - Psammite)		-31	48 (1.20)	
48.00										-32.008	48.74	
								Strong narrow to thin bands of greyish green fine to medium grained fresh PSAMMITE with closely to medium spaced narrow to very thin bands of green-brown and red-brown phyllite. (New Harbour Group - Psammite)			49 (0.76)	
49.00										-32.768	49.50	
								Medium strong to strong very thin to thin bands of greyish green fine to coarse grained fresh PSAMMITE with rare very narrow bands of purple phyllite. (New Harbour Group - Psammite)		-33	(0.90)	
											50	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:28** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00005

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH536R

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Mechanical Log					Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR %	SCR %	RQD %	If (mm)								
50.00				NI 960 1480								
										-33.668	50.40	
								Rotary borehole terminated at 50.40m depth.				

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:28** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH536R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
									Grass over TOPSOIL consisting of soft dark brown sandy slightly gravelly CLAY. Gravel is fine to coarse subrounded to angular phyllite. (Topsoil)			(0.30)	
											16.432	0.30	
									Soft dark brown to dark grey sandy gravelly CLAY. Gravel is fine to medium subrounded to subangular phyllite. (Drift Deposits - Unit B1)				
											16	(0.90)	
												1	
											15.532	1.20	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
26/05/11	17:20	3.50	1.30	101	1.60
27/05/11	08:15	3.50	1.30	101	1.71
27/05/11	18:00	25.80	1.30	101	14.50
28/05/11	09:00	25.80	1.30	101	3.30
28/05/11	16:02	33.85	1.30	101	12.00
29/05/11	08:45	33.85	1.30	101	3.20
29/05/11	16:00	42.50	1.30	101	8.80
30/05/11	09:00	42.50	1.30	101	3.20

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00005

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH536R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **30.05.11**	**16.732**	**E:234707.7 N:393238.2**	**2** of **61**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
									Dark brown sandy clayey fine to medium subangular to angular GRAVEL of phyllite (description from drilled cuttings). (Drift Deposits)			(0.40)	
									. . . between 1.45 to 2.02m depth psammite becoming coarse grained, and contains clasts/fine gravel size of phyllite, psammite and quartz.		15.132	1.60	
1.60-2.10 (0:10)	100	100	56	50 140 350					Strong to medium strong bluish grey fine to coarse medium grained slightly weathered to fresh PSAMMITE with closely to very closely spaced narrow to very thin bands of very narrowly foliated reddish purple phyllite. Veins closely locally closely spaced very narrow <3mm undulating randomly orientated quartz. Mixed dissolution voids up to 4mm wide, present through layer (possibly due to weathering?). Fractures are closely spaced undulating open generally stained brown dipping 10- 85°. (New Harbour Group - Psammite) . . . between 1.80 to 1.83m depth very thin psammite band is locally disturbed and contains fine gravel size clasts of phyllite, quartz and psammite.	2 FF[i] 1 J[i] 3 FF[i] 4 kF[i] 5 FF[i] 6 J[i] 7 J[i]	15	(0.42)	
2.10-3.50 (0:25)	95	95	91			1/C			Medium strong to strong narrowly foliated light green locally pink and brown fresh to slightly weathered PHYLLITE with very closely to closely spaced narrow bands of green fine and medium grained psammite. Phyllite has partial to complete quartz overprinting. Extremely to very closely spaced very narrow <2mm undulating and ptygmatic randomly orientated light green epidote veining. Fractures are very closely to closely spaced undulating rough open dipping 15-30° with slight brown staining. (New Harbour Group - Phyllite) . . . between 2.10 to 2.17m depth no recovery, assumed zone of core loss.	8 kF[i] 9 FF[i] 10 kF[i]	14.712	2.02	
												(0.63)	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
30/05/11	16:00	50.40	1.30	101	15.00

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00005

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH536R

Contract Ref:	Start: 26.05.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 30.05.11	16.732	E:234707.7 N:393238.2	3 of 61

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
				50 140 350						11 J[i] 12 FF 13 FF[i]			
						2/C			Medium strong to strong narrow to very thin bands of green grey fine grained fresh to slightly weathered PSAMMITE with extremely closely to very closely spaced narrow to very thin bands of very narrowly foliated greenish grey phyllite. Extremely closely to very closely spaced very narrow <1mm ptygmatic subhorizontal dark green chlorite cross cut by very closely to closely spaced very narrow <2mm lenticular and ptygmatic subhorizontal indistinct quart veins cross cut by subvertical very narrow <4mm en echelon and lenticular calcite veins. Fractures are very closely spaced undulating to stepped rough to open dipping 10-30° with dark brown staining. (New Harbour Group - Psammite) . . . between 2.72 to 2.81m depth phyllite is brownish grey to green grey. Extremely closely to very closely spaced very narrow <1mm subhorizontal ptygmatic epidote veins. . . . between 2.78 to 2.88m depth locally calcite veins have solution voids <15mm long by <4mm wide.		14.082	2.65	
						3/C				14 J[i]	14	(0.55)	
	95	95	91	20 390 1080							13.532	3.20	
3.50-5.00 (0:20)	100	94	84						Medium strong to strong narrow to very thin bands of reddish brown and purplish brown very narrowly foliated fresh to slightly weathered PHYLLITE with extremely to very closely spaced narrow to very thin bands of green grey fine grained psammite. Locally extremely closely to very closely spaced very narrow <1mm ptygmatic randomly oriented epidote veins cross cut by extremely closely to very closely spaced very narrow <1mm lenticular and sigmoidal subvertical calcite veins, locally with replacement at boundaries by epidote. Foliation fractures are closely to medium spaced undulating open dipping 15-30° with brown staining and generally no infill. Joints are medium to closely spaced stepped rough to undulating open, dipping 60-75° with no infill and dark brown staining. (New Harbour Group - Phyllite)	15 FF[i] 16 IcF[i] 17 IcF[i] 18 J[i]			

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: 1:7 | Inclination: Vertical | Azimuth: NA

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	Comacchio MC405	SP	ADingle + JWickenden	GS+BNS

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00005

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH536R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **30.05.11**	**16.732**	**E:234707.7 N:393238.2**	**4** of **61**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
									. . . between 3.63 to 3.65m depth grey to greenish grey narrow to very thin bands of phyllite. . . . at 3.68m depth narrow psammite band, en echelon structure.		13		
										19 FF[i]			
									. . . between 3.96 to 4.08m and 4.21 to 4.26m depth abundant extremely closely spaced very narrow <1mm randomly oriented ptygmatic epidote veins crossed by extremely closely to very closely spaced subhorizontal very narrow <2mm lenticular indistinct quartz veins cross cut by extremely closely spaced subvertical very narrow <1mm lenticular calcite veins with replacement by epidote at boundaries and locally with epidote overprinting.	20 lcF[i]		4	
										21 lcF[i]			
	100	94	84	20 390 1080									
									. . . between 4.30 to 4.44m depth locally abundant extremely closely spaced randomly oriented very narrow <1mm ptygmatic epidote veins within psammite and purplish phyllite bands. Disturbed lenticular banding.			(2.33)	
									. . . between 4.50 to 4.53m depth psammite band is highly overprinted with epidote.	22 FF[i]			
											12		
									. . . between 4.76 to 4.79m depth possible microfault subhorizontal 20° stepped re-fused				

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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BOREHOLE LOG

Contract:	Client:	Borehole:
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Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **30.05.11**	**16.732**	**E:234707.7 N:393238.2**	**5** of **61**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
									with disturbed phyllite.				
	100	94	84						. . . between 4.89 to 4.95m depth extremely closely spaced subhorizontal <23mm lenticular calcite veins with replacement by quartz. abundant veins within calcite with voids <4mm and locally possible solution voids.	23 PMF[i]		5	
5.00-6.50 (0:17)										24 FF[i]			
										26 IcF			
									. . . between 5.10 to 5.66m depth extremely closely to very closely spaced subvertical en echelon solution voids <1mm.	28 IcF[i]			
										25 J[i]			
				20						27 IcF[i]			
				390									
				1080						29 IcF[i]			
	100	99	92			4/C					11.202	5.53	
						5/C			Strong medium bands of green grey fine to coarse grained fresh to slightly weathered METACONGLOMERATE. Clasts are subangular to rounded fine to medium of phyllite, psammite and epidote on quartz in a fine grained matrix. Extremely closely spaced very narrow <1mm ptygmatic randomly oriented epidote veins cross cut by very closely to closely spaced very narrow <2mm lenticular subvertical indistinct quartz veins cross cut by extremely closely to very closely spaced very narrow <1mm lenticular subvertical en echelon calcite veins locally with replacement at boundaries with reddish brown mineralisation/staining. Fractures are very closely spaced stepped to undulating rough open dipping 10-40° and 75° with slight brown staining and possible dissolution voids (by possible slight weathering?). (New Harbour Group - METACONGLOMERATE) *Description on next sheet*		11	(0.47)	
											10.732	6.00	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres	Scale: **1:7**	Inclination: **Vertical**	Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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STRUCTURAL SOILS

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH536R

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	26.05.11 End: 30.05.11	16.732	E:234707.7 N:393238.2	6 of 61

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
									. . . between 5.57 to 5.62m and 5.65 to 5.70m depth locally abundant epidote over printing cross cut by indistinct of quartz overprinting <35mm.	30 IcF[i] 31 IcF[i] 32 IcF[i] 33 FF[i] 34 PMF[i]			
	100	99	92						Strong disturbed narrow to very thin bands of green grey fine to coarse grained fresh PSAMMITE with extremely closely spaced highly disturbed narrow bands of very narrowly foliated reddish brown phyllite. Extremely closely to very closely spaced narrow <17mm lenticular subhorizontal quartz veins locally with red, orange and purple brown staining/mineralisation and locally slight boudinage structure cross cut by extremely closely to very closely spaced very narrow <1mm subvertical en echelon calcite veins. Locally extremely to closely spaced very narrow <2mm lenticular and sigmoidal subvertical calcite veins. Fractures are very closely to closely spaced undulating to stepped open dipping 20-40° and 70-75° with occasional partial calcite infill. (New Harbour Group - Psammite)	35 PMF[i]		(0.45)	
				20 390 1080							10.282	6.45	
6.50-8.00 (0:19)						6/C			. . . between 6.00 to 6.05m depth reddish brown very thin band of disturbed phyllite with occasional clasts of psammite <5mm diameter. Extremely closely spaced randomly oriented very narrow <1mm ptygmatic epidote veins cross cut by extremely closely spaced subvertical very narrow <1mm lenticular calcite veins and extremely closely to very closely spaced narrowly, lenticular banded fine to medium psammite. . . . between 6.19 to 6.27m depth closely spaced possible microfaults dipping 25-40°causing offset to fabric.		10	(0.47)	
	100	99	99						Medium strong narrow to very thin bands of reddish brown very narrowly foliated fresh PHYLLITE interbanded with extremely closely to closely spaced narrow to thin bands of green grey and red-brown fine to medium grained PSAMMITE. Extremely closely to closely spaced very narrow <1mm randomly oriented ptygmatic epidote veins cross cut by extremely closely to closely spaced very narrow <1mm subvertical lenticular calcite veins. (New Harbour Group - Interbedded PHYLLITE & PSAMMITE)	36 J[i]	9.812	6.92	
				3600					. . . between 6.47 to 6.52m depth psammite bands ore disturbed. Very closely spaced subvertical very narrow <1mm en echelon calcite veins cross cutting ptygmatic epidote veins. . . . between 6.58-6.51m depth abundant extremely closely spaced randomly oriented very narrow <1mm ptygmatic epidote veins	37 PMF[i]		7	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH536R

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 30.05.11	16.732	E:234707.7 N:393238.2	7 of 61

Depth	Mechanical Log TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
									cross cut by extremely closely spaced subvertical very narrow <1mm lenticular calcite veins. . . . between 6.70-6.76m depth abundant extremely closely spaced very narrow <1mm randomly oriented ptygmatic, epidote veins cross cut by extremely closely spaced very narrow <2mm subhorizontal lenticular, sigmoidal calcite veins.	38 IcF[i]			
									Medium strong to strong narrow to very thin lenticular bands of green grey fine to coarse grained fresh PSAMMITE with extremely closely to very closely spaced narrow to very thin bands of very narrowly foliated greenish grey and greenish brown disturbed phyllite. Locally extremely closely spaced to very closely spaced very narrow <1mm randomly oriented ptygmatic, epidote veins cross cut by extremely closely to very closely spaced very narrow <2mm subvertical lenticular and en echelon calcite veins. Joints are widely spaced subvertical 50° undulating, open slight brown clay smearing and brown staining. Fractures are closely to very closely spaced undulating to stepped open dipping 5-25° with occasional slight brown staining. (New Harbour Group - Psammite)	39 IcF[i]		(1.08)	
										40 IcF[i]			
	100	99	99										
										41 IcF[i]	9		
				3600						42 IcF[i]			
									. . . between 6.98-7.05m depth medium strong purplish brown very narrowly foliated phyllite with extremely closely to very closely spaced lenticular narrow bands of fine grained psammite.				
									. . . between 7.17 to 7.40m depth extremely closely spaced to very closely spaced very narrow <4mm subvertical en echelon calcite veins cross cutting extremely closely to very closely spaced very narrow <1mm subhorizontal ptygmatic and en echelon epidote veins cross cut by irregular lenticular indistinct quartz veins narrow <14mm with indistinct boundaries locally ptygmatic subvertical, cross cut by calcite veins.	43 IcF[i]			
8.00-9.55 (0:23)											8.732	8.00	
	100	99	99						. . . at 7.18m depth possible microfault subhorizontal dipping 5° undulating, refused with <1mm calcite infill, disturbing fabric. . . . between 7.46 to 7.49m depth locally strong overprinting with epidote, with speckled reddish purple mineralisation <1mm diameter.				
									. . . between 7.64 to 7.94m depth locally extremely closely to very closely spaced subvertical possible calcite solution voids <1mm along weathered calcite veins adjacent to joint at 6.92m.	44 PMF[i]			
									Strong thin to medium bands of green grey fine to coarse grained fresh PSAMMITE with locally moderately disturbed very narrow				

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH536R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **30.05.11**	**16.732**	**E:234707.7 N:393238.2**	**8** of **61**

Mechanical Log					Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)									
									lenticular bands of brown phyllite. Extremely closely spaced very narrow <1mm randomly oriented ptygmatic epidote veins locally abundant and overprinted with epidote cross cut by extremely closely to very closely spaced very narrow <1mm subvertical lenticular and en echelon calcite veins locally with replacement by dark purple mineralisation. Fractures are medium to very closely spaced undulating open dipping 5-40° occasionally causing offsets by microfaults. (New Harbour Group - Psammite) . . . at 8.23m depth possible microfault subhorizontal - 25°, undulating re-fused with <1mm calcite. . . . between 8.60 to 8.69m depth locally phyllite is highly disturbed and psammite is disturbed with offset lenticular bands. . . . between 8.70 to 8.74m depth possible microfault subvertical 60° undulating and re-fused with calcite <1mm.	45 IcF[i]			
						7/C				46 IcF[i]	8	(1.32)	
	100	99	99	3600					. . . between 8.94 to 9.02m depth extremely closely spaced narrow <8mm subvertical lenticular and ptygmatic slightly indistinct quartz veins cross cutting extremely closely spaced very narrow <1mm randomly oriented ptygmatic epidote.	47 IcF[i]		9	
										48 IcF[i]			
9.55-11.05 (0:22)	100	100	100						Strong very thin to thin lenticular bands of green grey fine to coarse grained fresh PSAMMITE with very closely to medium spaced narrow disturbed bands of very narrowly foliated green grey and green brown phyllite. Extremely closely spaced very narrow <1mm randomly oriented ptygmatic epidote veins cross cut by extremely closely spaced narrow <11mm randomly oriented ptygmatic and lenticular quartz veins with indistinct boundaries and locally with epidote replacement of boundaries and purple mineralisation within cross cut by extremely		7.412	9.32	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres	Scale: **1:7**	Inclination: **Vertical**	Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00005

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH536R

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
									closely to very closely spaced very narrow <1mm randomly oriented en echelon calcite veins. Fractures are very closely spaced undulating dipping 20-30° and medium spaced dipping 85° causing offset by microfaults. (New Harbour Group - Psammite)	49 IcF[i] 51 IcF[i] 50 IcF[i]	7	(0.72)	
10.00				3600		1/W				52 IcF[i]	6.692	10.04	
	100	100	100						Strong narrow to thin lenticular bands of green grey fine to coarse grained fresh PSAMMITE with extremely closely to closely spaced narrow disturbed bands of very narrowly foliated purple-brown and green brown phyllite. Extremely closely to very closely spaced very narrow <2mm and locally <1mm subvertical en echelon lenticular calcite veins. Joints are very closely to widely spaced subhorizontal 30° undulating, rough, open, no infill and subvertical 60° stepped, rough open no infill. Fractures are very closely to closely spaced undulating partly open dipping 10-40° with occasional brown staining and causing offset by microfaults. (New Harbour Group - Psammite)	53 IcF[i]			
				60 1350 1670		8/C			. . . between 10.06 to 10.55m depth locally extremely closely spaced to very closely spaced very narrow <1mm randomly oriented ptygmatic epidote vein cross cut by extremely closely to very closely spaced very narrow <1mm subvertical lenticular calcite veins. . . . between 1.08 to 10.17m depth 1 no. subvertical very narrow <4mm en echelon calcite vein. . . . between 10.16 to 10.25m depth locally lenticular psammite bands slightly folded and offset. . . . at 10.29m depth disturbed narrow band of dark green psammite with slight red brown mineralisation. . . . at 10.41m depth extremely closely spaced very narrow <1mm randomly oriented epidote veining cross cut by quartz over printing <16mm and cross cut by very closely spaced very narrow <1mm subvertical lenticular calcite	54 IcF[i] 55 PMF[i] 56 PMF[i] 57 PMF[i]	6		

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH536R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **30.05.11**	**16.732**	**E:234707.7 N:393238.2**	**10** of **61**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
									veins. . . . at 10.70 and 11.20m depth possible multiple shear bands 10-25 offsetting calcite veins.	58 IcF[i]			
	100	100	100							59 IcF[i]		11	
11.05-12.55 (0:25)												(2.04)	
										60 IcF[i]			
										61 IcF[i]			
				60 1350 1670									
										62 IcF[i]			
									. . . between 11.45 to 11.73m depth phyllite is greenish grey.				
									. . . between 11.49 to 11.86m depth possible microfault dipping 70° with very narrow <5mm subvertical en echelon calcite veins locally with patchy orange brown staining, cross cutting locally extremely closely to very closely spaced very narrow <2mm subvertical lenticular indistinct quartz veins.	63 IcF[i]			
	100	100	100										
											5		
									. . . between 11.83 to 12.01m locally narrowly to very thinly banded disturbed light grey fine to medium psammite with extremely closely spaced very narrow <1mm randomly oriented en echelon and lenticular possible chlorite veins with extremely closely to very closely spaced disturbed very narrowly foliated very narrow to narrow bands of greenish grey and brown	64 J[i]			
										65 J[i]			
												12	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres	Scale: **1:7**	Inclination: **Vertical**	Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH536R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **30.05.11**	**16.732**	**E:234707.7 N:393238.2**	**11** of **61**

Depth	Mechanical Log TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
									phyllite.		4.652	12.08	
12.55-13.95 (0:22)	100	100	100	60 1350 1670		9/C			Medium strong to strong narrow to very thin bands of green grey fine to coarse grained fresh PSAMMITE with extremely closely to very closely spaced narrow to very thin bands of very thinly foliated purplish grey and purplish brown phyllite. Extremely closely to closely spaced very narrow <1mm subhorizontal lenticular and en echelon calcite veins. Fractures are closely to medium spaced undulating rough open dipping 15-50° with occasional slight orange brown staining and offset by microfaults. (New Harbour Group - Psammite) . . . between 12.08 to 12.18m depth phyllite is greenish grey. . . . between 12.18 to 12.46m depth purplish brown phyllite with disturbed extremely closely to very closely overprinting, highly indistinct and cross cut by extremely closely to very closely spaced very narrow <1mm subvertical lenticular and sigmoidal calcite veins. . . . between 12.40 to 12.42m depth disturbed very thin psammite band is fine to coarse grained with possible epidote overprinting cross cut by extremely closely to very closely spaced very narrow <3mm randomly oriented lenticular to irregular indistinct quartz veins. . . . at 12.46m depth re-fused with disturbed phyllite. . . . between 12.55 to 12.88m depth extremely closely to very closely spaced very narrow <2mm subvertical en echelon calcite veins, locally extremely closely to very closely spaced subvertical <1mm lenticular and sigmoidal calcite veins. . . . at 12.60m and 12.75m depth narrow and very thin bands of psammite with quartz. . . . between 12.83 to 12.90m depth abundant extremely closely spaced very narrow <1mm randomly oriented ptygmatic epidote veins cross cut by extremely closely spaced to very closely spaced subvertical very narrow <2mm en echelon and lenticular calcite veins. Locally disturbed with lenticular banding, and spots of purple mineralisation very narrow <1mm.	66 IcF[i]	4		
	100	100	71			10/C				67 IcF[i] 68 IcF[i]		(1.72) 13	
						11/C			. . . between 13.05 to 13.10m depth possible microfaults subhorizontal 15° and 30° undulating re-fused with very narrow <1mm calcite and disturbed phyllite. Possible brecciated appearance with subangular to subrounded clasts of psammite within a phyllite matrix.	69 PMF[i]			

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH536R

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 30.05.11	16.732	E:234707.7 N:393238.2	12 of 61

Depth	Mechanical Log TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
									. . . between 13.20 to 13.33m depth highly disturbed lenticular banding.	70 IcF[i]			
									. . . between 13.40 to 13.46m depth highly disturbed psammite bands with lenticular and boudinage structure locally slight brecciated appearance with rounded clasts of psammite and phyllite narrow <20mm. . . . between 13.41 to 13.73m depth highly disturbed narrow to very thinly lenticular banded psammite locally offset with narrow offset bands of phyllite. Locally psammite has extremely closely spaced subhorizontal <1mm lenticular and sigmoidal calcite veins, locally cross cutting extremely closely to very closely spaced subhorizontal indistinct quartz veins. . . . between 13.55 to 13.64m depth 3 no. microfaults dipping at 10° and 30-40°, causing offset to fabric. . . . between 13.73 to 13.80m depth psammite has brecciated appearance with angular to subrounded clasts <30mm within a matrix of disturbed phyllite. At contact with highly disturbed phyllite psammite appears brecciated and re-fused with disturbed phyllite.	71 IcF[i] 72 PMF[i] 73 FF[i] 74 PMF[i] 75 FF[i] 76 IcF[i]			
13.95-15.35 (0:19)	100	100	71	60 1350 1670					Strong thin to medium bands of greenish grey fine to coarse grained fresh PSAMMITE. Extremely closely spaced very narrow <1mm randomly oriented ptygmatic veins cross cut by very closely to closely spaced very narrow <2mm randomly oriented lenticular and en echelon indistinct quartz veins cross cut by very closely to closely spaced very narrow <1mm subvertical lenticular calcite veins. Fractures are very closely to closely spaced undulating rough open dipping 2-30° and closely spaced dipping 40-55° with occasional slight brown staining and offsets by microfaulting. (New Harbour Group - Psammite)		2.932	13.80	
	100	99	97						. . . between 13.80 to 13.85m depth very closely spaced subhorizontal narrow <8mm ptygmatic locally offset quartz veins locally with slight orange brown staining. . . . between 13.85 to 14.00m depth locally epidote over printing, cross cut by extremely closely spaced subvertical very narrow <2mm en echelon and lenticular, intersecting, indistinct quartz veins and extremely closely to very closely spaced subhorizontal <5mm ptygmatic and lenticular quartz veins. Locally			(0.76)	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH536R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	**26.05.11** End: **30.05.11**	**16.732**	**E:234707.7 N:393238.2**	**13** of **61**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
				60 1350 1670					extremely closely spaced subhorizontal possible microfaults 20-90° undulating and re-fused with possibly disturbed phyllite offset <5mm. . . . at 14.32m depth possible microfault subhorizontal 30°, undulating re-fused with dark reddish brown phyllite. . . . between 13.37 to 14.44m depth 1 no. subvertical 50°, en echelon possible quartz band replaced at boundaries with chlorite. . . . between 14.46 to 14.56m depth psammite is disturbed locally brecciated appearance with clasts <6mm possibly win a phyllite matrix.	77 PMF[i]	2.172	14.56	
	100	99	97						Medium strong to strong narrow bands of very narrowly foliated light green fresh PHYLLITE with extremely closely spaced narrow lenticular bands of greenish grey fine to medium grained psammite. Extremely closely to very closely spaced very narrow <2mm subvertical lenticular calcite veins concentrated within psammite bands (possible tensional veining?). Fractures are extremely closely to very closely spaced undulating open dipping 15-40° with occasional slight brown staining and causing offsets by microfaulting. (New Harbour Group - Phyllite)	78 IcF[i] 79 PF[i] 80 J[i]		2 (0.39)	
									. . . between 18.84 to 14.86m depth possible solution voids extremely closely to very closely spaced randomly oriented lenticular, possibly weather calcite veins. . . . between 14.88m and 14.95m depth phyllite is disturbed and offset, locally fractured and re-fused with calcite.	81 J[i]	1.782	14.95 15	
15.35-16.85 (0:18)	100	100	100	20 480 1090					Medium strong to strong narrow to thin bands of greenish grey fine to coarse grained fresh PSAMMITE with extremely closely to very closely spaced narrow to very thin disturbed bands of very narrowly foliated greenish grey and greenish brown phyllite. Locally extremely closely to very closely spaced very narrow <1mm randomly oriented ptygmatic epidote veins within psammite bands cross cut locally very closely to extremely closely spaced very narrow <1mm and <2mm subvertical lenticular en echelon calcite veins. Fractures are very closely to medium spaced stepped to undulating open dipping 5-50° with occasional slight brown staining and offset by microfaults. (New Harbour Group - Psammite)	82 IcF[i] 83 IcF[i] 84 IcF[i]			

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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BOREHOLE LOG

Contract:	Client:	Borehole:
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Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **30.05.11**	**16.732**	**E:234707.7 N:393238.2**	**14** of **61**

Depth	Mechanical Log: TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
						13/C			. . . between 15.62 to 15.83m depth locally abundant extremely closely to very closely spaced randomly oriented very narrow <1mm ptygmatic epidote veins cross cut by extremely closely spaced subvertical <1mm lenticular and en echelon calcite veins with extremely closely spaced subvertical very narrow <6mm ptygmatic quartz veins.	85 IcF[i]		(1.35)	
						12/C			. . . at 15.85m depth locally phyllite is grey highly fractured and re-fused with narrow <7mm subhorizontal lenticular calcite vein.		1		
										86 IcF[i]		16	
				20 480 1090					. . . at 16.06m depth possible microfault horizontal - 15° undulating re-fused with disturbed phyllite. . . . between 16.07 to 16.14m depth locally abundant extremely closely spaced randomly oriented very narrow <1mm ptygmatic epidote veins cross cut by extremely closely spaced subhorizontal narrow <12mm irregular indistinct quartz veins, locally purple mineralisation <2mm.	87 J[i]			
	100	100	100										
										88 IcF[i]	0.432	16.30	
									Medium strong to strong narrow disturbed bands of purplish brown very narrowly foliated fresh PHYLLITE with extremely closely spaced narrow to very thin lenticular bands of locally disturbed greenish grey fine to medium grained psammite. Extremely closely to very closely spaced very narrow <1mm subvertical lenticular and sigmoidal calcite veins. Fractures are very closely to closely spaced undulating open dipping 5-50° with occasional slight brown staining and causing offset by microfaults. (New Harbour Group - Phyllite)	89 IcF[i]			
												(0.53)	
				3330					. . . between 16.36 to 16.40m depth psammite band with extremely closely spaced randomly oriented very narrow <1mm ptygmatic epidote veins cross cut by extremely closely spaced subvertical very narrow <1mm lenticular and sigmoidal calcite veins. . . . between 16.48 to 16.59m locally disturbed locally lenticular banding and slight boudinage structure. *Description on next sheet*	90 J[i]	0		

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres	Scale: **1:7**	Inclination: **Vertical**	Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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STRUCTURAL SOILS

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH536R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **30.05.11**	**16.732**	**E:234707.7 N:393238.2**	**15** of **61**

Mechanical Log					Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)									
	100	100	100						. . . between 16.59 to 16.68m depth disturbed with extremely closely spaced subvertical very narrow <5mm irregular and lenticular calcite veins.		-0.098	16.83	
16.85-18.35 (0:15)									Medium strong to strong narrow to very thin bands of greenish grey fine to coarse grained fresh PSAMMITE with extremely closely to very closely spaced narrow bands of very narrowly foliated green grey and purplish grey phyllite. Extremely closely to closely spaced very narrow to narrow <6mm subvertical en echelon calcite veins locally with replacement on boundaries with dark green chlorite and within by quartz cross cutting. Fractures are very closely to closely spaced undulating open dipping 5-55° with occasional brown staining, rare calcite infill and offsets by microfaults. (New Harbour Group - Psammite)	91 PMF[i]			
										92 IcF[i]		17	
									. . . between 16.83 to 17.07m depth psammite is highly disturbed and offset locally with slight brecciated appearance .	93 PMF[i]			
									. . . at 16.95m depth possible microfault subvertical 50° undulating re-fused with disturbed phyllite.				
									. . . between 17.18 to 17.22m depth locally extremely closely spaced randomly oriented narrow <12mm lenticular quartz veins with slightly indistinct boundaries cross cut by and locally offset by extremely closely to very closely spaced subvertical very narrow <2mm lenticular calcite veins.	94 PMF[i]			
				3330									
	100	100	100									(1.22)	
									. . . at 17.18 to 17.49m depth multiple closely spaced possible microfaults dipping 25° undulating re-fused with <1mm calcite.	95 IcF[i]			
									. . . between 17.34 to 17.63m depth extremely closely to very closely spaced randomly oriented very narrow <2mm en echelon and lenticular calcite veins cross cut by intersecting very closely spaced subvertical <3mm en echelon and lenticular quartz veins locally with clasts <8mm of psammite cross cut by 1 no. subvertical narrow <11mm calcite vein replaced by quartz.	96 IcF[i]			
											-1		
						14/C							
												18	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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STRUCTURAL SOILS

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH536R

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 30.05.11	16.732	E:234707.7 N:393238.2	16 of 61

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
									. . . between 18.00 to 18.15m depth extremely closely spaced subvertical very narrow <2mm intersecting en echelon possible clastic veins locally replaced by chlorite.		-1.318	18.05	
	100	100	100						Medium strong to strong narrow to very thin bands of purplish grey very narrowly foliated fresh PHYLLITE with extremely closely to very closely spaced narrow lenticular bands of greenish grey fine grained psammite. Extremely closely to very closely spaced very narrow <1mm subhorizontal en echelon calcite vein. (New Harbour Group - Phyllite) . . . between 18.18 to 18.30m disturbed slightly brecciated appearance with rounded clasts and lenticular bands of psammite in a phyllite matrix.			(0.55)	
18.35-19.85 (0:17)						15/C							
									. . . between 18.43 to 18.60m depth disturbed lenticular narrow band of psammite.				
				3330					. . . between 18.55 to 18.60m depth 1 no. subhorizontal narrow <11mm lenticular calcite vein with clasts of phyllite and psammite.		-1.868	18.60	
						16/C			Medium strong to strong very thin to thin bands of greenish grey fine to medium grained fresh PSAMMITE with very closely to closely spaced narrow to very thin bands of very narrowly foliated greenish grey phyllite. Extremely closely to closely spaced very narrow <2mm subvertical en-echelon calcite veins locally with replacement by quartz. Extremely closely to very closely spaced very narrow <1mm subhorizontal lenticular calcite veins. microfaults are very closely spaced undulating to stepped partly open dipping 10-60° causing offset. (New Harbour Group - Psammite)		-2	(0.36)	
	100	100	97						. . . between 18.69 to 18.80m depth possible microfault subvertical 60° undulating re-fused with disturbed phyllite and possibly <1mm calcite.	98 PMF[i] 97 PMF[i]	-2.228	18.96	
									. . . between 18.85 to 19.06m depth possible microfaults subhorizontal 10° undulating re-fused with <2mm calcite and disturbed phyllite.			19	
									. . . at 18.90m depth microfault dipping 60° causing offset to fabric.	99 IcF[i]			
									. . . between 18.90 to 18.96m extremely closely spaced subvertical narrow <8mm irregular indistinct quartz veins locally with disturbed				

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00005

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH536R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **30.05.11**	**16.732**	**E:234707.7 N:393238.2**	**17** of **61**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
									clast of psammite and possible dark green chlorite with locally intersecting very closely spaced randomly oriented very narrow <2mm lenticular indistinct quartz veins.			(0.50)	
									Medium strong narrow bands of very narrowly foliated purple fresh PHYLLITE with extremely closely spaced very narrow to narrow lenticular and locally very thin bands of bluish grey fine to medium grained psammite. Extremely closely to very closely spaced very narrow undulating and locally en-echelon quartz veins with some partial calcite replacement. Very closely to closely spaced undulating and irregular narrow <20mm calcite veins. Foliation planes dipping at ~10°. Fractures are very closely to closely spaced undulating to stepped open dipping randomly from 15-80°. (New Harbour Group - Phyllite)	100 lcF[i]	-2.728	19.46	
	100	100	97	3330					Medium strong to strong thin to narrow bands of greenish grey fine to medium grained fresh PSAMMITE with extremely closely to very closely spaced very narrow to narrow bands of purplish-brown, green and brown phyllite. Foliation dipping at 15-20°. Quartz veining is rare, presents as undulating randomly oriented veins and as diffuse inclusions. Chlorite presents locally along veins edges concentrated within the psammite bands. Calcite veins extremely closely to very closely spaced very narrow <6mm undulating and locally en-echelon generally orientated at >50°. Fractures are extremely closely to closely spaced, occasionally medium spaced undulating to stepped smooth partly open dipping 15-30° and 60-80° occasionally causing offsets by microfaults. (New Harbour Group - Psammite)	101 lcF[i]	-3		
19.85-21.45 (0:20)									. . . between 19.51 to 19.66m depth mineral dissolution voids, up to 20mm long present.	102 FF[i]		20	
									. . . between 20.00 to 20.02m ductile shear band containing purple phyllite that cross cuts two calcite veins.			(1.16)	
	100	100	91	370 480 840					. . . between 20.30 and 20.45m depth multiple ductile shear bands (5°) offsetting calcite veins . . . between 20.33 to 20.44m depth 60° minor fault with orange and black stained.				

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH536R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **30.05.11**	**16.732**	**E:234707.7 N:393238.2**	**18** of **61**

Depth	Mechanical Log: TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
									. . . between 20.47 to 20.44m depth 30°shear band with disturbed phyllite and psammite present within a 10mm wide band.	103 FF[i]			
											-3.888	20.62	
						17/C			Medium strong narrow to very thin bands of grey-green fine to medium grained fresh PSAMMITE with extremely closely to very closely spaced very narrow to narrow bands of very narrowly foliated green-brown and occasional brownish purple phyllite. Phyllite bands are dipping at 10-15°. Un-fractured. Epidote veins extremely closely to very closely spaced very narrow undulating and ptygmatic randomly orientated generally confined to the psammite. Quartz veining very closely locally extremely closely spaced very narrow undulating and defuse randomly orientated. Fractures are closely to medium space undulating to stepped partly open dipping 10-50° and medium spaced dipping 75-90° with offsets by <10mm by microfaulting. (New Harbour Group - Psammite)		-4		
	100	100	91	370 480 840								21	
									. . . between 21.06 to 21.96m depth 2 no. microfaults dipping 45-50° with calcite infill, causing offset to fabric.	104 J[i] 105 PMF[i]			
										106 IcF[i]		(1.07)	
21.45-23.00 (0:20)													
	100	100	94						. . . between 21.49 to 21.58m depth psammite is heavily epidote and quartz veined.				

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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BOREHOLE LOG

Contract:	Client:	Borehole:
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Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	**26.05.11** End: **30.05.11**	**16.732**	**E:234707.7 N:393238.2**	**19** of **61**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
											-4.958	21.69	
									Medium strong very narrow to thin bands of very narrowly foliated purple fresh PHYLLITE with extremely closely to very closely spaced very narrow to narrow lenticular bands of green-grey fine grained psammite. 1 no. 30° undulating rough open clean joint present. Veins extremely closely to very closely spaced very narrow <1mm undulating and ptygmatic Epidote. (New Harbour Group - Phyllite) . . . between 21.72 to 21.86m depth microfault dipping 50°. . . . between 21.87 to 21.96m depth minor fault dipping 45° re-fused with disturbed psammite, phyllite, quartz and chlorite.	107 PMF[i]	-5	(0.25)	
											-5.208	21.94	
									Medium strong very narrow to very thin bands of grey-green fine to medium grained fresh PSAMMITE with extremely closely to very closely spaced very narrow to narrow bands of cream, green-brown and purplish-brown narrowly foliated phyllite. Foliation planes are undulating generally dipping at ~10-15°. Veins extremely closely spaced very narrow <3mm undulating and locally ptygmatic randomly oriented Epidote. Calcite and quartz veins are extremely closely to closely spaced, irregular and locally en-echelon randomly orientated. Fractures are closely to medium spaced undulating dipping 5-25° with rare brown staining. (New Harbour Group - Psammite) . . . at 22.00m depth 15mm thick narrow band of disturbed phyllite and psammite, locally microfractured. . . . at 22.08m depth microfault dipping 20° through a very thin disturbed phyllite band. . . . between 22.08 and 22.53m depth multiple ductile shear bands (10°) offsetting calcite veins . . . at 22.58m depth 3 no. microfaults dipping 5° through a phyllite band.	108 PMF[i]		22 (1.01)	
	100	100	94	370 480 840									
									. . . at 22.70 to 22.74m depth minor fault dipping 25° within fused 5-10mm thick phyllite and psammite breccia present along lower edge.	109 PF	-6		

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH536R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **30.05.11**	**16.732**	**E:234707.7 N:393238.2**	**20** of **61**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
	100	100	94	370 480 840							-6.218	22.95	
23.00-24.50 (0:19)									Medium strong to strong very narrow to very thin bands of very narrowly foliated purple locally greyish-purple fresh PHYLLITE with closely to locally extremely closely spaced very narrow to narrow bands and lenticular blue-grey fine to coarse grained psammite. Foliation planes dipping at 10-20°. Veins closely to locally extremely closely spaced very narrow <2mm undulating locally dipping parallel foliation planes Calcite. Fractures are closely to medium spaced undulating dipping 5-20° causing offsets by microfaults. (New Harbour Group - Phyllite) . . . between 23.08 to 23.15m depth phyllite fabric is locally highly disturbed and overprinted by quartz. Quartz appears green colour, possible overprinting of original chlorite.	110 FF[1]		23	
	100	100	95	3200		18/C 19/C					-7	(1.81)	
												24	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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BOREHOLE LOG

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Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
						20/C							
	100	100	95										
24.50-25.80 (0:25)				3200					. . . between 24.58 to 24.72m depth phyllite foliation is highly disturbed with localised quartz veining and epidote overprinting of quartz.		-8.028	24.76	
	100	100	100			21/C			Strong very narrow to thin bands of grey fine to coarse grained fresh PSAMMITE with extremely closely to very closely spaced very narrow bands of very narrowly foliated brownish-purple and green-brown phyllite. Foliation planes dipping at 25-30°. Veins very closely locally extremely closely spaced very narrow <3mm undulating and irregular occasionally en-echelon Calcite. Rare epidote veining, locally extremely closely spaced undulating and ptygmatic. Fractures are closely to medium spaced undulating dipping 5-50° causing offsets by microfaults. (New Harbour Group - Psammite) . . . between 25.02 to 25.92m depth multiple ductile shear band, dipping 10-50° offset sigmoidal calcite vein at different locations			(0.50)	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres	Scale: **1:7**	Inclination: **Vertical**	Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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BOREHOLE LOG

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Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
									. . . between 25.18 to 25.26m depth highly irregular and locally en echelon calcite vein.		-8.528	25.26	
	100	100	100						Strong very narrow to very thin bands of grey-green fine to locally coarse grained fresh PSAMMITE with a highly disturbed extremely closely to very closely spaced narrowly foliated green and locally brownish-purple phyllite. Veins closely to medium spaced narrow <15mm undulating randomly oriented Calcite. Localised quartz and chlorite present within calcite veins. Quartz veins are locally extremely closely spaced, undulating and irregular locally defuse/poorly defined. microfaults are closely to medium spaced undulating partly open dipping 5-20° causing offsets. (New Harbour Group - Psammite) . . . between 25.30 to 25.33m depth undulating minor faults dipping 20°, crosscutting phyllite bands, with localised quartz growth. . . . between 25.34 to 25.39m depth very thin psammite band, very narrow <3-6mm wide quartz vein present (i.e. brittle deformation). Vein contains chlorite and possible haematite. . . . between 25.39 to 25.55m depth high angle narrow <10mm calcite/quartz vein Psammite fabric around vein has been brecciated and is locally present within the vein. . . . at 25.72 to 25.92m depth multiple undulating microfaults dipping 5-10° causing offset to fabric.				
				3200							-9		
25.80-27.10 (0:40)													
	100	100	100									26	
												(2.03)	
				310 620 1700					. . . between 26.27 to 26.32m depth undulating refused micro fault dipping 10° with brecciated phyllite and psammite and quartz veining present.	111 PF[1]			

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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STRUCTURAL SOILS

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH536R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
									. . . between 26.41 to 26.57m depth undulating and irregular narrow <15mm calcite veining with chlorite and (possible) haematite growth.				
									. . . between 26.60 to 26.70m depth phyllite fabric is highly disturbed with localised microfaulting and microfractures.		-10		
	100	100	100										
				310 620 1700					. . . between 26.82 to 26.91m depth highly disturbed zone of phyllite with multiple shear bands and localised calcite and chlorite veining. . . . at 26.88m depth microfault dipping 5°.			27	
27.10-28.60 (0:35)									. . . between 27.13-27.20m depth undulating re-fused microfault dipping 45°.				
						22/C					-10.558	27.29	
	100	100	100			23/C			Medium strong very narrow to thin bands of very narrowly foliated purple fresh PHYLLITE interbanded with extremely closely to very closely spaced very thin bands of dark grey fine to coarse grained PSAMMITE. Foliation planes are dipping at ~20°. Single probable foliation fracture ~15° present. Veins are closely spaced very narrow <6mm locally present in extremely closely spaced groups undulating and irregular Calcite. Fractures are closely spaced undulating partly open dipping 0-20° and medium spaced dipping 55-60° with rare slight brown staining and causing offset by microfaults. (New Harbour Group - Interbedded				

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH536R

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
									PHYLLITE & PSAMMITE)				
										112 FF[i]	-11		
									. . . between 27.74 to 27.92m depth multiple high angle dipping 50-70° calcite veins present, locally quartz overprinted.			(1.04)	
									. . . between 27.97 to 28.30m depth highly disturbed fabric with a undulating re-fused possible minor fault dipping 65°. Phyllite and psammite are both locally deformed, brittle and ductile.			28	
	100	100	100	310 620 1700						113 IcF[i]			
									. . . between 28.27 to 28.32m depth possible re-fused minor fault dipping 10° at base of disturbed core above. Quartz veining and overprinting present and ductile shearing present within both phyllite and calcite veins.	114 IcF[i]			
										115 FF[i]	-11.598	28.33	
										116 IcF[i]			
									Strong narrow to thin bands of greenish-dark grey fine to coarse grained fresh PSAMMITE with closely to locally very closely spaced narrow to very thin bands of very narrowly foliated brownish purple phyllite. Foliation planes within phyllite are dipping at ~20°. Veins closely spaced very narrow to narrow 3-10mm undulating generally dipping at 50-60° Quartz cross cutting foliation planes. Calcite veining present within a disturbed zone from 28.57-28.92m depth, which contains multiple re-fused minor fault planes. Fractures are closely to medium spaced undulating rarely partly open dipping 0-20° and 40-60° with rare brown staining and occasionally causing offsets by microfaulting.	117 IcF[i]			
28.60-30.05 (0:30)													
	100	100	100								-12		
									(New Harbour Group - Psammite) . . . between 28.33 to 28.40m depth undulating re-fused microfault dipping 55°. Plane of fault is heavily epidote veined and locally brecciated.				

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00005

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH536R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	**26.05.11** End: **30.05.11**	**16.732**	**E:234707.7 N:393238.2**	**25** of **61**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
									. . . between 28.61 to 28.92m depth highly disturbed band of psammite, locally brecciated and microfaulted. Large irregular calcite and quartz veining throughout band, with yellow epidote and chlorite veining also present. Several calcite veins show ductile shearing.			29	
						24/C							
	100	100	100	310 620 1700					. . . between 29.28 to 29.44m depth thinly highly disturbed band of psammite and phyllite with multiple cross-cutting quartz and chlorite veins. Lower section of band is locally brecciated and possibly 2 no. re-fused microfault dipping 25-50°.	119 PMF[i] 118 PMF[i]			
											-13	(2.73)	
												30	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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WYL-SSL-SDT-LOG-00005

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH536R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **30.05.11**	**16.732**	**E:234707.7 N:393238.2**	**26** of **61**

Mechanical Log					Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)									
30.05-31.45 (0:35)	100	100	100						. . . between 30.00 to 30.30m depth zone of extremely closely to very closely spaced, multiple veins of quartz, chlorite and calcite and localised epidote dipping 50-70° overprinted veins. . . . between 30.01 to 30.06m depth very thin band of fine to coarse grained psammite, with very narrow <5mm calcite veins dipping at >40° locally 60°. Psammite band is locally overprinted with quartz.	120 J[i]			
						25/C			. . . between 30.45 to 30.06m depth re-fused brecciated zone. Psammite clasts fine to medium gravel sized, angular, set locally within a "matrix" of calcite and orthoclase. Phyllite clasts also present within the veins. Quartz veining also present and occasional epidote veining. Multiple microfaults, horizontal to near vertical crosscutting veins and psammite.	121 IcF[i]			
	100	100	100	310 620 1700						122 PMF[i]	-14		
												31	
									Strong very thin to thin bands of green-grey fine to medium to locally coarse grained fresh PSAMMITE with closely spaced narrow to very thin bands of very narrowly foliated purple phyllite. Quartz and calcite veining is closely locally extremely closely spaced narrow		-14.328	31.06	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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BOREHOLE LOG

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Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **30.05.11**	**16.732**	**E:234707.7 N:393238.2**	**27** of **61**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
	100	100	100						<15mm undulating randomly oriented. Chlorite is present within both the quartz and calcite veins possibly as replacement mineral? (New Harbour Group - Psammite)			(0.66)	
31.45-32.65 (0:20)				310 620 1700					. . . between 31.49 to 31.66m depth thin band of highly disturbed psammite and phyllite, crosscut by multiple microfaults dipping 10-40°. Locally psammite is present as angular clasts within a matrix of calcite and quartz. Possible re-fused microfault present between 31.56 to 31.60m depth.	123 J[i]			
											-14.988	31.72	
	100	100	100						Medium very narrow to very thin bands of strong very narrowly foliated brownish purple fresh PHYLLITE with extremely closely spaced very narrow occasionally narrow lenticular bands of grey fine to medium grained psammite. Foliation planes dipping at ~15-20°. Un-fractured. (New Harbour Group - Phyllite)	124 PMF[i]	-15	(0.41)	
				300 1100 1340					. . . between 31.73 to 31.82m depth up to 45mm wide possible re-fused micro fault dipping 40°. Band comprises randomly oriented fine to medium gravel size fragments of purple phyllite in a matrix of grey psammite and calcite. Localised quartz overprint at of some psammite present.			32	
											-15.398	32.13	
									Strong very narrow to very thin bands of grey-green fine to locally coarse fresh PSAMMITE with extremely closely to closely spaced very narrow bands of very narrowly foliated purple and green phyllite. Foliation planes are locally undulating and indistinct. Un-fractured. Rare calcite veining present around incipient fracture and rare extremely closely spaced quartz and chlorite veins. Fractures are closely to medium spaced undulating dipping 10-40° and rarely 60-70° with rare brown staining and generally causing				

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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BOREHOLE LOG

Contract:	Client:	Borehole:
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Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
									offsets by microfaults. (New Harbour Group - Psammite)	125 IcF[i]		(0.62)	
	100	100	100										
32.65-33.85 (0:21)											-16.018	32.75	
									Medium strong very narrow to very thin bands of very narrowly foliated purple fresh PHYLLITE with extremely closely to very closely spaced very narrow lenticular bands of grey fine grained psammite. Foliation planes dipping at ~15°. Un-fractured. Veins locally extremely closely spaced narrow <10mm Epidote cross cutting foliation planes. (New Harbour Group - Phyllite) . . . between 32.80 to 33.00m depth microfault dipping ~70° cross cutting phyllite	126 PMF[i] 127 IcF[i]		(0.24)	
				300 1100 1340		26/C					-16.258	32.99	
	100	100	100						Medium strong to strong greyish green fine grained fresh PSAMMITE breccia with a white calcite matrix. Clasts are fine to coarse gravel sized, angular and randomly orientated and matrix supported. Quartz overprinting of calcite present in localised patches. Fractures are medium spaced undulating dipping 60-70°. (New Harbour Group - Psammite)	128 FF		33 (0.51)	
						27/C			. . . between 33.37 to 33.53m depth locally fine to medium gravel size brecciated psammite and purple phyllite.		-16.768	33.50	
									Strong very narrow to very thin bands of greenish-grey fine to medium, locally coarse grained fresh PSAMMITE with extremely closely to closely spaced narrow to very thin				

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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Contract:	Client:	Borehole:
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Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Mechanical Log					Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)									
	100	100	100						bands of very narrowly foliated purple phyllite. Veins extremely closely spaced very narrow <2mm undulating randomly orientated Epidote and calcite. Veins generally concentrated to the psammite bands. Fractures are medium spaced undulating to planar open dipping 5° and 80-85° with rare brown staining. (New Harbour Group - Psammite)		-17		
33.85-35.35 (0:18)												(0.90)	
										129 FF		34	
				300 1100 1340									
	100	100	100										
										130 FF	-17.668	34.40	
									Medium strong greenish grey and diffuse purple fine grained weakly foliated fresh PSAMMITE. Un-fractured. Very closely spaced very narrow <1.5mm undulating calcite veins dipping at 40-60°. (New Harbour Group - Psammite)				
						28/C						(0.41)	
											-18		

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres	Scale: 1:7	Inclination: Vertical	Azimuth: NA

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	Comacchio MC405	SP	ADingle + JWickenden	GS+BNS

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Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
									Medium strong to strong very narrow to very thin bands of very narrowly foliated purplish-greyish becoming purple fresh PHYLLITE with extremely closely to very closely spaced very narrow lenticular bands of grey fine grained psammite. Foliation planar dipping at 20°. Un-fractured. Rare calcite veins very narrow <4mm thick undulating cross cutting foliation planes. (New Harbour Group - Phyllite)		18.078	34.81	
	100	100	100									35	
												(0.76)	
35.35-36.65 (0:21)				300 1100 1340									
											-18.838	35.57	
	100	100	100						Strong very narrow to very thin bands of greenish grey fine to medium to locally coarse grained fresh PSAMMITE with extremely closely to closely spaced very narrow to very thin bands of brown-green and brownish-purple very narrowly foliated phyllite. Single 5° foliation fracture present. Phyllite bands are undulating and locally diffuse. Closely to locally extremely closely spaced very narrow undulating irregular calcite veins. Localised red (possible haematite) veining present from 35.62-35.70m depth. Foliation fractures are closely to medium spaced undulating dipping 5-10° and 40-85° with rare calcite infill and occasionally causing offsets by microfaults. (New Harbour Group - Psammite) . . . at 35.93m depth microfault dipping 55° crosscutting calcite vein. *Description on next sheet*	131 FF[i]	-19	(0.65)	
												36	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
									. . . between 35.97 to 36.12m depth localised epidote and quartz veining present within psammite bands.				
											-19.488	36.22	
	100	100	100						Strong very thin to thin bands of grey locally greenish grey fine to coarse grained fresh PSAMMITE with closely to medium spaced very narrow to narrow bands of very narrowly foliated purple phyllite. Foliation planes are dipping at 20-40°. Un-fractured. Veins are extremely closely to very closely spaced very narrow <2mm randomly oriented undulating and ptygmatic Epidote. Quartz veins, up to 12mm thick, locally present extremely closely spaced undulating veins within psammite bands. (New Harbour Group - Psammite)				
36.65-38.05 (0:16)				300 1100 1340		29/C							
									. . . between 36.66 to 37.00m depth high concentration of epidote veining and multiple high angle quartz veins.		-20		
									. . . between 36.84 to 36.97m depth microfault dipping ~85° cross cutting quartz veins.			(1.32)	
	100	100	100							132 PMF[i]			
										133 FF		37	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
									. . . between 37.25 to 37.30m depth very thin band of psammite with extremely closely <1mm thick epidote veins and multiple high angle (>55°) quartz and calcite veins.	134 FF			
											-20.808	37.54	
	100	100	100	300 1100 1340					Medium strong to strong very narrow to very thin bands of very narrowly foliated purple fresh PHYLLITE with extremely closely to very closely spaced very narrow to very thin lenticular bands of grey fine to medium grained psammite. Foliation planes dipping at 20°. Veins extremely closely spaced very narrow <1mm undulating Epidote confined to psammite bands. (New Harbour Group - Phyllite)		-21	(0.57)	
38.05-39.50 (0:20)									. . . between 38.03 to 38.16m depth core recovered non-intact presumed to be drilling induced.			38	
											-21.378	38.11	
	100	91	91						Strong disturbed and brecciated green fine grained fresh PSAMMITE with irregularly spaced very narrow to narrow clasts of green phyllite, locally set within a matrix of calcite and quartz. Veins extremely closely spaced narrow <20mm undulating and irregular Calcite locally overprinting chlorite and epidote veins. Quartz veins are very narrow <4mm irregular, undulating and diffuse. Occasional possible calcite lenticular veining also present. Fractures are closely to medium spaced undulating dipping 5-40° and rarely 85-90° causing occasional offsets by microfaults.	135 IcF[1]			

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
									(New Harbour Group - Psammite)				
									. . . between 38.56 to 38.64m depth 2 no. possible refused microfaults with narrow 20mm quartz vein present dipping at 10-40°.	136 PMF[i] 138 PMF[i] 137 PMF[i]		(0.93)	
									. . . between 38.67 to 38.96m depth multiple microfaults dipping 5-40° causing offset to fabric.	139 PMF[i]			
									. . . between 38.75 to 38.90m depth narrow quartz vein containing pinkish calcite and dark green chlorite. Dark red-brown (possible haematite) veining also present through psammite.	140 PMF[i]	-22		
	100	91	91	300 1100 1340						141 PMF[i] 142 PMF[i]		39	
											-22.308	39.04	
									Medium strong to strong narrow to very thin bands of very narrowly foliated greyish purple to purple fresh PHYLLITE with extremely closely to very closely spaced very narrow to narrow lenticular bands of grey fine to medium grained psammite. Foliation planes dipping at 10-15°. Rare medium to widely spaced narrow <10mm undulating quartz veins. Closely to medium spaced very narrow <2mm undulating calcite veins generally crosscutting foliation planes. Core is Un-fractured, with multiple incipient planes present through core.				
									(New Harbour Group - Phyllite)			(0.55)	
									. . . between 39.10 to 39.23m depth thin band of disturbed phyllite with ptygmatic quartz veining.				
39.50-41.00 (0:18)	100	100	100								-22.858	39.59	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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Mechanical Log					Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)									
									Strong thin bands of green fine grained fresh PSAMMITE with rare very narrow bands of green-brown poorly foliated phyllite. Un-fractured. Extremely closely to very closely spaced undulating randomly oriented occasional dipping at 60-70° very narrow 2-4mm quartz veins. microfaults are medium spaced undulating dipping 40-90° with multiple offsets. (New Harbour Group - Psammite) . . . between 39.74 to 39.87m depth zone of locally disturbed and sheared phyllite.		-23		
										143 IcF[i] 144 PMF[i]		40	
									. . . between 40.08 to 40.20m depth near vertical incipient fracture, terminating in a 70° incipient fracture that cross cuts the core.	145 IcF[i] 146 IcF[i]			
	100	100	100	300 1100 1340		30/C							
						31/C					-24		

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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725061	End: **30.05.11**	**16.732**	**E:234707.7 N:393238.2**	**35** of **61**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
						32/C			. . . between 40.81 to 40.84m depth epidote veining present within psammite band.				
	100	100	100										
41.00-42.15 (0:17)												41	
										147 IcF[i]			
				300 1100 1340					. . . between 41.31 to 41.51m depth possible re-fused minor fault dipping 50°. Phyllite and psammite is highly disturbed and locally brecciated. Calcite veining is present along upper and lower surfaces of zone.	149 J 148 PMF[i]		(3.76)	
	100	100	100										
											-25		
									. . . between 41.79 to 41.84m depth very thin psammite band containing high angle (~60°) quartz, calcite and chlorite veins.				
												42	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH536R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
42.15-43.35 (0:19)	100	100	100	300 1100 1340		33/C			. . . between 42.17 to 42.28m depth possible re-fused micro fault dipping ~ 45-50°, cross cut by multiple near horizontal microfaults. . . . between 42.48 to 42.70m depth thin disturbed zone. Phyllite fabric is locally sheared and brecciated. Zone is a possible re-fused minor fault dipping 35°. . . . between 42.74 to 42.88m depth stepped rough joint dipping ~60°.	150 IcF[i] 151 PMF[i] 152 PMF[i] 154 IcF[i] 153 J[i]	-26	43	
	100	100	100	4050									

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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BOREHOLE LOG

Contract:	Client:	Borehole:
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Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
						34/C							
	100	100	100								-26.618	43.35	
43.35-44.55 (0:15)									Strong very narrow to very thin bands of bluish grey fine to coarse grained fresh PSAMMITE with extremely closely to closely spaced very narrow to narrow bands of very narrowly foliated purple phyllite. Foliation planes dipping at 20-25°. Un-fractured. Medium spaced undulating very narrow to narrow 5-10mm quartz veins with possible partial chlorite replacement. Very closely to closely spaced undulating narrow <12mm calcite veins with locally partial overprinted with epidote. Fractures are absent. (New Harbour Group - Psammite)				
				4050							-27		
	100	100	100									44	
									. . . between 44.30 to 44.60m depth undulating calcite, chlorite and quartz vein crosscut at 44.45m by a microfault dipping 15°.				(2.03)	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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BOREHOLE LOG

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Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
	100	100	100						. . . between 44.45 to 44.47m depth 2 no. microfaults dipping ~10-15°.	155 PMF[i] 156 PMF[i]			
44.55-45.65 (0:21)									. . . at 44.53m depth ductile shear bands (5°) offsetting calcite veins) offsets calcite vein				
									. . . between 44.65 to 44.96m depth large irregular calcite veining with some localised quartz, chlorite and epidote veins.				
									. . . at 44.74m depth microfault dipping ~60° through phyllite bands.	157 PMF[i]	-28		
						35/C							
				4050								45	
	100	100	100						. . . between 45.08 to 45.20m and 45.54 to 45.60m depth 2 no. microfaults dipping 45-60°.	158 PMF[i]			
						36/C							
											-28.648	45.38	
									Strong very thin to thin bands of grey fine to coarse grained fresh PSAMMITE with medium to locally very closely spaced very narrow to narrow bands of narrowly foliated purple phyllite. Phyllite bands are dipping at ~10°. Single ~20° foliation fracture present at 46.77m depth. Veins are closely to locally extremely closely spaced narrow <10mm undulating and irregular Calcite locally containing possible red staining by haematite. Closely to widely spaced	159 PMF[i]			

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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Contract:	Client:	Borehole:
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Mechanical Log					Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)									
45.65-47.10 (0:20)	100	100	100						very narrow <1mm thin bands of extremely closely spaced undulating randomly oriented Epidote. Fractures are closely to medium spaced undulating dipping 5° and 30-60° occasionally causing offset by microfaults. (New Harbour Group - Psammite)		-29	46	
	98	97	97	4050					. . . at 46.14m depth possible near horizontal re-fused micro fault. Psammite is brecciated and has calcite around fragments.	160 PMF[i]	-30	(1.72)	
										161 FF[i]			

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
	98	97	97									47	
											-30.368	47.10	
47.10-48.50 (0:19)						37/C			Strong to medium strong disturbed very narrow to thin bands of green-grey fine to medium grained fresh PSAMMITE with very closely spaced very narrow to narrow lenticular bands of very narrowly foliated purple phyllite. Fabric of rock is undulating, sheared, and locally microfaulted with possible poorly developed mylonitic texture. Localised quartz overprinting of psammite. Foliation planes are locally indistinct, generally dipping at ~20°. Rock is Un-fractured. Epidote and calcite veins are extremely closely to very closely spaced, undulating an irregular. (New Harbour Group - Psammite)			(0.44)	
				NI 960 1480							-30.808	47.54	
	95	92	90			38/C			Medium strong to strong very narrow to very thin bands of greenish grey fine to locally coarse grained fresh PSAMMITE with extremely closely to closely spaced very narrow to narrow bands of very narrowly foliated purple and brownish-purple phyllite. Foliation planes are dipping at ~20°. Extremely closely to very closely spaced randomly orientated very narrow calcite veins. Fractures are medium spaced undulating open dipping 10-40° with rare red mineral smearing and occasionally causing offsets by microfaults. (New Harbour Group - Psammite) . . . between 47.81m to 48.05m depth multiple incipient fractures present, randomly orientated though core.	162 FF[i] 163 IcF[i] 164 IcF[i] 165 IcF[i]	-31		
												48	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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BOREHOLE LOG

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Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
										166 J[i]		(1.20)	
	95	92	90										
48.50-48.90 (0:05)				NI 960 1480					. . . between 48.50 to 48.67m depth core is non-intact, recovered as moderately coarse gravel sized fragments.				
	100	57	57								-32.008	48.74	
48.90-50.40 (0:20)									Strong narrow to thin bands of greyish green fine to medium grained fresh PSAMMITE with closely to medium spaced narrow to very thin bands of green-brown and red-brown phyllite. Fabric of rock is locally brecciated within large calcite veins, possible moderately developed brecciated appearance? Quartz veins also present within the calcite veins and rare very narrow <1mm thick epidote veins also present. (New Harbour Group - Psammite) . . . between 48.75 to 48.86m depth brecciated zone. Clasts of psammite are angular fine to medium gravel size, contained within calcite veining.			49	
	90	90	90						. . . between 49.08 to 49.34m depth brecciated zone. Clasts are angular to subrounded, fine to coarse gravel size contained within calcite veining.			(0.76)	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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BOREHOLE LOG

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Mechanical Log					Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)									
											-32.768	49.50	
	90	90	90	NI 960 1480		39/C 40/C			Medium strong to strong very thin to thin bands of greyish green fine to coarse grained fresh PSAMMITE with rare very narrow bands of purple phyllite. Single joint present at 49.58m depth. Closely spaced very narrow <5mm calcite veins present between 49.72-49.90m. Very closely to closely spaced very narrow <5mm generally undulating near horizontal quartz veins. Extremely closely to very closely spaced very narrow <5mm randomly orientated undulating and locally ptygmatic epidote and chlorite veins. (New Harbour Group - Psammite) . . . at 49.51 to 49.58m depth microfault dipping 40°, causing offset to fabric.	167 PMF[i] 168 J[i] 169 IcF[i]	-33	(0.90)	
											-33.668	50.40	

50

Rotary borehole terminated at 50.40m depth.

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres	Scale: 1:7	Inclination: Vertical	Azimuth: NA

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	Comacchio MC405	SP	ADingle + JWickenden	GS+BNS

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BOREHOLE LOG

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Mechanical Log					Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)									

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 10.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Comacchio MC405**	**SP**	**ADingle + JWickenden**	**GS+BNS**

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1.60 - 3.50m depth



Method Used:	Rotary open hole + Rotary Cored	Plant Used:	Comacchio MC405	Drilled By:	SP	Logged By:	ADingle + JWickenden	Checked By:	GS+BNS

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3.50 - 6.50m depth



Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	Comacchio MC405	SP	ADingle + JWickenden	GS+BNS

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6.50 - 9.55m depth



Method Used:	Rotary open hole + Rotary Cored	Plant Used:	Comacchio MC405	Drilled By:	SP	Logged By:	ADingle + JWickenden	Checked By:	GS+BNS

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9.55 - 12.55m depth



Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	Comacchio MC405	SP	ADingle + JWickenden	GS+BNS

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12.55 - 15.35m depth



Method Used:	Rotary open hole + Rotary Cored	Plant Used:	Comacchio MC405	Drilled By:	SP	Logged By:	ADingle + JWickenden	Checked By:	GS+BNS

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH536R

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15.35 - 18.35m depth



Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	Comacchio MC405	SP	ADingle + JWickenden	GS+BNS

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH536R

Contract Ref:	Start: 26.05.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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18.35 - 21.45m depth



Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	Comacchio MC405	SP	ADingle + JWickenden	GS+BNS

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BOREHOLE LOG

Contract:		Client:		Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation		Horizon Nuclear Power Wylfa Limited		BH536R
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21.45 - 24.50m depth



Method Used:	Rotary open hole + Rotary Cored	Plant Used:	Comacchio MC405	Drilled By:	SP	Logged By:	ADingle + JWickenden	Checked By:	GS+BNS

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BOREHOLE LOG

Contract:		Client:		Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation		Horizon Nuclear Power Wylfa Limited		BH536R
Contract Ref:	Start: 26.05.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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24.50 - 27.10m depth



Method Used:	Rotary open hole + Rotary Cored	Plant Used:	Comacchio MC405	Drilled By:	SP	Logged By:	ADingle + JWickenden	Checked By:	GS+BNS

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH536R

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27.10 - 30.05m depth



Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	Comacchio MC405	SP	ADingle + JWickenden	GS+BNS

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BOREHOLE LOG

Contract:		Client:		Borehole:
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30.05 - 32.65m depth



Method Used:	Rotary open hole + Rotary Cored	Plant Used:	Comacchio MC405	Drilled By:	SP	Logged By:	ADingle + JWickenden	Checked By:	GS+BNS

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BOREHOLE LOG

Contract:		Client:		Borehole:
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32.65 - 35.35m depth



Method Used:	Rotary open hole + Rotary Cored	Plant Used:	Comacchio MC405	Drilled By:	SP	Logged By:	ADingle + JWickenden	Checked By:	GS+BNS

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BOREHOLE LOG

Contract:		Client:		Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation		Horizon Nuclear Power Wylfa Limited		BH536R
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35.35 - 38.05m depth



Method Used:	Rotary open hole + Rotary Cored	Plant Used:	Comacchio MC405	Drilled By:	SP	Logged By:	ADingle + JWickenden	Checked By:	GS+BNS

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BOREHOLE LOG

Contract:		Client:		Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation		Horizon Nuclear Power Wylfa Limited		BH536R
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38.05 - 41.00m depth



Method Used:	Rotary open hole + Rotary Cored	Plant Used:	Comacchio MC405	Drilled By:	SP	Logged By:	ADingle + JWickenden	Checked By:	GS+BNS

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BOREHOLE LOG

Contract:		Client:		Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation		Horizon Nuclear Power Wylfa Limited		BH536R
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41.00 - 43.35m depth



Method Used:	Rotary open hole + Rotary Cored	Plant Used:	Comacchio MC405	Drilled By:	SP	Logged By:	ADingle + JWickenden	Checked By:	GS+BNS

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BOREHOLE LOG

Contract:		Client:		Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation		Horizon Nuclear Power Wylfa Limited		BH536R
Contract Ref:	Start: 26.05.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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43.35 - 45.65m depth



Method Used:	Rotary open hole + Rotary Cored	Plant Used:	Comacchio MC405	Drilled By:	SP	Logged By:	ADingle + JWickenden	Checked By:	GS+BNS

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BOREHOLE LOG

Contract:		Client:		Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation		Horizon Nuclear Power Wylfa Limited		BH536R
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45.65 - 48.50m depth



Method Used:	Rotary open hole + Rotary Cored	Plant Used:	Comacchio MC405	Drilled By:	SP	Logged By:	ADingle + JWickenden	Checked By:	GS+BNS

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BOREHOLE LOG

Contract:		Client:		Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation		Horizon Nuclear Power Wylfa Limited		BH536R
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48.50 - 50.25m depth



Method Used:	Rotary open hole + Rotary Cored	Plant Used:	Comacchio MC405	Drilled By:	SP	Logged By:	ADingle + JWickenden	Checked By:	GS+BNS

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SUMMARY OF DISCONTINUITIES - BH536R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
1	1.60-1.81	J	65	U-R	Open	None	Brown stained	NHG	META_M
2	1.65	FF	10	U-R	Open	None	Brown and black stained	NHG	META_M
3	1.73	FF	10	U-R	Partly open	None	slight brown discolouration	NHG	META_M
4	1.81-1.86	IcF	85	U	Tight	None		NHG	META_M
5	1.86	FF	10	S-R	Open	None	Brown stained	NHG	META_M
6	1.86-2.02	J	85	U-R	Open	Copper coloured metallic clay	Dark brown and copper stained	NHG	META_M
						smearing			
7	2.02	J	20	U-R	Open	None	Brown stained, slight copper smearing.	NHG	META_M
8	2.24-2.29	IcF	45	U	Tight	None	None	NHG	META_M
9	2.37	FF	15	U-R	Open	Slight brown staining	None	NHG	META_M
10	2.39	IcF	15	U	Partly open	None	None	NHG	META_M
11	2.45-2.50	J	35	U-R	Open	None	None	NHG	META_M
12	2.59	FF	10	U-R	Partly open	-	None	NHG	META_M
13	2.64	FF	15	U-R	Partly open	Dark brown staining	None	NHG	META_M
14	2.83	J	25	S-R	Open	Dark brown staining	None	NHG	META_F
15	3.26	FF	30	U-SM	Open	Brown staining	None	NHG	META_M

Key:
Type codes: FF = Foliation fracture, IcF = Incipient fracture, J = Joint, PF = Possible Fault, PMF = Possible Micro fault.
Small-scale roughness codes: S = Stepped, S-R = Stepped - rough, U = Undulating, U-R = Undulating - rough, U-SM = Undulating - smooth, U-ST = Undulating - striated.
Aperture description codes: Open = (0.5mm - 2.5mm), Partly open = (0.25mm - 0.5mm), Tight = (0.1mm - 0.25mm), Very tight = (<0.1mm).

SUMMARY OF DISCONTINUITIES - BH536R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
16	3.31-3.33	IcF	50	U	Very tight	None	None	NHG	META_M
17	3.51-3.60	IcF	60	U	Tight	None	None	NHG	META_F
18	3.52-3.64	J	60	S-R	Open	Dark brown staining	None	NHG	META_F
19	3.91	FF	15	U-R	Partly open	brown staining	None	NHG	META_M
20	4.09	IcF	25	U	Tight	Possibly opened by drilling, brown	None	NHG	META_F
						staining			
21	4.14	IcF	20	U	Tight	Possibly opened by drilling, brown	None	NHG	META_F
						staining			
22	4.51	FF	25	U-R	Open	Strong pale brown staining	None	NHG	META_F
24	5.06	FF	10	U-R	Open	Slight brown staining	None	NHG	META_M
25	5.08-5.17	J	40	S-R	Open	Brown and reddish brown staining	None	NHG	META_M
26	5.09	IcF	25	U	Tight	-	None	NHG	META_M
27	5.09-5.46	IcF	75	U	Tight	Possible solution voids within	None	NHG	META_M
						en-echelon calcite vein			
28	5.10	IcF	75	U	Tight	Possible solution voids with en-echelon	None	NHG	META_M
						calcite vein			

Key:
Type codes: FF = Foliation fracture, IcF = Incipient fracture, J = Joint, PF = Possible Fault, PMF = Possible Micro fault.
Small-scale roughness codes: S = Stepped, S-R = Stepped - rough, U = Undulating, U-R = Undulating - rough, U-SM = Undulating - smooth, U-ST = Undulating - striated.
Aperture description codes: Open = (0.5mm - 2.5mm), Partly open = (0.25mm - 0.5mm), Tight = (0.1mm - 0.25mm), Very tight = (<0.1mm).

SUMMARY OF DISCONTINUITIES - BH536R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
29	5.46	IcF	10	S	Partly open	Possible opened by drilling	None	NHG	META_M
30	6.08	IcF	15	U	Partly open	Possible opened by drilling, slight	None	NHG	META_M
						orange brown staining.			
31	6.08-6.13	IcF	75	U	Very tight	None	None	NHG	META_M
32	6.12-6.16	IcF	75	U	Very tight	None	None	NHG	META_M
33	6.16	FF	20	U-SM	Partly open	Slight orange brown staining	None	NHG	META_M
36	6.89-6.94	J	40	S-R	Open	Slight patchy calcite infill <1mm,	None	NHG	META_F
						possible calcite vein, brown staining			
38	7.18	IcF	5	U	Very tight	Icf clast MF	None	NHG	META_M
39	7.41	IcF	10	S	Partly open	Possible opened by drilling	Patchy brown staining	NHG	META_F
40	7.41-7.57	IcF	75	S	Very tight	None	None	NHG	META_F
41	7.56-7.87	IcF	75	U	Partly open	Patchy calcite infill <1mm	Possible calcite infill	NHG	META_F
42	7.73-7.85	IcF	70	S	Very tight	None	None	NHG	META_M
43	7.91	IcF	15	U	Partly open	Possible opened by drilling, brown	None	NHG	META_M
						staining.			
45	8.40	IcF	20	U	Partly open	Possible opened by drilling, slight	None	NHG	META_F

Key:
Type codes: FF = Foliation fracture, IcF = Incipient fracture, J = Joint, PF = Possible Fault, PMF = Possible Micro fault.
Small-scale roughness codes: S = Stepped, S-R = Stepped - rough, U = Undulating, U-R = Undulating - rough, U-SM = Undulating - smooth, U-ST = Undulating - striated.
Aperture description codes: Open = (0.5mm - 2.5mm), Partly open = (0.25mm - 0.5mm), Tight = (0.1mm - 0.25mm), Very tight = (<0.1mm).

SUMMARY OF DISCONTINUITIES - BH536R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
						brown staining			
46	8.67	IcF	15	U	Partly open	Possible opened by drilling	None	NHG	META_M
47	8.93	IcF	5	U	Partly open	Possible opened by drilling, brown and	None	NHG	META_M
						orange brown staining			
48	9.21	IcF	25	U	Partly open	Possible opened by drilling. Patchy	None	NHG	META_M
						brown staining			
49	9.74-9.79	IcF	85	U	Very tight	None	None	NHG	META_M
50	9.74-9.91	IcF	85	U	Tight	None	None	NHG	META_M
51	9.76-9.77	IcF	20	U	Very tight	None	None	NHG	META_M
52	9.95-10.04	IcF	85	U	Very tight	Along possible micro-faults.	None	NHG	META_M
53	10.26	IcF	25	U	Partly open	Possibly opened by drilling slight	None	NHG	META_F
						brown and speckled dark brown			
						staining.			
54	10.49	IcF	15	U	Tight	Possible opened by drilling slight	None	NHG	META_M
						brown staining along micro-fault			
58	10.86	IcF	40	U	Partly open	Possible opened by drilling, partial	None	NHG	META_M

Key:
Type codes: FF = Foliation fracture, IcF = Incipient fracture, J = Joint, PF = Possible Fault, PMF = Possible Micro fault.
Small-scale roughness codes: S = Stepped, S-R = Stepped - rough, U = Undulating, U-R = Undulating - rough, U-SM = Undulating - smooth, U-ST = Undulating - striated.
Aperture description codes: Open = (0.5mm - 2.5mm), Partly open = (0.25mm - 0.5mm), Tight = (0.1mm - 0.25mm), Very tight = (<0.1mm).

SUMMARY OF DISCONTINUITIES - BH536R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
						brown staining.			
59	10.94	IcF	20	U	Partly open	Possible opened by drilling, partial	None	NHG	META_M
						brown staining.			
60	11.18	IcF	20	U	Partly open	Possibly opened by drilling, slight	None	NHG	META_F
						brown staining.			
61	11.30	IcF	20	U	Partly open	Possibly opened by drilling, slight	None	NHG	META_F
						brown staining.			
62	11.44	IcF	15	U	Partly open	Possibly opened by drilling, slight	None	NHG	META_F
						brown staining.			
63	11.49	IcF	15	U	Partly open	Possibly opened by drilling, slight	None	NHG	META_F
						brown staining.			
64	11.84-11.89	J	30	U-R	Open	Slight patchy brown staining	None	NHG	META_M
65	11.90-12.00	J	60	S-R	Open	Purple brown staining/mineralisation	None	NHG	META_M
66	12.65	IcF	10	U	Partly open	slight orange brown staining.	None	NHG	META_M
67	12.94	IcF	15	U	Partly open	slight orange brown staining.	None	NHG	META_M
68	12.99	IcF	15	U	Partly open	slight orange brown staining	None	NHG	META_M

Key:
Type codes: FF = Foliation fracture, IcF = Incipient fracture, J = Joint, PF = Possible Fault, PMF = Possible Micro fault.
Small-scale roughness codes: S = Stepped, S-R = Stepped - rough, U = Undulating, U-R = Undulating - rough, U-SM = Undulating - smooth, U-ST = Undulating - striated.
Aperture description codes: Open = (0.5mm - 2.5mm), Partly open = (0.25mm - 0.5mm), Tight = (0.1mm - 0.25mm), Very tight = (<0.1mm).

SUMMARY OF DISCONTINUITIES - BH536R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
70	13.27-13.34	IcF	45	U	Partly open	slight orange brown staining	None	NHG	META_M
71	13.53	IcF	25	U	Partly open	slight orange brown staining.	None	NHG	META_M
73	13.57-13.63	FF	40	U-R	Open	No infill, slight orange brown staining.	None	NHG	META_F
75	13.72-13.78	FF	50	U-R	Open	No infill, slight orange brown staining.	None	NHG	META_F
76	13.80-13.85	IcF	20	U	Partly open	light brown staining	None	NHG	META_F
78	14.73	IcF	20	U	Partly open	slight speckled brown staining	None	NHG	META_F
79	14.84	PF	25	U-R	Open	Slight brown clay smearing, brown	possible minor fault	NHG	META_F
						staining.			
80	14.86	J	35	U-R	Open	Slight brown clay smearing, brown	None	NHG	META_F
						staining.			
81	15.02	J	40	U-R	Open	Slight brown clay smearing, brown	None	NHG	META_M
						staining.			
82	15.12	IcF	15	U	Partly open	brown staining	None	NHG	META_M
83	15.22	IcF	20	U	Partly open	fracture along calcite vein	None	NHG	META_M
84	15.54	IcF	10	U	Partly open	brown and brown staining	None	NHG	META_M
85	15.66	IcF	15	U	Partly open	brown staining and purple	None	NHG	META_M

Key:
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Small-scale roughness codes: S = Stepped, S-R = Stepped - rough, U = Undulating, U-R = Undulating - rough, U-SM = Undulating - smooth, U-ST = Undulating - striated.
Aperture description codes: Open = (0.5mm - 2.5mm), Partly open = (0.25mm - 0.5mm), Tight = (0.1mm - 0.25mm), Very tight = (<0.1mm).

SUMMARY OF DISCONTINUITIES - BH536R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
						mineralisation			
86	16.04	IcF	15	U	Partly open	brown staining and purple	None	NHG	META_M
						mineralisation			
87	16.11	J	15	S-R	Open	No infill	None	NHG	META_M
88	16.30	IcF	10	U	Partly open	orange brown staining	None	NHG	META_M
89	16.38	IcF	10	U	Partly open	orange brown staining	None	NHG	META_M
90	16.59-16.69	J	50	U-R	Open	None	None	NHG	META_F
92	17.02	IcF	15	U	Partly open	slight brown staining	None	NHG	META_M
95	17.49	IcF	25	U	Partly open	along <1mm calcite vein, slight brown	None	NHG	META_F
						staining.			
96	17.61	IcF	20	U	Partly open	along <1mm calcite vein	None	NHG	META_M
99	19.10-19.13	IcF	30	S	Partly open	None	None	NHG	META_F
100	19.35-19.48	IcF	80	S	Partly open	None	Foliation fracture within phyllite band.	NHG	META_F
101	19.56-19.92	IcF	75	U	Partly open	None	None	NHG	META_F
102	19.92	FF	20	U-R	Partly open	None	None	NHG	META_F
103	20.55	FF	20	U-SM	Partly open	White very soft material.	Foliation fracture within phyllite band.	NHG	META_F

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Small-scale roughness codes: S = Stepped, S-R = Stepped - rough, U = Undulating, U-R = Undulating - rough, U-SM = Undulating - smooth, U-ST = Undulating - striated.
Aperture description codes: Open = (0.5mm - 2.5mm), Partly open = (0.25mm - 0.5mm), Tight = (0.1mm - 0.25mm), Very tight = (<0.1mm).

SUMMARY OF DISCONTINUITIES - BH536R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
104	21.03	J	30	U-R	Open	None	None	NHG	META_F
106	21.10-21.18	IcF	75	U	Partly open	None	None	NHG	META_M
109	22.70-22.74	PF	25	U-R	Open	-	possible minor fault	NHG	META_M
110	23.07	FF	5	U-R	Open	None	Localised orange-brown staining.	NHG	META_F
111	26.27-26.32	PF	10	U-ST	Open	striated	possible minor fault	NHG	META_M
112	27.71	FF	15	U-R	Partly open	None	Localised orange-brown staining.	NHG	META_M
113	28.16	IcF	60	U	Tight	None		NHG	META_M
114	28.29	IcF	10	U	Tight	None		NHG	META_M
115	28.33	FF	10	U-R	Partly open	None		NHG	META_M
116	28.33-28.40	IcF	55	U	Tight	None		NHG	META_M
117	28.43-28.47	IcF	60	U	Tight	None		NHG	META_M
120	30.03-30.10	J	40	U-R	Open	None	Localised patchy brown staining.	NHG	META_M
121	30.64-30.70	IcF	40	U	Tight	None	None	NHG	META_M
123	31.47	J	10	U	Open	None		NHG	META_M
125	32.48	IcF	10	U	Very tight	None	Localised orange-brown staining.	NHG	META_M
127	32.55-32.95	IcF	60	U	Tight	None	None	NHG	META_M

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Type codes: FF = Foliation fracture, IcF = Incipient fracture, J = Joint, PF = Possible Fault, PMF = Possible Micro fault.
Small-scale roughness codes: S = Stepped, S-R = Stepped - rough, U = Undulating, U-R = Undulating - rough, U-SM = Undulating - smooth, U-ST = Undulating - striated.
Aperture description codes: Open = (0.5mm - 2.5mm), Partly open = (0.25mm - 0.5mm), Tight = (0.1mm - 0.25mm), Very tight = (<0.1mm).

SUMMARY OF DISCONTINUITIES - BH536R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
128	33.20	FF	10	U-R	Open	-			
129	34.00	FF	10	U-R	Open	-			
130	34.40	FF	10	U-R	Open	-			
131	35.90	FF	5	U-SM	Partly open	None	Patchy orange-brown staining.	NHG	META_M
133	37.00	FF	10	U-R	Open	-			
134	37.30	FF	10	U-R	Open	-			
135	38.22	IcF	10	U	Tight	None	None	NHG	META_M
143	39.96	IcF	85	U	Tight	None	None	NHG	META_F
145	40.08-40.20	IcF	90	U	Tight	None	None	NHG	META_F
146	40.13-40.32	IcF	70	S	Tight	None	locally calcite veined.	NHG	META_F
147	41.25	IcF	60	S	Tight	None	None	NHG	META_F
149	41.40	J	-	U-R	Open	-			
150	42.00-42.21	IcF	40	S	Tight	None	None	NHG	META_F
153	42.74-42.88	J	60	S-R	Open	None	None	NHG	META_F
154	42.76-42.80	IcF	40	S	Tight	None	None	NHG	META_F
161	46.79	FF	25	U	Open	None	Core non-intact on upper surface.	NHG	META_M

Key:
Type codes: FF = Foliation fracture, IcF = Incipient fracture, J = Joint, PF = Possible Fault, PMF = Possible Micro fault.
Small-scale roughness codes: S = Stepped, S-R = Stepped - rough, U = Undulating, U-R = Undulating - rough, U-SM = Undulating - smooth, U-ST = Undulating - striated.
Aperture description codes: Open = (0.5mm - 2.5mm), Partly open = (0.25mm - 0.5mm), Tight = (0.1mm - 0.25mm), Very tight = (<0.1mm).

SUMMARY OF DISCONTINUITIES - BH536R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
162	47.75-47.82	FF	30	U	Open	None	Core is non-intact around upper surface.	NHG	META_M
163	47.88	IcF	30	U	Tight	None	None	NHG	META_M
164	47.92	IcF	35	U	Tight	None	None	NHG	META_M
165	47.94	IcF	70	U	Tight	None	None	NHG	META_M
166	48.08-48.13	J	40	U-R	Open	None	Possible joint, core is non-intact on upper surface.	NHG	META_M
168	49.56-49.60	J	20	U-R	Open	Red mineral smearing.	Orange-brown stained and red (haematite) mineral	NHG	META_M
							on surfaces.		
169	49.69	IcF	10	U-R	Tight	None	None	NHG	META_M

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Aperture description codes: Open = (0.5mm - 2.5mm), Partly open = (0.25mm - 0.5mm), Tight = (0.1mm - 0.25mm), Very tight = (<0.1mm).

STRUCTURAL SOILS
The Old School
Stillhouse Lane
Bedminster
Bristol BS3 4EB

Compiled By		Date	Contract Ref:
[redacted]	MBEVAN	17.12.11	725061

Contract: **Wylfa New Build - Intermediate Onshore Ground Investigation**

SUMMARY OF POSSIBLE MICRO FAULTS - BH536R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
23	4.92	PMF	25	U-R	Open	Formed along calcite mineralisation	None	NHG	META_F
						(1mm) with strong pale brown staining			
						(possible naturally open microfault)			
34	6.19	PMF	40	U	Tight	Re-fused with possible disturbed	None	NHG	META_M
						phyllite			
35	6.27	PMF	25	U	Tight	Re-fused with possible disturbed	None	NHG	META_M
						phyllite			
37	7.18	PMF	5	U	Very tight	re-fused with <1mm calcite IcF during	None	NHG	META_M
						MF			
44	8.23	PMF	25	U	Tight	Re-fused with <1mm calcite infill.	None	NHG	META_M
55	10.49	PMF	15	U	Partly open	Possible micro-fault previously	None	NHG	META_M
						re-fused with disturbed phyllite.			
56	10.55	PMF	20	U	Tight	Re-fused with <1mm calcite.	None	NHG	META_M
57	10.60	PMF	10	U	Tight	Re-fused with <1mm calcite.	None	NHG	META_M
69	13.05	PMF	15	U	Tight	Re-fused with <1mm calcite.	None	NHG	META_M
72	13.54	PMF	30	U	Tight	Re-fused with <2mm calcite.	None	NHG	META_M

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Small-scale roughness codes: S = Stepped, S-R = Stepped - rough, U = Undulating, U-R = Undulating - rough, U-SM = Undulating - smooth, U-ST = Undulating - striated.
Aperture description codes: Open = (0.5mm - 2.5mm), Partly open = (0.25mm - 0.5mm), Tight = (0.1mm - 0.25mm), Very tight = (<0.1mm).

STRUCTURAL SOILS
The Old School
Stillhouse Lane
Bedminster
Bristol BS3 4EB

Compiled By	Date	Contract Ref:
[redacted] MBEVAN	17.12.11	725061

Contract: **Wylfa New Build - Intermediate Onshore Ground Investigation**

AGS

SUMMARY OF POSSIBLE MICRO FAULTS - BH536R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
74	13.64-13.71	PMF	40	U	Tight	Re-fused with <1mm calcite.	None	NHG	META_M
77	14.47-14.59	PMF	55	S-R	Open	naturally opened up re-fused microfault	None	NHG	META_M
						with re-crystallisation of calcite and			
						dark brown staining.			
91	16.95	PMF	50	U	Tight	Re-fused with <1mm calcite	None	NHG	META_M
93	17.18	PMF	25	U	Tight	Re-fused with <1mm calcite.	None	NHG	META_M
94	17.34	PMF	25	U	Tight	Re-fused with <1mm calcite.	None	NHG	META_M
97	18.85-19.00	PMF	10	U	Tight	Re-fused with disturbed phyllite and	Fracture at phyllite-psammite contact	NHG	META_M
						<2mm calcite			
98	18.90	PMF	60	U	Tight	Re-fused with disturbed phyllite and	None	NHG	META_M
						<1mm calcite			
105	21.06	PMF	50	U	Tight	None	None	NHG	META_F
107	21.87-21.96	PMF	45	U	Partly open	Psammite, phyllite, quartz, chlorite.	Re-fused minor fault.	NHG	META_F
108	22.08	PMF	20	U	Tight	None	None	NHG	META_M
118	29.36-29.44	PMF	50	U	Tight	None	Re-fused micro-fault.	NHG	META_M
119	29.37	PMF	25	U	Tight	None	Re-fused micro-fault.	NHG	META_M

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SUMMARY OF POSSIBLE MICRO FAULTS - BH536R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
122	30.76	PMF	20	U	Tight	None	None	NHG	META_M
124	31.73-31.82	PMF	40	U-R	Partly open	Brecciated phyllite.	Re-fused micro-fault.	NHG	META_F
126	32.50-33.00	PMF	70	U	Tight	None	Epidote veining present along fracture plane.	NHG	META_F
132	36.84-36.97	PMF	85	U	Tight	None	None	NHG	META_M
136	38.56-38.59	PMF	10	U	Tight	Quartz and calcite.	Possible re-fused micro-fault.	NHG	META_M
137	38.59-38.64	PMF	40	U	Tight	None	Possible re-fused micro-fault.	NHG	META_M
138	38.60	PMF	5	U-R	Open	naturally open			
139	38.67	PMF	5	U	Tight	None	Re-fused micro-fault.	NHG	META_M
140	38.72	PMF	20	U	Tight	None	None	NHG	META_M
141	38.93	PMF	35	U	Tight	None	None	NHG	META_M
142	38.96	PMF	40	U	Tight	None	None	NHG	META_M
144	40.00	PMF	-	U-R	Open	naturally open			
148	41.31-41.50	PMF	50	U	Tight	Brecciated phyllite and psammite.	Re-fused micro-fault.	NHG	META_F
151	42.17-42.28	PMF	45	U	Tight	Brecciated phyllite and psammite.	Re-fused micro-fault.	NHG	META_F
152	42.48-42.70	PMF	35	U	Tight	None	None	NHG	META_F
155	44.45	PMF	15	U	Tight	None	None	NHG	META_M

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SUMMARY OF POSSIBLE MICRO FAULTS - BH536R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
156	44.47	PMF	10	U	Tight	None	None	NHG	META_M
157	44.74	PMF	60	U	Tight	None	None	NHG	META_M
158	45.08-45.20	PMF	60	U	Tight	None	None	NHG	META_M
159	45.54-45.60	PMF	45	U	Tight	None	None	NHG	META_M
160	46.14	PMF	5	U	Tight	Brecciated psammite and calcite.	Possible re-fused microfault.	NHG	META_M
167	49.51-49.58	PMF	40	U	Tight	None	None	NHG	META_M

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Aperture description codes: Open = (0.5mm - 2.5mm), Partly open = (0.25mm - 0.5mm), Tight = (0.1mm - 0.25mm), Very tight = (<0.1mm).

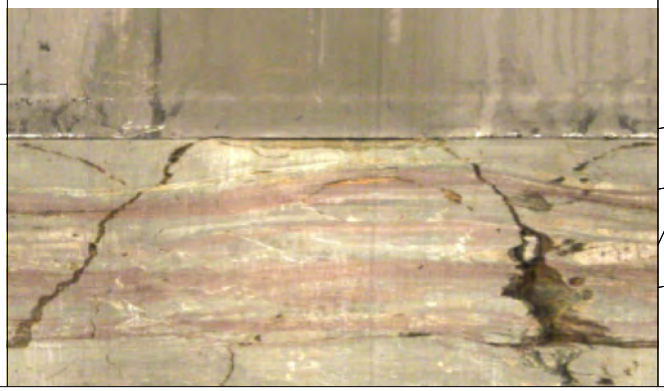
STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00005

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH536R

Contract Ref:	Start: 26.05.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 30.05.11	16.732	E:234707.7 N:393238.2	1 of 26

Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
0.00-0.30	Grass over TOPSOIL consisting of soft dark brown sandy slightly gravelly CLAY. Gravel is fine to coarse subrounded to angular phyllite. (Topsoil)			16.432	(0.30) 0.30	
0.30-1.20	Soft dark brown to dark grey sandy gravelly CLAY. Gravel is fine to medium subrounded to subangular phyllite. (Drift Deposits - Unit B1)			15.532	(0.90) 1.20	
1.20-1.60	Dark brown sandy clayey fine to medium subangular to angular GRAVEL of phyllite (description from drilled cuttings). (Drift Deposits) . . . between 1.45 to 2.02m depth psammite becoming coarse grained, and contains clasts/fine gravel size of phyllite, psammite and quartz.			15.132	(0.40) 1.60	
1.60-2.02	Strong to medium strong bluish grey fine to coarse medium grained slightly weathered to fresh PSAMMITE with closely to very closely spaced narrow to very thin bands of very narrowly foliated reddish purple phyllite. Veins closely locally closely spaced very narrow <3mm undulating randomly orientated quartz. Mixed dissolution voids up to 4mm wide, present through layer (possibly due to weathering?). Fractures are closely spaced undulating open generally stained brown dipping 10- 85°. (New Harbour Group - Psammite) . . . between 1.80 to 1.83m depth very thin psammite band is locally disturbed and contains fine gravel size clasts of phyllite, quartz and psammite.		2[i] 1[i] 3[i] 4[i] 5[i] 6[i]	15	(0.42) 2	

Method Used:	Plant Used:	Drilled By:	Logged By:	All dimensions in metres
RC+ RO	Comacchio MC405	SP	ADingle+ JWickenden	Scale: 1:10

GINT_LIBRARY_V8_04.GLB!XCUSTOM - SSL - 725061 - OPTV | 725061_WYLFA.GPJ - v8_04 | 17/12/11 - 22:53 | MJB.
Structural Soils Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.soils.co.uk, Email:admin@soils.co.uk.

STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00005

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH536R

Contract Ref:	Start: 26.05.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 30.05.11	16.732	E:234707.7 N:393238.2	2 of 26

Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
2.02-2.65	Medium strong to strong narrowly foliated light green locally pink and brown fresh to slightly weathered PHYLLITE with very closely to closely spaced narrow bands of green fine and medium grained psammite. Phyllite has partial to complete quartz overprinting. Extremely to very closely spaced very narrow <2mm undulating and ptygmatic randomly orientated light green epidote veining. Fractures are very closely to closely spaced undulating rough open dipping 15-30° with slight brown staining. (New Harbour Group - Phyllite) . . . between 2.10 to 2.17m depth no recovery, assumed zone of core loss.		7[i] 8[i] 9[i] 10[i] 11[i] 12 13[i]	14.712 14.082	2.02 (0.63) 2.65	
2.65-3.20	Medium strong to strong narrow to very thin bands of green grey fine grained fresh to slightly weathered PSAMMITE with extremely closely to very closely spaced narrow to very thin bands of very narrowly foliated greenish grey phyllite. Extremely closely to very closely spaced very narrow <1mm ptygmatic subhorizontal dark green chlorite cross cut by very closely to closely spaced very narrow <2mm lenticular and ptygmatic subhorizontal indistinct quart veins cross cut by subvertical very narrow <4mm en echelon and lenticular calcite veins. Fractures are very closely spaced undulating to stepped rough to open dipping 10-30° with dark brown staining. (New Harbour Group - Psammite) . . . between 2.72 to 2.81m depth phyllite is brownish grey to green grey. Extremely closely to very closely spaced very narrow <1mm subhorizontal ptygmatic epidote veins. . . . between 2.78 to 2.88m depth locally calcite veins have solution voids <15mm long by <4mm wide.		14[i]	14	(0.55) 3	
3.20-5.53	Medium strong to strong narrow to very thin bands of reddish brown and purplish brown very narrowly foliated fresh to slightly weathered PHYLLITE with extremely to very closely spaced narrow to very thin bands of green grey fine grained psammite. Locally extremely closely to very closely spaced very narrow <1mm ptygmatic randomly oriented epidote veins cross cut by extremely closely to very closely spaced very narrow <1mm lenticular and sigmoidal subvertical calcite veins, locally with replacement at boundaries by epidote. Foliation fractures are closely to medium spaced undulating open dipping 15-30° with brown staining and generally no infill. Joints are medium to closely spaced stepped rough to undulating open, dipping 60-75° with no infill and dark brown staining. (New Harbour Group - Phyllite) . . . between 3.63 to 3.65m depth grey to greenish grey narrow to very thin bands of phyllite. . . . at 3.68m depth narrow psammite band, en echelon structure. *Description on next sheet*		15[i] 16[i] 17[i] 18[i] 19[i]	13.532 13	3.20 4	

Method Used:	Plant Used:	Drilled By:	Logged By:	All dimensions in metres
RC+ RO	Comacchio MC405	SP	ADingle+ JWickenden	Scale: 1:10

GINT_LIBRARY_V8_04.GLB!XCUSTOM - SSL - 725061 - OPTV | 725061_WYLFA.GPJ - v8_04 | 17/12/11 - 22:53 | MJB.
Structural Soils Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.soils.co.uk, Email:admin@soils.co.uk.

STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00005

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH536R

Contract Ref:	Start: 26.05.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 30.05.11	16.732	E:234707.7 N:393238.2	3 of 26

Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
3.20-5.53	. . . between 3.96 to 4.08m and 4.21 to 4.26m depth abundant extremely closely spaced very narrow <1mm randomly oriented ptygmatic epidote veins crossed by extremely closely to very closely spaced subhorizontal very narrow <2mm lenticular indistinct quartz veins cross cut by extremely closely spaced subvertical very narrow <1mm lenticular calcite veins with replacement by epidote at boundaries and locally with epidote overprinting. . . . between 4.30 to 4.44m depth locally abundant extremely closely spaced randomly oriented very narrow <1mm ptygmatic epidote veins within psammite and purplish phyllite bands. Disturbed lenticular banding. . . . between 4.50 to 4.53m depth psammite band is highly overprinted with epidote. . . . between 4.76 to 4.79m depth possible microfault subhorizontal 20° stepped re-fused with disturbed phyllite. . . . between 4.89 to 4.95m depth extremely closely spaced subhorizontal <23mm lenticular calcite veins with replacement by quartz. abundant veins within calcite with voids <4mm and locally possible solution voids. . . . between 5.10 to 5.66m depth extremely closely to very closely spaced subvertical en echelon solution voids <1mm.		20[i] 21[i] 22[i] 23[i] 24[i] 26 28[i] 25[i] 27[i] 29[i]	12	(2.33) 5	
5.53-6.00	Strong medium bands of green grey fine to coarse grained fresh to slightly weathered METACONGLOMERATE. Clasts are subangular to rounded fine to medium of phyllite, psammite and epidote on quartz in a fine grained matrix. Extremely closely spaced very narrow <1mm ptygmatic randomly oriented epidote veins cross cut by very closely to closely spaced very narrow <2mm lenticular subvertical indistinct quartz veins cross cut by extremely closely to very closely spaced very narrow <1mm lenticular subvertical en echelon calcite veins locally with replacement at boundaries with reddish brown mineralisation/staining. Fractures are very closely spaced stepped to undulating rough open dipping 10-40° and 75° with slight brown staining and possible dissolution voids (by possible slight weathering?). (New Harbour Group -			11.202 11 10.732	5.53 (0.47) 6.00	

Method Used:	Plant Used:	Drilled By:	Logged By:	All dimensions in metres
RC+ RO	Comacchio MC405	SP	ADingle+ JWickenden	Scale: 1:10

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00005

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH536R

Contract Ref:	Start: 26.05.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 30.05.11	16.732	E:234707.7 N:393238.2	4 of 26

Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
6.00-6.45	METACONGLOMERATE) . . . between 5.57 to 5.62m and 5.65 to 5.70m depth locally abundant epidote over printing cross cut by indistinct of quartz overprinting <35mm. Strong disturbed narrow to very thin bands of green grey fine to coarse grained fresh PSAMMITE with extremely closely spaced highly disturbed narrow bands of very narrowly foliated reddish brown phyllite. Extremely closely to very closely spaced narrow <17mm lenticular subhorizontal quartz veins locally with red, orange and purple brown staining/mineralisation and locally slight boudinage structure cross cut by extremely closely to very closely spaced very narrow <1mm subvertical en echelon calcite veins. Locally extremely to closely spaced very narrow <2mm lenticular and sigmoidal subvertical calcite veins. Fractures are very closely to closely spaced undulating to stepped open dipping 20-40° and 70-75° with occasional partial calcite infill. (New Harbour Group - Psammite) . . . between 6.00 to 6.05m depth reddish brown very thin band of disturbed phyllite with occasional clasts of psammite <5mm diameter. Extremely closely spaced randomly oriented very narrow <1mm ptygmatic epidote veins cross cut by extremely closely spaced subvertical very narrow <1mm lenticular calcite veins and extremely closely to very closely spaced narrowly, lenticular banded fine to medium psammite. . . . between 6.19 to 6.27m depth closely spaced possible microfaults dipping 25-40°causing offset to fabric.		30[i] 31[i] 32[i] 33[i] 34[i] 35[i]		(0.45)	
6.45-6.92	Medium strong narrow to very thin bands of reddish brown very narrowly foliated fresh PHYLLITE interbanded with extremely closely to closely spaced narrow to thin bands of green grey and red-brown fine to medium grained PSAMMITE. Extremely closely to closely spaced very narrow <1mm randomly oriented ptygmatic epidote veins cross cut by extremely closely to closely spaced very narrow <1mm subvertical lenticular calcite veins. (New Harbour Group - Interbedded PHYLLITE & PSAMMITE) . . . between 6.47 to 6.52m depth psammite bands ore disturbed. Very closely spaced subvertical very narrow <1mm en echelon calcite veins cross cutting ptygmatic epidote veins. . . . between 6.58-6.51m depth abundant extremely closely spaced randomly oriented very narrow <1mm ptygmatic epidote veins cross cut by extremely closely spaced subvertical very narrow <1mm lenticular calcite veins. . . . between 6.70-6.76m depth abundant extremely closely spaced very narrow <1mm randomly oriented ptygmatic, epidote veins cross cut by extremely closely spaced very narrow <2mm subhorizontal lenticular, sigmoidal calcite veins.		36[i] 37[i] 38[i] 39[i] 40[i] 41[i] 42[i] 43[i]	10.282 10 9.812	(0.47)	
6.92-8.00	Medium strong to strong narrow to very thin lenticular bands of green grey fine to coarse grained fresh PSAMMITE with extremely closely to very closely spaced narrow to very thin bands of very narrowly foliated greenish grey and greenish brown disturbed phyllite. Locally extremely closely spaced to very closely spaced very narrow <1mm randomly oriented ptygmatic, epidote veins cross cut by extremely closely to very closely spaced very narrow <2mm subvertical lenticular and en echelon calcite veins. Joints are widely spaced subvertical 50° undulating, open slight brown clay smearing and brown staining. Fractures are closely to very closely spaced undulating to stepped open dipping 5-25° with occasional slight brown staining. (New Harbour Group - Psammite) . . . between 6.98-7.05m depth medium strong purplish brown very narrowly foliated phyllite			9 8.732	6.92 (1.08) 8.00	

Method Used:	Plant Used:	Drilled By:	Logged By:	All dimensions in metres
RC+ RO	Comacchio MC405	SP	ADingle+ JWickenden	Scale: 1:10

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00005

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH536R

Contract Ref:	Start: 26.05.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
8.00-9.32	with extremely closely to very closely spaced lenticular narrow bands of fine grained psammite. . . . between 7.17 to 7.40m depth extremely closely spaced to very closely spaced very narrow <4mm subvertical en echelon calcite veins cross cutting extremely closely to very closely spaced very narrow <1mm subhorizontal ptygmatic and en echelon epidote veins cross cut by irregular lenticular indistinct quartz veins narrow <14mm with indistinct boundaries locally ptygmatic subvertical, cross cut by calcite veins. . . . at 7.18m depth possible microfault subhorizontal dipping 5° undulating, refused with <1mm calcite infill, disturbing fabric. . . . between 7.46 to 7.49m depth locally strong overprinting with epidote, with speckled reddish purple mineralisation <1mm diameter. . . . between 7.64 to 7.94m depth locally extremely closely to very closely spaced subvertical possible calcite solution voids <1mm along weathered calcite veins adjacent to joint at 6.92m. Strong thin to medium bands of green grey fine to coarse grained fresh PSAMMITE with locally moderately disturbed very narrow lenticular bands of brown phyllite. Extremely closely spaced very narrow <1mm randomly oriented ptygmatic epidote veins locally abundant and overprinted with epidote cross cut by extremely closely to very closely spaced very narrow <1mm subvertical lenticular and en echelon calcite veins locally with replacement by dark purple mineralisation. Fractures are medium to very closely spaced undulating open dipping 5-40° occasionally causing offsets by microfaults. (New Harbour Group - Psammite) . . . at 8.23m depth possible microfault subhorizontal - 25°, undulating re-fused with <1mm calcite. . . . between 8.60 to 8.69m depth locally phyllite is highly disturbed and psammite is disturbed with offset lenticular bands. . . . between 8.70 to 8.74m depth possible microfault subvertical 60° undulating and re-fused with calcite <1mm. . . . between 8.94 to 9.02m depth extremely closely spaced narrow <8mm subvertical lenticular and ptygmatic slightly indistinct quartz veins cross cutting extremely closely spaced very narrow <1mm randomly oriented ptygmatic epidote.		44[i] 45[i] 46[i] 47[i] 48[i]	8	(1.32)	
9.32-10.04	Strong very thin to thin lenticular bands of green grey fine to coarse grained fresh PSAMMITE with very closely to medium spaced narrow disturbed bands of very narrowly foliated green grey and green brown phyllite. Extremely closely spaced very narrow <1mm randomly oriented ptygmatic epidote veins cross cut by extremely closely spaced narrow <11mm randomly oriented ptygmatic and lenticular quartz veins with indistinct boundaries and locally with epidote replacement of boundaries and purple mineralisation within cross cut by extremely closely to very closely spaced very narrow <1mm randomly oriented en echelon calcite veins. Fractures are very closely spaced undulating dipping 20-30° and medium spaced dipping 85° causing offset by microfaults. (New Harbour Group - Psammite)		49[i] 51[i] 50[i]	7.412 9 7	9.32 (0.72)	
					10	

Method Used:	Plant Used:	Drilled By:	Logged By:	All dimensions in metres
RC+ RO	Comacchio MC405	SP	ADingle+ JWickenden	Scale: 1:10

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00005

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH536R

Contract Ref:	Start: 26.05.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
9.32-10.04	Strong narrow to thin lenticular bands of green grey fine to coarse grained fresh PSAMMITE with extremely closely to closely spaced narrow disturbed bands of very narrowly foliated purple-brown and green brown phyllite. Extremely closely to very closely spaced very narrow <2mm and locally <1mm subvertical en echelon lenticular calcite veins. Joints are very closely to widely spaced subhorizontal 30° undulating, rough, open, no infill and subvertical 60° stepped, rough open no infill. Fractures are very closely to closely spaced undulating partly open dipping 10-40° with occasional brown staining and causing offset by microfaults. (New Harbour Group - Psammite) . . . between 10.06 to 10.55m depth locally extremely closely spaced to very closely spaced very narrow <1mm randomly oriented ptygmatic epidote vein cross cut by extremely closely to very closely spaced very narrow <1mm subvertical lenticular calcite veins. . . . between 1.08 to 10.17m depth 1 no. subvertical very narrow <4mm en echelon calcite vein. . . . between 10.16 to 10.25m depth locally lenticular psammite bands slightly folded and offset. . . . at 10.29m depth disturbed narrow band of dark green psammite with slight red brown mineralisation. . . . at 10.41m depth extremely closely spaced very narrow <1mm randomly oriented epidote veining cross cut by quartz over printing <16mm and cross cut by very closely spaced very narrow <1mm subvertical lenticular calcite veins. . . . at 10.70 and 11.20m depth possible multiple shear bands 10-25 offsetting calcite veins.		52[i] 53[i] 54[i] 55[i] 56[i] 57[i] 58[i] 59[i] 60[i] 61[i] 62[i] 63[i] 64[i] 65[i]	6.692	10.04	
10.04-12.08	. . . between 11.45 to 11.73m depth phyllite is greenish grey. . . . between 11.49 to 11.86m depth possible microfault dipping 70° with very narrow <5mm subvertical en echelon calcite veins locally with patchy orange brown staining, cross cutting locally extremely closely to very closely spaced very narrow <2mm subvertical lenticular indistinct quartz veins. . . . between 11.83 to 12.01m locally narrowly to very thinly banded disturbed light grey fine to medium psammite with extremely closely spaced very narrow <1mm randomly oriented en echelon and lenticular possible chlorite veins with extremely closely to very closely spaced disturbed very narrowly foliated very			6 5	11 (2.04) 12	

Method Used:	Plant Used:	Drilled By:	Logged By:	All dimensions in metres
RC+ RO	Comacchio MC405	SP	ADingle+ JWickenden	Scale: 1:10

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WYL-SSL-SDT-LOG-00005

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH536R

Contract Ref:	Start: 26.05.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
10.04-12.08	narrow to narrow bands of greenish grey and brown phyllite.			4.652	12.08	
12.08-13.80	Medium strong to strong narrow to very thin bands of green grey fine to coarse grained fresh PSAMMITE with extremely closely to very closely spaced narrow to very thin bands of very thinly foliated purplish grey and purplish brown phyllite. Extremely closely to closely spaced very narrow <1mm subhorizontal lenticular and en echelon calcite veins. Fractures are closely to medium spaced undulating rough open dipping 15-50° with occasional slight orange brown staining and offset by microfaults. (New Harbour Group - Psammite) . . . between 12.08 to 12.18m depth phyllite is greenish grey. . . . between 12.18 to 12.46m depth purplish brown phyllite with disturbed extremely closely to very closely overprinting, highly indistinct and cross cut by extremely closely to very closely spaced very narrow <1mm subvertical lenticular and sigmoidal calcite veins. . . . between 12.40 to 12.42m depth disturbed very thin psammite band is fine to coarse grained with possible epidote overprinting cross cut by extremely closely to very closely spaced very narrow <3mm randomly oriented lenticular to irregular indistinct quartz veins. . . . at 12.46m depth re-fused with disturbed phyllite. . . . between 12.55 to 12.88m depth extremely closely to very closely spaced very narrow <2mm subvertical en echelon calcite veins, locally extremely closely to very closely spaced subvertical <1mm lenticular and sigmoidal calcite veins. . . . at 12.60m and 12.75m depth narrow and very thin bands of psammite with quartz. . . . between 12.83 to 12.90m depth abundant extremely closely spaced very narrow <1mm randomly oriented ptygmatic epidote veins cross cut by extremely closely spaced to very closely spaced subvertical very narrow <2mm en echelon and lenticular calcite veins. Locally disturbed with lenticular banding, and spots of purple mineralisation very narrow <1mm. . . . between 13.05 to 13.10m depth possible microfaults subhorizontal 15° and 30° undulating re-fused with very narrow <1mm calcite and disturbed phyllite. Possible brecciated appearance with subangular to subrounded clasts of psammite within a phyllite matrix. . . . between 13.20 to 13.33m depth highly disturbed lenticular banding. . . . between 13.40 to 13.46m depth highly disturbed psammite bands with lenticular and boudinage structure locally slight brecciated appearance with rounded clasts of psammite and phyllite narrow <20mm. . . . between 13.41 to 13.73m depth highly disturbed narrow to very thinly lenticular banded psammite locally offset with narrow offset bands of phyllite. Locally psammite has extremely closely spaced subhorizontal <1mm lenticular and sigmoidal calcite veins, locally cross cutting extremely closely to very closely spaced subhorizontal indistinct quartz veins. . . . between 13.55 to 13.64m depth 3 no. microfaults dipping at 10° and 30-40°, causing offset to fabric. . . . between 13.73 to 13.80m depth psammite has brecciated appearance with angular to subrounded clasts <30mm within a matrix of disturbed phyllite. At contact with highly disturbed phyllite psammite appears brecciated and re-fused with disturbed phyllite.		66[i] 67[i] 68[i] 69[i] 70[i] 71[i] 72[i] 73[i] 74[i] 75[i] 76[i]	4 3	(1.72) 13	
13.80-14.56	Strong thin to medium bands of greenish grey fine to coarse grained fresh PSAMMITE. Extremely closely spaced very narrow <1mm randomly oriented ptygmatic veins cross cut			2.932	13.80 14	

Method Used:	Plant Used:	Drilled By:	Logged By:	All dimensions in metres
RC+ RO	Comacchio MC405	SP	ADingle+ JWickenden	Scale: 1:10

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BOREHOLE LOG

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Contract Ref:	Start: 26.05.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
13.80-14.56	by very closely to closely spaced very narrow <2mm randomly oriented lenticular and en echelon indistinct quartz veins cross cut by very closely to closely spaced very narrow <1mm subvertical lenticular calcite veins. Fractures are very closely to closely spaced undulating rough open dipping 2-30° and closely spaced dipping 40-55° with occasional slight brown staining and offsets by microfaulting. (New Harbour Group - Psammite) . . . between 13.80 to 13.85m depth very closely spaced subhorizontal narrow <8mm ptygmatic locally offset quartz veins locally with slight orange brown staining. . . . between 13.85 to 14.00m depth locally epidote over printing, cross cut by extremely closely spaced subvertical very narrow <2mm en echelon and lenticular, intersecting, indistinct quartz veins and extremely closely to very closely spaced subhorizontal <5mm ptygmatic and lenticular quartz veins. Locally extremely closely spaced subhorizontal possible microfaults 20-90° undulating and re-fused with possibly disturbed phyllite offset <5mm. . . . at 14.32m depth possible microfault subhorizontal 30°, undulating re-fused with dark reddish brown phyllite. . . . between 13.37 to 14.44m depth 1 no. subvertical 50°, en echelon possible quartz band replaced at boundaries with chlorite. . . . between 14.46 to 14.56m depth psammite is disturbed locally brecciated appearance with clasts <6mm possibly win a phyllite matrix.		77[i]	2.172	(0.76) 14.56	
14.56-14.95	Medium strong to strong narrow bands of very narrowly foliated light green fresh PHYLLITE with extremely closely spaced narrow lenticular bands of greenish grey fine to medium grained psammite. Extremely closely to very closely spaced very narrow <2mm subvertical lenticular calcite veins concentrated within psammite bands (possible tensional veining?). Fractures are extremely closely to very closely spaced undulating open dipping 15-40° with occasional slight brown staining and causing offsets by microfaulting. (New Harbour Group - Phyllite) . . . between 18.84 to 14.86m depth possible solution voids extremely closely to very closely spaced randomly oriented lenticular, possibly weather calcite veins. . . . between 14.88m and 14.95m depth phyllite is disturbed and offset, locally fractured and re-fused with calcite.		78[i] 79[i] 80[i]	2 1.782	(0.39) 14.95	
14.95-16.30	Medium strong to strong narrow to thin bands of greenish grey fine to coarse grained fresh PSAMMITE with extremely closely to very closely spaced narrow to very thin disturbed bands of very narrowly foliated greenish grey and greenish brown phyllite. Locally extremely closely to very closely spaced very narrow <1mm randomly oriented ptygmatic epidote veins within psammite bands cross cut locally very closely to extremely closely spaced very narrow <1mm and <2mm subvertical lenticular en echelon calcite veins. Fractures are very closely to medium spaced stepped to undulating open dipping 5-50° with occasional slight brown staining and offset by microfaults. (New Harbour Group - Psammite) . . . between 15.62 to 15.83m depth locally abundant extremely closely to very closely spaced randomly oriented very narrow <1mm ptygmatic epidote veins cross cut by extremely closely spaced subvertical <1mm lenticular and en echelon calcite veins with extremely closely spaced subvertical very narrow <6mm ptygmatic quartz veins. . . . at 15.85m depth locally phyllite is grey highly fractured and re-fused with narrow <7mm subhorizontal lenticular calcite vein.		81[i] 82[i] 83[i] 84[i] 85[i]	1	15 (1.35) 16	

Method Used:	Plant Used:	Drilled By:	Logged By:	All dimensions in metres
RC+ RO	Comacchio MC405	SP	ADingle+ JWickenden	Scale: 1:10

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00005

BOREHOLE LOG

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Contract Ref:	Start: 26.05.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 30.05.11	16.732	E:234707.7 N:393238.2	9 of 26

Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
14.95-16.30	. . . at 16.06m depth possible microfault horizontal - 15° undulating re-fused with disturbed phyllite. . . . between 16.07 to 16.14m depth locally abundant extremely closely spaced randomly oriented very narrow <1mm ptygmatic epidote veins cross cut by extremely closely spaced subhorizontal narrow <12mm irregular indistinct quartz veins, locally purple mineralisation <2mm.		86[i] 87[i]			
16.30-16.83	Medium strong to strong narrow disturbed bands of purplish brown very narrowly foliated fresh PHYLLITE with extremely closely spaced narrow to very thin lenticular bands of locally disturbed greenish grey fine to medium grained psammite. Extremely closely to very closely spaced very narrow <1mm subvertical lenticular and sigmoidal calcite veins. Fractures are very closely to closely spaced undulating open dipping 5-50° with occasional slight brown staining and causing offset by microfaults. (New Harbour Group - Phyllite) . . . between 16.36 to 16.40m depth psammite band with extremely closely spaced randomly oriented very narrow <1mm ptygmatic epidote veins cross cut by extremely closely spaced subvertical very narrow <1mm lenticular and sigmoidal calcite veins. . . . between 16.48 to 16.59m locally disturbed locally lenticular banding and slight boudinage structure. . . . between 16.59 to 16.68m depth disturbed with extremely closely spaced subvertical very narrow <5mm irregular and lenticular calcite veins.		88[i] 89[i] 90[i]	0.432 0 -0.098	16.30 (0.53) 16.83	
16.83-18.05	Medium strong to strong narrow to very thin bands of greenish grey fine to coarse grained fresh PSAMMITE with extremely closely to very closely spaced narrow bands of very narrowly foliated green grey and purplish grey phyllite. Extremely closely to closely spaced very narrow to narrow <6mm subvertical en echelon calcite veins locally with replacement on boundaries with dark green chlorite and within by quartz cross cutting. Fractures are very closely to closely spaced undulating open dipping 5-55° with occasional brown staining, rare calcite infill and offsets by microfaults. (New Harbour Group - Psammite) . . . between 16.83 to 17.07m depth psammite is highly disturbed and offset locally with slight brecciated appearance . . . . at 16.95m depth possible microfault subvertical 50° undulating re-fused with disturbed phyllite. . . . between 17.18 to 17.22m depth locally extremely closely spaced randomly oriented narrow <12mm lenticular quartz veins with slightly indistinct boundaries cross cut by and locally offset by extremely closely to very closely spaced subvertical very narrow <2mm lenticular calcite veins. . . . at 17.18 to 17.49m depth multiple closely spaced possible microfaults dipping 25° undulating re-fused with <1mm calcite. . . . between 17.34 to 17.63m depth extremely closely to very closely spaced randomly oriented very narrow <2mm en echelon and lenticular calcite veins cross cut by intersecting very closely spaced subvertical <3mm en echelon and lenticular quartz veins locally with clasts <8mm of psammite cross cut by 1 no. subvertical narrow <11mm calcite vein replaced by quartz.		91[i] 92[i] 93[i] 94[i] 95[i] 96[i]	-1	17 (1.22) 18	

Method Used:	RC+ RO	Plant Used:	Comacchio MC405	Drilled By:	SP	Logged By:	ADingle+ JWickenden	All dimensions in metres Scale:	1:10

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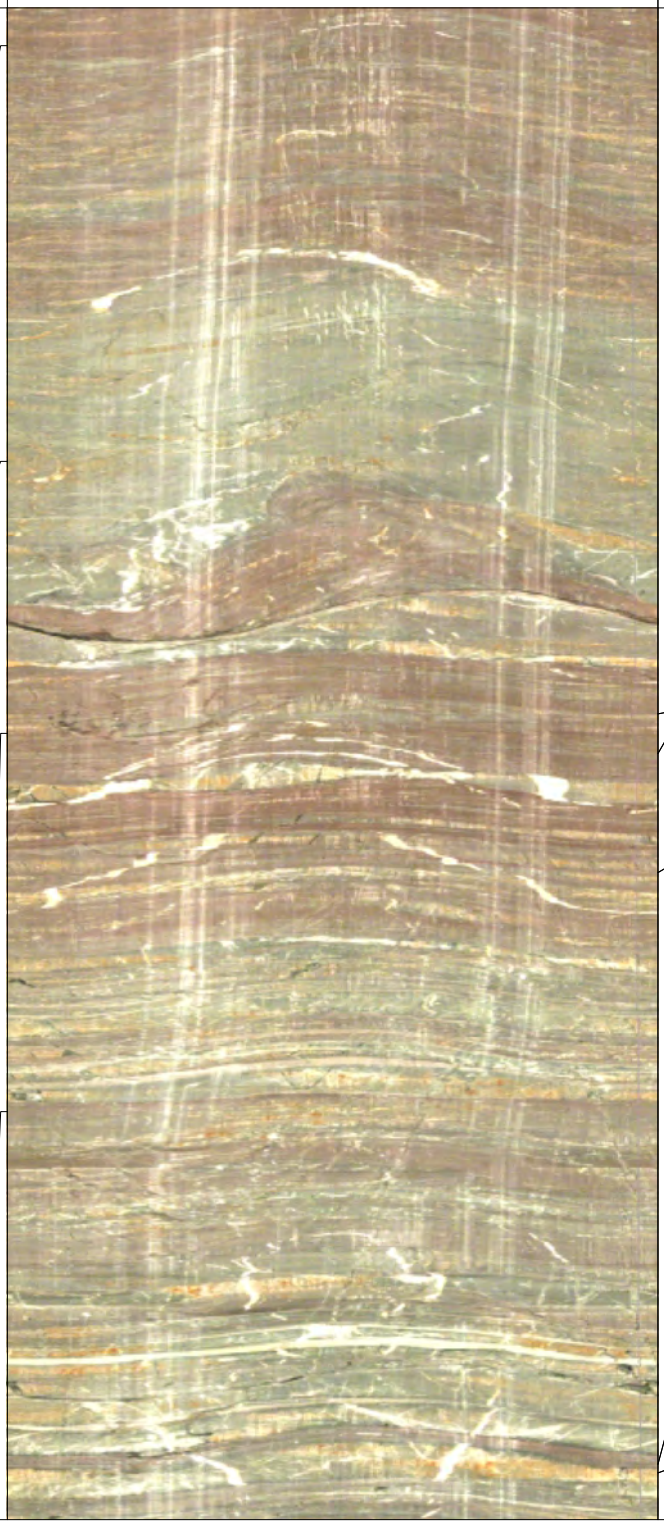
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WYL-SSL-SDT-LOG-00005

BOREHOLE LOG

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Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
16.83-18.05	. . . between 18.00 to 18.15m depth extremely closely spaced subvertical very narrow <2mm intersecting en echelon possible clastic veins locally replaced by chlorite. Medium strong to strong narrow to very thin bands of purplish grey very narrowly foliated fresh PHYLLITE with extremely closely to very closely spaced narrow lenticular bands of greenish grey fine grained psammite. Extremely closely to very closely spaced very narrow <1mm subhorizontal en echelon calcite vein. (New Harbour Group - Phyllite)			-1.318	18.05	
18.05-18.60	. . . between 18.18 to 18.30m disturbed slightly brecciated appearance with rounded clasts and lenticular bands of psammite in a phyllite matrix. . . . between 18.43 to 18.60m depth disturbed lenticular narrow band of psammite. . . . between 18.55 to 18.60m depth 1 no. subhorizontal narrow <11mm lenticular calcite vein with clasts of phyllite and psammite.			-1.868	(0.55) 18.60	
18.60-18.96	Medium strong to strong very thin to thin bands of greenish grey fine to medium grained fresh PSAMMITE with very closely to closely spaced narrow to very thin bands of very narrowly foliated greenish grey phyllite. Extremely closely to closely spaced very narrow <2mm subvertical en-echelon calcite veins locally with replacement by quartz. Extremely closely to very closely spaced very narrow <1mm subhorizontal lenticular calcite veins. microfaults are very closely spaced undulating to stepped partly open dipping 10-60° causing offset. (New Harbour Group - Psammite)		98[i] 97[i]	-2	(0.36) 18.96	
18.96-19.46	. . . between 18.69 to 18.80m depth possible microfault subvertical 60° undulating re-fused with disturbed phyllite and possibly <1mm calcite. . . . between 18.85 to 19.06m depth possible microfaults subhorizontal 10° undulating re-fused with <2mm calcite and disturbed phyllite. . . . at 18.90m depth microfault dipping 60° causing offset to fabric. . . . between 18.90 to 18.96m extremely closely spaced subvertical narrow <8mm irregular indistinct quartz veins locally with disturbed clast of psammite and possible dark green chlorite with locally intersecting very closely spaced randomly oriented very narrow <2mm lenticular indistinct quartz veins. Medium strong narrow bands of very narrowly foliated purple fresh PHYLLITE with extremely closely spaced very narrow to narrow lenticular and locally very thin bands of bluish grey fine to medium grained psammite. Extremely closely to very closely spaced very narrow undulating and locally en-echelon quartz veins with some partial calcite replacement. Very closely to closely spaced undulating and irregular narrow <20mm calcite veins. Foliation planes dipping at ~10°. Fractures are very closely to closely spaced undulating to stepped open dipping randomly from 15-80°. (New Harbour Group - Phyllite)		99[i]	-2.228	19 (0.50) 19.46	
19.46-20.62	Medium strong to strong thin to narrow bands of greenish grey fine to medium grained fresh PSAMMITE with extremely closely to very closely spaced very narrow to narrow bands of purplish-brown, green and brown phyllite. Foliation dipping at 15-20°. Quartz veining is rare, presents as undulating randomly oriented veins and as diffuse inclusions. Chlorite presents locally along veins edges concentrated within the psammite bands. Calcite veins extremely closely to very closely spaced very narrow <6mm undulating and locally en-echelon generally orientated at >50°. Fractures are extremely closely to		100[i] 101[i] 102[i]	-2.728 -3	20	

Method Used:	Plant Used:	Drilled By:	Logged By:	All dimensions in metres
RC+ RO	Comacchio MC405	SP	ADingle+ JWickenden	Scale: 1:10

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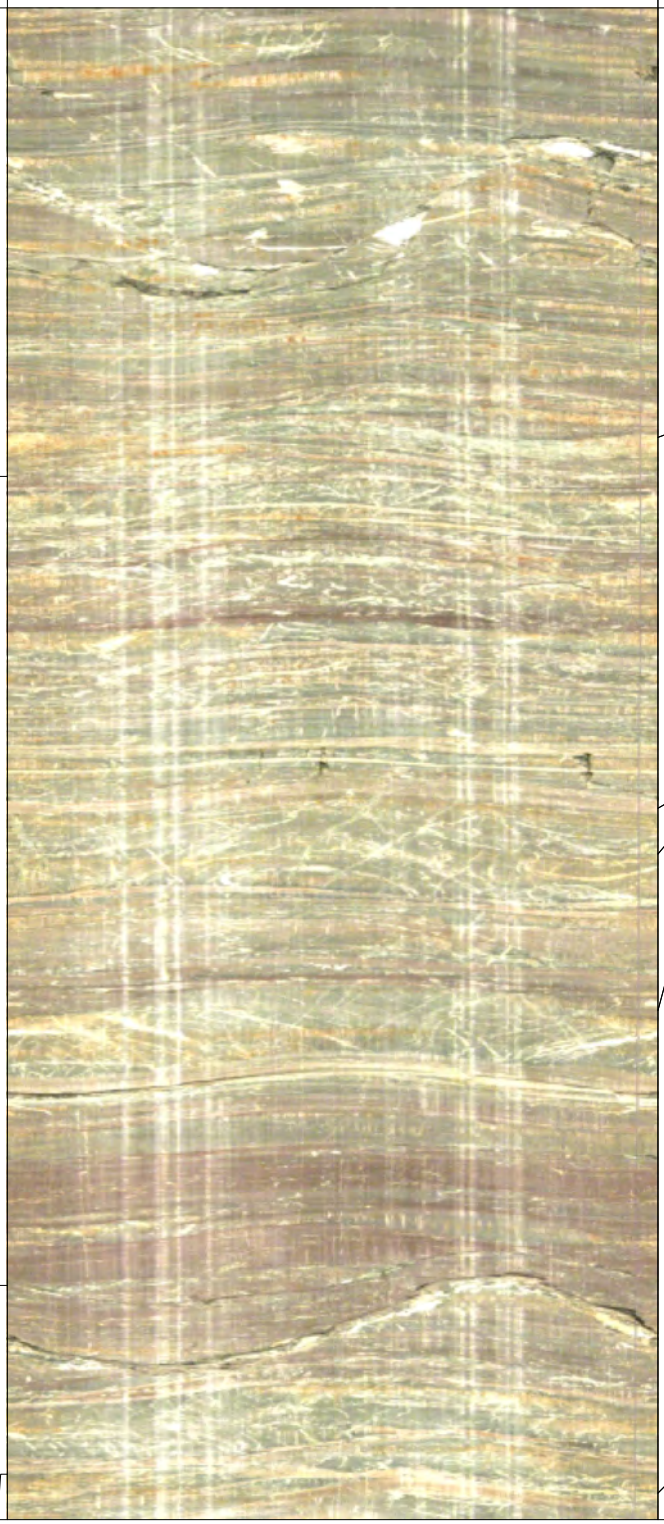
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WYL-SSL-SDT-LOG-00005

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH536R

Contract Ref:	Start: 26.05.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
	closely spaced, occasionally medium spaced undulating to stepped smooth partly open dipping 15-30° and 60-80° occasionally causing offsets by microfaults. (New Harbour Group - Psammite) . . . between 19.51 to 19.66m depth mineral dissolution voids, up to 20mm long present. . . . between 20.00 to 20.02m ductile shear band containing purple phyllite that cross cuts two calcite veins.				(1.16)	
19.46-20.62	. . . between 20.30 and 20.45m depth multiple ductile shear bands (5°) offsetting calcite veins . . . between 20.33 to 20.44m depth 60° minor fault with orange and black stained. . . . between 20.47 to 20.44m depth 30°shear band with disturbed phyllite and psammite present within a 10mm wide band.		103[i]	-3.888	20.62	
	Medium strong narrow to very thin bands of grey-green fine to medium grained fresh PSAMMITE with extremely closely to very closely spaced very narrow to narrow bands of very narrowly foliated green-brown and occasional brownish purple phyllite. Phyllite bands are dipping at 10-15°. Un-fractured. Epidote veins extremely closely to very closely spaced very narrow undulating and ptygmatic randomly orientated generally confined to the psammite. Quartz veining very closely locally extremely closely spaced very narrow undulating and defuse randomly orientated. Fractures are closely to medium space undulating to stepped partly open dipping 10-50° and medium spaced dipping 75-90° with offsets by <10mm by microfaulting. (New Harbour Group - Psammite)			-4		
	. . . between 21.06 to 21.96m depth 2 no. microfaults dipping 45-50° with calcite infill, causing offset to fabric.		104[i] 105[i]		21	
20.62-21.69			106[i]		(1.07)	
	. . . between 21.49 to 21.58m depth psammite is heavily epidote and quartz veined.			-4.958	21.69	
	Medium strong very narrow to thin bands of very narrowly foliated purple fresh PHYLLITE with extremely closely to very closely spaced very narrow to narrow lenticular bands of green-grey fine grained psammite. 1 no. 30° undulating rough open clean joint present. Veins extremely closely to very closely spaced very narrow <1mm undulating and ptygmatic Epidote. (New Harbour Group - Phyllite)			-5		
21.69-21.94					(0.25)	
	. . . between 21.72 to 21.86m depth microfault dipping 50°.		107[i]	-5.208	21.94	
21.94-22.95	*Description on next sheet*				22	

Method Used:	RC+ RO	Plant Used:	Comacchio MC405	Drilled By:	SP	Logged By:	ADingle+ JWickenden	All dimensions in metres Scale:	1:10

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH536R

Contract Ref:	Start: 26.05.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
	. . . between 21.87 to 21.96m depth minor fault dipping 45° re-fused with disturbed psammite, phyllite, quartz and chlorite.		108[i]			
	Medium strong very narrow to very thin bands of grey-green fine to medium grained fresh PSAMMITE with extremely closely to very closely spaced very narrow to narrow bands of cream, green-brown and purplish-brown narrowly foliated phyllite. Foliation planes are undulating generally dipping at ~10-15°. Veins extremely closely spaced very narrow <3mm undulating and locally ptygmatic randomly oriented Epidote. Calcite and quartz veins are extremely closely to closely spaced, irregular and locally en-echelon randomly orientated. Fractures are closely to medium spaced undulating dipping 5-25° with rare brown staining. (New Harbour Group - Psammite) . . . at 22.00m depth 15mm thick narrow band of disturbed phyllite and psammite, locally microfractured. . . . at 22.08m depth microfault dipping 20° through a very thin disturbed phyllite band. . . . between 22.08 and 22.53m depth multiple ductile shear bands (10°) offsetting calcite veins . . . at 22.58m depth 3 no. microfaults dipping 5° through a phyllite band.				(1.01)	
21.94-22.95	. . . at 22.70 to 22.74m depth minor fault dipping 25° within fused 5-10mm thick phyllite and psammite breccia present along lower edge.		109	-6		
				-6.218	22.95	
	Medium strong to strong very narrow to very thin bands of very narrowly foliated purple locally greyish-purple fresh PHYLLITE with closely to locally extremely closely spaced very narrow to narrow bands and lenticular blue-grey fine to coarse grained psammite. Foliation planes dipping at 10-20°. Veins closely to locally extremely closely spaced very narrow <2mm undulating locally dipping parallel foliation planes Calcite. Fractures are closely to medium spaced undulating dipping 5-20° causing offsets by microfaults. (New Harbour Group - Phyllite) . . . between 23.08 to 23.15m depth phyllite fabric is locally highly disturbed and overprinted by quartz. Quartz appears green colour, possible overprinting of original chlorite.		110[i]		23	
22.95-24.76				-7	(1.81)	
					24	

Method Used:	RC+ RO	Plant Used:	Comacchio MC405	Drilled By:	SP	Logged By:	ADingle+ JWickenden	All dimensions in metres Scale:	1:10

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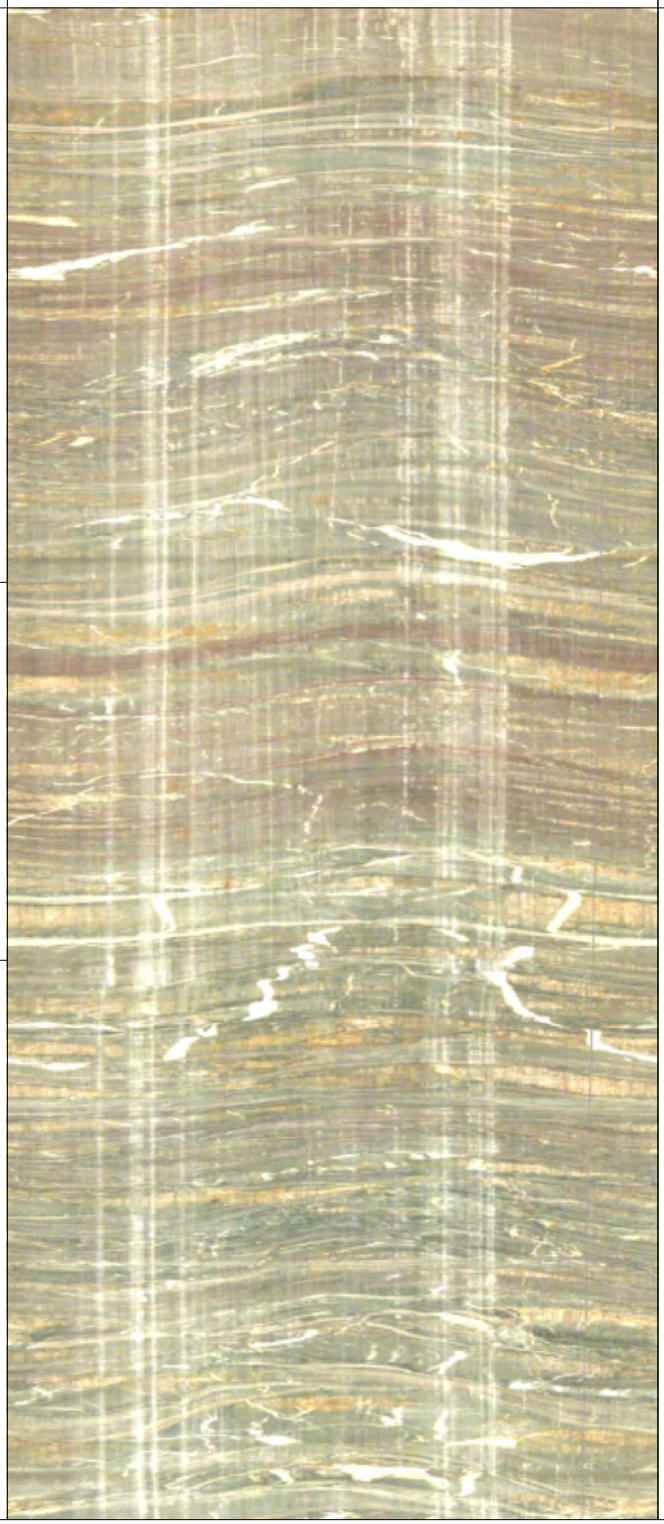
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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH536R

Contract Ref:	Start: 26.05.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
22.95-24.76	. . . between 24.58 to 24.72m depth phyllite foliation is highly disturbed with localised quartz veining and epidote overprinting of quartz.			-8.028	24.76	
24.76-25.26	Strong very narrow to thin bands of grey fine to coarse grained fresh PSAMMITE with extremely closely to very closely spaced very narrow bands of very narrowly foliated brownish-purple and green-brown phyllite. Foliation planes dipping at 25-30°. Veins very closely locally extremely closely spaced very narrow <3mm undulating and irregular occasionally en-echelon Calcite. Rare epidote veining, locally extremely closely spaced undulating and ptygmatic. Fractures are closely to medium spaced undulating dipping 5-50° causing offsets by microfaults. (New Harbour Group - Psammite) . . . between 25.02 to 25.92m depth multiple ductile shear band, dipping 10-50° offset sigmoidal calcite vein at different locations . . . between 25.18 to 25.26m depth highly irregular and locally en echelon calcite vein.			-8.528	(0.50) 25.26	
25.26-27.29	Strong very narrow to very thin bands of grey-green fine to locally coarse grained fresh PSAMMITE with a highly disturbed extremely closely to very closely spaced narrowly foliated green and locally brownish-purple phyllite. Veins closely to medium spaced narrow <15mm undulating randomly oriented Calcite. Localised quartz and chlorite present within calcite veins. Quartz veins are locally extremely closely spaced, undulating and irregular locally defuse/poorly defined. microfaults are closely to medium spaced undulating partly open dipping 5-20° causing offsets. (New Harbour Group - Psammite) . . . between 25.30 to 25.33m depth undulating minor faults dipping 20°, crosscutting phyllite bands, with localised quartz growth. . . . between 25.34 to 25.39m depth very thin psammite band, very narrow <3-6mm wide quartz vein present (i.e. brittle deformation). Vein contains chlorite and possible haematite. . . . between 25.39 to 25.55m depth high angle narrow <10mm calcite/quartz vein Psammite fabric around vein has been brecciated and is locally present within the vein. . . . at 25.72 to 25.92m depth multiple undulating microfaults dipping 5-10° causing offset to fabric.			-9	26	

Method Used:	RC+ RO	Plant Used:	Comacchio MC405	Drilled By:	SP	Logged By:	ADingle+ JWickenden	All dimensions in metres Scale:	1:10

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH536R

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Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
25.26-27.29	. . . between 26.27 to 26.32m depth undulating refused micro fault dipping 10° with brecciated phyllite and psammite and quartz veining present. . . . between 26.41 to 26.57m depth undulating and irregular narrow <15mm calcite veining with chlorite and (possible) haematite growth. . . . between 26.60 to 26.70m depth phyllite fabric is highly disturbed with localised microfaulting and microfractures. . . . between 26.82 to 26.91m depth highly disturbed zone of phyllite with multiple shear bands and localised calcite and chlorite veining. . . . at 26.88m depth microfault dipping 5°. . . . between 27.13-27.20m depth undulating re-fused microfault dipping 45°.		111[i]	-10	(2.03) 27	
27.29-28.33	Medium strong very narrow to thin bands of very narrowly foliated purple fresh PHYLLITE interbanded with extremely closely to very closely spaced very thin bands of dark grey fine to coarse grained PSAMMITE. Foliation planes are dipping at ~20°. Single probable foliation fracture ~15° present. Veins are closely spaced very narrow <6mm locally present in extremely closely spaced groups undulating and irregular Calcite. Fractures are closely spaced undulating partly open dipping 0-20° and medium spaced dipping 55-60° with rare slight brown staining and causing offset by microfaults. (New Harbour Group - Interbedded PHYLLITE & PSAMMITE) . . . between 27.74 to 27.92m depth multiple high angle dipping 50-70° calcite veins present, locally quartz overprinted.		112[i]	-10.558 -11	27.29 (1.04) 28	

Method Used:	Plant Used:	Drilled By:	Logged By:	All dimensions in metres
RC+ RO	Comacchio MC405	SP	ADingle+ JWickenden	Scale: 1:10

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Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
27.29-28.33	. . . between 27.97 to 28.30m depth highly disturbed fabric with a undulating re-fused possible minor fault dipping 65°. Phyllite and psammite are both locally deformed, brittle and ductile. . . . between 28.27 to 28.32m depth possible re-fused minor fault dipping 10° at base of disturbed core above. Quartz veining and overprinting present and ductile shearing present within both phyllite and calcite veins. Strong narrow to thin bands of greenish-dark grey fine to coarse grained fresh PSAMMITE with closely to locally very closely spaced narrow to very thin bands of very narrowly foliated brownish purple phyllite. Foliation planes within phyllite are dipping at ~20°. Veins closely spaced very narrow to narrow 3-10mm undulating generally dipping at 50-60° Quartz cross cutting foliation planes. Calcite veining present within a disturbed zone from 28.57-28.92m depth, which contains multiple re-fused minor fault planes. Fractures are closely to medium spaced undulating rarely partly open dipping 0-20° and 40-60° with rare brown staining and occasionally causing offsets by microfaulting. (New Harbour Group - Psammite) . . . between 28.33 to 28.40m depth undulating re-fused microfault dipping 55°. Plane of fault is heavily epidote veined and locally brecciated. . . . between 28.61 to 28.92m depth highly disturbed band of psammite, locally brecciated and microfaulted. Large irregular calcite and quartz veining throughout band, with yellow epidote and chlorite veining also present. Several calcite veins show ductile shearing.		113[i] 114[i] 115[i] 116[i] 117[i]	-11.598	28.33	
28.33-31.06	. . . between 29.28 to 29.44m depth thinly highly disturbed band of psammite and phyllite with multiple cross-cutting quartz and chlorite veins. Lower section of band is locally brecciated and possibly 2 no. re-fused microfault dipping 25-50°.		119[i] 118[i]	-12 -13	29 (2.73) 30	

Method Used:	RC+ RO	Plant Used:	Comacchio MC405	Drilled By:	SP	Logged By:	ADingle+ JWickenden	All dimensions in metres Scale:	1:10

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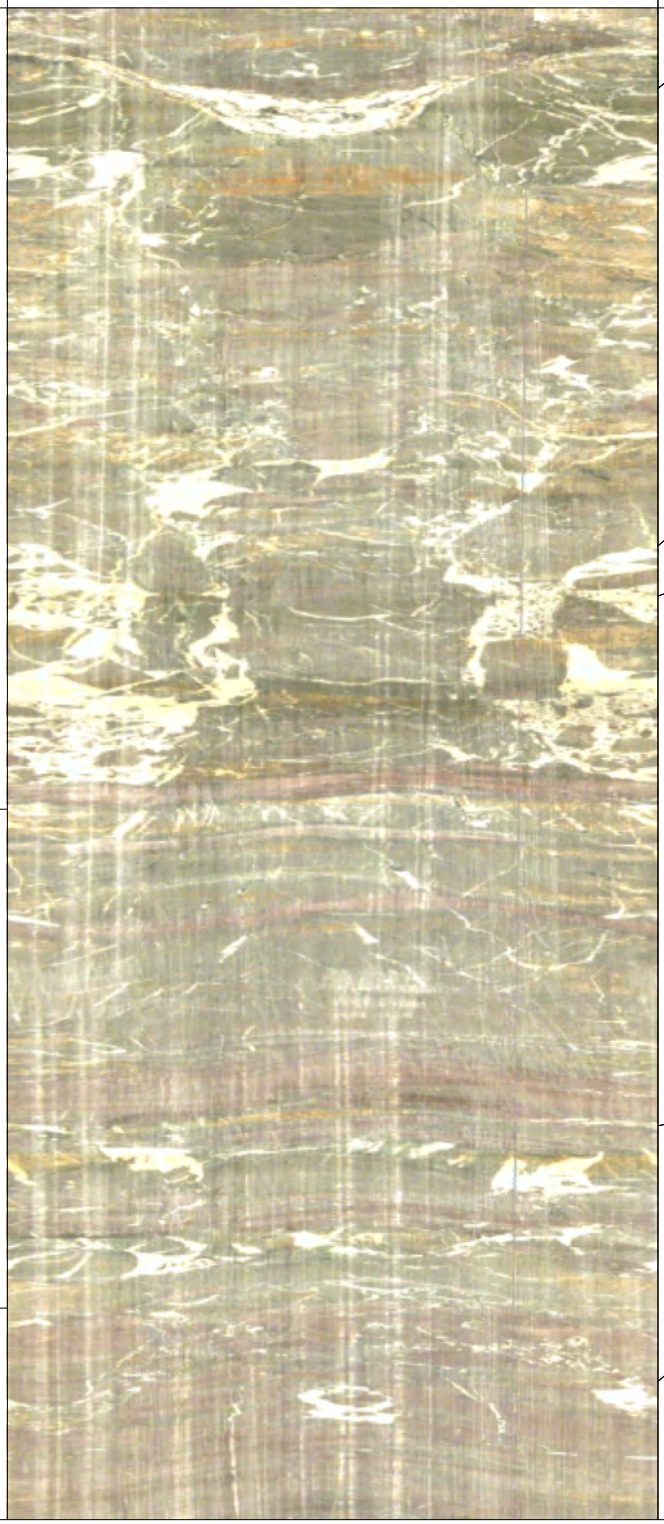
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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH536R

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Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
28.33-31.06	. . . between 30.00 to 30.30m depth zone of extremely closely to very closely spaced, multiple veins of quartz, chlorite and calcite and localised epidote dipping 50-70° overprinted veins. . . . between 30.01 to 30.06m depth very thin band of fine to coarse grained psammite, with very narrow <5mm calcite veins dipping at >40° locally 60°. Psammite band is locally overprinted with quartz. . . . between 30.45 to 30.06m depth re-fused brecciated zone. Psammite clasts fine to medium gravel sized, angular, set locally within a "matrix" of calcite and orthoclase. Phyllite clasts also present within the veins. Quartz veining also present and occasional epidote veining. Multiple microfaults, horizontal to near vertical crosscutting veins and psammite.		120[i] 121[i] 122[i]	-14	31	
31.06-31.72	Strong very thin to thin bands of green-grey fine to medium to locally coarse grained fresh PSAMMITE with closely spaced narrow to very thin bands of very narrowly foliated purple phyllite. Quartz and calcite veining is closely locally extremely closely spaced narrow <15mm undulating randomly oriented. Chlorite is present within both the quartz and calcite veins possibly as replacement mineral? (New Harbour Group - Psammite) . . . between 31.49 to 31.66m depth thin band of highly disturbed psammite and phyllite, crosscut by multiple microfaults dipping 10-40°. Locally psammite is present as angular clasts within a matrix of calcite and quartz. Possible re-fused microfault present between 31.56 to 31.60m depth.		123[i]	-14.328 31.06 -14.988 31.72	(0.66)	
31.72-32.13	Medium very narrow to very thin bands of strong very narrowly foliated brownish purple fresh PHYLLITE with extremely closely spaced very narrow occasionally narrow lenticular bands of grey fine to medium grained psammite. Foliation planes dipping at ~15-20°. Un-fractured. (New Harbour Group - Phyllite) . . . between 31.73 to 31.82m depth up to 45mm wide possible re-fused micro fault dipping 40°. Band comprises randomly oriented fine to medium gravel size fragments		124[i]	-15	(0.41) 32	

Method Used:	Plant Used:	Drilled By:	Logged By:	All dimensions in metres
RC+ RO	Comacchio MC405	SP	ADingle+ JWickenden	Scale: 1:10

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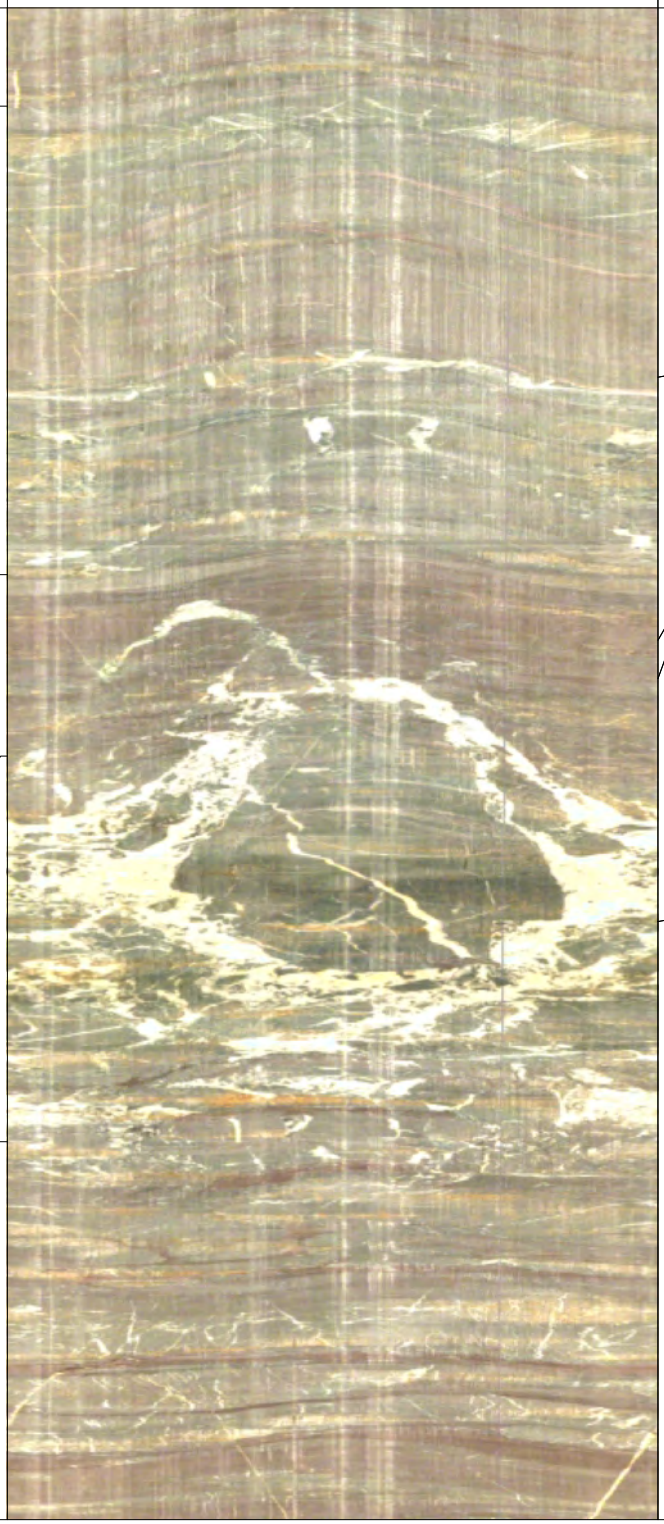
STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00005

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH536R

Contract Ref:	Start: 26.05.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 30.05.11	16.732	E:234707.7 N:393238.2	17 of 26

Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
31.72-32.13	of purple phyllite in a matrix of grey psammite and calcite. Localised quartz overprint at of some psammite present.			-15.398	32.13	
32.13-32.75	Strong very narrow to very thin bands of grey-green fine to locally coarse fresh PSAMMITE with extremely closely to closely spaced very narrow bands of very narrowly foliated purple and green phyllite. Foliation planes are locally undulating and indistinct. Un-fractured. Rare calcite veining present around incipient fracture and rare extremely closely spaced quartz and chlorite veins. Fractures are closely to medium spaced undulating dipping 10-40° and rarely 60-70° with rare brown staining and generally causing offsets by microfaults. (New Harbour Group - Psammite)		125[i]		(0.62)	
32.75-32.99	Medium strong very narrow to very thin bands of very narrowly foliated purple fresh PHYLLITE with extremely closely to very closely spaced very narrow lenticular bands of grey fine grained psammite. Foliation planes dipping at ~15°. Un-fractured. Veins locally extremely closely spaced narrow <10mm Epidote cross cutting foliation planes. (New Harbour Group - Phyllite)		126[i] 127[i]	-16.018	32.75	
	. . . between 32.80 to 33.00m depth microfault dipping ~70° cross cutting phyllite				(0.24)	
32.99-33.50	Medium strong to strong greyish green fine grained fresh PSAMMITE breccia with a white calcite matrix. Clasts are fine to coarse gravel sized, angular and randomly orientated and matrix supported. Quartz overprinting of calcite present in localised patches. Fractures are medium spaced undulating dipping 60-70°. (New Harbour Group - Psammite)			-16.258	32.99	
	. . . between 33.37 to 33.53m depth locally fine to medium gravel size brecciated psammite and purple phyllite.		128		33 (0.51)	
33.50-34.40	Strong very narrow to very thin bands of greenish-grey fine to medium, locally coarse grained fresh PSAMMITE with extremely closely to closely spaced narrow to very thin bands of very narrowly foliated purple phyllite. Veins extremely closely spaced very narrow <2mm undulating randomly orientated Epidote and calcite. Veins generally concentrated to the psammite bands. Fractures are medium spaced undulating to planar open dipping 5° and 80-85° with rare brown staining. (New Harbour Group - Psammite)			-16.768	33.50	
				-17	(0.90)	
					34	

Method Used:	RC+ RO	Plant Used:	Comacchio MC405	Drilled By:	SP	Logged By:	ADingle+ JWickenden	All dimensions in metres Scale:	1:10

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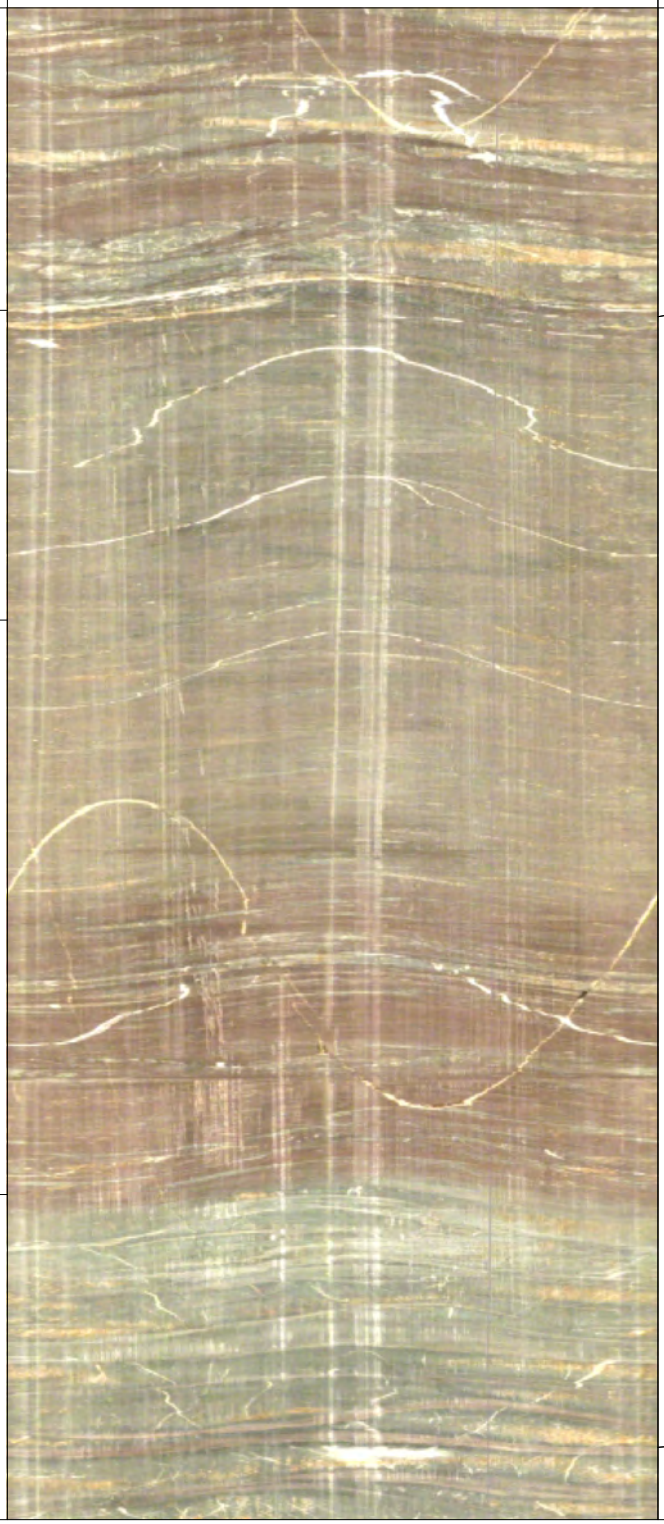
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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH536R

Contract Ref:	Start: 26.05.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 30.05.11	16.732	E:234707.7 N:393238.2	18 of 26

Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
33.50-34.40			129			
34.40-34.81	Medium strong greenish grey and diffuse purple fine grained weakly foliated fresh PSAMMITE. Un-fractured. Very closely spaced very narrow <1.5mm undulating calcite veins dipping at 40-60°. (New Harbour Group - Psammite)		130	17.668 -18 18.078	34.40 (0.41) 34.81	
34.81-35.57	Medium strong to strong very narrow to very thin bands of very narrowly foliated purplish-greyish becoming purple fresh PHYLLITE with extremely closely to very closely spaced very narrow lenticular bands of grey fine grained psammite. Foliation planar dipping at 20°. Un-fractured. Rare calcite veins very narrow <4mm thick undulating cross cutting foliation planes. (New Harbour Group - Phyllite)				35 (0.76)	
35.57-36.22	Strong very narrow to very thin bands of greenish grey fine to medium to locally coarse grained fresh PSAMMITE with extremely closely to closely spaced very narrow to very thin bands of brown-green and brownish-purple very narrowly foliated phyllite. Single 5° foliation fracture present. Phyllite bands are undulating and locally diffuse. Closely to locally extremely closely spaced very narrow undulating irregular calcite veins. Localised red (possible haematite) veining present from 35.62-35.70m depth. Foliation fractures are closely to medium spaced undulating dipping 5-10° and 40-85° with rare calcite infill and occasionally causing offsets by microfaults. (New Harbour Group - Psammite) . . . at 35.93m depth microfault dipping 55° crosscutting calcite vein.		131[i]	18.838 -19	35.57 (0.65) 36	

Method Used:	Plant Used:	Drilled By:	Logged By:	All dimensions in metres
RC+ RO	Comacchio MC405	SP	ADingle+ JWickenden	Scale: 1:10

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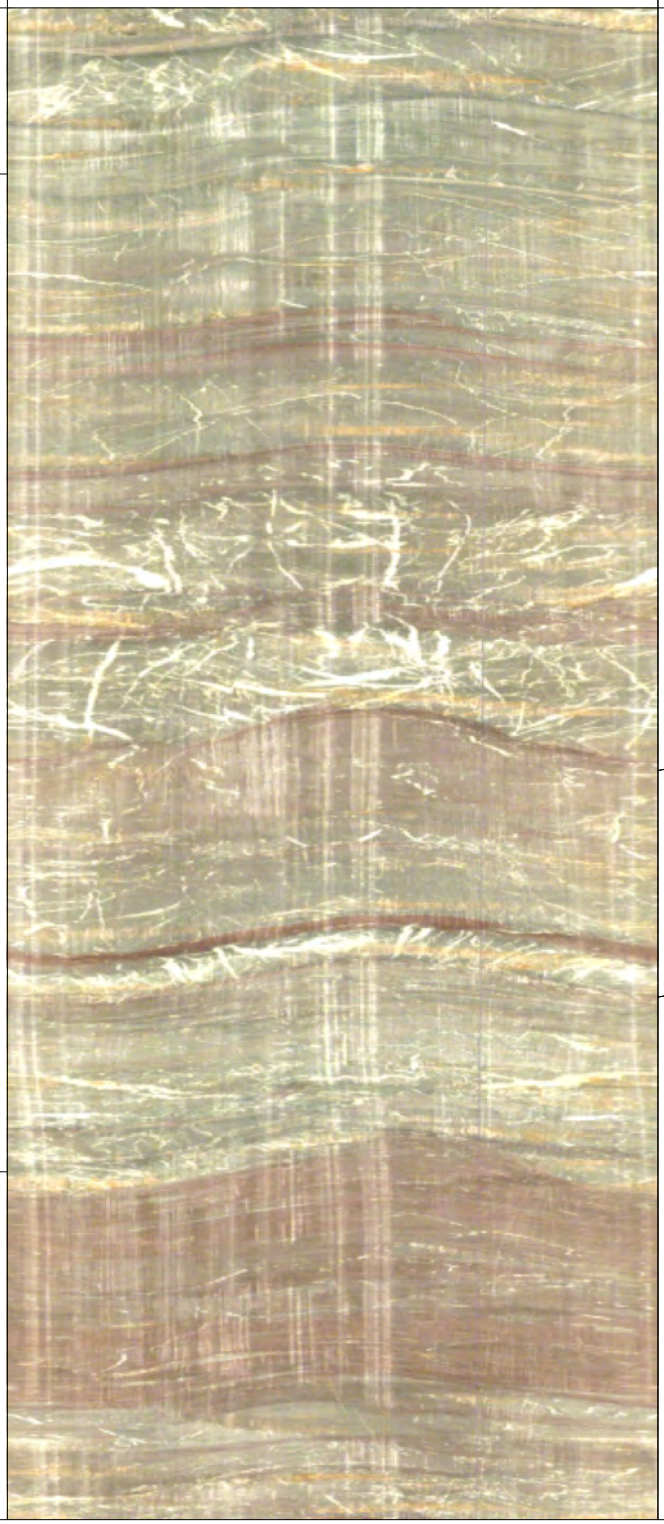
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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH536R

Contract Ref:	Start: 26.05.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 30.05.11	16.732	E:234707.7 N:393238.2	19 of 26

Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
35.57-36.22	. . . between 35.97 to 36.12m depth localised epidote and quartz veining present within psammite bands.			19.488	36.22 (1.32)	
36.22-37.54	Strong very thin to thin bands of grey locally greenish grey fine to coarse grained fresh PSAMMITE with closely to medium spaced very narrow to narrow bands of very narrowly foliated purple phyllite. Foliation planes are dipping at 20-40°. Un-fractured. Veins are extremely closely to very closely spaced very narrow <2mm randomly oriented undulating and ptygmatic Epidote. Quartz veins, up to 12mm thick, locally present extremely closely spaced undulating veins within psammite bands. (New Harbour Group - Psammite) . . . between 36.66 to 37.00m depth high concentration of epidote veining and multiple high angle quartz veins. . . . between 36.84 to 36.97m depth microfault dipping ~85° cross cutting quartz veins. . . . between 37.25 to 37.30m depth very thin band of psammite with extremely closely <1mm thick epidote veins and multiple high angle (>55°) quartz and calcite veins.		132[i] 133 134	-20 -20.808	37 (0.57)	
37.54-38.11	Medium strong to strong very narrow to very thin bands of very narrowly foliated purple fresh PHYLLITE with extremely closely to very closely spaced very narrow to very thin lenticular bands of grey fine to medium grained psammite. Foliation planes dipping at 20°. Veins extremely closely spaced very narrow <1mm undulating Epidote confined to psammite bands. (New Harbour Group - Phyllite)			-21	38	

Method Used:	Plant Used:	Drilled By:	Logged By:	All dimensions in metres
RC+ RO	Comacchio MC405	SP	ADingle+ JWickenden	Scale: 1:10

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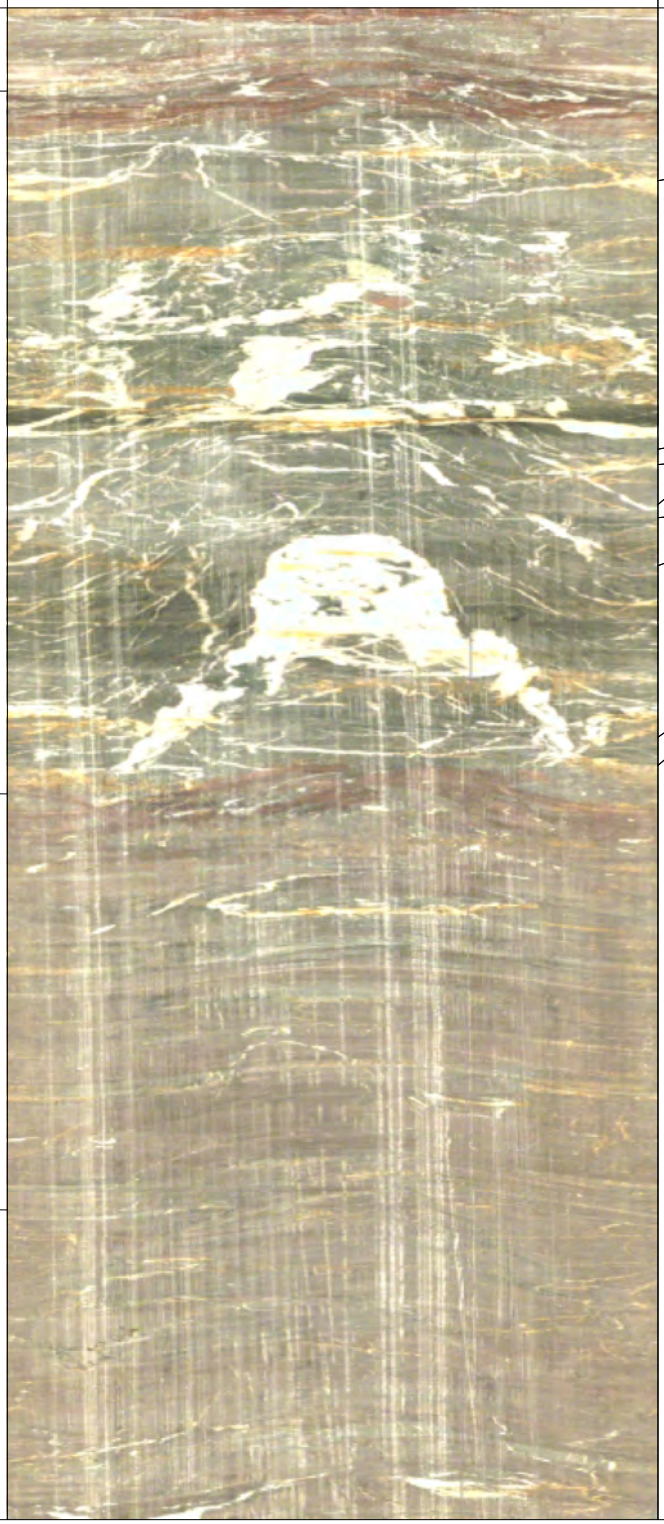
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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH536R

Contract Ref:	Start: 26.05.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 30.05.11	16.732	E:234707.7 N:393238.2	20 of 26

Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
37.54-38.11	. . . between 38.03 to 38.16m depth core recovered non-intact presumed to be drilling induced.			-21.378	38.11	
	Strong disturbed and brecciated green fine grained fresh PSAMMITE with irregularly spaced very narrow to narrow clasts of green phyllite, locally set within a matrix of calcite and quartz. Veins extremely closely spaced narrow <20mm undulating and irregular Calcite locally overprinting chlorite and epidote veins. Quartz veins are very narrow <4mm irregular, undulating and diffuse. Occasional possible calcite lenticular veining also present. Fractures are closely to medium spaced undulating dipping 5-40° and rarely 85-90° causing occasional offsets by microfaults. (New Harbour Group - Psammite)		135[i]			
38.11-39.04	. . . between 38.56 to 38.64m depth 2 no. possible refused microfaults with narrow 20mm quartz vein present dipping at 10-40°. . . . between 38.67 to 38.96m depth multiple microfaults dipping 5-40° causing offset to fabric. . . . between 38.75 to 38.90m depth narrow quartz vein containing pinkish calcite and dark green chlorite. Dark red-brown (possible haematite) veining also present through psammite.		136[i] 138[i] 137[i] 139[i] 140[i] 141[i] 142[i]	-22	(0.93)	
39.04-39.59	Medium strong to strong narrow to very thin bands of very narrowly foliated greyish purple to purple fresh PHYLLITE with extremely closely to very closely spaced very narrow to narrow lenticular bands of grey fine to medium grained psammite. Foliation planes dipping at 10-15°. Rare medium to widely spaced narrow <10mm undulating quartz veins. Closely to medium spaced very narrow <2mm undulating calcite veins generally crosscutting foliation planes. Core is Un-fractured, with multiple incipient planes present through core. (New Harbour Group - Phyllite) . . . between 39.10 to 39.23m depth thin band of disturbed phyllite with ptygmatic quartz veining.			-22.308 -22.858	39.04 (0.55) 39.59	
39.59-43.35	Strong thin bands of green fine grained fresh PSAMMITE with rare very narrow bands of green-brown poorly foliated phyllite. Un-fractured. Extremely closely to very closely spaced undulating randomly oriented occasional dipping at 60-70° very narrow 2-4mm quartz veins. microfaults are medium spaced undulating dipping 40-90° with multiple offsets. (New Harbour Group - Psammite) . . . between 39.74 to 39.87m depth zone of locally disturbed and sheared phyllite.		143[i]	-23	40	

Method Used:	RC+ RO	Plant Used:	Comacchio MC405	Drilled By:	SP	Logged By:	ADingle+ JWickenden	All dimensions in metres Scale:	1:10

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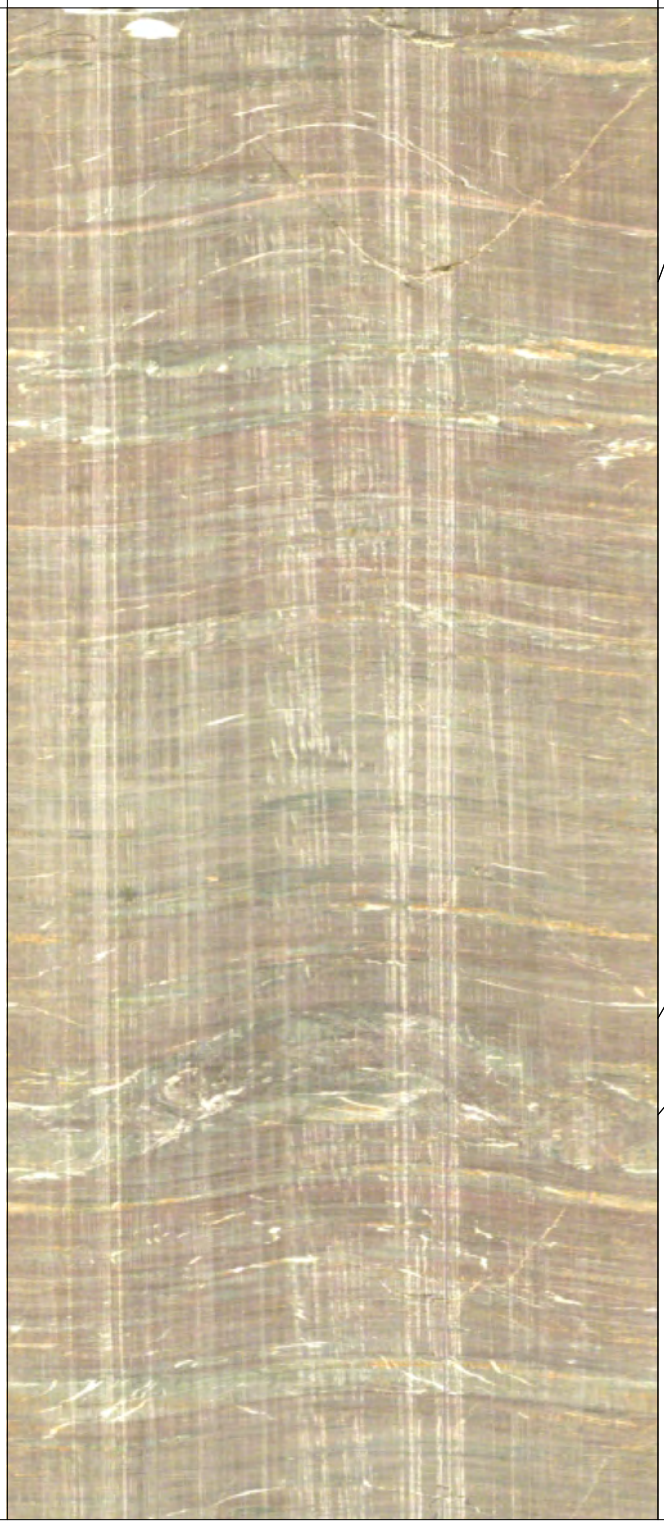
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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH536R

Contract Ref:	Start: 26.05.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 30.05.11	16.732	E:234707.7 N:393238.2	21 of 26

Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
39.59-43.35	. . . between 40.08 to 40.20m depth near vertical incipient fracture, terminating in a 70° incipient fracture that cross cuts the core. . . . between 40.81 to 40.84m depth epidote veining present within psammite band. . . . between 41.31 to 41.51m depth possible re-fused minor fault dipping 50°. Phyllite and psammite is highly disturbed and locally brecciated. Calcite veining is present along upper and lower surfaces of zone. . . . between 41.79 to 41.84m depth very thin psammite band containing high angle (~60°) quartz, calcite and chlorite veins.		144[i] 145[i] 146[i] 147[i] 149 148[i]	-24 -25	41 (3.76) 42	

Method Used:	Plant Used:	Drilled By:	Logged By:	All dimensions in metres
RC+ RO	Comacchio MC405	SP	ADingle+ JWickenden	Scale: 1:10

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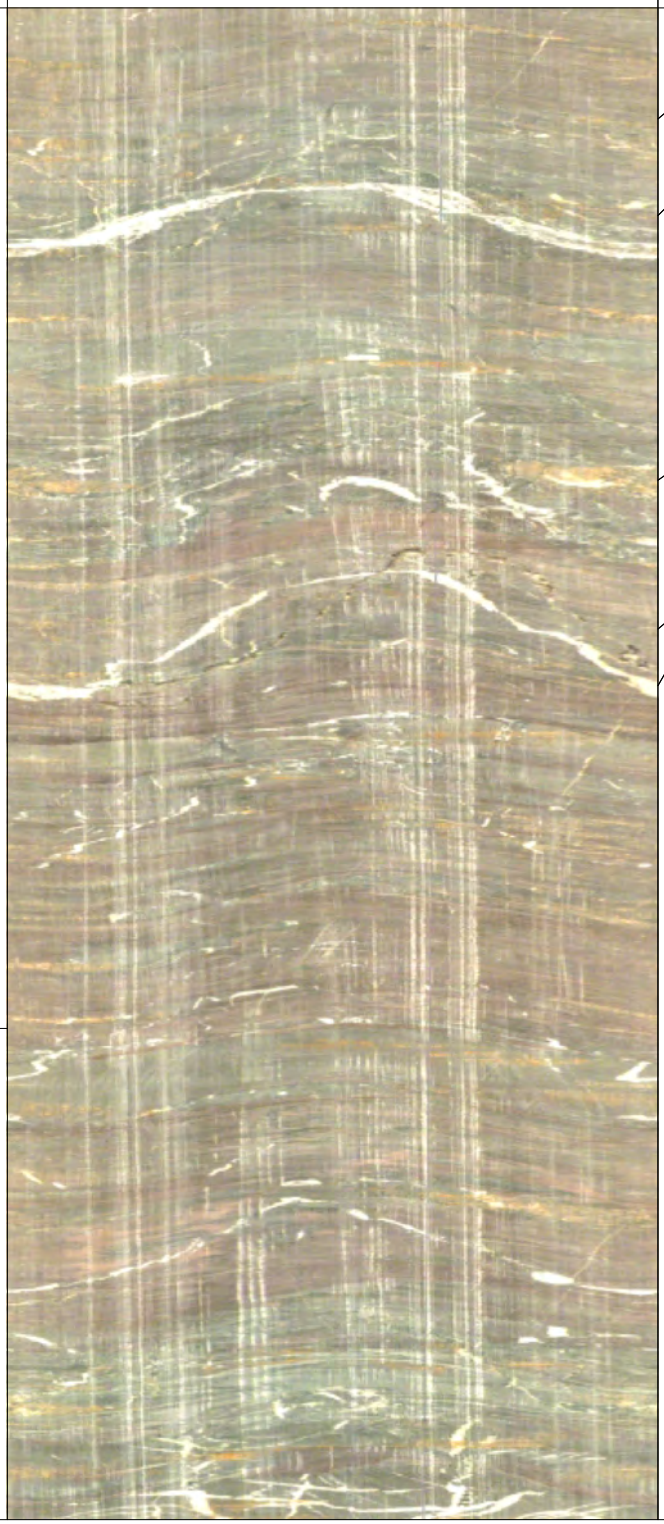
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BOREHOLE LOG

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Contract Ref:	Start: 26.05.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
39.59-43.35	. . . between 42.17 to 42.28m depth possible re-fused micro fault dipping ~ 45-50°, cross cut by multiple near horizontal microfaults. . . . between 42.48 to 42.70m depth thin disturbed zone. Phyllite fabric is locally sheared and brecciated. Zone is a possible re-fused minor fault dipping 35°. . . . between 42.74 to 42.88m depth stepped rough joint dipping ~60°.		150[i] 151[i] 152[i] 154[i] 153[i]	-26	43	
43.35-45.38	Strong very narrow to very thin bands of bluish grey fine to coarse grained fresh PSAMMITE with extremely closely to closely spaced very narrow to narrow bands of very narrowly foliated purple phyllite. Foliation planes dipping at 20-25°. Un-fractured. Medium spaced undulating very narrow to narrow 5-10mm quartz veins with possible partial chlorite replacement. Very closely to closely spaced undulating narrow <12mm calcite veins with locally partial overprinted with epidote. Fractures are absent. (New Harbour Group - Psammite)			-26.618 -27	43.35 44	

Method Used:	RC+ RO	Plant Used:	Comacchio MC405	Drilled By:	SP	Logged By:	ADingle+ JWickenden	All dimensions in metres Scale:	1:10

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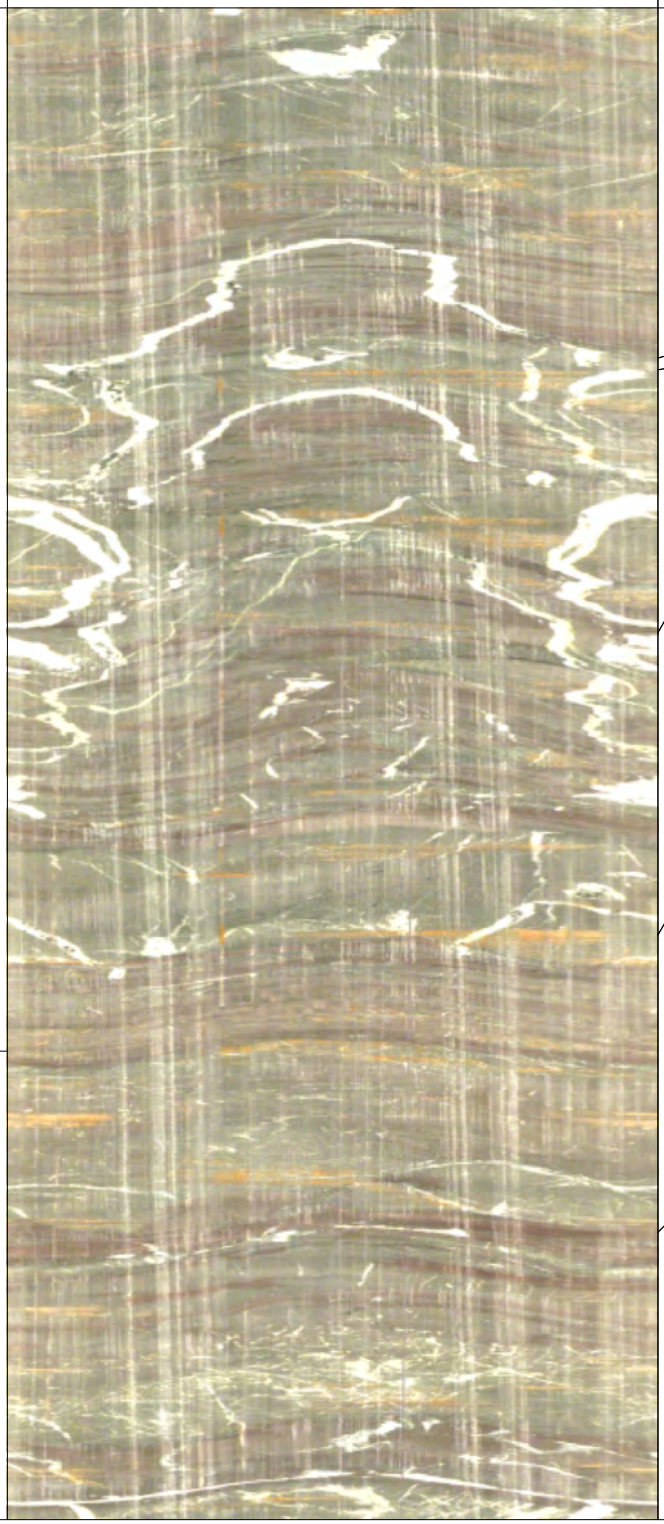
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BOREHOLE LOG

Contract:	Client:	Borehole:
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Contract Ref:	Start: 26.05.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
	. . . between 44.30 to 44.60m depth undulating calcite, chlorite and quartz vein crosscut at 44.45m by a microfault dipping 15°.				(2.03)	
	. . . between 44.45 to 44.47m depth 2 no. microfaults dipping ~10-15°.		155[i] 156[i]			
	. . . at 44.53m depth ductile shear bands (5°) offsetting calcite veins) offsets calcite vein					
43.35-45.38	. . . between 44.65 to 44.96m depth large irregular calcite veining with some localised quartz, chlorite and epidote veins.					
	. . . at 44.74m depth microfault dipping ~60° through phyllite bands.		157[i]	-28		
	. . . between 45.08 to 45.20m and 45.54 to 45.60m depth 2 no. microfaults dipping 45-60°.		158[i]		45	
				-28.648	45.38	
45.38-47.10	Strong very thin to thin bands of grey fine to coarse grained fresh PSAMMITE with medium to locally very closely spaced very narrow to narrow bands of narrowly foliated purple phyllite. Phyllite bands are dipping at ~10°. Single ~20° foliation fracture present at 46.77m depth. Veins are closely to locally extremely closely spaced narrow <10mm undulating and irregular Calcite locally containing possible red staining by haematite. Closely to widely spaced very narrow <1mm thin bands of extremely closely spaced undulating randomly oriented Epidote. Fractures are closely to medium spaced undulating dipping 5° and 30-60° occasionally causing offset by microfaults. (New Harbour Group - Psammite)		159[i]	-29	46	

Method Used:	RC+ RO	Plant Used:	Comacchio MC405	Drilled By:	SP	Logged By:	ADingle+ JWickenden	All dimensions in metres Scale:	1:10

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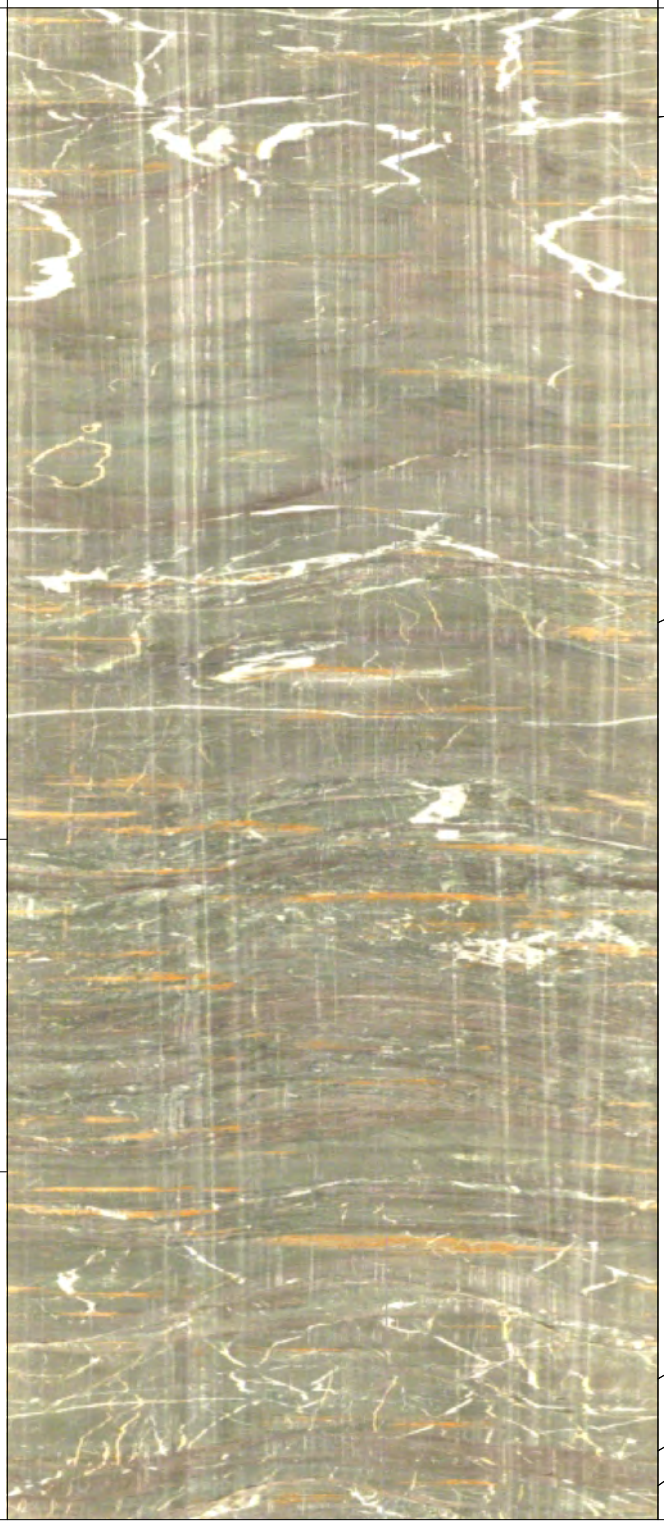
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BOREHOLE LOG

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Contract Ref:	Start: 26.05.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 30.05.11	16.732	E:234707.7 N:393238.2	24 of 26

Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
45.38-47.10	. . . at 46.14m depth possible near horizontal re-fused micro fault. Psammite is brecciated and has calcite around fragments.		160[i] 161[i] 162[i] 163[i] 164[i] 165[i]	-30 -30.368 -31	(1.72) 47 47.10	
47.10-47.54	Strong to medium strong disturbed very narrow to thin bands of green-grey fine to medium grained fresh PSAMMITE with very closely spaced very narrow to narrow lenticular bands of very narrowly foliated purple phyllite. Fabric of rock is undulating, sheared, and locally microfaulted with possible poorly developed mylonitic texture. Localised quartz overprinting of psammite. Foliation planes are locally indistinct, generally dipping at ~20°. Rock is Un-fractured. Epidote and calcite veins are extremely closely to very closely spaced, undulating an irregular. (New Harbour Group - Psammite)			-30.808	(0.44) 47.54	
47.54-48.74	Medium strong to strong very narrow to very thin bands of greenish grey fine to locally coarse grained fresh PSAMMITE with extremely closely to closely spaced very narrow to narrow bands of very narrowly foliated purple and brownish-purple phyllite. Foliation planes are dipping at ~20°. Extremely closely to very closely spaced randomly orientated very narrow calcite veins. Fractures are medium spaced undulating open dipping 10-40° with rare red mineral smearing and occasionally causing offsets by microfaults. (New Harbour Group - Psammite) . . . between 47.81m to 48.05m depth multiple incipient fractures present, randomly orientated though core.				48	

Method Used:	RC+ RO	Plant Used:	Comacchio MC405	Drilled By:	SP	Logged By:	ADingle+ JWickenden	All dimensions in metres Scale:	1:10

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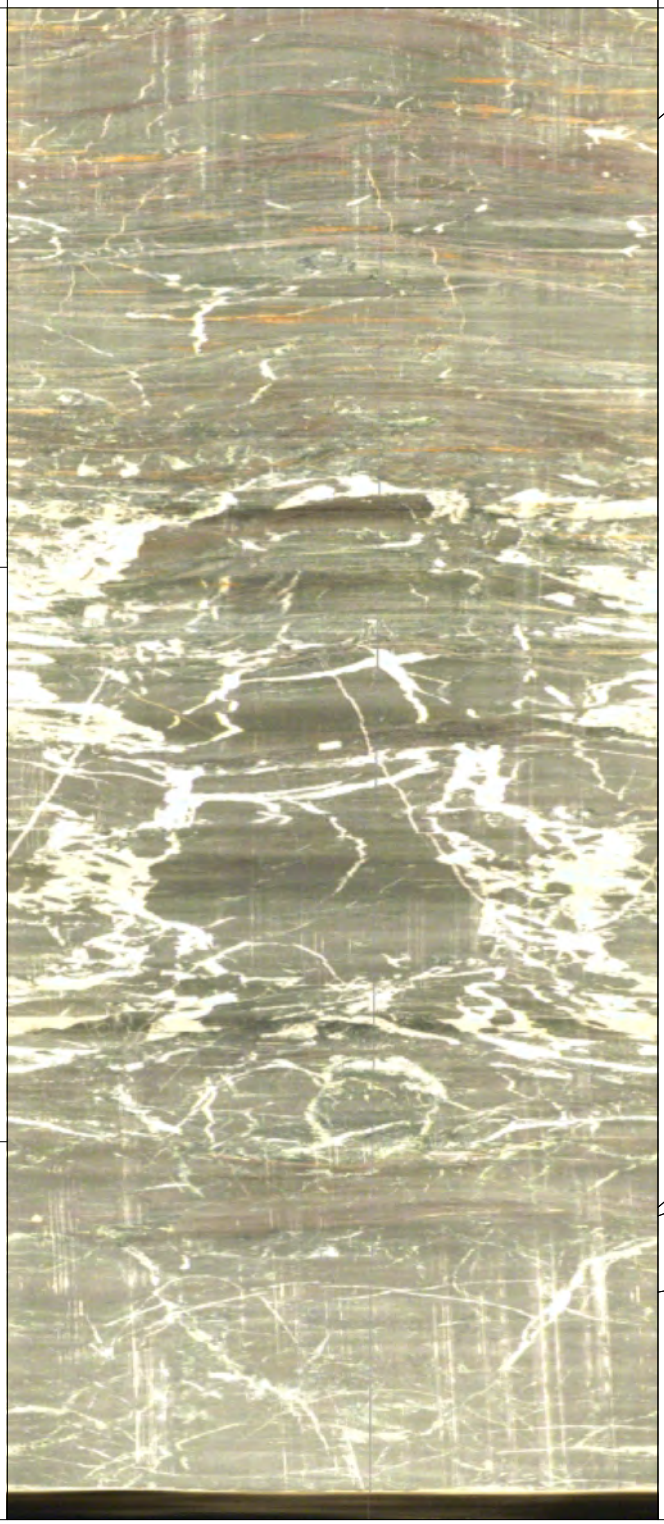
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BOREHOLE LOG

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Contract Ref:	Start: 26.05.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 30.05.11	16.732	E:234707.7 N:393238.2	25 of 26

Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
47.54-48.74	. . . between 48.50 to 48.67m depth core is non-intact, recovered as moderately coarse gravel sized fragments.		166[i]	-32.008	(1.20) 48.74	
48.74-49.50	Strong narrow to thin bands of greyish green fine to medium grained fresh PSAMMITE with closely to medium spaced narrow to very thin bands of green-brown and red-brown phyllite. Fabric of rock is locally brecciated within large calcite veins, possible moderately developed brecciated appearance? Quartz veins also present within the calcite veins and rare very narrow <1mm thick epidote veins also present. (New Harbour Group - Psammite) . . . between 48.75 to 48.86m depth brecciated zone. Clasts of psammite are angular fine to medium gravel size, contained within calcite veining. . . . between 49.08 to 49.34m depth brecciated zone. Clasts are angular to subrounded, fine to coarse gravel size contained within calcite veining.			-32.768	(0.76) 49.50	
49.50-50.40	Medium strong to strong very thin to thin bands of greyish green fine to coarse grained fresh PSAMMITE with rare very narrow bands of purple phyllite. Single joint present at 49.58m depth. Closely spaced very narrow <5mm calcite veins present between 49.72-49.90m. Very closely to closely spaced very narrow <5mm generally undulating near horizontal quartz veins. Extremely closely to very closely spaced very narrow <5mm randomly orientated undulating and locally ptygmatic epidote and chlorite veins. (New Harbour Group - Psammite) . . . at 49.51 to 49.58m depth microfault dipping 40°, causing offset to fabric.		167[i] 168[i] 169[i]	-33	(0.90) 50	

Method Used:	Plant Used:	Drilled By:	Logged By:	All dimensions in metres
RC+ RO	Comacchio MC405	SP	ADingle+ JWickenden	Scale: 1:10

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725061	End: 30.05.11	16.732	E:234707.7 N:393238.2	26 of 26

Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
49.50-50.40	Rotary borehole terminated at 50.40m depth.			-33.668	50.40	

Method Used:	RC+ RO	Plant Used:	Comacchio MC405	Drilled By:	SP	Logged By:	ADingle+ JWickenden	All dimensions in metres Scale:	1:10

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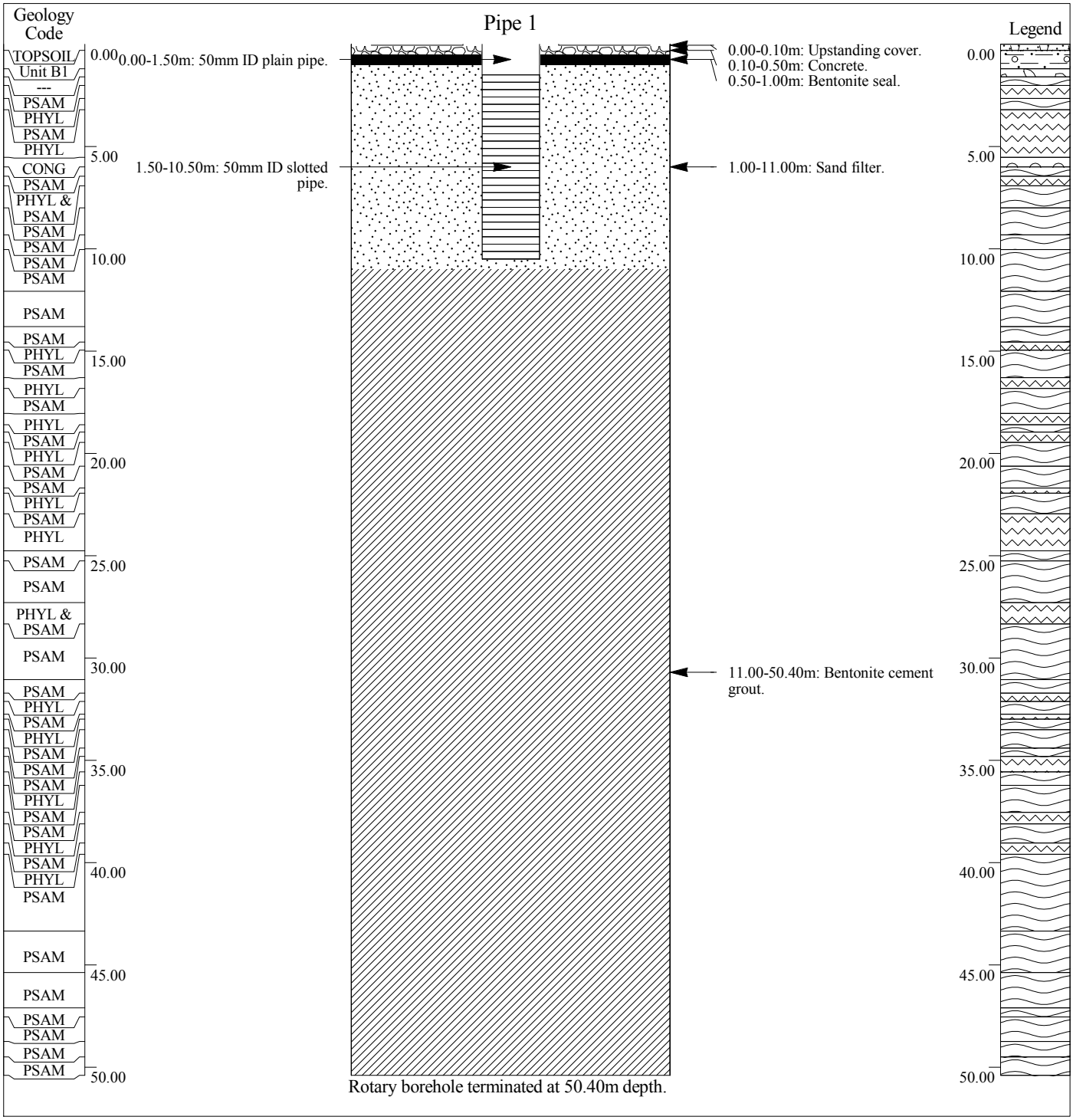
STRUCTURAL SOILS

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INSTALLATIONS

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH536R

Contract Ref:	Start: 26.05.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 30.05.11	16.732	E:234707.7 N:393238.2	1 of 1



General Remarks

Geology code details:

CONG=METACONGLOMERATE, PHYL=Phyllite, PHYL & PSAM=Interbedded PHYLLITE & PSAMMITE, PSAM=Psammite, TOPSOIL=Topsoil, Unit B1=Unit B1

Note: Graphical representation of well installation is scaled vertically, but exaggerated in the horizontal to aid interpretation.

All dimensions in metres	Installation Date	Installation Type	Installed By
Scale 1:283	05/07/2011	-	JWickenden

GINT_LIBRARY_V8_04.GLB!INSTALLATIONS LOG | 725061_WYLFA.GPJ - v8_04 | 17/12/11 - 22:54 | MJB
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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 309**

Contract Ref:	Start: **27.10.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **28.10.09**	**9.39**	**E:235818.31 N:393410.42**	**1** of **1**

Samples and In-situ Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	No	Type	Results						
						Dark brown friable TOPSOIL.	9.14	0.25	
0.25-0.60	1	B				Stiff pale greenish grey sandy slightly gravelly CLAY. Gravel is angular to rounded fine to coarse of phyllite, psammite, sandstone and quartzite. (Glacial Deposits)	8.79	0.60	
0.60	2	D					8.54	0.85	
0.60-0.85	3	B							
0.85	4	D				Greyish orangish brown silty slightly gravelly fine SAND. Gravel is subangular to subrounded fine to medium of phyllite and psammite. (Glacial Deposits)	8.19	1.20	
0.85-1.20	5	B							
1.20	6	D							
1.40	7	D							
1.50-1.95	8	SPT	N=10						
1.50-1.95	9	B		1		Dark orangish brown clayey gravelly to very gravelly fine SAND. Gravel is angular to subrounded fine to coarse of mixed lithologies including phyllite, psammite, sandstone, limestone and quartzite. (Glacial Deposits)		(1.30)	
				1 2			6.89	2.50	
2.40	10	D				Firm dark brown sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium of mixed lithology including, phyllite, sandstone and mudstone. (Glacial Deposits)	6.59	2.80	
2.50-2.95	11	SPT	N=14						
2.50	12	B							
2.50	13	W							
3.40	14	D				Medium dense dark brown slightly silty gravelly fine to medium SAND. Gravel is subangular to subrounded fine to medium of mixed lithology including phyllite, sandstone and mudstone. (Glacial Deposits)		(1.90)	
3.50-3.95	15	SPT	N=14						
3.50-3.95	16	B				Firm dark grey sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to medium of phyllite, psammite and rare sandstone. (Glacial Deposits) Below 4.00m becoming slightly sandy.			
4.40	17	D					4.69	4.70	
4.50-4.95	18	SPT	N=23						
4.50-4.95	19	B				Competely weathered PHYLLITE (Foreman's description). Recovered as yellow brown clayey angular to subangular fine to coarse gravel of phyllite and occasional quartz. Locally recovered as claybound gravel. (The New Harbour Group)			
				2				(2.80)	
5.90	20	D							
6.00-6.45	21	SPT	N=34						
6.00-6.45	22	B							
6.00	23	W							
7.40	24	D					1.89	7.50	
7.50-7.73	25	SPT	N=125*			Very weak to weak thinly laminated greenish grey PHYLLITE completely to highly weathered. Recovered as slightly clayey to clayey slightly sandy angular fine to coarse gravel sized fragments. (The New Harbour Group)	1.66	7.73	
						Borehole terminated at 7.73m due to refusal on bedrock.			

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
27/10/09	11:00	0.00	-	150	
27/10/09	12:20	2.50	2.50	150	2.50
27/10/09	13:00	6.00	3.00	150	6.00
27/10/09	17:00	7.40	6.70	150	-
28/10/09	08:00	7.40	6.70	150	6.00
28/10/09	10:00	7.73	7.50	150	-

Chiselling		
From	To	Duration (hh:mm)

General Remarks

1. Machine dug inspection pit to 1.20m depth.
2. Inspection pit stable during excavation.
3. No groundwater encountered during excavation.
4. Excavation easy to moderate.
5. Inspection pit backfilled with arisings on completion.
6. Borehole drilled from 1.20m to 7.73m.

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Cable percussion	**Dando 2000**	**RW**	**NFowler**	**MD**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 309D**

Contract Ref:	Start: **04.02.10**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **04.02.10**	**9.54**	**E:235813.27 N:393409.77**	**1** of **1**

Samples and In-situ Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
						TOPSOIL. (Foreman's description)	9.44	0.10	
						Firm yellow grey sandy gravelly CLAY. (Foreman's description) (Glacial Deposits)		(1.80)	
							7.64	1.90	
						Brown slightly clayey GRAVEL. (Foreman's description) (Glacial Deposits)	7.34	2.20	
						Stiff grey boulder clay. (Foreman's description) (Glacial Deposits)		(0.80)	
							6.54	3.00	
						Borehole terminated at 3.00m on clients instruction.			

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
04/02/10	11:00	1.80	1.50	150	1.80
04/02/10	12:00	3.00	2.50	150	-

Chiselling		
From	To	Duration (hh:mm)
1.50	2.30	02:00

General Remarks

1. Hand dug pit excavated to 1.20m.
2. Water added from 1.20m to 2.30m, 20 litres.
3. Groundwater encountered at 1.80m, rising to 0.10m after 20 minutes.
4. 50mm diameter HDPE monitoring well installed on completion.

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Cable percussion	**Dando 2000**	**SP**	**AFoss**	**MD**

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 310**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	**12.11.09** End: **12.11.09**	**11.86**	**E:236094.36 N:393333.30**	**1** of **1**

Samples and In-situ Tests				Water	Backfill & Instru-mentation	Description of Strata	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	No	Type	Results						
						Firm dark brown TOPSOIL. With rare to occasional medium to coarse gravel of phyllite and dolerite.	11.41	0.45	
0.50-0.70	1	B				Firm locally stiff orangish brown sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse of phyllite, psammite, sandstone and chert. (Glacial Deposits)		(0.85)	
0.90-1.00	2	B							
1.10-1.20	3	B				Below 0.60m: low cobble content.	10.56	1.30	
1.40	4	D				Below 0.70m: lenses (approx 800mm by 200mm) of brownish grey gravelly clay.			
1.50-1.95	5	SPT	N=17			Below 1.00m: Grey brown mottling and pockets of soft grey brown clay.		(1.10)	
1.50-1.95	6	B							
						Firm becoming stiff brown mottled orange brown and light grey slightly sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to medium occasionally coarse of phyllite and psammite. (Glacial Deposits)	9.46	2.40	
2.40	7	D							
2.50-2.95	8	SPT	N=21						
2.50-2.95	9	B		1		Stiff light brown to greyish brown sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse of phyllite, psammite and dolerite. (Glacial Deposits)			
				1					
3.40	10	D						(2.30)	
3.50	11	W							
3.50-3.95	12	SPT	N=19						
3.50-3.95	13	B							
				2					
4.40	14	D							
4.50-4.87	15	SPT	N=70*				7.16	4.70	
4.50	18	W				Weak greyish green and orange brown very narrowly foliated PHYLLITE.		(0.52)	
5.00	16	D				Recovered as clay and gravel size fragments.	6.64	5.22	
5.10-5.22	17	SPT	N=214*			(The New Harbour Group)			
						Borehole terminated at 5.22m on bedrock.			

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
12/11/09	09:00	3.50	1.50	150	3.50
12/11/09	10:15	4.50	4.50	150	4.50
12/11/09	15:00	5.22	4.50	150	4.50

Chiselling		
From	To	Duration (hh:mm)
4.80	5.11	01:00

General Remarks

1. Machine dug inspection pit to 1.30m depth.
2. Inspection pit stable during excavation.
3. No groundwater encountered during excavation.
4. Inspection pit backfilled with arisings on completion.
5. Percussive boring from 1.30m to 5.22m.
6. Groundwater encountered at 3.50m rising to

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Cable percussion	**Dando 2000**	**SP**	**ADingle**	**MD**

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 311**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **17.11.09**	**11.96**	**E:236051.24 N:393711.51**	**1** of **3**

Samples and In-situ Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
0.50-1.00	1	B				Rough grass/pasture over soft to firm brown slightly sandy slightly gravelly CLAY with occasional cobbles. Gravel is subangular to subrounded fine to coarse of sandstone, quartz, psammite and dolerite. (Glacial Deposits)	10.96	(1.00) 1.00	
1.40	2	D				Firm brown locally mottled orange brown slightly sandy to sandy slightly gravelly CLAY with rare cobbles. Gravel is subangular to rounded fine to coarse of sandstone, dolerite, phyllite and siltstone. (Glacial Deposits)		(1.80)	
1.50-1.95	3	$SPT_{(NR)}$	N=9						
1.50-1.95	3	B							
2.40	4	D							
2.50-2.95	5	U	38 blows				9.16	2.80	
3.40	6	D				Stiff grey dark grey clayey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse of sandstone, flint, limestone, siltstone and rare schist (Glacial Deposits)			
3.50-3.95	7	SPT	N=22						
3.50-3.95	8	B							
4.40	9	D							
4.50-4.95	10	SPT	N=19						
4.50-4.95	11	B							
4.50	12	W				Below 5.00m boulders (foremans description).			
5.90	13	D							
6.00-6.45	14	SPT	N=35			Below 6.00m becoming very stiff.			
6.00-6.45	15	B							
7.40	16	D							
7.50-7.95	17	U	68 blows					(12.30)	

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
12/11/09	09:00	0.00	-		
12/11/09	17:00	4.40	3.00	150	Dry
13/11/09	08:00	4.40	3.00	150	2.90
13/11/09	17:00	7.95	7.95	150	Dry
16/11/09	08:00	7.95	7.95	150	Dry
16/11/09	17:00	15.55	9.00	150	Dry
17/11/09	08:00	15.50	9.00	150	Dry
17/11/09	14:00	25.00	10.50	150	25.00

Chiselling		
From	To	Duration (hh:mm)
5.40	6.00	01:50
6.80	7.10	01:00
10.00	10.30	01:00

General Remarks

1. Inspection pit excavated from ground level to 1.20m.
2. Groundwater encountered at 2.90m at start of shift 13/11/2009.
3. Water added from 3.50m to 20.00m 240 litres.
4. Falling head permeability tests undertaken at 8.50m, 10.50m and 12.50m.

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Cable percussion	**Dando 2000**	**SP**	**AFoss**	**MD**

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 311**

Contract Ref:	Start: **12.11.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **17.11.09**	**11.96**	**E:236051.24 N:393711.51**	**2** of **3**

Samples and In-situ Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
8.90	18	D				Stiff grey dark grey clayey slightly sandy slightly gravelly CLAY. Gravel is subangular to subrounded fine to coarse of sandstone, flint, limestone, siltstone and rare schist (Glacial Deposits)			
9.00-9.45	19	SPT	N=24						
9.00-9.45	20	B				Below 9.00m becoming stiff.			
10.40	21	D							
10.50-10.95	22	SPT	N=30			Below 10.50m becoming very stiff.			
10.50-10.95	23	B		1					
11.90	24	D							
12.00-12.45	25	U	87 blows						
13.40	26	D							
13.50-13.95	27	SPT	N=26			Below 13.50m becoming stiff.			
13.50-13.95	28	B							
14.90	29	D				Below 14.90m medium gravel sized pockets of brown clay.	-3.14	15.10	
15.00-15.45	30	U	65 blows			Stiff thinly laminated grey calcareous CLAY. (Glacial Deposits)			
15.45-15.55	31	D							
16.40	31a	D							
16.50-16.95	32	SPT	N=21						
16.50-16.95	33	B							
16.50	34	W							

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
17/11/09	16:00	25.00	10.50	150	11.30

Chiselling		
From	To	Duration (hh:mm)

General Remarks

5. Borehole drilled to 25.00m.
6. 50mm diameter HDPE monitoring well installed on completion.

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Cable percussion	**Dando 2000**	**SP**	**AFoss**	**MD**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 311**

Contract Ref:	Start: **12.11.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **17.11.09**	**11.96**	**E:236051.24 N:393711.51**	**3** of **3**

Samples and In-situ Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
17.90	35	D				Stiff thinly laminated grey calcareous CLAY. (Glacial Deposits)			
18.00-18.45	36	U	74 blows						
19.40	37	D							
19.50-19.95	38	SPT	N=36			Below 19.50m becoming very stiff.			
19.50-19.95	39	B						(9.80)	
20.90	40	D							
21.00-21.45	41	U	86 blows						
21.45-21.55	42	D							
22.40	43	D							
22.50-22.95	44	SPT	N=24			Below 22.50m becoming stiff.			
22.50-22.95	45	B							
23.90	46	D							
24.00-24.45	47	U	89 blows						
24.45-24.55	48	D							
				▼			-12.94	24.90	
25.00	49	D				Multicoloured clayey slightly sandy GRAVEL. Gravel is angular to rounded fine to coarse of sandstone, quartz, phyllite and occasional psammite. (Glacial Deposits)	-13.04	25.00	
25.00	50a	W							

Boring Progress and Water Observations						Chiselling			General Remarks
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth	From	To	Duration (hh:mm)	

All dimensions in metres | Scale: **1:50**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Cable percussion	**Dando 2000**	**SP**	**AFoss**	**MD**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 309R**

Contract Ref:	Start: **28.10.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **02.11.09**	**9.45**	**E:235816.10 N:393410.50**	**1** of **23**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Legend
										Dark brown friable TOPSOIL.		9.20	0.25 (0.25)	
										Stiff pale greenish grey sandy slightly gravelly CLAY. Gravel is angular to rounded fine to coarse of phyllite, psammite, sandstone and quartzite. (Glacial Deposits)		8.85	0.60 (0.35)	
										Greyish orangish brown silty slightly gravelly fine SAND. Gravel is subangular to subrounded fine to medium of phyllite and psammite. (Glacial Deposits)		8.60	0.85 (0.25)	
										Dark orangish brown clayey gravelly to very gravelly fine SAND. Gravel is angular to subrounded fine to coarse of mixed lithologies including phyllite, psammite, sandstone, limestone and quartzite. (Glacial Deposits)		8.25	1.20 (0.35)	
										Sandy Boulder Clay (Foreman's description).		8		

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
28/10/09	08:00	0.00	None	N/R	
28/10/09	12:00	8.50	8.50	107	8.50
28/10/09	17:00	14.50	8.50	107	8.50
29/10/09	08:00	14.50	8.50	107	8.50
29/10/09	17:00	24.50	8.50	107	None
30/10/09	08:00	24.50	8.50	107	8.50
30/10/09	17:00	32.00	8.50	107	None
02/11/09	08:00	32.00	8.50	107	8.50

General Remarks

1. Machine dug inspection pit to 1.20m depth (see log IP309).
2. Rotary open hole drilling from ground level to 8.50m using Odex system.
3. Rotary core drilling from 8.50m to 40.00m using 412 core barrel, PCD core bit and air/mist flush.
4. Water encountered at 8.50m on 28/10/2009, standing level 8.50m.
5. Many drilling induced fractures, If not presented on the log.

All dimensions in metres | Scale: **1:10**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored + Rotary open hole	**Beretta T44**	**ND**	**NFowler**	**MDolby**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 309R**

Contract Ref:	Start: **28.10.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **02.11.09**	**9.45**	**E:235816.10 N:393410.50**	**2** of **23**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Legend
										strata continues from previous page			(2.20)	
												7		
												6.05	3.40	
										Sandy clay with gravel (Foreman's description)		6		

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
02/11/09	12:00	40.00	8.50	107	8.50

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored + Rotary open hole	**Beretta T44**	**ND**	**NFowler**	**MDolby**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 309R**

Contract Ref:	Start: **28.10.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **02.11.09**	**9.45**	**E:235816.10 N:393410.50**	**3** of **23**

Mechanical Log					Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)										
										strata continues from previous page		5	(4.00)	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored + Rotary open hole	**Beretta T44**	**ND**	**NFowler**	**MDolby**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 309R**

Contract Ref:	Start: **28.10.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **02.11.09**	**9.45**	**E:235816.10 N:393410.50**	**4** of **23**

Mechanical Log					Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)										
										strata continues from previous page		4		
												3		

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored + Rotary open hole	**Beretta T44**	**ND**	**NFowler**	**MDolby**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 309R**

Contract Ref:	Start: **28.10.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **02.11.09**	**9.45**	**E:235816.10 N:393410.50**	**5** of **23**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Legend
										strata continues from previous page		2.05	7.40	
										Weathered broken rock (Foreman's description)		2	(1.10)	
									1			0.95	8.50	
8.50-10.00	92	84	17		(00:35)					Strong very narrowly foliated greenish grey PHYLLITE occasionally discoloured greenish brown. Discontinuities:- Set 1:- 20 degrees very closely locally extremely closely spaced, planar, smooth, tight with some dark brown surface staining, clean. Many drilling induced. Set 2:- 50 degrees very closely locally extremely closely spaced locally intersecting with set 1 planar, smooth, tight with some dark brown surface staining, clean.			(0.75)	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored + Rotary open hole	**Beretta T44**	**ND**	**NFowler**	**MDolby**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 309R**

Contract Ref:	Start: **28.10.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **02.11.09**	**9.45**	**E:235816.10 N:393410.50**	**6** of **23**

Depth	Mechanical Log: TCR (%)	SCR (%)	RQD (%)	If (mm)	Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Legend
9.00-13.00										Many drilling induced. (The New Harbour Group) 8.68m to 8.80m - AZCL.		0.20	9.25	
	92	84	17		(00:35)		2.85E-06m/s			Strong very narrowly foliated bluish greenish grey PHYLLITE. Discontinuities:- Set 1:- 10 to 30 degrees very closely spaced planar, smooth and rough tight with dark brown surface staining, clean. Many drilling induced. Set 2:- 40 to 70 degrees closely spaced, planar smooth to rough, tight with dark brown staining, clean. Many drilling induced. (The New Harbour Group) Below 9.25m becoming bluish grey. 9.67m to 9.70m - NI. 9.78m to 9.82m - NI.		0		
10.00-11.50										10.08m to 10.17m - AZCL.				
	94	83	24		(00:40)					Below 10.35m 50 to 70 degree closely spaced upto 5mm wide calcite veins.		-1		

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored + Rotary open hole	**Beretta T44**	**ND**	**NFowler**	**MDolby**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 309R**

Contract Ref:	Start: **28.10.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **02.11.09**	**9.45**	**E:235816.10 N:393410.50**	**7** of **23**

Mechanical Log														
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Legend
										strata continues from previous page				
	94	83	24		(00:40)									
11.50-13.00										11.50m to 11.61m - AZCL.		-2		
							2.85E-06m/s							
	93	85	30		(00:40)								(5.60)	
												-3		

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored + Rotary open hole	**Beretta T44**	**ND**	**NFowler**	**MDolby**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 309R**

Contract Ref:	Start: **28.10.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **02.11.09**	**9.45**	**E:235816.10 N:393410.50**	**8** of **23**

Mechanical Log													
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Legend
										strata continues from previous page 12.59m to 12.60m 20 degree 3mm quartz vein.				
	93	85	30		(00:40)		2.85E-06m/s							
13.00-14.50 13.00-18.00										13.08m to 13.16m - AZCL.				
										13.33m 40 degree lenticular upto 15mm wide quartz vein.				
												-4		
										13.48m to 13.56m - NI.				
	95	85	28		(00:40)		1.14E-06m/s							

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored + Rotary open hole	**Beretta T44**	**ND**	**NFowler**	**MDolby**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 309R**

Contract Ref:	Start: **28.10.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **02.11.09**	**9.45**	**E:235816.10 N:393410.50**	**9** of **23**

Mechanical Log													
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Legend
	95	85	28		(00:40)					*strata continues from previous page*		-5		
14.50-16.00														
										14.81m to 14.87m - NI.		-5.40	14.85	
	100	83	22		(00:35)		1.14E-06m/s			Strong to very strong thinly to thickly interlaminated greenish grey fine grained PSAMMITE and strong to very strong very narrowly foliated purplish green grey PHYLLITE with 40-70 degree, upto 5mm, closely to medium spaced wide lenticular calcite inclusions. Discontinuities:- Set 1:- 20 to 30 degree medium locally very closely spaced, planar smooth, very tight to incipient dark brown stained, clean. Many drilling induced. Set 2:- 45-50 degree medium spaced, undulating, rough, very tight dark brown stained, clean. Many drilling induced. (The New Harbour Group) 15.45m to 15.55m - NI.		-6	(1.95)	
16.00-17.50														
	94	77	25		(00:15)									

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored + Rotary open hole	**Beretta T44**	**ND**	**NFowler**	**MDolby**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 309R**

Contract Ref:	Start: **28.10.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **02.11.09**	**9.45**	**E:235816.10 N:393410.50**	**10** of **23**

Mechanical Log													
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Legend
										strata continues from previous page 16.18m to 16.30m - NI. 16.30m to 16.39m - AZCL.		-7		
												-7.35	16.80	
	94	77	25		(00:15)		1.14E-06m/s			Very strong green grey fine to medium grained PSAMMITE with vein sets, 15-30 degrees, upto 4mm, very closely spaced, lenticular and 60-80 degrees, upto 2mm, extremely closely spaced, lenticular of calcite and occasionally quartz. (The New Harbour Group)			(0.35)	
												-7.70	17.15	
17.50-18.00										Strong very narrowly foliated (poorly developed), psammitic PHYLLITE with 30-70 degree, upto 8mm, very closely to closely spaced, lenticular calcite locally quartz inclusions. Discontinuities:- Set 1: 30-40 degree medium to closely spaced, planar, smooth, incipient dark brown non penetrative stained, clean. Many drilling induced. Set 2:- 50-70 degree medium spaced, planar, rough, incipient to very tight dark brown non penetrative stained, clean. Many drilling induced. (The New Harbour Group) 17.54m to 17.59m - AZCL.		-8		
	90	60	43		(00:15)									

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored + Rotary open hole	**Beretta T44**	**ND**	**NFowler**	**MDolby**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 309R**

Contract Ref:	Start: **28.10.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **02.11.09**	**9.45**	**E:235816.10 N:393410.50**	**11** of **23**

Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Legend
18.00-18.50 18.00-23.00										*strata continues from previous page*				
	98	98	30		(00:15)					18.30m to 18.36m Very thin bed of strong to very strong green grey fine to medium grained psammite.		-9		
18.50-19.00	84	84	0		(00:15)		1.30E-06m/s			18.50m to 18.60m - AZCL.				
19.00-19.50	86	38	0		(00:15)					19.20m to 19.35 - NI. 19.35m to 19.41m - AZCL.		-10		
19.50-20.00	54	38	0		(00:15)					19.62m to 19.67m - NI. 19.67m to 19.90m - AZCL.				

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored + Rotary open hole	**Beretta T44**	**ND**	**NFowler**	**MDolby**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 309R**

Contract Ref:	Start: **28.10.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **02.11.09**	**9.45**	**E:235816.10 N:393410.50**	**12** of **23**

Mechanical Log													
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Legend
										strata continues from previous page				
	54	38	0		(00:15)								(5.55)	
20.00-20.50										20.05m to 20.10m - NI.				
										20.10m to 20.20m - AZCL.				
	80	54	0		(00:15)									
										20.40m to 20.50m - NI.		-11		
20.50-21.00														
										20.59m to 20.95m - NI.				
	90	18	0		(00:15)		1.30E-06m/s							
										20.95m to 21.14m - AZCL.				
21.00-21.50														
	72	26	0		(00:15)					21.27m to 21.50m - NI.				
												-12		
21.50-22.00														
	100	40	0		(00:15)									

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	**Rotary Cored + Rotary open hole**	Plant Used:	**Beretta T44**	Drilled By:	**ND**	Logged By:	**NFowler**	Checked By:	**MDolby**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 309R**

Contract Ref:	Start: **28.10.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **02.11.09**	**9.45**	**E:235816.10 N:393410.50**	**13** of **23**

Depth	Mechanical Log: TCR (%)	SCR (%)	RQD (%)	If (mm)	Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Legend
22.00-22.50	100	40	0		(00:15)					*strata continues from previous page* 21.63m to 21.80m - NI.				
22.50-24.00	100	14	0		(00:15)		1.30E-06m/s			22.10m to 22.26m - NI. 22.35m to 22.70m - NI.		-13		
23.00-28.00	92	66	18		(00:45)		4.33E-07m/s			Very strong locally extremely strong greenish grey fine to medium grained PSAMMITE with 40-60 degree, upto 50mm, extremely to very closely spaced lenticular locally ptygmatic calcite locally quartz veins and inclusions. Discontinuities:- Set 1:- 10-20 degree medium to closely spaced, planar, rough, incipient with brown to dark brown staining, clean. Many drilling induced. Set 2:- 60-80 degree medium spaced, planar, rough, incipient to very tight with dark brown staining, clean. Many drilling induced. Set 3:- (below 23.50m) 40-50 degree medium spaced, planar, rough, incipient to very tight dark		-13.25	22.70	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored + Rotary open hole	**Beretta T44**	**ND**	**NFowler**	**MDolby**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 309R**

Contract Ref:	Start: **28.10.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **02.11.09**	**9.45**	**E:235816.10 N:393410.50**	**14** of **23**

Mechanical Log													
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Legend
	92	66	18		(00:45)					brown stained, clean. Many drilling induced. (The New Harbour Group) 23.30m to 23.37m - NI. 23.45m to 23.50m - NI.		-14	(2.00)	
24.00-24.50	84	52	0		(00:20)		4.33E-07m/s			23.88m to 24.00m - AZCL. 24.07m to 24.24m band of strong very narrow foliated greyish green PHYLLITE predominantly - NI. 24.42m to 24.59m - AZCL.		-15		
24.50-26.00	94	89	0		(00:30)					Strong very narrowly foliated greyish green PHYLLITE with 50-85 degree, upto 2mm, medium spaced lenticular calcite inclusions. Discontinuities:- Set 1:- 10-30 degree medium to medium spaced, planar, smooth, incipient dark brown non penetrative staining, clean. Many drilling induced. Set 2:- 70-80 degree medium spaced, planar, rough, incipient to very tight dark brown non penetrative staining, clean. Many		-15.25	24.70	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	**Rotary Cored + Rotary open hole**	Plant Used:	**Beretta T44**	Drilled By:	**ND**	Logged By:	**NFowler**	Checked By:	**MDolby**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 309R**

Contract Ref:	Start: **28.10.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **02.11.09**	**9.45**	**E:235816.10 N:393410.50**	**15** of **23**

Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Legend
										drilling induced. (The New Harbour Group)				
										25.40m very narrow to narrow purplish green bands.		-16	(1.45)	
	94	89	0		(00:30)									
26.00-27.50							4.33E-07m/s					-16.70	26.15	
										Strong to very strong very narrowly foliated (poorly developed), greyish green fine to medium grained PSAMMITE with 40-80 degree, upto 5mm, extremely closely spaced lenticular locally ptygmatic calcite inclusions. Discontinuities:- Set 1:- 20-40 degrees very closely to closely, planar, smooth, rough, incipient to very tight dark brown staining, clean with occasional clay infill. (The New Harbour Group)		-17		
	98	84	31		(00:30)									

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored + Rotary open hole	**Beretta T44**	**ND**	**NFowler**	**MDolby**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 309R**

Contract Ref:	Start: **28.10.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **02.11.09**	**9.45**	**E:235816.10 N:393410.50**	**16** of **23**

Depth	Mechanical Log: TCR (%)	SCR (%)	RQD (%)	If (mm)	Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Legend
	98	84	31		(00:30)					Below 27.00m with strong very closely to closely spaced, narrowly foliated bands of greyish green PHYLLITE. 27.00m to 27.10m - NI.				
												-18		
27.50-29.00							4.33E-07m/s			27.50m to 27.75m - AZCL.				
										27.75m to 27.80 - NI.				
28.00-33.00														
	83	73	7		(00:30)								(3.95)	
							1.33E-06m/s					-19		

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored + Rotary open hole	**Beretta T44**	**ND**	**NFowler**	**MDolby**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 309R**

Contract Ref:	Start: **28.10.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **02.11.09**	**9.45**	**E:235816.10 N:393410.50**	**17** of **23**

Mechanical Log													
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Legend
	83	73	7		(00:30)					*strata continues from previous page*				
29.00-29.50										29.00m to 29.18m - NI.				
	100	58	0		(00:15)							-20		
29.50-31.00										29.50m to 29.65m - AZCL.				
							1.33E-06m/s							
	90	50	0		(00:40)							-20.65	30.10	
										Strong very narrowly foliated greyish green PHYLLITE with 30-50 degree, upto 4mm, extremely closely spaced, lenticular calcite with occasional quartz inclusions. Discontinuities:- Set 1:- 65-80 degree medium to medium spaced, planar, rough, incipient to very tight dark brown stained, clean. Many drilling induced. Set 2:- 10-20 degree close to medium spaced, planar, smooth, incipient dark brown stained,		-21		

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored + Rotary open hole	**Beretta T44**	**ND**	**NFowler**	**MDolby**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 309R**

Contract Ref:	Start: **28.10.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **02.11.09**	**9.45**	**E:235816.10 N:393410.50**	**18** of **23**

Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Legend
	90	50	0		(00:40)					clean. Many drilling induced. (The New Harbour Group) 30.25m to 30.40m - NI.			(1.80)	
31.00-31.50	90	26	0		(00:15)					31.15m to 31.20m - AZCL. 31.20m to 31.38m - NI.		-22		
31.50-32.00	98	32	0		(00:15)		1.33E-06m/s					-22.45	31.90	
32.00-33.00	100	84	22		(00:40)					Strong to very strong grey fine to medium grained PSAMMITE with 60-80 degree, upto 4mm, very closely to closely spaced calcite and occasional quartz inclusions. Discontinuities:- Set 1:- 10-20 degree medium to closely spaced planar, rough locally striated, incipient to very tight red stained, clean. Many drilling induced. Set 2:- 60-80 degree medium to medium spaced planar, rough, incipient to very tight red stained, clean. Many drilling induced.		-22.95	32.40	(0.50)

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored + Rotary open hole	**Beretta T44**	**ND**	**NFowler**	**MDolby**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 309R**

Contract Ref:	Start: **28.10.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **02.11.09**	**9.45**	**E:235816.10 N:393410.50**	**19** of **23**

Mechanical Log														
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Legend
										(The New Harbour Group) Strong very narrowly foliated greyish green PHYLLITE with 30-50 degree, upto 4mm, extremely closely spaced lenticular calcite with occasional quartz inclusions. Discontinuities:- Set 1:- 65-80 degree medium to medium spaced, planar, rough, incipient to very tight dark brown stained, clean. (The New Harbour Group)		-23 -23.10	(0.15) 32.55	
	100	84	22		(00:40)		1.33E-06m/s			Strong to very strong grey fine to medium grained PSAMMITE with 60-80 degree, upto 4mm, very closely to closely spaced calcite and occasional quartz inclusions. Discontinuities:- Set 1:- 10-20 degree medium to closely spaced planar, rough locally striated, incipient to very tight red stained, clean. Many drilling induced. Set 2:- 60-80 degree medium to medium spaced planar, rough, incipient to very tight red stained, clean. Many drilling induced. (The New Harbour Group) 33.20m to 33.45m - NI.				
33.00-34.50 33.00-38.00												-24		
	96	83	18		(00:50)		1.95E-07m/s						(2.30)	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored + Rotary open hole	**Beretta T44**	**ND**	**NFowler**	**MDolby**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 309R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	**28.10.09** End: **02.11.09**	**9.45**	**E:235816.10 N:393410.50**	**20** of **23**

Mechanical Log					Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)										
	96	83	18		(00:50)					*strata continues from previous page*				
34.50-36.00										34.44m to 34.50m assumed zone core loss		-25		
										34.69m to 34.74 band of strong very narrowly foliated dark green grey PHYLLITE.		-25.40	34.85	
	95	85	0		(00:50)		1.95E-07m/s			Strong thinly interbedded very narrowly foliated (poorly developed) greenish grey fine to medium grained PSAMMITE and medium strong very narrowly foliated pale green PHYLLITE with 60-80 degree, upto 3mm, extremely closely spaced, lenticular calcite veins. Discontinuities:- Set 1:- 10-20 closely spaced, planar rough, very tight brown stained, clean. Many drilling induced. Set 2:- 80-85 degree medium spaced, planar rough, very tight dark brown stained, clean. Many drilling induced. (The New Harbour Group) 35.15m to 35.25m 60 degree, upto 20mm wide calcite vein. 35.30m to 35.37m - NI.		-26	(1.91)	
										35.85m to 35.88m very thin bands of very strong greenish grey fine to medium grained psammite. *Description on next sheet*				

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored + Rotary open hole	**Beretta T44**	**ND**	**NFowler**	**MDolby**

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 309R**

Contract Ref:	Start: **28.10.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **02.11.09**	**9.45**	**E:235816.10 N:393410.50**	**21** of **23**

Mechanical Log														
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Legend
36.00-37.50	73	33	0		(00:50)		1.95E-07m/s			35.96m to 36.00m very thin bands of very strong greenish grey fine to medium grained psammite. 36.00m to 36.41m - AZCL.		-27		
												-27.31	36.76	
										Strong very narrowly foliated greyish green PHYLLITE with 50-70 degree, upto 4mm, closely to very closely spaced, lenticular calcite veins. Discontinuities:- Set 1:- 10-20 degree, planar smooth, very tight brown stained, clean. Many drilling induced. (The New Harbour Group)			(0.14)	
												-27.45	36.90	
37.50-38.60	100	64	0		(00:40)					Very strong greenish grey fine to medium grained PSAMMITE with 50-70 degree, upto 4mm, closely spaced, lenticular, calcite veins. Discontinuities:- Set 1:- 10-20 degree, closely to medium spaced, planar rough, very tight brown stained, clean. Many drilling induced. Set 2:- 80-85 degree, medium spaced, planar smooth to rough, very tight dark brown stained, clean. Many drilling induced. (The New Harbour Group) 36.98m to 37.18m - NI. 37.2m to 37.3m bands of strong very narrowly foliated green grey phyllite.		-28	(1.50)	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	**Rotary Cored + Rotary open hole**	Plant Used:	**Beretta T44**	Drilled By:	**ND**	Logged By:	**NFowler**	Checked By:	**MDolby**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 309R**

Contract Ref:	Start: **28.10.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **02.11.09**	**9.45**	**E:235816.10 N:393410.50**	**22** of **23**

Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Legend
							1.95E-07m/s			37.8m to 37.90m bands of strong very narrowly foliated green grey phyllite. 37.96m to 38.15m 80 degree, upto 25mm, boulinaged calcite vein. 38.10m to 38.20m bands of strong very narrowly foliated green grey phyllite. 38.15m to 38.26m - NI.				
	100	64	0		(00:40)							-28.95	38.40	
38.60-40.00										Strong to very strong very narrowly foliated greenish grey PHYLLITE. Discontinuities:- Set 1:- 10-20 degree, closely to medium spaced, planar rough, very tight brown stained, clean. Many drilling induced. (The New Harbour Group) 38.60m to 38.75m bands of very strong green grey fine to medium grained psammite.		-29		
	85	23	0		(00:50)					39.09m to 39.30m - AZCL.			(1.60)	
										39.30m to 39.45m bands of very strong green grey fine to medium grained psammite.		-30		

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored + Rotary open hole	**Beretta T44**	**ND**	**NFowler**	**MDolby**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 309R**

Contract Ref:	Start: **28.10.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **02.11.09**	**9.45**	**E:235816.10 N:393410.50**	**23** of **23**

Mechanical Log														
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Legend
	85	23	0		(00:50)					*strata continues from previous page*		-30.55	40.00	
										Borehole terminated at 40.00m depth.		-31		

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored + Rotary open hole	**Beretta T44**	**ND**	**NFowler**	**MDolby**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 310R**

Contract Ref:	Start: **01.12.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **10.12.09**	**11.98**	**E:236096.60 N:393333.70**	**1** of **23**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Legend
										Dark brown TOPSOIL with rare to occasional medium to coarse grained gravel of phyllite and dolerite.			(0.45)	
									1	Firm locally stiff orangish brown sandy slightly gravelly CLAY. Gravel is angular to subrounded fine to coarse of phyllite, psammite, sandstone and chert. (Glacial Deposits)		11.53 11	0.45 (0.85)	
										Boulder clay brown (Foreman's description). (Glacial Deposits)		10.68	1.30	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
01/12/09	13:00	5.50	2.00	121	2.00
01/12/09	17:00	5.50	5.50	121	0.51
02/12/09	08:00	5.50	5.50	121	4.39
02/12/09	17:00	16.00	5.50	121	5.85
03/12/09	08:00	16.00	5.50	121	0.31
03/12/09	17:00	19.00	5.50	121	0.39
04/12/09	08:00	19.00	5.50	121	0.30
04/12/09	17:00	23.00	5.50	121	1.50

General Remarks

1. Machine dug inspection pit to 1.30m depth. (see log IP310)
2. Rotary open hole drilling from ground level to 5.50m using symetrix system.
3. Rotary core drilling from 5.50m to 40.00m using PWF core barrel, impregnated bits and air/mist flush.
4. Water encountered at 2.00m on 01/12/2009, standing level 0.51m.
5. 50mm diameter HDPE water monitoring well installed on completion.

All dimensions in metres | Scale: **1:10**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored + Rotary open hole	**Comacchio MC300**	**JS**	**NFowler**	**MDolby**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 310R**

Contract Ref:	Start: **01.12.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **10.12.09**	**11.98**	**E:236096.60 N:393333.70**	**2** of **23**

Mechanical Log					Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)										
									1	*(strata continues from previous page)*		10	(2.20)	
												9		
										Boulder clay grey (Foreman's description).		8.48	3.50	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
07/12/09	08:00	23.00	5.50	121	0.30
07/12/09	17:00	26.50	5.50	121	1.80
08/12/09	08:00	26.50	5.50	121	0.30
08/12/09	17:00	32.00	5.50	121	1.85
09/12/09	08:00	32.00	5.50	121	0.30
09/12/09	17:00	38.00	5.50	121	1.60
10/12/09	08:00	38.00	5.50	121	0.30
10/12/09	17:00	40.00	5.50	121	1.00

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored + Rotary open hole	**Comacchio MC300**	**JS**	**NFowler**	**MDolby**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 310R**

Contract Ref:	Start: **01.12.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **10.12.09**	**11.98**	**E:236096.60 N:393333.70**	**3** of **23**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Legend
										(strata continues from previous page)		8	(1.30)	
												7.18	4.80	
5.00-10.00							7.96E-06m/s			Siltstone grey (Foreman's description).		7	(0.70)	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored + Rotary open hole	**Comacchio MC300**	**JS**	**NFowler**	**MDolby**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 310R**

Contract Ref:	Start: **01.12.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **10.12.09**	**11.98**	**E:236096.60 N:393333.70**	**4** of **23**

Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Legend
										(strata continues from previous page)		6.48	5.50	
5.50-6.50	52	0	0	NI NI 40	(00:15)		7.96E-06m/s			Medium strong to strong very narrowly foliated light green/cream PHYLLITE with narrow laminations and very thin interbeds of green fine to medium grained PSAMMITE. Recovered as angular to subangular fine to medium gravel size fragments. (The New Harbour Group) 5.50-6.00m - AZCL. 6.00-6.50m recovered as predominantly NI.		6	(1.65)	
6.50-7.50	77	50	21	NI 100 600	(00:15)						1[i] 2[i] 3[i]	5		
										6.92m to 7.15m - AZCL.		4.83	7.15	
										Description on next sheet				

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored + Rotary open hole	**Comacchio MC300**	**JS**	**NFowler**	**MDolby**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 310R**

Contract Ref:	Start: **01.12.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **10.12.09**	**11.98**	**E:236096.60 N:393333.70**	**5** of **23**

Mechanical Log														
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Legend
7.50-9.00	77 60	50 37	21 13	NI 100 600	(00:15) (00:19)		7.96E-06m/s			Strong green and light brown very narrowly foliated (30-50 degree) PHYLLITE with extremely closely to very closely spaced, narrow, lenticular bluish green/green fine grained psammite fabric. Discontinuities:- Set 1:- Subhorizontal, closely spaced, planar and undulating, smooth, partly open dark brown stained. (The New Harbour Group) 8.40m to 9.00m - AZCL.	4[i] 5[i] 6[i]	4 3	(2.33)	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored + Rotary open hole	**Comacchio MC300**	**JS**	**NFowler**	**MDolby**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 310R**

Contract Ref:	Start: **01.12.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **10.12.09**	**11.98**	**E:236096.60 N:393333.70**	**6** of **23**

Depth	Mechanical Log: TCR (%)	SCR (%)	RQD (%)	If (mm)	Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Legend
9.00-10.00										*(strata continues from previous page)* 9.00m to 9.48m foliation 15 to 20 degrees.		2.50	9.48	
	75	52	0	NI 100 600	(00:13)		7.96E-06m/s			Strong very thinly interlaminated bluish grey green fine to medium grained PSAMMITE and very narrowly foliated (20 degree) green light brown PHYLLITE. (The New Harbour Group) 9.75m to 10.00m - AZCL.		2		
10.00-11.00 10.00-15.00	75	33	0		(00:08)		5.00E-06m/s			Below 10.00m Discontinuities:- Set 1:- 30-60 degree, planar and undulating, smooth and rough orange brown stained, clean. 10.72m to 11.00m - AZCL.	7[i] 8[i]		(1.97)	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored + Rotary open hole	**Comacchio MC300**	**JS**	**NFowler**	**MDolby**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 310R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	**01.12.09** End: **10.12.09**	**11.98**	**E:236096.60 N:393333.70**	**7** of **23**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Legend
	75	33	0		(00:08)					*(strata continues from previous page)*				
11.00-12.00										11.00m to 11.45m some narrow lenticular phyllite bands.		1		
												0.53	11.45	
	65	20	10	NI 100 600	(00:14)		5.00E-06m/s			Strong light brown and green very narrowly foliated (25 degree) PHYLLITE with extremely closely spaced, narrow to very narrow, lenticular, blue green psammite fabric. (The New Harbour Group) 11.65m to 12.00m - AZCL.			(0.80)	
12.00-13.00										Below 12.00m occasional thin laminations of phyllite.		0		
												-0.27	12.25	
	100	85	60		(00:19)					Strong to very strong grey and blue green narrowly foliated (poorly developed 20 degree) PHYLLITE. Discontinuities:- Set 1:- 1 no. 20 degree, undulating smooth, open orange brown stained, clean. Set 2:- 1 no 80 degree, stepped rough, tight dark brown stained, clean.	9[i]			

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored + Rotary open hole	**Comacchio MC300**	**JS**	**NFowler**	**MDolby**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 310R**

Contract Ref:	Start: **01.12.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **10.12.09**	**11.98**	**E:236096.60 N:393333.70**	**8** of **23**

Depth	Mechanical Log: TCR (%)	SCR (%)	RQD (%)	If (mm)	Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Legend
	100	85	60		(00:19)					(The New Harbour Group) *(strata continues from previous page)*	10[i]	-1		
13.00-14.00	73	44	0	NI 100 600	(00:15)		5.00E-06m/s			13.73m to 14.00m - AZCL.		-2.02	(1.75)	
14.00-15.00	63	49	25		(00:13)					Strong bluish green and purple very narrowly foliated (30-40 degree) PHYLLITE with very closely spaced, very narrow, lenticular green blue psammite fabric. Discontinuities:- Set 1:- 30-60 degree, closely spaced, planar and undulating smooth, open tight orange brown stained. (The New Harbour Group)	11[i] 12[i] 13[i]	-2	14.00	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored + Rotary open hole	**Comacchio MC300**	**JS**	**NFowler**	**MDolby**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 310R**

Contract Ref:	Start: **01.12.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **10.12.09**	**11.98**	**E:236096.60 N:393333.70**	**9** of **23**

Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Legend
										(strata continues from previous page)				
											14[i]			
										14.63m to 15.00m - AZCL.				
	63	49	25		(00:13)		5.00E-06m/s							
15.00-16.00 15.00-20.00												-3	(2.00)	
											15[i]			
											16[i]			
				NI 100 600							17[i]			
	85	35	18		(00:13)		6.84E-06m/s							
											18[i]			
										15.85m to 16.00m - AZCL.				
												-4.02	16.00	
16.00-17.00										Strong to very strong interlaminated bluish green fine grained PSAMMITE and narrowly foliated (20 degree) brown green and blue PHYLLITE. Discontinuities:-				
	97	80	75		(00:19)									

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored + Rotary open hole	**Comacchio MC300**	**JS**	**NFowler**	**MDolby**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 310R**

Contract Ref:	Start: **01.12.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **10.12.09**	**11.98**	**E:236096.60 N:393333.70**	**10** of **23**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Legend
17.00-18.00	97	80	75	NI 100 600	(00:19)		6.84E-06m/s			Set 1:- 20-40 degree, undulating/curved, closely spaced smooth, tight, dark brown stained, clean. (The New Harbour Group)	19[i] 20[i] 21[i] 22[i] 23[i]	-5	(1.57)	
	80	70	70		(00:18)					Strong to very strong bluish green fine to medium grained PSAMMITE with extremely closely spaced, very narrow, lenticular, narrowly foliated purple phyllite fabric. (The New Harbour Group) 17.80m to 18.00m - AZCL.		-5.59 -6.02-6	17.57 (0.43) 18.00	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored + Rotary open hole	**Comacchio MC300**	**JS**	**NFowler**	**MDolby**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 310R**

Contract Ref:	Start: **01.12.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **10.12.09**	**11.98**	**E:236096.60 N:393333.70**	**11** of **23**

Mechanical Log														
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Legend
18.00-19.00	96	80	75	NI 100 600	(00:20)		6.84E-06m/s			Strong bluish green brown very narrowly foliated (poorly developed 30-40 degree) PHYLLITE with closely spaced locally extremely closely spaced, very narrow, lenticular to irregular, greenish blue psammite fabric. Discontinuities:- Set 1:-20-40 degree, closely spaced, undulating smooth, tight orange brown stained, clean. (The New Harbour Group)	24[i] 25[i] 26[i] 27[i]	-6.68	(0.66)	
19.00-20.00	65	40	40		(00:20)					Strong to very strong thinly laminated to thinly bedded bluish grey fine to coarse PSAMMITE and very narrowly foliated (30-40 degree) purple PHYLLITE. Discontinuities:- Set 1: (Below 20.00m) 30-70 degree, closely to medium spaced, planar and undulating, smooth and rough, tight, clean. (The New Harbour Group) Below 19.10m randomly oriented, upto 2mm, quartz veins. 19.65m to 20.00m - AZCL.	28[i] 29[i] 30[i]	-7	18.66	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	**Rotary Cored + Rotary open hole**	Plant Used:	**Comacchio MC300**	Drilled By:	**JS**	Logged By:	**NFowler**	Checked By:	**MDolby**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 310R**

Contract Ref:	Start: **01.12.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **10.12.09**	**11.98**	**E:236096.60 N:393333.70**	**12** of **23**

Mechanical Log														
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Legend
	65	40	40		(00:20)		6.84E-06m/s			*(strata continues from previous page)*				
20.00-21.00 20.00-25.00	78	67	48	NI 100 600	(00:19)		4.48E-06m/s			20.78m to 21.00m - AZCL.	31[i] 32[i]	-8	(3.34)	
21.00-22.00	76	10	0		(00:26)					21.00m to 21.76m - NI.		-9		

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored + Rotary open hole	**Comacchio MC300**	**JS**	**NFowler**	**MDolby**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 310R**

Contract Ref:	Start: **01.12.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **10.12.09**	**11.98**	**E:236096.60 N:393333.70**	**13** of **23**

Mechanical Log														
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Legend
	76	10	0		(00:26)					*(strata continues from previous page)* 21.76m to 22.00m - AZCL.		-10.02	22.00	
22.00-23.00	90	16	0	NI 100 600	(00:25)		4.48E-06m/s			Strong bluish green and orange brown very narrowly foliated (30 degree) PHYLLITE with occasional narrow laminations of green blue fine grained psammite. (The New Harbour Group)		-10.36	(0.34) 22.34	
										Strong to very strong green blue fine to medium grained PSAMMITE with closely to extremely closely spaced, very narrow, lenticular light brown and orange phyllite fabric and occasional mineral dissolution voids present below 22.65m. (The New Harbour Group)	33[i]			
23.00-24.00	30	8	0		(01:45)					23.30m to 24.00m - AZCL.		-11		

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	**Rotary Cored + Rotary open hole**	Plant Used:	**Comacchio MC300**	Drilled By:	**JS**	Logged By:	**NFowler**	Checked By:	**MDolby**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 310R**

Contract Ref:	Start: **01.12.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **10.12.09**	**11.98**	**E:236096.60 N:393333.70**	**14** of **23**

Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Legend
	30	8	0		(01:45)					*(strata continues from previous page)*			(2.16)	
24.00-24.50	38	14	0	NI 100 600	(00:45)		4.48E-06m/s			24.00m to 24.19m - NI. 24.19m to 24.50m - AZCL.		-12		
24.50-25.50	80	57	45		(01:10)					Strong to very strong greyish green fine to medium grained PSAMMITE with frequent mineral dissolution voids. Discontinuities:- Set 1:- 50-60 degree, closely to medium spaced, planar to undulating, rough, tight orange brown stained, clean. (The New Harbour Group)	34[i] 35[i]	-12.52	24.50	
25.00-30.00							3.76E-06m/s				36[i]	-13		

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored + Rotary open hole	**Comacchio MC300**	**JS**	**NFowler**	**MDolby**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 310R**

Contract Ref:	Start: **01.12.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **10.12.09**	**11.98**	**E:236096.60 N:393333.70**	**15** of **23**

Mechanical Log														
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Legend
										(strata continues from previous page)	37[i] 38[i]			
	80	57	45		(01:10)					25.30m to 25.50m - AZCL.				
25.50-26.50										25.58m to 25.78m quartz veining and inclusions upto 40mm. 25.60m to 25.85m - NI.				
	62	17	0	NI 100 600	(01:00)		3.76E-06m/s			Below 26.00m extremely closely spaced, very narrow, laminations of green brown phyllite.	39[i]	-14	(3.00)	
26.50-27.50										26.50m to 26.98 - NI.				
	48	0	0		(00:40)							-15		

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	**Rotary Cored + Rotary open hole**	Plant Used:	**Comacchio MC300**	Drilled By:	**JS**	Logged By:	**NFowler**	Checked By:	**MDolby**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 310R**

Contract Ref:	Start: **01.12.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **10.12.09**	**11.98**	**E:236096.60 N:393333.70**	**16** of **23**

Mechanical Log														
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Legend
	48	0	0		(00:40)					26.98m to 27.50m - AZCL. *(strata continues from previous page)*				
												-15.52	27.50	
27.50-28.50	63	35	35	NI 100 600	(00:42)		3.76E-06m/s			Strong to very strong greyish green narrowly to very narrowly foliated (20-30 degree) PHYLLITE with very closely spaced, narrow, lenticular bluish green fine to medium grained psammite fabric. (The New Harbour Group) 27.50m to 27.80m - NI.				
												-16	(1.17)	
										28.13m to 28.50m - AZCL. 28.58m 50 degree, upto 15mm, quartz vein.	40[i]			
28.50-29.50	98	95	95	15 250 900	(01:00)							-16.69	28.67	
										Strong bluish grey fine to medium grained PSAMMITE with extremely closely spaced, narrow, lenticular, very narrowly foliated				

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	**Rotary Cored + Rotary open hole**	Plant Used:	**Comacchio MC300**	Drilled By:	**JS**	Logged By:	**NFowler**	Checked By:	**MDolby**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 310R**

Contract Ref:	Start: **01.12.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **10.12.09**	**11.98**	**E:236096.60 N:393333.70**	**17** of **23**

Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Legend
										(35-40 degree) green brown phyllite fabric and randomly oriented, upto 20mm, closely spaced, undulating, curved, quartz veins. (The New Harbour Group)		-17	(0.51)	
	98	95	95		(01:00)						41[i]	-17.20	29.18	
29.50-30.50				15 250 900			3.76E-06m/s			Strong to very strong very narrowly foliated (30 degree) purplish brown and greenish brown PHYLLITE with extremely closely spaced, very narrow to narrow, lenticular, bluish grey fine to medium grained psammite and randomly oriented, upto 5mm, extremely closely spaced, curved and planar, calcite veins. Discontinuities:- Set 1:- 10-35 degree, medium spaced planar and undulating, tight, orange brown stained, clean. (The New Harbour Group)				
30.00-35.00	100	90	90		(01:00)					29.97m to 30.11m strong blue grey fine to medium grained psammite band.		-18	(1.53)	
							1.21E-06m/s				42[i]			
30.50-32.00	93	87	83		(01:20)						43[i]			

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored + Rotary open hole	**Comacchio MC300**	**JS**	**NFowler**	**MDolby**

STRUCTURAL_SOILS_GINT_LIBRARY.GLBIXCUSTOM - WYLFA - DETAIL LOG | 761404 WYLFA LOGS ONLY.GPJ - v8_02 | 20/05/10 - 15:26.◆ = datamarker used throughout reporting for current exploratory position.
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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 310R**

Contract Ref:	Start: **01.12.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **10.12.09**	**11.98**	**E:236096.60 N:393333.70**	**18** of **23**

Mechanical Log														
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Legend
										(strata continues from previous page)		-18.73	30.71	
										Strong very strong bluish grey fine to medium grained PSAMMITE with extremely closely to very closely spaced, very narrow to narrow, lenticular, locally thinly laminated, purple brown and green blue, very narrowly foliated (30 degree) phyllite fabric and randomly oriented, upto 4mm, extremely closely spaced, planar, calcite veins. (The New Harbour Group)	44[i]	-19		
	93	87	83	15 250 900	(01:20)		1.21E-06m/s						(1.64)	
										31.90m to 32.00m - AZCL.		-20		
32.00-33.50	91	87	87		(01:10)									
										Description on next sheet		-20.37	32.35	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored + Rotary open hole	**Comacchio MC300**	**JS**	**NFowler**	**MDolby**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 310R**

Contract Ref:	Start: **01.12.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **10.12.09**	**11.98**	**E:236096.60 N:393333.70**	**19** of **23**

Depth	Mechanical Log: TCR (%)	SCR (%)	RQD (%)	If (mm)	Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Legend
33.50-35.00	91	87	87	15 250 900	(01:10)		1.21E-06m/s			Strong greyish blue and light purple brown very narrowly foliated (30 degree) PHYLLITE with extremely closely spaced, very narrow to narrow, lenticular, greyish blue, fine to medium grained psammite fabric and randomly oriented, upto 3mm, extremely closely spaced, planar, curved calcite veins. Discontinuities:- Set 1:- 15-30 degree, medium spaced, planar and undulating, smooth, tight, clean. (The New Harbour Group) 33.37m to 33.50m - AZCL.	45[i] 46[i]	-21	(1.45)	
	93	93	93		(01:10)					Very strong bluish grey fine to medium grained PSAMMITE with closely, locally extremely closely spaced, narrow, lenticular, very narrowly foliated (30 degree) phyllite fabric and randomly oriented, upto 5mm, extremely closely spaced, planar, calcite inclusions and veins. (The New Harbour Group)		-21.82 -22	33.80 (0.77)	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored + Rotary open hole	**Comacchio MC300**	**JS**	**NFowler**	**MDolby**

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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 310R**

Contract Ref:	Start: **01.12.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **10.12.09**	**11.98**	**E:236096.60 N:393333.70**	**20** of **23**

Mechanical Log														
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Legend
										(strata continues from previous page)		-22.59	34.57	
	93	93	93		(01:10)		1.21E-06m/s			Strong to very strong greyish blue and greenish grey very narrowly foliated (30-40 degree) PHYLLITE with closely locally extremely closely spaced, very narrow, lenticular, locally irregular fine to medium grained psammite fabric and randomly oriented, upto 2mm, very closely spaced, planar and undulating, calcite veins. Discontinuities:- Set 1:- 60-70 degree, medium spaced planar and undulating, tight, orange brown stained, clean. (The New Harbour Group)				
35.00-36.50				15 250 900							47[i] 48[i] 49[i] 50[i] 51[i]	-23		
	100	93	87		(01:10)							-24		

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	**Rotary Cored + Rotary open hole**	Plant Used:	**Comacchio MC300**	Drilled By:	**JS**	Logged By:	**NFowler**	Checked By:	**MDolby**

STRUCTURAL_SOILS_GINT_LIBRARY.GLBIXCUSTOM - WYLFA - DETAIL LOG | 761404 WYLFA LOGS ONLY.GPJ - v8_02 | 20/05/10 - 15:26.◆ = datamarker used throughout reporting for current exploratory position.
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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 310R**

Contract Ref:	Start: **01.12.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **10.12.09**	**11.98**	**E:236096.60 N:393333.70**	**21** of **23**

Mechanical Log														
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Legend
36.50-38.00	100	93	87	15 250 900	(01:10)					Below 36.05m phyllite becoming purple brown, psammite becoming bluish grey. *(strata continues from previous page)*		-25	(5.43)	
	100	80	67		(01:10)									

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored + Rotary open hole	**Comacchio MC300**	**JS**	**NFowler**	**MDolby**

STRUCTURAL_SOILS_GINT_LIBRARY.GLBIXCUSTOM - WYLFA - DETAIL LOG | 761404 WYLFA LOGS ONLY.GPJ - v8_02 | 20/05/10 - 15:26.◆ = datamarker used throughout reporting for current exploratory position.
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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 310R**

Contract Ref:	Start: **01.12.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **10.12.09**	**11.98**	**E:236096.60 N:393333.70**	**22** of **23**

Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Legend
										(strata continues from previous page)	52[i]			
38.00-39.50	100	80	67		(01:10)							-26		
	100	100	100	15 250 900	(01:10)						53[i]	-27		
39.50-40.00	100	70	70		(00:30)									

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary Cored + Rotary open hole	**Comacchio MC300**	**JS**	**NFowler**	**MDolby**

STRUCTURAL_SOILS_GINT_LIBRARY.GLBIXCUSTOM - WYLFA - DETAIL LOG | 761404 WYLFA LOGS ONLY.GPJ - v8_02 | 20/05/10 - 15:26.◆ = datamarker used throughout reporting for current exploratory position.
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STRUCTURAL SOILS

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa B Power Station	**RWEnpower**	**BH 310R**

Contract Ref:	Start: **01.12.09**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
761404	End: **10.12.09**	**11.98**	**E:236096.60 N:393333.70**	**23** of **23**

Mechanical Log														
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Drill Time (hh:mm)	Sampling	Packer Testing	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Legend
	100	70	70	15 250 900	(00:30)					*(strata continues from previous page)*		-28.02	40.00	
										Borehole terminated at 40.00m.				

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

All dimensions in metres | Scale: **1:10**

Method Used:	**Rotary Cored + Rotary open hole**	Plant Used:	**Comacchio MC300**	Drilled By:	**JS**	Logged By:	**NFowler**	Checked By:	**MDolby**

STRUCTURAL_SOILS_GINT_LIBRARY.GLBIXCUSTOM - WYLFA - DETAIL LOG | 761404 WYLFA LOGS ONLY.GPJ - v8_02 | 20/05/10 - 15:26.◆ = datamarker used throughout reporting for current exploratory position.
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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00003

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH524

Contract Ref:	Start: 14.03.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 15.03.11	9.633	E:235620.0 N:393778.2	1 of 1

Samples and In-situ Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
						MADE GROUND: Dense light brown clayey GRAVEL. Gravel is subrounded to subangular fine to coarse chert and possible limestone. (MADE GROUND)	9.533	0.10	
							9.333	0.30	
0.50	1	ES				MADE GROUND: Light grey/green clayey GRAVEL. Gravel is fine to coarse subangular grey limestone. Possible sub-base. (MADE GROUND)		(0.90)	
0.60	1	D							
1.00	2	D					8.433	1.20	
1.40	3	D				MADE GROUND: Brown gravelly CLAY. Gravel is fine to coarse subangular to angular orange chert. With orange and black staining. Occasional boulders. (MADE GROUND) . . . below 0.50m depth becoming less gravelly and rare boulders.		(1.10)	
1.50-1.95	4	SPT	N=20						
1.50	4	D							
1.50-1.95	5	B							
						Soft becoming firm dark brown sandy slightly gravelly CLAY. Gravel is fine to coarse angular to subangular phyllite and occasional subrounded medium chert. (Unit B1)	7.333	2.30	
2.40	6	D							
2.50-2.95	7	U							
2.75-3.05	8	D				Firm grey fine sandy CLAY. (Unit B1)			
3.40	9	D							
3.50-3.95	10	SPT	N=16						
3.50	10	D							
3.50-3.95	11	B		1				(4.20)	
4.40	12	D							
4.50-4.95	13	U							
5.00	1	W							
5.30		EW							
5.90	14	D							
6.00-6.45	15	SPT	N=5			. . . at 6.00m depth becoming soft.			
6.00	15	D							
6.00-6.45	16	B		1			3.133	6.50	
						Very stiff to hard grey fine sandy CLAY. Occasional gravel of dark grey/green subangular to angular fine to medium psammite. (Unit B1)	2.833	6.80	
6.70	17	D							
6.80-7.13	18	SPT	N=83*					(0.55)	
6.80	18	D				Strong grey/green thinly laminated moderately weathered fine grained PSAMMITE with red/purple staining on fracture surfaces. (Psammite)			
6.80-7.13	19	B							
7.20	20	D					2.283	7.35	
7.20-7.35	21	SPT	N=158*						
7.20	21	D				Cable percussion borehole terminated at 7.35m depth due to refusal.			

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
15/03/11		4.50	-	150	4.50
15/03/11		6.50	6.50	150	6.50

Chiselling		
From	To	Duration (hh:mm)
7.00	7.20	01:00

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. Water strike at 6.50m depth.
3. 50mm standpipe installed to 6.50m depth. Sunken stopcock cover used as borehole within car park open to the public.
4. Hammer Serial No: 2011-H2

All dimensions in metres | Scale: 1:50

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Cable percussion	Dando 2000	RW	GSherwood	SAT

GINT_LIBRARY_V8_04.GLB|CABLE PERCUSSION LOG | 725061_WYLFA.GPJ - v8_04 | 25/11/11 - 14:00 | KJ ● = datamarker used throughout reporting for current exploratory position.
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STANDARD PENETRATION TEST SUMMARY TABLE

Exploratory Position ID	Depth (m)	Hole Dia (mm)	Casing Depth (m)	Water Depth (m)	Seating Drive		Test Drive			Hammer ID	Calibration Date	Energy Ratio (%)	N_{60}	Comments
					Blows	Pen (mm)	Blows	R (mm)	Result					
BH524	1.50		1.50		5,5	150	4,5,6,5		N=20	2011-H2	14/03/2011	65	22	
	3.50		3.00		3,3	150	4,4,4,4		N=16	2011-H2	14/03/2011	65	17	
	6.00		6.00	5.80	1,0	150	1,2,1,1		N=5	2011-H2	14/03/2011	65	5	
	6.80		6.80	4.00	10,11	150	15,21,14+	180	N=83*	2011-H2	14/03/2011	65	90	
	7.20		7.00	4.00	25	55	38,12+	95	N=158*	2011-H2	14/03/2011	65	171	

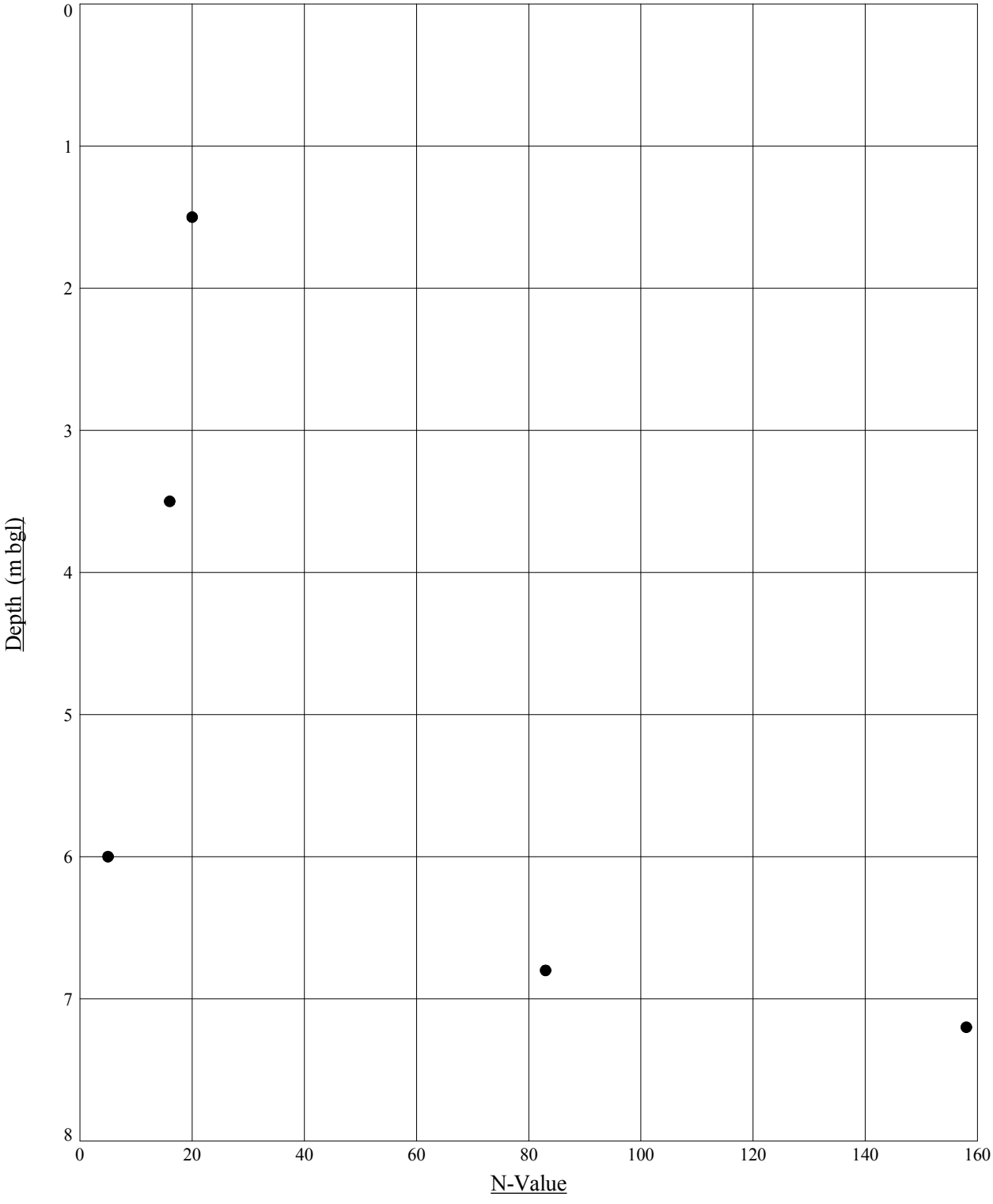
Notes:
1. Tests carried out in general accordance with BS EN ISO 22476-3:2005.
2. Reported blows are for 75mm penetration unless indicated "+".
3. Where full test drive was not achieved, actual penetration (R) and extrapolated N value (N*) reported.
4. Tests carried out using a split spoon sampler unless noted as SPT(c) (denotes use of solid cone method) in the comments column.
5. Entries in the water depth column reflects the measured water depth at time of test.

N_{60} = (Measured hammer energy ratio / 60) x N value

STRUCTURAL SOILS
The Old School
Stillhouse Lane
Bedminster
Bristol BS3 4EB

Compiled By		Date	Contract Ref:
[redacted]	**KJOHNSTONE**	**25.11.11**	**725061**
Contract: **Wylfa New Build - Intermediate Onshore Ground Investigation**			Page **1** of **1**

STANDARD PENETRATION TEST (SPT N-Value)
vs
DEPTH

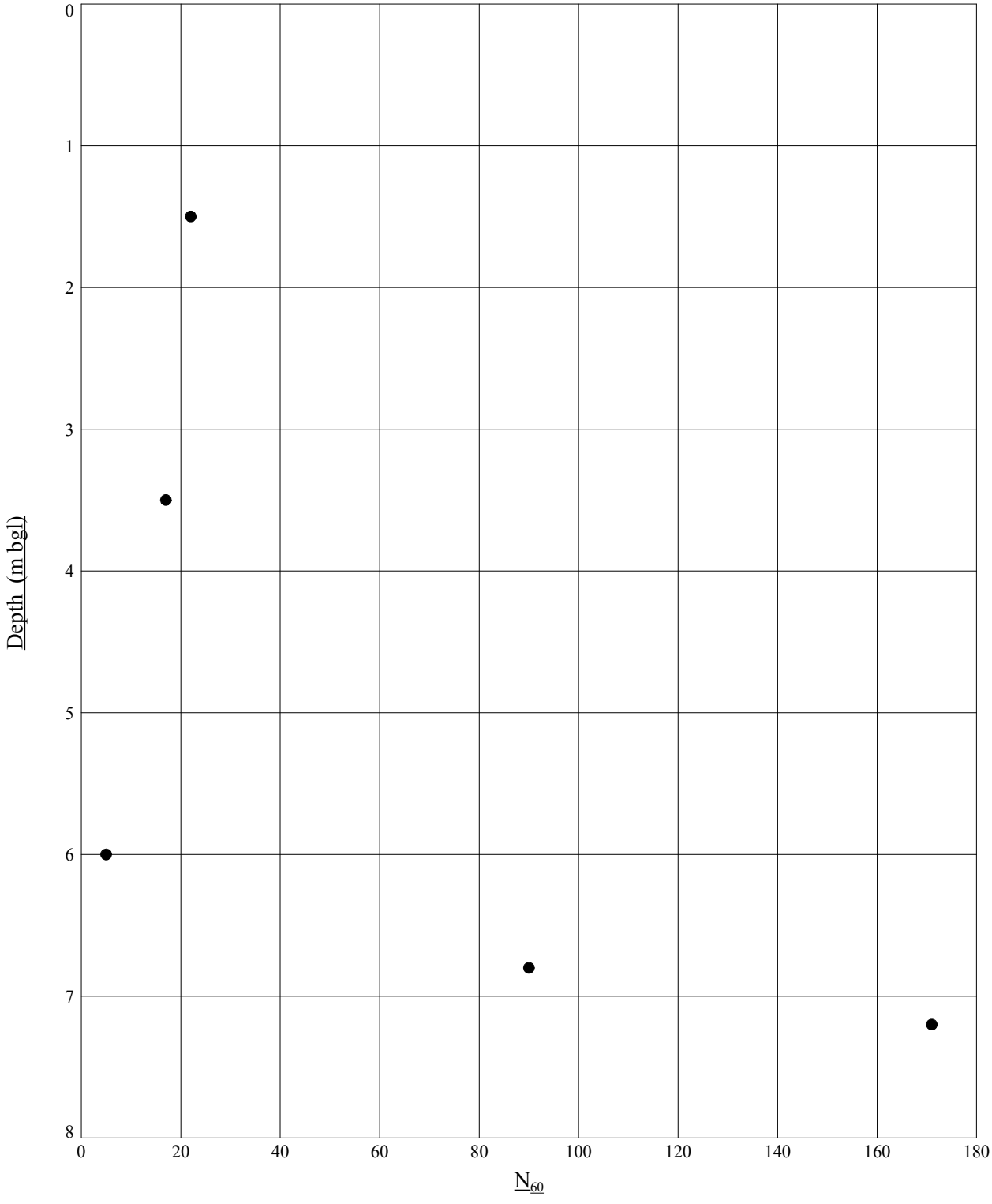


Key: ● = BH524

STRUCTURAL SOILS The Old School Stillhouse Lane Bedminster Bristol BS3 4EB	Contract **Wylfa New Build - Intermediate Onshore Ground Investigation**	Date **10.11.11**	Compiled By KJ
	Client **Horizon Nuclear Power Wylfa Limited**	Contract Ref: **725061**	AGS

GINT_LIBRARY_V8_04.GLB|G - PLOTS - SITE - GENERAL | 725061_WYLFA.GPJ - v8_04 | 10/11/11 - 08:55 | KJ.

STANDARD PENETRATION TEST (SPT N_{60})
vs
DEPTH



Key: ● = BH524

STRUCTURAL SOILS
The Old School
Stillhouse Lane
Bedminster
Bristol BS3 4EB

Contract	Date	Compiled By
Wylfa New Build - Intermediate Onshore Ground Investigation	**10.11.11**	KJ
Client: **Horizon Nuclear Power Wylfa Limited**	Contract Ref: **725061**	

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WYL-SSL-SDT-LOG-00003

testconsult
Specialist Testing Services

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

Testconsult Limited
Ruby House
40A Hardwick Grange
Warrington
Cheshire
WA1 4RF

SPT Hammer Ref:	H2
Test Date:	26/04/2010
Report Date:	28/05/2010
File Name:	SS_H2_260410.spt
Test Operator:	YV

UKAS TESTING 0955

Instrumented Rod Data

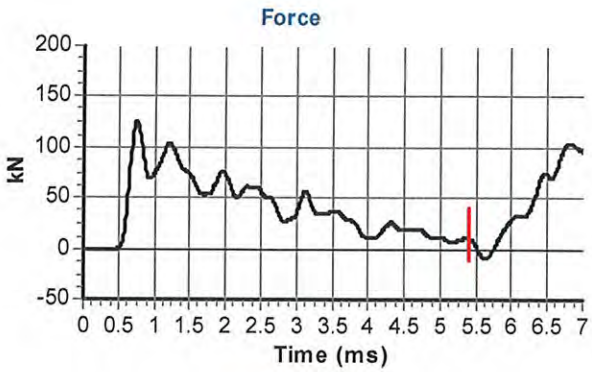
Diameter d_r (mm):	54
Wall Thickness t_r (mm):	6.6
Assumed Modulus E_a (GPa):	208
Accelerometer No.1:	5677
Accelerometer No.2:	5833

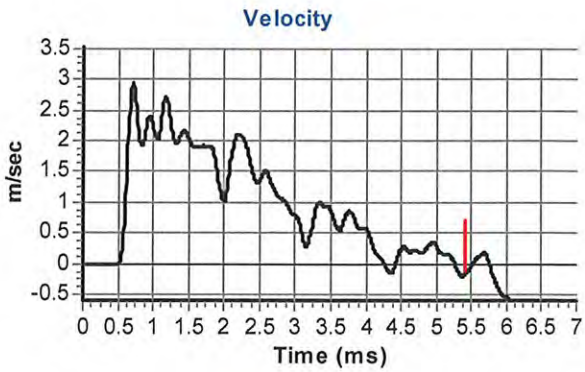
SPT Hammer Information

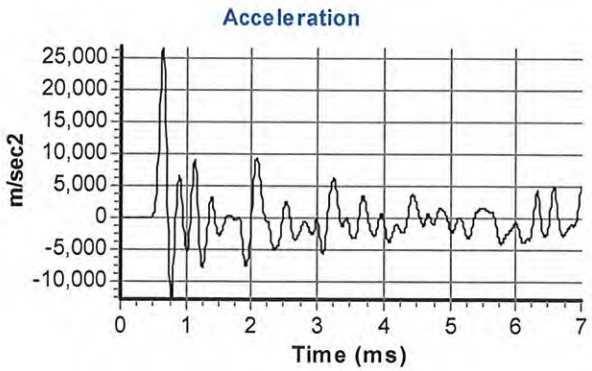
Hammer Mass m (kg):	67.5
Falling Height h (mm):	760
SPT String Length L (m):	14.0

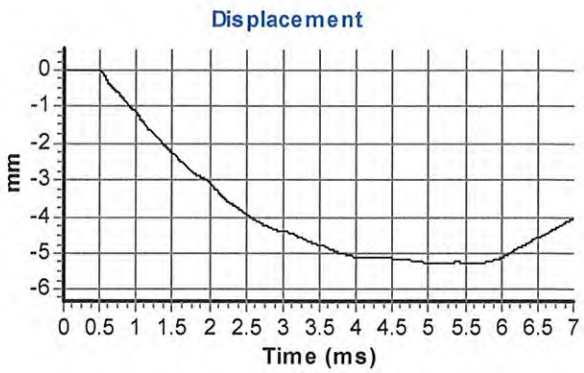
Comments / Location

Client: Structural Soils Limited
Trip Hammer
Location: Archway Engineering









Calculations

Area of Rod A (mm2):	983
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	334

Energy Ratio E_r (%): **71**

[redacted]

Signed: Huw Williams
Title: Director

TESTCONSULT LIMITED TESTING SERVICES

The recommended calibration interval is 6 months

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00003

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH524R

Contract Ref:	Start: 23.03.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 29.03.11	9.557	E:235623.8 N:393776.7	1 of 3

Depth	Mechanical Log: TCR %	SCR %	RQD %	If (mm)	Flush Returns & Details	Drill Time (hh:mm:ss)	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
0.00					Air	(00:40:00)				MADE GROUND: Dense grey sandy fine to coarse subangular to angular GRAVEL of phyllite. (Made Ground)		9.357	0.20	
										MADE GROUND: Dense sandy fine to coarse subangular to angular GRAVEL and COBBLES of brick, wood and phyllite. (Made Ground)		8.757	(0.60) 0.80	
1.00										MADE GROUND: Dense silvery grey very gravelly SAND. (Made Ground)		8.357	1.20	
2.00										Soft becoming firm dark brown sandy slightly gravelly CLAY. (Drift Deposits - Unit B1)		7.257	(1.10) 2.30	
3.00										Firm grey fine sandy CLAY. (Drift Deposits - Unit B1)			(4.50)	
4.00														
5.00														
6.00					Water									
7.00				NI 100 600						Medium strong to strong narrow to very thin bands of green grey fine grained slightly weathered to locally moderately weathered PSAMMITE with very narrow lenticular bands of very narrowly foliated green grey phyllite. (New Harbour Group - Psammite)		2.757	6.80	
				NI										
8.00				50 100 170										
				100 180 220										

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
25/03/11	08:30	10.50	6.50	121	2.83
25/03/11	12:00	15.00	6.50	121	2.52
28/03/11	12:30	15.00	6.50	121	2.87
28/03/11	17:45	19.50	6.50	121	3.23
29/03/11	08:30	19.50	6.50	121	2.86
29/03/11	17:30	25.00	6.50	121	2.31

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 19.0m depth. Sunken stopcock cover used as borehole within car park open to the public.

All dimensions in metres	Scale: 1:50	Inclination: Vertical	Azimuth: NA

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	Beretta T44	CG	JWickenden + JPhelan	GS+BNS

GINT_LIBRARY_V8_04.GLB!XCUSTOM - SSL - 725061 - SUMMARY LOG | 725061_WYLFA.GPJ - v8_04 | 17/12/11 - 21:45 | MJB
Structural Soils Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.soils.co.uk, Email:admin@soils.co.uk.

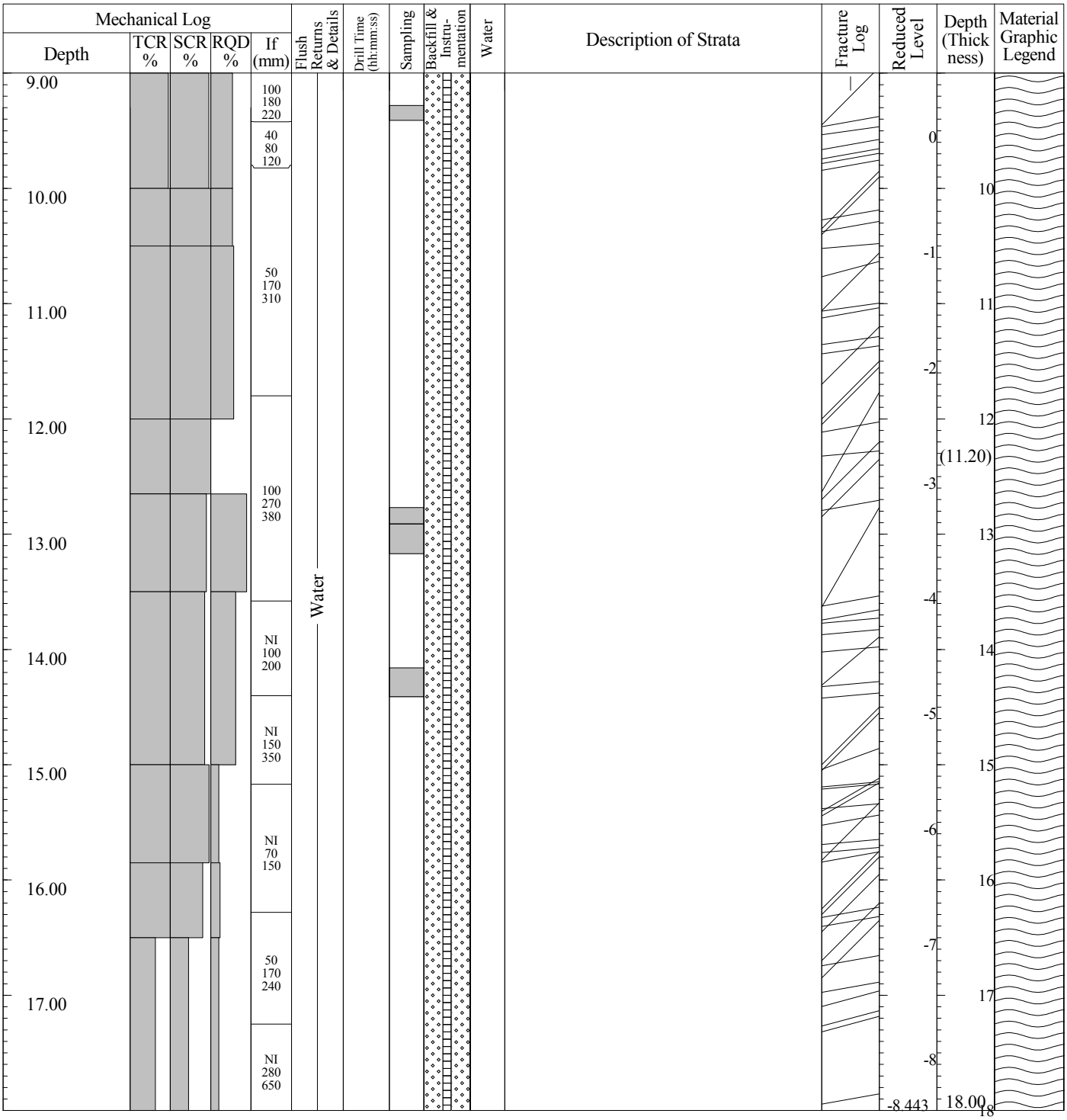
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WYL-SSL-SDT-LOG-00003

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH524R

Contract Ref:	Start: 23.03.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 29.03.11	9.557	E:235623.8 N:393776.7	2 of 3



Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
25/03/11	08:30	10.50	6.50	121	2.83
25/03/11	12:00	15.00	6.50	121	2.52
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29/03/11	08:30	19.50	6.50	121	2.86
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2. 50mm standpipe installed to 19.0m depth. Sunken stopcock cover used as borehole within car park open to the public.

All dimensions in metres	Scale: 1:50	Inclination: Vertical	Azimuth: NA

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	Beretta T44	CG	JWickenden + JPhelan	GS+BNS

GINT_LIBRARY_V8_04.GLB!XCUSTOM - SSL - 725061 - SUMMARY LOG | 725061_WYLFA.GPJ - v8_04 | 17/12/11 - 21:45 | MJB
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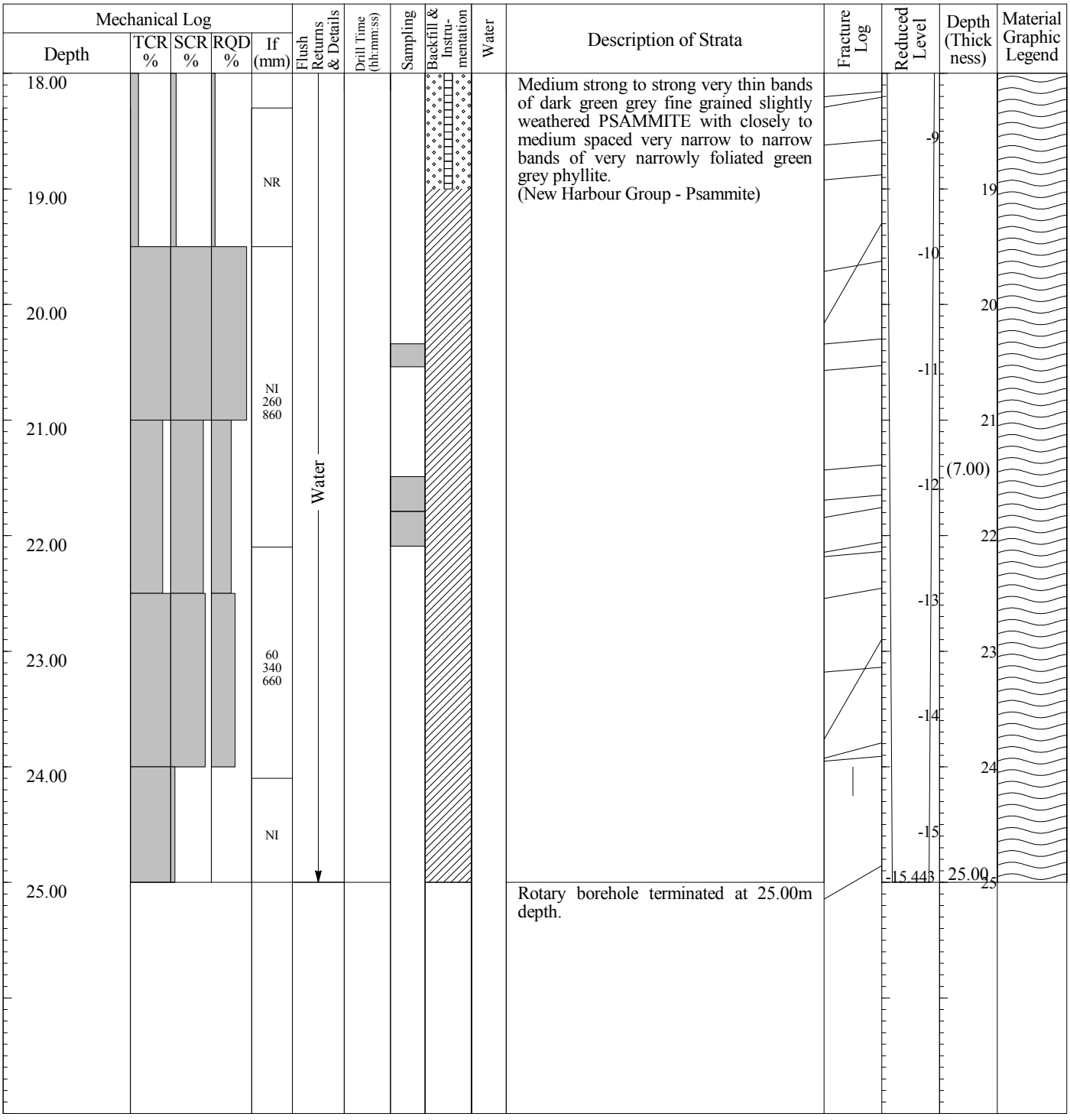
STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00003

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH524R

Contract Ref:	Start: 23.03.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 29.03.11	9.557	E:235623.8 N:393776.7	3 of 3



Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
25/03/11	08:30	10.50	6.50	121	2.83
25/03/11	12:00	15.00	6.50	121	2.52
28/03/11	12:30	15.00	6.50	121	2.87
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29/03/11	08:30	19.50	6.50	121	2.86
29/03/11	17:30	25.00	6.50	121	2.31

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 19.0m depth. Sunken stopcock cover used as borehole within car park open to the public.

All dimensions in metres | Scale: **1:50** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Beretta T44**	**CG**	**JWickenden + JPhelan**	**GS+BNS**

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH524R

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 29.03.11	9.557	E:235623.8 N:393776.7	1 of 22

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
									MADE GROUND: Dense grey sandy fine to coarse subangular to angular GRAVEL of phyllite. (Ballast). (Made Ground)			(0.20)	
											9.357	0.20	
									MADE GROUND: Dense sandy fine to coarse subangular to angular GRAVEL and COBBLES of brick, wood and phyllite. (Made Ground) . . . at 0.30m depth discoloured cable encountered.			(0.60)	
0.50-0.50						1/B					9		
									. . . between 0.60 and 0.80m depth multiple cobble sized bricks encountered.				
											8.757	0.80	
									MADE GROUND: Dense silvery grey very gravelly SAND. Gravel is fine to coarse subangular to angular phyllite and brick. (Made Ground)			(0.40)	1
											8.357	1.20	
									Soft becoming firm dark brown sandy slightly gravelly CLAY. Gravel is fine to coarse angular to subangular phyllite and occasional subrounded medium chert. (Drift Deposits - Unit B1)				
											8		
												(1.10)	

Flush Returns & Details: Air

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
25/03/11	08:30	10.50	6.50	121	2.83
25/03/11	12:00	15.00	6.50	121	2.52
28/03/11	12:30	15.00	6.50	121	2.87
28/03/11	17:45	19.50	6.50	121	3.23
29/03/11	08:30	19.50	6.50	121	2.86
29/03/11	17:30	25.00	6.50	121	2.31

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 19.0m depth. Sunken stopcock cover used as borehole within car park open to the public.

All dimensions in metres | Scale: **1:10** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Beretta T44**	**CG**	**JWickenden + JPhelan**	**GS+BNS**

GINT_LIBRARY_V8_04.GLB|XCUSTOM - SSL - 725061 - DETAIL LOG | 725061_WYLFA.GPJ - v8_04 | 17/12/11 - 21:45 | MJB
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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00003

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH524R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **29.03.11**	**9.557**	**E:235623.8 N:393776.7**	**2** of **22**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
					Air							2	
											7.257	2.30	
									Firm grey fine sandy CLAY. (Drift Deposits - Unit B1)				
												7	
												3	
											6		

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
25/03/11	08:30	10.50	6.50	121	2.83
25/03/11	12:00	15.00	6.50	121	2.52
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General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 19.0m depth. Sunken stopcock cover used as borehole within car park open to the public.

All dimensions in metres | Scale: **1:10** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Beretta T44**	**CG**	**JWickenden + JPhelan**	**GS+BNS**

GINT_LIBRARY_V8_04.GLB|XCUSTOM - SSL - 725061 - DETAIL LOG | 725061_WYLFA.GPJ - v8_04 | 17/12/11 - 21:45 | MJB
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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00003

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH524R

Contract Ref:	Start: 23.03.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 29.03.11	9.557	E:235623.8 N:393776.7	3 of 22

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
					Air						5	(4.50)	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
25/03/11	08:30	10.50	6.50	121	2.83
25/03/11	12:00	15.00	6.50	121	2.52
28/03/11	12:30	15.00	6.50	121	2.87
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General Remarks

1. Hand dug inspection pit to 1.20m depth.
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All dimensions in metres | Scale: **1:10** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Beretta T44**	**CG**	**JWickenden + JPhelan**	**GS+BNS**

GINT_LIBRARY_V8_04.GLB|XCUSTOM - SSL - 725061 - DETAIL LOG | 725061_WYLFA.GPJ - v8_04 | 17/12/11 - 21:45 | MJB
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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00003

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH524R

Contract Ref:	Start: 23.03.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 29.03.11	9.557	E:235623.8 N:393776.7	4 of 22

Mechanical Log					Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)									
6.50-7.50 (0:48)	94	16	0	NI 100 600	Air / Water				. . . below 6.50m depth occasional gravel of dark grey/green subangular to angular fine to medium psammite. . . . between 6.50 to 6.77m depth non-intact recovered as fine to coarse subangular to subrounded gravel with brown staining on fracture surfaces.		4 / 3 / 2.757	6 / 6.80	
									Medium strong to strong narrow to very thin bands of green grey fine grained slightly weathered to locally moderately weathered PSAMMITE with very narrow lenticular bands of very narrowly foliated green grey phyllite. Closely to widely spaced narrow to thin bands containing subvertical very narrow lenticular voids with brown black staining (possible dissolution feature due to moderate weathering?). Foliation fractures are 5-15° very closely to widely spaced undulating rough/planar rough open with orange brown			7	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
25/03/11	08:30	10.50	6.50	121	2.83
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All dimensions in metres | Scale: **1:10** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Beretta T44**	**CG**	**JWickenden + JPhelan**	**GS+BNS**

GINT_LIBRARY_V8_04.GLB|XCUSTOM - SSL - 725061 - DETAIL LOG | 725061_WYLFA.GPJ - v8_04 | 17/12/11 - 21:45 | MJB
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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00003

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH524R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	**23.03.11** End: **29.03.11**	**9.557**	**E:235623.8 N:393776.7**	**5** of **22**

Depth	Mechanical Log: TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
	94	16	0	NI 100 600	Water				staining. Joints are 5-90° very closely to widely spaced undulating/stepped rough open to moderately wide with brown staining/fine gravel of psammite. (New Harbour Group - Psammite) . . . between 7.05 to 7.40m depth non-intact recovered as fine to coarse subangular to subrounded gravel with brown staining on fracture surfaces.	1 J[i] 2 FF[i]			
7.50-8.10 (0:45)				NI					. . . between 7.50 to 7.80m depth non-intact recovered as fine to coarse subangular to subrounded gravel with brown staining on fracture surfaces.			2	
	100	50	17							3 FF[i]			
8.10-9.00 (0:39)				50 100 170					. . . between 8.00 to 8.10m depth non-intact recovered as fine to coarse subangular to subrounded gravel with brown staining on fracture surfaces.	4 J[i] 5 J[i] 6 FF[i] 7 J[i]		8	
	92	89	13							8 J[i] 9 J[i]	1		
				100 180 220						10 J[i] 11 J[i]		9	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
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General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 19.0m depth. Sunken stopcock cover used as borehole within car park open to the public.

All dimensions in metres | Scale: **1:10** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Beretta T44**	**CG**	**JWickenden + JPhelan**	**GS+BNS**

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00003

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH524R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	**23.03.11** End: **29.03.11**	**9.557**	**E:235623.8 N:393776.7**	**6** of **22**

Depth	Mechanical Log: TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
9.00-10.00 (0:37)	95	95	54	100 180 220 40 80 120	Water	22/C				12 J[i] 13 J[i] 14 FF[i] 15 FF[i] 16 FF[i] 17 FF[i] 18 FF[i] 19 FF[i]	0		
10.00-10.50 (0:27)	100	100	54	50 170 310						20 J[i] 21 J[i] 22 J[i] 23 FF[i]		10	
10.50-12.00 (0:33)	100	100	57							24 J[i] 25 FF[i]	-1		

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
25/03/11	08:30	10.50	6.50	121	2.83
25/03/11	12:00	15.00	6.50	121	2.52
28/03/11	12:30	15.00	6.50	121	2.87
28/03/11	17:45	19.50	6.50	121	3.23
29/03/11	08:30	19.50	6.50	121	2.86
29/03/11	17:30	25.00	6.50	121	2.31

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 19.0m depth. Sunken stopcock cover used as borehole within car park open to the public.

All dimensions in metres | Scale: **1:10** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Beretta T44**	**CG**	**JWickenden + JPhelan**	**GS+BNS**

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00003

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH524R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	**23.03.11** End: **29.03.11**	**9.557**	**E:235623.8 N:393776.7**	**7** of **22**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
12.00-12.65 (0:26)	100 100	100 100	57 0	50 170 310 100 270 380	Water				. . . at 11.00m depth very narrow <5mm randomly orientated ptygmatic quartz and calcite veins. . . . between 11.20 and 11.40m depth very narrow <5mm randomly orientated ptygmatic quartz and calcite veins.	26 J[i] 27 FF[i] 28 FF[i] 29 FF[i] 30 FF[i] 31 J[i] 32 J[i] 33 J 35 J[i] 36 J[i] 37 FF[i] 38 J[i]	-2 -3	11 12 (11.20)	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
25/03/11	08:30	10.50	6.50	121	2.83
25/03/11	12:00	15.00	6.50	121	2.52
28/03/11	12:30	15.00	6.50	121	2.87
28/03/11	17:45	19.50	6.50	121	3.23
29/03/11	08:30	19.50	6.50	121	2.86
29/03/11	17:30	25.00	6.50	121	2.31

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 19.0m depth. Sunken stopcock cover used as borehole within car park open to the public.

All dimensions in metres | Scale: **1:10** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Beretta T44**	**CG**	**JWickenden + JPhelan**	**GS+BNS**

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH524R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **29.03.11**	**9.557**	**E:235623.8 N:393776.7**	**8** of **22**

Depth	Mechanical Log TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
12.65-13.50 (0:18)	100	100	0			23/C			. . . between 12.65 to 12.80m depth non-intact recovered as fine to coarse subangular to subrounded gravel with brown staining on fracture surfaces. . . . at 12.75m depth very narrow <5mm randomly orientated ptygmatic quartz and calcite veins.	39 IcF[i]			
						24/C			. . . between 12.91 to 13.17m depth locally becoming weak.	40 FF[i]			
	100	89	89	100 270 380								13	
									. . . between 13.20 and 13.45m depth very narrow <5mm randomly orientated ptygmatic quartz and calcite veins.	41 J[i]			
13.50-15.00 (0:35)					Water						-4		
										42 FF[i]			
										43 FF[i]			
										44 FF[i]			
										45 FF[i]			
	100	85	62	NI 100 200					. . . between 13.95 to 14.05m depth non-intact recovered as fine subangular to subrounded gravel with slight clay smearing and brown staining. Possible fault?	46 PF[i]		14	
										47 J			
						25/C							
										48 FF[i]			

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
25/03/11	08:30	10.50	6.50	121	2.83
25/03/11	12:00	15.00	6.50	121	2.52
28/03/11	12:30	15.00	6.50	121	2.87
28/03/11	17:45	19.50	6.50	121	3.23
29/03/11	08:30	19.50	6.50	121	2.86
29/03/11	17:30	25.00	6.50	121	2.31

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 19.0m depth. Sunken stopcock cover used as borehole within car park open to the public.

All dimensions in metres | Scale: **1:10** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Beretta T44**	**CG**	**JWickenden + JPhelan**	**GS+BNS**

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH524R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	**23.03.11** End: **29.03.11**	**9.557**	**E:235623.8 N:393776.7**	**9** of **22**

Mechanical Log												
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
15.00-15.85 (0:38) 15.00	100	85	62	NI 150 350	Water	1/W			. . . between 14.70 to 14.80m depth non-intact recovered as fine to coarse subangular to subrounded gravel with brown staining on fracture surfaces.	49 FF[i] 50 J[i] 51 J[i] 52 J[i] 53 FF[i] 54 FF[i] 55 J[i] 56 J[i] 57 FF[i] 58 FF[i] 59 J[i] 60 FF[i] 61 FF[i] 62 FF[i]	-5 -6	15	
	100	96	20	NI 70 150									
15.85-16.50 (0:15)	100	80	23						. . . between 15.85 to 16.00m depth non-intact recovered as fine to coarse subangular to subrounded gravel with brown staining on fracture surfaces.	63 J[i] 64 J[i]		16	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
25/03/11	08:30	10.50	6.50	121	2.83
25/03/11	12:00	15.00	6.50	121	2.52
28/03/11	12:30	15.00	6.50	121	2.87
28/03/11	17:45	19.50	6.50	121	3.23
29/03/11	08:30	19.50	6.50	121	2.86
29/03/11	17:30	25.00	6.50	121	2.31

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 19.0m depth. Sunken stopcock cover used as borehole within car park open to the public.

All dimensions in metres | Scale: **1:10** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Beretta T44**	**CG**	**JWickenden + JPhelan**	**GS+BNS**

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00003

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH524R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	**23.03.11** End: **29.03.11**	**9.557**	**E:235623.8 N:393776.7**	**10** of **22**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
16.50-18.00 (0:51)	100	80	23	50 170 240	Water				. . . between 16.20 and 16.40m depth very narrow <5mm randomly orientated ptygmatic quartz and calcite veins.	65 J[i]; 66 FF[i]; 67 FF[i]; 34 IcF[i]; 68 J[i]; 69 FF[i]; 70 FF[i]; 71 FF[i]; 72 FF[i]; 73 FF[i]; 74 FF[i]	-7; -8; -8.443	17; 18.00	
	63	45	20	NI 280 650					. . . between 17.90 to 18.00m depth non-intact recovered as fine to coarse subangular to subrounded gravel with brown staining on				

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
25/03/11	08:30	10.50	6.50	121	2.83
25/03/11	12:00	15.00	6.50	121	2.52
28/03/11	12:30	15.00	6.50	121	2.87
28/03/11	17:45	19.50	6.50	121	3.23
29/03/11	08:30	19.50	6.50	121	2.86
29/03/11	17:30	25.00	6.50	121	2.31

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 19.0m depth. Sunken stopcock cover used as borehole within car park open to the public.

All dimensions in metres | Scale: **1:10** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Beretta T44**	**CG**	**JWickenden + JPhelan**	**GS+BNS**

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STRUCTURAL SOILS

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BOREHOLE LOG

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Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **29.03.11**	**9.557**	**E:235623.8 N:393776.7**	**11** of **22**

Depth	Mechanical Log: TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
18.00-19.50 (0:37)	20	13	9	NI 280 650 NR	Water				fracture surfaces. Medium strong to strong very thin bands of dark green grey fine grained slightly weathered PSAMMITE with closely to medium spaced very narrow to narrow bands of very narrowly foliated green grey phyllite. Extremely to closely spaced very narrow lenticular calcite veins dipping subhorizontal and parallel to foliation and subvertical (occasionally intersecting each other). Foliation fractures are 5-15° very closely to widely spaced undulating rough open with orange brown staining. Joints are 5-90° medium to very widely spaced undulating/stepped/planar rough open with brown staining/fine gravel of psammite. (New Harbour Group - Psammite) . . . at 18.18m depth possible microfault dipping 5° undulating with brown iron staining and disturbed fabric (naturally open re-fused microfault) . . . between 18.30 and 19.50, loss of recovery (75%)	75 PMF[i] 76 FF[i] 77 IcF[i] 78 IcF[i]	-9	19	
19.50-21.00 (0:38)	100	100	87	NI 260 860						80 FF[i] 79 J[i]	-10		

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
25/03/11	08:30	10.50	6.50	121	2.83
25/03/11	12:00	15.00	6.50	121	2.52
28/03/11	12:30	15.00	6.50	121	2.87
28/03/11	17:45	19.50	6.50	121	3.23
29/03/11	08:30	19.50	6.50	121	2.86
29/03/11	17:30	25.00	6.50	121	2.31

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 19.0m depth. Sunken stopcock cover used as borehole within car park open to the public.

All dimensions in metres | Scale: **1:10** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Beretta T44**	**CG**	**JWickenden + JPhelan**	**GS+BNS**

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00003

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH524R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **29.03.11**	**9.557**	**E:235623.8 N:393776.7**	**12** of **22**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
									. . . between 19.82 to 19.84m depth non-intact recovered as fine subangular to subrounded gravel with slight clay smearing and brown staining. . . . between 19.85 and 20.00m depth very narrow <5mm randomly orientated ptygmatic quartz and calcite veins.			20	
						26/C				81 FF[i]			
	100	100	87										
									. . . at 20.55 to 21.00m depth en echelon quartz veins <1mm thickness.	82 FF	-11		
				NI 260 860	Water								
21.00-22.50 (0:33)												21	
	80	80	49										
									. . . at 21.41m depth possible microfault dipping 5° undulating with orange brown iron staining and disturbed fabric (naturally open re-fused microfault) . . . between 21.45 to 21.55m depth non-intact recovered as fine to coarse subangular to	83 PMF[i]			
						27/C						(7.00)	
											-12		

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
25/03/11	08:30	10.50	6.50	121	2.83
25/03/11	12:00	15.00	6.50	121	2.52
28/03/11	12:30	15.00	6.50	121	2.87
28/03/11	17:45	19.50	6.50	121	3.23
29/03/11	08:30	19.50	6.50	121	2.86
29/03/11	17:30	25.00	6.50	121	2.31

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 19.0m depth. Sunken stopcock cover used as borehole within car park open to the public.

All dimensions in metres | Scale: **1:10** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Beretta T44**	**CG**	**JWickenden + JPhelan**	**GS+BNS**

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STRUCTURAL SOILS

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH524R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	**23.03.11** End: **29.03.11**	**9.557**	**E:235623.8 N:393776.7**	**13** of **22**

Depth	Mechanical Log: TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
22.50-24.00 (0:37)	80 100	80 85	49 59	NI 260 860 60 340 660	Water	28/C			subrounded gravel with brown staining on fracture surfaces. . . . at 21.67m depth possible microfault dipping 5° undulating with orange brown iron staining disturbing fabric (naturally open re-fused microfault) . . . between 21.79 to 22.00m depth locally becoming weak. . . . at 22.63m depth very narrow <5mm randomly orientated ptygmatic quartz and calcite veins.	84 PMF[i] 85 FF[i] 86 FF[i] 87 J[i] 88 J[i] 89 FF[i] 90 J[i]	-13	22 23	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
25/03/11	08:30	10.50	6.50	121	2.83
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28/03/11	12:30	15.00	6.50	121	2.87
28/03/11	17:45	19.50	6.50	121	3.23
29/03/11	08:30	19.50	6.50	121	2.86
29/03/11	17:30	25.00	6.50	121	2.31

General Remarks

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2. 50mm standpipe installed to 19.0m depth. Sunken stopcock cover used as borehole within car park open to the public.

All dimensions in metres | Scale: **1:10** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Beretta T44**	**CG**	**JWickenden + JPhelan**	**GS+BNS**

GINT_LIBRARY_V8_04.GLB|XCUSTOM - SSL - 725061 - DETAIL LOG | 725061_WYLFA.GPJ - v8_04 | 17/12/11 - 21:45 | MJB
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STRUCTURAL SOILS

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH524R

Contract Ref:	Start: 23.03.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 29.03.11	9.557	E:235623.8 N:393776.7	14 of 22

Mechanical Log					Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)									
									. . . between 23.38 to 23.55m depth non-intact recovered as fine to coarse subangular to subrounded gravel with brown staining on fracture surfaces. . . . at 23.55 to 24.00m depth en echelon quartz veins <1mm.		-14		
	100	85	59	60 340 660						91 FF[i] 92 FF[i]			
24.00-25.00 (0:31)					Water				. . . between 24.10 to 24.90m depth non-intact recovered as fine to coarse subangular to subrounded gravel with brown staining on fracture surfaces. . . . at 24.15m depth very narrow <5mm slightly undulating to ptygmatic randomly orientated quartz vein . . . at 24.25m depth very narrow <5mm slightly undulating to ptygmatic randomly orientated quartz vein	93 J[i]		24	
	100	10	0	NI							-15		
									Rotary borehole terminated at 25.00m depth.	94 J[i]	-15.443	25.00	25

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
25/03/11	08:30	10.50	6.50	121	2.83
25/03/11	12:00	15.00	6.50	121	2.52
28/03/11	12:30	15.00	6.50	121	2.87
28/03/11	17:45	19.50	6.50	121	3.23
29/03/11	08:30	19.50	6.50	121	2.86
29/03/11	17:30	25.00	6.50	121	2.31

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 19.0m depth. Sunken stopcock cover used as borehole within car park open to the public.

All dimensions in metres	Scale: 1:10	Inclination: Vertical	Azimuth: NA

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	Beretta T44	CG	JWickenden + JPhelan	GS+BNS

GINT_LIBRARY_V8_04.GLB|XCUSTOM - SSL - 725061 - DETAIL LOG | 725061_WYLFA.GPJ - v8_04 | 17/12/11 - 21:45 | MJB
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BOREHOLE LOG

Contract:		Client:		Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation		Horizon Nuclear Power Wylfa Limited		BH524R
Contract Ref:	Start: 23.03.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 29.03.11	9.557	E:235623.8 N:393776.7	15 of 22

6.50m - 8.10m depth



Method Used:	Rotary open hole + Rotary Cored	Plant Used:	Beretta T44	Drilled By:	CG	Logged By:	JWickenden + JPhelan	Checked By:	GS+BNS

GINT_LIBRARY_V8_04.GLB|XCUSTOM - SSL - 725061 - DETAIL LOG | 725061_WYLFA.GPJ - v8_04 | 17/12/11 - 21:45 | MJB
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Contract Ref:	Start: 23.03.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 29.03.11	9.557	E:235623.8 N:393776.7	16 of 22

8.10m - 10.50m depth



Method Used:	Rotary open hole + Rotary Cored	Plant Used:	Beretta T44	Drilled By:	CG	Logged By:	JWickenden + JPhelan	Checked By:	GS+BNS

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Contract Ref:	Start: 23.03.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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10.50m - 13.50m depth



Method Used:	Rotary open hole + Rotary Cored	Plant Used:	Beretta T44	Drilled By:	CG	Logged By:	JWickenden + JPhelan	Checked By:	GS+BNS

GINT_LIBRARY_V8_04.GLB|XCUSTOM - SSL - 725061 - DETAIL LOG | 725061_WYLFA.GPJ - v8_04 | 17/12/11 - 21:45 | MJB
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BOREHOLE LOG

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Wylfa New Build - Intermediate Onshore Ground Investigation		Horizon Nuclear Power Wylfa Limited		BH524R
Contract Ref:	Start: 23.03.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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13.50m - 15.00m depth



Method Used:	Rotary open hole + Rotary Cored	Plant Used:	Beretta T44	Drilled By:	CG	Logged By:	JWickenden + JPhelan	Checked By:	GS+BNS

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BOREHOLE LOG

Contract:		Client:		Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation		Horizon Nuclear Power Wylfa Limited		BH524R
Contract Ref:	Start: 23.03.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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15.00m - 18.00m depth



Method Used:	Rotary open hole + Rotary Cored	Plant Used:	Beretta T44	Drilled By:	CG	Logged By:	JWickenden + JPhelan	Checked By:	GS+BNS

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BOREHOLE LOG

Contract:		Client:		Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation		Horizon Nuclear Power Wylfa Limited		BH524R
Contract Ref:	Start: 23.03.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 29.03.11	9.557	E:235623.8 N:393776.7	20 of 22

18.00m - 21.00m depth



Method Used:	Rotary open hole + Rotary Cored	Plant Used:	Beretta T44	Drilled By:	CG	Logged By:	JWickenden + JPhelan	Checked By:	GS+BNS

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BOREHOLE LOG

Contract:		Client:		Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation		Horizon Nuclear Power Wylfa Limited		BH524R
Contract Ref:	Start: 23.03.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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21.00m - 24.00m depth



Method Used:	Rotary open hole + Rotary Cored	Plant Used:	Beretta T44	Drilled By:	CG	Logged By:	JWickenden + JPhelan	Checked By:	GS+BNS

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BOREHOLE LOG

Contract:		Client:		Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation		Horizon Nuclear Power Wylfa Limited		BH524R
Contract Ref:	Start: 23.03.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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24.00m - 25.00m depth



Method Used:	Rotary open hole + Rotary Cored	Plant Used:	Beretta T44	Drilled By:	CG	Logged By:	JWickenden + JPhelan	Checked By:	GS+BNS

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SUMMARY OF DISCONTINUITIES - BH524R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
1	7.35	J	90	U-R	Open	None.	Orange brown iron staining.	NHG	META_M
2	7.42	FF	8	U-R	Open	None.	Orange brown iron staining.	NHG	META_M
3	7.88	FF	8	U-R	Open	None.	Orange brown iron staining.	NHG	META_M
4	8.05	J	90	P-R	Open	None.	Orange brown iron staining.	NHG	META_M
5	8.15	J	45	U-R	Open	None.	Orange brown iron staining.	NHG	META_M
6	8.28	FF	10	U-R	Open	None.	Orange brown iron staining.	NHG	META_M
7	8.35	J	45	U-R	Open	None.	Orange brown iron staining.	NHG	META_M
8	8.50	J	30	S-R	Open	None.	Brown iron staining.	NHG	META_M
9	8.55	J	45	S-R	Open	None.	Brown iron staining.	NHG	META_M
10	8.75	J	45	U-R	Open	None.	Brown iron staining.	NHG	META_M
11	8.85-9.00	J	90	U-R	Open	None.	Brown iron staining.	NHG	META_M
12	9.03-9.15	J	90	S-R	Open	None.	Brown iron staining.	NHG	META_M
13	9.20	J	45	U-R	Open	None.	Orange brown iron staining.	NHG	META_M
14	9.42	FF	10	S-R	Open	None.	Orange brown iron staining.	NHG	META_M
15	9.50	FF	8	U-R	Open	None.	Orange brown iron staining.	NHG	META_M
16	9.62	FF	10	U-R	Open	None.	Orange brown iron staining.	NHG	META_M

Key:
Type codes: FF = Foliation fracture, IcF = Incipient fracture, J = Joint, PF = Possible Fault, PMF = Possible Micro fault.
Small-scale roughness codes: P-R = Planar - rough, S-R = Stepped - rough, U = Undulating, U-R = Undulating - rough.
Aperture description codes: Moderately wide = (2.5mm - 10mm), Open = (0.5mm - 2.5mm), Partly open = (0.25mm - 0.5mm).

SUMMARY OF DISCONTINUITIES - BH524R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
17	9.70	FF	10	U-R	Open	None.	Orange brown iron staining.	NHG	META_M
18	9.74	FF	10	U-R	Open	None.	Orange brown iron staining.	NHG	META_M
19	9.80	FF	10	U-R	Open	None.	Orange brown iron staining.	NHG	META_M
20	10.10	J	45	S-R	Open	None.	Orange brown iron staining.	NHG	META_M
21	10.15	J	45	S-R	Open	None.	Orange brown iron staining.	NHG	META_M
22	10.23	J	10	U-R	Open	None.	Orange brown iron staining.	NHG	META_M
23	10.33	FF	10	U-R	Open	None.	Orange brown iron staining.	NHG	META_M
24	10.50	J	5	S-R	Open	None.	Orange brown iron staining.	NHG	META_M
25	10.70	FF	15	U-R	Open	None.	Brown iron staining.	NHG	META_M
26	10.72-10.90	J	45	P-R	Open	None.	Brown iron staining.	NHG	META_M
27	11.03	FF	8	U-R	Open	None.	Brown iron staining.	NHG	META_M
28	11.08	FF	10	U-R	Open	None.	Brown iron staining.	NHG	META_M
29	11.32	FF	8	U-R	Open	None.	Brown iron staining.	NHG	META_M
30	11.40	FF	8	U-R	Open	None.	Brown iron staining.	NHG	META_M
31	11.45	J	45	S-R	Open	None.	Brown iron staining.	NHG	META_M
32	11.75	J	45	U-R	Open	None.	Brown iron staining.	NHG	META_M

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Type codes: FF = Foliation fracture, IcF = Incipient fracture, J = Joint, PF = Possible Fault, PMF = Possible Micro fault.
Small-scale roughness codes: P-R = Planar - rough, S-R = Stepped - rough, U = Undulating, U-R = Undulating - rough.
Aperture description codes: Moderately wide = (2.5mm - 10mm), Open = (0.5mm - 2.5mm), Partly open = (0.25mm - 0.5mm).

SUMMARY OF DISCONTINUITIES - BH524R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
33	11.80	J	45	U-R	Open	-	Orange brown iron staining.	NHG	META_M
34	11.90-21.00	IcF	45	U	Partly open	None.	None	NHG	META_M
35	12.07	J	10	U-R	Open	None.	Brown iron staining.	NHG	META_M
36	12.20	J	60	S-R	Open	None.	Brown iron staining.	NHG	META_M
37	12.30	FF	5	S-R	Open	None.	Brown iron staining.	NHG	META_M
38	12.45	J	45	S-R	Open	None.	Brown iron staining.	NHG	META_M
39	12.60	IcF	45	U	Partly open	None	None	NHG	META_M
40	12.75	FF	10	U-R	Open	None.	Brown iron staining.	NHG	META_M
41	13.20	J	60	U-R	Open	None.	Brown iron staining.	NHG	META_M
42	13.58	FF	10	U-R	Open	None.	Brown iron staining.	NHG	META_M
43	13.70	FF	10	U-R	Open	None.	Brown iron staining.	NHG	META_M
44	13.75	FF	5	U-R	Open	None.	Brown iron staining.	NHG	META_M
45	13.85	FF	5	U-R	Open	None.	Brown iron staining.	NHG	META_M
46	13.95-14.05	PF	5	U-R	Moderately wide	Orange brown iron staining and fine	(possible minor fault)	NHG	META_M
						subangular gravel with slight clay			
						smearing.			

Key:
Type codes: FF = Foliation fracture, IcF = Incipient fracture, J = Joint, PF = Possible Fault, PMF = Possible Micro fault.
Small-scale roughness codes: P-R = Planar - rough, S-R = Stepped - rough, U = Undulating, U-R = Undulating - rough.
Aperture description codes: Moderately wide = (2.5mm - 10mm), Open = (0.5mm - 2.5mm), Partly open = (0.25mm - 0.5mm).

SUMMARY OF DISCONTINUITIES - BH524R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
47	14.10	J	40	U-R	Open	-	Brown iron staining.	NHG	META_M
48	14.30	FF	5	U-R	Open	None.	Orange brown iron staining.	NHG	META_M
49	14.40	FF	5	P-R	Open	None.	Brown iron staining.	NHG	META_M
50	14.75	J	45	S-R	Open	None.	Brown iron staining.	NHG	META_M
51	14.80	J	45	S-R	Moderately wide	None.	Brown iron staining with fine subangular gravel of	NHG	META_M
							psammite.		
52	14.95	J	20	U-R	Open	None.	Orange brown staining.	NHG	META_M
53	15.17	FF	5	U-R	Open	None.	Brown iron staining.	NHG	META_M
54	15.19	FF	5	U-R	Open	None.	Brown iron staining.	NHG	META_M
55	15.26	J	30	U-R	Moderately wide	None.	Brown iron staining.	NHG	META_M
56	15.30	J	30	S-R	Open	None.	Brown iron staining.	NHG	META_M
57	15.36	FF	5	U-R	Open	None.	Brown iron staining.	NHG	META_M
58	15.48	FF	10	U-R	Open	None.	Orange brown iron staining.	NHG	META_M
59	15.58	J	45	P-R	Open	None.	Brown staining.	NHG	META_M
60	15.67	FF	5	U-R	Open	None.	Brown staining.	NHG	META_M
61	15.74	FF	5	U-R	Open	None.	Brown staining.	NHG	META_M

Key:
Type codes: FF = Foliation fracture, IcF = Incipient fracture, J = Joint, PF = Possible Fault, PMF = Possible Micro fault.
Small-scale roughness codes: P-R = Planar - rough, S-R = Stepped - rough, U = Undulating, U-R = Undulating - rough.
Aperture description codes: Moderately wide = (2.5mm - 10mm), Open = (0.5mm - 2.5mm), Partly open = (0.25mm - 0.5mm).

SUMMARY OF DISCONTINUITIES - BH524R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
62	15.80	FF	10	U-R	Open	None.	Brown iron staining.	NHG	META_M
63	16.00	J	45	U-R	Open	None.	Brown iron staining.	NHG	META_M
64	16.05	J	45	U-R	Open	None.	Brown iron staining.	NHG	META_M
65	16.20	J	45	S-R	Open	None.	Brown iron staining.	NHG	META_M
66	16.28	FF	10	P-R	Open	None.	Brown iron staining.	NHG	META_M
67	16.36	FF	10	U-R	Open	None.	Brown iron staining.	NHG	META_M
68	16.60	J	45	S-R	Open	None.	Brown iron staining.	NHG	META_M
69	16.70	FF	10	U-R	Open	None.	Brown iron staining.	NHG	META_M
70	16.93	FF	10	U-R	Open	None.	Brown iron staining.	NHG	META_M
71	17.03	FF	15	U-R	Open	None.	Brown iron staining.	NHG	META_M
72	17.20	FF	15	P-R	Open	None.	Brown iron staining.	NHG	META_M
73	17.25	FF	15	P-R	Open	None.	Brown iron staining.	NHG	META_M
74	17.90	FF	10	U-R	Open	None.	Brown iron staining.	NHG	META_M
76	18.25	FF	10	U-R	Open	None.	Orange brown iron staining.	NHG	META_M
77	18.60	IcF	5	U	Partly open	None	Brown iron staining penetrating downward.	NHG	META_M
78	18.90	IcF	5	U	Partly open	None	Brown iron staining penetrating downward.	NHG	META_M

Key:
Type codes: FF = Foliation fracture, IcF = Incipient fracture, J = Joint, PF = Possible Fault, PMF = Possible Micro fault.
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Aperture description codes: Moderately wide = (2.5mm - 10mm), Open = (0.5mm - 2.5mm), Partly open = (0.25mm - 0.5mm).

SUMMARY OF DISCONTINUITIES - BH524R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
79	19.58-19.88	J	60	S-R	Open	None.	Brown iron staining.	NHG	META_M
80	19.67	FF	10	U-R	Open	None.	Orange brown iron staining.	NHG	META_M
81	20.32	FF	5	U-R	Open	Fine angular.	Brown iron staining.	NHG	META_M
82	20.55	FF	5	U-R	Open	-	Brown iron staining.	NHG	META_M
85	21.80	FF	10	U-R	Open	None.	Orange brown iron staining.	NHG	META_M
86	22.10	FF	10	U-R	Open	None.	Orange brown iron staining.	NHG	META_M
87	22.16	J	5	U-R	Open	None.	Orange brown iron staining.	NHG	META_M
88	22.50	J	10	P-R	Open	None.	Red brown staining.	NHG	META_M
89	23.16	FF	5	U-R	Open	None.	Orange brown iron staining.	NHG	META_M
90	23.33	J	60	U-R	Open	None.	Orange brown iron staining.	NHG	META_M
91	23.86	FF	15	U-R	Open	None.	slight orange brown staining	NHG	META_M
92	23.93	FF	5	U-R	Open	None.	slight orange brown staining	NHG	META_M
93	24.00-24.25	J	90	S-R	Open	None.	Iron staining, one of the wall rocks absent.	NHG	META_M
94	25.00	J	30	U-R	Open	None.	Red brown staining.	NHG	META_M

Key:
Type codes: FF = Foliation fracture, IcF = Incipient fracture, J = Joint, PF = Possible Fault, PMF = Possible Micro fault.
Small-scale roughness codes: P-R = Planar - rough, S-R = Stepped - rough, U = Undulating, U-R = Undulating - rough.
Aperture description codes: Moderately wide = (2.5mm - 10mm), Open = (0.5mm - 2.5mm), Partly open = (0.25mm - 0.5mm).

STRUCTURAL SOILS
The Old School
Stillhouse Lane
Bedminster
Bristol BS3 4EB

Compiled By	Date	Contract Ref:
[redacted] MBEVAN	17.12.11	725061

Contract: **Wylfa New Build - Intermediate Onshore Ground Investigation**

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SUMMARY OF POSSIBLE MICRO FAULTS - BH524R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
75	18.18	PMF	5	U-R	Open	naturally opened up possible	Brown iron staining penetrating (opened by natural	NHG	META_M
						microfault.	processes)		
83	21.41	PMF	5	U	Open	naturally opened up possible	Orange brown iron staining (naturally opened up	NHG	META_M
						microfault.	microfault)		
84	21.67	PMF	5	U	Open	naturally opened up possible	Orange brown iron staining (naturally opened up	NHG	META_M
						microfault.	microfault)		

Key:
Type codes: FF = Foliation fracture, IcF = Incipient fracture, J = Joint, PF = Possible Fault, PMF = Possible Micro fault.
Small-scale roughness codes: P-R = Planar - rough, S-R = Stepped - rough, U = Undulating, U-R = Undulating - rough.
Aperture description codes: Moderately wide = (2.5mm - 10mm), Open = (0.5mm - 2.5mm), Partly open = (0.25mm - 0.5mm).

STRUCTURAL SOILS
The Old School
Stillhouse Lane
Bedminster
Bristol BS3 4EB

Compiled By		Date	Contract Ref:
[redacted]	MBEVAN	17.12.11	725061

Contract: **Wylfa New Build - Intermediate Onshore Ground Investigation**

AGS

STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00003

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH524R

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	23.03.11 End: 29.03.11	9.557	E:235623.8 N:393776.7	1 of 13

Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
0.00-0.20	MADE GROUND: Dense grey sandy fine to coarse subangular to angular GRAVEL of phyllite. (Ballast). (Made Ground)			9.357	(0.20) 0.20	
0.20-0.80	MADE GROUND: Dense sandy fine to coarse subangular to angular GRAVEL and COBBLES of brick, wood and phyllite. (Made Ground) . . . at 0.30m depth discoloured cable encountered. . . . between 0.60 and 0.80m depth multiple cobble sized bricks encountered.			9	(0.60) 0.80	
0.80-1.20	MADE GROUND: Dense silvery grey very gravelly SAND. Gravel is fine to coarse subangular to angular phyllite and brick. (Made Ground)			8.757	(0.40) 1.20	
1.20-2.30	Soft becoming firm dark brown sandy slightly gravelly CLAY. Gravel is fine to coarse angular to subangular phyllite and occasional subrounded medium chert. (Drift Deposits - Unit B1)			8.357 8	(1.10) 2	

Method Used:	Plant Used:	Drilled By:	Logged By:	All dimensions in metres
RC+ RO	Beretta T44	CG	JWickenden	Scale: 1:10

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WYL-SSL-SDT-LOG-00003

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH524R

Contract Ref:	Start: 23.03.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 29.03.11	9.557	E:235623.8 N:393776.7	2 of 13

Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
1.20-2.30				7.257	2.30	
2.30-6.80	Firm grey fine sandy CLAY. (Drift Deposits - Unit B1)			7 6	3 4	

Method Used:	RC+ RO	Plant Used:	Beretta T44	Drilled By:	CG	Logged By:	JWickenden	All dimensions in metres Scale: 1:10

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Contract Ref:	Start: 23.03.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 29.03.11	9.557	E:235623.8 N:393776.7	3 of 13

Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
2.30-6.80				5 4	(4.50) 5 6	

Method Used:	RC+ RO	Plant Used:	Beretta T44	Drilled By:	CG	Logged By:	JWickenden	All dimensions in metres Scale:	1:10

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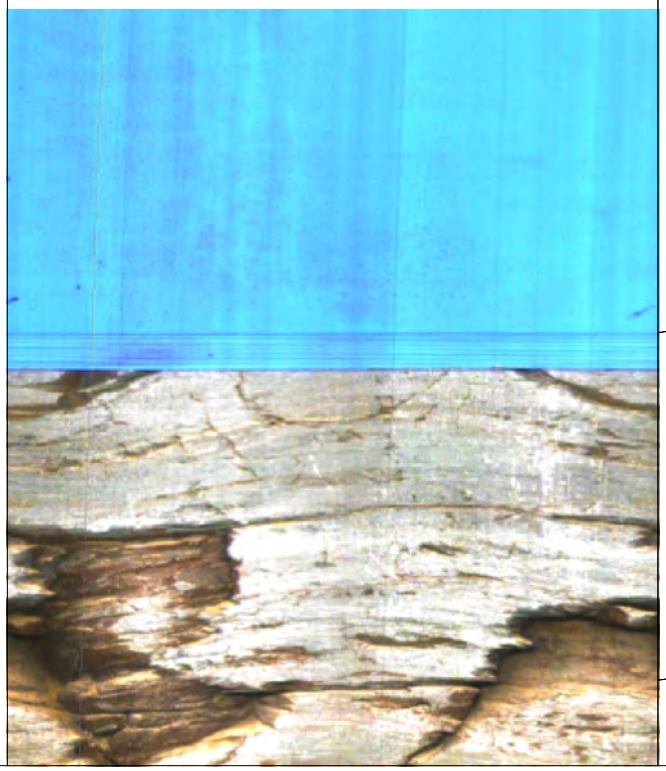
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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH524R

Contract Ref:	Start: 23.03.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 29.03.11	9.557	E:235623.8 N:393776.7	4 of 13

Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
2.30-6.80	. . . below 6.50m depth occasional gravel of dark grey/green subangular to angular fine to medium psammite. . . . between 6.50 to 6.77m depth non-intact recovered as fine to coarse subangular to subrounded gravel with brown staining on fracture surfaces.			3 2.757	6.80	
6.80-18.00	Medium strong to strong narrow to very thin bands of green grey fine grained slightly weathered to locally moderately weathered PSAMMITE with very narrow lenticular bands of very narrowly foliated green grey phyllite. Closely to widely spaced narrow to thin bands containing subvertical very narrow lenticular voids with brown black staining (possible dissolution feature due to moderate weathering?). Foliation fractures are 5-15° very closely to widely spaced undulating rough/planar rough open with orange brown staining. Joints are 5-90° very closely to widely spaced undulating/stepped rough open to moderately wide with brown staining/fine gravel of psammite. (New Harbour Group - Psammite) . . . between 7.05 to 7.40m depth non-intact recovered as fine to coarse subangular to subrounded gravel with brown staining on fracture surfaces. . . . between 7.50 to 7.80m depth non-intact recovered as fine to coarse subangular to subrounded gravel with brown staining on fracture surfaces.		1[i] 2[i] 3[i]	2	7 8	

Method Used:	Plant Used:	Drilled By:	Logged By:	All dimensions in metres
RC+ RO	Beretta T44	CG	JWickenden	Scale: 1:10

GINT_LIBRARY_V8_04.GLB!XCUSTOM - SSL - 725061 - OPTV | 725061_WYLFA.GPJ - v8_04 | 17/12/11 - 21:47 | MJB.
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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH524R

Contract Ref:	Start: 23.03.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 29.03.11	9.557	E:235623.8 N:393776.7	5 of 13

Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
6.80-18.00	. . . between 8.00 to 8.10m depth non-intact recovered as fine to coarse subangular to subrounded gravel with brown staining on fracture surfaces.		4[i] 5[i] 6[i] 7[i] 8[i] 9[i] 10[i] 11[i] 12[i] 13[i] 14[i] 15[i] 16[i] 17[i] 18[i] 19[i]	1 0	9 10	

Method Used:	Plant Used:	Drilled By:	Logged By:	All dimensions in metres
RC+ RO	Beretta T44	CG	JWickenden	Scale: 1:10

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH524R

Contract Ref:	Start: 23.03.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 29.03.11	9.557	E:235623.8 N:393776.7	6 of 13

Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
6.80-18.00	. . . at 11.00m depth very narrow <5mm randomly orientated ptygmatic quartz and calcite veins. . . . between 11.20 and 11.40m depth very narrow <5mm randomly orientated ptygmatic quartz and calcite veins.		20[i] 21[i] 22[i] 23[i] 24[i] 25[i] 26[i] 27[i] 28[i] 29[i] 30[i] 31[i] 32[i] 33	-1 -2	11 12	

Method Used:	Plant Used:	Drilled By:	Logged By:	All dimensions in metres
RC+ RO	Beretta T44	CG	JWickenden	Scale: 1:10

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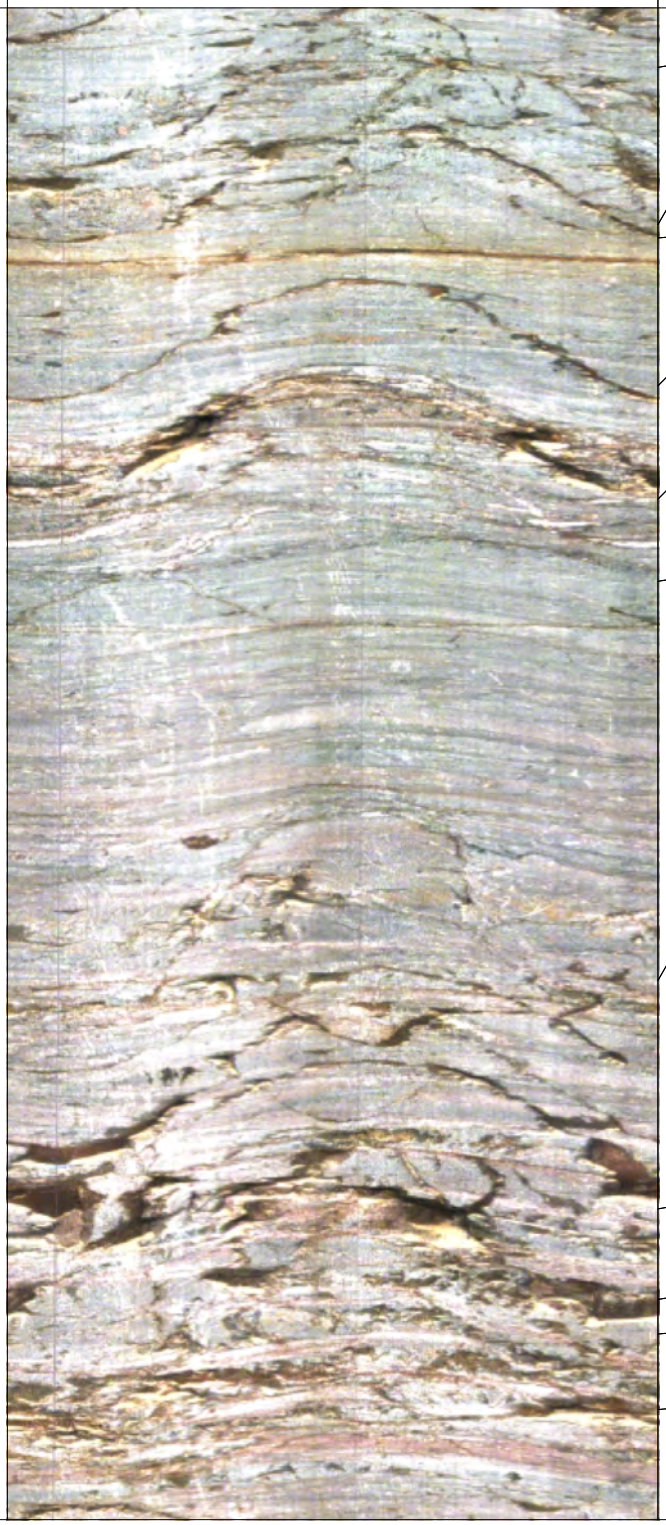
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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH524R

Contract Ref:	Start: 23.03.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 29.03.11	9.557	E:235623.8 N:393776.7	7 of 13

Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
6.80-18.00	. . . between 12.65 to 12.80m depth non-intact recovered as fine to coarse subangular to subrounded gravel with brown staining on fracture surfaces. . . . at 12.75m depth very narrow <5mm randomly orientated ptygmatic quartz and calcite veins. . . . between 12.91 to 13.17m depth locally becoming weak. . . . between 13.20 and 13.45m depth very narrow <5mm randomly orientated ptygmatic quartz and calcite veins. . . . between 13.95 to 14.05m depth non-intact recovered as fine subangular to subrounded		35[i] 36[i] 37[i] 38[i] 39[i] 40[i] 41[i] 42[i] 43[i] 44[i] 45[i]	-3 -4	(11.20) 13 14	

Method Used:	Plant Used:	Drilled By:	Logged By:	All dimensions in metres
RC+ RO	Beretta T44	CG	JWickenden	Scale: 1:10

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH524R

Contract Ref:	Start: 23.03.11 End: 29.03.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061		9.557	E:235623.8 N:393776.7	8 of 13

Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
6.80-18.00	gravel with slight clay smearing and brown staining. Possible fault? . . . between 14.70 to 14.80m depth non-intact recovered as fine to coarse subangular to subrounded gravel with brown staining on fracture surfaces. . . . between 15.85 to 16.00m depth non-intact recovered as fine to coarse subangular to subrounded gravel with brown staining on fracture surfaces.		46[i] 47 48[i] 49[i] 50[i] 51[i] 52[i] 53[i] 54[i] 55[i] 56[i] 57[i] 58[i] 59[i] 60[i] 61[i] 62[i]	-5 -6	15 16	

Method Used:	Plant Used:	Drilled By:	Logged By:	All dimensions in metres Scale:
RC+ RO	Beretta T44	CG	JWickenden	1:10

GINT_LIBRARY_V8_04.GLB!XCUSTOM - SSL - 725061 - OPTV | 725061_WYLFA.GPJ - v8_04 | 17/12/11 - 21:47 | MJB.
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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH524R

Contract Ref:	Start: 23.03.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 29.03.11	9.557	E:235623.8 N:393776.7	9 of 13

Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
6.80-18.00	. . . between 16.20 and 16.40m depth very narrow <5mm randomly orientated ptygmatic quartz and calcite veins. . . . between 17.90 to 18.00m depth non-intact recovered as fine to coarse subangular to subrounded gravel with brown staining on fracture surfaces.		63[i] 64[i] 65[i] 66[i] 67[i] 34[i] 68[i] 69[i] 70[i] 71[i] 72[i] 73[i] 74[i]	-7 -8 -8.443	17 18.00	

Method Used:	Plant Used:	Drilled By:	Logged By:	All dimensions in metres
RC+ RO	Beretta T44	CG	JWickenden	Scale: 1:10

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH524R

Contract Ref:	Start: 23.03.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 29.03.11	9.557	E:235623.8 N:393776.7	10 of 13

Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
18.00-25.00	Medium strong to strong very thin bands of dark green grey fine grained slightly weathered PSAMMITE with closely to medium spaced very narrow to narrow bands of very narrowly foliated green grey phyllite. Extremely to closely spaced very narrow lenticular calcite veins dipping subhorizontal and parallel to foliation and subvertical (occasionally intersecting each other). Foliation fractures are 5-15° very closely to widely spaced undulating rough open with orange brown staining. Joints are 5-90° medium to very widely spaced undulating/stepped/planar rough open with brown staining/fine gravel of psammite. (New Harbour Group - Psammite) . . . at 18.18m depth possible microfault dipping 5° undulating with brown iron staining and disturbed fabric (naturally open re-fused microfault) . . . between 18.30 and 19.50, loss of recovery (75%) . . . between 19.82 to 19.84m depth non-intact recovered as fine subangular to subrounded gravel with slight clay smearing and brown staining. . . . between 19.85 and 20.00m depth very narrow <5mm randomly orientated ptygmatic quartz and calcite veins.		75[i] 76[i] 77[i] 78[i] 80[i] 79[i]	-9 -10	19 20	

Method Used:	Plant Used:	Drilled By:	Logged By:	All dimensions in metres
RC+ RO	Beretta T44	CG	JWickenden	Scale: 1:10

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BOREHOLE LOG

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Contract Ref:	Start: 23.03.11 End: 29.03.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061		9.557	E:235623.8 N:393776.7	11 of 13

Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
18.00-25.00	. . . at 20.55 to 21.00m depth en echelon quartz veins <1mm thickness. . . . at 21.41m depth possible microfault dipping 5° undulating with orange brown iron staining and disturbed fabric (naturally open re-fused microfault) . . . between 21.45 to 21.55m depth non-intact recovered as fine to coarse subangular to subrounded gravel with brown staining on fracture surfaces. . . . at 21.67m depth possible microfault dipping 5° undulating with orange brown iron staining disturbing fabric (naturally open re-fused microfault) . . . between 21.79 to 22.00m depth locally becoming weak.		81[i] 82 83[i] 84[i] 85[i]	-11 -12	21 (7.00) 22	

Method Used:	Plant Used:	Drilled By:	Logged By:	All dimensions in metres Scale:
RC+ RO	Beretta T44	CG	JWickenden	1:10

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH524R

Contract Ref:	Start: 23.03.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 29.03.11	9.557	E:235623.8 N:393776.7	12 of 13

Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
18.00-25.00	. . . at 22.63m depth very narrow <5mm randomly orientated ptygmatic quartz and calcite veins. . . . between 23.38 to 23.55m depth non-intact recovered as fine to coarse subangular to subrounded gravel with brown staining on fracture surfaces. . . . at 23.55 to 24.00m depth en echelon quartz veins <1mm.		86[i] 87[i] 88[i] 89[i] 90[i] 91[i] 92[i]	-13 -14	23 24	

Method Used:	Plant Used:	Drilled By:	Logged By:	All dimensions in metres
RC+ RO	Beretta T44	CG	JWickenden	Scale: 1:10

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STRUCTURAL SOILS

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BOREHOLE LOG

Contract:	Client:	Borehole:
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Contract Ref:	Start: 23.03.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 29.03.11	9.557	E:235623.8 N:393776.7	13 of 13

Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
18.00-25.00	. . . between 24.10 to 24.90m depth non-intact recovered as fine to coarse subangular to subrounded gravel with brown staining on fracture surfaces. . . . at 24.15m depth very narrow <5mm slightly undulating to ptygmatic randomly orientated quartz vein . . . at 24.25m depth very narrow <5mm slightly undulating to ptygmatic randomly orientated quartz vein		93[i] 94[i]	-15 -15.443	25.00 25	
	Rotary borehole terminated at 25.00m depth.					

Method Used:	Plant Used:	Drilled By:	Logged By:	All dimensions in metres
RC+ RO	Beretta T44	CG	JWickenden	Scale: 1:10

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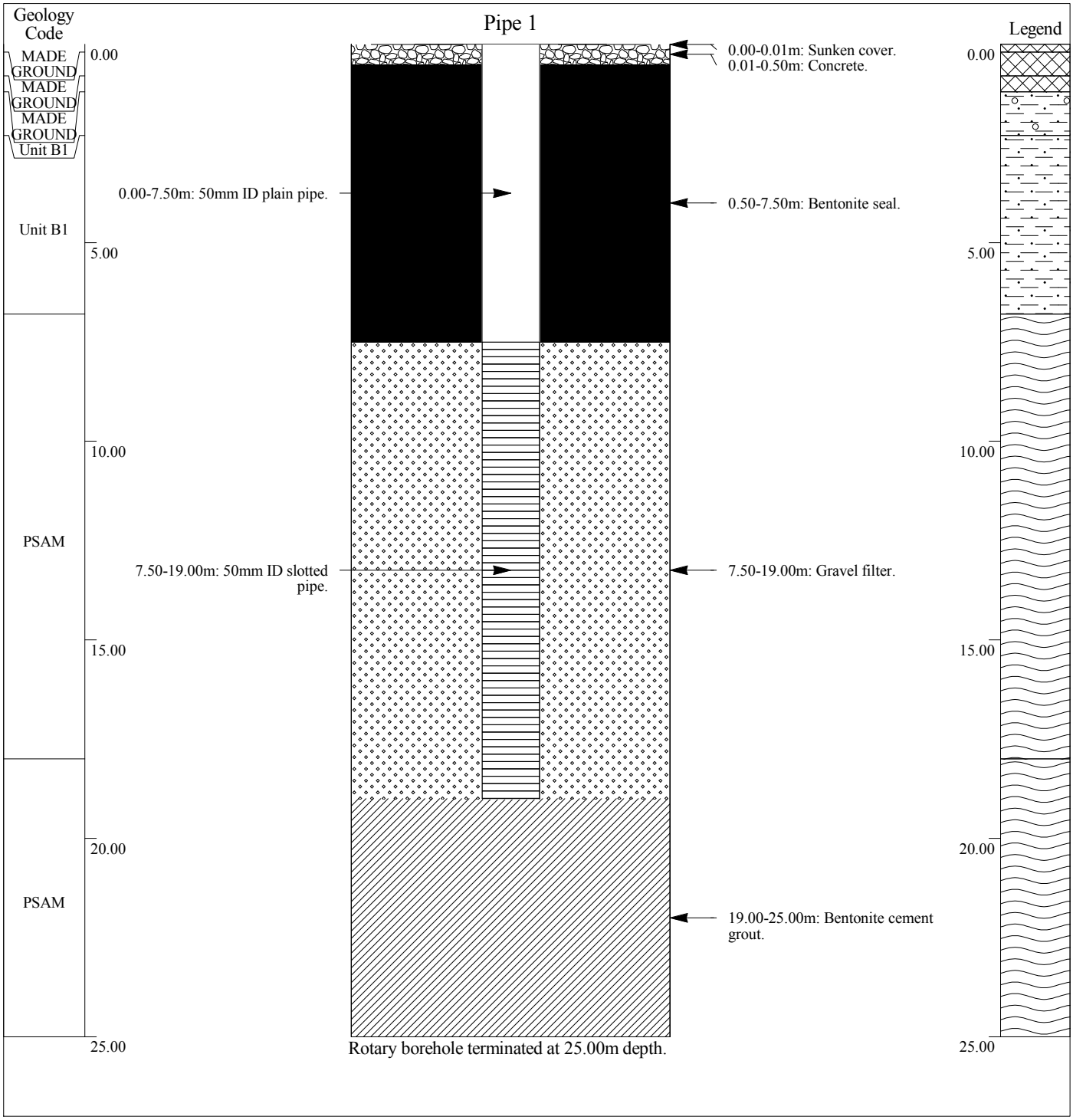
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INSTALLATIONS

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH524R

Contract Ref:	Start: 23.03.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 29.03.11	9.557	E:235623.8 N:393776.7	1 of 1



General Remarks

Geology code details:

MADE GROUND=MADE GROUND, PSAM=Psammite, Unit B1=Unit B1

Note: Graphical representation of well installation is scaled vertically, but exaggerated in the horizontal to aid interpretation.

All dimensions in metres	Installation	Installation	Installed
Scale 1:146	Date 14/06/2011	Type -	By SPincher

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH525

Contract Ref:	Start: 15.03.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 15.03.11	10.849	E:235735.3 N:393536.3	1 of 1

Samples and In-situ Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
						TOPSOIL over firm dark brown slightly gravelly CLAY with abundant rootlets. Gravel is fine to medium with occasional boulders subangular to subrounded psammite and occasional fine chert. (Topsoil)	10.049	(0.80) 0.80	
0.50	1	ES							
0.50	2	B							
0.60	1	D				Firm to stiff light brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded grey/green psammite and rounded fine to coarse chert. Occasional subrounded boulders of chert and psammite. (Unit B1)	9.649	1.20	
1.00	2	D							
1.40	3	D				Firm dark brown gravelly CLAY. Gravel is fine to coarse subrounded to subangular phyllite and psammite with occasional gravel of fine to medium subrounded to rounded chert. (Unit B1)		(2.00)	
1.50-1.95	4	SPT	N=19						
1.50	4	D							
1.50-1.95	5	B							
2.40	6	D							
2.50-2.95	7	SPT	N=21						
2.50	7	D							
2.50-2.95	8	B					7.649	3.20	
3.40	9	D				Firm to very stiff grey slightly silty very gravelly CLAY. Gravel is fine to medium with occasional boulders of subangular to subrounded green psammite and rare phyllite with occasional rounded chert. (Unit B1)		(2.10)	
3.50-3.93	10	SPT	N=54*						
3.50	10	D							
3.50-3.93	11	B							
4.40	12	D							
4.50-4.91	13	SPT	N=58*						
4.50	13	D							
4.50-4.91	14	B							
5.00	1	W					5.549	5.30	
5.30	15	D				Strong light green thinly laminated moderately weathered PSAMMITE non intact recovered as medium to coarse subangular to angular gravel and cobbles. (Psammite)		(0.85)	
5.40-5.73	16	SPT	N=83*						
5.40	16	D							
5.40-5.73	17	B							
5.90	18	D					4.699	6.15	
6.00-6.17	19	SPT	N=188*			Cable percussion borehole terminated at 6.15m depth due to refusal.			
6.00	19	D							

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

Chiselling		
From	To	Duration (hh:mm)
3.80	3.90	00:30
4.80	4.90	00:30
5.80	6.00	01:00

General Remarks

1. Hand dug inspection pit to 1.20m depth.
2. 50mm standpipe installed to 5.25m depth.
3. Borehole dry.
4. Hammer Serial No: 2011-H2

All dimensions in metres | Scale: 1:50

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Cable percussion	Dando 2000	RW	GSherwood	SAT

GINT_LIBRARY_V8_04.GLB|CABLE PERCUSSION LOG | 725061_WYLFA.GPJ - v8_04 | 25/11/11 - 14:00 | KJ ● = datamarker used throughout reporting for current exploratory position.
Structural Soils Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.soils.co.uk, Email:admin@soils.co.uk.

STANDARD PENETRATION TEST SUMMARY TABLE

Exploratory Position ID	Depth (m)	Hole Dia (mm)	Casing Depth (m)	Water Depth (m)	Seating Drive		Test Drive			Hammer ID	Calibration Date	Energy Ratio (%)	N_{60}	Comments
					Blows	Pen (mm)	Blows	R (mm)	Result					
BH525	1.50		1.50		5,6	150	5,4,5,5		N=19	2011-H2	14/03/2011	65	21	
	2.50		2.50		6,10	150	5,5,6,5		N=21	2011-H2	14/03/2011	65	23	
	3.50		3.50		10,6	150	7,17,15,11+	280	N=54*	2011-H2	14/03/2011	65	58	
	4.50		4.50		7,9	150	7,17,15,11+	260	N=58*	2011-H2	14/03/2011	65	63	
	5.40		5.40	5.00	9,15	150	19,21,10+	180	N=83*	2011-H2	14/03/2011	65	90	
	6.00		5.60	5.00	20,5	85	42,8+	80	N=188*	2011-H2	14/03/2011	65	204	

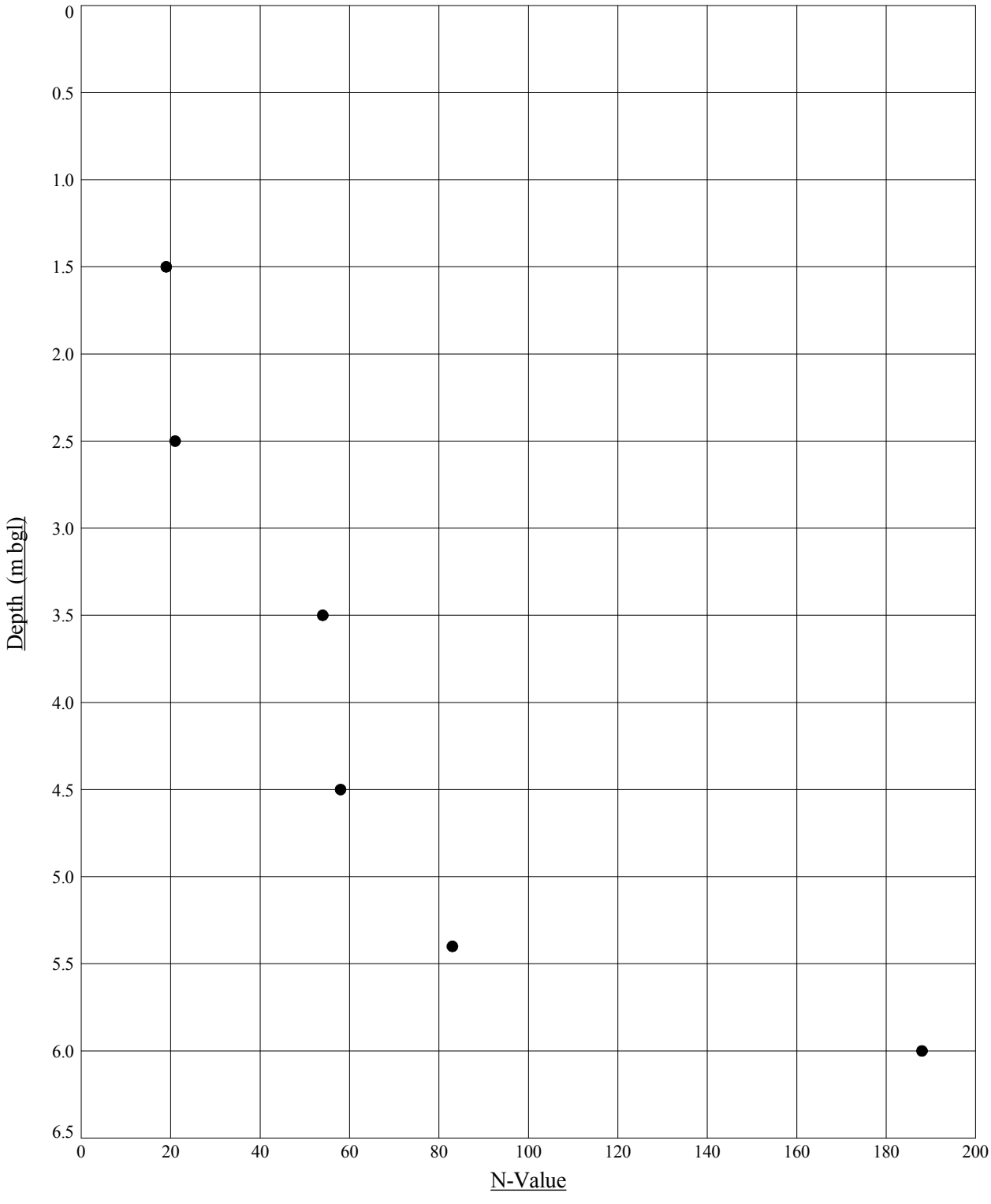
Notes:
1. Tests carried out in general accordance with BS EN ISO 22476-3:2005.
2. Reported blows are for 75mm penetration unless indicated "+".
3. Where full test drive was not achieved, actual penetration (R) and extrapolated N value (N*) reported.
4. Tests carried out using a split spoon sampler unless noted as SPT(c) (denotes use of solid cone method) in the comments column.
5. Entries in the water depth column reflects the measured water depth at time of test.

N_{60} = (Measured hammer energy ratio / 60) x N value

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Bedminster
Bristol BS3 4EB

Compiled By		Date	Contract Ref:
[redacted]	**KJOHNSTONE**	**25.11.11**	**725061**
Contract: **Wylfa New Build - Intermediate Onshore Ground Investigation**			Page **1** of **1**

STANDARD PENETRATION TEST (SPT N-Value)
vs
DEPTH



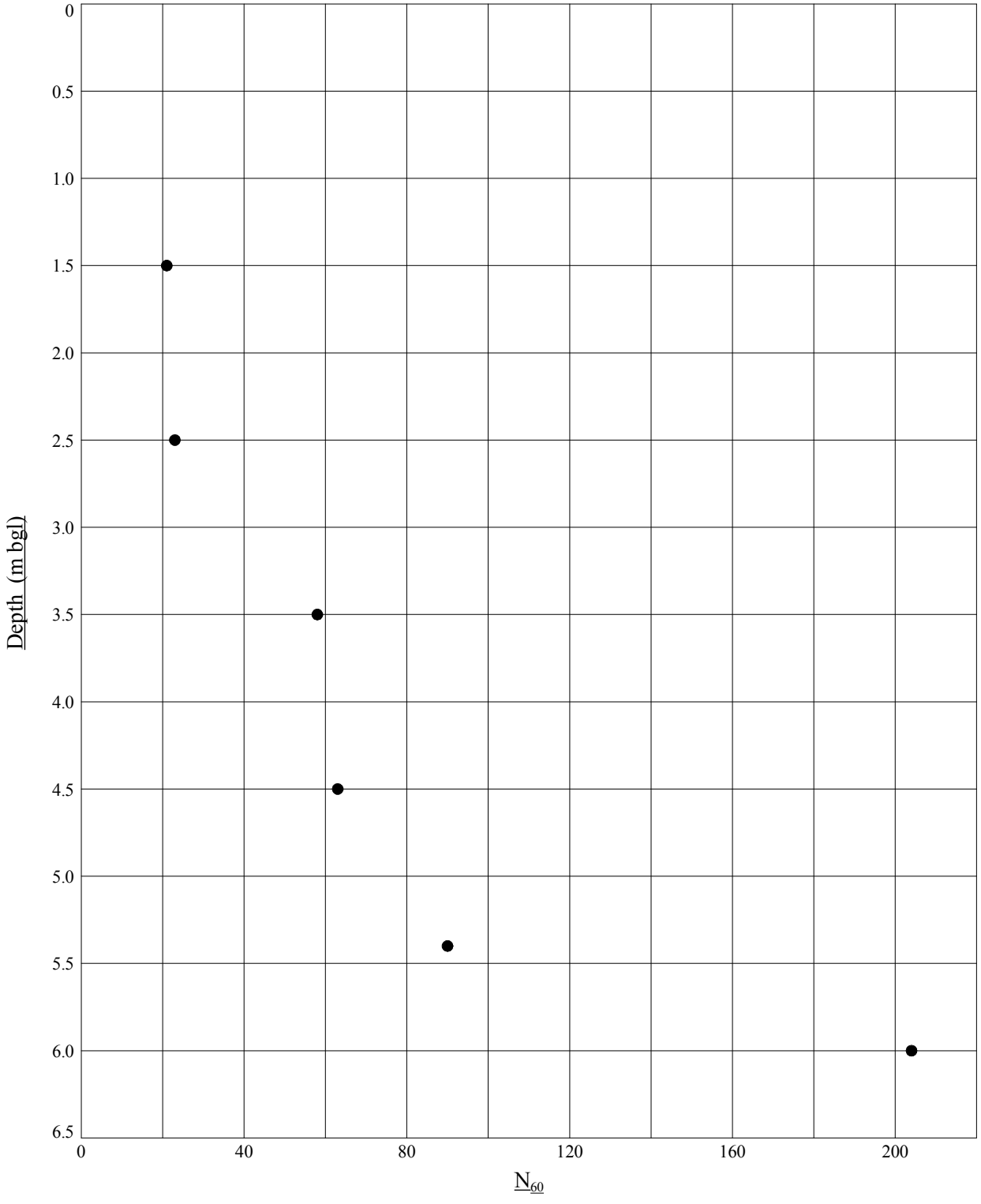
Key: ● = BH525

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Bristol BS3 4EB

Contract	Date	Compiled By
Wylfa New Build - Intermediate Onshore Ground Investigation	**10.11.11**	KJ
Client: **Horizon Nuclear Power Wylfa Limited**	Contract Ref: **725061**	

GINT_LIBRARY_V8_04.GLB|G - PLOTS - SITE - GENERAL | 725061_WYLFA.GPJ - v8_04 | 10/11/11 - 08:55 | KJ.

STANDARD PENETRATION TEST (SPT N_{60})
vs
DEPTH



Key: ● = BH525

STRUCTURAL SOILS
The Old School
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Bedminster
Bristol BS3 4EB

Contract	Date	Compiled By
Wylfa New Build - Intermediate Onshore Ground Investigation	**10.11.11**	KJ
Client: **Horizon Nuclear Power Wylfa Limited**	Contract Ref: **725061**	

GINT_LIBRARY_V8_04.GLB|G - PLOTS - SITE - GENERAL | 725061_WYLFA.GPJ - v8_04 | 10/11/11 - 08:55 | KJ.

WYL-SSL-SDT-LOG-00004

testconsult
Specialist Testing Services

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

Testconsult Limited
Ruby House
40A Hardwick Grange
Warrington
Cheshire
WA1 4RF

SPT Hammer Ref:	H2
Test Date:	26/04/2010
Report Date:	28/05/2010
File Name:	SS_H2_260410.spt
Test Operator:	YV

UKAS TESTING 0955

Instrumented Rod Data

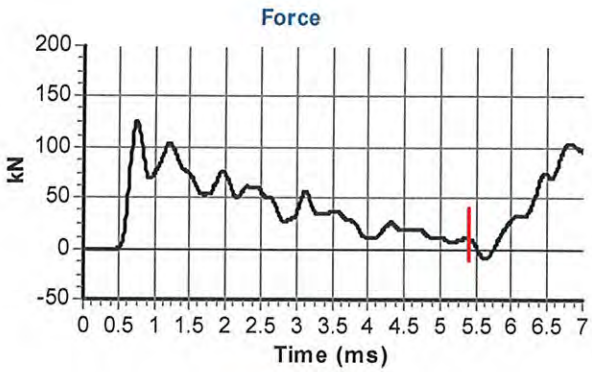
Diameter d_r (mm):	54
Wall Thickness t_r (mm):	6.6
Assumed Modulus E_a (GPa):	208
Accelerometer No.1:	5677
Accelerometer No.2:	5833

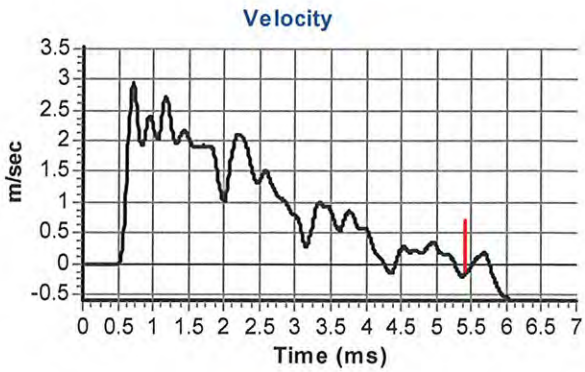
SPT Hammer Information

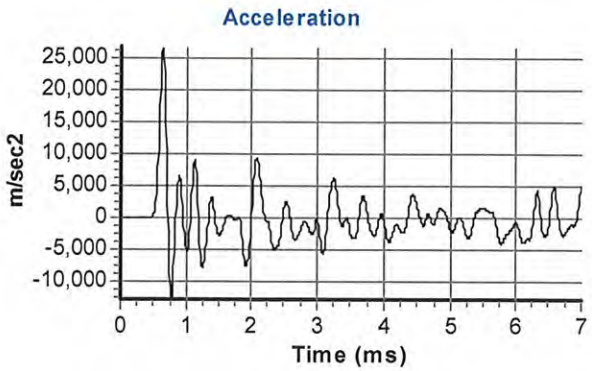
Hammer Mass m (kg):	67.5
Falling Height h (mm):	760
SPT String Length L (m):	14.0

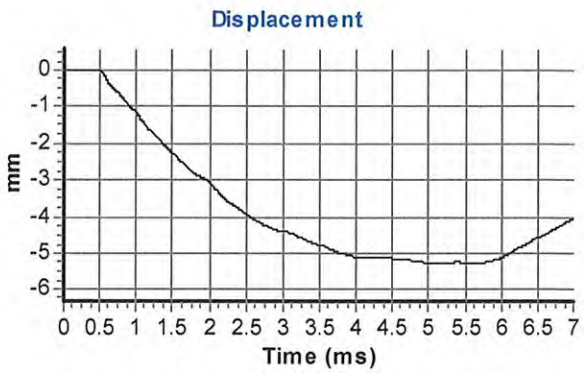
Comments / Location

Client: Structural Soils Limited
Trip Hammer
Location: Archway Engineering









Calculations

Area of Rod A (mm2):	983
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	334

Energy Ratio E_r (%): **71**

[redacted]

Signed: Huw Williams
Title: Director

TESTCONSULT LIMITED TESTING SERVICES

The recommended calibration interval is 6 months

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH525R

Contract Ref:	Start: 28.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 30.04.11	10.761	E:235735.9 N:393538.1	1 of 6

Mechanical Log: Depth	TCR %	SCR %	RQD %	If (mm)	Flush Returns & Details	Drill Time (hh:mm:ss)	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
0.00					Air	(00:35:00)				Grass over TOPSOIL consisting of soft dark brown slightly sandy CLAY with abundant fine rootlets. (Made Ground - Topsoil)		10.561	0.20	
										Soft dark brown slightly sandy gravelly CLAY. (Drift Deposits - Unit B1)		10.361	0.40	
										Soft dark orange brown sandy slightly gravelly CLAY. (Drift Deposits - Unit B1)		9.961	(0.40)	
1.00										Firm light brown slightly sandy gravelly CLAY. (Drift Deposits - Unit B1)		9.561	0.80	
										Firm dark brown gravelly CLAY. (Drift Deposits - Unit B1)			(0.40)	
2.00													1.20	
													(2.00)	
3.00												7.561	3.20	
										Firm to very stiff grey slightly silty very gravelly CLAY. (Drift Deposits - Unit B1)				
4.00													(2.10)	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
29/04/11	09:00	9.00	6.00	121	3.80
29/04/11	16:00	21.00	6.00	121	4.80
30/04/11	09:00	21.00	9.00	121	3.90
30/04/11		25.50	9.00	121	4.10

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Between 10.50 to 12.00m depth no liner.
3. 50mm standpipe installed to 12.50m depth.

All dimensions in metres	Scale: 1:28	Inclination: Vertical	Azimuth: NA

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	Beretta T44	CG/CA	GSherwood + JWickenden	GS+BS

GINT_LIBRARY_V8_04.GLB|XCUSTOM - SSL - 725061 - SUMMARY LOG | 725061_WYLFA.GPJ - v8_04 | 17/12/11 - 21:47 | MJB
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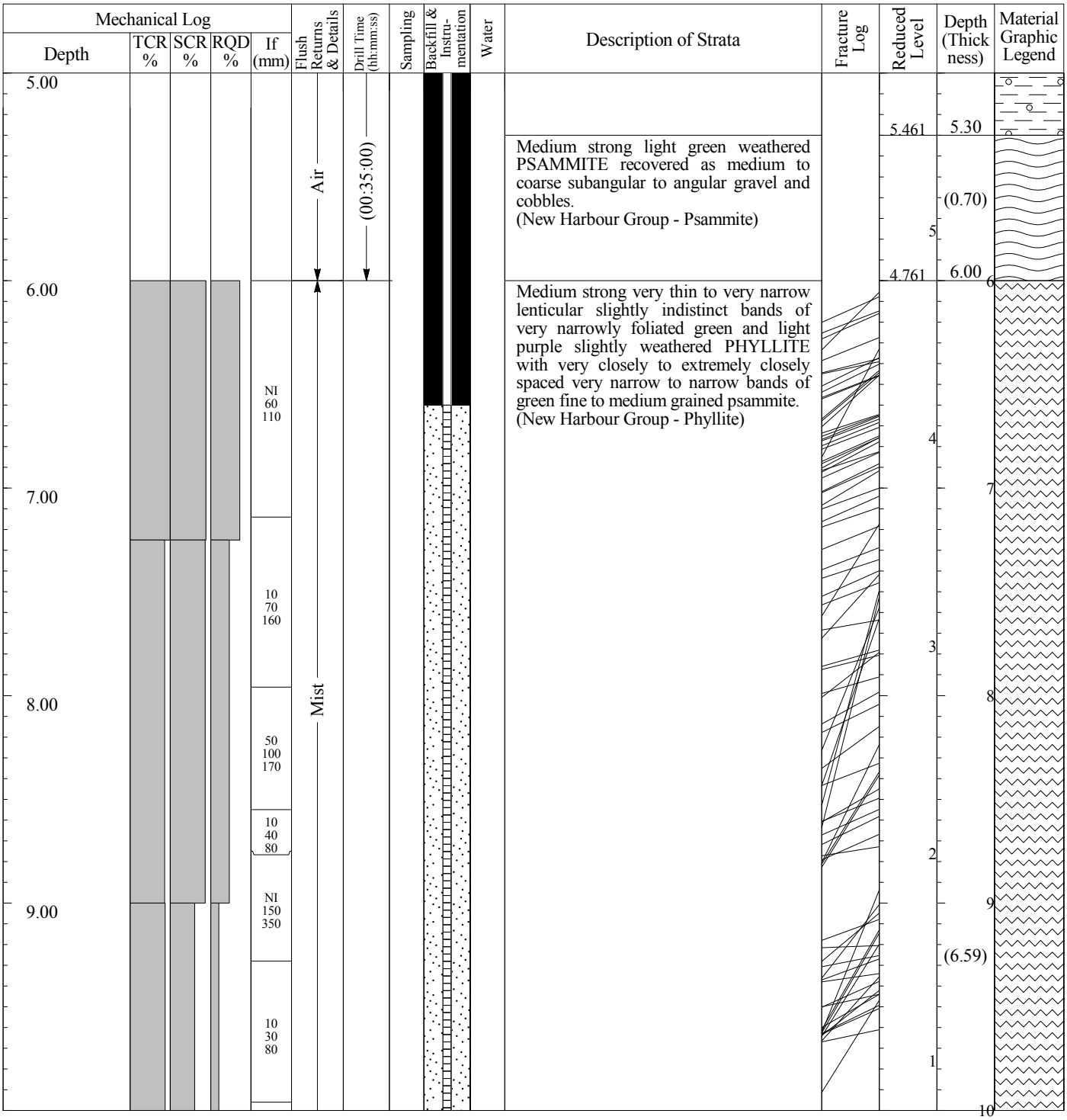
STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH525R

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	28.04.11 End: 30.04.11	10.761	E:235735.9 N:393538.1	2 of 6



Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
29/04/11	09:00	9.00	6.00	121	3.80
29/04/11	16:00	21.00	6.00	121	4.80
30/04/11	09:00	21.00	9.00	121	3.90
30/04/11		25.50	9.00	121	4.10

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Between 10.50 to 12.00m depth no liner.
3. 50mm standpipe installed to 12.50m depth.

All dimensions in metres	Scale: 1:28	Inclination: Vertical	Azimuth: NA

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	Beretta T44	CG/CA	GSherwood + JWickenden	GS+BS

GINT_LIBRARY_V8_04.GLB!XCUSTOM - SSL - 725061 - SUMMARY LOG | 725061_WYLFA.GPJ - v8_04 | 17/12/11 - 21:47 | MJB
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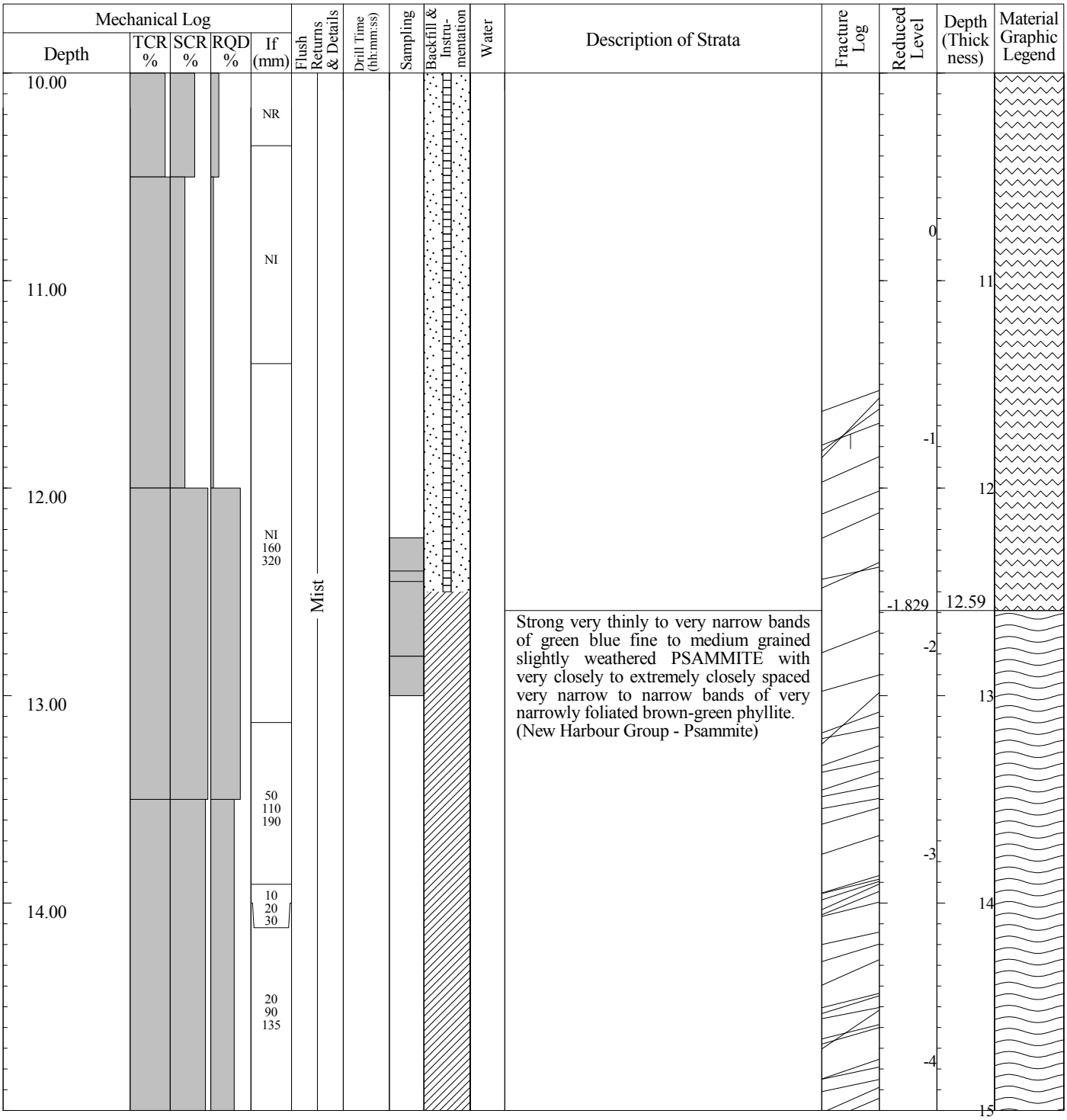
STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH525R

Contract Ref:	Start: 28.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 30.04.11	10.761	E:235735.9 N:393538.1	3 of 6



Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
29/04/11	09:00	9.00	6.00	121	3.80
29/04/11	16:00	21.00	6.00	121	4.80
30/04/11	09:00	21.00	9.00	121	3.90
30/04/11		25.50	9.00	121	4.10

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Between 10.50 to 12.00m depth no liner.
3. 50mm standpipe installed to 12.50m depth.

All dimensions in metres	Scale: 1:28	Inclination: Vertical	Azimuth: NA

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	Beretta T44	CG/CA	GSherwood + JWickenden	GS+BS

GINT_LIBRARY_V8_04.GLB!XCUSTOM - SSL - 725061 - SUMMARY LOG | 725061_WYLFA.GPJ - v8_04 | 17/12/11 - 21:47 | MJB
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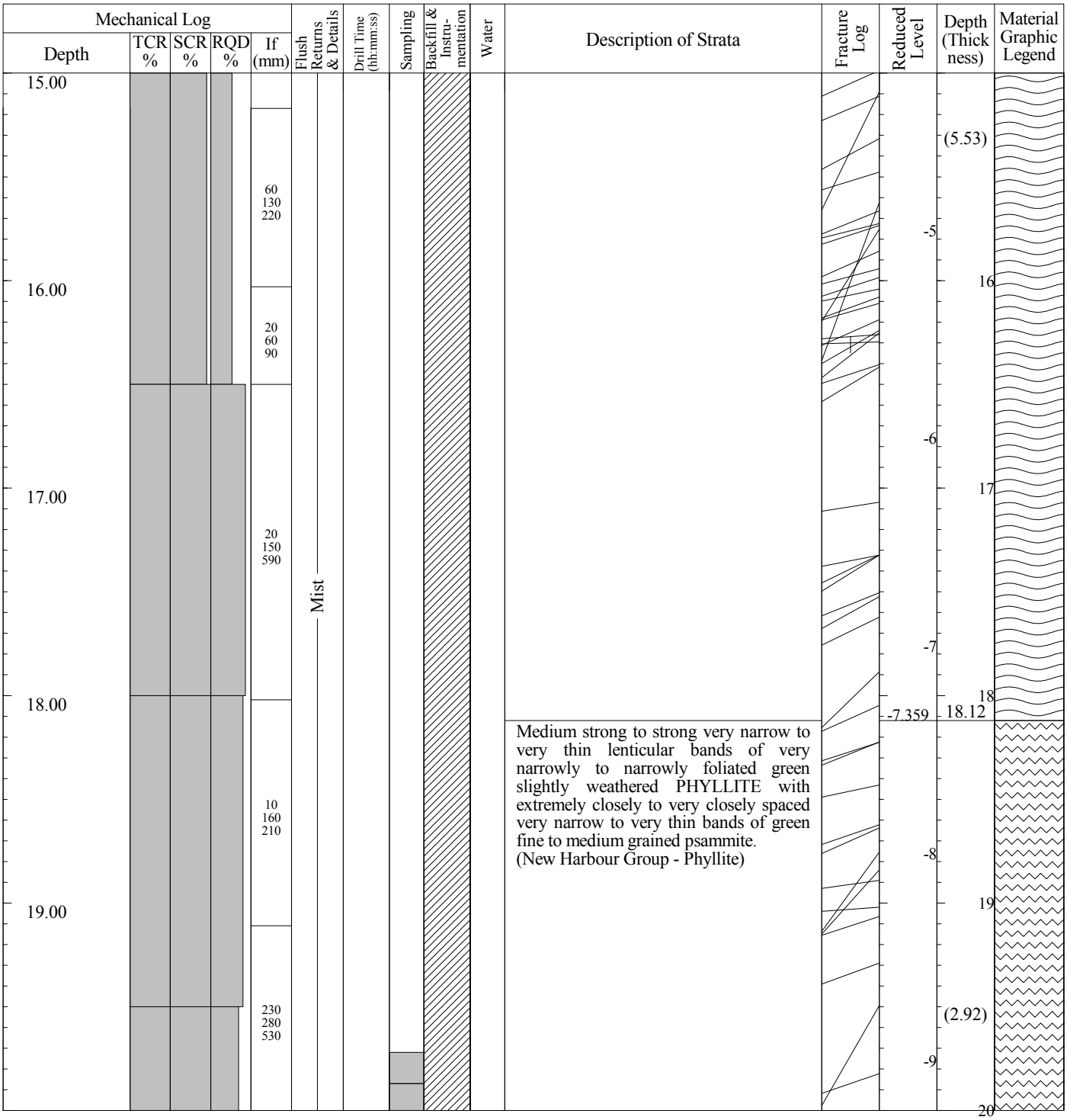
STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH525R

Contract Ref:	Start: 28.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 30.04.11	10.761	E:235735.9 N:393538.1	4 of 6



Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
29/04/11	09:00	9.00	6.00	121	3.80
29/04/11	16:00	21.00	6.00	121	4.80
30/04/11	09:00	21.00	9.00	121	3.90
30/04/11		25.50	9.00	121	4.10

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Between 10.50 to 12.00m depth no liner.
3. 50mm standpipe installed to 12.50m depth.

All dimensions in metres	Scale: 1:28	Inclination: Vertical	Azimuth: NA

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	Beretta T44	CG/CA	GSherwood + JWickenden	GS+BS

GINT_LIBRARY_V8_04.GLB!XCUSTOM - SSL - 725061 - SUMMARY LOG | 725061_WYLFA.GPJ - v8_04 | 17/12/11 - 21:47 | MJB
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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH525R

Contract Ref:	Start: 28.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 30.04.11	10.761	E:235735.9 N:393538.1	5 of 6

Depth	Mechanical Log TCR %	SCR %	RQD %	If (mm)	Flush Returns & Details	Drill Time (hh:mm:ss)	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
20.00														
				10 70 130								-10		
21.00										Strong very thin to thin bands of green blue fine to medium grained slightly weathered to fresh PSAMMITE with very closely to closely spaced very narrow to very thin bands of very narrowly foliated purple phyllite. (New Harbour Group - Psammite)		-10.279	21.04	
				40 40 630									(0.76)	
										Medium strong thin to very thin bands of very narrowly foliated green occasionally green brown slightly weathered PHYLLITE with closely to very closely spaced very narrow to very thin lenticular bands of green fine to medium grained psammite. (New Harbour Group - Phyllite)		-11.039	21.80	
22.00				10 140 360	Mist								22	
												-12		
23.00													23	
				210 230 310									(3.70)	
												-13		
24.00				10 50 180									24	
				150 310 370								-14		
													25	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
29/04/11	09:00	9.00	6.00	121	3.80
29/04/11	16:00	21.00	6.00	121	4.80
30/04/11	09:00	21.00	9.00	121	3.90
30/04/11		25.50	9.00	121	4.10

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Between 10.50 to 12.00m depth no liner.
3. 50mm standpipe installed to 12.50m depth.

All dimensions in metres	Scale: 1:28	Inclination: Vertical	Azimuth: NA

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	Beretta T44	CG/CA	GSherwood + JWickenden	GS+BS

GINT_LIBRARY_V8_04.GLB!XCUSTOM - SSL - 725061 - SUMMARY LOG | 725061_WYLFA.GPJ - v8_04 | 17/12/11 - 21:47 | MJB
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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH525R

Contract Ref:	Start: 28.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 30.04.11	10.761	E:235735.9 N:393538.1	6 of 6

Mechanical Log: Depth	TCR %	SCR %	RQD %	If (mm)	Flush Returns & Details	Drill Time (hh:mm:ss)	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
25.00				20 70 150	Mist ↓							-14.739	25.50	
										Rotary borehole terminated at 25.50m depth.				

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
29/04/11	09:00	9.00	6.00	121	3.80
29/04/11	16:00	21.00	6.00	121	4.80
30/04/11	09:00	21.00	9.00	121	3.90
30/04/11		25.50	9.00	121	4.10

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Between 10.50 to 12.00m depth no liner.
3. 50mm standpipe installed to 12.50m depth.

All dimensions in metres | Scale: **1:28** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Beretta T44**	**CG/CA**	**GSherwood + JWickenden**	**GS+BS**

GINT_LIBRARY_V8_04.GLB|XCUSTOM - SSL - 725061 - SUMMARY LOG | 725061_WYLFA.GPJ - v8_04 | 17/12/11 - 21:47 | MJB
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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH525R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **30.04.11**	**10.761**	**E:235735.9 N:393538.1**	**1** of **29**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
									Grass over TOPSOIL consisting of soft dark brown slightly sandy CLAY with abundant fine rootlets. (Made Ground - Topsoil)			(0.20)	
											10.561	0.20	
									Soft dark brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded phyllite. (Drift Deposits - Unit B1)			(0.20)	
											10.361	0.40	
0.50						1/B			Soft dark orange brown sandy slightly gravelly CLAY. Gravel is fine to coarse subangular to subrounded phyllite. (Drift Deposits - Unit B1)			(0.40)	
0.50					Air	2/ES					10 9.961	0.80	
									Firm light brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded grey/green psammite and rounded fine to coarse chert. Occasional subrounded boulders of chert and psammite. (Drift Deposits - Unit B1)			(0.40)	
											1 9.561	1.20	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
29/04/11	09:00	9.00	6.00	121	3.80
29/04/11	16:00	21.00	6.00	121	4.80
30/04/11	09:00	21.00	9.00	121	3.90
30/04/11		25.50	9.00	121	4.10

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Between 10.50 to 12.00m depth no liner.
3. 50mm standpipe installed to 12.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Beretta T44**	**CG/CA**	**GSherwood + JWickenden**	**GS+BS**

GINT_LIBRARY_V8_04.GLB|XCUSTOM - SSL - 725061 - DETAIL LOG | 725061_WYLFA.GPJ - v8_04 | 17/12/11 - 21:48 | MJB
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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH525R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **30.04.11**	**10.761**	**E:235735.9 N:393538.1**	**2** of **29**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
					Air				Firm dark brown gravelly CLAY. Gravel is fine to coarse subrounded to subangular phyllite and psammite with occasional gravel of fine to medium subrounded to rounded chert. (Drift Deposits - Unit B1)		9	(2.00)	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
29/04/11	09:00	9.00	6.00	121	3.80
29/04/11	16:00	21.00	6.00	121	4.80
30/04/11	09:00	21.00	9.00	121	3.90
30/04/11		25.50	9.00	121	4.10

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Between 10.50 to 12.00m depth no liner.
3. 50mm standpipe installed to 12.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Beretta T44**	**CG/CA**	**GSherwood + JWickenden**	**GS+BS**

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH525R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **30.04.11**	**10.761**	**E:235735.9 N:393538.1**	**3** of **29**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
					Air						8		
											3		
									Firm to very stiff grey slightly silty very gravelly CLAY. Gravel is fine to medium with occasional boulders of subangular to subrounded green psammite and rare phyllite with occasional rounded chert. (Drift Deposits - Unit B1)		7.561	3.20	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
29/04/11	09:00	9.00	6.00	121	3.80
29/04/11	16:00	21.00	6.00	121	4.80
30/04/11	09:00	21.00	9.00	121	3.90
30/04/11		25.50	9.00	121	4.10

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Between 10.50 to 12.00m depth no liner.
3. 50mm standpipe installed to 12.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Beretta T44**	**CG/CA**	**GSherwood + JWickenden**	**GS+BS**

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STRUCTURAL SOILS

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH525R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **30.04.11**	**10.761**	**E:235735.9 N:393538.1**	**4** of **29**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
					Air						7 6	4 (2.10)	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
29/04/11	09:00	9.00	6.00	121	3.80
29/04/11	16:00	21.00	6.00	121	4.80
30/04/11	09:00	21.00	9.00	121	3.90
30/04/11		25.50	9.00	121	4.10

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Between 10.50 to 12.00m depth no liner.
3. 50mm standpipe installed to 12.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Beretta T44**	**CG/CA**	**GSherwood + JWickenden**	**GS+BS**

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STRUCTURAL SOILS

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH525R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **30.04.11**	**10.761**	**E:235735.9 N:393538.1**	**5** of **29**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
					Air						5.461	5.30	
									Medium strong light green weathered PSAMMITE recovered as medium to coarse subangular to angular gravel and cobbles. (New Harbour Group - Psammite)		4.761	(0.70) 6.00	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
29/04/11	09:00	9.00	6.00	121	3.80
29/04/11	16:00	21.00	6.00	121	4.80
30/04/11	09:00	21.00	9.00	121	3.90
30/04/11		25.50	9.00	121	4.10

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Between 10.50 to 12.00m depth no liner.
3. 50mm standpipe installed to 12.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Beretta T44**	**CG/CA**	**GSherwood + JWickenden**	**GS+BS**

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH525R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	**28.04.11** End: **30.04.11**	**10.761**	**E:235735.9 N:393538.1**	**6** of **29**

Mechanical Log													
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
6.00-7.25 (0:39)	100	88	72	NI 60 110	Mist				Medium strong very thin to very narrow lenticular slightly indistinct bands of very narrowly foliated green and light purple slightly weathered PHYLLITE with very closely to extremely closely spaced very narrow to narrow bands of green fine to medium grained psammite. Phyllite has a feathery, slightly disturbed texture. Foliation fractures are 10-36° extremely closely to closely spaced partly open to open undulating rough/smooth with brown staining/clay smears. Joints dipping 8-86° extremely closely to medium spaced undulating rough/planar smooth open to moderately wide with intense brown staining/clay smears. (New Harbour Group - Phyllite) . . . between 6.00 to 6.14m depth non-intact recovered as subrounded to rounded medium gravel of red, green and purple phyllite and psammite with occasional brown staining (possibly drilling induced?). . . . at 6.27m, 6.99m, 7.17m, 8.35m, 8.56m and 8.68m depth bands of extremely closely spaced subvertical parallel occasional sigmoidal very narrow lenticular voids with dark staining and slight weathering. . . . between 6.80 and 10.00m, occasional gravel sized solution cavities formed by the dissolution of calcite veins and occasional incipient fractures associated with possible minor fault between 10.00m and 11.40m. . . . between 7..06 to 7.08 and at 7.12m depth locally phyllite is orange yellow. . . . between 7.07 to 7.12m depth locally abundant randomly orientated very narrow intersecting dark green possible chlorite staining.	1 FF[i] 2 IcF[i] 3 FF[i] 4 FF[i] 5 FF[i] 6 IcF[i] 7 IcF[i] 8 FF[i] 9 FF 10 FF[i] 11 FF[i] 12 J[i] 13 J[i] 14 J[i] 15 IcF[i] 16 FF[i] 17 FF[i] 18 FF[i] 19 FF[i] 20 FF[i] 21 FF[i] 22 FF[i] 23 FF[i] 24 FF[i] 25 FF[i] 26 FF[i] 27 FF[i] 28 FF[i] 29 FF[i] 30 J[i] 31 FF[i] 32 FF[i] 33 FF[i]	4 7		
				10 70									

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
29/04/11	09:00	9.00	6.00	121	3.80
29/04/11	16:00	21.00	6.00	121	4.80
30/04/11	09:00	21.00	9.00	121	3.90
30/04/11		25.50	9.00	121	4.10

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Between 10.50 to 12.00m depth no liner.
3. 50mm standpipe installed to 12.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Beretta T44**	**CG/CA**	**GSherwood + JWickenden**	**GS+BS**

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH525R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **30.04.11**	**10.761**	**E:235735.9 N:393538.1**	**7** of **29**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
7.25-9.00 (0:25)	100	88	72	160	Mist					34 FF[i]			
										35 FF[i]			
										37 FF[i]			
										36 J[i]			
										38 J[i]			
										39 FF[i]			
				10						40 J[i]			
				70									
				160						41 FF[i]			
	86	86	46						. . . between 7.83 to 7.92m depth locally psammite is medium grained with multiple incipient fractures dipping at 30 and 40° intersecting at 60° (possible conjugate jointing?) with dark brown staining along incipient fractures.	42 FF[i]	3		
										43 FF[i]			
										44 IcF[i]			
										45 IcF[i]			
										46 FF[i]			
										47 J[i]		8	
										48 J[i]			
										49 FF[i]			
										50 IcF[i]			
										51 FF[i]			
				50					. . . between 8.12 to 8.18m depth band of fine grained psammite.				
				100									
				170						52 FF[i]			
										53 FF[i]			

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
29/04/11	09:00	9.00	6.00	121	3.80
29/04/11	16:00	21.00	6.00	121	4.80
30/04/11	09:00	21.00	9.00	121	3.90
30/04/11		25.50	9.00	121	4.10

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Between 10.50 to 12.00m depth no liner.
3. 50mm standpipe installed to 12.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Beretta T44**	**CG/CA**	**GSherwood + JWickenden**	**GS+BS**

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH525R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **30.04.11**	**10.761**	**E:235735.9 N:393538.1**	**8** of **29**

Depth	Mechanical Log: TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
9.00-10.50 (0:30)	86 87	86 60	46 20	50 100 170 10 40 80 NI 150 350 10 30 80	Mist				. . . between 9.00 to 9.08m, 9.08 to 9.12m, 9.53 to 9.57m and 12.00 to 12.06m depth non-intact recovered as fine to medium angular to subangular gravel with dark brown staining and clay smearing (possibly due to jointing?).	54 IcF[i] 55 IcF[i] 56 FF[i] 57 J[i] 58 J[i] 59 FF[i] 60 FF[i] 61 FF[i] 62 J[i] 64 FF[i] 65 IcF[i] 63 J[i] 66 IcF[i] 67 IcF[i] 68 J[i] 69 FF[i] 72 J[i] 70 J[i] 71 J[i] 73 IcF[i] 74 FF[i] 75 FF[i] 76 J[i] 78 J[i] 77 J[i] 79 FF[i] 80 FF[i]	2 9	(6.59)	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
29/04/11	09:00	9.00	6.00	121	3.80
29/04/11	16:00	21.00	6.00	121	4.80
30/04/11	09:00	21.00	9.00	121	3.90
30/04/11		25.50	9.00	121	4.10

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Between 10.50 to 12.00m depth no liner.
3. 50mm standpipe installed to 12.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Beretta T44**	**CG/CA**	**GSherwood + JWickenden**	**GS+BS**

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH525R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **30.04.11**	**10.761**	**E:235735.9 N:393538.1**	**9** of **29**

Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
				10 30 80	Mist					82 FF[i] 81 J[i]	1		
10.00	87	60	20			1/W			. . . between 9.96 to 10.35m depth possible zone of core loss.			10	
				NR									
10.50-12.00 (0:35)	100	36	7	NI					. . . between 10.35 to 11.45m depth non-intact recovered as fine to medium occasional coarse subangular to subrounded gravel with slight brown staining and light brown grey clay (possible crush zone associated with a fault)		0		

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
29/04/11	09:00	9.00	6.00	121	3.80
29/04/11	16:00	21.00	6.00	121	4.80
30/04/11	09:00	21.00	9.00	121	3.90
30/04/11		25.50	9.00	121	4.10

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Between 10.50 to 12.00m depth no liner.
3. 50mm standpipe installed to 12.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Beretta T44**	**CG/CA**	**GSherwood + JWickenden**	**GS+BS**

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH525R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **30.04.11**	**10.761**	**E:235735.9 N:393538.1**	**10** of **29**

Mechanical Log												
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
				NI								11	
	100	36	7		Mist					83 FF[i]			
				NI 160 320						84 IcF[i] 85 IcF[i] 86 FF[i] 87 J[i]	-1		
										88 FF[i]		12	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
29/04/11	09:00	9.00	6.00	121	3.80
29/04/11	16:00	21.00	6.00	121	4.80
30/04/11	09:00	21.00	9.00	121	3.90
30/04/11		25.50	9.00	121	4.10

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Between 10.50 to 12.00m depth no liner.
3. 50mm standpipe installed to 12.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Beretta T44**	**CG/CA**	**GSherwood + JWickenden**	**GS+BS**

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH525R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **30.04.11**	**10.761**	**E:235735.9 N:393538.1**	**11** of **29**

Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
12.00-13.50 (0:30)	100	93	73	NI 160 320	Mist	22 + 23/C			. . . at 12.10m, 12.11m and 12.55m depth very narrow ptygmatic intersecting calcite veins <0.5mm intersecting at 60° (conjugated jointing/pressure).	89 FF[i] 90 FF[i]			
						20/C				91 IcF[i] 92 FF[i]	-1.829	12.59	
						21/C			Strong very thinly to very narrow bands of green blue fine to medium grained slightly weathered PSAMMITE with very closely to extremely closely spaced very narrow to narrow bands of very narrowly foliated brown-green phyllite. Extremely closely spaced randomly orientated very narrow lenticular poorly defined occasionally ptygmatic calcite veins. Extremely closely to closely spaced subvertical very narrow light green slight ptygmatic epidote veins. Foliation fractures are 10-25° extremely closely to widely spaced undulating/planar rough partly open to open brown staining/clay smears. Joints dipping 2-44° extremely closely to medium spaced undulating rough/planar smooth open to moderately wide with brown staining/clay smears. (New Harbour Group - Psammite) . . . between 12.62 to 12.70 and 14.80 to 14.97m depth extremely closely spaced very narrow stepped sigmoidal calcite veins dipping 40°. . . . between 12.86 to 12.90m, 13.00 to 13.02m and 17.40 to 17.47m depth locally abundant subvertical very narrow parallel calcite veins dipping 48° (possible tensional veining?).	93 FF[i] 94 FF[i] 95 IcF[i] 96 FF[i] 97 FF[i]	-2	13	
				50 110 190									

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
29/04/11	09:00	9.00	6.00	121	3.80
29/04/11	16:00	21.00	6.00	121	4.80
30/04/11	09:00	21.00	9.00	121	3.90
30/04/11		25.50	9.00	121	4.10

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Between 10.50 to 12.00m depth no liner.
3. 50mm standpipe installed to 12.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Beretta T44**	**CG/CA**	**GSherwood + JWickenden**	**GS+BS**

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH525R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	**28.04.11** End: **30.04.11**	**10.761**	**E:235735.9 N:393538.1**	**12** of **29**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
13.50-15.00 (0:35)	100	93	73	50 110 190	Mist					98 FF[i] 99 FF[i] 100 FF[i] 101 FF[i] 102 FF[i] 103 FF[i] 104 FF[i]	-3	14	
	100	87	58	10 20 30						105 FF[i] 106 FF[i] 107 FF[i] 108 J[i] 109 FF[i] 110 IcF[i]			
				20 90 135					. . . at 14.13m, 14.21m and 16.04m depth multiple subparallel subvertical sigmoidal calcite veins dipping 45°. . . . between 14.24 to 14.33 depth possible re-fused microfault dipping 64° undulating with calcite re-crystallisation and slight brown staining (naturally opened up microfault) . . . at 14.27m depth very narrow calcite vein dipping 80° with 5 no subhorizontal microfaults with offset of 2 - 35mm.	111 J[i] 112 FF[i] 113 J[i]		

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
29/04/11	09:00	9.00	6.00	121	3.80
29/04/11	16:00	21.00	6.00	121	4.80
30/04/11	09:00	21.00	9.00	121	3.90
30/04/11		25.50	9.00	121	4.10

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Between 10.50 to 12.00m depth no liner.
3. 50mm standpipe installed to 12.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Beretta T44**	**CG/CA**	**GSherwood + JWickenden**	**GS+BS**

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STRUCTURAL SOILS

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH525R

Contract Ref:	Start: 28.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 30.04.11	10.761	E:235735.9 N:393538.1	13 of 29

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
15.00-16.50 (0:33)	100	87	58	20 90 135	Mist				. . . between 14.64 to 14.79m, 15.31 to 15.38m, 15.50 to 15.56m, 15.76 to 15.90m and 17.70 to 17.90m depth locally extremely abundant randomly orientated very narrow light green ptygmatic chlorite veins cross cut by subvertical very narrow slightly folded calcite veins. Calcite veins offset by multiple subhorizontal microfaults by <5mm. . . . at 14.76m depth possible re-fused microfault dipping 28° planar very tight with calcite infill causing offset. . . . at 14.77 and 14.80m depth very narrow calcite veins dipping 20° with sigmoidal en echelon veining.	114 J[i] 115 FF[i] 116 J[i] 117 IcF[i] 118 J[i] 119 J[i] 120 IcF[i] 121 FF[i] 122 J[i] 123 J[i] 124 J[i] 125 J[i] 126 J[i] 127 IcF[i] 128 J[i] 129 FF[i]	-4	15 (5.53)	
	100	90	53	60 130 220									

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
29/04/11	09:00	9.00	6.00	121	3.80
29/04/11	16:00	21.00	6.00	121	4.80
30/04/11	09:00	21.00	9.00	121	3.90
30/04/11		25.50	9.00	121	4.10

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Between 10.50 to 12.00m depth no liner.
3. 50mm standpipe installed to 12.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Beretta T44**	**CG/CA**	**GSherwood + JWickenden**	**GS+BS**

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH525R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	**28.04.11** End: **30.04.11**	**10.761**	**E:235735.9 N:393538.1**	**14** of **29**

Depth	Mechanical Log: TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
16.50-18.00 (0:31)	100 100	90 100	53 86	60 130 220 20 60 90 20 150 590	Mist				. . . at 15.68m depth possible re-fused microfault dipping 36° planar tight with calcite infill, disturbing fabric. . . . at 15.80m depth narrow (4mm) sharp quartz vein with slight pink discolouration cross cutting ptygmatic chlorite/epidote veining and calcite veining dipping 56°. . . . at 16.56m, 16.92m, 17.12m, 17.22m, 17.43m and 17.56m depth very narrow lenticular calcite vein dipping 60° with fine to medium lenticular subrounded clasts of phyllite and psammite.	130 FF[i] 131 IcF[i] 132 J[i] 133 J[i] 134 J[i] 135 IcF[i] 136 IcF[i] 137 FF[i] 138 FF[i] 139 FF[i] 140 FF[i] 141 J[i] 142 IcF[i] 144 J[i] 143 IcF[i] 145 J[i] 146 J[i] 147 J[i] 148 J[i]	-5 -6	16	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
29/04/11	09:00	9.00	6.00	121	3.80
29/04/11	16:00	21.00	6.00	121	4.80
30/04/11	09:00	21.00	9.00	121	3.90
30/04/11		25.50	9.00	121	4.10

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Between 10.50 to 12.00m depth no liner.
3. 50mm standpipe installed to 12.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Beretta T44**	**CG/CA**	**GSherwood + JWickenden**	**GS+BS**

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH525R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **30.04.11**	**10.761**	**E:235735.9 N:393538.1**	**15** of **29**

Mechanical Log					Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)									
	100	100	86	20 150 590	Mist				. . . between 17.22 to 17.25 and 17.50 to 17.57m depth locally psammite is medium to coarse with extremely closely spaced randomly orientated poorly defined calcite veins. . . . at 17.27m depth possible re-fused microfault dipping 12° planar tight with calcite infill, disturbing fabric. . . . at 17.46m depth possible re-fused microfault dipping 78° undulating with calcite infill and brown staining causing offset to the fabric (naturally open re-fused microfault) . . . at 17.56m depth possible re-fused microfault dipping 22° with partial calcite re-crystallisation and brown staining (naturally open microfault) . . . between 17.70 to 17.90m depth multiple subvertical very narrow intersecting lenticular chlorite/epidote veining cross cut by multiple subvertical intersecting very narrow lenticular calcite veins cross cut by subhorizontal lenticular very narrow calcite veins cross cut by subvertical lenticular very narrow calcite veins with <4mm only to subhorizontal vein offset and cross cut by subvertical very narrow quartz vein (4 no possible stages of veining). Rare slight dark green chlorite replacement along calcite veins. . . . at 17.85m depth possible re-fused microfault dipping 38° undulating tight with	149 J[i] 150 J[i] 151 J[i] 152 J[i] 153 PMF[i] 154 J[i] 155 J[i]	-7	17 18	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
29/04/11	09:00	9.00	6.00	121	3.80
29/04/11	16:00	21.00	6.00	121	4.80
30/04/11	09:00	21.00	9.00	121	3.90
30/04/11		25.50	9.00	121	4.10

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Between 10.50 to 12.00m depth no liner.
3. 50mm standpipe installed to 12.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Beretta T44**	**CG/CA**	**GSherwood + JWickenden**	**GS+BS**

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH525R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **30.04.11**	**10.761**	**E:235735.9 N:393538.1**	**16** of **29**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
18.00-19.50 (0:33)	100	100	80	10 160 210 230 280 530	Mist				calcite infill causing disturbing fabric. . . . at 18.05m depth possible re-fused microfault dipping 40° undulating tight with calcite infill, disturbing fabric.	156 J[i] 157 FF[i]	-7.359	18.12	
									Medium strong to strong very narrow to very thin lenticular bands of very narrowly to narrowly foliated green slightly weathered PHYLLITE with extremely closely to very closely spaced very narrow to very thin bands of green fine to medium grained psammite. lenticular Phyllite foliation is generally dipping ~19°. Closely to very closely spaced very narrow randomly orientated poorly defined quartz veins. Closely to extremely closely spaced lenticular very narrow subvertical calcite veins cross cutting indistinct quartz veins. Foliation fractures are 10-25° extremely closely to medium spaced undulating/planar rough/smooth partly open to open brown staining/clay smears. Joints dipping 4-54° extremely closely to widely spaced undulating rough open with brown staining. (New Harbour Group - Phyllite) . . . at 18.32m, 18.57m, 18.73m, 20.19m, 20.51m, 20.58m and 20.93m depth randomly orientated poorly defined irregular very narrow quartz veins. Vein at 20.58m depth has dark red mineral growth/replacement. . . . at 18.57m, 18.69m, 19.56m, 19.60m, 19.75m, 19.80m, 20.92m, 20.98m and 21.02m depth lenticular very narrow calcite veins dipping 40 - 60° with fine subangular clasts of phyllite. Veins have multiple offset <30mm by microfault. . . . at 18.70m depth microfault dipping 24° planar tight, offsets calcite vein by <30mm. . . . between 18.72 to 18.83m depth locally abundant very narrow (<0.5mm) slight sigmoidal subparallel calcite veins generally very fine grained psammite. . . . between 18.78 to 18.86m depth 3 no very narrow to narrow square shaped calcite veins with dark brown staining around vein edges (appears as calcite vein has broken apart due to refused microfaulting/deformation). . . . between 18.92 to 19.24m depth locally psammite is medium to coarse and phyllite and psammite are highly disturbed with multiple randomly orientated narrow to very narrow calcite veins with fine to medium subangular to subrounded clasts of phyllite and psammite. Calcite veins causing multiple offsets to phyllite and psammite bands by <10mm (possible calcite infilled microfault?). Phyllite is locally purple.	158 FF[i] 159 FF[i] 160 FF[i] 161 FF[i] 162 PMF[i] 164 J[i] 163 J[i] 165 J[i] 166 J[i] 167 FF[i]	-8	19	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
29/04/11	09:00	9.00	6.00	121	3.80
29/04/11	16:00	21.00	6.00	121	4.80
30/04/11	09:00	21.00	9.00	121	3.90
30/04/11		25.50	9.00	121	4.10

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Between 10.50 to 12.00m depth no liner.
3. 50mm standpipe installed to 12.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Beretta T44**	**CG/CA**	**GSherwood + JWickenden**	**GS+BS**

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH525R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **30.04.11**	**10.761**	**E:235735.9 N:393538.1**	**17** of **29**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
19.50-21.00 (0:33)	100 100	100 100	80 69	230 280 530 10 70 130	Mist	25/C 24/C			. . . at 19.01m depth possible re-fused microfault dipping 34° undulating tight causing offset to the fabric. . . . at 19.30m, 19.44m, 19.55m, 19.67m and 20.26m depth very narrow parallel calcite veins dipping 58° with stepped sigmoidal en echelon veining. . . . between 19.87 to 20.15m depth becoming medium strong. . . . at 20.07m to 20.43m depth multiple possible re-fused microfaults dipping 19-22° undulating tight with calcite infill, disturbing fabric.	168 FF[i] 169 IcF[i] 170 FF[i] 171 FF[i] 172 IcF[i] 173 FF[i] 174 FF[i] 175 FF[i] 176 J[i] 177 J[i]	-9 20	(2.92)	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
29/04/11	09:00	9.00	6.00	121	3.80
29/04/11	16:00	21.00	6.00	121	4.80
30/04/11	09:00	21.00	9.00	121	3.90
30/04/11		25.50	9.00	121	4.10

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Between 10.50 to 12.00m depth no liner.
3. 50mm standpipe installed to 12.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Beretta T44**	**CG/CA**	**GSherwood + JWickenden**	**GS+BS**

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH525R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **30.04.11**	**10.761**	**E:235735.9 N:393538.1**	**18** of **29**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
21.00-22.50 (0:23)	100	100	69	10 70 130	Mist				. . . between 20.44 and 20.60m depth locally abundant randomly orientated very narrow lenticular intersecting calcite veins. . . . at 20.78m depth possible re-fused microfault dipping 19° undulating with calcite infill, disturbing fabric.	178 FF[i] 179 J[i] 180 FF[i] 181 J[i] 182 J[i]	-10		
	100	100	93	40 40 630					Strong very thin to thin bands of green blue fine to medium grained slightly weathered to fresh PSAMMITE with very closely to closely spaced very narrow to very thin bands of very narrowly foliated purple phyllite. Extremely closely to very closely spaced subvertical lenticular intersecting very narrow calcite veins dipping 45-60° with occasional poorly defined vein edges concentrated in the psammite. Extremely closely to closely subhorizontal very narrow calcite veins (<0.5mm) dipping ~20° cross-cut by subvertical calcite veins. Foliation fractures are 20-28° medium spaced undulating rough/planar smooth open with brown staining. Joints dipping 12-40° very closely to closely spaced undulating/planar rough open with brown staining. (New Harbour Group - Psammite) . . . between 21.14 to 21.17m, 21.21 to 21.26m and 21.74 to 21.80m depth abundant extremely closely spaced subvertical ptygmatic light green chlorite/epidote veining cross-cut by calcite veining. . . . between 21.17 to 21.21 and 21.26 to 21.29m depth phyllite is disturbed with mottled appearance possibly due to calcite overprinting.	183 FF[i] 185 J[i] 184 IcF[i] 186 J[i] 187 IcF[i] 188 IcF[i] 189 J[i]	-10.279	21 21.04 (0.76)	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
29/04/11	09:00	9.00	6.00	121	3.80
29/04/11	16:00	21.00	6.00	121	4.80
30/04/11	09:00	21.00	9.00	121	3.90
30/04/11		25.50	9.00	121	4.10

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Between 10.50 to 12.00m depth no liner.
3. 50mm standpipe installed to 12.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Beretta T44**	**CG/CA**	**GSherwood + JWickenden**	**GS+BS**

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH525R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **30.04.11**	**10.761**	**E:235735.9 N:393538.1**	**19** of **29**

Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
				40 40 630	Mist				. . . between 21.21 to 21.26m depth calcite veining cross-cut is chlorite/epidote veining. . . . at 21.60m and 21.71m depth 2 no. possible re-fused microfault dipping 52° undulating tight with calcite infill, disturbing fabric.	191 IcF[i] 190 J[i]	-11		
										192 FF[i]	-11.039	21.80	
									Medium strong thin to very thin bands of very narrowly foliated green occasionally green brown slightly weathered PHYLLITE with closely to very closely spaced very narrow to very thin lenticular bands of green fine to medium grained psammite. Phyllite foliation is generally dipping ~15-25°. Extremely closely to very closely spaced subvertical very narrow parallel slightly ptygmatic calcite veins dipping 50-70° with occasional moderately developed boudinage texture and veins generally concentrated within psammite (possible tensional veining?). Extremely closely to closely spaced subhorizontal very narrow (<0.5mm) calcite veins dipping ~20° parallel to foliation. Foliation fractures 15-25° very closely to medium spaced undulating/planar rough partly open to open with dark brown staining. Joints are 2-55° extremely closely to widely spaced planar rough/ undulating rough open with slight brown staining. (New Harbour Group - Phyllite) . . . at 21.91m depth possible re-fused microfault dipping 21° with partial calcite infill and slight brown staining, disturbing fabric.	193 IcF[i] 194 IcF[i] 195 IcF[i] 196 PMF[i] 197 FF[i]		22	
	100	100	93							198 IcF[i]			
										199 J[i]			
				10 140 360						200 FF[i]			
										201 FF[i]			
22.50-24.00 (0:31)										202 FF[i] 203 FF[i]			
										204 PMF[i]			
	100	100	71						. . . at 22.62m depth possible re-fused microfault dipping 10° undulating with partial calcite infill with slight brown staining causing offset to the fabric (naturally opened up microfault)	205 J[i]	-12		

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
29/04/11	09:00	9.00	6.00	121	3.80
29/04/11	16:00	21.00	6.00	121	4.80
30/04/11	09:00	21.00	9.00	121	3.90
30/04/11		25.50	9.00	121	4.10

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Between 10.50 to 12.00m depth no liner.
3. 50mm standpipe installed to 12.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Beretta T44**	**CG/CA**	**GSherwood + JWickenden**	**GS+BS**

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH525R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	**28.04.11** End: **30.04.11**	**10.761**	**E:235735.9 N:393538.1**	**20** of **29**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
				10 140 360						206 IcF[i] 207 FF[i]		23	
									. . . between 23.00 to 23.10m, 24.74 to 24.77m and 25.08 to 25.10m depth multiple extremely closely spaced subvertical parallel sigmoidal lenticular calcite veins (tensional veining).	209 FF[i] 208 J[i]			
									. . . between 23.20 to 23.32 and 25.34 to 25.40m depth extremely closely spaced very narrow (<0.1mm) subvertical subparallel occasionally intersecting dark red/purple veining (possible poorly developed brecciated appearance ?).	210 IcF[i]			
	100	100	71		Mist				. . . between 23.37 to 23.41m, 23.54 to 23.64m, 23.96 to 24.13m and 24.22 to 24.30m depth locally extremely closely spaced randomly orientate very narrow intersecting ptygmatic chlorite/epidote veining cross-cut to calcite veining. . . . between 23.43 to 23.61 and below 23.83m depth phyllite is light brown. . . . at 23.46m depth possible re-fused microfault dipping 2° undulating tight with white calcite infill, disturbing fabric.	211 FF[i] 212 IcF[i] 213 FF[i]	-13	(3.70)	
				210 230 310						214 FF[i] 215 FF[i]			
				10 50 180						216 J[i]		24	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
29/04/11	09:00	9.00	6.00	121	3.80
29/04/11	16:00	21.00	6.00	121	4.80
30/04/11	09:00	21.00	9.00	121	3.90
30/04/11		25.50	9.00	121	4.10

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Between 10.50 to 12.00m depth no liner.
3. 50mm standpipe installed to 12.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Beretta T44**	**CG/CA**	**GSherwood + JWickenden**	**GS+BS**

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH525R

Contract Ref:	Start: 28.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 30.04.11	10.761	E:235735.9 N:393538.1	21 of 29

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
24.00-25.50 (0:25)	100	100	66	10 50 180 150 310 370 20 70 150	Mist				. . . at 24.28m, 24.29m, 24.64m, 24.74m and 25.10m depth very narrow lenticular calcite veins with poorly defined vein edges. Veins cross-cut ptygmatic chlorite/epidote veining and are cross-cut by calcite infill foliation fractures. . . . between 24.49 to 24.53m depth phyllite is narrow lenticular and is locally dark brown/dark green in colour. . . . between 24.57 to 24.67m depth phyllite and psammite appear moderately disturbed with light grey-white mottled appearance possibly calcite overprinting?. . . . at 24.60 and 24.95m depth 2 number parallel very narrow calcite veins dipping~35° with boudinage texture. . . . between 25.08 to 25.10m and 25.37 to 25.50m depth sharp very narrow lenticular sigmoidal subparallel to parallel occasionally intersecting calcite veins with fine subangular clasts of phyllite (possibly late stages poorly	217 IcF[i] 218 J[i] 219 J[i] 220 FF[i] 221 FF[i] 222 J[i] 223 J[i] 224 J[i]	-14 25		

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
29/04/11	09:00	9.00	6.00	121	3.80
29/04/11	16:00	21.00	6.00	121	4.80
30/04/11	09:00	21.00	9.00	121	3.90
30/04/11		25.50	9.00	121	4.10

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Between 10.50 to 12.00m depth no liner.
3. 50mm standpipe installed to 12.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Beretta T44**	**CG/CA**	**GSherwood + JWickenden**	**GS+BS**

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH525R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **30.04.11**	**10.761**	**E:235735.9 N:393538.1**	**22** of **29**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
	100	100	66	20 70 150	Mist				developed tensional veining due to inclusions and occasional intersecting calcite veins.	225 FF[i] 226 FF[i] 227 FF[i] 228 J[i] 229 J[i]	-14.739	25.50	
									Rotary borehole terminated at 25.50m depth.			26	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
29/04/11	09:00	9.00	6.00	121	3.80
29/04/11	16:00	21.00	6.00	121	4.80
30/04/11	09:00	21.00	9.00	121	3.90
30/04/11		25.50	9.00	121	4.10

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Between 10.50 to 12.00m depth no liner.
3. 50mm standpipe installed to 12.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	**Beretta T44**	**CG/CA**	**GSherwood + JWickenden**	**GS+BS**

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BOREHOLE LOG

Contract:		Client:		Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation		Horizon Nuclear Power Wylfa Limited		BH525R
Contract Ref:	Start: 28.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 30.04.11	10.761	E:235735.9 N:393538.1	23 of 29

6.00m - 9.00m depth



Method Used:	Rotary open hole + Rotary Cored	Plant Used:	Beretta T44	Drilled By:	CG/CA	Logged By:	GSherwood + JWickenden	Checked By:	GS+BS

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BOREHOLE LOG

Contract:		Client:		Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation		Horizon Nuclear Power Wylfa Limited		BH525R
Contract Ref:	Start: 28.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 30.04.11	10.761	E:235735.9 N:393538.1	24 of 29

9.00m - 12.00m depth



Method Used:	Rotary open hole + Rotary Cored	Plant Used:	Beretta T44	Drilled By:	CG/CA	Logged By:	GSherwood + JWickenden	Checked By:	GS+BS

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BOREHOLE LOG

Contract:		Client:		Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation		Horizon Nuclear Power Wylfa Limited		BH525R
Contract Ref:	Start: 28.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 30.04.11	10.761	E:235735.9 N:393538.1	25 of 29

12.00m - 15.00m depth



Method Used:	Rotary open hole + Rotary Cored	Plant Used:	Beretta T44	Drilled By:	CG/CA	Logged By:	GSherwood + JWickenden	Checked By:	GS+BS

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BOREHOLE LOG

Contract:		Client:		Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation		Horizon Nuclear Power Wylfa Limited		BH525R
Contract Ref:	Start: 28.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 30.04.11	10.761	E:235735.9 N:393538.1	26 of 29

15.00m - 18.00m depth



Method Used:	Rotary open hole + Rotary Cored	Plant Used:	Beretta T44	Drilled By:	CG/CA	Logged By:	GSherwood + JWickenden	Checked By:	GS+BS

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BOREHOLE LOG

Contract:		Client:		Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation		Horizon Nuclear Power Wylfa Limited		BH525R
Contract Ref:	Start: 28.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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18.00m - 21.00m depth



Method Used:	Rotary open hole + Rotary Cored	Plant Used:	Beretta T44	Drilled By:	CG/CA	Logged By:	GSherwood + JWickenden	Checked By:	GS+BS

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BOREHOLE LOG

Contract:		Client:		Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation		Horizon Nuclear Power Wylfa Limited		BH525R
Contract Ref:	Start: 28.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 30.04.11	10.761	E:235735.9 N:393538.1	28 of 29

21.00m - 24.00m depth



Method Used:	Rotary open hole + Rotary Cored	Plant Used:	Beretta T44	Drilled By:	CG/CA	Logged By:	GSherwood + JWickenden	Checked By:	GS+BS

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH525R

Contract Ref:	Start: 28.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 30.04.11	10.761	E:235735.9 N:393538.1	29 of 29

24.00m - 25.00m depth



Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Rotary Cored	Beretta T44	CG/CA	GSherwood + JWickenden	GS+BS

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SUMMARY OF DISCONTINUITIES - BH525R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
1	6.14	FF	24	U-R	Open	Slight brown staining.		NHG	META_F
2	6.14-6.25	IcF	45	U	Partly open	Very narrow voids along IcF with		NHG	META_F
						brown staining.			
3	6.20	FF	21	U-R	Open	Slight brown staining.		NHG	META_F
4	6.22	FF	24	U-R	Open	Slight brown staining.		NHG	META_F
5	6.33	FF	22	U-R	Partly open	Brown staining.		NHG	META_F
6	6.41	IcF	14	P	Tight	Slight brown staining.		NHG	META_F
7	6.42	IcF	12	P	Partly open	Very narrow voids with brown staining		NHG	META_F
						penetrating downward.			
8	6.44	FF	26	U-R	Open	Brown staining.		NHG	META_F
9	6.47	FF	26	U-R	Partly open	-		NHG	META_F
10	6.51	FF	21	P-R	Partly open	Slight brown staining.		NHG	META_F
11	6.52	FF	22	U-R	Partly open	Slight brown staining.		NHG	META_F
12	6.55	J	40	U-R	Open	Brown staining and slight formation of		NHG	META_F
						clay			
13	6.56	J	40	U-R	Moderately wide	Brown staining (possible dissolution of		NHG	META_F

Key:
Type codes: FF = Foliation fracture, IcF = Incipient fracture, J = Joint, PMF = Possible Micro fault.
Small-scale roughness codes: P = Planar, P-R = Planar - rough, P-SM = Planar - smooth, U = Undulating, U-R = Undulating - rough, U-SM = Undulating - smooth.
Aperture description codes: Moderately wide = (2.5mm - 10mm), Open = (0.5mm - 2.5mm), Partly open = (0.25mm - 0.5mm), Tight = (0.1mm - 0.25mm), Very tight = (<0.1mm).

STRUCTURAL SOILS
The Old School
Stillhouse Lane
Bedminster
Bristol BS3 4EB

Compiled By		Date	Contract Ref:
[redacted]	MBEVAN	17.12.11	725061

Contract: **Wylfa New Build - Intermediate Onshore Ground Investigation**

AGS

SUMMARY OF DISCONTINUITIES - BH525R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
						calcite?).			
14	6.58	J	42	U-R	Moderately wide	Brown staining (possible dissolution of		NHG	META_F
						calcite?).			
15	6.59	IcF	62	U	Tight	Slight brown staining penetrating		NHG	META_F
						downward.			
16	6.69	FF	18	U-R	Open	Dark brown red staining.		NHG	META_F
17	6.70	FF	20	U-R	Open	Slight brown staining and slight		NHG	META_F
						weathering.			
18	6.71	FF	22	U-R	Open	Slight clay infill.		NHG	META_F
19	6.72	FF	21	U-R	Partly open	Slight brown staining and slight		NHG	META_F
						weathering.			
20	6.74	FF	22	U-R	Partly open	Slight brown staining.		NHG	META_F
21	6.76	FF	21	U-SM	Partly open	Slight brown staining.		NHG	META_F
22	6.81	FF	24	U-R	Open	Brown staining.		NHG	META_F
23	6.82	FF	24	U-R	Partly open	Slight brown staining		NHG	META_F
24	6.83	FF	28	U-R	Open	Brown staining.		NHG	META_F

Key:
Type codes: FF = Foliation fracture, IcF = Incipient fracture, J = Joint, PMF = Possible Micro fault.
Small-scale roughness codes: P = Planar, P-R = Planar - rough, P-SM = Planar - smooth, U = Undulating, U-R = Undulating - rough, U-SM = Undulating - smooth.
Aperture description codes: Moderately wide = (2.5mm - 10mm), Open = (0.5mm - 2.5mm), Partly open = (0.25mm - 0.5mm), Tight = (0.1mm - 0.25mm), Very tight = (<0.1mm).

SUMMARY OF DISCONTINUITIES - BH525R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
25	6.85	FF	28	U-R	Partly open	Slight brown staining.		NHG	META_F
26	6.87	FF	18	U-R	Partly open	None.		NHG	META_F
27	6.89	FF	24	U-R	Open	Brown staining.		NHG	META_F
28	6.95	FF	26	U-R	Open	Intense brown staining.		NHG	META_F
29	6.96	FF	24	U-R	Open	Brown staining.		NHG	META_F
30	7.00	J	31	U-R	Open	Slight brown staining.		NHG	META_F
31	7.05	FF	20	U-R	Open	Brown orange staining.		NHG	META_F
32	7.10	FF	24	U-R	Partly open	Brown and orange staining.		NHG	META_F
33	7.14	FF	19	U-R	Partly open	Brown staining with mottled		NHG	META_F
						appearance.			
34	7.24	FF	22	U-R	Partly open	Slight brown staining.		NHG	META_F
35	7.34	FF	21	U-R	Partly open	Slight brown staining.		NHG	META_F
36	7.36-7.43	J	58	U-R	Open	Brown staining.		NHG	META_F
37	7.39	FF	18	U-R	Partly open	Slight brown staining.		NHG	META_F
38	7.46	J	24	U-R	Open	Slight brown staining.		NHG	META_F
39	7.51	FF	21	U-R	Partly open	Slight brown staining.		NHG	META_F

Key:
Type codes: FF = Foliation fracture, IcF = Incipient fracture, J = Joint, PMF = Possible Micro fault.
Small-scale roughness codes: P = Planar, P-R = Planar - rough, P-SM = Planar - smooth, U = Undulating, U-R = Undulating - rough, U-SM = Undulating - smooth.
Aperture description codes: Moderately wide = (2.5mm - 10mm), Open = (0.5mm - 2.5mm), Partly open = (0.25mm - 0.5mm), Tight = (0.1mm - 0.25mm), Very tight = (<0.1mm).

SUMMARY OF DISCONTINUITIES - BH525R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
40	7.54-7.60	J	48	U-R	Open	Dark brown staining.		NHG	META_F
41	7.66	FF	10	U-R	Partly open	Brown staining.		NHG	META_F
42	7.82	FF	16	U-R	Partly open	Brown staining.		NHG	META_F
43	7.84	FF	14	U-R	Open	Slight brown staining.		NHG	META_F
44	7.90	IcF	38	P	Tight	Brown staining penetrating downward.		NHG	META_F
45	7.91-7.93	IcF	68	P	Tight	Brown staining penetrating downward.		NHG	META_F
46	7.95	FF	16	U-R	Partly open	Brown staining.		NHG	META_F
47	7.95-8.07	J	75	U-R	Open	Purple-brown staining.		NHG	META_F
48	7.96-8.10	J	71	U-R	Open	Purple-brown staining.		NHG	META_F
49	8.06	FF	29	U-R	Partly open	Slight brown staining.		NHG	META_F
50	8.06-8.10	IcF	76	P	Tight	Brown staining penetrating downward.		NHG	META_F
51	8.11	FF	26	U-R	Partly open	Brown staining.		NHG	META_F
52	8.25	FF	36	U-R	Open	Brown staining.		NHG	META_F
53	8.38	FF	21	U-R	Partly open	Intense dark brown staining.		NHG	META_F
54	8.52	IcF	64	U	Tight	Dark brown staining penetrating		NHG	META_F
						downward.			

Key:
Type codes: FF = Foliation fracture, IcF = Incipient fracture, J = Joint, PMF = Possible Micro fault.
Small-scale roughness codes: P = Planar, P-R = Planar - rough, P-SM = Planar - smooth, U = Undulating, U-R = Undulating - rough, U-SM = Undulating - smooth.
Aperture description codes: Moderately wide = (2.5mm - 10mm), Open = (0.5mm - 2.5mm), Partly open = (0.25mm - 0.5mm), Tight = (0.1mm - 0.25mm), Very tight = (<0.1mm).

SUMMARY OF DISCONTINUITIES - BH525R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
55	8.53	IcF	30	U	Tight	Dark brown staining penetrating		NHG	META_F
						downward.			
56	8.55	FF	22	U-R	Open	Brown staining.		NHG	META_F
57	8.56-8.62	J	58	U-R	Open	Intense brown staining.		NHG	META_F
58	8.56-8.65	J	58	U-R	Open	Intense brown staining.		NHG	META_F
59	8.61	FF	24	U-R	Open	Brown staining.		NHG	META_F
60	8.65	FF	26	U-R	Open	Clay infill.		NHG	META_F
61	8.73	FF	24	U-R	Partly open	Slight brown staining.		NHG	META_F
62	8.75	J	9	U-R	Open	None.		NHG	META_F
63	9.10-9.27	J	52	U-R	Open	Brown purple staining.		NHG	META_F
64	9.13	FF	20	U-R	Partly open	Dark brown staining.		NHG	META_F
65	9.15-9.18	IcF	40	U	Tight	Dark brown staining penetrating		NHG	META_F
						downward.			
66	9.21	IcF	2	P	Tight	None.		NHG	META_F
67	9.23-9.33	IcF	68	U	Partly open	Intense brown staining penetrating		NHG	META_F
						downward along the partly open side.			

Key:
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Small-scale roughness codes: P = Planar, P-R = Planar - rough, P-SM = Planar - smooth, U = Undulating, U-R = Undulating - rough, U-SM = Undulating - smooth.
Aperture description codes: Moderately wide = (2.5mm - 10mm), Open = (0.5mm - 2.5mm), Partly open = (0.25mm - 0.5mm), Tight = (0.1mm - 0.25mm), Very tight = (<0.1mm).

SUMMARY OF DISCONTINUITIES - BH525R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
68	9.28	J	11	U-R	Open	Brown staining.		NHG	META_F
69	9.32	FF	20	U-R	Open	Brown staining.		NHG	META_F
70	9.34-9.40	J	60	U-R	Open	Intense brown staining.		NHG	META_F
71	9.35-9.42	J	60	U-R	Open	Slight clay smearing and dark staining.		NHG	META_F
72	9.36	J	8	U-R	Open	Brown staining.		NHG	META_F
73	9.40-9.44	IcF	58	U	Partly open	Intense brown staining penetrating		NHG	META_F
						down along the partly open end.			
74	9.44	FF	24	U-R	Open	Brown staining.		NHG	META_F
75	9.47	FF	12	U-R	Partly open	Brown staining.		NHG	META_F
76	9.47-9.55	J	48	U-R	Open	Dark brown staining.		NHG	META_F
77	9.48-9.58	J	38	U-R	Open	Dark brown staining.		NHG	META_F
78	9.52	J	30	U-R	Moderately wide	Dark brown staining.		NHG	META_F
79	9.56	FF	26	U-R	Open	Slight clay smearing and brown		NHG	META_F
						smearing.			
80	9.57	FF	24	U-R	Open	Brown clay smearing.		NHG	META_F
81	9.61-9.77	J	58	U-R	Open	Dark brown red staining.		NHG	META_F

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Aperture description codes: Moderately wide = (2.5mm - 10mm), Open = (0.5mm - 2.5mm), Partly open = (0.25mm - 0.5mm), Tight = (0.1mm - 0.25mm), Very tight = (<0.1mm).

SUMMARY OF DISCONTINUITIES - BH525R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
82	9.64	FF	12	U-R	Partly open	Slight brown staining.		NHG	META_F
83	11.58	FF	20	U-R	Open	Brown staining.		NHG	META_F
84	11.71	IcF	46	U	Tight	Slight brown staining penetrating		NHG	META_F
						downward.			
85	11.72	IcF	36	U	Tight	Slight brown staining penetrating		NHG	META_F
						downward.			
86	11.74	FF	21	U-R	Partly open	Slight brown staining.		NHG	META_F
87	11.74-11.81	J	86	U-R	Open	Brown red staining.		NHG	META_F
88	11.91	FF	24	U-R	Open	Slight clay smearing (<2mm).		NHG	META_F
89	12.07	FF	22	U-R	Partly open	One of the wall brecciated/ non intact.		NHG	META_F
90	12.18	FF	24	U-R	Open	Brown staining.		NHG	META_F
91	12.41	IcF	12	U	Tight	Slight brown staining penetrating		NHG	META_F
						downward.			
92	12.42	FF	24	U-R	Open	Slight brown staining.		NHG	META_F
93	12.74	FF	21	P-R	Partly open	Slight brown staining.		NHG	META_M
94	12.94	FF	16	P-R	Open	Intense brown staining.		NHG	META_M

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Aperture description codes: Moderately wide = (2.5mm - 10mm), Open = (0.5mm - 2.5mm), Partly open = (0.25mm - 0.5mm), Tight = (0.1mm - 0.25mm), Very tight = (<0.1mm).

SUMMARY OF DISCONTINUITIES - BH525R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
95	13.07-13.15	IcF	42	P	Tight	Brown staining penetrating downward.		NHG	META_M
96	13.13	FF	20	U-R	Partly open	Slight brown staining.		NHG	META_M
97	13.18	FF	11	U-R	Partly open	Slight brown staining.		NHG	META_M
98	13.29	FF	19	U-R	Open	Intense brown staining and slight clay		NHG	META_M
						smearing.			
99	13.34	FF	12	U-R	Partly open	Slight brown staining.		NHG	META_M
100	13.41	FF	18	P-R	Partly open	Slight brown staining.		NHG	META_M
101	13.46	FF	11	P-R	Partly open	Slight clay smearing.		NHG	META_M
102	13.52	FF	10	P-R	Partly open	Slight clay smearing.		NHG	META_M
103	13.58	FF	16	U-R	Partly open	Slight brown staining.		NHG	META_M
104	13.72	FF	18	U-R	Partly open	Slight clay smearing.		NHG	META_M
105	13.91	FF	17	P-R	Open	Slight clay smearing and slight brown		NHG	META_M
						staining.			
106	13.92	FF	14	U-R	Partly open	None.		NHG	META_M
107	13.94	FF	18	U-R	Partly open	Slight brown staining.		NHG	META_M
108	13.97	J	24	U-R	Open	Slight clay smearing.		NHG	META_M

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Aperture description codes: Moderately wide = (2.5mm - 10mm), Open = (0.5mm - 2.5mm), Partly open = (0.25mm - 0.5mm), Tight = (0.1mm - 0.25mm), Very tight = (<0.1mm).

SUMMARY OF DISCONTINUITIES - BH525R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
109	14.00	FF	22	U-R	Partly open	Slight clay infill.		NHG	META_M
110	14.03	IcF	14	U	Tight	Partly opened on one side.		NHG	META_M
111	14.17	J	12	U-R	Open	Slight brown staining.		NHG	META_M
112	14.24	FF	17	P-SM	Open	Slight brown staining.		NHG	META_M
113	14.34	J	24	U-R	Open	Slight brown staining.		NHG	META_M
114	14.47	J	14	U-R	Open	Brown staining.		NHG	META_M
115	14.49	FF	17	U-R	Partly open	Slight brown staining.		NHG	META_M
116	14.53	J	11	U-R	Open	Brown staining.		NHG	META_M
117	14.61	IcF	34	P	Very tight	None.		NHG	META_M
118	14.62	J	14	U-R	Open	Brown staining.		NHG	META_M
119	14.64	J	16	U-R	Open	Brown staining.		NHG	META_M
120	14.80	IcF	19	P	Very tight	None.		NHG	META_M
121	14.82	FF	12	U-R	Partly open	Slight brown staining and slight clay		NHG	META_M
						smearing.			
122	14.88	J	12	U-R	Open	Slight brown staining and slight clay		NHG	META_M
						smearing.			

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Aperture description codes: Moderately wide = (2.5mm - 10mm), Open = (0.5mm - 2.5mm), Partly open = (0.25mm - 0.5mm), Tight = (0.1mm - 0.25mm), Very tight = (<0.1mm).

SUMMARY OF DISCONTINUITIES - BH525R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
123	14.95	J	24	U-R	Open	None.		NHG	META_M
124	15.00	J	23	U-R	Open	None.		NHG	META_M
125	15.05	J	24	U-R	Open	None.		NHG	META_M
126	15.17	J	23	U-R	Open	Slight brown staining.		NHG	META_M
127	15.30-15.45	IcF	64	P	Tight	None.		NHG	META_M
128	15.39	J	28	U-R	Open	Slight brown staining and partial		NHG	META_M
						calcite infilling (probably open up			
						calcite vein - natural).			
129	15.52	FF	17	U-R	Partly open	Slight brown staining.		NHG	META_M
130	15.72	FF	22	U-R	Partly open	Brown staining.		NHG	META_M
131	15.76	IcF	14	U	Tight	Slight brown staining penetrating		NHG	META_M
						downward.			
132	15.78	J	18	U-R	Open	Slight brown staining.		NHG	META_M
133	15.92	J	24	U-R	Open	Slight clay smearing.		NHG	META_M
134	15.92-16.03	J	58	U-R	Open	Slight clay smearing and slight brown		NHG	META_M
						staining.			

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Aperture description codes: Moderately wide = (2.5mm - 10mm), Open = (0.5mm - 2.5mm), Partly open = (0.25mm - 0.5mm), Tight = (0.1mm - 0.25mm), Very tight = (<0.1mm).

SUMMARY OF DISCONTINUITIES - BH525R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
135	15.98	IcF	15	U	Tight	Slight clay smearing on partly open		NHG	META_M
						side.			
136	15.98-16.03	IcF	70	U	Tight	Dark staining penetrating downward		NHG	META_M
						along the IcF.			
137	16.03	FF	18	U-R	Partly open	None.		NHG	META_M
138	16.07	FF	12	U-R	Open	None.		NHG	META_M
139	16.13	FF	20	U-R	Partly open	None.		NHG	META_M
140	16.15	FF	16	U-R	Partly open	None.		NHG	META_M
141	16.25	J	24	U-R	Open	Clay infill and dark brown staining.		NHG	META_M
142	16.27	IcF	4	U	Partly open	Brown staining penetrating downward.		NHG	META_M
143	16.27-16.35	IcF	81	U	Partly open	Light brown staining.		NHG	META_M
144	16.30	J	2	U-R	Open	Brown staining.		NHG	META_M
145	16.32	J	30	U-R	Moderately wide	Clay infill and slight brown staining.		NHG	META_M
146	16.36	J	38	U-R	Moderately wide	Slight brown staining with fine gravel		NHG	META_M
						of green psammite			
147	16.45	J	18	U-R	Open	Brown staining.		NHG	META_M

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SUMMARY OF DISCONTINUITIES - BH525R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
148	16.50	J	31	P-R	Open	Brown staining.		NHG	META_M
149	17.09	J	9	U-R	Open	Slight brown staining.		NHG	META_M
150	17.35	J	11	U-R	Open	Brown staining.		NHG	META_M
151	17.39	J	26	U-R	Open	Brown staining.		NHG	META_M
152	17.41	J	32	P-R	Open	Brown staining.		NHG	META_M
154	17.60	J	29	U-R	Open	Brown staining.		NHG	META_M
155	17.69	J	26	U-R	Open	Brown staining.		NHG	META_M
156	18.02	J	44	U-R	Open	Slight brown staining.		NHG	META_M
157	18.11	FF	24	U-R	Partly open	Brown staining.		NHG	META_F
158	18.27	FF	18	U-R	Partly open	None.		NHG	META_F
159	18.28	FF	22	U-R	Partly open	None.		NHG	META_F
160	18.46	FF	12	U-R	Open	Slight brown staining.		NHG	META_F
161	18.67	FF	19	P-SM	Partly open	Calcite infill.		NHG	META_F
163	18.86-19.03	J	54	U-R	Open	Dark brown staining possibly found		NHG	META_F
						along the calcite vein.			
164	18.91	J	8	U-R	Open	Intense dark brown staining.		NHG	META_F

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Aperture description codes: Moderately wide = (2.5mm - 10mm), Open = (0.5mm - 2.5mm), Partly open = (0.25mm - 0.5mm), Tight = (0.1mm - 0.25mm), Very tight = (<0.1mm).

SUMMARY OF DISCONTINUITIES - BH525R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
165	18.95-19.04	J	48	U-R	Open	Intense dark brown staining.		NHG	META_F
166	19.03	J	4	U-R	Open	Intense dark brown staining and slight		NHG	META_F
						clay smearing.			
167	19.11	FF	18	U-R	Open	Brown staining.		NHG	META_F
168	19.34	FF	20	U-R	Open	Slight brown staining.		NHG	META_F
169	19.72-19.75	IcF	60	U	Tight	Slight brown staining penetrating		NHG	META_F
						downward along the partly open side.			
170	19.87	FF	19	U-R	Open	Slight brown staining.		NHG	META_F
171	20.15	FF	19	U-R	Open	Slight brown staining.		NHG	META_F
172	20.18	IcF	31	P	Tight	Slight brown staining penetrating		NHG	META_F
						downward.			
173	20.20	FF	20	U-R	Open	Slight brown staining and slight clay		NHG	META_F
						smearing.			
174	20.31	FF	22	P-R	Partly open	Slight brown staining.		NHG	META_F
175	20.34	FF	21	U-R	Open	Brown staining.		NHG	META_F
176	20.37	J	38	U-R	Open	Dark brown staining.		NHG	META_F

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Aperture description codes: Moderately wide = (2.5mm - 10mm), Open = (0.5mm - 2.5mm), Partly open = (0.25mm - 0.5mm), Tight = (0.1mm - 0.25mm), Very tight = (<0.1mm).

SUMMARY OF DISCONTINUITIES - BH525R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
177	20.38	J	50	U-R	Open	Dark brown staining.		NHG	META_F
178	20.42	FF	18	U-R	Partly open	Slight brown staining.		NHG	META_F
179	20.55	J	34	U-R	Open	Dark brown staining.		NHG	META_F
180	20.62	FF	19	U-R	Open	Slight brown staining.		NHG	META_F
181	20.70-20.80	J	38	U-R	Open	Dark brown staining.		NHG	META_F
182	20.76	J	34	U-R	Open	Slight brown staining.		NHG	META_F
183	21.39	FF	28	U-R	Open	Brown staining.		NHG	META_M
184	21.40-21.56	IcF	70	U	Partly open	Dark brown staining penetrating		NHG	META_F
						downward.			
185	21.46	J	28	U-R	Open	Slight brown staining.		NHG	META_F
186	21.50	J	24	U-R	Open	Brown staining.		NHG	META_F
187	21.52	IcF	51	P	Tight	None.		NHG	META_F
188	21.54	IcF	6	P	Tight	None.		NHG	META_F
189	21.55	J	12	P-R	Open	Brown staining.		NHG	META_F
190	21.71-21.75	J	40	P-SM	Open	Calcite vein and brown staining.		NHG	META_F
191	21.72	IcF	20	P	Tight	Partial calcite recrystallisation		NHG	META_M

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Aperture description codes: Moderately wide = (2.5mm - 10mm), Open = (0.5mm - 2.5mm), Partly open = (0.25mm - 0.5mm), Tight = (0.1mm - 0.25mm), Very tight = (<0.1mm).

SUMMARY OF DISCONTINUITIES - BH525R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
192	21.79	FF	20	P-SM	Open	Slight brown staining.		NHG	META_F
193	21.85	IcF	21	P	Tight	None.		NHG	META_F
194	21.86	IcF	16	P	Tight	Calcite vein		NHG	META_F
195	21.89	IcF	54	P	Tight	None.		NHG	META_F
197	21.93	FF	24	P-R	Open	Brown staining.		NHG	META_F
198	22.04	IcF	20	P	Tight	None.		NHG	META_F
199	22.20	J	12	P-R	Open	Slight brown staining.		NHG	META_F
200	22.30	FF	18	U-R	Partly open	Slight brown staining.		NHG	META_F
201	22.36	FF	24	U-R	Partly open	Slight brown staining.		NHG	META_F
202	22.46	FF	19	P-R	Partly open	None.		NHG	META_F
203	22.48	FF	16	P-R	Partly open	None.		NHG	META_F
205	22.65	J	18	U-R	Open	Slight brown staining.		NHG	META_F
206	22.98	IcF	22	P	Tight	None.		NHG	META_F
207	23.01	FF	19	U-R	Open	Brown staining.		NHG	META_F
208	23.10-23.21	J	52	U-R	Open	Brown staining.		NHG	META_F
209	23.11	FF	24	U-R	Partly open	Brown staining.		NHG	META_F

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Aperture description codes: Moderately wide = (2.5mm - 10mm), Open = (0.5mm - 2.5mm), Partly open = (0.25mm - 0.5mm), Tight = (0.1mm - 0.25mm), Very tight = (<0.1mm).

SUMMARY OF DISCONTINUITIES - BH525R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
210	23.26	IcF	32	U	Partly open	Brown staining penetrating downward.		NHG	META_F
211	23.42	FF	22	U-R	Open	Slight brown staining.		NHG	META_F
212	23.55	IcF	19	P	Tight	None.		NHG	META_F
213	23.63	FF	16	P-R	Open	Brown staining.		NHG	META_F
214	23.86	FF	16	U-R	Open	Slight brown staining.		NHG	META_F
215	23.91	FF	19	U-R	Open	Slight brown staining.		NHG	META_F
216	23.99	J	4	U-R	Open	Slight brown staining and slight clay		NHG	META_F
						smearing.			
217	24.13	IcF	24	U	Tight	None.		NHG	META_F
218	24.17	J	18	U-R	Open	None.		NHG	META_F
219	24.18	J	2	U-R	Open	Slight brown staining.		NHG	META_F
220	24.33	FF	18	U-R	Partly open	Brown staining.		NHG	META_F
221	24.70	FF	15	U-R	Open	Slight brown staining.		NHG	META_M
222	25.01	J	6	U-R	Open	Dark brown staining.		NHG	META_F
223	25.05	J	10	U-R	Open	Dark brown staining.		NHG	META_F
224	25.07	J	4	U-R	Open	Dark brown staining.		NHG	META_F

Key:
Type codes: FF = Foliation fracture, IcF = Incipient fracture, J = Joint, PMF = Possible Micro fault.
Small-scale roughness codes: P = Planar, P-R = Planar - rough, P-SM = Planar - smooth, U = Undulating, U-R = Undulating - rough, U-SM = Undulating - smooth.
Aperture description codes: Moderately wide = (2.5mm - 10mm), Open = (0.5mm - 2.5mm), Partly open = (0.25mm - 0.5mm), Tight = (0.1mm - 0.25mm), Very tight = (<0.1mm).

SUMMARY OF DISCONTINUITIES - BH525R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
225	25.22-25.26	FF	38	U-R	Open	Dark brown staining.		NHG	META_F
226	25.29	FF	21	U-R	Partly open	Slight brown staining.		NHG	META_F
227	25.32	FF	20	U-R	Open	Slight brown staining.		NHG	META_F
228	25.35	J	40	U-R	Open	Brown staining formed along calcite		NHG	META_F
						vein formed naturally.			
229	25.47	J	26	U-R	Open	Slight brown staining.		NHG	META_F

Key:
Type codes: FF = Foliation fracture, IcF = Incipient fracture, J = Joint, PMF = Possible Micro fault.
Small-scale roughness codes: P = Planar, P-R = Planar - rough, P-SM = Planar - smooth, U = Undulating, U-R = Undulating - rough, U-SM = Undulating - smooth.
Aperture description codes: Moderately wide = (2.5mm - 10mm), Open = (0.5mm - 2.5mm), Partly open = (0.25mm - 0.5mm), Tight = (0.1mm - 0.25mm), Very tight = (<0.1mm).

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Contract: **Wylfa New Build - Intermediate Onshore Ground Investigation**

AGS

SUMMARY OF POSSIBLE MICRO FAULTS - BH525R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
153	17.56	PMF	22	U-SM	Open	Partial calcite infill and brown staining		NHG	META_M
						(Naturally open microfault)			
162	18.70	PMF	24	P	Tight	None. Offsets calcite vein by <30mm.		NHG	META_F
196	21.91	PMF	21	P-R	Open	Calcite infill and brown staining		NHG	META_F
						(naturally opened up microfault)			
204	22.62	PMF	10	U-R	Open	Partial calcite infill with slight brown		NHG	META_F
						staining (naturally opened up			
						microfault)			

Key:
Type codes: FF = Foliation fracture, IcF = Incipient fracture, J = Joint, PMF = Possible Micro fault.
Small-scale roughness codes: P = Planar, P-R = Planar - rough, P-SM = Planar - smooth, U = Undulating, U-R = Undulating - rough, U-SM = Undulating - smooth.
Aperture description codes: Moderately wide = (2.5mm - 10mm), Open = (0.5mm - 2.5mm), Partly open = (0.25mm - 0.5mm), Tight = (0.1mm - 0.25mm), Very tight = (<0.1mm).

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Contract: Wylfa New Build - Intermediate Onshore Ground Investigation			Page 1 of 1

STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH525R

Contract Ref:	Start: 28.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 30.04.11	10.761	E:235735.9 N:393538.1	1 of 10

Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
0.00-0.20	Grass over TOPSOIL consisting of soft dark brown slightly sandy CLAY with abundant fine rootlets. (Made Ground - Topsoil)			10.561	(0.20) 0.20	
0.20-0.40	Soft dark brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded phyllite. (Drift Deposits - Unit B1)			10.361	(0.20) 0.40	
0.40-0.80	Soft dark orange brown sandy slightly gravelly CLAY. Gravel is fine to coarse subangular to subrounded phyllite. (Drift Deposits - Unit B1)			9.961	(0.40) 0.80	
0.80-1.20	Firm light brown slightly sandy gravelly CLAY. Gravel is fine to coarse subangular to subrounded grey/green psammite and rounded fine to coarse chert. Occasional subrounded boulders of chert and psammite. (Drift Deposits - Unit B1)			9.561	(0.40) 1.20	
1.20-3.20	Firm dark brown gravelly CLAY. Gravel is fine to coarse subrounded to subangular phyllite and psammite with occasional gravel of fine to medium subrounded to rounded chert. (Drift Deposits - Unit B1)			9	(2.00)	

Method Used:	Plant Used:	Drilled By:	Logged By:	All dimensions in metres
RC+ RO	Beretta T44	CG/CA	GSherwood+ JWickenden	Scale: 1:14

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH525R

Contract Ref:	Start: 28.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 30.04.11	10.761	E:235735.9 N:393538.1	2 of 10

Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
1.20-3.20				8	3	
				7.561	3.20	
	Firm to very stiff grey slightly silty very gravelly CLAY. Gravel is fine to medium with occasional boulders of subangular to subrounded green psammite and rare phyllite with occasional rounded chert. (Drift Deposits - Unit B1)			7	4	
3.20-5.30					(2.10)	
				6	5	
				5.461	5.30	
5.30-6.00	Medium strong light green weathered PSAMMITE recovered as medium to coarse subangular to angular gravel and cobbles.					

Method Used:	Plant Used:	Drilled By:	Logged By:	All dimensions in metres
RC+ RO	Beretta T44	CG/CA	GSherwood+ JWickenden	Scale: 1:14

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Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
5.30-6.00	(New Harbour Group - Psammite)			5	(0.70)	
				4.761	6.00	6
6.00-12.59	Medium strong very thin to very narrow lenticular slightly indistinct bands of very narrowly foliated green and light purple slightly weathered PHYLLITE with very closely to extremely closely spaced very narrow to narrow bands of green fine to medium grained psammite. Phyllite has a feathery, slightly disturbed texture. Foliation fractures are 10-36° extremely closely to closely spaced partly open to open undulating rough/smooth with brown staining/clay smears. Joints dipping 8-86° extremely closely to medium spaced undulating rough/planar smooth open to moderately wide with intense brown staining/clay smears. (New Harbour Group - Phyllite) . . . between 6.00 to 6.14m depth non-intact recovered as subrounded to rounded medium gravel of red, green and purple phyllite and psammite with occasional brown staining (possibly drilling induced?). . . . at 6.27m, 6.99m, 7.17m, 8.35m, 8.56m and 8.68m depth bands of extremely closely spaced subvertical parallel occasional sigmoidal very narrow lenticular voids with dark staining and slight weathering. . . . between 6.80 and 10.00m, occasional gravel sized solution cavities formed by the dissolution of calcite veins and occasional incipient fractures associated with possible minor fault between 10.00m and 11.40m. . . . between 7..06 to 7.08 and at 7.12m depth locally phyllite is orange yellow. . . . between 7.07 to 7.12m depth locally abundant randomly orientated very narrow intersecting dark green possible chlorite staining. . . . between 7.83 to 7.92m depth locally psammite is medium grained with multiple incipient fractures dipping at 30 and 40° intersecting at 60° (possible conjugate jointing?) with dark brown staining along incipient fractures.		1[i] 2[i] 3[i] 4[i] 5[i] 6[i] 7[i] 8[i] 9[i] 10[i] 11[i] 12[i] 13[i] 14[i] 15[i] 16[i] 17[i] 18[i] 19[i] 20[i] 21[i] 22[i] 23[i] 24[i] 25[i] 26[i] 27[i] 28[i] 29[i] 30[i] 31[i] 32[i] 33[i] 34[i] 35[i] 37[i] 36[i] 38[i] 39[i] 40[i] 41[i] 42[i] 43[i] 44[i] 45[i] 46[i] 47[i] 48[i] 49[i]	4 3	7 8	

Method Used:	RC+ RO	Plant Used:	Beretta T44	Drilled By:	CG/CA	Logged By:	GSherwood+ JWickenden	All dimensions in metres Scale:	1:14

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH525R

Contract Ref:	Start: 28.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
6.00-12.59	. . . between 8.12 to 8.18m depth band of fine grained psammite. . . . between 9.00 to 9.08m, 9.08 to 9.12m, 9.53 to 9.57m and 12.00 to 12.06m depth non-intact recovered as fine to medium angular to subangular gravel with dark brown staining and clay smearing (possibly due to jointing?). . . . between 9.96 to 10.35m depth possible zone of core loss. . . . between 10.35 to 11.45m depth non-intact recovered as fine to medium occasional coarse subangular to subrounded gravel with slight brown staining and light brown grey clay (possible crush zone associated with a fault)		50[i] 51[i] 52[i] 53[i] 54[i] 55[i] 56[i] 57[i] 58[i] 59[i] 60[i] 61[i] 62[i] 64[i] 65[i] 63[i] 66[i] 67[i] 68[i] 69[i] 72[i] 70[i] 71[i] 73[i] 74[i] 75[i] 76[i] 78[i] 77[i] 79[i] 80[i] 82[i] 81[i]	2 1 0	9 (6.59) 10	

Method Used:	Plant Used:	Drilled By:	Logged By:	All dimensions in metres
RC+ RO	Beretta T44	CG/CA	GSherwood+ JWickenden	Scale: 1:14

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Contract Ref:	Start: 28.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
6.00-12.59	. . . at 12.10m, 12.11m and 12.55m depth very narrow ptygmatic intersecting calcite veins <0.5mm intersecting at 60° (conjugated jointing/pressure).		83[i] 84[i] 85[i] 86[i] 87[i] 88[i] 89[i] 90[i] 91[i] 92[i]	-1	11 12	
12.59-18.12	Strong very thinly to very narrow bands of green blue fine to medium grained slightly weathered PSAMMITE with very closely to extremely closely spaced very narrow to narrow bands of very narrowly foliated brown-green phyllite. Extremely closely spaced randomly orientated very narrow lenticular poorly defined occasionally ptygmatic calcite veins. Extremely closely to closely spaced subvertical very narrow light green slight ptygmatic epidote veins. Foliation fractures are 10-25° extremely closely to widely spaced undulating/planar rough partly open to open brown staining/clay smears. Joints dipping 2-44° extremely closely to medium spaced undulating rough/planar smooth open to moderately wide with brown staining/clay smears. (New Harbour Group - Psammite) . . . between 12.62 to 12.70 and 14.80 to 14.97m depth extremely closely spaced very narrow stepped sigmoidal calcite veins dipping 40°. . . . between 12.86 to 12.90m, 13.00 to 13.02m and 17.40 to 17.47m depth locally abundant subvertical very narrow parallel calcite veins dipping 48° (possible tensional veining?).		93[i] 94[i] 95[i] 96[i] 97[i] 98[i] 99[i] 100[i] 101[i]	-1.829 -2	12.59 13	

Method Used:	Plant Used:	Drilled By:	Logged By:	All dimensions in metres
RC+ RO	Beretta T44	CG/CA	GSherwood+ JWickenden	Scale: 1:14

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Contract Ref:	Start: 28.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 30.04.11	10.761	E:235735.9 N:393538.1	6 of 10

Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
12.59-18.12	. . . at 14.13m, 14.21m and 16.04m depth multiple subparallel subvertical sigmoidal calcite veins dipping 45°. . . . between 14.24 to 14.33 depth possible re-fused microfault dipping 64° undulating with calcite re-crystallisation and slight brown staining (naturally opened up microfault) . . . at 14.27m depth very narrow calcite vein dipping 80° with 5 no subhorizontal microfaults with offset of 2 - 35mm. . . . between 14.64 to 14.79m, 15.31 to 15.38m, 15.50 to 15.56m, 15.76 to 15.90m and 17.70 to 17.90m depth locally extremely abundant randomly orientated very narrow light green ptygmatic chlorite veins cross cut by subvertical very narrow slightly folded calcite veins. Calcite veins offset by multiple subhorizontal microfaults by <5mm. . . . at 14.76m depth possible re-fused microfault dipping 28° planar very tight with calcite infill causing offset. . . . at 14.77 and 14.80m depth very narrow calcite veins dipping 20° with sigmoidal en echelon veining. . . . at 15.68m depth possible re-fused microfault dipping 36° planar tight with calcite infill, disturbing fabric. . . . at 15.80m depth narrow (4mm) sharp quartz vein with slight pink discolouration cross cutting ptygmatic chlorite/epidote veining and calcite veining dipping 56°.		102[i] 103[i] 104[i] 105[i] 106[i] 107[i] 108[i] 109[i] 110[i] 111[i] 112[i] 113[i] 114[i] 115[i] 116[i] 117[i] 118[i] 119[i] 120[i] 121[i] 122[i] 123[i] 124[i] 125[i] 126[i] 127[i] 128[i] 129[i] 130[i] 131[i] 132[i] 133[i] 134[i] 135[i] 136[i] 137[i] 138[i] 139[i]	-3 -4 -5	14 15 (5.53) 16	

Method Used:	RC+ RO	Plant Used:	Beretta T44	Drilled By:	CG/CA	Logged By:	GSherwood+ JWickenden	All dimensions in metres Scale:	1:14

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH525R

Contract Ref:	Start: 28.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 30.04.11	10.761	E:235735.9 N:393538.1	7 of 10

Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
12.59-18.12	. . . at 16.56m, 16.92m, 17.12m, 17.22m, 17.43m and 17.56m depth very narrow lenticular calcite vein dipping 60° with fine to medium lenticular subrounded clasts of phyllite and psammite. . . . between 17.22 to 17.25 and 17.50 to 17.57m depth locally psammite is medium to coarse with extremely closely spaced randomly orientated poorly defined calcite veins. . . . at 17.27m depth possible re-fused microfault dipping 12° planar tight with calcite infill, disturbing fabric. . . . at 17.46m depth possible re-fused microfault dipping 78° undulating with calcite infill and brown staining causing offset to the fabric (naturally open re-fused microfault) . . . at 17.56m depth possible re-fused microfault dipping 22° with partial calcite re-crystallisation and brown staining (naturally open microfault) . . . between 17.70 to 17.90m depth multiple subvertical very narrow intersecting lenticular chlorite/epidote veining cross cut by multiple subvertical intersecting very narrow lenticular calcite veins cross cut by subhorizontal lenticular very narrow calcite veins cross cut by subvertical lenticular very narrow calcite veins with <4mm only to subhorizontal vein offset and cross cut by subvertical very narrow quartz vein (4 no possible stages of veining). Rare slight dark green chlorite replacement along calcite veins. . . . at 17.85m depth possible re-fused microfault dipping 38° undulating tight with calcite infill causing disturbing fabric. . . . at 18.05m depth possible re-fused microfault dipping 40° undulating tight with calcite infill, disturbing fabric.		140[i] 141[i] 142[i] 144[i] 143[i] 145[i] 146[i] 147[i] 148[i] 149[i] 150[i] 151[i] 152[i] 153[i] 154[i] 155[i] 156[i] 157[i] 158[i] 159[i] 160[i] 161[i] 162[i]	-6 -7 -8	17 18 -7.359 18.12	
18.12-21.04	Medium strong to strong very narrow to very thin lenticular bands of very narrowly to narrowly foliated green slightly weathered PHYLLITE with extremely closely to very closely spaced very narrow to very thin bands of green fine to medium grained psammite. lenticular Phyllite foliation is generally dipping ~19°. Closely to very closely spaced very narrow randomly orientated poorly defined quartz veins. Closely to extremely closely spaced lenticular very narrow subvertical calcite veins cross cutting indistinct quartz veins. Foliation fractures are 10-25° extremely closely to medium spaced undulating/planar rough/smooth partly open to open brown staining/clay smears. Joints dipping 4-54° extremely closely to widely spaced undulating rough open with brown staining. (New Harbour Group - Phyllite) . . . at 18.32m, 18.57m, 18.73m, 20.19m, 20.51m, 20.58m and 20.93m depth randomly					

Method Used:	Plant Used:	Drilled By:	Logged By:	All dimensions in metres
RC+ RO	Beretta T44	CG/CA	GSherwood+ JWickenden	Scale: 1:14

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BOREHOLE LOG

Contract:	Client:	Borehole:
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Contract Ref:	Start: 28.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 30.04.11	10.761	E:235735.9 N:393538.1	8 of 10

Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
18.12-21.04	orientated poorly defined irregular very narrow quartz veins. Vein at 20.58m depth has dark red mineral growth/replacement. . . . at 18.57m, 18.69m, 19.56m, 19.60m, 19.75m, 19.80m, 20.92m, 20.98m and 21.02m depth lenticular very narrow calcite veins dipping 40 - 60° with fine subangular clasts of phyllite. Veins have multiple offset <30mm by microfault. . . . at 18.70m depth microfault dipping 24° planar tight, offsets calcite vein by <30mm. . . . between 18.72 to 18.83m depth locally abundant very narrow (<0.5mm) slight sigmoidal subparallel calcite veins generally very fine grained psammite. . . . between 18.78 to 18.86m depth 3 no very narrow to narrow square shaped calcite veins with dark brown staining around vein edges (appears as calcite vein has broken apart due to refused microfaulting/deformation). . . . between 18.92 to 19.24m depth locally psammite is medium to coarse and phyllite and psammite are highly disturbed with multiple randomly orientated narrow to very narrow calcite veins with fine to medium subangular to subrounded clasts of phyllite and psammite. Calcite veins causing multiple offsets to phyllite and psammite bands by <10mm (possible calcite infilled microfault?). Phyllite is locally purple. . . . at 19.01m depth possible re-fused microfault dipping 34° undulating tight causing offset to the fabric. . . . at 19.30m, 19.44m, 19.55m, 19.67m and 20.26m depth very narrow parallel calcite veins dipping 58° with stepped sigmoidal en echelon veining. . . . between 19.87 to 20.15m depth becoming medium strong. . . . at 20.07m to 20.43m depth multiple possible re-fused microfaults dipping 19-22° undulating tight with calcite infill, disturbing fabric. . . . between 20.44 and 20.60m depth locally abundant randomly orientated very narrow lenticular intersecting calcite veins. . . . at 20.78m depth possible re-fused microfault dipping 19° undulating with calcite infill, disturbing fabric.		164[i] 163[i] 165[i] 166[i] 167[i] 168[i] 169[i] 170[i] 171[i] 172[i] 173[i] 174[i] 175[i] 176[i] 177[i] 178[i] 179[i] 180[i] 181[i] 182[i]	-9 -10	19 (2.92) 20	
21.04-21.80	Strong very thin to thin bands of green blue fine to medium grained slightly weathered to fresh PSAMMITE with very closely to closely spaced very narrow to very thin bands of very narrowly foliated purple phyllite. Extremely closely to very closely spaced subvertical lenticular intersecting very narrow calcite veins dipping 45-60° with occasional poorly defined vein edges concentrated in the psammite. Extremely closely to closely subhorizontal very narrow calcite veins (<0.5mm) dipping ~20° cross-cut by subvertical calcite veins. Foliation fractures are 20-28° medium spaced undulating rough/planar smooth open with brown staining. Joints dipping 12-40° very closely to closely spaced undulating/planar rough open with brown staining.		183[i] 185[i] 184[i] 186[i] 187[i]	-10.279	21 21.04 (0.76)	

Method Used:	Plant Used:	Drilled By:	Logged By:	All dimensions in metres
RC+ RO	Beretta T44	CG/CA	GSherwood+ JWickenden	Scale: 1:14

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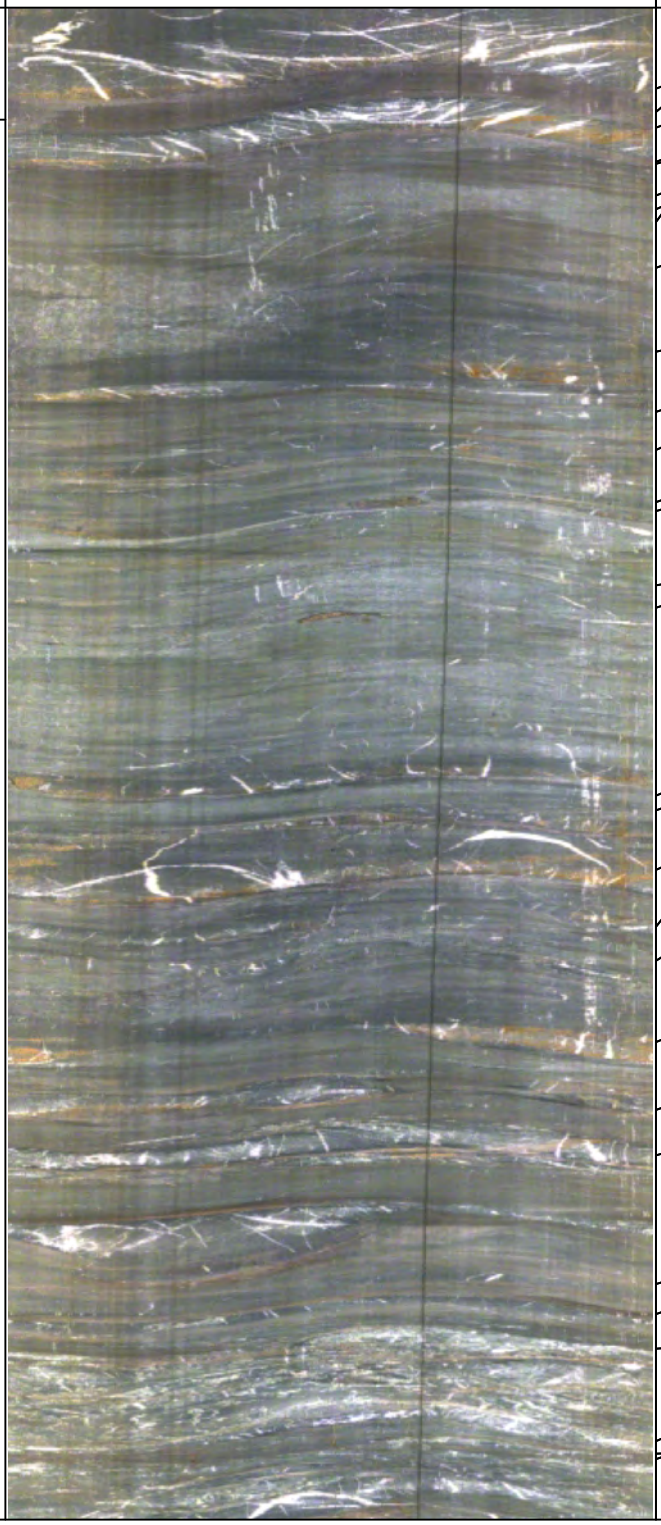
STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH525R

Contract Ref:	Start: 28.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 30.04.11	10.761	E:235735.9 N:393538.1	9 of 10

Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
21.04-21.80	(New Harbour Group - Psammite) . . . between 21.14 to 21.17m, 21.21 to 21.26m and 21.74 to 21.80m depth abundant extremely closely spaced subvertical ptygmatic light green chlorite/epidote veining cross-cut by calcite veining. . . . between 21.17 to 21.21 and 21.26 to 21.29m depth phyllite is disturbed with mottled appearance possibly due to calcite overprinting. . . . between 21.21 to 21.26m depth calcite veining cross-cut is chlorite/epidote veining. . . . at 21.60m and 21.71m depth 2 no. possible re-fused microfault dipping 52° undulating tight with calcite infill, disturbing fabric. Medium strong thin to very thin bands of very narrowly foliated green occasionally green brown slightly weathered PHYLLITE with closely to very closely spaced very narrow to very thin lenticular bands of green fine to medium grained psammite. Phyllite foliation is generally dipping ~15-25°. Extremely closely to very closely spaced subvertical very narrow parallel slightly ptygmatic calcite veins dipping 50-70° with occasional moderately developed boudinage texture and veins generally concentrated within psammite (possible tensional veining?). Extremely closely to closely spaced subhorizontal very narrow (<0.5mm) calcite veins dipping ~20° parallel to foliation. Foliation fractures 15-25° very closely to medium spaced undulating/planar rough partly open to open with dark brown staining. Joints are 2-55° extremely closely to widely spaced planar rough/ undulating rough open with slight brown staining.		188[i] 189[i] 191[i] 190[i] 192[i] 193[i] 194[i] 195[i] 196[i] 197[i] 198[i] 199[i] 200[i] 201[i] 202[i] 203[i] 204[i] 205[i] 206[i] 207[i] 209[i] 208[i] 210[i] 211[i] 212[i] 213[i] 214[i] 215[i] 216[i] 217[i] 218[i] 219[i]	-11 -11.039 -12 -13	21.80 22 23 (3.70) 24	
21.80-25.50	(New Harbour Group - Phyllite) . . . at 21.91m depth possible re-fused microfault dipping 21° with partial calcite infill and slight brown staining, disturbing fabric. . . . at 22.62m depth possible re-fused microfault dipping 10° undulating with partial calcite infill with slight brown staining causing offset to the fabric (naturally opened up microfault) . . . between 23.00 to 23.10m, 24.74 to 24.77m and 25.08 to 25.10m depth multiple extremely closely spaced subvertical parallel sigmoidal lenticular calcite veins (tensional veining). . . . between 23.20 to 23.32 and 25.34 to 25.40m depth extremely closely spaced very narrow (<0.1mm) subvertical subparallel occasionally intersecting dark red/purple veining (possible poorly developed brecciated appearance ?). . . . between 23.37 to 23.41m, 23.54 to 23.64m, 23.96 to 24.13m and 24.22 to 24.30m depth locally extremely closely spaced randomly orientate very narrow intersecting ptygmatic chlorite/epidote veining cross-cut to calcite veining. . . . between 23.43 to 23.61 and below 23.83m depth phyllite is light brown. . . . at 23.46m depth possible re-fused microfault dipping 2° undulating tight with white calcite infill, disturbing fabric.					

Method Used:	Plant Used:	Drilled By:	Logged By:	All dimensions in metres
RC+ RO	Beretta T44	CG/CA	GSherwood+ JWickenden	Scale: 1:14

GINT_LIBRARY_V8_04.GLB!XCUSTOM - SSL - 725061 - OPTV | 725061_WYLFA.GPJ - v8_04 | 18/12/11 - 14:52 | MJB.
Structural Soils Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.soils.co.uk, Email:admin@soils.co.uk.

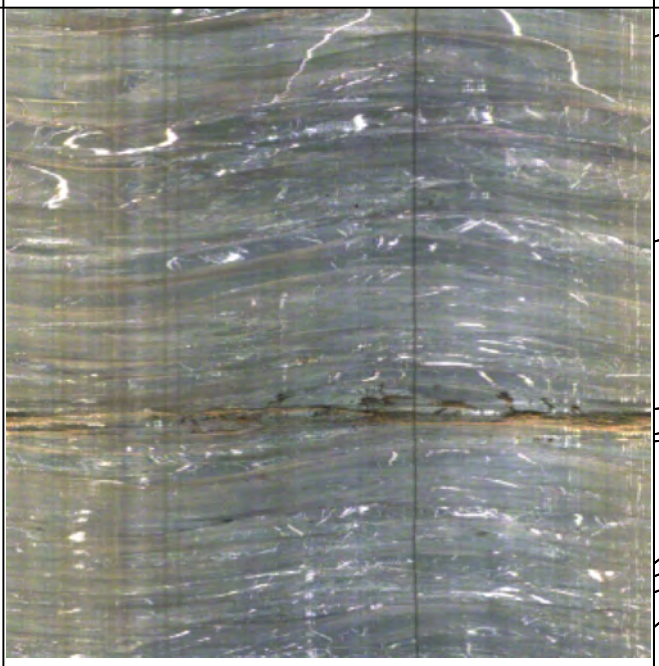
STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH525R

Contract Ref:	Start: 28.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 30.04.11	10.761	E:235735.9 N:393538.1	10 of 10

Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
21.80-25.50	. . . at 24.28m, 24.29m, 24.64m, 24.74m and 25.10m depth very narrow lenticular calcite veins with poorly defined vein edges. Veins cross-cut ptygmatic chlorite/epidote veining and are cross-cut by calcite infill foliation fractures. . . . between 24.49 to 24.53m depth phyllite is narrow lenticular and is locally dark brown/dark green in colour. . . . between 24.57 to 24.67m depth phyllite and psammite appear moderately disturbed with light grey-white mottled appearance possibly calcite overprinting?. . . . at 24.60 and 24.95m depth 2 number parallel very narrow calcite veins dipping~35° with boudinage texture. . . . between 25.08 to 25.10m and 25.37 to 25.50m depth sharp very narrow lenticular sigmoidal subparallel to parallel occasionally intersecting calcite veins with fine subangular clasts of phyllite (possibly late stages poorly developed tensional veining due to inclusions and occasional intersecting calcite veins.		220[i] 221[i] 222[i] 223[i] 224[i] 225[i] 226[i] 227[i] 228[i] 229[i]	-14 -14.739	25 25.50	
	Rotary borehole terminated at 25.50m depth.					

Method Used:	Plant Used:	Drilled By:	Logged By:	All dimensions in metres
RC+ RO	Beretta T44	CG/CA	GSherwood+ JWickenden	Scale: 1:14

GINT_LIBRARY_V8_04.GLB!XCUSTOM - SSL - 725061 - OPTV | 725061_WYLFA.GPJ - v8_04 | 18/12/11 - 14:52 | MJB.
Structural Soils Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.soils.co.uk, Email:admin@soils.co.uk.

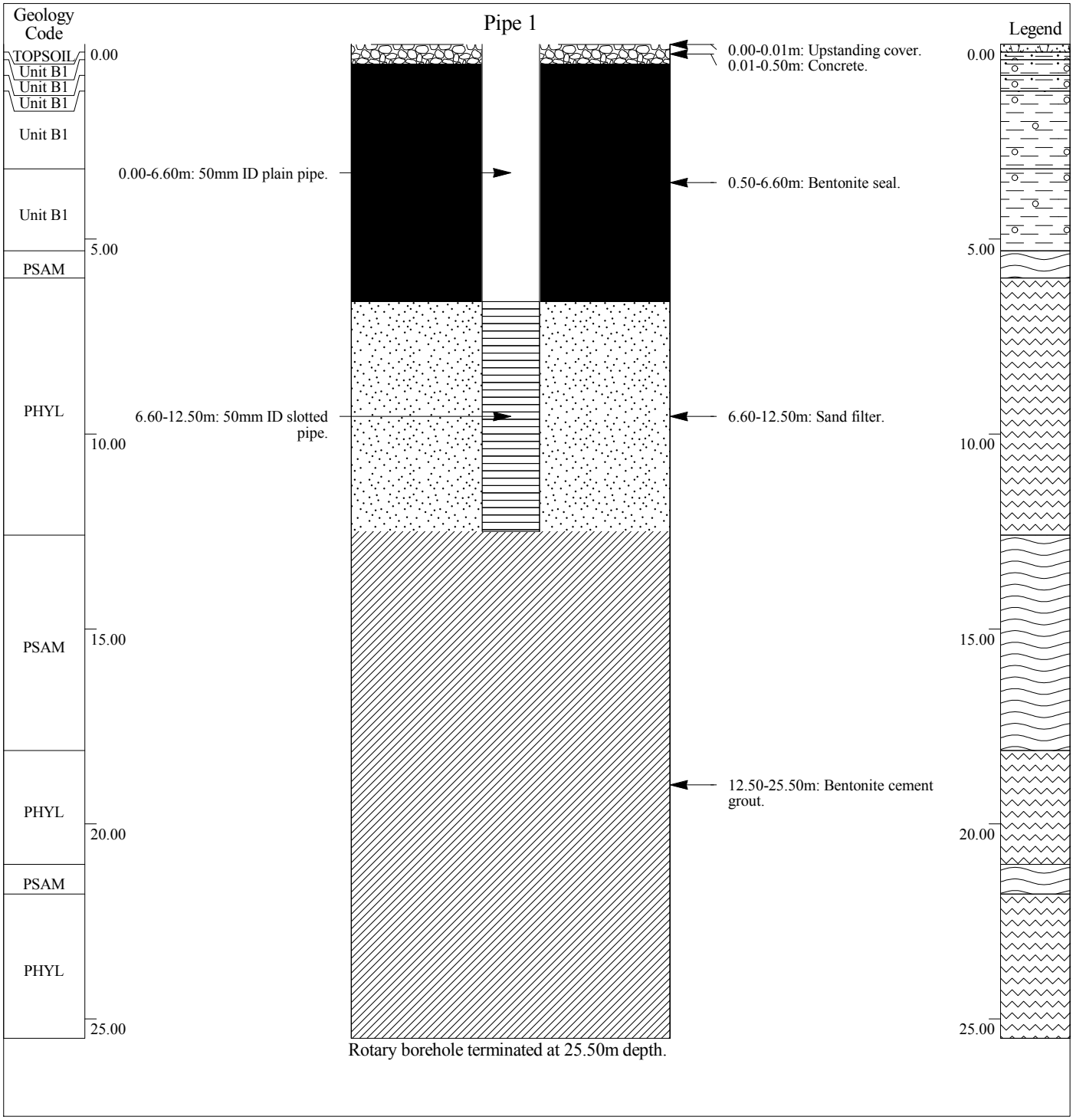
STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

INSTALLATIONS

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH525R

Contract Ref:	Start: 28.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 30.04.11	10.761	E:235735.9 N:393538.1	1 of 1



General Remarks

Geology code details:

PHYL=Phyllite, PSAM=Psammite, TOPSOIL=Topsoil, Unit B1=Unit B1

Note: Graphical representation of well installation is scaled vertically, but exaggerated in the horizontal to aid interpretation.

All dimensions in metres	Installation Date	Installation Type	Installed By
Scale 1:149	03/05/2011	-	SAmsden

GINT_LIBRARY_V8_04.GLB!INSTALLATIONS LOG | 725061_WYLFA.GPJ - v8_04 | 17/12/11 - 21:51 | MJB
Structural Soils Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.soils.co.uk, Email:admin@soils.co.uk.

STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH526

Contract Ref:	Start: 03.05.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 11.05.11	9.748	E:236013.6 N:393694.3	1 of 3

Samples and In-situ Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
0.40	1	B				TOPSOIL over soft dark brown sandy slightly gravelly CLAY. Gravel is fine to coarse subrounded to subangular phyllite/psammite. (Topsoil)		(1.20)	
0.50	1	ES							
0.50	1	B							
0.60	2	D							
1.00	3	D					8.548	1.20	
1.40	4	D				Firm becoming stiff with depth dark grey slightly gravelly sandy CLAY. Gravel is fine to medium subangular to subrounded of flint, quartz and rare psammite and possible calcite (Drift Deposits - Unit F)			
1.50-1.95	5	SPT	N=18						
1.50	5	D							
1.50-1.75	6	B							
2.40	7	D							
2.50-2.95	8	U	49 blows						
2.95-3.05	9	B							
3.40	10	D							
3.50-3.95	11	SPT	N=21						
3.50	11	D							
3.50-3.95	12	B							
4.40	13	D				. . . from 4.40m depth becoming stiff.			
4.50-4.95	14	U	53 blows						
4.95-5.05	15	B						(8.10)	
5.90	16	D							
6.00-6.45	17	SPT	N=25						
6.00	17	D							
6.00-6.45	18	B							
7.40	19	D							
7.50-7.95	19A	U	100 blows 0% recovery						
7.50-7.95	20	B							

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
12/05/11	08:00	22.30	22.30	150	7.60

Chiselling		
From	To	Duration (hh:mm)
22.50	22.60	01:00

General Remarks

1. Inspection pit to 1.2m depth.
2. 50mm standpipe installed to 11.80m depth.
3. Standing water level at 7.60m depth on 12/05/11.
4. Hammer Serial No: 2011-H2

All dimensions in metres | Scale: 1:50

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Cable percussion	Dando 2000	RW	GSherwood	SAT

GINT_LIBRARY_V8_04.GLB!CUSTOM - SSL - 725061 - CP LOG | 725061_WYLFA.GPJ - v8_04 | 25/11/11 - 15:40 | KJ.
Structural Soils Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.soils.co.uk, Email:admin@soils.co.uk.

STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH526

Contract Ref:	Start: 03.05.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 11.05.11	9.748	E:236013.6 N:393694.3	2 of 3

Samples and In-situ Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
8.90	21	D							
9.00-9.45	22	SPT	N=29				0.448	9.30	
9.00	22	D				Light grey brown sandy silty CLAY with occasional fine subangular to subrounded gravel of flint (Driller's report water seepage). (Drift Deposits - Unit F)		(0.50)	
9.00-9.45	23	B					-0.052	9.80	
10.40	24	D				Stiff dark grey silty slightly gravelly CLAY. Gravel is fine to medium rounded to subangular flint, quartz (with some red staining and rare psammite. (Drift Deposits - Unit F)			
10.50-10.95	25	U	180 blows						
10.95-11.05	26	B							
11.00	1	W							
11.90	27	D							
12.00-12.45	28	SPT	N=39					(4.80)	
12.00	28	D							
12.00-12.45	29	B							
13.40	30	D							
13.50-13.95	31	U	150 blows						
13.95-14.00	32	B							
							-4.852	14.60	
14.90	33	D				Firm to stiff light grey slightly silty CLAY. (Drift Deposits - Unit F)			
15.00-15.45	33	$SPT_{(NR)}$	N=28						
15.00-15.45	34	B							
15.22	48	CS							
16.40	35	D							
16.50-16.95	36	U	150 blows					(6.20)	

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
12/05/11	08:00	22.30	22.30	150	7.60

Chiselling		
From	To	Duration (hh:mm)

General Remarks

1. Inspection pit to 1.2m depth.
2. 50mm standpipe installed to 11.80m depth.
3. Standing water level at 7.60m depth on 12/05/11.
4. Hammer Serial No: 2011-H2

All dimensions in metres | Scale: 1:50

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Cable percussion	Dando 2000	RW	GSherwood	SAT

GINT_LIBRARY_V8_04.GLB!XCUSTOM - SSL - 725061 - CP LOG | 725061_WYLFA.GPJ - v8_04 | 25/11/11 - 15:40 | KJ.
Structural Soils Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.soils.co.uk, Email:admin@soils.co.uk.

STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH526

Contract Ref:	Start: 03.05.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 11.05.11	9.748	E:236013.6 N:393694.3	3 of 3

Samples and In-situ Tests				Water	Backfill & Instrumentation	Description of Strata	Reduced Level	Depth (Thickness)	Material Graphic Legend
Depth	No	Type	Results						
17.90	37	D							
18.00-18.45	38	SPT	N=43						
18.00	38	D							
18.00-18.45	39	B							
19.40	40	D							
19.50-19.95	41	U	150 blows						
							-11.052	20.80	
20.90	42	D				Firm light brown mottled grey silty CLAY. (Drift Deposits - Unit F)			
21.00-21.45	43	SPT	N=11					(1.50)	
21.00	43	D							
21.00-21.45	44	B					-12.552	22.30	
22.40	45	D				Very stiff to hard brown slightly sandy gravelly CLAY. Gravel is fine to coarse angular to subangular blue green fine to medium grained psammite and purple phyllite. Highly weathered crumbles under hand pressure. (Drift Deposits - Unit B1)		(0.70)	
22.50-22.78	46	SPT	N=115*						
22.50	46	D							
22.50	47	B					-13.252	23.00	
22.80-23.00	48	SPT	N=136*			. . . at 22.6m depth becoming weak (possibly weathered rock head).			
22.80	48	D				Cable percussion borehole terminated at 23.00m depth.			

Boring Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
12/05/11	08:00	22.30	22.30	150	7.60

Chiselling		
From	To	Duration (hh:mm)

General Remarks

1. Inspection pit to 1.2m depth.
2. 50mm standpipe installed to 11.80m depth.
3. Standing water level at 7.60m depth on 12/05/11.
4. Hammer Serial No: 2011-H2

All dimensions in metres | Scale: 1:50

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Cable percussion	Dando 2000	RW	GSherwood	SAT

GINT_LIBRARY_V8_04.GLB!XCUSTOM - SSL - 725061 - CP LOG | 725061_WYLFA.GPJ - v8_04 | 25/11/11 - 15:40 | KJ.
Structural Soils Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.soils.co.uk, Email:admin@soils.co.uk.

STANDARD PENETRATION TEST SUMMARY TABLE

Exploratory Position ID	Depth (m)	Hole Dia (mm)	Casing Depth (m)	Water Depth (m)	Seating Drive		Test Drive			Hammer ID	Calibration Date	Energy Ratio (%)	N_{60}	Comments
					Blows	Pen (mm)	Blows	R (mm)	Result					
BH526	1.50		1.50		3,3	150	4,4,4,6		N=18	2011-H2	14/03/2011	65	20	
	3.50		3.00		5,5	150	5,6,4,6		N=21	2011-H2	14/03/2011	65	23	
	6.00		6.00		7,9	150	9,6,5,5		N=25	2011-H2	14/03/2011	65	27	
	9.00		9.00		5,6	150	6,7,7,9		N=29	2011-H2	14/03/2011	65	31	
	12.00		12.00		8,6	150	8,8,12,11		N=39	2011-H2	14/03/2011	65	42	
	15.00		13.50	14.00	6,6	150	6,7,8,7		N=28	2011-H2	14/03/2011	65	30	No Recovery
	18.00		13.50	17.50	9,10	150	10,11,11,11		N=43	2011-H2	14/03/2011	65	47	
	21.00		13.50	18.00	1,2	150	2,4,3,2		N=11	2011-H2	14/03/2011	65	12	
	22.50		22.50	8.00	12,13	150	26,24+	130	N=115*	2011-H2	14/03/2011	65	125	
	22.80		22.50		20,5	90	36,14+	110	N=136*	2011-H2	14/03/2011	65	147	

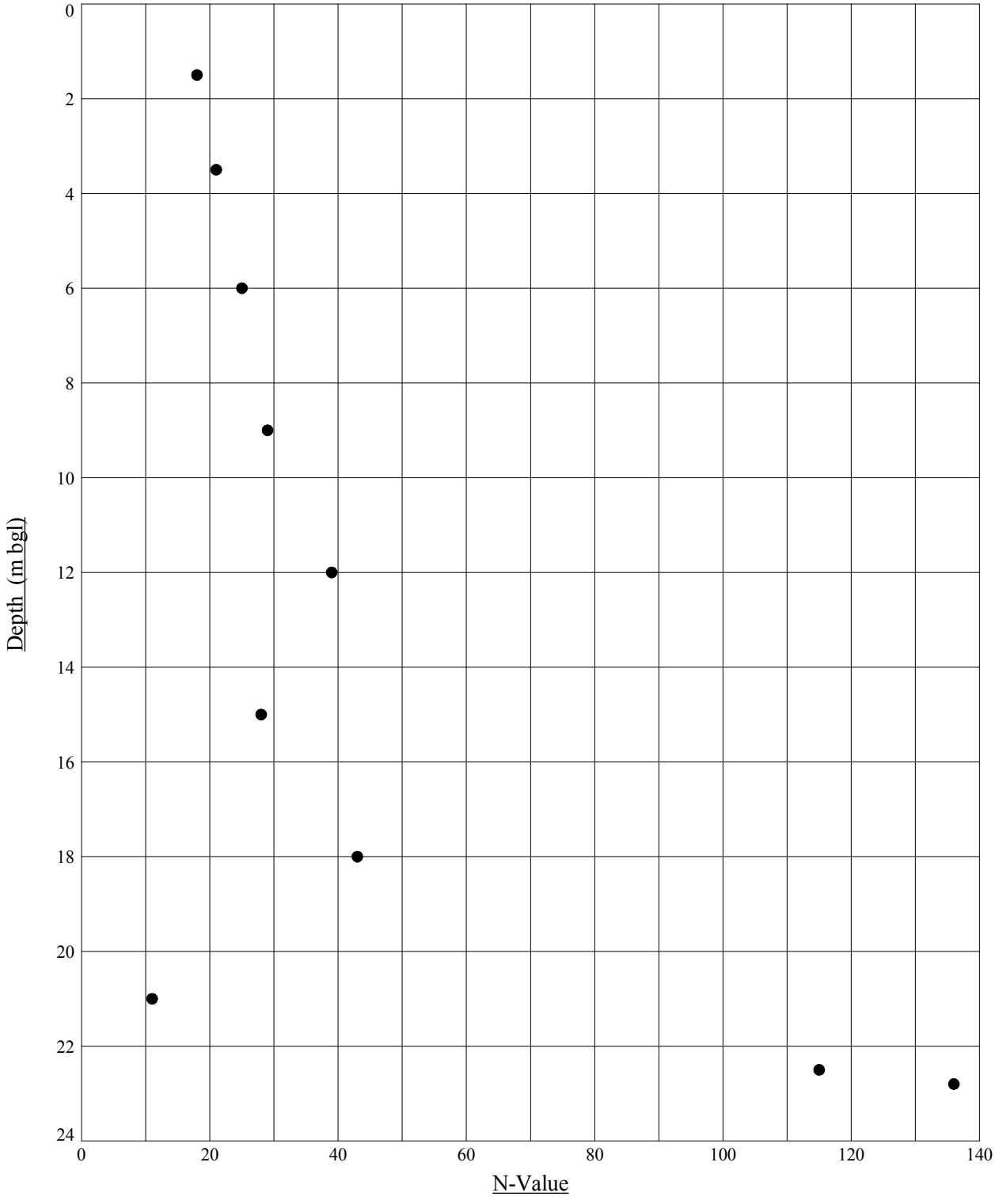
Notes:
1. Tests carried out in general accordance with BS EN ISO 22476-3:2005.
2. Reported blows are for 75mm penetration unless indicated "+".
3. Where full test drive was not achieved, actual penetration (R) and extrapolated N value (N*) reported.
4. Tests carried out using a split spoon sampler unless noted as SPT(c) (denotes use of solid cone method) in the comments column.
5. Entries in the water depth column reflects the measured water depth at time of test.

N_{60} = (Measured hammer energy ratio / 60) x N value

STRUCTURAL SOILS
The Old School
Stillhouse Lane
Bedminster
Bristol BS3 4EB

Compiled By		Date	Contract Ref:
[redacted]	**KJOHNSTONE**	**25.11.11**	**725061**
Contract: **Wylfa New Build - Intermediate Onshore Ground Investigation**			Page **1** of **1**

STANDARD PENETRATION TEST (SPT N-Value)
vs
DEPTH



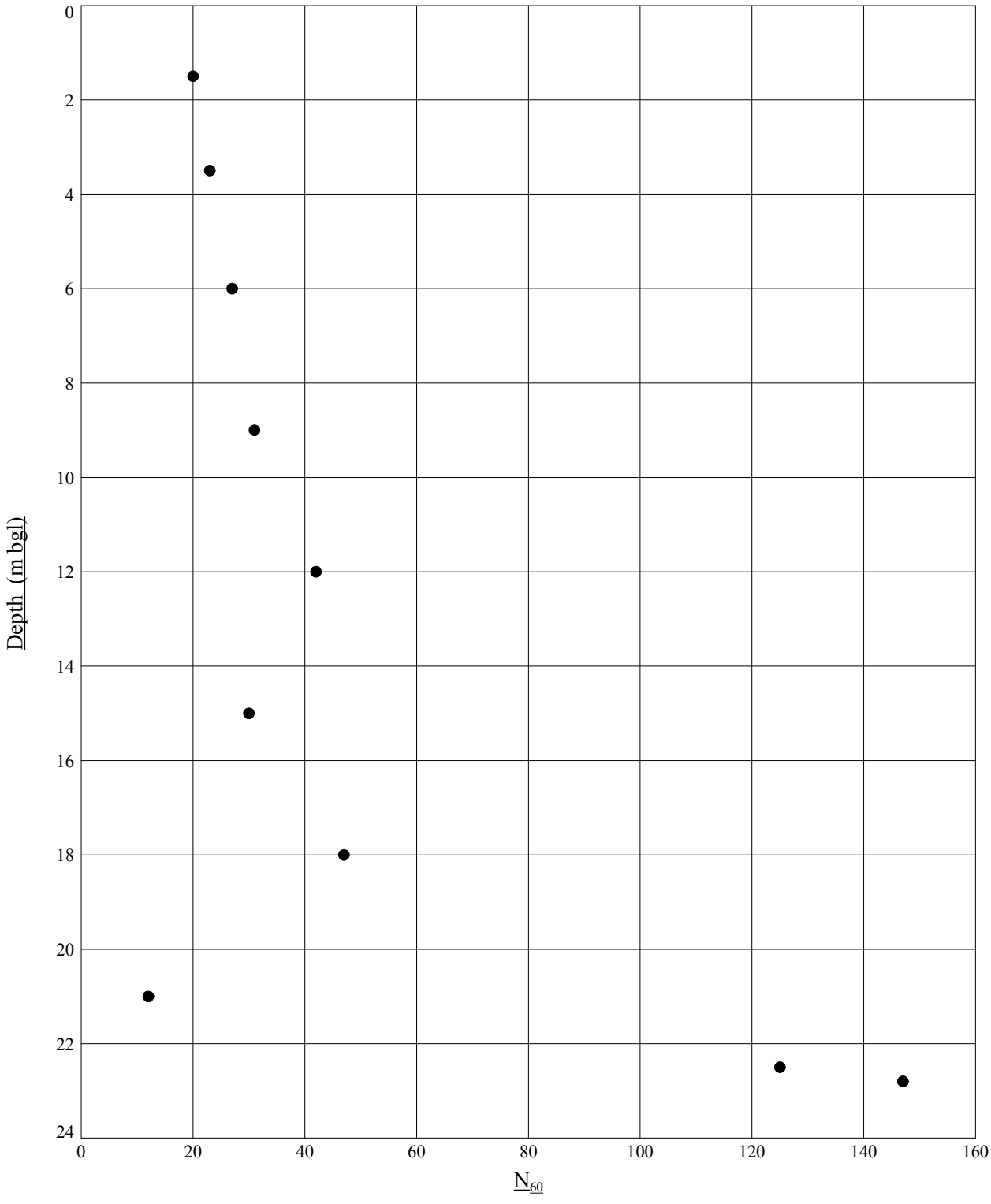
Key: ● = BH526

STRUCTURAL SOILS
The Old School
Stillhouse Lane
Bedminster
Bristol BS3 4EB

Contract	Date	Compiled By
Wylfa New Build - Intermediate Onshore Ground Investigation	**10.11.11**	KJ
Client: **Horizon Nuclear Power Wylfa Limited**	Contract Ref: **725061**	

GINT_LIBRARY_V8_04.GLB|G - PLOTS - SITE - GENERAL | 725061_WYLFA.GPJ - v8_04 | 10/11/11 - 08:55 | KJ.

STANDARD PENETRATION TEST (SPT N_{60})
vs
DEPTH



Key: ● = BH526

STRUCTURAL SOILS
The Old School
Stillhouse Lane
Bedminster
Bristol BS3 4EB

Contract	Date	Compiled By
Wylfa New Build - Intermediate Onshore Ground Investigation	**10.11.11**	KJ
Client: **Horizon Nuclear Power Wylfa Limited**	Contract Ref: **725061**	

GINT_LIBRARY_V8_04.GLB|G - PLOTS - SITE - GENERAL | 725061_WYLFA.GPJ - v8_04 | 10/11/11 - 08:55 | KJ.

WYL-SSL-SDT-LOG-00004

testconsult
Specialist Testing Services

SPT Hammer Energy Test Report

in accordance with BSEN ISO 22476-3:2005

Testconsult Limited
Ruby House
40A Hardwick Grange
Warrington
Cheshire
WA1 4RF

SPT Hammer Ref:	H2
Test Date:	26/04/2010
Report Date:	28/05/2010
File Name:	SS_H2_260410.spt
Test Operator:	YV

UKAS TESTING 0955

Instrumented Rod Data

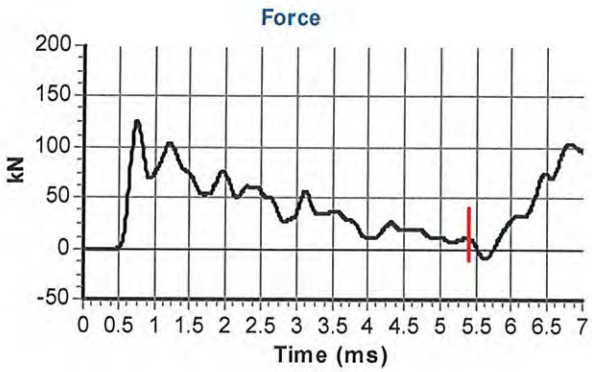
Diameter d_r (mm):	54
Wall Thickness t_r (mm):	6.6
Assumed Modulus E_a (GPa):	208
Accelerometer No.1:	5677
Accelerometer No.2:	5833

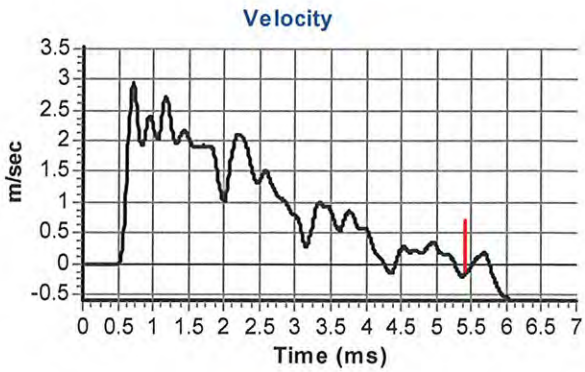
SPT Hammer Information

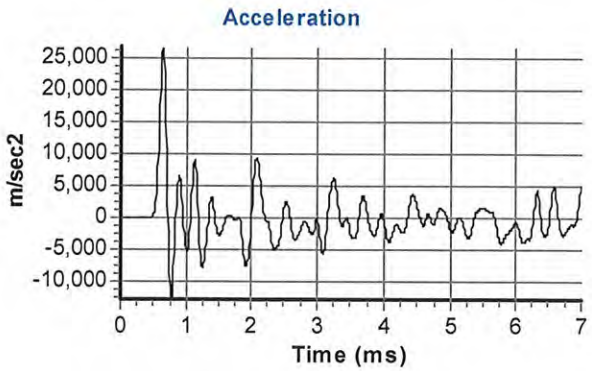
Hammer Mass m (kg):	67.5
Falling Height h (mm):	760
SPT String Length L (m):	14.0

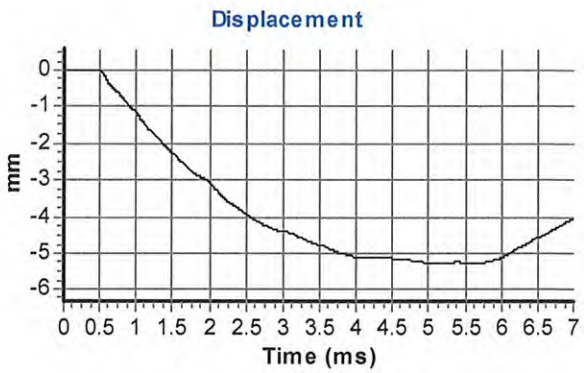
Comments / Location

Client: Structural Soils Limited
Trip Hammer
Location: Archway Engineering









Calculations

Area of Rod A (mm2):	983
Theoretical Energy E_{theor} (J):	473
Measured Energy E_{meas} (J):	334

Energy Ratio E_r (%): 71

[redacted]

Signed: Huw Williams
Title: Director

TESTCONSULT LIMITED TESTING SERVICES

The recommended calibration interval is 6 months

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH526R

Contract Ref:	Start: 30.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 09.05.11	7.892	E:236005.9 N:393683.2	1 of 9

Mechanical Log: Depth	TCR %	SCR %	RQD %	If (mm)	Flush Returns & Details	Drill Time (hh:mm:ss)	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
0.00					Air	(00:15:00)				Grass over soft dark brown to dark reddish brown sandy PEAT with additional fine rootlets. (Drift Deposits - Topsoil)		7.592	(0.30) 0.30	
										Loose light grey silty clayey fine to coarse SAND. (Drift Deposits - Unit F)		7.392	0.50	
										Soft dark brown very sandy slightly gravelly CLAY. (Drift Deposits - Unit F)		7.092	(0.30) 0.80	
1.00										Soft dark brown very gravelly slightly clayey SAND. (Drift Deposits - Unit F)		6.692	(0.40) 1.20	
										Dark grey very fine sand slightly gravelly CLAY. (Drift Deposits - Unit F)				
2.00														
3.00														
4.00														

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
28/04/11	13:30	0.90	None	121	0.90
30/04/11		7.00	7.00	121	7.00
01/05/11	09:00	10.00	10.00	121	6.00
01/05/11	16:00	19.50	18.00	121	-2.80
03/05/11	10:30	22.50	21.00	121	1.30
04/05/11	08:30	27.00	25.50	121	1.40
04/05/11	17:45	31.50	25.50	121	7.30
05/05/11	08:30	31.50	25.50	121	1.35

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres	Scale: 1:28	Inclination: Vertical	Azimuth: NA

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Dynamic sampling + Rotary Cored	Beretta T44	CG/CA	JWickenden + NFowler + SAl-Jassar	GS+BNS

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH526R

Contract Ref:	Start: 30.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 09.05.11	7.892	E:236005.9 N:393683.2	2 of 9

Mechanical Log													
Depth	TCR %	SCR %	RQD %	If (mm)	Flush Returns & Details	Drill Time (hh:mm:ss)	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
5.00														
													(8.10)	
6.00												2		6
7.00												1		7
					Air	(00:15:00)			1.1					
8.00												0		8
9.00												-1		9
										Light grey brown sandy silty CLAY with occasional fine subangular to subrounded gravel of flint (Driller's report water seepage). (Drift Deposits - Unit F)		-1.408	9.30	
													(0.50)	
										Dark grey silty slightly gravelly CLAY. (Drift Deposits - Unit F)		-1.908	9.80	
												-2		10
												-2.108	10.00	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
05/05/11	17:30	37.50	25.50	121	4.00
09/05/11		39.00	25.50	121	7.63

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres	Scale: 1:28	Inclination: Vertical	Azimuth: NA

Method Used:	Rotary open hole + Dynamic sampling + Rotary Cored	Plant Used:	Beretta T44	Drilled By:	CG/CA	Logged By:	JWickenden + NFowler + SAl-Jassar	Checked By:	GS+BNS

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH526R

Contract Ref:	Start: 30.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 09.05.11	7.892	E:236005.9 N:393683.2	3 of 9

Depth	Mechanical Log: TCR %	SCR %	RQD %	If (mm)	Flush Returns & Details	Drill Time (hh:mm:ss)	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
10.00						(00:05:00)				Stiff to very stiff locally firm medium grey brown mottled gravelly sandy silty CLAY. (Drift Deposits - Unit F)		-3	11 (2.50)	
11.00	Dynamic sampling run 101mm dia (30% rec)													
12.00	Dynamic sampling run 88mm dia (100% rec)					(00:06:00)						-4.608	12.50	
										Stiff to very stiff brown grey mottled locally poorly laminated slightly gravelly sandy CLAY. (Drift Deposits - Unit F)		-5	(0.60)	
13.00	Dynamic sampling run 88mm dia (100% rec)					(00:06:00)						-5.208	13.10	
										Very stiff locally stiff medium grey brown locally poorly laminated slightly sandy silty CLAY. (Drift Deposits - Unit F)		-6	14 (2.10)	
14.00	Dynamic sampling run 88mm dia (100% rec)				Mist	(00:25:00)						-7	15	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres	Scale: 1:28	Inclination: Vertical	Azimuth: NA

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Dynamic sampling + Rotary Cored	Beretta T44	CG/CA	JWickenden + NFowler + SAl-Jassar	GS+BNS

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BOREHOLE LOG

Contract:	Client:	Borehole:
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Contract Ref:	Start: 30.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Mechanical Log: Depth	TCR %	SCR %	RQD %	If (mm)	Flush Returns & Details	Drill Time (hh:mm:ss)	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
15.00												-7.308	15.20	
										Stiff to very stiff dark brown grey locally poorly laminated slightly fissured silty CLAY. (Drift Deposits - Unit F)		-8	(1.60) 16	
16.00												-8.908	16.80	
										Very stiff locally stiff medium brown becoming light brown with depth locally poorly laminated slightly fissured silty CLAY. (Drift Deposits - Unit F)		-9	17 (1.00)	
17.00												-9.908	17.80	
										Very stiff brown light brown very silty CLAY. (Drift Deposits - Unit F)		-10	18	
18.00														
												-11	19	
19.00														
												-12	(4.20) 20	

Dynamic sampling run 88mm dia (100% rec) — (00:31:00)

Dynamic sampling run 88mm dia (90% rec) — (00:25:00)

(00:30:00)

Mist

NR

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres	Scale: 1:28	Inclination: Vertical	Azimuth: NA

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Dynamic sampling + Rotary Cored	Beretta T44	CG/CA	JWickenden + NFowler + SAl-Jassar	GS+BNS

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BOREHOLE LOG

Contract:	Client:	Borehole:
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Contract Ref:	Start: 30.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 09.05.11	7.892	E:236005.9 N:393683.2	5 of 9

Mechanical Log														
Depth	TCR %	SCR %	RQD %	If (mm)	Flush Returns & Details	Drill Time (hh:mm:ss)	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
20.00														
												-13		
21.00				NR									21	
												-14		
												-14.108	22.00	
22.00										Soft locally firm brown sandy locally very sandy gravelly CLAY with rare subangular cobbles of psammite. (Drift Deposits - Unit B1)			22	
													(0.50)	
												-14.608	22.50	
										Brown slightly clayey slightly sandy angular to rounded fine to coarse GRAVEL of psammite and phyllite (possibly moderately weathered phyllite/psammite) (New Harbour Group - Psammite)		-15		
23.00													23	
				NI									(1.27)	
												-15.878	23.77	
										Medium strong to strong dark greenish blue fine to medium grained moderately to slightly weathered PSAMMITE. (New Harbour Group - Psammite)		-16		
24.00													24	
													(1.73)	
												-17		
													25	

Mist

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres	Scale: 1:28	Inclination: Vertical	Azimuth: NA

Method Used:	Rotary open hole + Dynamic sampling + Rotary Cored	Plant Used:	Beretta T44	Drilled By:	CG/CA	Logged By:	JWickenden + NFowler + SAl-Jassar	Checked By:	GS+BNS

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BOREHOLE LOG

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Contract Ref:	Start: 30.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 09.05.11	7.892	E:236005.9 N:393683.2	6 of 9

Mechanical Log														
Depth	TCR %	SCR %	RQD %	If (mm)	Flush Returns & Details	Drill Time (hh:mm:ss)	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
25.00												-17.608	25.50	
										Medium strong to strong greenish blue fine grained slightly weathered PSAMMITE with medium strong very narrowly foliated greenish blue slightly weathered phyllite. (New Harbour Group - Psammite)		-18	26	
26.00														
												-19	(3.00) 27	
27.00				NI	Mist									
												-20	28	
28.00												-20.608	28.50	
										Medium strong very narrowly foliated purple slightly weathered PHYLLITE with strong dark bluish grey fine grained slightly weathered psammite with evidence of extremely closely spaced randomly orientated calcite veining. (New Harbour Group - Phyllite)		-21	(1.00) 29	
29.00												-21.608	29.50	
				30 70 120						Strong narrow to very thin bands of very narrowly foliated locally highly disturbed dark purple fresh PHYLLITE with extremely closely spaced very narrow locally narrow lenticular bands of		-22	30	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres	Scale: 1:28	Inclination: Vertical	Azimuth: NA

Method Used:	Rotary open hole + Dynamic sampling + Rotary Cored	Plant Used:	Beretta T44	Drilled By:	CG/CA	Logged By:	JWickenden + NFowler + SAl-Jassar	Checked By:	GS+BNS

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STRUCTURAL SOILS

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH526R

Contract Ref:	Start: 30.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 09.05.11	7.892	E:236005.9 N:393683.2	7 of 9

Depth	Mechanical Log: TCR %	SCR %	RQD %	If (mm)	Flush Returns & Details	Drill Time (hh:mm:ss)	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
30.00										bluish grey fine grained psammite. (New Harbour Group - Phyllite)			(1.30)	
												-22.908	30.80	
										Medium strong to strong very narrow bands of very narrowly foliated purplish red and red fresh PHYLLITE with extremely closely spaced very narrow lenticular bands of grey fine grained psammite. (New Harbour Group - Phyllite)		-23.038	30.93	
31.00													31	
										Strong bluish grey fine to medium grained fresh PSAMMITE. (New Harbour Group - Psammite)		-24	32	
32.00				NI 500	Mist								(2.51)	
												-25	33	
33.00												-25.548	33.44	
										Medium strong highly disturbed very narrow to very thin bands of very narrowly foliated dark purple moderately to slightly weathered PHYLLITE with very narrow to narrow bands of blue-grey fine grained psammite. (New Harbour Group - Phyllite)			(0.52)	
												-26.068	33.96	
34.00										Medium strong very narrowly foliated dark purple moderately weathered PHYLLITE with foliation dipping at 15 - 20°. (New Harbour Group - Phyllite)		-26	34	
													(0.69)	
												-26.758	34.65	
										Medium strong very narrow to narrow bands of very narrowly foliated purplish grey slightly weathered PHYLLITE with extremely closely spaced very narrow		-27	35	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres	Scale: 1:28	Inclination: Vertical	Azimuth: NA

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Dynamic sampling + Rotary Cored	Beretta T44	CG/CA	JWickenden + NFowler + SAl-Jassar	GS+BNS

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH526R

Contract Ref:	Start: 30.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 09.05.11	7.892	E:236005.9 N:393683.2	8 of 9

Depth	Mechanical Log TCR %	SCR %	RQD %	If (mm)	Flush Returns & Details	Drill Time (hh:mm:ss)	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
35.00				20 130 390	Mist					lenticular bands of bluish grey fine grained psammite. (New Harbour Group - Phyllite)		-27.958	(1.20) 35.85	
36.00				60 70 100						Medium strong to strong narrow bands of bluish grey fine grained slightly weathered to fresh PSAMMITE with extremely closely spaced very narrow bands of very narrowly foliated dark purple phyllite. (New Harbour Group - Psammite)		-28 -28.608	36 (0.65) 36.50	
				NI 80 140						Medium strong disturbed very narrow to narrow bands of very narrowly foliated greyish purple slightly weathered PHYLLITE with extremely closely spaced very narrow lenticular bands of bluish grey fine grained psammite. (New Harbour Group - Phyllite)		-28.948	(0.34) 36.84	
37.00				NI						Medium strong to strong highly disturbed very narrowly foliated bluish green slightly weathered to fresh PHYLLITE with frequent extremely to very closely spaced incipient fractures and microfaulting disturbing/deformed foliation. (New Harbour Group - Phyllite)		-29 -29.268	(0.32) 37 37.16	
				10 30 40						Medium strong bluish grey fine grained moderately weathered PSAMMITE. (New Harbour Group - Psammite)		-29.448	37.34	
38.00				40 70 110						Medium strong very narrow to very thin bands of very narrowly foliated bluish green slightly weathered PHYLLITE with extremely closely spaced very narrow lenticular bands of bluish green fine grained psammite. (New Harbour Group - Phyllite)		-30 -30.208	(0.76) 38 38.10	
39.00				NI						Medium strong highly disturbed bluish green fine grained slightly weathered PSAMMITE with highly disturbed/deformed fabric. (New Harbour Group - Psammite)		-31	39 (1.95)	
				NI 300								-32	40	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres	Scale: 1:28	Inclination: Vertical	Azimuth: NA

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Dynamic sampling + Rotary Cored	Beretta T44	CG/CA	JWickenden + NFowler + SAl-Jassar	GS+BNS

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH526R

Contract Ref:	Start: 30.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 09.05.11	7.892	E:236005.9 N:393683.2	9 of 9

Mechanical Log: Depth	TCR %	SCR %	RQD %	If (mm)	Flush Returns & Details	Drill Time (hh:mm:ss)	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
40.00										Medium strong to strong very narrowly foliated bluish green fresh PHYLLITE. (New Harbour Group - Phyllite)		-32.158	40.05	
				NI 300	Mist								(1.45)	
												-33		
41.00													41	
										Rotary borehole terminated at 41.50m depth.		-33.608	41.50	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres	Scale: 1:28	Inclination: Vertical	Azimuth: NA

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Dynamic sampling + Rotary Cored	Beretta T44	CG/CA	JWickenden + NFowler + SAl-Jassar	GS+BNS

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH526R**

Contract Ref:	Start: **30.04.11**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **09.05.11**	**7.892**	**E:236005.9 N:393683.2**	**1** of **44**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
									Grass over soft dark brown to dark reddish brown sandy PEAT with additional fine rootlets. (Drift Deposits - Topsoil)				
											7.592	0.30	
0.30						2/ES			Loose light grey silty clayey fine to coarse SAND. Clay occurs as pockets of light grey silty clay (100mm). (Drift Deposits - Unit F) . . . at 0.40m depth sand is orange-brown in places.				
											7.392	0.50	
0.50						1/B			Soft dark brown very sandy slightly gravelly CLAY. Gravel is fine to medium subangular to rounded phyllite. (Drift Deposits - Unit F)				
0.50					Air	2/ES							
												(0.30)	
											7.092	0.80	
0.80						3/ES			Soft dark brown very gravelly slightly clayey SAND. Gravel is fine to medium subangular to rounded phyllite. (Drift Deposits - Unit F)				
											7		
												(0.40)	
											6.692	1.20	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
28/04/11	13:30	0.90	None	121	0.90
30/04/11		7.00	7.00	121	7.00
01/05/11	09:00	10.00	10.00	121	6.00
01/05/11	16:00	19.50	18.00	121	-2.80
03/05/11	10:30	22.50	21.00	121	1.30
04/05/11	08:30	27.00	25.50	121	1.40
04/05/11	17:45	31.50	25.50	121	7.30
05/05/11	08:30	31.50	25.50	121	1.35

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres	Scale: **1:7**	Inclination: **Vertical**	Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Dynamic sampling + Rotary Cored	**Beretta T44**	**CG/CA**	**JWickenden + NFowler + SAl-Jassar**	**GS+BNS**

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH526R**

Contract Ref:	Start: **30.04.11**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **09.05.11**	**7.892**	**E:236005.9 N:393683.2**	**2** of **44**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
					Air				Dark grey very fine sand slightly gravelly CLAY. Gravel is fine to medium subangular to subrounded of flint, quartz and rare psammite and possible calcite (Drift Deposits - Unit F)		6	2	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth
05/05/11	17:30	37.50	25.50	121	4.00
09/05/11		39.00	25.50	121	7.63

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres	Scale: **1:7**	Inclination: **Vertical**	Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Dynamic sampling + Rotary Cored	**Beretta T44**	**CG/CA**	**JWickenden + NFowler + SAl-Jassar**	**GS+BNS**

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STRUCTURAL SOILS

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH526R

Contract Ref:	Start: 30.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 09.05.11	7.892	E:236005.9 N:393683.2	3 of 44

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
					Air						5	3	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres | Scale: 1:7 | Inclination: Vertical | Azimuth: NA

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Dynamic sampling + Rotary Cored	Beretta T44	CG/CA	JWickenden + NFowler + SAl-Jassar	GS+BNS

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BOREHOLE LOG

Contract:	Client:	Borehole:
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Contract Ref:	Start: **30.04.11**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **09.05.11**	**7.892**	**E:236005.9 N:393683.2**	**4** of **44**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
					Air						4	4	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Dynamic sampling + Rotary Cored	**Beretta T44**	**CG/CA**	**JWickenden + NFowler + SAl-Jassar**	**GS+BNS**

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BOREHOLE LOG

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Contract Ref:	Start: 30.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
					Air						3 2	5 (8.10) 6	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres	Scale: 1:7	Inclination: Vertical	Azimuth: NA

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Dynamic sampling + Rotary Cored	Beretta T44	CG/CA	JWickenden + NFowler + SAl-Jassar	GS+BNS

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Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
					Air			1.1			1	7	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres	Scale: 1:7	Inclination: Vertical	Azimuth: NA

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Dynamic sampling + Rotary Cored	Beretta T44	CG/CA	JWickenden + NFowler + SAl-Jassar	GS+BNS

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BOREHOLE LOG

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Contract Ref:	Start: 30.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 09.05.11	7.892	E:236005.9 N:393683.2	7 of 44

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
					Air						0	8	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres	Scale: 1:7	Inclination: Vertical	Azimuth: NA

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Dynamic sampling + Rotary Cored	Beretta T44	CG/CA	JWickenden + NFowler + SAl-Jassar	GS+BNS

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BOREHOLE LOG

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Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **09.05.11**	**7.892**	**E:236005.9 N:393683.2**	**8** of **44**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
					Air						-1	9	
									Light grey brown sandy silty CLAY with occasional fine subangular to subrounded gravel of flint (Driller's report water seepage). (Drift Deposits - Unit F)		-1.408	9.30	
												(0.50)	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Dynamic sampling + Rotary Cored	**Beretta T44**	**CG/CA**	**JWickenden + NFowler + SAl-Jassar**	**GS+BNS**

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH526R**

Contract Ref:	Start: **30.04.11**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **09.05.11**	**7.892**	**E:236005.9 N:393683.2**	**9** of **44**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
					Air						-1.908	9.80	
									Dark grey silty slightly gravelly CLAY. Gravel is fine to medium rounded to subangular flint, quartz (with some red staining and rare psammite. (Drift Deposits - Unit F)		-2	(0.20)	
10.00					DEEP/ SHALLO						-2.108	10.00	
10.00									Stiff to very stiff locally firm medium grey brown mottled gravelly sandy silty CLAY. Gravel medium to coarse angular to subangular phyllite. (Drift Deposits - Unit F)				

Window run 101mm dia (30% rec)

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Dynamic sampling + Rotary Cored	**Beretta T44**	**CG/CA**	**JWickenden + NFowler + SAl-Jassar**	**GS+BNS**

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BOREHOLE LOG

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Contract Ref:	Start: 30.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
											-3		
												11	
Window run 101mm dia (30% rec)													
												(2.50)	
									. . . from 11.30m depth with occasional cobbles of phyllite.				
Window run 88mm dia (100% rec)											-4		
												12	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres	Scale: 1:7	Inclination: Vertical	Azimuth: NA

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Dynamic sampling + Rotary Cored	Beretta T44	CG/CA	JWickenden + NFowler + SAl-Jassar	GS+BNS

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
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Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
12.20													
											-4.608	12.50	
									Stiff to very stiff brown grey mottled locally poorly laminated slightly gravelly sandy CLAY. Gravel fine to medium angular to subrounded phyllite and psammite. Becoming very stiff with depth. (Drift Deposits - Unit F)				
12.80												(0.60)	
											-5		
												13	
											-5.208	13.10	
									Very stiff locally stiff medium grey brown locally poorly laminated slightly sandy silty CLAY. (Drift Deposits - Unit F)				

Window run 88mm dia (100% rec)

Window run 88mm dia (100% rec)

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres	Scale: 1:7	Inclination: Vertical	Azimuth: NA

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Dynamic sampling + Rotary Cored	Beretta T44	CG/CA	JWickenden + NFowler + SAl-Jassar	GS+BNS

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BOREHOLE LOG

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Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
13.30	Window run 88mm dia (100% rec)												
	Window run 88mm dia (100% rec)				Mist						-6	14 (2.10)	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres	Scale: 1:7	Inclination: Vertical	Azimuth: NA

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Dynamic sampling + Rotary Cored	Beretta T44	CG/CA	JWickenden + NFowler + SAl-Jassar	GS+BNS

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BOREHOLE LOG

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Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
14.50					Mist				Window run 88mm dia (100% rec)				
									Window run 88mm dia (100% rec)		-7	15	
									Stiff to very stiff dark brown grey locally poorly laminated slightly fissured silty CLAY. (Drift Deposits - Unit F)		-7.308	15.20	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres | Scale: 1:7 | Inclination: Vertical | Azimuth: NA

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Dynamic sampling + Rotary Cored	Beretta T44	CG/CA	JWickenden + NFowler + SAl-Jassar	GS+BNS

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH526R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **09.05.11**	**7.892**	**E:236005.9 N:393683.2**	**14** of **44**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
16.00	Window run 88mm dia (100% rec)				Mist						-8	(1.60) 16	
	Window run 88mm dia (90% rec)										-8.908	16.80	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres	Scale: **1:7**	Inclination: **Vertical**	Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Dynamic sampling + Rotary Cored	**Beretta T44**	**CG/CA**	**JWickenden + NFowler + SAl-Jassar**	**GS+BNS**

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH526R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **09.05.11**	**7.892**	**E:236005.9 N:393683.2**	**15** of **44**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
					Mist				Very stiff locally stiff medium brown becoming light brown with depth locally poorly laminated slightly fissured silty CLAY. (Drift Deposits - Unit F)		-9	17	
												(1.00)	
											-9.908	17.80	
									Very stiff brown light brown very silty CLAY. With occasional <1mm lenses of light grey fine sand. (Drift Deposits - Unit F)		-10	18	

Window run 88mm dia (90% rec)

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Dynamic sampling + Rotary Cored	**Beretta T44**	**CG/CA**	**JWickenden + NFowler + SAl-Jassar**	**GS+BNS**

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH526R

Contract Ref:	Start: 30.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
18.00-22.00 (0:30)	ZCL	ZCL	ZCL	NR	Mist				. . . between 18.00 and 22.00m depth zone of core loss		-11	19	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Dynamic sampling + Rotary Cored	Beretta T44	CG/CA	JWickenden + NFowler + SAl-Jassar	GS+BNS

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BOREHOLE LOG

Contract:	Client:	Borehole:
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Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **09.05.11**	**7.892**	**E:236005.9 N:393683.2**	**17** of **44**

Mechanical Log														
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
	ZCL	ZCL	ZCL	NR	Mist						-12	(4.20)	
												20	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres	Scale: **1:7**	Inclination: **Vertical**	Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Dynamic sampling + Rotary Cored	**Beretta T44**	**CG/CA**	**JWickenden + NFowler + SAl-Jassar**	**GS+BNS**

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BOREHOLE LOG

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Contract Ref:	Start: **30.04.11**	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Mechanical Log													
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
	ZCL	ZCL	ZCL	NR	Mist						-13	21	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres	Scale: **1:7**	Inclination: **Vertical**	Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Dynamic sampling + Rotary Cored	**Beretta T44**	**CG/CA**	**JWickenden + NFowler + SAl-Jassar**	**GS+BNS**

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BOREHOLE LOG

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Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Depth	Mechanical Log TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
	ZCL	ZCL	ZCL	NR	Mist						-14		
22.00-22.50 (0:10)	56	0	0	NI					Soft locally firm brown sandy locally very sandy gravelly CLAY with rare subangular cobbles of psammite. Gravel is angular to subrounded medium to coarse psammite and phyllite. (Drift Deposits - Unit B1)		-14.108	22.00 (0.50)	
22.50-23.00 (0:21)	100	0	0						Brown slightly clayey slightly sandy angular to rounded fine to coarse GRAVEL of psammite and phyllite (possibly moderately weathered phyllite/psammite) (New Harbour Group - Psammite)		-14.608	22.50	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Dynamic sampling + Rotary Cored	**Beretta T44**	**CG/CA**	**JWickenden + NFowler + SAl-Jassar**	**GS+BNS**

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Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **09.05.11**	**7.892**	**E:236005.9 N:393683.2**	**20** of **44**

Mechanical Log					Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)									
	100	0	0								-15		
23.00-24.00 (0:21)									. . . between 23.00 and 23.4m depth loss of recovery (50%) recovered as fine to coarse gravel of psammite and phyllite			23 (1.27)	
	47	10	10	NI	Mist						-15.878	23.77	
									Medium strong to strong dark greenish blue fine to medium grained moderately to slightly weathered PSAMMITE. Extremely closely spaced randomly orientated intersecting lenticular and ptygmatic very narrow <1mm epidote veins. Joints are closely spaced locally intersecting, planar smooth to rough possibly up to wide dipping 50 - 60° & 80° and infilled with brown angular to rounded fine to coarse gravel. (New Harbour Group - Psammite)		-16	24	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres	Scale: **1:7**	Inclination: **Vertical**	Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Dynamic sampling + Rotary Cored	**Beretta T44**	**CG/CA**	**JWickenden + NFowler + SAl-Jassar**	**GS+BNS**

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BOREHOLE LOG

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Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH526R

Contract Ref:	Start: 30.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
24.00-25.50 (0:27)	ZCL	ZCL	ZCL	NI	Mist				. . . between 23.88 and 24.00m depth frequent randomly orientated extremely closely spaced intersecting incipient fractures. . . . between 24.00 and 25.50m depth zone of core loss		-17	(1.73)	
											25		

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres	Scale: 1:7	Inclination: Vertical	Azimuth: NA

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Dynamic sampling + Rotary Cored	Beretta T44	CG/CA	JWickenden + NFowler + SAl-Jassar	GS+BNS

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BOREHOLE LOG

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Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
	ZCL	ZCL	ZCL								-17.608	25.50	
25.50-27.00 (0:24)	27	0	0	NI	Mist				Medium strong to strong greenish blue fine grained slightly weathered PSAMMITE with medium strong very narrowly foliated greenish blue slightly weathered phyllite. Recovered as non intact angular to subrounded fine to coarse grained with evidence of dark brown stained fracture surfaces. Locally with subrounded cobbles and smooth (possible non intact due to frequent intersecting extremely to very closely spaced incipient fractures or possible crush zone?). (New Harbour Group - Psammite)		-18	26	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Dynamic sampling + Rotary Cored	**Beretta T44**	**CG/CA**	**JWickenden + NFowler + SAl-Jassar**	**GS+BNS**

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STRUCTURAL SOILS

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BOREHOLE LOG

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Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Mechanical Log					Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)									
	27	0	0										
				NI	Mist						-19	(3.00)	
27.00-28.50 (1:27)	33	0	0						. . . between 27 and 28.50m loss of recovery (60%) recovered as angular to subangular fine to coarse gravel of phyllite			27	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres	Scale: **1:7**	Inclination: **Vertical**	Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Dynamic sampling + Rotary Cored	**Beretta T44**	**CG/CA**	**JWickenden + NFowler + SAl-Jassar**	**GS+BNS**

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STRUCTURAL SOILS

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BOREHOLE LOG

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Mechanical Log					Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)									
	33	0	0	NI	Mist						-20	28	
28.50-29.00 (0:40)	80	0	0						Medium strong very narrowly foliated purple slightly weathered PHYLLITE with strong dark bluish grey fine grained slightly weathered psammite with evidence of extremely closely spaced randomly orientated calcite veining. Recovered as non intact angular to subrounded fine to coarse grained locally very stained (possible crush zone?). (New Harbour Group - Phyllite)		-20.608	28.50	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres	Scale: 1:7	Inclination: Vertical	Azimuth: NA

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Dynamic sampling + Rotary Cored	Beretta T44	CG/CA	JWickenden + NFowler + SAl-Jassar	GS+BNS

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BOREHOLE LOG

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Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
	80	0	0								-21		
												(1.00) 29	
29.00-30.00 (0:15)				NI	Mist				. . . between 29.00 and 29.50m depth partially non-intact recovered as fine gravel (possible crush zone?) with loss of recovery				
	60	18	0						Strong narrow to very thin bands of very narrowly foliated locally highly disturbed dark purple fresh PHYLLITE with extremely closely spaced very narrow locally narrow lenticular bands of bluish grey fine grained psammite. Foliation dipping 15-20°. Closely spaced lenticular very narrow <5mm occasional en echelon calcite veins dipping 25° and 70°. Foliation fractures are very closely spaced planar smooth dipping 15 - 20° (New Harbour Group - Phyllite)	1 kF[i] 2 FF[i]	-21.608	29.50	
				30 70 120					. . . between 29.50 and 29.72m depth non-intact recovered as angular to subrounded fine to coarse gravel with rare subrounded cobbles (possible crush zone?). . . . between 29.87 and 29.91m depth non-intact recovered as angular fine to coarse tabular gravel (possible crush zone related to faulting?).	3 kF[i] 4 FF[i] 5 FF[i] 6 FF[i]	-22	30	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres	Scale: **1:7**	Inclination: **Vertical**	Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Dynamic sampling + Rotary Cored	**Beretta T44**	**CG/CA**	**JWickenden + NFowler + SAl-Jassar**	**GS+BNS**

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH526R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **09.05.11**	**7.892**	**E:236005.9 N:393683.2**	**26** of **44**

Depth	Mechanical Log: TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
30.00-31.00 (1:40)	63	10	0	NI 500	Mist				. . . between 30.00 and 31m depth non-intact recovered as angular fine to coarse tabular gravel (possible crush zone related to faulting?) with loss of recovery			(1.30)	
									Medium strong to strong very narrow bands of very narrowly foliated purplish red and red fresh PHYLLITE with extremely closely spaced very narrow lenticular bands of grey fine grained psammite. Foliation is dipping at 20°. Extremely closely spaced lenticular very narrow <2mm calcite veins dipping ~60°. (New Harbour Group - Phyllite)		-22.908	30.80	
											-23	(0.13)	
31.00-31.50 (0:37)	76	12	0						Strong bluish grey fine to medium grained fresh PSAMMITE. Recovered as predominantly non intact angular to subrounded medium to coarse gravel with occasional cobbles. Extremely closely spaced lenticular very narrow to narrow <6mm quartz veins dipping 70-80° cross cut by possible very closely spaced lenticular very narrow <3mm calcite veins dipping 40 - 65° with possible boudinage texture? (New Harbour Group - Psammite)		-23.038	30.93	
												31	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres	Scale: **1:7**	Inclination: **Vertical**	Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Dynamic sampling + Rotary Cored	**Beretta T44**	**CG/CA**	**JWickenden + NFowler + SAl-Jassar**	**GS+BNS**

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STRUCTURAL SOILS

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH526R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
31.50-33.00 (0:47)	76	12	0	NI 500	Mist				. . . between 31.00 and 33m depth non-intact recovered as subangular to subrounded coarse gravel (possible crush zone related to faulting?) with loss of core loss (65%)		-24	32 (2.51)	
	17	4	0										

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Dynamic sampling + Rotary Cored	**Beretta T44**	**CG/CA**	**JWickenden + NFowler + SAl-Jassar**	**GS+BNS**

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BOREHOLE LOG

Contract:	Client:	Borehole:
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Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Mechanical Log					Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)									
	17	4	0										
											-25		
33.00-34.50 (0:52)				NI 500	Mist				. . . between 33 and 33.50m depth non-intact recovered as angular to subrounded coarse gravel (possible crush zone).			33	
	83	3	0										
									Medium strong highly disturbed very narrow to very thin bands of very narrowly foliated dark purple moderately to slightly weathered PHYLLITE with very narrow to narrow bands of blue-grey fine grained psammite. Very closely to closely spaced lenticular and ptygmatic narrow <10mm calcite veins dipping		-25.548	33.44	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres	Scale: **1:7**	Inclination: **Vertical**	Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Dynamic sampling + Rotary Cored	**Beretta T44**	**CG/CA**	**JWickenden + NFowler + SAl-Jassar**	**GS+BNS**

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BOREHOLE LOG

Contract:	Client:	Borehole:
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Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
									25-85° with pale orange discolouration/staining penetrating up to 2mm. Fractures are extremely closely spaced planar smooth dipping 3-25° and closely spaced dipping 55-70° with rare slight clay smearing. (New Harbour Group - Phyllite) . . . between 33.63 to 33.69m depth possible microfault dipping 55° undulating with very tight offsets disturbing fabric. . . . between 33.63 and 34.50m depth non-intact recovered as slightly gravelly fine to coarse sand (possible crush zone associated with faulting) . . . below 33.80m depth phyllite pale purplish brown.	7 PF[i] 8 FF[i]	-26 -26.068	(0.52) 33.96	
	83	3	0	NI 500	Mist				Medium strong very narrowly foliated dark purple moderately weathered PHYLLITE with foliation dipping at 15 - 20°. Recovered as predominantly non intact with evidence of weathered calcite veining stained/discoloured pale orange. (New Harbour Group - Phyllite)			34 (0.69)	
34.50-35.50 (0:16)									. . . between 34.44 and 34.49m depth band of bluish grey fine to medium grained psammite with subvertical and subhorizontal extremely closely spaced calcite veining discoloured pale orange.				
	85	43	40						Medium strong very narrow to narrow bands of very narrowly foliated purplish grey slightly weathered PHYLLITE with extremely closely spaced very narrow lenticular bands of bluish grey fine grained psammite. Strata has a possible poorly developed mylonitic fabric? Foliation dipping at ~5°. Very closely spaced		-26.758	34.65	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Dynamic sampling + Rotary Cored	**Beretta T44**	**CG/CA**	**JWickenden + NFowler + SAl-Jassar**	**GS+BNS**

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH526R

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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	End: 09.05.11			

Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
				NI 500	Mist				very narrow <1mm calcite veins dipping 35 - 75°. (New Harbour Group - Phyllite) . . . between 34.65 and 34.96m depth non-intact recovered as very angular to angular coarse gravel with evidence of fracture surfaces (stained brown) and narrow bands of bluish grey fine grained psammite.	12 PMF[i]	-27		
												35	
	85	43	40						. . . between 35.06 and 35.09m depth narrow lenticular bluish grey fine grained psammite fabric.	9 IcF[i]			
										10 FF[i]			
									. . . between 35.21 and 35.30m depth 25° possible fault infilled with non-intact slightly clayey gravelly fine to coarse sand formed by the crushing of phyllite and psammite	11 PF[i]		(1.20)	
									. . . between 35.25 and 35.60m depth 30 - 60° extremely to very closely spaced intersecting lenticular and irregular calcite veins up to 15mm wide with pale orange discolouration/staining penetrating up to 3mm and clasts of phyllite (possibly associated with extremely closely spaced microfaults and incipient between 35.30 and 35.50m depth psammite fabric highly disturbed by microfaults between 35.50 and 35.40m depth.	13 PMF[i]			
										14 IcF[i]			
										15 IcF[i]			
										16 IcF[i]			
35.50-36.50 (0:18)				20 130 390					. . . between 35.29 to 35.40m depth 2 no. possible microfault dipping 80-85° undulating with very tight with offsets of <5mm disturbing fabric. . . . between 35.30 to 35.35m depth possible microfault dipping 35° undulating with very tight with offsets of <5mm disturbing fabric. . . . between 35.35 to 35.43m depth possible re-fused microfault dipping 50° undulating partly open causing offset of 30mm.				
	100	75	30						. . . between 35.40 and 35.58m depth band of bluish grey fine to medium grained psammite with incipient fractures. . . . between 35.50 and 35.69m depth non-intact recovered as angular to subrounded medium to coarse gravel (possibly due to very closely spaced incipient fractures?).	17 J[i]			
										18 IcF[i]			
										19 J[i]			
										20 IcF[i]	-27.958	35.85	
									Medium strong to strong narrow bands of bluish grey fine grained slightly weathered to fresh PSAMMITE with extremely closely spaced very narrow bands of very narrowly foliated dark purple phyllite. Psammite bands are dipping at 20 - 30°. Extremely closely to		-28		
										21 J[i]			
										22 IcF[i]		36	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Dynamic sampling + Rotary Cored	Beretta T44	CG/CA	JWickenden + NFowler + SAl-Jassar	GS+BNS

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH526R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	**30.04.11** End: **09.05.11**	**7.892**	**E:236005.9 N:393683.2**	**31** of **44**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
				20 130 390	Mist				very closely spaced lenticular very narrow <3mm calcite veins dipping 75 - 85°. Fractures are closely to closely spaced planar smooth locally planar rough open dipping 15 - 40° locally 85° with occasional calcite infill. (New Harbour Group - Psammite) . . . between 35.98 and 36.10m depth subvertical ptygmatic dark green chlorite veins. . . . between 36.05 and 36.10m depth 50 - 60° extremely closely spaced lenticular quartz veining up to 2mm wide. . . . between 36.13 and 36.22m depth non-intact recovered as very angular fine to medium gravel (lower wall rock of 85° microfault). . . . between 36.14 to 36.50m depth possible microfault dipping 85° undulating very tight with localised calcite infill, disturbing fabric. . . . between 36.22 and 36.25m depth subhorizontal calcite vein cut off by microfault dipping 85°, causing offset by <20mm, with subangular to subrounded inclusions/clasts of psammite. . . . between 36.28 and 36.33m depth non-intact recovered as very angular fine to medium gravel (lower wall rock of 85° microfault). . . . at 36.32m depth possible naturally open microfault dipping 20° undulating pale grey clay, disturbing fabric.	23 IcF[i] 24 J[i] 25 IcF[i] 26 J[i] 28 J[i] 29 J[i] 27 PMF[i] 30 PMF[i] 31 J[i]			
100	75	30	60 70 100									(0.65)	
											-28.608	36.50	
36.50-37.50 (0:21)									Medium strong disturbed very narrow to narrow bands of very narrowly foliated greyish purple slightly weathered PHYLLITE with extremely closely spaced very narrow lenticular bands of bluish grey fine grained psammite. Very closely spaced irregular narrow <20mm calcite veins dipping 70 - 85°. (New Harbour Group - Phyllite) . . . between 36.50 and 36.70m depth predominantly non-intact recovered as very angular to angular fine to coarse tabular gravel (possible crush zone related to faulting?). . . . below 36.70m depth fabric disturbed by microfaulting and calcite veining. . . . between 36.70 to 36.88m depth 2 no. possible microfaults dipping 70-85° undulating with very tight offsets psammite band by <15mm.	32 PMF[i] 33 PMF[i] 34 J[i]		(0.34)	
			NI 80 140								-28.948	36.84	
100	40	30									-29		
												(0.32)	
												37	
									Medium strong to strong highly disturbed very narrowly foliated bluish green slightly weathered to fresh PHYLLITE with frequent extremely to very closely spaced incipient fractures and microfaulting disturbing/deformed foliation. Very closely spaced narrow <20mm calcite veins dipping 60 - 70°. Fractures Closely spaced undulating to planar rough open	36 PF[i] 35 IcF[i] 37 IcF[i] 40 J[i]			
											-29.268	37.16	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Dynamic sampling + Rotary Cored	**Beretta T44**	**CG/CA**	**JWickenden + NFowler + SAl-Jassar**	**GS+BNS**

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH526R

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	30.04.11 End: 09.05.11	7.892	E:236005.9 N:393683.2	32 of 44

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
37.50-38.50 (0:18)	100	40	30	NI 80 140	Mist				to wide dipping 10 - 15° infilled with non intact material. (New Harbour Group - Phyllite) . . . between 36.91 to 37.08m depth possible microfault dipping 65° undulating with very tight offsets disturbing fabric and re-fused breccia of phyllite and calcite. . . . between 37.08 and 37.17m depth boudinage calcite vein. . . . below 37.12m depth extremely closely spaced narrow bands of red phyllite.	41 IcF[i] 38 IcF[i] 39 J[i] 42 J[i] 43 J[i] 44 IcF[i]	-29.448	(0.18) 37.34	
									Medium strong bluish grey fine grained moderately weathered PSAMMITE. Extremely to very closely spaced lenticular very narrow calcite veins dipping 70 - 80°. Fractures are closely spaced conjugate planar rough open dipping 30 - 45° (New Harbour Group - Psammite)				
	92	53	14	NI 10 30 40					Medium strong very narrow to very thin bands of very narrowly foliated bluish green slightly weathered PHYLLITE with extremely closely spaced very narrow lenticular bands of bluish green fine grained psammite. Foliation is dipping at 10 - 15°. Recovered as predominantly non intact angular to subangular coarse tabular gravel (possibly due to fracturing?). (New Harbour Group - Phyllite) . . . between 37.40 and 37.93m depth non-intact recovered as angular to subangular coarse tabular gravel with 8% loss of core.	45 FF[i] 46 FF[i] 47 FF[i]	-30	(0.76) 38	
									. . . at 38.02m depth apparent change in direction of dip.	48 FF[i] 49 IcF[i] 51 IcF[i]	-30.208	38.10	
				40 70 110					Medium strong highly disturbed bluish green fine grained slightly weathered PSAMMITE with highly disturbed/deformed fabric. Extremely to very closely spaced lenticular very narrow irregular calcite veins dipping 50 - 70°. Fractures are very closely to closely spaced planar and undulating rough partly open dipping 20 - 65° and 80 - 90° with occasional slight clay smearing. (New Harbour Group - Psammite) . . . between 38.10 to 38.17m depth possible re-fused microfault (55°) with calcite re-crystallisation causing offset to fabric, naturally open along calcite re-crystallisation	52 J[i] 53 PMF[i] 50 J[i] 54 J[i] 55 J[i] 56 IcF[i] 58 J[i] 57 IcF[i]			

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres | Scale: 1:7 | Inclination: Vertical | Azimuth: NA

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Dynamic sampling + Rotary Cored	Beretta T44	CG/CA	JWickenden + NFowler + SAl-Jassar	GS+BNS

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH526R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: **09.05.11**	**7.892**	**E:236005.9 N:393683.2**	**33** of **44**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instrumentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thickness)	Material Graphic Legend
38.50-40.00 (0:24)	92	53	14	NI	Mist				vein infilled with pale grey clay infill. . . . between 38.33 and 38.42m depth highly disturbed and deformed with possible parasitic folding of phyllite? band between 38.37 and 38.42m depth. . . . between 38.41 to 38.50m depth possible re-fused microfault (65°) with calcite re-crystallisation causing offset to fabric, naturally open along calcite re-crystallisation vein infilled with grey fine fragments of phyllite and psammite. . . . between 38.46 and 38.50m depth non-intact recovered as subangular to subrounded coarse gravel.	59 J[i] 60 PMF[i]	-31	39 (1.95)	
	19	7	0										

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres	Scale: **1:7**	Inclination: **Vertical**	Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Dynamic sampling + Rotary Cored	**Beretta T44**	**CG/CA**	**JWickenden + NFowler + SAl-Jassar**	**GS+BNS**

GINT_LIBRARY_V8_04.GLB|XCUSTOM - SSL - 725061 - DETAIL LOG | 725061_WYLFA.GPJ - v8_04 | 17/12/11 - 21:52 | MJB
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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	**Horizon Nuclear Power Wylfa Limited**	**BH526R**

Contract Ref:	Start:	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	**30.04.11** End: **09.05.11**	**7.892**	**E:236005.9 N:393683.2**	**34** of **44**

Mechanical Log: Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)	Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
40.00-41.50 (0:50)	19	7	0	NI	Mist				. . . between 39.72 and 39.83m depth non-intact recovered as pale green slightly sandy slightly gravelly clay. Gravel is subangular to subrounded coarse psammite.	61 J[i] 62 IcF[i]	-32	40	
	100	39	0	NI 300					Medium strong to strong very narrowly foliated bluish green fresh PHYLLITE. Foliation dipping at 20 - 35°. Recovered as 10 - 90mm long sections of core separated by non intact material comprising angular to subangular medium to coarse gravel (possibly caused by very closely to closely spaced intersecting incipient fractures and foliation fractures?). Evidence of occasional (possible closely to medium spaced?) fractures with sandy clay infill. Medium spaced very narrow calcite veins dipping 60 - 85°. Medium to very closely spaced to locally extremely closely spaced very narrow to narrow <6mm ptygmatic quartz veins dipping 35°. Closely spaced randomly orientated very narrow <1mm dark green chlorite veins. (New Harbour Group - Phyllite)		-32.158	40.05	
									. . . between 40.70 and 41.20m depth non-intact recovered as angular coarse gravel with occasional 50mm sections of core (possible faulting)			(1.45)	

Drilling Progress and Water Observations					
Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres | Scale: **1:7** | Inclination: **Vertical** | Azimuth: **NA**

Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Dynamic sampling + Rotary Cored	**Beretta T44**	**CG/CA**	**JWickenden + NFowler + SAl-Jassar**	**GS+BNS**

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH526R

Contract Ref:	Start: 30.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Mechanical Log					Flush Returns & Details	Sampling	Backfill & Instru-mentation	Water	Description of Strata	Fracture Log	Reduced Level	Depth (Thick ness)	Material Graphic Legend
Depth	TCR (%)	SCR (%)	RQD (%)	If (mm)									
	100	39	0	NI 300	Mist				. . . between 41.40 and 41.50m depth extremely closely spaced ptygmatic quartz veining.		-33	41	
									Rotary borehole terminated at 41.50m depth.		-33.608	41.50	

Drilling Progress and Water Observations

Date	Time	Borehole Depth	Casing Depth	Borehole Diameter (mm)	Water Depth

General Remarks

1. Hand dug inspection pit to 1.10m depth.
2. Twin 50mm standpipes installed: Deep to 39.0m depth, shallow to 23.0m depth.
3. Inspection pit backfilled on completion.
4. Dynamic sample from 10.00 to 10.20 and 10.20 to 13.50m depth.

All dimensions in metres	Scale: 1:7	Inclination: Vertical	Azimuth: NA

Method Used:	Rotary open hole + Dynamic sampling + Rotary Cored	Plant Used:	Beretta T44	Drilled By:	CG/CA	Logged By:	JWickenden + NFowler + SAl-Jassar	Checked By:	GS+BNS

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH526R

Contract Ref:	Start: 30.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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10.00 - 13.00m depth



Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Dynamic sampling + Rotary Cored	Beretta T44	CG/CA	JWickenden + NFowler + SAl-Jassar	GS+BNS

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BOREHOLE LOG

Contract:		Client:		Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation		Horizon Nuclear Power Wylfa Limited		BH526R
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13.00 - 15.00m depth



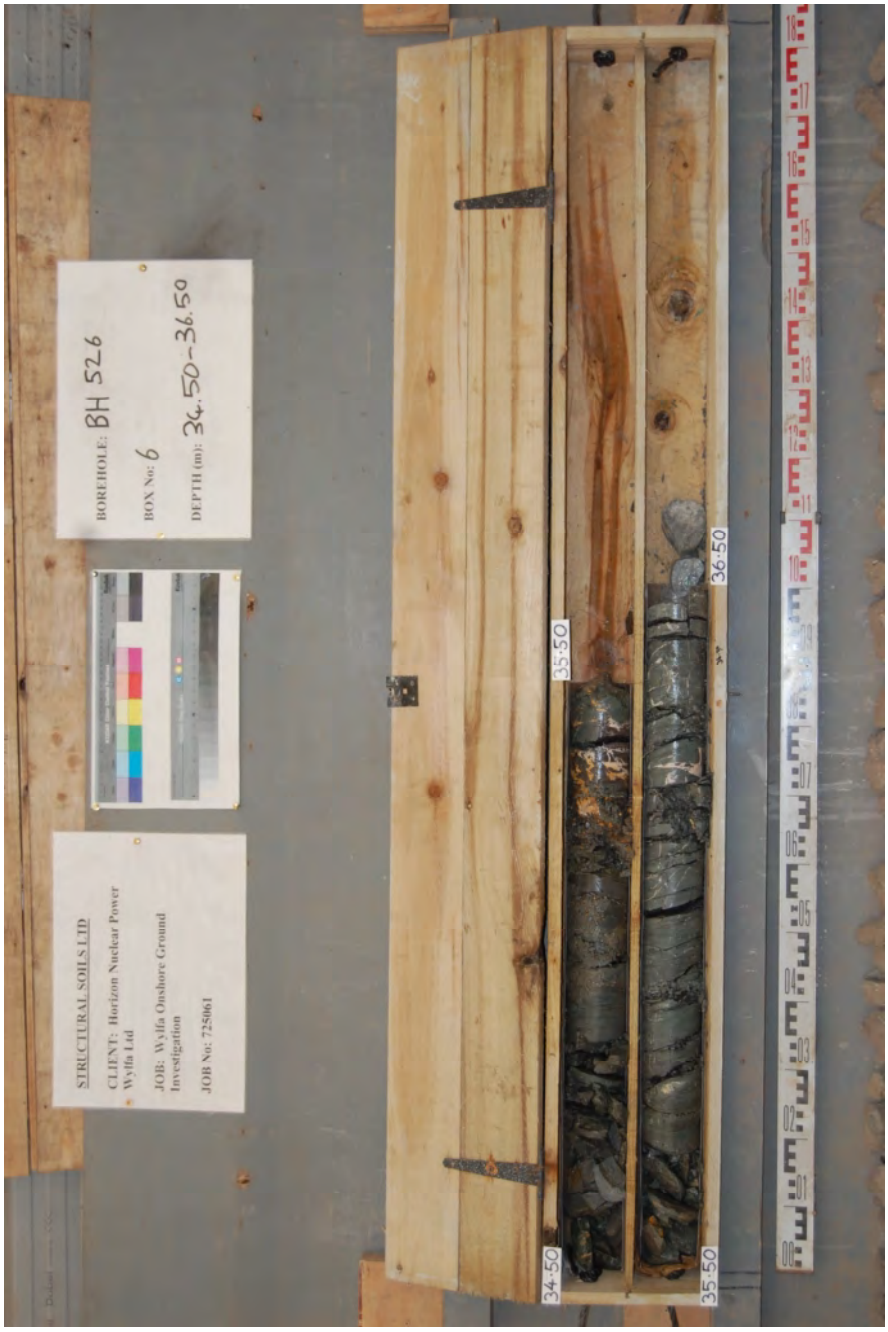
Method Used:	Rotary open hole + Dynamic sampling + Rotary Cored	Plant Used:	Beretta T44	Drilled By:	CG/CA	Logged By:	JWickenden + NFowler + SAl-Jassar	Checked By:	GS+BNS

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BOREHOLE LOG

Contract:		Client:		Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation		Horizon Nuclear Power Wylfa Limited		BH526R
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34.50 - 36.50m depth



Method Used:	Rotary open hole + Dynamic sampling + Rotary Cored	Plant Used:	Beretta T44	Drilled By:	CG/CA	Logged By:	JWickenden + NFowler + SAl-Jassar	Checked By:	GS+BNS

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH526R

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15.00 - 18.00m depth



Method Used:	Plant Used:	Drilled By:	Logged By:	Checked By:
Rotary open hole + Dynamic sampling + Rotary Cored	Beretta T44	CG/CA	JWickenden + NFowler + SAl-Jassar	GS+BNS

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BOREHOLE LOG

Contract:		Client:		Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation		Horizon Nuclear Power Wylfa Limited		BH526R
Contract Ref:	Start: 30.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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18.00 - 29.00m depth



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Method Used:	Rotary open hole + Dynamic sampling + Rotary Cored	Plant Used:	Beretta T44	Drilled By:	CG/CA	Logged By:	JWickenden + NFowler + SAl-Jassar	Checked By:	GS+BNS

BOREHOLE LOG

Contract:		Client:		Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation		Horizon Nuclear Power Wylfa Limited		BH526R
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29.00 - 34.50m depth



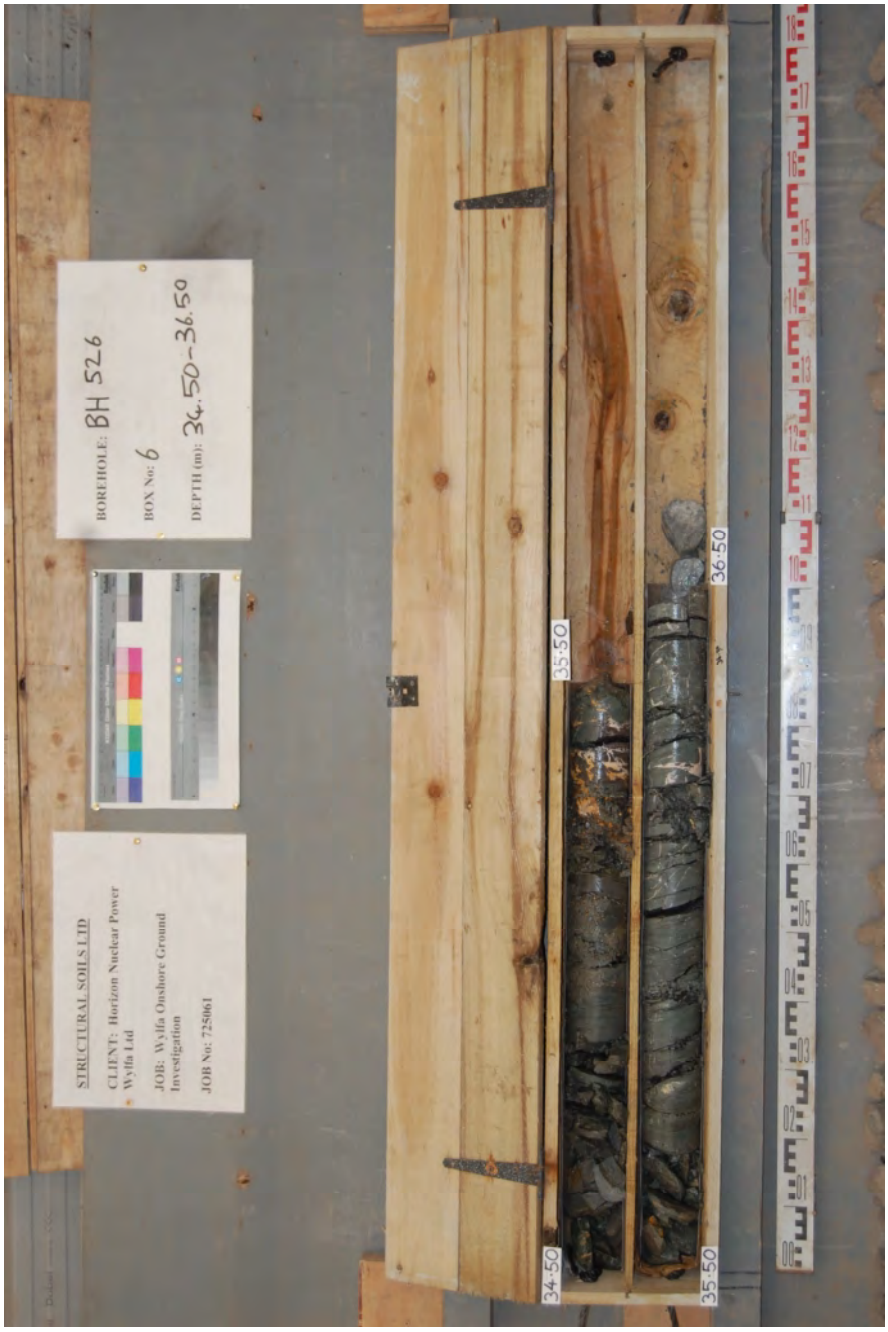
Method Used:	Rotary open hole + Dynamic sampling + Rotary Cored	Plant Used:	Beretta T44	Drilled By:	CG/CA	Logged By:	JWickenden + NFowler + SAl-Jassar	Checked By:	GS+BNS

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BOREHOLE LOG

Contract:		Client:		Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation		Horizon Nuclear Power Wylfa Limited		BH526R
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34.50 - 36.50m depth



Method Used:	Rotary open hole + Dynamic sampling + Rotary Cored	Plant Used:	Beretta T44	Drilled By:	CG/CA	Logged By:	JWickenden + NFowler + SAl-Jassar	Checked By:	GS+BNS

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH526R

Contract Ref:	Start: 30.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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36.50 - 38.50m depth



Method Used:	Rotary open hole + Dynamic sampling + Rotary Cored	Plant Used:	Beretta T44	Drilled By:	CG/CA	Logged By:	JWickenden + NFowler + SAl-Jassar	Checked By:	GS+BNS

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BOREHOLE LOG

Contract:		Client:		Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation		Horizon Nuclear Power Wylfa Limited		BH526R
Contract Ref:	Start: 30.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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38.50 - 41.50m depth



Method Used:	Rotary open hole + Dynamic sampling + Rotary Cored	Plant Used:	Beretta T44	Drilled By:	CG/CA	Logged By:	JWickenden + NFowler + SAl-Jassar	Checked By:	GS+BNS

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SUMMARY OF DISCONTINUITIES - BH526R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
1	29.51-29.88	IcF	50	U	Very tight	None	Lower wall rock locally non intact.	NHG	META_F
2	29.72	FF	20	U-R	Partly open	Black grey clayey fine to coarse sand.	Upper wall rock non intact.	NHG	META_F
3	29.76-29.82	IcF	45	U	Very tight	None		NHG	META_F
4	29.84	FF	15	U-R	Open	None	Upper wall rock locally non intact.	NHG	META_F
5	29.87	FF	20	U-R	Partly open	None	Lower wall rock non intact.	NHG	META_F
6	29.94	FF	20	U-R	Open	Bluish grey sandy clay.		NHG	META_F
7	33.70-33.76	PF	25	U-R	Wide	Purplish brown slightly clayey slightly	Possible fault?	NHG	META_F
						gravelly fine to coarse sand formed by			
						the crushing of phyllite and psammite			
8	33.75-33.95	FF	3	U-R	Partly open	None	Set of extremely closely spaced randomly orientated	NHG	META_F
							foliation fractures.		
9	35.15-35.21	IcF	40	U	Partly open	None		NHG	META_F
10	35.19	FF	10	U-R	Very tight	None		NHG	META_F
11	35.21-35.30	PF	25	U-R	Wide	with slightly clayey gravelly fine to	Possible fault	NHG	META_F
						coarse sand formed by the crushing of			
						phyllite and psammite			

Key:
Type codes: FF = Foliation fracture, IcF = Incipient fracture, J = Joint, PF = Possible Fault, PMF = Possible Micro fault.
Small-scale roughness codes: P-R = Planar - rough, U = Undulating, U-R = Undulating - rough.
Aperture description codes: Open = (0.5mm - 2.5mm), Partly open = (0.25mm - 0.5mm), Tight = (0.1mm - 0.25mm), Very tight = (<0.1mm), Wide = (0.01m - 0.1m).

STRUCTURAL SOILS
The Old School
Stillhouse Lane
Bedminster
Bristol BS3 4EB

Compiled By	Date	Contract Ref:
[redacted] MBEVAN	17.12.11	725061

Contract: **Wylfa New Build - Intermediate Onshore Ground Investigation**

SUMMARY OF DISCONTINUITIES - BH526R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
14	35.39-35.45	IcF	50	U	Very tight	None		NHG	META_M
15	35.43-35.48	IcF	50	U	Very tight	Localised calcite.		NHG	META_M
16	35.43-35.49	IcF	45	U	Very tight	None		NHG	META_M
17	35.74	J	15	U-R	Open	None		NHG	META_F
18	35.74-35.79	IcF	30	U	Very tight	None		NHG	META_F
19	35.77-35.82	J	35	U-R	Open	None		NHG	META_F
20	35.84	IcF	20	U	Very tight	None		NHG	META_F
21	35.90-35.96	J	40	P-R	Open	None	Partially non intact above and below fracture.	NHG	META_M
22	35.98	IcF	20	U	Very tight	None		NHG	META_M
23	35.99-36.02	IcF	40	U	Very tight	None	Terminates against fracture at 36.03m.	NHG	META_M
24	36.03	J	13	P-R	Open	None		NHG	META_M
25	36.10	IcF	20	U	Very tight	None		NHG	META_M
26	36.14	J	15	U-R	Open	None		NHG	META_M
28	36.19	J	15	U-R	Open	None		NHG	META_M
29	36.25-36.29	J	25	U-R	Open	None		NHG	META_M
31	36.42	J	12	U-R	Open	None		NHG	META_M

Key:
Type codes: FF = Foliation fracture, IcF = Incipient fracture, J = Joint, PF = Possible Fault, PMF = Possible Micro fault.
Small-scale roughness codes: P-R = Planar - rough, U = Undulating, U-R = Undulating - rough.
Aperture description codes: Open = (0.5mm - 2.5mm), Partly open = (0.25mm - 0.5mm), Tight = (0.1mm - 0.25mm), Very tight = (<0.1mm), Wide = (0.01m - 0.1m).

SUMMARY OF DISCONTINUITIES - BH526R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
34	36.90	J	10	U-R	Wide	angular to subrounded fine to medium		NHG	META_F
						gravel (30mm)			
35	37.00-37.10	IcF	50	U	Very tight	None		NHG	META_F
36	37.01	PF	15	P-R	Open	None	Offsets fracture at 36.91 by 10mm.	NHG	META_F
37	37.07-37.17	IcF	60	U	Very tight	None		NHG	META_F
38	37.09-37.30	IcF	85	U	Very tight	None		NHG	META_F
39	37.15-37.28	J	40	P-R	Open	None	Lower wall rock non intact.	NHG	META_F
40	37.16-37.20	J	30	P-R	Open	None	Upper wall rock non intact.	NHG	META_F
41	37.16-37.22	IcF	35	U	Partly open	Pale green clay smears		NHG	META_M
42	37.24-37.31	J	45	P-R	Open	None		NHG	META_M
43	37.25-37.31	J	35	P-R	Open	None		NHG	META_M
44	37.30-37.40	IcF	87	U	Tight	Calcite.		NHG	META_M
45	37.94	FF	15	U-R	Partly open	None		NHG	META_F
46	37.97	FF	15	U-R	Partly open	None		NHG	META_F
47	38.00	FF	10	U-R	Partly open	None		NHG	META_F
48	38.04	FF	15	U-R	Partly open	Pale green clay.		NHG	META_F

Key:
Type codes: FF = Foliation fracture, IcF = Incipient fracture, J = Joint, PF = Possible Fault, PMF = Possible Micro fault.
Small-scale roughness codes: P-R = Planar - rough, U = Undulating, U-R = Undulating - rough.
Aperture description codes: Open = (0.5mm - 2.5mm), Partly open = (0.25mm - 0.5mm), Tight = (0.1mm - 0.25mm), Very tight = (<0.1mm), Wide = (0.01m - 0.1m).

SUMMARY OF DISCONTINUITIES - BH526R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
49	38.05	IcF	15	U	Very tight	None		NHG	META_F
50	38.05-38.33	J	90	U-R	Open	None	Intersects fracture at 38.07m.	NHG	META_F
51	38.07	IcF	15	U	Very tight	None	Intersects fracture at 38.05 - 38.33m.	NHG	META_F
52	38.08-38.13	J	35	U-R	Open	None		NHG	META_F
54	38.17-38.28	J	55	P-R	Partly open	Pale green clay.		NHG	META_M
55	38.21-38.31	J	45	P-R	Open	None		NHG	META_M
56	38.24-38.35	IcF	50	U	Very tight	None		NHG	META_M
57	38.30-38.35	IcF	40	U	Very tight	None		NHG	META_M
58	38.32	J	80	U-R	Open	None		NHG	META_M
59	38.37-38.44	J	40	U-R	Open	None		NHG	META_M
61	39.83-39.87	J	50	P-R	Open	None	Upper wall rock non intact.	NHG	META_M
62	39.87-39.89	IcF	40	U	Very tight	None		NHG	META_M

Key:
Type codes: FF = Foliation fracture, IcF = Incipient fracture, J = Joint, PF = Possible Fault, PMF = Possible Micro fault.
Small-scale roughness codes: P-R = Planar - rough, U = Undulating, U-R = Undulating - rough.
Aperture description codes: Open = (0.5mm - 2.5mm), Partly open = (0.25mm - 0.5mm), Tight = (0.1mm - 0.25mm), Very tight = (<0.1mm), Wide = (0.01m - 0.1m).

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Compiled By	Date	Contract Ref:
[redacted] MBEVAN	17.12.11	725061

Contract: **Wylfa New Build - Intermediate Onshore Ground Investigation**

SUMMARY OF POSSIBLE MICRO FAULTS - BH526R

Fracture Number	Depth (m)	Fracture Type	Dip (deg)	Small Scale Roughness	Aperture Description	Infill Material Description	Remarks	Stratigraphic Layer	Lithological Facies
12	35.35-34.40	PMF	80	U	Very tight	Calcite with phyllite clasts.	Offset of 5mm re-fused with calcite.	NHG	META_F
13	35.35-35.43	PMF	50	U	Partly open	None	Offset of 30mm re-fused.	NHG	META_F
27	36.14-36.50	PMF	85	U	Very tight	with calcitic re-crystallisation.		NHG	META_M
30	36.32	PMF	20	U-R	Partly open	Pale grey clay (naturally open		NHG	META_M
						microfault)			
32	36.70-36.84	PMF	85	U	Very tight	None	Offsets psammite band by 15mm.	NHG	META_F
33	36.75-36.88	PMF	70	U	Very tight	None	Offsets psammite band by 5mm.	NHG	META_F
53	38.10-38.17	PMF	55	U-R	Open	(naturally open re-fused microfault)	re-fused by calcite re-crystallisation	NHG	META_M
						with pale green clay infill			
60	38.41-38.50	PMF	65	U-R	Open	(naturally open re-fused microfault)	re-fused by calcite re-crystallisation	NHG	META_M
						with grey fine to medium fragments of			
						phyllite and psammite			

Key:
Type codes: FF = Foliation fracture, IcF = Incipient fracture, J = Joint, PF = Possible Fault, PMF = Possible Micro fault.
Small-scale roughness codes: P-R = Planar - rough, U = Undulating, U-R = Undulating - rough.
Aperture description codes: Open = (0.5mm - 2.5mm), Partly open = (0.25mm - 0.5mm), Tight = (0.1mm - 0.25mm), Very tight = (<0.1mm), Wide = (0.01m - 0.1m).

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Compiled By		Date	Contract Ref:
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Contract: **Wylfa New Build - Intermediate Onshore Ground Investigation**

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STRUCTURAL SOILS

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BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH526R

Contract Ref:	Start: 30.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 09.05.11	7.892	E:236005.9 N:393683.2	1 of 21

Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
0.00-0.30	Grass over soft dark brown to dark reddish brown sandy PEAT with additional fine rootlets. (Drift Deposits - Topsoil)			7.592	(0.30) 0.30	
0.30-0.50	Loose light grey silty clayey fine to coarse SAND. Clay occurs as pockets of light grey silty clay (100mm). (Drift Deposits - Unit F) . . . at 0.40m depth sand is orange-brown in places.			7.392	(0.20) 0.50	
0.50-0.80	Soft dark brown very sandy slightly gravelly CLAY. Gravel is fine to medium subangular to rounded phyllite. (Drift Deposits - Unit F)			7.092	(0.30) 0.80	
0.80-1.20	Soft dark brown very gravelly slightly clayey SAND. Gravel is fine to medium subangular to rounded phyllite. (Drift Deposits - Unit F)			7	(0.40) 1.20	
1.20-9.30	Dark grey very fine sand slightly gravelly CLAY. Gravel is fine to medium subangular to subrounded of flint, quartz and rare psammite and possible calcite (Drift Deposits - Unit F)			6.692 6 2		

Method Used:	DS+ RC+ RO	Plant Used:	Beretta T44	Drilled By:	CG/CA	Logged By:	JWickenden+ NFowler+ SAl-Jassar	All dimensions in metres Scale: 1:10

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BOREHOLE LOG

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Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
1.20-9.30				5 4	3 4	

Method Used:	DS+ RC+ RO	Plant Used:	Beretta T44	Drilled By:	CG/CA	Logged By:	JWickenden+ NFowler+ SAl-Jassar	All dimensions in metres Scale:	1:10

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Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
1.20-9.30				3 2	5 (8.10) 6	

Method Used:	DS+ RC+ RO	Plant Used:	Beretta T44	Drilled By:	CG/CA	Logged By:	JWickenden+ NFowler+ SAl-Jassar	All dimensions in metres Scale:	1:10

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Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
1.20-9.30				1 0	7 8	

Method Used:	DS+ RC+ RO	Plant Used:	Beretta T44	Drilled By:	CG/CA	Logged By:	JWickenden+ NFowler+ SAl-Jassar	All dimensions in metres Scale:	1:10

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Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
1.20-9.30				-1	9	
				-1.408	9.30	
9.30-9.80	Light grey brown sandy silty CLAY with occasional fine subangular to subrounded gravel of flint (Driller's report water seepage). (Drift Deposits - Unit F)				(0.50)	
				-1.908	9.80	
9.80-10.00	Dark grey silty slightly gravelly CLAY. Gravel is fine to medium rounded to subangular flint, quartz (with some red staining and rare psammite. (Drift Deposits - Unit F)			-2	(0.20)	
				-2.108	10.00	

Method Used:	Plant Used:	Drilled By:	Logged By:	All dimensions in metres
DS+ RC+ RO	Beretta T44	CG/CA	JWickenden+ NFowler+ SAl-Jassar	Scale: 1:10

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Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
10.00-12.50	Stiff to very stiff locally firm medium grey brown mottled gravelly sandy silty CLAY. Gravel medium to coarse angular to subangular phyllite. (Drift Deposits - Unit F) . . . from 11.30m depth with occasional cobbles of phyllite.			-3 -4	11 (2.50) 12	

Method Used:	DS+ RC+ RO	Plant Used:	Beretta T44	Drilled By:	CG/CA	Logged By:	JWickenden+ NFowler+ SAl-Jassar	All dimensions in metres Scale:	1:10

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Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
10.00-12.50				-4.608	12.50	
12.50-13.10	Stiff to very stiff brown grey mottled locally poorly laminated slightly gravelly sandy CLAY. Gravel fine to medium angular to subrounded phyllite and psammite. Becoming very stiff with depth. (Drift Deposits - Unit F)			-5	(0.60) 13	
13.10-15.20	Very stiff locally stiff medium grey brown locally poorly laminated slightly sandy silty CLAY. (Drift Deposits - Unit F)			-5.208 -6	13.10 14	

Method Used:	DS+ RC+ RO	Plant Used:	Beretta T44	Drilled By:	CG/CA	Logged By:	JWickenden+ NFowler+ SAl-Jassar	All dimensions in metres Scale:	1:10

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Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
13.10-15.20				-7	(2.10) 15	
	Stiff to very stiff dark brown grey locally poorly laminated slightly fissured silty CLAY. (Drift Deposits - Unit F)			-7.308	15.20	
15.20-16.80				-8	(1.60) 16	

Method Used:	Plant Used:	Drilled By:	Logged By:	All dimensions in metres
DS+ RC+ RO	Beretta T44	CG/CA	JWickenden+ NFowler+ SAl-Jassar	Scale: 1:10

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Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
15.20-16.80				-8.908	16.80	
16.80-17.80	Very stiff locally stiff medium brown becoming light brown with depth locally poorly laminated slightly fissured silty CLAY. (Drift Deposits - Unit F)			-9 -9.908	17 (1.00) 17.80	
17.80-22.00	Very stiff brown light brown very silty CLAY. With occasional <1mm lenses of light grey fine sand. (Drift Deposits - Unit F)			-10	18	

Method Used:	DS+ RC+ RO	Plant Used:	Beretta T44	Drilled By:	CG/CA	Logged By:	JWickenden+ NFowler+ SAl-Jassar	All dimensions in metres Scale:	1:10

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Contract Ref:	Start: 30.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
17.80-22.00	. . . between 18.00 and 22.00m depth zone of core loss			-11 -12	19 (4.20) 20	

Method Used:	DS+ RC+ RO	Plant Used:	Beretta T44	Drilled By:	CG/CA	Logged By:	JWickenden+ NFowler+ SAl-Jassar	All dimensions in metres Scale:	1:10

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Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
17.80-22.00				-13 -14 -14.108	21 22.00	

Method Used:	DS+ RC+ RO	Plant Used:	Beretta T44	Drilled By:	CG/CA	Logged By:	JWickenden+ NFowler+ SAl-Jassar	All dimensions in metres Scale:	1:10

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Contract Ref:	Start: 30.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
22.00-22.50	Soft locally firm brown sandy locally very sandy gravelly CLAY with rare subangular cobbles of psammite. Gravel is angular to subrounded medium to coarse psammite and phyllite. (Drift Deposits - Unit B1)			-14.608	(0.50) 22.50	
22.50-23.77	Brown slightly clayey slightly sandy angular to rounded fine to coarse GRAVEL of psammite and phyllite (possibly moderately weathered phyllite/psammite) (New Harbour Group - Psammite) . . . between 23.00 and 23.4m depth loss of recovery (50%) recovered as fine to coarse gravel of psammite and phyllite			-15 -15.878	23 (1.27) 23.77	
23.77-25.50	Medium strong to strong dark greenish blue fine to medium grained moderately to slightly weathered PSAMMITE. Extremely closely spaced randomly orientated intersecting lenticular and ptygmatic very narrow <1mm epidote veins. Joints are closely spaced locally intersecting, planar smooth to rough possibly up to wide dipping 50 - 60° & 80° and infilled with brown angular to rounded fine to coarse gravel.			-16	24	

Method Used:	DS+ RC+ RO	Plant Used:	Beretta T44	Drilled By:	CG/CA	Logged By:	JWickenden+ NFowler+ SAl-Jassar	All dimensions in metres Scale:	1:10

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Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
	(New Harbour Group - Psammite) . . . between 23.88 and 24.00m depth frequent randomly orientated extremely closely spaced intersecting incipient fractures. . . . between 24.00 and 25.50m depth zone of core loss				(1.73)	
23.77-25.50				-17	25	
				-17.608	25.50	
25.50-28.50	Medium strong to strong greenish blue fine grained slightly weathered PSAMMITE with medium strong very narrowly foliated greenish blue slightly weathered phyllite. Recovered as non intact angular to subrounded fine to coarse grained with evidence of dark brown stained fracture surfaces. Locally with subrounded cobbles and smooth (possible non intact due to frequent intersecting extremely to very closely spaced incipient fractures or possible crush zone?). (New Harbour Group - Psammite)			-18	26	

Method Used:	DS+ RC+ RO	Plant Used:	Beretta T44	Drilled By:	CG/CA	Logged By:	JWickenden+ NFowler+ SAl-Jassar	All dimensions in metres Scale:	1:10

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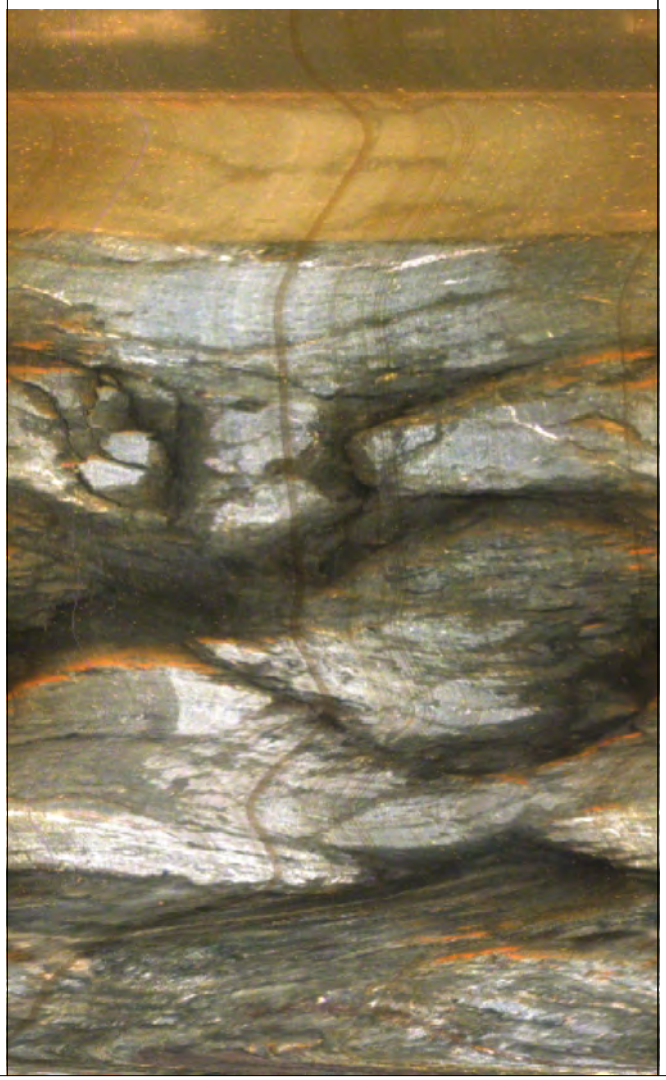
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Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
25.50-28.50	. . . between 27 and 28.50m loss of recovery (60%) recovered as angular to subangular fine to coarse gravel of phyllite			-19 -20	(3.00) 27 28	

Method Used:	DS+ RC+ RO	Plant Used:	Beretta T44	Drilled By:	CG/CA	Logged By:	JWickenden+ NFowler+ SAl-Jassar	All dimensions in metres Scale:	1:10

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Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
25.50-28.50				-20.608	28.50	
28.50-29.50	Medium strong very narrowly foliated purple slightly weathered PHYLLITE with strong dark bluish grey fine grained slightly weathered psammite with evidence of extremely closely spaced randomly orientated calcite veining. Recovered as non intact angular to subrounded fine to coarse grained locally very stained (possible crush zone?). (New Harbour Group - Phyllite) . . . between 29.00 and 29.50m depth partially non-intact recovered as fine gravel (possible crush zone?) with loss of recovery			-21	(1.00) 29	
29.50-30.80	Strong narrow to very thin bands of very narrowly foliated locally highly disturbed dark purple fresh PHYLLITE with extremely closely spaced very narrow locally narrow lenticular bands of bluish grey fine grained psammite. Foliation dipping 15-20°. Closely spaced lenticular very narrow <5mm occasional en echelon calcite veins dipping 25° and 70°. Foliation fractures are very closely spaced planar smooth dipping 15 - 20° (New Harbour Group - Phyllite) . . . between 29.50 and 29.72m depth non-intact recovered as angular to subrounded fine to coarse gravel with rare subrounded cobbles (possible crush zone?). . . . between 29.87 and 29.91m depth non-intact recovered as angular fine to coarse tabular gravel (possible crush zone related to faulting?).		1[i] 2[i] 3[i] 4[i] 5[i] 6[i]	-21.608 -22	29.50 30	

Method Used:	Plant Used:	Drilled By:	Logged By:	All dimensions in metres
DS+ RC+ RO	Beretta T44	CG/CA	JWickenden+ NFowler+ SAl-Jassar	Scale: 1:10

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH526R

Contract Ref:	Start: 30.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
29.50-30.80	. . . between 30.00 and 31m depth non-intact recovered as angular fine to coarse tabular gravel (possible crush zone related to faulting?) with loss of recovery				(1.30)	
				-22.908	30.80	
30.80-30.93	Medium strong to strong very narrow bands of very narrowly foliated purplish red and red fresh PHYLLITE with extremely closely spaced very narrow lenticular bands of grey fine grained psammite. Foliation is dipping at 20°. Extremely closely spaced lenticular very narrow <2mm calcite veins dipping ~60°. (New Harbour Group - Phyllite)			-23		
				-23.038	30.93	
30.93-33.44	Strong bluish grey fine to medium grained fresh PSAMMITE. Recovered as predominantly non intact angular to subrounded medium to coarse gravel with occasional cobbles. Extremely closely spaced lenticular very narrow to narrow <6mm quartz veins dipping 70-80° cross cut by possible very closely spaced lenticular very narrow <3mm calcite veins dipping 40 - 65° with possible boudinage texture? (New Harbour Group - Psammite) . . . between 31.00 and 33m depth non-intact recovered as subangular to subrounded coarse gravel (possible crush zone related to faulting?) with loss of core loss (65%)				31	
				-24		
					32	

Method Used:	DS+ RC+ RO	Plant Used:	Beretta T44	Drilled By:	CG/CA	Logged By:	JWickenden+ NFowler+ SAl-Jassar	All dimensions in metres Scale:	1:10

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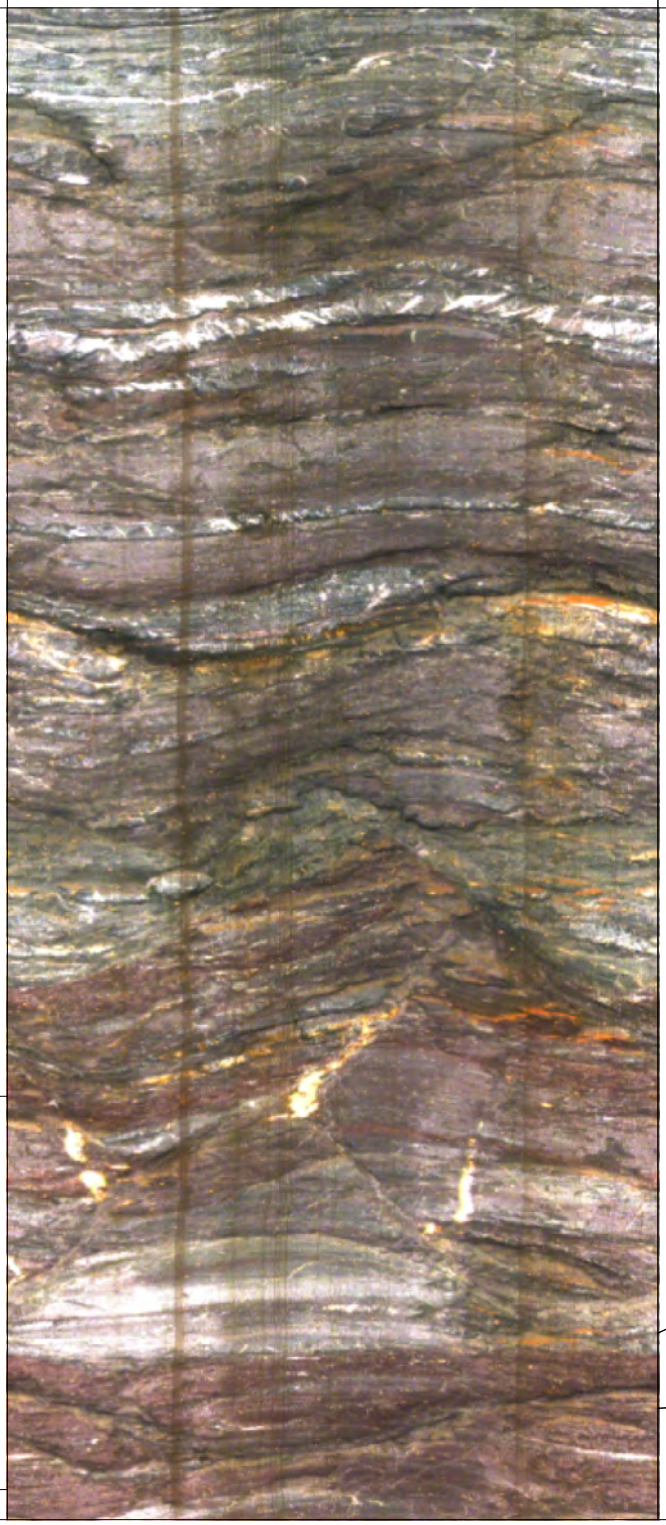
STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

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Contract Ref:	Start: 30.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 09.05.11	7.892	E:236005.9 N:393683.2	17 of 21

Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
30.93-33.44	. . . between 33 and 33.50m depth non-intact recovered as angular to subrounded coarse gravel (possible crush zone).			-25	(2.51) 33	
33.44-33.96	Medium strong highly disturbed very narrow to very thin bands of very narrowly foliated dark purple moderately to slightly weathered PHYLLITE with very narrow to narrow bands of blue-grey fine grained psammite. Very closely to closely spaced lenticular and ptygmatic narrow <10mm calcite veins dipping 25-85° with pale orange discolouration/staining penetrating up to 2mm. Fractures are extremely closely spaced planar smooth dipping 3-25° and closely spaced dipping 55-70° with rare slight clay smearing. (New Harbour Group - Phyllite) . . . between 33.63 to 33.69m depth possible microfault dipping 55° undulating with very tight offsets disturbing fabric. . . . between 33.63 and 34.50m depth non-intact recovered as slightly gravelly fine to coarse sand (possible crush zone associated with faulting) . . . below 33.80m depth phyllite pale purplish brown.		7[i] 8[i]	-25.548 33.44 -26	(0.52)	
33.96-34.65	*Description on next sheet*			-26.068 33.96	34	

Method Used:	Plant Used:	Drilled By:	Logged By:	All dimensions in metres
DS+ RC+ RO	Beretta T44	CG/CA	JWickenden+ NFowler+ SAl-Jassar	Scale: 1:10

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BOREHOLE LOG

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Contract Ref:	Start: 30.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 09.05.11	7.892	E:236005.9 N:393683.2	18 of 21

Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
33.96-34.65	Medium strong very narrowly foliated dark purple moderately weathered PHYLLITE with foliation dipping at 15 - 20°. Recovered as predominantly non intact with evidence of weathered calcite veining stained/discoloured pale orange. (New Harbour Group - Phyllite) . . . between 34.44 and 34.49m depth band of bluish grey fine to medium grained psammite with subvertical and subhorizontal extremely closely spaced calcite veining discoloured pale orange.		12[i]	-27	(0.69) 35	
34.65-35.85	Medium strong very narrow to narrow bands of very narrowly foliated purplish grey slightly weathered PHYLLITE with extremely closely spaced very narrow lenticular bands of bluish grey fine grained psammite. Strata has a possible poorly developed mylonitic fabric? Foliation dipping at ~5°. Very closely spaced very narrow <1mm calcite veins dipping 35 - 75°. (New Harbour Group - Phyllite) . . . between 34.65 and 34.96m depth non-intact recovered as very angular to angular coarse gravel with evidence of fracture surfaces (stained brown) and narrow bands of bluish grey fine grained psammite. . . . between 35.06 and 35.09m depth narrow lenticular bluish grey fine grained psammite fabric. . . . between 35.21 and 35.30m depth 25° possible fault infilled with non-intact slightly clayey gravelly fine to coarse sand formed by the crushing of phyllite and psammite . . . between 35.25 and 35.60m depth 30 - 60° extremely to very closely spaced intersecting lenticular and irregular calcite veins up to 15mm wide with pale orange discolouration/staining penetrating up to 3mm and clasts of phyllite (possibly associated with extremely closely spaced microfaults and incipient between 35.30 and 35.50m depth psammite fabric highly disturbed by microfaults between 35.50 and 35.40m depth. . . . between 35.29 to 35.40m depth 2 no. possible microfault dipping 80-85° undulating with very tight with offsets of <5mm disturbing fabric. . . . between 35.30 to 35.35m depth possible microfault dipping 35° undulating with very tight with offsets of <5mm disturbing fabric. . . . between 35.35 to 35.43m depth possible re-fused microfault dipping 50° undulating partly open causing offset of 30mm. . . . between 35.40 and 35.58m depth band of bluish grey fine to medium grained psammite with incipient fractures. . . . between 35.50 and 35.69m depth non-intact recovered as angular to subrounded medium to coarse gravel (possibly due to very closely spaced incipient fractures?).		9[i] 10[i] 11[i] 13[i] 14[i] 15[i] 16[i] 17[i] 18[i] 19[i] 20[i]	-26.758 -27.958	34.65 (1.20) 35.85	
35.85-36.50	Medium strong to strong narrow bands of bluish grey fine grained slightly weathered to fresh PSAMMITE with extremely closely		21[i] 22[i]	-28	36	

Method Used:	Plant Used:	Drilled By:	Logged By:	All dimensions in metres
DS+ RC+ RO	Beretta T44	CG/CA	JWickenden+ NFowler+ SAl-Jassar	Scale: 1:10

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH526R

Contract Ref:	Start: 30.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
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Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
35.85-36.50	spaced very narrow bands of very narrowly foliated dark purple phyllite. Psammite bands are dipping at 20 - 30°. Extremely closely to very closely spaced lenticular very narrow <3mm calcite veins dipping 75 - 85°. Fractures are closely to closely spaced planar smooth locally planar rough open dipping 15 - 40° locally 85° with occasional calcite infill. (New Harbour Group - Psammite) . . . between 35.98 and 36.10m depth subvertical ptygmatic dark green chlorite veins. . . . between 36.05 and 36.10m depth 50 - 60° extremely closely spaced lenticular quartz veining up to 2mm wide. . . . between 36.13 and 36.22m depth non-intact recovered as very angular fine to medium gravel (lower wall rock of 85° microfault). . . . between 36.14 to 36.50m depth possible microfault dipping 85° undulating very tight with localised calcite infill, disturbing fabric.		23[i] 24[i] 25[i] 26[i] 28[i] 29[i] 27[i] 30[i] 31[i]	-28.608	(0.65) 36.50	
36.50-36.84	. . . between 36.22 and 36.25m depth subhorizontal calcite vein cut off by microfault dipping 85°, causing offset by <20mm, with subangular to subrounded inclusions/clasts of psammite. . . . between 36.28 and 36.33m depth non-intact recovered as very angular fine to medium gravel (lower wall rock of 85° microfault). . . . at 36.32m depth possible naturally open microfault dipping 20° undulating pale grey clay, disturbing fabric.		32[i] 33[i]	-28.948	(0.34) 36.84	
36.84-37.16	Medium strong disturbed very narrow to narrow bands of very narrowly foliated greyish purple slightly weathered PHYLLITE with extremely closely spaced very narrow lenticular bands of bluish grey fine grained psammite. Very closely spaced irregular narrow <20mm calcite veins dipping 70 - 85°. (New Harbour Group - Phyllite) . . . between 36.50 and 36.70m depth predominantly non-intact recovered as very angular to angular fine to coarse tabular gravel (possible crush zone related to faulting?). . . . below 36.70m depth fabric disturbed by microfaulting and calcite veining. . . . between 36.70 to 36.88m depth 2 no. possible microfaults dipping 70-85° undulating with very tight offsets psammite band by <15mm.		34[i] 36[i] 35[i] 37[i]	-29 -29.268	(0.32) 37 37.16	
37.16-37.34	Medium strong to strong highly disturbed very narrowly foliated bluish green slightly weathered to fresh PHYLLITE with frequent extremely to very closely spaced incipient fractures and microfaulting disturbing/deformed foliation. Very closely spaced narrow <20mm calcite veins dipping 60 - 70°. Fractures Closely spaced undulating to planar rough open to wide dipping 10 - 15° infilled with non intact material. (New Harbour Group - Phyllite) . . . between 36.91 to 37.08m depth possible microfault dipping 65° undulating with very tight offsets disturbing fabric and re-fused breccia of phyllite and calcite. . . . between 37.08 and 37.17m depth boudinage calcite vein. . . . below 37.12m depth extremely closely spaced narrow bands of red phyllite.		40[i] 41[i] 38[i] 39[i] 42[i] 43[i] 44[i]	-29.448	(0.18) 37.34	
37.34-38.10	Medium strong bluish grey fine grained moderately weathered PSAMMITE. Extremely to very closely spaced lenticular very narrow calcite veins dipping 70 - 80°. Fractures are closely spaced conjugate planar rough open dipping 30 - 45° (New Harbour Group - Psammite)				(0.76)	
	Medium strong very narrow to very thin bands of very narrowly foliated bluish green slightly weathered PHYLLITE with extremely closely spaced very narrow lenticular bands of bluish green fine grained psammite. Foliation is dipping at 10 - 15°. Recovered as predominantly non intact angular to subangular coarse tabular gravel (possibly due to fracturing?).		45[i] 46[i]	-30	38	

Method Used:	DS+ RC+ RO	Plant Used:	Beretta T44	Drilled By:	CG/CA	Logged By:	JWickenden+ NFowler+ SAl-Jassar	All dimensions in metres Scale:	1:10

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH526R

Contract Ref:	Start: 30.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 09.05.11	7.892	E:236005.9 N:393683.2	20 of 21

Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
37.34-38.10	(New Harbour Group - Phyllite) . . . between 37.40 and 37.93m depth non-intact recovered as angular to subangular coarse tabular gravel with 8% loss of core. . . . at 38.02m depth apparent change in direction of dip. Medium strong highly disturbed bluish green fine grained slightly weathered PSAMMITE with highly disturbed/deformed fabric. Extremely to very closely spaced lenticular very narrow irregular calcite veins dipping 50 - 70° . Fractures are very closely to closely spaced planar and undulating rough partly open dipping 20 - 65° and 80 - 90° with occasional slight clay smearing. (New Harbour Group - Psammite) . . . between 38.10 to 38.17m depth possible re-fused microfault (55°) with calcite re-crystallisation causing offset to fabric, naturally open along calcite re-crystallisation vein infilled with pale grey clay infill. . . . between 38.33 and 38.42m depth highly disturbed and deformed with possible parasitic folding of phyllite? band between 38.37 and 38.42m depth. . . . between 38.41 to 38.50m depth possible re-fused microfault (65°) with calcite re-crystallisation causing offset to fabric, naturally open along calcite re-crystallisation vein infilled with grey fine fragments of phyllite and psammite. . . . between 38.46 and 38.50m depth non-intact recovered as subangular to subrounded coarse gravel.		47[i] 48[i] 49[i] 51[i] 52[i] 53[i] 50[i] 54[i] 55[i] 56[i] 58[i] 57[i] 59[i] 60[i] 61[i] 62[i]	30.208 -31 -32	38.10 39 (1.95) 40	
38.10-40.05	. . . between 39.72 and 39.83m depth non-intact recovered as pale green slightly sandy slightly gravelly clay. Gravel is subangular to subrounded coarse psammite.					

Method Used:	DS+ RC+ RO	Plant Used:	Beretta T44	Drilled By:	CG/CA	Logged By:	JWickenden+ NFowler+ SAl-Jassar	All dimensions in metres Scale:	1:10

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Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
35.85-36.50	spaced very narrow bands of very narrowly foliated dark purple phyllite. Psammite bands are dipping at 20 - 30°. Extremely closely to very closely spaced lenticular very narrow <3mm calcite veins dipping 75 - 85°. Fractures are closely to closely spaced planar smooth locally planar rough open dipping 15 - 40° locally 85° with occasional calcite infill. (New Harbour Group - Psammite) . . . between 35.98 and 36.10m depth subvertical ptygmatic dark green chlorite veins. . . . between 36.05 and 36.10m depth 50 - 60° extremely closely spaced lenticular quartz veining up to 2mm wide. . . . between 36.13 and 36.22m depth non-intact recovered as very angular fine to medium gravel (lower wall rock of 85° microfault). . . . between 36.14 to 36.50m depth possible microfault dipping 85° undulating very tight with localised calcite infill, disturbing fabric.		23[i] 24[i] 25[i] 26[i] 28[i] 29[i] 27[i] 30[i] 31[i]	-28.608	(0.65) 36.50	
36.50-36.84	. . . between 36.22 and 36.25m depth subhorizontal calcite vein cut off by microfault dipping 85°, causing offset by <20mm, with subangular to subrounded inclusions/clasts of psammite. . . . between 36.28 and 36.33m depth non-intact recovered as very angular fine to medium gravel (lower wall rock of 85° microfault). . . . at 36.32m depth possible naturally open microfault dipping 20° undulating pale grey clay, disturbing fabric.		32[i] 33[i]	-28.948	(0.34) 36.84	
36.84-37.16	Medium strong disturbed very narrow to narrow bands of very narrowly foliated greyish purple slightly weathered PHYLLITE with extremely closely spaced very narrow lenticular bands of bluish grey fine grained psammite. Very closely spaced irregular narrow <20mm calcite veins dipping 70 - 85°. (New Harbour Group - Phyllite) . . . between 36.50 and 36.70m depth predominantly non-intact recovered as very angular to angular fine to coarse tabular gravel (possible crush zone related to faulting?). . . . below 36.70m depth fabric disturbed by microfaulting and calcite veining. . . . between 36.70 to 36.88m depth 2 no. possible microfaults dipping 70-85° undulating with very tight offsets psammite band by <15mm.		34[i] 36[i] 35[i] 37[i]	-29 -29.268	(0.32) 37 37.16	
37.16-37.34	Medium strong to strong highly disturbed very narrowly foliated bluish green slightly weathered to fresh PHYLLITE with frequent extremely to very closely spaced incipient fractures and microfaulting disturbing/deformed foliation. Very closely spaced narrow <20mm calcite veins dipping 60 - 70°. Fractures Closely spaced undulating to planar rough open to wide dipping 10 - 15° infilled with non intact material. (New Harbour Group - Phyllite) . . . between 36.91 to 37.08m depth possible microfault dipping 65° undulating with very tight offsets disturbing fabric and re-fused breccia of phyllite and calcite. . . . between 37.08 and 37.17m depth boudinage calcite vein. . . . below 37.12m depth extremely closely spaced narrow bands of red phyllite.		40[i] 41[i] 38[i] 39[i] 42[i] 43[i] 44[i]	-29.448	(0.18) 37.34	
37.34-38.10	Medium strong bluish grey fine grained moderately weathered PSAMMITE. Extremely to very closely spaced lenticular very narrow calcite veins dipping 70 - 80°. Fractures are closely spaced conjugate planar rough open dipping 30 - 45° (New Harbour Group - Psammite) Medium strong very narrow to very thin bands of very narrowly foliated bluish green slightly weathered PHYLLITE with extremely closely spaced very narrow lenticular bands of bluish green fine grained psammite. Foliation is dipping at 10 - 15°. Recovered as predominantly non intact angular to subangular coarse tabular gravel (possibly due to fracturing?).		45[i] 46[i]	-30	(0.76) 38	

Method Used:	DS+ RC+ RO	Plant Used:	Beretta T44	Drilled By:	CG/CA	Logged By:	JWickenden+ NFowler+ SAl-Jassar	All dimensions in metres Scale:	1:10

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STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
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Contract Ref:	Start: 30.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 09.05.11	7.892	E:236005.9 N:393683.2	20 of 21

Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
37.34-38.10	(New Harbour Group - Phyllite) . . . between 37.40 and 37.93m depth non-intact recovered as angular to subangular coarse tabular gravel with 8% loss of core. . . . at 38.02m depth apparent change in direction of dip. Medium strong highly disturbed bluish green fine grained slightly weathered PSAMMITE with highly disturbed/deformed fabric. Extremely to very closely spaced lenticular very narrow irregular calcite veins dipping 50 - 70° . Fractures are very closely to closely spaced planar and undulating rough partly open dipping 20 - 65° and 80 - 90° with occasional slight clay smearing. (New Harbour Group - Psammite) . . . between 38.10 to 38.17m depth possible re-fused microfault (55°) with calcite re-crystallisation causing offset to fabric, naturally open along calcite re-crystallisation vein infilled with pale grey clay infill. . . . between 38.33 and 38.42m depth highly disturbed and deformed with possible parasitic folding of phyllite? band between 38.37 and 38.42m depth. . . . between 38.41 to 38.50m depth possible re-fused microfault (65°) with calcite re-crystallisation causing offset to fabric, naturally open along calcite re-crystallisation vein infilled with grey fine fragments of phyllite and psammite. . . . between 38.46 and 38.50m depth non-intact recovered as subangular to subrounded coarse gravel.		47[i] 48[i] 49[i] 51[i] 52[i] 53[i] 50[i] 54[i] 55[i] 56[i] 58[i] 57[i] 59[i] 60[i]	30.208 -31	38.10 39 (1.95)	
38.10-40.05	. . . between 39.72 and 39.83m depth non-intact recovered as pale green slightly sandy slightly gravelly clay. Gravel is subangular to subrounded coarse psammite.		61[i] 62[i]	-32	40	

Method Used:	DS+ RC+ RO	Plant Used:	Beretta T44	Drilled By:	CG/CA	Logged By:	JWickenden+ NFowler+ SAl-Jassar	All dimensions in metres Scale: 1:10

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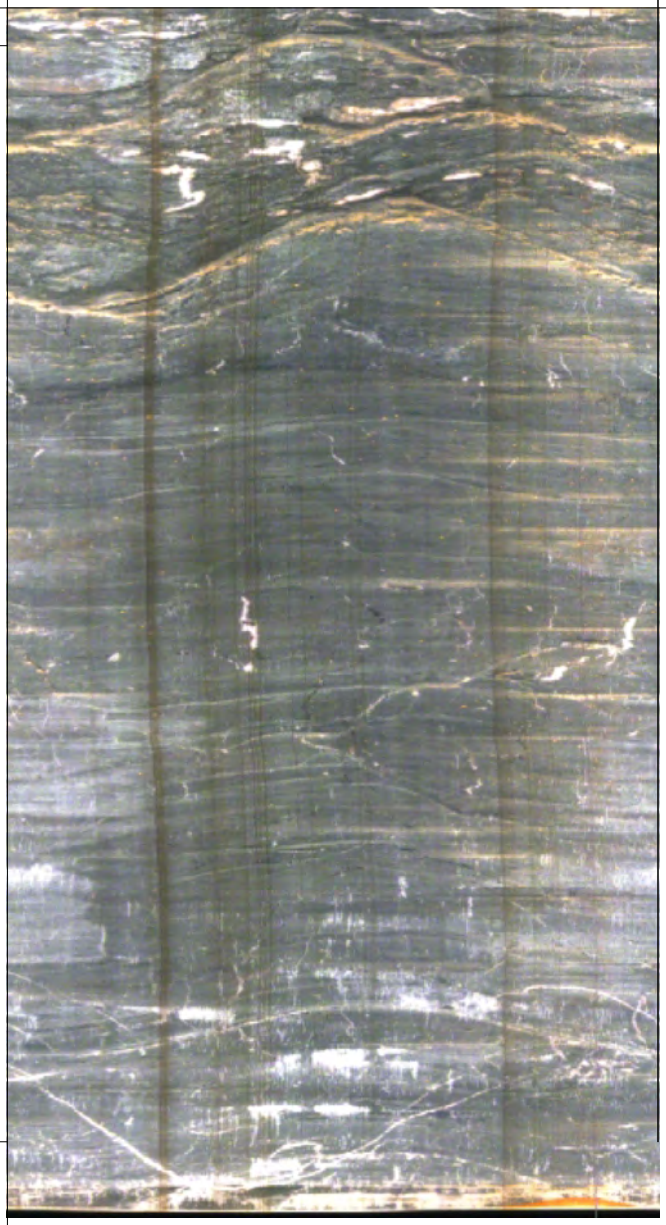
STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

BOREHOLE LOG

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH526R

Contract Ref:	Start: 30.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 09.05.11	7.892	E:236005.9 N:393683.2	21 of 21

Depth	Description of Strata	Optical Log	Fracture Log	Reduced Level	Stratum Depth (Thickness)	Material Graphic Legend
38.10-40.05	Medium strong to strong very narrowly foliated bluish green fresh PHYLLITE. Foliation dipping at 20 - 35°. Recovered as 10 - 90mm long sections of core separated by non intact material comprising angular to subangular medium to coarse gravel (possibly caused by very closely to closely spaced intersecting incipient fractures and foliation fractures?). Evidence of occasional (possible closely to medium spaced?) fractures with sandy clay infill. Medium spaced very narrow calcite veins dipping 60 - 85°. Medium to very closely spaced to locally extremely closely spaced very narrow to narrow <6mm ptygmatic quartz veins dipping 35°. Closely spaced randomly orientated very narrow <1mm dark green chlorite veins. (New Harbour Group - Phyllite)			-32.158	40.05	
40.05-41.50	. . . between 40.70 and 41.20m depth non-intact recovered as angular coarse gravel with occasional 50mm sections of core (possible faulting) . . . between 41.40 and 41.50m depth extremely closely spaced ptygmatic quartz veining.			-33	(1.45) 41	
	Rotary borehole terminated at 41.50m depth.			-33.608	41.50	

Method Used:	Plant Used:	Drilled By:	Logged By:	All dimensions in metres
DS+ RC+ RO	Beretta T44	CG/CA	JWickenden+ NFowler+ SAl-Jassar	Scale: 1:10

GINT_LIBRARY_V8_04.GLB!XCUSTOM - SSL - 725061 - OPTV | 725061_WYLFA.GPJ - v8_04 | 17/12/11 - 21:54 | MJB.
Structural Soils Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.soils.co.uk, Email:admin@soils.co.uk.

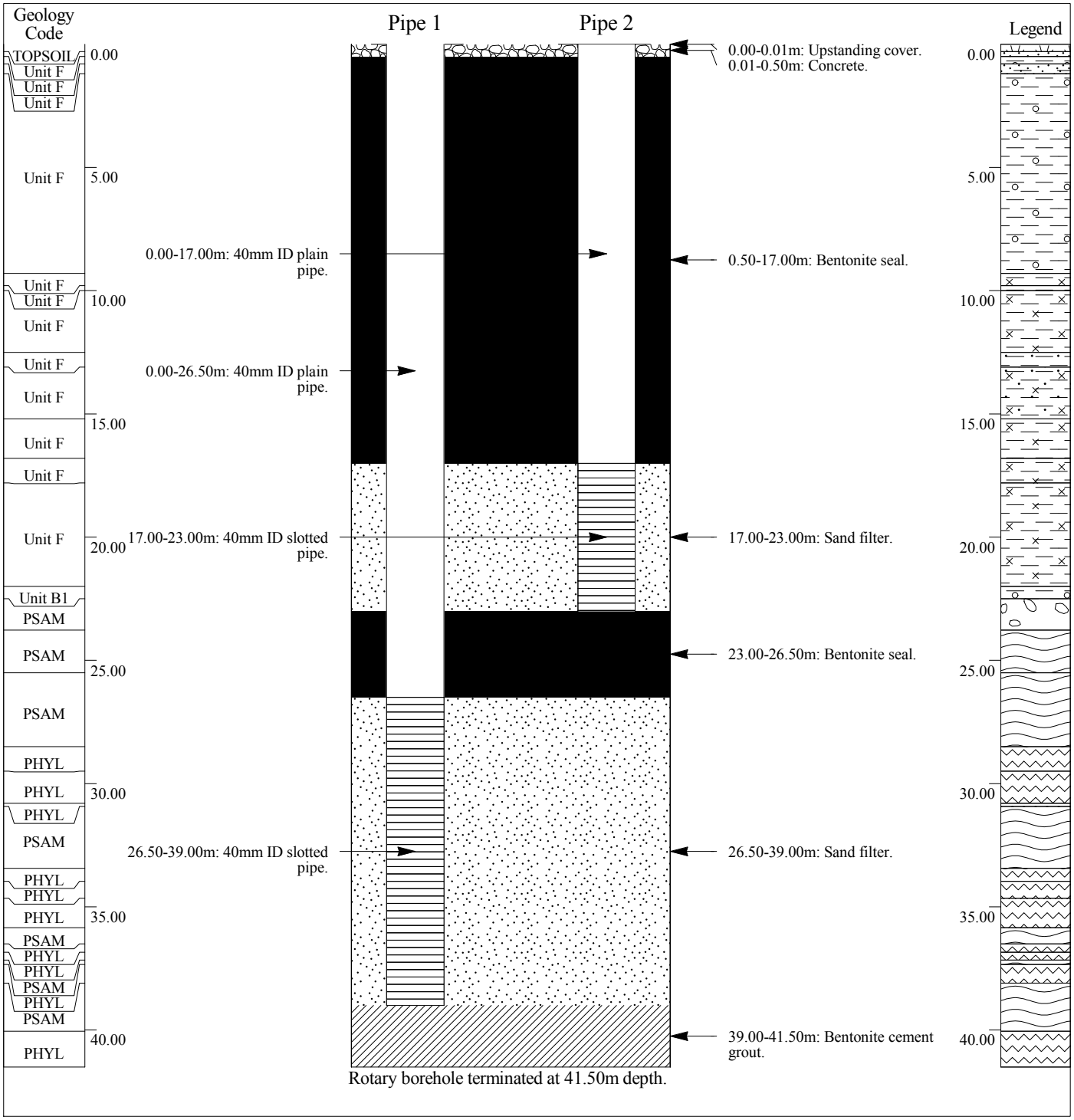
STRUCTURAL SOILS

WYL-SSL-SDT-LOG-00004

INSTALLATIONS

Contract:	Client:	Borehole:
Wylfa New Build - Intermediate Onshore Ground Investigation	Horizon Nuclear Power Wylfa Limited	BH526R

Contract Ref:	Start: 30.04.11	Ground Level (m AOD):	National Grid Co-ordinate:	Sheet:
725061	End: 09.05.11	7.892	E:236005.9 N:393683.2	1 of 1



General Remarks

Geology code details:

PHYL=Phyllite, PSAM=Psammite, TOPSOIL=Topsoil, Unit B1=Unit B1, Unit F=Unit F

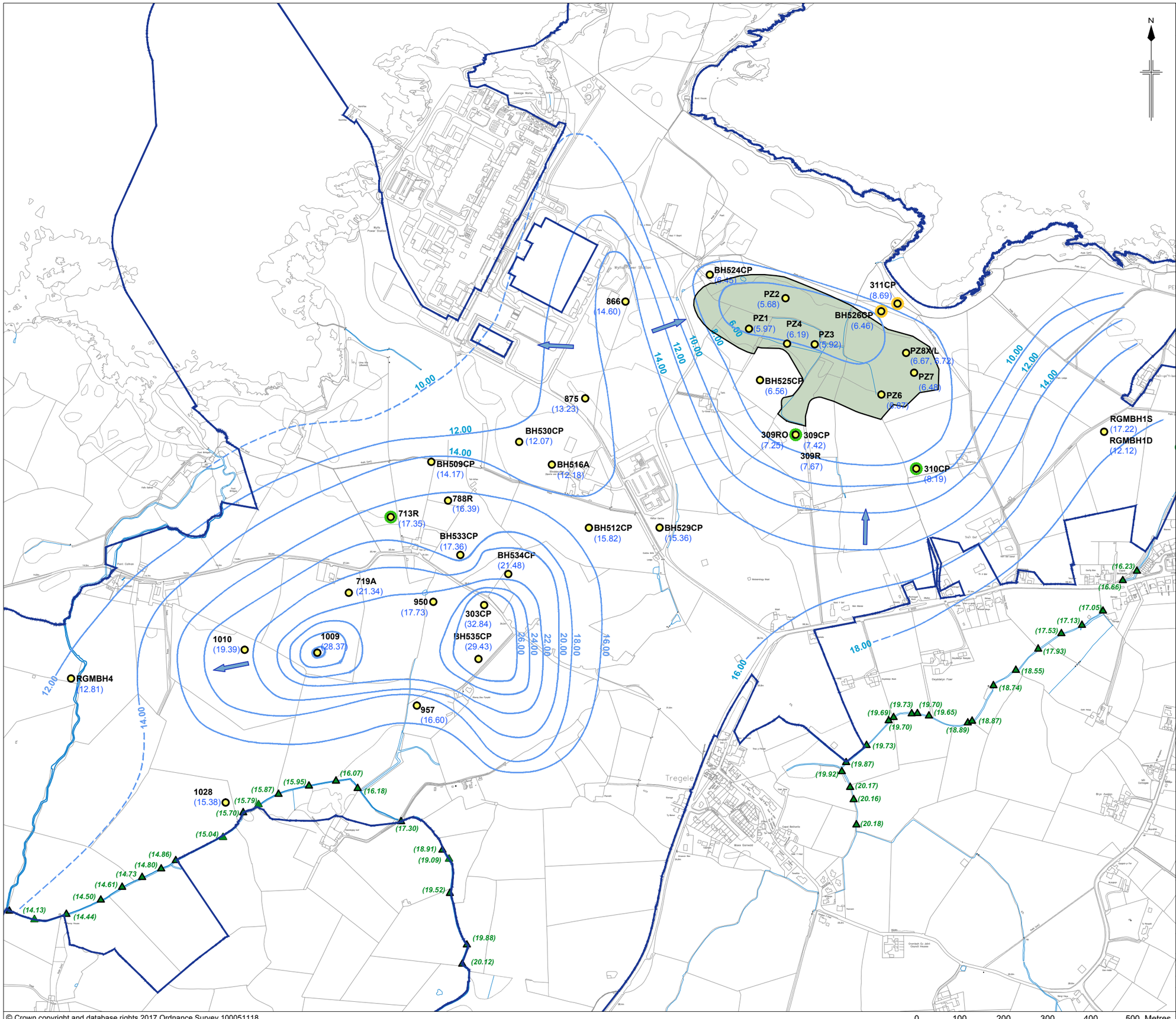
Note: Graphical representation of well installation is scaled vertically, but exaggerated in the horizontal to aid interpretation.

All dimensions in metres	Installation	Installation	Installed
Scale 1:235	Date 11/05/2011	Type -	By JWickenden

GINT_LIBRARY_V8_04.GLB!INSTALLATIONS LOG | 725061_WYLFA.GPJ - v8_04 | 17/12/11 - 21:54 | MJB
Structural Soils Ltd, Head Office - Bristol: The Old School, Stillhouse Lane, Bedminster, Bristol, BS3 4EB. Tel: 0117-947-1000, Fax: 0117-947-1004, Web: www.soils.co.uk, Email:admin@soils.co.uk.

APPENDIX F GROUNDWATER CONTOUR PLOTS

FIGURE 6.1



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Licence information for additional legend items can be found in Appendix A1-1.

0 100 200 300 400 500 Metres

KEY:

- Wylfa Newydd Development Area
- Groundwater contour (mAOD)
- Groundwater flow direction
- Monitoring borehole
- Artesian conditions have been identified in these boreholes on one or more occasion, although not necessarily on the date for these contours
- Tidal fluctuations observed in these boreholes
- River levels March 2015
- Tre'r Gof SSSI

Rev.	Date	Purpose of Revision	Drawn	Check'd	Rev'd	App'd
0	MAR 17	INITIAL ISSUE	AR	TD	MB	SH

JACOBS®
Jacobs House, Shrewsbury Business Park, Sitka Drive, Shrewsbury SY2 6LG
Tel:+44(0)1743 284800
www.jacobs.com

Client: HORIZON NUCLEAR POWER

Project: WYLFA NEWYDD PROPOSED NUCLEAR POWER STATION

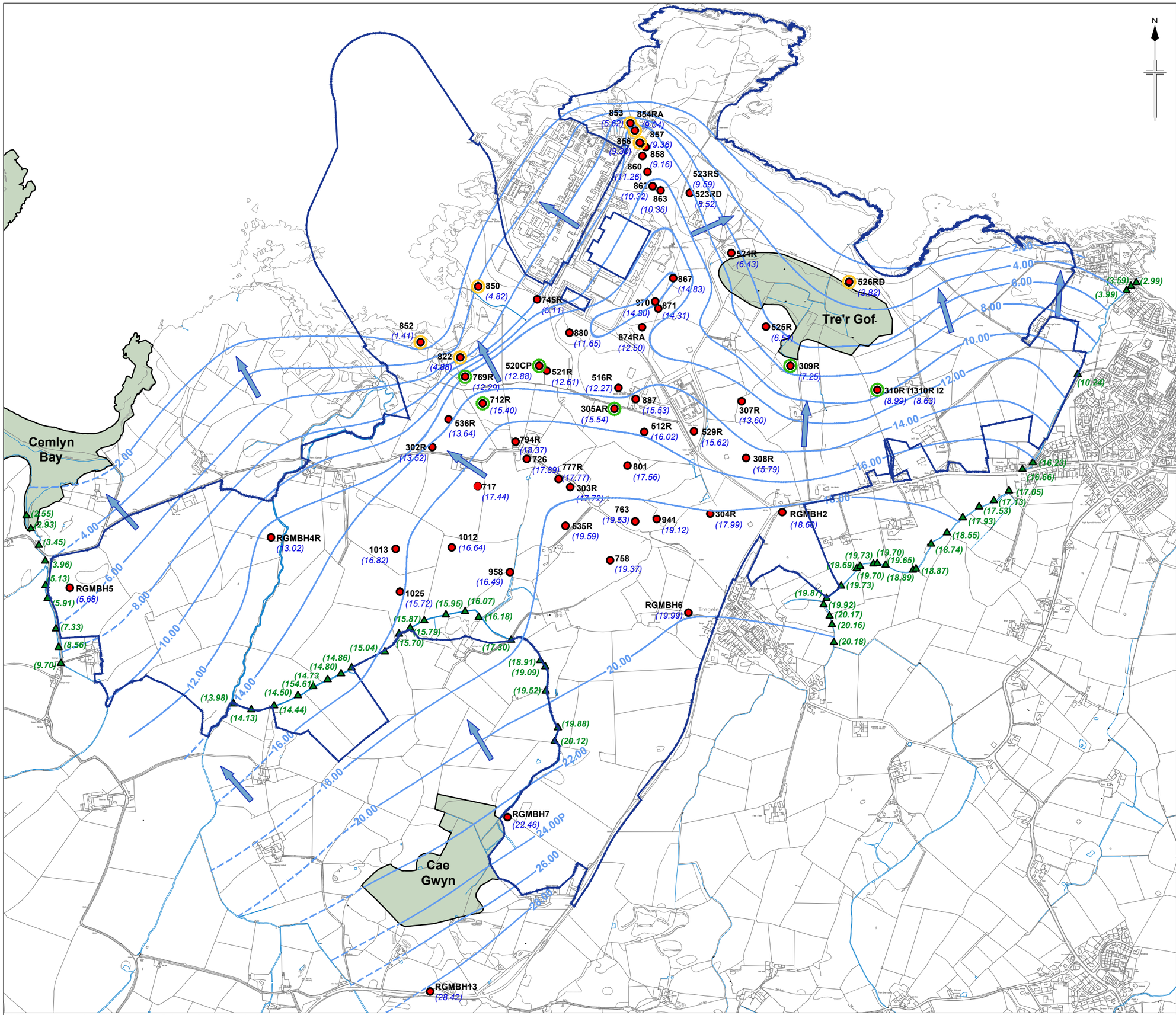
Drawing Title: GROUNDWATER CONTOURS SUPERFICIAL DEPOSITS - SEPTEMBER 30th 2016

Drawing Status: INITIAL ISSUE

Scale	AS SHOWN — DO NOT SCALE
Jacobs No.	60PO8099
Client No.	
Drawing No.	60PO8099_FIGURE 6.1

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FIGURE 6.2



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KEY:

- Wylfa Newydd Development Area
- Groundwater contour (mAOD)
- Groundwater flow direction
- Monitoring borehole
- Artesian conditions have been identified in these boreholes on one or more occasion, although not necessarily on the date for these contours
- Tidal fluctuations observed in these boreholes
- River levels March 2015
- SSSI

Rev.	Date	Purpose of Revision	Drawn	Check'd	Rev'd	App'd
0	MAR 17	INITIAL ISSUE	AR	HR	MB	SH

JACOBS
Jacobs House, Shrewsbury Business Park, Sitka Drive, Shrewsbury SY2 6LG
Tel:+44(0)1743 284800
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Client: HORIZON NUCLEAR POWER

Project: WYLFA NEWYDD PROPOSED NUCLEAR POWER STATION

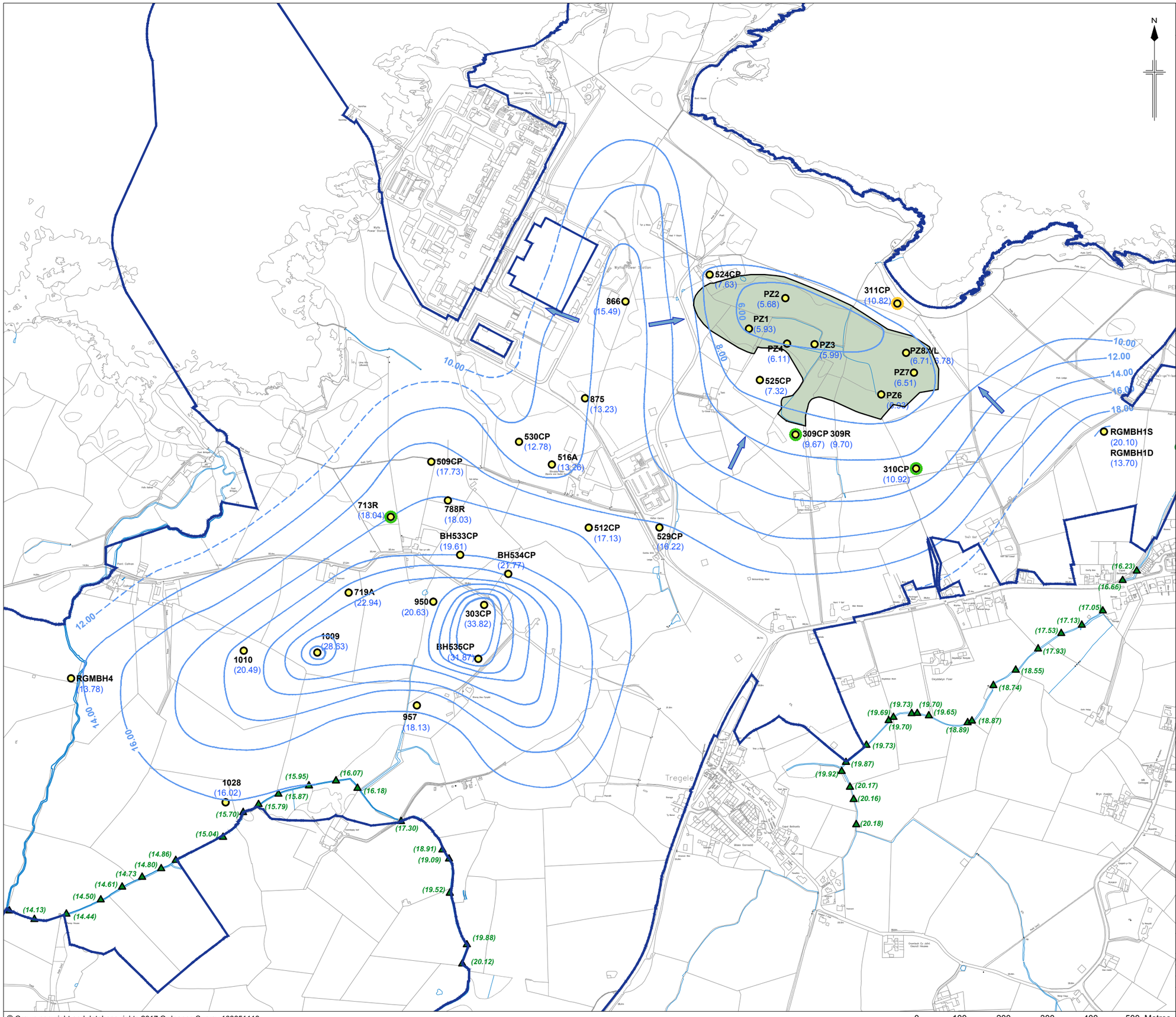
Drawing Title: GROUNDWATER CONTOURS BEDROCK
SEPTEMBER 30th 2016

Drawing Status: INITIAL ISSUE

Scale	AS SHOWN	DO NOT SCALE
Jacobs No.	60PO8099	
Client No.		
Drawing No.	60PO8099_FIGURE 6.2	

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FIGURE 6.3



KEY:

- Wylfa Newydd Development Area
- Groundwater contour (mAOD)
- Groundwater flow direction
- Monitoring borehole
- Artesian conditions have been identified in these boreholes on one or more occasion, although not necessarily on the date for these contours
- Tidal fluctuations observed in these boreholes
- River levels March 2015
- Tre'r Gof SSSI

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0 100 200 300 400 500 Metres

Rev.	Date	Purpose of Revision	Drawn	Check'd	Rev'd	App'd
0	MAR 17	INITIAL ISSUE	AR	TD	MB	SH

JACOBS
Jacobs House, Shrewsbury Business Park, Sitka Drive, Shrewsbury SY2 6LG
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Client: HORIZON NUCLEAR POWER

Project: WYLFA NEWYDD PROPOSED NUCLEAR POWER STATION

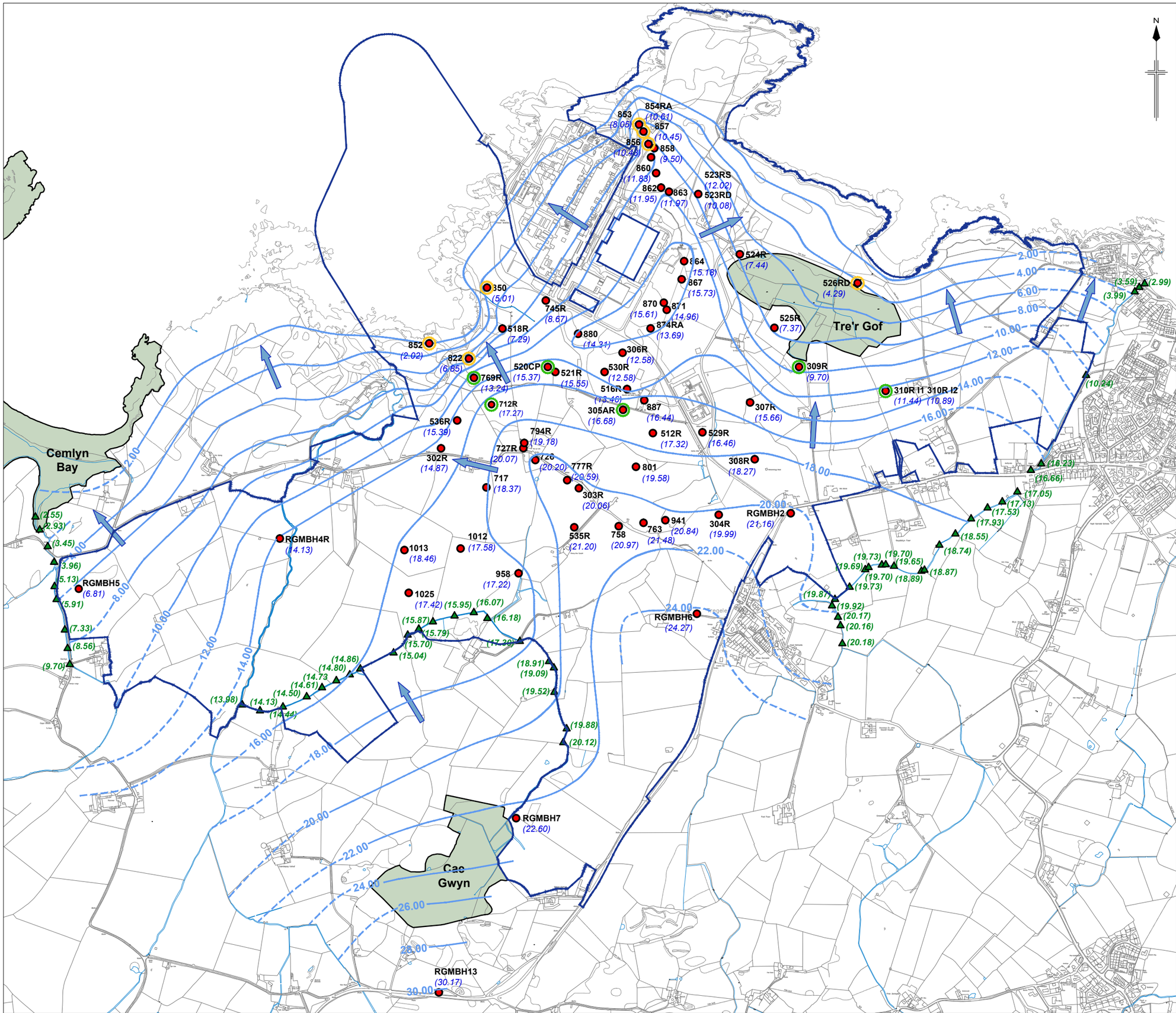
Drawing Title: GROUNDWATER CONTOURS SUPERFICIAL DEPOSITS - DECEMBER 9th 2015

Drawing Status: INITIAL ISSUE

Scale	AS SHOWN — DO NOT SCALE
Jacobs No.	60PO8099
Client No.	
Drawing No.	60PO8099_FIGURE 6.3

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FIGURE 6.4



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KEY:

- Wylfa Newydd Development Area
- Groundwater contour (mAOD)
- Groundwater flow direction
- Monitoring borehole
- Artesian conditions have been identified in these boreholes on one or more occasion, although not necessarily on the date for these contours
- Tidal fluctuations observed in these boreholes
- River levels March 2015
- SSSI

Rev.	Date	Purpose of Revision	Drawn	Check'd	Rev'd	App'd
0	MAR 17	INITIAL ISSUE	AR	TD	MB	SH

JACOBS
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Tel:+44(0)1743 284800
www.jacobs.com

Client: HORIZON NUCLEAR POWER

Project: WYLFA NEWYDD PROPOSED NUCLEAR POWER STATION

Drawing Title: GROUNDWATER CONTOURS BEDROCK
DECEMBER 9th 2015

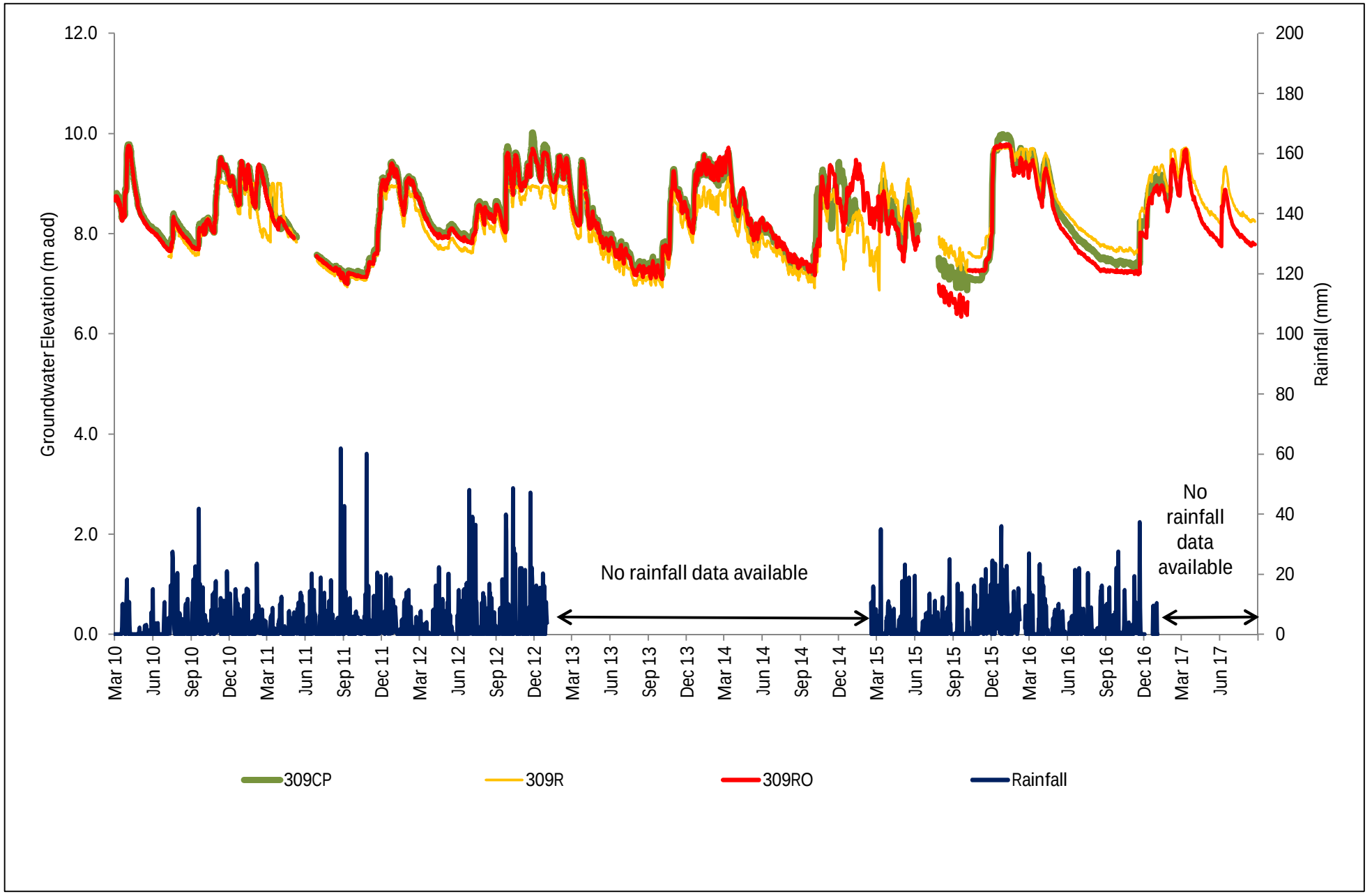
Drawing Status: INITIAL ISSUE

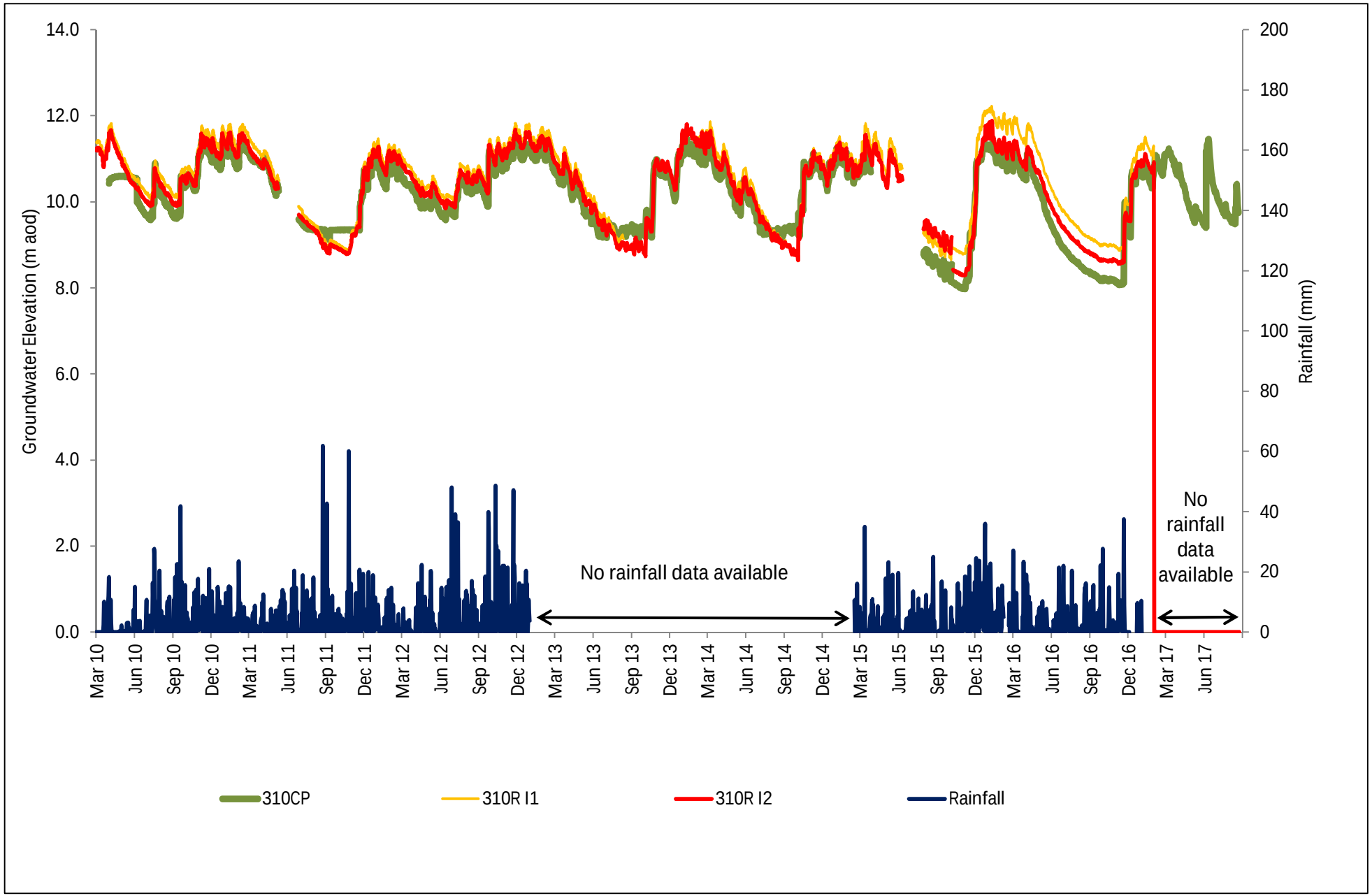
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Jacobs No.	60PO8099	
Client No.		

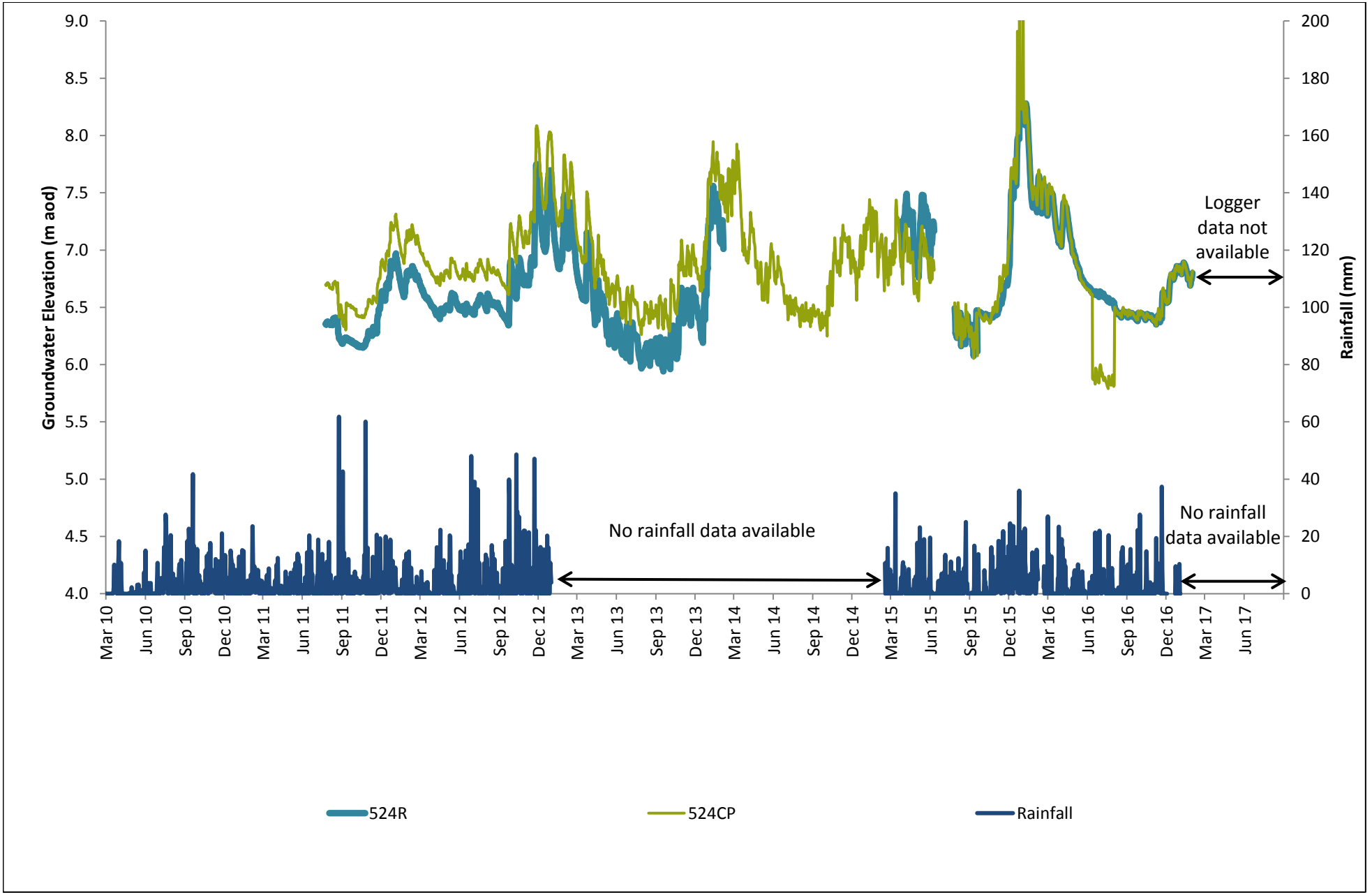
Drawing No.: 60PO8099_FIGURE 6.4

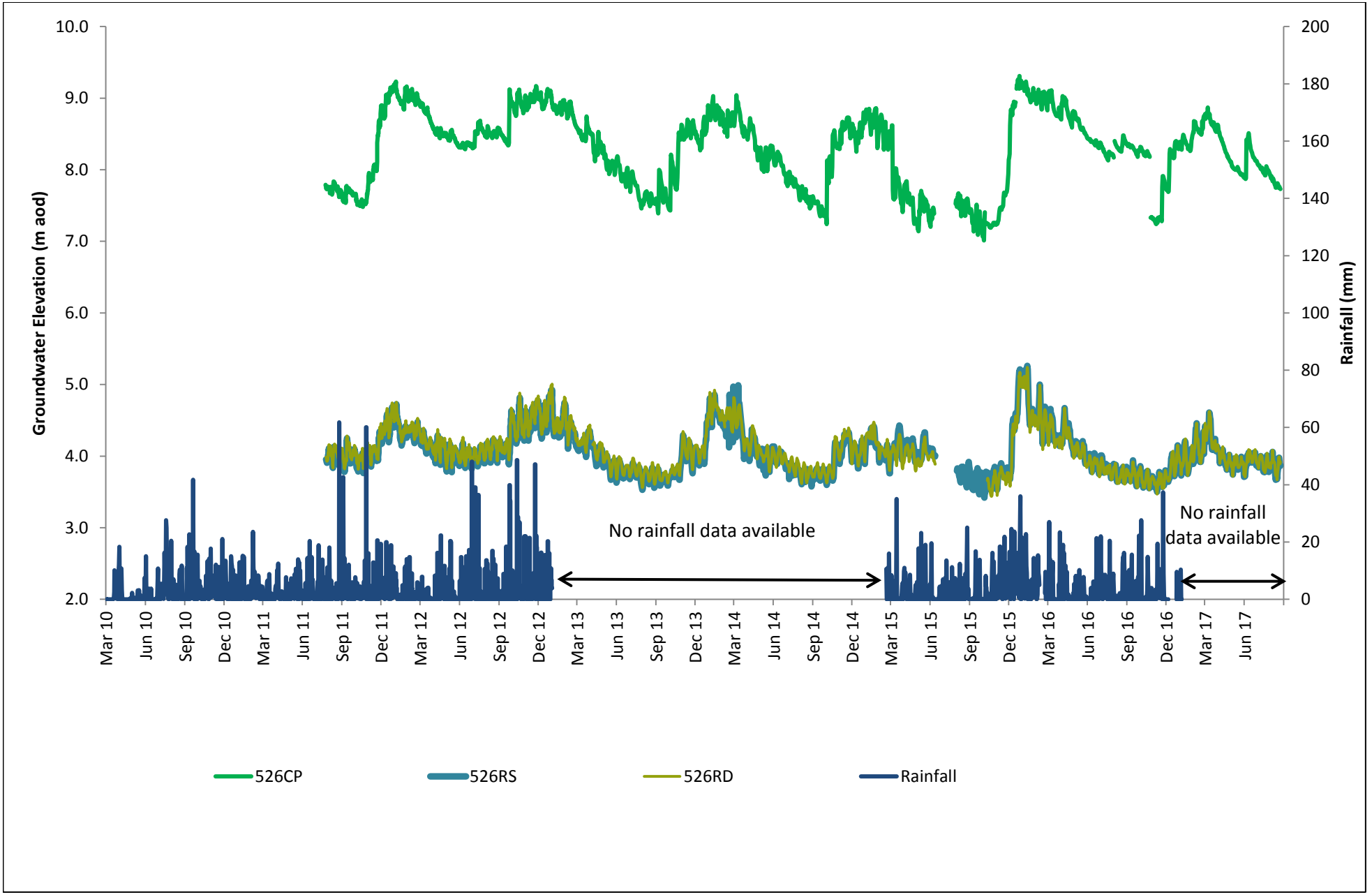
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APPENDIX G GROUNDWATER HYDROGRAPHS


Groundwater Elevation (m aod)
Rainfall (mm)
12.0
10.0
8.0
6.0
4.0
2.0
0.0
200
180
160
140
120
100
80
60
40
20
0
Mar 10
Jun 10
Sep 10
Dec 10
Mar 11
Jun 11
Sep 11
Dec 11
Mar 12
Jun 12
Sep 12
Dec 12
Mar 13
Jun 13
Sep 13
Dec 13
Mar 14
Jun 14
Sep 14
Dec 14
Mar 15
Jun 15
Sep 15
Dec 15
Mar 16
Jun 16
Sep 16
Dec 16
Mar 17
Jun 17
No rainfall data available
No rainfall data available
309CP
309R
309RO
Rainfall


Groundwater Elevation (m aod)
Rainfall (mm)
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
200
180
160
140
120
100
80
60
40
20
0
No rainfall data available
No rainfall data available
Mar 10
Jun 10
Sep 10
Dec 10
Mar 11
Jun 11
Sep 11
Dec 11
Mar 12
Jun 12
Sep 12
Dec 12
Mar 13
Jun 13
Sep 13
Dec 13
Mar 14
Jun 14
Sep 14
Dec 14
Mar 15
Jun 15
Sep 15
Dec 15
Mar 16
Jun 16
Sep 16
Dec 16
Mar 17
Jun 17
310CP
310R I1
310R I2
Rainfall


Groundwater Elevation (m aod)
Rainfall (mm)
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
200
180
160
140
120
100
80
60
40
20
0
Mar 10
Jun 10
Sep 10
Dec 10
Mar 11
Jun 11
Sep 11
Dec 11
Mar 12
Jun 12
Sep 12
Dec 12
Mar 13
Jun 13
Sep 13
Dec 13
Mar 14
Jun 14
Sep 14
Dec 14
Mar 15
Jun 15
Sep 15
Dec 15
Mar 16
Jun 16
Sep 16
Dec 16
Mar 17
Jun 17
Logger data not available
No rainfall data available
No rainfall data available
524R
524CP
Rainfall


Groundwater Elevation (m aod)
Rainfall (mm)
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
200
180
160
140
120
100
80
60
40
20
0
Mar 10
Jun 10
Sep 10
Dec 10
Mar 11
Jun 11
Sep 11
Dec 11
Mar 12
Jun 12
Sep 12
Dec 12
Mar 13
Jun 13
Sep 13
Dec 13
Mar 14
Jun 14
Sep 14
Dec 14
Mar 15
Jun 15
Sep 15
Dec 15
Mar 16
Jun 16
Sep 16
Dec 16
Mar 17
Jun 17
No rainfall data available
No rainfall data available
526CP
526RS
526RD
Rainfall

APPENDIX H WATER QUALITY

APPENDIX H.1 FIELD PARAMETERS

APPENDIX H.2 LAB RESULTS

APPENDIX H.3 PIPER PLOTS

APPENDIX H.4 WATER QUALITY TRENDS

APPENDIX H.1 FIELD PARAMETERS

Field parameters

Date	Location	pH	EC (µS/cm)	DO (%)	REDOX (mv)	Temperature (°C)
04/11/2015	PZ1	6.93	734	30.1	22	12.5
04/11/2015	PZ2	6.39	870		-30	12.1
04/11/2015	PZ3	6.78	669	22.1	63	12.5
04/11/2015	PZ4	6.45	914		-7	12.3
04/11/2015	PZ5	7.18	747	12	79	11.7
04/11/2015	PZ6	6.61	914		22	12
04/11/2015	PZ7	6.43	758	22.4	37	11.7
04/11/2015	PZ8X	6.32	583	8.9	-13	11.5
04/11/2015	PZ8L					
14/12/2015	PZ1	5.7	478	39.9	2	9.6
14/12/2015	PZ2	5.37	820	12.5	18	10.8
14/12/2015	PZ3	5.75	620	16	-17	10.1
14/12/2015	PZ4	5.65	830	12.2	-74	10.4
14/12/2015	PZ5	6.11	588	41.3	17	9.9
14/12/2015	PZ6	5.77	681	15.7	14	10.1
14/12/2015	PZ7	5.79	642	16.2	23	10
14/12/2015	PZ8X	6.13	502	16.2	34	10.1
14/12/2015	PZ8L					
11/01/2016 13:15	PZ1	5.66	509	99	27	8.7
11/01/2016 13:01	PZ2	5.95	893	58	13	8.1
11/01/2016 13:52	PZ3	5.77	690	72.1	16	8.9
11/01/2016 13:35	PZ4	5.73	849	52.3	-25	8.4
11/01/2016 13:50	PZ5	6.1	635	43.8	17	8.9
11/01/2016 14:10	PZ6	5.96	755	54	35	9
11/01/2016 14:35	PZ7	6	706	42.6	35	8.4
11/01/2016 14:40	PZ8L					
11/01/2016 14:40	PZ8X	6.08	545	49.6	38	8.4
08/02/2016 14:03	PZ1	5.47	590	14.3	-16	8.5
08/02/2016 13:45	PZ2	6.08	825	77.1	-29	8
08/02/2016 14:45	PZ3	5.76	659	28.8	-17	8.3
08/02/2016 14:25	PZ4	5.67	842	30.3	-50	8
08/02/2016 15:50	PZ5	6.2	592	45.3	-14	8.2
08/02/2016 15:00	PZ6	5.94	712	34.2	-22	7.8
08/02/2016 15:15	PZ7	5.99	668	40.1	-9	7.7
08/02/2016 15:32	PZ8L	6.12	547	39.2	-48	7.6
08/02/2016 15:33	PZ8X					
07/03/2016 15:16	PZ1	5.6	501	34.3	8	7.7
07/03/2016 15:00	PZ2	5.35	921	31.3	-27	8.5
07/03/2016 15:50	PZ3	6	646	19.7	15	8.4
07/03/2016 15:35	PZ4	5.96	796	25.5	5	8.2
07/03/2016 17:05	PZ5	6.46	580	30.5	17	8.4
07/03/2016 16:07	PZ6	6.15	685	23.6	19	8.3

Date	Location	pH	EC (µS/cm)	DO (%)	REDOX (mv)	Temperature (°C)
07/03/2016 16:30	PZ7	6.25	666	25.9	18	7.7
07/03/2016 16:50	PZ8L					
07/03/2016 16:50	PZ8FX	6.44	536	26.2	29	7.5
25/04/2016 14:50	PZ1	6.19	550	39.1	43	10.9
25/04/2016 14:00	PZ2	5.85	827	33.6	162	11.5
25/04/2016 15:20	PZ3	6.28	651	52	-5	10.5
25/04/2016 15:00	PZ4	6.17	760	44.3	16	10.2
25/04/2016 16:45	PZ5	6.9	576	38.8	-8	9.7
25/04/2016 15:45	PZ6	6.44	675	49.5	-14	10.3
25/04/2016 16:04	PZ7	6.49	669	41.8	1	10.1
25/04/2016 16:23	PZ8L					
25/04/2016 16:23	PZ8X	6.65	532	20	-5	10.5
31/05/2016 14:20	PZ1					
31/05/2016 15:22	PZ2					
31/05/2016 14:30	PZ3					
31/05/2016 14:25	PZ4					
31/05/2016 15:10	PZ5					
31/05/2016 14:50	PZ6					
31/05/2016 14:56	PZ7					
31/05/2016 15:00	PZ8FX					
28/06/2016 16:00	PZ1					
28/06/2016 15:20	PZ2					
28/06/2016 16:20	PZ3					
28/06/2016 16:20	PZ4					
28/06/2016 17:20	PZ5					
28/06/2016 16:50	PZ6					
28/06/2016 16:59	PZ7					
28/06/2016 17:07	PZ8L					
28/06/2016 17:08	PZ8FX					
02/08/2016 11:26	PZ1					
02/08/2016 10:00	PZ2					
02/08/2016 15:11	PZ3	6.42	748		8	16.5
02/08/2016 11:45	PZ4					
02/08/2016 16:15	PZ5	6.83	700		-4	14.6
02/08/2016 15:30	PZ6	6.54	858		-13	15.8
02/08/2016 15:45	PZ7	6.48	837		17	15.5
02/08/2016 13:08	PZ8L					
02/08/2016 16:00	PZ8X	6.44	601		-12	15.7
30/08/2016 13:54	PZ1					
30/08/2016 13:10	PZ2					
30/08/2016 14:01	PZ3					
30/08/2016 13:56	PZ4					
30/08/2016 14:45	PZ5					
30/08/2016 14:19	PZ6					

Date	Location	pH	EC (µS/cm)	DO (%)	REDOX (mv)	Temperature (°C)
30/08/2016 14:26	PZ7					
30/08/2016 14:33	PZ8L					
30/08/2016 14:32	PZ8X					
25/10/2016 10:40	PZ1	5.53	684	26.8		12
25/10/2016 10:40	PZ2	7.16	924	21.9		11.3
25/10/2016 10:40	PZ3					
25/10/2016 10:40	PZ4					
25/10/2016 10:40	PZ5	7.15	760	21.9		11.3
25/10/2016 10:40	PZ6	7.16	836	15		11
25/10/2016 10:40	PZ7	7.16	837			10.8
25/10/2016 10:40	PZ8L	7.14	537	24.3		10.5
25/10/2016 10:40	PZ8X	7.15	611	19.6		10.5
28/11/2016 00:00	PZ1	6.05	961	12.1	-30	10.9
28/11/2016 00:00	PZ2	6.7	632	69.3	7	8.3
28/11/2016 00:00	PZ3	6.2	860	12	-45	11.1
28/11/2016 00:00	PZ4	6.46	916	12.2	7	10.6
28/11/2016 00:00	PZ5	6.75	762	13.4	2	11
28/11/2016 00:00	PZ6	6.32	875	11.2	-41	10.4
28/11/2016 00:00	PZ7					
28/11/2016 00:00	PZ8L	6.38	562	15.2	-48	10.2
28/11/2016 00:00	PZ8X	6.3	705	12.2	-56	10.2
03/01/2017 00:00	PZ1	5.99	652		-41	9.4
03/01/2017 00:00	PZ2	6.7	200		9	8.8
03/01/2017 00:00	PZ3	6.3	790		-55	9.2
03/01/2017 00:00	PZ4	6.83	861		-3	9.2
03/01/2017 00:00	PZ5	6.8	658		-28	9.2
03/01/2017 00:00	PZ6	6..7	347		25	10.6
03/01/2017 00:00	PZ7	6.44	787		-20	8.5
03/01/2017 00:00	PZ8L	6.68	538		-13	8.6
03/01/2017 00:00	PZ8X	6.84	646		-35	8.7
01/02/2017 00:00	PZ1	7.11	584	100.2	22.2	11.01
01/02/2017 00:00	PZ2	7.3	753		89.7	10.8
01/02/2017 00:00	PZ3	7.33	590.1		-10	9.09
01/02/2017 00:00	PZ4	7.42	575.4		-4.1	9.64
01/02/2017 00:00	PZ5	7.55	554.4		73.1	10.22
01/02/2017 00:00	PZ6	7.03	681.5		-39.6	8.9
01/02/2017 00:00	PZ7	6.92	731		-0.2	8.71
01/02/2017 00:00	PZ8L					
01/02/2017 00:00	PZ8X	7.05	513.1		-38.7	8.71
07/03/2017 00:00	PZ3	6.74	607.4	19.7	215.6	8.67
07/03/2017 00:00	PZ2	6.85	634	35.3	262	8.19
07/03/2017 00:00	PZ5	7.27	551.3	33.7	366.5	9.41
07/03/2017 00:00	PZ8L	6.96	414.2	31.7	272.6	8.52
07/03/2017 00:00	PZ8X	6.71	513.3	24.2	205.1	8.29

Date	Location	pH	EC (µS/cm)	DO (%)	REDOX (mv)	Temperature (°C)
07/03/2017 00:00	PZ7	6.96	604.7	52.2	312.3	8.51
07/03/2017 00:00	PZ6	6.83	614.3	24.4	206.3	8.43
07/03/2017 00:00	PZ4	7.08	687.2	26	427.8	8.78
07/03/2017 00:00	PZ1	6.87	519.3	22.4	242.3	8.67
05/04/2017 00:00	PZ1	6.49	515.13	20.05	4.7	10.95
09/05/2017 10:55	PZ1	6.9	548.83	39.5	54.1	14.08
06/06/2017 14:37	PZ1	6.34	630.85	26.5	-98.3	16.38
24/07/2017 15:10	PZ1	6.52	431.19	38.26	-134.3	20.27
21/08/2017 16:25	PZ1	6.46	550.24	27.74	-74.7	16.85
05/04/2017 00:00	PZ2	6.86	647.57	24.07	-15.9	12.7
09/05/2017 13:45	PZ2	7.06	639.4	48.13	-47	13.25
06/06/2017 16:31	PZ2	6.63	686.38	34.32	-53.3	14.81
24/07/2017 17:50	PZ2	6.92	667.74	37.57	-142.2	17.75
22/08/2017 11:39	PZ2	6.57	805.82	29.05	-27.9	17.32
04/04/2017 00:00	PZ3	6.65	459.13	32.89	-0.3	10.07
09/05/2017 11:45	PZ3	6.88	538.48	48.29	-67	12.34
06/06/2017 14:59	PZ3	6.62	714.53	19.6	-48.8	15.21
26/07/2017 11:00	PZ3	8.42	888.42	34.99	-119.7	19.2
27/07/2017 15:30	PZ3	6.81	831.56	106	-132.3	19.59
21/08/2017 17:24	PZ3	6.66	822.49	28.83	-63.5	15.33
05/04/2017 00:00	PZ4	6.98	715.73	22.57	-58.4	10.86
09/05/2017 11:20	PZ4	7	739.3	25.76	-96.3	13.39
06/06/2017 14:59	PZ4	6.84	870.64	23.35	-88.1	15.48
21/08/2017 17:05	PZ4	6.74	869.06	28.78	-72	15.17
05/04/2017 00:00	PZ5	7.06	570.46	31.77	-77	13.47
09/05/2017 13:10	PZ5	7.07	567.84	49.79	-72.2	15.03
06/06/2017 16:09	PZ5	6.94	584.08	21.09	-95.1	14.72
24/07/2017 17:10	PZ5	7.07	572.69	49.29	-162.1	19.06
22/08/2017 10:50	PZ5	6.96	657.37	58.66	-82.5	17.48
05/04/2017 00:00	PZ6	6.61	671.36	26.74	-47.6	11.51
09/05/2017 12:30	PZ6	6.89	642.91	42.17	-78.7	13.93
06/06/2017 15:26	PZ6	6.82	759.01	14.73	-72.5	16.08
24/07/2017 16:00	PZ6	6.81	856.22	105.53	-129.6	22.14
23/08/2017 11:15	PZ6	6.92	979.85	35.01	-68.3	17.23
09/05/2017 12:40	PZ7	6.7	681.69	27.24	-44.7	12.82
06/06/2017 15:43	PZ7	6.71	727.44	19.2	-34.7	16.02
24/07/2017 16:20	PZ7	6.79	870.55	54.36	-76.4	20.75
21/08/2017 18:30	PZ7	6.81	764.82	42.89	-39.7	16.25
05/04/2017 00:00	PZ8L	6.65	424.96	41.91	-32.5	11.7
09/05/2017 13:00	PZ8L	-	-	-	-	-
06/06/2017 15:56	PZ8L	-	-	-	-	-
21/08/2017 18:04	PZ8L					
05/04/2017 00:00	PZ8X	6.65	529.69	22.88	-49.4	12.57
09/05/2017 12:55	PZ8X	6.81	487.24	42.93	-62.4	12.16

Date	Location	pH	EC (µS/cm)	DO (%)	REDOX (mv)	Temperature (°C)
06/06/2017 15:52	PZ8X	6.68	566.65	31.1	-63.1	15.3
24/07/2017 16:40	PZ8X	6.67	620.08	87.46	-116.3	19.83
21/08/2017 18:04	PZ8X	6.62	637.14	43.85	-60.1	15.69
03/11/2015	Spring A					
03/11/2015	Spring B					
03/11/2015	Spring C					
03/11/2015	Spring D					
03/11/2015	Spring E					
03/11/2015	Spring F					
15/12/2015	Spring A	6.74	588	34.9	7.4	10.2
15/12/2015	Spring C	6.92	281	88.4	72	11.2
15/12/2015	Spring D	6.92	451	34.8	79	9.6
16/12/2015	Spring E	6.92	213		37	11.7
15/12/2015	Spring G	6.91	322	60	62	8.9
09/02/2016 09:10	Spring A	5.64	587	88	52	7.4
09/02/2016 09:50	Spring B	5.95	392	81	47	5.3
09/02/2016 10:50	Spring C	5.92	295	90	68	8.4
09/02/2016 12:00	Spring D	5.96	438	84.3	87	6
09/05/2016 11:30	Spring E	6.02	304	89.2	63	5.3
09/05/2016	Spring F	-	-	-	-	-
08/03/2016 10:00	Spring A	7.32	585	70	104	7.9
08/03/2016 10:23	Spring B	6.07	458	95.4	99	7.6
08/03/2016 11:15	Spring C	7.33	297	77	44	9.3
08/03/2016 11:36	Spring D	6.11	451	83.7	69	7
-	Spring F	-	-	-	-	-
26/04/2016 10:05	Spring A	6.66	594	41.8	27	12.3
26/04/2016 10:45	Spring B	6.9	562	60.4	28	11.4
26/04/2016 12:10	Spring C	7.23	313	61.1	26	10
26/04/2016 14:15	Spring D	7.78	562	64.9	96	11.2
26/04/2016	Spring F	7.57	341	72.8	69	11.4
02/08/2016 10:21	Spring A	-	-	-	-	-
02/08/2016 12:16	Spring C	-	-	-	-	-
02/08/2016 16:57	Spring D	-	-	-	-	-
31/012017	Spring A	7.82	613.7	46.3	99	10.73
31/012017	Spring B	7.45	443.9	52.4	29.3	8.9
31/012017	Spring C	7.87		76	100	10.02
31/012017	Spring D	7.68	493.3	67.9	119.6	7.94
07/03/2017 00:00	Spring D	7.13	415.1	81.6	493.7	6.81
07/03/2017 00:00	Spring C	7.08	258.2	79.2	478.5	8.84
07/03/2017 00:00	Spring B	7.51	320.3	90	382.9	7.7
07/03/2017 00:00	Spring A	7.38	515.9	61.5	393	9.75
05/04/2017 00:00	Spring A	7.09	523.63	54.33	40.8	13.24
09/05/2017 13:55	Spring A	-	-	-	-	-

Date	Location	pH	EC (µS/cm)	DO (%)	REDOX (mv)	Temperature (°C)
06/06/2017 16:42	Spring A	7.08	548.51	42.24	27.6	13.13
24/07/2017 18:15	Spring A	7.17	595.19	43.35	-95.3	17.1
22/08/2017 12:06	Spring A	7.35	619.28	59.38	33.6	17
05/04/2017 00:00	Spring B	7.34	379.13	132.34	37	14.34
09/05/2017 10:30	Spring B	-	-	-	-	-
06/06/2017 14:40	Spring B	7.12	319.4	78.7	79.5	16.11
24/07/2017 14:50	Spring B	-	-	-	-	-
21/08/2017 17:45	Spring B	-	-	-	-	-
04/04/2017 00:00	Spring C	7.3	263.63	85.34	43.7	10.13
09/05/2017 12:10	Spring C	7.03	311.75	54.84	-9.5	15.92
06/06/2017 15:12	Spring C	6.63	326.94	69.58	64.4	14.12
24/07/2017 15:40	Spring C	-	-	-	-	-
21/08/2017 17:45	Spring C	-	-	-	-	-
04/04/2017 00:00	Spring D	7.1	498.72	81.91	78.3	9.74
09/05/2017 16:00	Spring D	-	-	-	-	-
06/06/2017 17:07	Spring D	7	735.37	80.85	37.7	14.79
24/07/2017 18:30	Spring D	-	-	-	-	-
22/08/2017 15:05	Spring D	7.36	700.13	56.3	57	20.57
02/06/2015 14:30	VN1	7.24	325	10.3	81	12.3
02/06/2015 15:00	VN2	6.36	753	1	104	12.2
02/06/2015	VN3	-	-	-	-	-
02/06/2015	VN4	-	-	-	-	-
06/07/2015	VN4	-	-	-	-	-
06/07/2015	VN1	-	-	-	-	-
06/07/2015	VN2	8.58	714	13.3	92	12.4
06/07/2015	VN3	-	-	-	-	-
14/08/2015	VN4	-	-	-	-	-
14/08/2015	VN3	-	-	-	-	-
14/08/2015	VN1	-	-	-	-	-
14/08/2015	VN2	-	-	-	-	-
17/09/2015 13:25	VN1	-	-	-	-	-
17/09/2015 13:35	VN2	-	-	-	-	-
17/09/2015 13:45	VN3	-	-	-	-	-
17/09/2015 14:15	VN4	-	-	-	-	-
03/11/2015	VN1	-	-	-	-	-
03/11/2015	VN2	-	-	-	-	-
03/11/2015	VN3	-	-	-	-	-
03/11/2015	VN4	-	-	-	-	-
15/12/2015	VN1	6.74	292	50.8	63	8.8
15/12/2015	VN2	6.91	720		81	10.6
15/12/2015	VN3	6.88	309	65.2	75	9.1
15/12/2015	VN4	6.92	411	68.8	79	9
13/01/2016 13:55	VN1	6.4	316	-	101	6.9

Date	Location	pH	EC (µS/cm)	DO (%)	REDOX (mv)	Temperature (°C)
13/01/2016 14:15	VN2	6.98	780	-	116	9.7
13/01/2016 14:55	VN3	6.51	329	-	113	6
13/01/2016 16:00	VN4	6.98	382	-	130	5.3
09/02/2016 09:55	VN1	5.9	321	82.4	51	5.7
09/02/2016 09:25	VN2	5.61	781	61.5	48	9.4
09/02/2016 10:30	VN3	5.9	365	89.5	72	4.2
09/02/2016 12:05	VN4	6.25	411	80.2	83	5
08/03/2016 10:33	VN1	6.18	349	82.4	91	7
08/03/2016 10:14	VN2	7.32	709	44.7	108	10
08/03/2016 11:08	VN3	6.26	359	97.2	48	7.1
08/03/2016 11:45	VN4	6.55	367	96.7	42	8.3
26/04/2016 10:55	VN1	7.07	339	64.8	11	10.1
26/04/2016 10:15	VN2	6.76	727	35.4	25	10.7
26/04/2016 12:00	VN3	7.04	502	67.2	40	7.4
26/04/2016 14:29	VN4	-	-	-	-	-
31/05/2016 14:10	VN1	-	-	-	-	-
31/05/2016 14:03	VN2	-	-	-	-	-
31/05/2016 14:39	VN3	-	-	-	-	-
01/06/2016 16:00	VN4	-	-	-	-	-
28/06/2016 15:40	VN1	-	-	-	-	-
28/06/2016 15:30	VN2	-	-	-	-	-
28/06/2016 16:42	VN3	-	-	-	-	-
28/06/2016 18:53	VN4	-	-	-	-	-
02/08/2016 11:13	VN1	-	-	-	-	-
02/08/2016 10:35	VN2	6.49	813	-	160	13.6
02/08/2016 12:17	VN3	-	-	-	-	-
02/08/2016 17:00	VN4	-	-	-	-	-
30/08/2016 13:46	VN1	-	-	-	-	-
30/08/2016 13:27	VN2	-	-	-	-	-
30/08/2016 14:11	VN3	-	-	-	-	-
30/08/2016 15:42	VN4	-	-	-	-	-
25/09/2016 00:00	VN2	6.47	861	54		11.3
28/11/2016 00:00	VN2	6.25	841	31.8	106	11.8
03/01/2017 00:00	VN1	6.54	228		60	8.3
03/01/2017 00:00	VN2	6.05	760		58	11.2
03/01/2017 00:00	VN3	6.99	506		-14	7.6
31/01/2017 00:00	VN1	7.73	424		55.7	8.85
31/01/2017 00:00	VN2	7.09	683		121	10.03
31/01/2017 00:00	VN3	7.86	402.6		99.6	9.51
07/03/2017 00:00	VN4	7.47	343	93.7	343	6.81
07/03/2017 00:00	VN3	7.79	296.4	94.4	491	6.53
07/03/2017 00:00	VN2	6.87	595.4	40.9	442.4	9.79
07/03/2017 00:00	VN1	7.29	335.6	80.9	330.7	7.8
05/04/2017 00:00	VN1	7.14	299.37	90.79	16	10.72

Date	Location	pH	EC (µS/cm)	DO (%)	REDOX (mv)	Temperature (°C)
09/05/2017 10:35	VN1	-	-	-	-	-
06/06/2017 14:25	VN1	7.09	296.08	78.47	79.5	16.01
24/07/2017 14:55	VN1	-	-	-	-	-
21/08/2017 16:09	VN1	-	-	-	-	-
05/04/2017 00:00	VN2	6.68	591.14	35.4	49.9	13.39
09/05/2017 10:15	VN2	6.99	579.97	55.52	95.8	14.17
06/06/2017 14:07	VN2	6.07	694.52	44.99	92.4	15.44
24/07/2017 15:40	VN2	-	-	-	-	-
21/08/2017 15:15	VN2	6.79	689.35	63.14	161.8	15.12
04/04/2017 00:00	VN3	-	-	-	-	-
09/05/2017 12:00	VN3	-	-	-	-	-
06/06/2017 15:10	VN3	-	-	-	-	-
24/07/2017 15:40	VN3	-	-	-	-	-
21/08/2017 17:45	VN3	-	-	-	-	-
04/04/2017 00:00	VN4	-	-	-	-	-
09/05/2017 16:10	VN4	-	-	-	-	-
06/06/2017 17:10	VN4	-	-	-	-	-
24/07/2017 18:30	VN4	-	-	-	-	-
23/08/2017 10:16	VN4	-	-	-	-	-
02/06/2015 16:18	VN5	7.46	510	7	60	14.3
06/07/2015	VN5	7.2	627	12.1	21	14.6
14/08/2015	VN5	6.84	588		54	14.3
17/09/2015 14:00	VN5	6.19	600	54.3	86	13.7
14/10/2015 14:20	VN5	6.71	615	60.3	126	10.4
03/11/2015	VN5	6.56	755	-	83	8.4
15/12/2015	VN5	7.2	407	97.3	72	7
13/01/2016	VN5	6.56	392	-	103	5.7
09/02/2016 08:53	VN5	6.01	413	80	58	4.6
08/03/2016 09:45	VN5	5.85	426	82.3	122	5.9
26/04/2016 09:20	VN5	6.53	486	62.8	77	7
31/05/2016 15:16	VN5	-	-	-	-	-
28/06/2016 17:56	VN5	-	-	-	-	-
02/08/2016 13:33	VN5	7.16	690	-	86	17.1
31/08/2016 10:42	VN5	6.1	660	44.5	84	15.9
28/09/2016 08:15	VN5	6.67	586	54	167	14.1
25/09/2016 00:00	VN5	7.16	668	55		9.6
28/11/2016 00:00	VN5	7.21	632	69.3	7	8.3
03/01/2017 00:00	VN5	7.19			-18	7.3
31/01/2017 00:00	VN5	7.78	441		70.5	9.7
07/03/2017 00:00	VN5	7.57	340.8	87.2	336.4	7.64
05/04/2017 00:00	VN5	7.67	426.93	91.67	12.5	13.17
09/05/2017 13:31	VN5	7.47	492.99	71.43	-27.9	16.66
06/06/2017 16:20	VN5	7.29	262.15	57.81	-45.4	15.93
24/07/2017 17:30	VN5	7.49	667.74	59.35	-69.8	19

Date	Location	pH	EC (µS/cm)	DO (%)	REDOX (mv)	Temperature (°C)
22/08/2017 11:20	VN5	7.52	618.27	65.71	32	19.16

APPENDIX H.2 LAB RESULTS

Location	Sample type	Date	pH	Electrical conductivity @ 20degC (w)	Alkalinity (carbonate)	Alkalinity (bicarbonate)	Alkalinity (total)	Total Dissolved Solids (w)	Ammoniacal nitrogen as N or NH4 (w)	Chloride (w)	Nitrite as N or NO2 (w)	Nitrate as N or NO3 (w)	Sulphate (w)	Calcium (dissolved)	Total dissolved iron	Magnesium (dissolved)	Potassium (0.1mg/l) (dissolved)	Sodium (0.5mg/l) (dissolved)	Total Suspended Solids (1mg/l) (w)
BH309R	Bedrock	03/03/2015	7.67	513		190	190	334	<0.3	49.5	<0.02	5.310	23.5	63.5	0.924	9.85	1.07	34.4	453
BH309R	Bedrock	10/06/2015	7.43	355	<2	74.5	74.5		0.975	43.8	0.074	7.770	17.5	34.2	0.189	8.29	<1	22	<9
BH309R	Bedrock	16/09/2015	7	357	<2	90	90	214	<0.3	43.3	0.155	7.070	17	33.4	<0.019	8.38	<1	23.7	123
BH309R	Bedrock	17/12/2015	7.94	299	<2	60	60	254	<0.3	41.9	<0.015	7.320	21.6	28.6	<0.019	6.49	<1	19.2	<4
BH309R	Bedrock	28/04/2016	7.5	505	<2	160	160	292	<0.3	49.7	0.019	7.79	27.5	61.3	<0.019	8.34	1.04	29.8	98.5
BH309R	Bedrock	04/08/2016	7.52	496	<2	160	160	333	0.352	48.6	<0.015	7.68	25	64.2	<0.019	8.77	<1	32.1	13
BH309R	Bedrock	26/10/2016	7.48	487	<2	160	160	325	<0.3	50.6	<0.015	7.07	23.8	62	<0.019	8.23	<1	30.4	24.5
BH309R	Bedrock	03/02/2017	7.57	478	<2	150	150	309	<0.3	48.8	<0.015	7.70	24.6		<0.019	9.21	<1	30.7	13.3
BH309R	Bedrock	09-May-17	7.86	487	<2	150	150	300	<0.3	50.4	<0.02	7.48	24.80	64.7	<0.019	8.85	1.14	31.20	21.7
BH309R	Bedrock	25/08/2017	7.78	461	<2	145	145	315	<0.3	51.6	<0.06	7.55	25.5	67.2	<0.019	9.14	1.63	32.7	15.5
BH310RD	Bedrock	24/07/2014	6.97	576		215	215	255	0.02	48.82	<0.03	1.760	36	16		9	1.6	66.7	
BH310RD	Bedrock	04/03/2015	7.53	633	<2	265	265	439	<0.3	56.9	<0.02	2.080	42.5	79.6	0.377	16.4	1.17	46.2	20.8
BH310RD	Bedrock	11/06/2015	7.77	669	<2	260	260	441	4.46	54.1	<0.015	2.300	42.3	72.6	0.276	15.3	1.13	42.4	13.5
BH310RD	Bedrock	18/12/2015	8.36	548	<2	220	220	304	<0.3	45.6	<0.015	1.690	35.6	58.7	<0.019	16.1	1.07	35.6	3.5
BH310RD	Bedrock	26/04/2016	7.35	633	<2	260	260	422	<0.3	55.2	<0.015	2.26	38.7	83	<0.019	17.5	1.18	50	24
BH310RD	Bedrock	02/08/2016	7.17	669	<2	260	260	425	<0.3	53.6	<0.015	2.21	43.1	83.9	<0.019	16.1	1.4	45.1	2.5
BH310RD	Bedrock	25/10/2016	7.18	658	<2	250	250	429	<0.3	55.7	<0.015	2.33	43.3	77.1	<0.019	16.2	1.02	44.3	4
BH310RD	Bedrock	31/01/2017	7.4	633	<2	255	255	421	<0.3	56.5	<0.015	2.15	43.6	79.7	<0.019	16.5	1.3	44.2	<2
BH310RD	Bedrock	23/08/2017	7.37	526	<2	230	230	379	<0.3	45.1	<0.06	1.50	34	63	<0.019	16.80	1.11	36.3	5.9
BH310RS	Bedrock	18/07/2014	8.14	665		245	245	295	0.03	59.65	<0.03	2.96	44	73		17	1.1	44.4	
BH310RS	Bedrock	04/03/2015	7.49	540	<2	230	230	368	<0.3	44.6	<0.02	1.46	32.4	60.9	0.113	17.1	<1	38.9	<6
BH310RS	Bedrock	11/06/2015	7.49	553	<2	230	230	372	1.32	44.8	<0.015	1.70	34.7	55.4	0.302	15.2	<1	34.5	15.5
BH310RS	Bedrock	15/09/2015	6.91	570	<2	220	220	321	<0.3	45.6	<0.015	1.67	33.6	61	<0.019	16.8	<1	39.2	37.9
BH310RS	Bedrock	18/12/2015	8.41	547	<2	200	200	350	<0.3	51	<0.015	3.59	36.9	58.9	<0.019	14.2	1.68	32.4	3.5
BH310RS	Bedrock	26/04/2016	7.38	561	<2	215	215	354	<0.3	45.6	<0.015	1.71	29.7	68.1	<0.019	18.5	1.51	43.9	4
BH310RS	Bedrock	02/08/2016	7	557	<2	220	220	364	<0.3	44.3	<0.015	1.76	33.9	53.1	<0.019	16.1	1.32	39.5	8.5
BH310RS	Bedrock	25/10/2016	7.24	546	<2	210	210	353	<0.3	46	<0.015	1.79	33.6	60.5	<0.019	16.6	<1	39.5	<2
BH310RS	Bedrock	31/01/2017	7.31	548	<2	230	230	369	<0.3	45.8	<0.015	1.82	33.2	61.6	<0.019	17.1	1.33	37	<2
BH310RS	Bedrock	23/08/2017	7.34	526	<2	215	215	370	<0.3	46.9	<0.06	1.79	34.9	62	<0.019	16.00	<1	36.8	<2
BH523RS	Bedrock	22/08/2017	7.66	281	<2	65	65	202	<0.3	33.8	<0.06	5.72	23.6	8.92	<0.019	9.90	<1	39.1	15.7
BH524R	Bedrock	01/07/2011	7.3	731			164	434	0.5	101	0	4.45	61	62.7	0	20.2	11	56.7	
BH524R	Bedrock	14/07/2014	7.77	624		137	137	372	0.1	100.69	0.03	4.14	48	64		14	1.3	46	
BH524R	Bedrock	27/11/2014	8.21	629			145		0.22	103	0.0115	4.36	44.4	63.8	<0.019	13.4	1.09	46	
BH524R	Bedrock	03/03/2015	7.86	629	<2	315	315	400	<0.3	99.8	0.060	4.41	44.7	82.3	1.53	13.8	1.03	42.5	793
BH524R	Bedrock	10/06/2015	7.97	609	<2	238	238	379	0.516	96.2	0.079	3.73	41.9	58.9	<0.019	12	1.98	39	409
BH524R	Bedrock	16/09/2015	8.23	595	<2	275	275	338	0.35	99.7	0.0560	3.86	43	60.5	<0.019	12.2	1.29	42.7	367
BH524R	Bedrock	15/12/2015	8.41	532	<2	190	190	328	<0.3	70.2	0.055	2.00	32.5	55.8	0.0363	12.7	8.49	32	372
BH524R	Bedrock	28/04/2016	7.99	644	<2	145	145	448	<0.3	106	0.051	4.72	46.7	64.8	<0.019	13.6	1.38	44.9	29.5
BH524R	Bedrock	02/08/2016	7.63	638	<2	140	140	435	<0.3	99.5	0.054	4.77	44.1	69.4	0.0465	13	1.67	45.7	44.5
BH524R	Bedrock	25/10/2016	7.59	625	<2	645	645	422	<0.3	103	0.037	3.95	42.4	68.1	0.0353	14.1	1.32	47.9	1770
BH524R	Bedrock	01/02/2017	8.19	610	<2	385	385	417	<0.3	101	<0.015	4.13	43	71.1	<0.019	15.2	2.33	46.7	636
BH524R	Bedrock	21/08/2017	7.56	663	<2	165	165	400	<0.3	86	<0.06	2.91	40.4	66.8	0.161	15.00	4.05	44.2	14.6

Location	Sample type	Date	pH	Electrical conductivity @ 20degC (w)	Alkalinity (carbonate)	Alkalinity (bicarbonate)	Alkalinity (total)	Total Dissolved Solids (w)	Ammoniacal nitrogen as N or NH4 (w)	Chloride (w)	Nitrite as N or NO2 (w)	Nitrate as N or NO3 (w)	Sulphate (w)	Calcium (dissolved)	Total dissolved iron	Magnesium (dissolved)	Potassium (0.1mg/l) (dissolved)	Sodium (0.5mg/l) (dissolved)	Total Suspended Solids (1mg/l) (w)
BH525R	Bedrock	01/07/2011	7.3	542			171	339	0	59	0	5.38	29	62.4	0	9.2	3	39.7	
BH525R	Bedrock	14/07/2014	7.27	562		172	172	425	0.14	69.41	<0.03	6.35	29	73		9	1.2	39.5	
BH525R	Bedrock	27/11/2014	7.7	593			205		<0.2	69.5	<0.05	5.33	28.5	76.3	<0.019	8.82	1.22	40.2	
BH525R	Bedrock	27/11/2014												78	<0.019	9.08	1.27	41.4	
BH525R	Bedrock	02/12/2014	6.52	34			35.4		<0.3	53.9	<0.05	7.89	20.1	24.9	<0.019	5.47	6.63	28.6	
BH525R	Bedrock	03/03/2015	7.41	601	<2	220	220	384	<0.3	70.6	<0.02	4.57	28.4	102	11.8	13.1	2.13	40.4	5080
BH525R	Bedrock	10/06/2015	8.01	620	<2	200	200	401	<0.3	71.3	<0.015	5.42	29.9	75	<0.019	8.43	1.02	37.1	463
BH525R	Bedrock	16/09/2015	8.09	585	<2	200	200	393	<0.3	69.7	<0.015	5.69	28	74.2	<0.019	8.23	1.22	37.1	496
BH525R	Bedrock	15/12/2015	7.79	562	<2	205	205	352	<0.3	75.1	0.018	5.31	30.1	80.2	<0.019	8.17	1.34	38.9	3720
BH525R	Bedrock	28/04/2016	7.79	587	<2	200	200	391	<0.3	69.5	<0.015	5.47	30.3	78.4	<0.019	9.03	1.35	39.9	243
BH525R	Bedrock	02/08/2016	7.41	606	<2	190	190	375	0.428	67.5	0.016	5.76	27.3	79.3	<0.019	7.84	2.41	40.7	186
BH525R	Bedrock	26/10/2016	7.41	595	<2	215	215	396	0.737	71.4	<0.015	4.29	24.7	74.6	<0.019	8.17	1.1	38.5	343
BH525R	Bedrock	01/02/2017	8.06	586	<2	210	210	373	0.417	70.2	<0.015	4.52	27.5	84.8	0.481	9.4	1.38	40.6	264
BH525R	Bedrock	11/05/2017	7.53	590	<2	195	195	381	<0.3	72.5	<0.02	5.06	29	75.6	<0.019	8.39	1.11	38.7	22.3
BH525R	Bedrock	25/08/2017	7.01	756	<2	350	350	651	2.67	76.3	0.02645	<0.07	24	82.9	0.161	9.50	3.14	41.9	120
BH526RD	Bedrock	01/07/2011	7.9	790			309	461	0.2	88	0	0.136	55	78.7	0.01	21.6	3.1	71.4	
BH526RD	Bedrock	23/07/2014	7.6	961		220	220	582	0.05	182.39	<0.03	<0.11	25	96		29	2.5	60.4	
VN5	FLUME	14/10/2015	7.66	0.669			300			55.7	<0.05	<0.3	26	89.3	0.146	17.1	1.43	31.5	10.5
VN5	FLUME	03/11/2015	8.32	637	<2	250	250	450	<0.2	83.4	<0.05	1.500	30.2	89.4	0.1	17.9	3.85	45.1	9
VN5	FLUME	13/01/2016	8.04	415	<2	145	145	248	<0.2	45.7	<0.05	5.010	23.3	50.9	0.0501	9.13	2.04	22.8	<2
VN5	FLUME	12/02/2015	7.88	525	<2	195	195	299	<0.2	55	<0.05	4.100	23.7	68.1	0.0434	12.7	1.84	30.3	5
VN5	FLUME	15/12/2015	7.85	478	<2	155	155	318	<0.2	54	<0.05	5.670	25.6	49.6	0.0634	9.76	2.94	25	<2
VN5	FLUME	09/02/2016	8.11	429	<2	160	160	277	<0.2	44.4	<0.05	3.130	20.2	50.8	0.0583	10.1	1.72	23.1	<2
VN5	FLUME	26/04/2016	7.23	566	<2	245	245	361	<0.2	50.6	<0.05	<0.3	<2	72.3	0.37	13.4	2.2	29	11800
VN5	FLUME	02/08/2016	7.25	0.713	<2	215	215	528	0.248	116	<0.05	<0.3	25.8	92.6	0.188	15.6	1.35	33.8	259
VN5	FLUME	25/10/2016	7.86	0.641	<2	250	250	445	<0.2	75.1	<0.05	1.7	32.1	80.8	0.227	15.9	1.92	35.7	26.5
VN5	FLUME	02/02/2017	7.85	498	<2	185	185	304	<0.2	54.8	<0.05	0.5376	26.1	67.8	0.102	5.22	1.01	35	7.25
VN1	FLUME	12/02/2015	7.53	341	<2	80	80	207	<0.2	58.8	<0.05	6.130	15.9	27.1	0.019	7.31	3.13	31.8	4
VN2	FLUME	12/02/2015	7.11	725	<2	155	155	480	<0.2	125	<0.05	35.400	57	73.2	0.019	18.5	3.88	54.4	20
VN1	FLUME	15/12/2015	7.35	323	<2	55	55	231	<0.2	61.9	<0.05	9.620	23.6	21.9	0.0606	5.94	3.38	27.1	<2
VN2	FLUME	15/12/2015	7.44	880	<2	165	165	622	<0.2	152	<0.05	39.000	62.3	88.6	<0.019	19.2	2.57	54	12.5
VN3	FLUME	15/12/2015	7.33	373	<2	95	95	264	<0.2	53.8	<0.05	10.300	20.9	33.4	0.0441	7.58	2.38	23.6	<2
VN4	FLUME	15/12/2015	7.91	495	<2	145	145	306	0.226	58	<0.05	10.700	32.7	57.5	<0.019	8.78	8.26	22.7	15
VN1	FLUME	13/01/2016	7.81	302	<2	65	65	178	<0.2	53.3	<0.05	8.970	21.5	22.1	0.0206	6.09	3.11	24.5	2
VN2	FLUME	13/01/2016	7.35	916	<2	130	130	612	<0.2	167	<0.05	51.800	74.1	82.1	<0.019	19.1	3.04	58.5	16
VN3	FLUME	13/01/2016	7.9	339	<2	80	80	213	<0.2	48.5	<0.05	11.000	15.3	28.5	<0.019	6.51	2.18	20.9	9.5
VN4	FLUME	13/01/2016	8.07	399	<2	140	140	266	<0.2	45.7	<0.05	4.590	27	51.4	<0.019	8.19	5.27	22.7	15.5
VN1	FLUME	09/02/2016	7.91	340	<2	70	70	214	<0.2	60.1	0.051	11.200	21.9	26.9	0.146	7.97	2.75	29.1	<2
VN2	FLUME	09/02/2016	7.38	841	<2	135	135	651	<0.2	161	<0.05	47.500	65.3	81.5	<0.019	17.1	2.81	58.7	360
VN3	FLUME	09/02/2016	8.07	378	<2	120	120	258	<0.2	48	0.06	7.410	15.8	41.7	0.0312	10.3	2.46	23.4	497
VN4	FLUME	09/02/2016	8.04	433	<2	160	160	271	<0.2	46.6	0.054	6.990	24	61.6	<0.019	10.5	5.79	23.6	327
VN1	FLUME	26/04/2016	7.64	334	<2	80	80	217	<0.2	55	<0.05	0.778	23.6	29.9	0.0241	7.63	<1	27.1	16

Location	Sample type	Date	pH	Electrical conductivity @ 20degC (w)	Alkalinity (carbonate)	Alkalinity (bicarbonate)	Alkalinity (total)	Total Dissolved Solids (w)	Ammoniacal nitrogen as N or NH4 (w)	Chloride (w)	Nitrite as N or NO2 (w)	Nitrate as N or NO3 (w)	Sulphate (w)	Calcium (dissolved)	Total dissolved iron	Magnesium (dissolved)	Potassium (0.1mg/l) (dissolved)	Sodium (0.5mg/l) (dissolved)	Total Suspended Solids (1mg/l) (w)
VN2	FLUME	26/04/2016	7.79	496	<2	190	190	321	<0.2	49.7	<0.05	1.24	22.8	63.1	0.0999	11.7	<1	27.1	10
VN2	FLUME	02/08/2016	7.02	769	<2	150	150	568	0.249	134	<0.05	33.4	53.7	79.4	0.0466	17.6	4.24	58.2	176
VN2	FLUME	25/10/2016	7.54	761	<2	150	150	548	<0.2	139	<0.05	36	56.3	75	<0.019	18.1	3.71	52.4	3
VN1	FLUME	01/02/2017	7.47	487	<2	75	75	336	<0.2	107	0.131	5.65	29.6	33.5	0.0453	8.26	5.52	59.1	9.85
VN2	FLUME	01/02/2017	7.22	736	<2	165	165	485	<0.2	119	<0.05	28.8	53.9	79.4	<0.019	16.8	<1	59.5	115
VN3	FLUME	01/02/2017	7.8	455	<2	150	150	302	<0.2	52.5	<0.05	10.3	29.2	55.4	0.0323	12.7	4.53	33	75.7
VN2	Flume	10/05/2017	7.21	0.703	<2	160	160	482	<0.2	120	<0.05	27.5	52.5	72.3	3.71	18.1		54.5	55.8
VN2	Flume	21/08/2017	7.02	0.711	<2	170	170	477	<0.2	-	<0.04	-	-	74.6	<0.019	17.6	3.51	52.6	<2
VN5	Flume	09/05/2017	7.82	0.59	<2	230	230	392	<0.2	64.3	<0.05	0.433	32.5	83.6	0.15	15.6	<1	35.1	4.9
VN5	Flume	22/08/2017	7.81	0.563	<2	235	235	373	<0.2	68.3	<0.05	0.773	20.4	79.6	0.136	14.3	1.77	33.8	2.3
PZ1	PIEZOMETER	04/11/2015	6.81	688	<2	170	170	501	0.918	104	<0.5	<0.3	47.1	79.4	0.155	11.5	3.07	40.3	6300
PZ2	PIEZOMETER	04/11/2015	7.02	809	<2	245	245	669	1.12	137	<0.5	<0.3	<2	99.5	1.4	17.3	2.82	69.1	14000
PZ3	PIEZOMETER	04/11/2015	7.33	626	<2	268	268	412	<0.2	68.6	<0.05	<0.3	<2	95.7	0.0837	15.1	1	39	3700
PZ4	PIEZOMETER	04/11/2015	6.77	784	<2	395	395	576	1.04	53.6	<0.5	<3	33.8	154	21.8	14.2	1.63	29.6	51300
PZ5	PIEZOMETER	04/11/2015	7.39	685	<2	345	345	456	0.27	41.9	<0.05	<0.3	16.8	114	0.0549	20.1	<1	29.8	4640
PZ6	PIEZOMETER	04/11/2015	7.29	842	<2	372	372	579	1.44	54.7	<0.5	<3	36.2	148	3.45	18.6	2.18	33.2	8600
PZ7	PIEZOMETER	04/11/2015	7.04	689	<2	339	339	526	<0.2	63.7	<0.05	<0.3	<2	103	<0.019	16	<1	32.4	328
PZ8x	PIEZOMETER	04/11/2015	7.55	514	<2	219	219	369	<0.2	52.2	<0.05	<0.3	<2	76.6	<0.019	12.2	1	33.6	1860
PZ1	PIEZOMETER	14/12/2015	6.8	423	<2	200	200	315	2.77	58.1	<0.5	0.372	<2	61.2	2.98	7.21	4.46	27.4	3880
PZ2	PIEZOMETER	14/12/2015	7.04	811	<2	340	340	706	1.49	133	<0.5	<0.3	<2	120	6.31	18.2	3.7	61.3	8440
PZ3	PIEZOMETER	14/12/2015	6.92	627	<2	315	315	447	<0.2	69.6	<0.5	<0.3	<2	102	0.0473	14.4	<1	38.2	8160
PZ4	PIEZOMETER	14/12/2015	7.17	763	<2	500	500	546	0.25	41.2	<0.5	<0.3	<2	165	10.1	13.7	<1	23.5	11100
PZ5	PIEZOMETER	14/12/2015	7.36	595	<2	345	345	399	0.296	46.5	<0.05	0.482	9.9	102	0.15	17	1.16	31.9	9500
PZ6	PIEZOMETER	14/12/2015	7.19	694	<2	430	430	503	1.14	45	<0.5	0.378	<2	130	1.47	16.1	<1	24.2	9900
PZ7	PIEZOMETER	14/12/2015	7.38	671	<2	355	355	505	0.392	73.6	<0.5	<0.3	<2	106	0.213	16.1	1.09	39.6	5020
PZ8x	PIEZOMETER	14/12/2015	7.14	520	<2	250	250	296	13.4	55.5	<0.05	0.358	<2	71.3	<0.019	11.1	<1	35.2	2060
PZ1	PIEZOMETER	11/01/2016	6.6	500	<2	220	220	352	3.34	55.3	<1	<0.3	<2	68.9	2.34	9.16	1.62	28	13700
PZ2	PIEZOMETER	11/01/2016	7.02	971	<2	355	355	784	0.224	127	<0.05	<3	<20	113	4.69	18.8	<1	64.7	57
PZ3	PIEZOMETER	11/01/2016	6.77	650	<2	320	320	482	<0.2	69.9	<0.05	<0.3	<2	103	0.722	14	<1	37.7	9830
PZ4	PIEZOMETER	11/01/2016	6.98	807	<2	465	465	571	0.289	36.6	<0.05	<0.3	<2	156	<0.019	13.5	<1	22.1	2980
PZ5	PIEZOMETER	11/01/2016	7.35	669	<2	320	320	435	<0.2	41.4	<1	<0.3	16.6	99.9	0.0194	16.9	<1	28.5	4230
PZ6	PIEZOMETER	11/01/2016	6.97	790	<2	420	420	542	0.962	41.4	<1	<0.3	<2	137	0.817	16.9	<1	26.1	2960
PZ7	PIEZOMETER	11/01/2016	7	756	<2	360	360	503	0.51	65.8	<1	<0.3	<2	112	0.0298	17.1	<1	36.6	3200
PZ8x	PIEZOMETER	11/01/2016	6.99	560	<2	245	245	337	<0.2	50.1	<0.05	<0.3	<2	70.3	0.777	11.2	<1	30.6	36.5
PZ1	PIEZOMETER	08/02/2016	6.68	559	<2	250	250	415	3.32	74.9	<0.05	<0.3	<2	77.2	1.05	15.8	1.11	32.1	3960
PZ2	PIEZOMETER	08/02/2016	7.05	930	<2	340	340	710	0.25	142	<0.05	<0.3	<2	105	8.75	18.5	<1	62.4	143
PZ3	PIEZOMETER	08/02/2016	7.11	672	<2	320	320	459	<0.2	67.9	<0.05	<0.3	<2	92.4	0.0979	16.5	<1	36.6	1990
PZ4	PIEZOMETER	08/02/2016	7.18	709	<2	440	440	468	0.246	38.1	<0.5	<0.3	<2	137	12.7	30.8	<1	20.2	2500
PZ5	PIEZOMETER	08/02/2016	7.7	643	<2	315	315	420	<0.2	42.8	<0.05	<0.3	20.2	89.7	<0.019	20.9	1.01	26.4	610
PZ6	PIEZOMETER	08/02/2016	7.25	721	<2	415	415	512	1.05	43.1	<0.5	<0.3	<2	128	0.928	22	<1	24.8	2450
PZ7	PIEZOMETER	08/02/2016	6.87	724	<2	365	365	533	0.219	66	<0.05	<0.3	<2	105	0.0689	19.4	<1	33.8	464
PZ8X	PIEZOMETER	08/02/2016	7.16	534	<2	250	250	353	<0.2	51.9	<0.05	<0.3	<2	71.9	0.135	13.2	<1	30.8	476

Location	Sample type	Date	pH	Electrical conductivity @ 20degC (w)	Alkalinity (carbonate)	Alkalinity (bicarbonate)	Alkalinity (total)	Total Dissolved Solids (w)	Ammoniacal nitrogen as N or NH4 (w)	Chloride (w)	Nitrite as N or NO2 (w)	Nitrate as N or NO3 (w)	Sulphate (w)	Calcium (dissolved)	Total dissolved iron	Magnesium (dissolved)	Potassium (0.1mg/l) (dissolved)	Sodium (0.5mg/l) (dissolved)	Total Suspended Solids (1mg/l) (w)
PZ1	PIEZOMETER	25/04/2016	6.83	47	<2	220	220	416	<0.2	74.6	<0.05	<0.3	<2	83.2	1.44	11	1.27	35.5	2880
PZ2	PIEZOMETER	25/04/2016	7.11	804	<2	355	355	737	1.73	132	<0.05	<0.3	<2	114	17.2	20.2	<1	67.3	89
PZ3	PIEZOMETER	25/04/2016	6.92	634	<2	330	330	473	<0.2	65.1	<0.05	<0.3	<2	92.6	16.2	15.2	<1	37.9	1500
PZ4	PIEZOMETER	25/04/2016	7.11	693	<2	445	445	523	<0.2	38.1	<0.05	<0.3	<2	138	33.8	13	<1	20.9	1390
PZ5	PIEZOMETER	25/04/2016	7.52	64	<2	325	325	443	<0.2	43.7	<0.05	<0.3	26.5	98.4	0.154	17.3	<1	27.8	1150
PZ6	PIEZOMETER	25/04/2016	7.07	669	<2	420	420	513	0.788	42.6	<0.05	<0.3	<2	127	6.64	16.8	<1	25.2	1200
PZ7	PIEZOMETER	25/04/2016	7.15	706	<2	385	385	535	<0.2	65.6	<0.05	<0.3	<2	114	4.78	18.9	<1	36.5	65.5
PZ8X	PIEZOMETER	25/04/2016	6.8	489	<2	265	265	380	<0.2	54.1	<0.05	<0.3	<2	70.1	10.9	11.5	<1	31.3	2910
PZ3	PIEZOMETER	02/08/2016	8.05	643	<2	300	300	459	<0.2	65.4	<0.05	<0.3	<2	90.2	1.63	14.6	<1	35.3	201
PZ5	PIEZOMETER	02/08/2016	8.18	611	<2	320	320	424	<0.2	41.1	<1	<0.3	21.4	97.4	24.7	14.9	<1	34.9	3320
PZ6	PIEZOMETER	02/08/2016	6.99	76	<2	435	435	528	1.07	43.3	<0.05	<0.3	<2	147	15.4	16.6	<1	25.4	455
PZ7	PIEZOMETER	02/08/2016	6.9	785	<2	395	395	545	1.09	64.1	<0.05	<0.3	<2	127	8.94	18.4	<1	36.9	179
PZ8X	PIEZOMETER	02/08/2016	6.84	519	<2	240	240	351	0.361	50.3	<0.05	<0.3	<2	76.8	16.2	10.9	<1	31.3	174
PZ1	PIEZOMETER	26/10/2016	6.77	634	<2	275	275	520	3.82	79.7	<0.05	<0.3	<2	88.1	2.65	11.8	1.86	36	499
PZ2	PIEZOMETER	26/10/2016	6.96	786	<2	335	335	670	3.56	107	<0.05	<0.3	<2	161	4.13	12.1	<1	24.3	3090
PZ4	PIEZOMETER	26/10/2016	7.44	736	<2	415	415	553	0.994	45.6	<0.05	<0.3	<2	162	4.15	12.2	<1	25.3	5920
PZ5	PIEZOMETER	26/10/2016	7.46	652	<2	345	345	444	0.311	43.4	<0.05	<0.3	11.2	99.8	0.0664	17.2	<1	27.4	250
PZ3	PIEZOMETER	25/10/2016	7.04	662	<2	315	315	459	<0.2	67.9	<0.05	<0.3	<2	93.3	26.7	15	<1	35.8	384
PZ6	PIEZOMETER	25/10/2016	7.26	74	<2	420	420	518	1.21	43.5	<0.05	<0.3	<2	130	19.3	17	<1	24.1	1300
PZ7	PIEZOMETER	25/10/2016	7.11	777	<2	395	395	546	0.418	65.9	<0.05	<0.3	<2	115	11.7	18.7	<1	33.5	119
PZ8X	PIEZOMETER	25/10/2016	7.35	537	<2	260	260	356	<0.2	52.8	<0.05	<0.3	<2	74.2	15.3	11.9	<1	30.2	105
PZ1	PIEZOMETER	01/02/2017	7.35	641	<2	280	280	452	7.39	75.7	<0.05	<0.3	<2	97.5	1.68	12.8	2.47	42.8	62.3
PZ2	PIEZOMETER	02/02/2017	7.46	778	<2	335	335	536	1.69	99.6	0.12	<0.3	<2	120	1.21	20.8	1.56	57.3	225
PZ3	PIEZOMETER	01/02/2017	6.88	627	<2	280	280	395	<0.2	62.9	<0.05	<0.3	<2	91.9	18.3	15	<1	38.4	269
PZ4	PIEZOMETER	02/02/2017	7.83	892	<2	495	515	575	<0.2	41.5	<0.05	<0.3	<2	199	0.968	14.3	<1	27.6	197
PZ5	PIEZOMETER	02/02/2017	7.64	657	<2	320	320	429	<0.2	45	<0.05	<0.3	24.5	108	0.041	18.3	<1	30.7	41.1
PZ6	PIEZOMETER	01/02/2017	6.96	72	<2	395	395	482	0.821	41.5	<0.05	<0.3	<2	135	16.8	18.3	<1	24.6	276
PZ7	PIEZOMETER	01/02/2017	7.08	784	<2	410	410	553	<0.2	63.7	<0.05	<0.3	<2	139	13.9	21.6	<1	39.3	71.2
PZ1	PIEZOMETER	09/05/2017	7.08	0.653	<2	270	270	478	3.22	83.3	<0.05	<0.3	<2	82.2	1.85	14.7	2.55	45.3	66.7
PZ1	PIEZOMETER	21/08/2017	6.71	0.701	<2	330	330	461	<0.2	70.7	0.143	2.14	<2	103	45.5	17	<1	39.5	276
PZ2	PIEZOMETER	09/05/2017	7.19	0.807	<2	340	340	593	1.6	108	<0.05	0.705	<2	109	2.32	18.1	1.12	50.4	16.5
PZ3	PIEZOMETER	09/05/2017	6.88	0.627	<2	290	290	423	<0.2	66.7	<0.05	<0.3	<2	89.5	38.3	15.1	<1	36.9	198
PZ3	PIEZOMETER	21/08/2017	6.71	0.701	<2	330	330	461	<0.2	70.7	0.143	2.14	<2	103	45.5	17	<1	39.5	276
PZ4	PIEZOMETER	09/05/2017	6.88	0.627	<2	290	290	423	<0.2	66.7	<0.05	<0.3	<2	89.5	38.3	15.1	<1	36.9	198
PZ4	PIEZOMETER	21/08/2017	7.02	0.808	<2	450	450	528	0.416	35.6	<0.05	<0.3	<2	177	14.9	12.8	<1	25.6	83.2
PZ5	PIEZOMETER	09/05/2017	7.56	0.683	<2	355	355	438	<0.2	46	<0.05	<0.3	14.3	133	2	18	<1	31.7	111
PZ6	PIEZOMETER	09/05/2017	7.56	0.683	<2	355	355	438	<0.2	46	<0.05	<0.3	14.3	133	2	18	<1	31.7	111
PZ6	PIEZOMETER	25/08/2017	-	-	-	-	-	-	1.09	-	<0.05	-	-	136	35.2	17.4	1.65	27.2	-
PZ7	PIEZOMETER	09/05/2017	7.12	0.813	<2	410	410	548	0.5	66.1	0.06	<1	<2	69.6	5.41	10.3	<1	18.1	325
PZ7	PIEZOMETER	21/08/2017	6.81	0.809	<2	400	400	509	0.313	-	<0.04	-	-	122	25.2	20.1	<1	36.2	122
PZ8X	PIEZOMETER	09/05/2017	7.03	0.587	<2	270	270	360	<0.2	52.5	<0.05	<0.3	<2	84.5	22.8	13.6	<1	32.8	94.8
PZ8X	PIEZOMETER	01/02/2017	6.9	55	<2	255	255	343	<0.2	51.2	<0.05	<0.3	<2	88	19.4	13.2	<1	34.3	65.2
TGSW8	SEEP	12/02/2015	7.23	482	<2	215	215	312	1.34	44.3	<0.05	0.438	13.1	68.9	0.332	10.6	2.93	24	2780

Location	Sample type	Date	pH	Electrical conductivity @ 20degC (w)	Alkalinity (carbonate)	Alkalinity (bicarbonate)	Alkalinity (total)	Total Dissolved Solids (w)	Ammoniacal nitrogen as N or NH4 (w)	Chloride (w)	Nitrite as N or NO2 (w)	Nitrate as N or NO3 (w)	Sulphate (w)	Calcium (dissolved)	Total dissolved iron	Magnesium (dissolved)	Potassium (0.1mg/l) (dissolved)	Sodium (0.5mg/l) (dissolved)	Total Suspended Solids (1mg/l) (w)
SPRING A	SPRING	15/12/2015	8.34	686	<2	190	190	445	<0.2	107	<0.05	11.900	41.7	57.5	<0.019	13.7	7.05	53	121
SPRING B	SPRING	15/12/2015	7.46	383	<2	65	65	236	<0.2	65.7	<0.05	7.250	23.9	30.4	0.0751	6.5	3.2	28	41.5
SPRING C	SPRING	15/12/2015	7.75	351	<2	55	55	255	<0.2	49.4	<0.05	30.800	25.1	30.8	<0.019	6.57	<1	20.8	<2
SPRING D	SPRING	15/12/2015	7.33	546	<2	150	150	364	<0.2	65.6	<0.05	21.500	35.4	63	<0.019	9.05	10.9	23	16
SPRING E	SPRING	16/12/2015	7.62	246	<2	50	50	189	0.268	46	<0.05	4.33	22.1	18.2	0.361	6.19	<1	21.6	7
SPRING A	SPRING	13/01/2016	7.83	655	<2	145	145	400	<0.2	117	<0.05	14.400	44	45.8	<0.019	12.1	7	59.5	81.5
SPRING B	SPRING	13/01/2016	7.7	614	<2	85	85	391	<0.2	115	<0.05	31.700	44.5	46.7	<0.019	10.4	3.38	45	2
SPRING C	SPRING	13/01/2016	7.44	334	<2	50	50	211	<0.2	50.6	<0.05	26.900	23.1	27.5	<0.019	5.64	<1	20.4	2.5
SPRING D	SPRING	13/01/2016	7.59	439	<2	130	130	275	<0.2	54.2	<0.05	10.800	28.4	49	<0.019	7.19	8.21	21.2	115
SPRING E	SPRING	13/01/2016	7.3	236	<2	35	35	144	<0.2	45.9	<0.05	1.940	7	14.4	0.157	5.17	<1	18.9	124
SPRING A	SPRING	12/02/2015	7.81	595	<2	165	165	397	<0.2	87.8	<0.05	18.700	39.8	56.6	0.019	14.1	6.38	50.2	23.4
SPRING E	SPRING	12/02/2015	6.78	301	<2	60	60	132	0.219	46.6	<0.25	7.560	12.2	21.3	0.266	7.91	1.32	23.2	2670
SPRING C	SPRING	12/02/2015	7.05	337	<2	65	65	202	<0.2	44	<0.05	1.857	19.1	35.7	0.019	7.26	0	23.1	39
SPRING D	SPRING	12/02/2015	7.22	606	<2	215	215	330	<0.2	63.4	<0.05	7.250	46.6	85.3	0.019	11.6	12.9	30.1	21.9
SPRING A	SPRING	09/02/2016	8.01	626	<2	140	140	405	<0.2	107	<0.05	12.400	41.3	46.7	<0.019	13.2	7.52	62	203
SPRING B	SPRING	09/02/2016	7.78	441	<2	95	95	298	<0.2	72	<0.05	12.100	28.2	40.2	0.198	8.45	2.76	35.8	7
SPRING C	SPRING	09/02/2016	7.42	313	<2	55	55	242	<0.2	46.3	<0.05	27.700	18.7	30.9	<0.019	6.11	<1	22.3	<2
SPRING D	SPRING	09/02/2016	7.56	473	<2	155	155	312	<0.2	50.5	<0.05	14.400	27.4	60.1	<0.019	9.33	7.88	24.3	320
SPRING E	SPRING	09/02/2016	7.46	291	<2	55	55	205	<0.2	51	<0.05	7.540	15.8	22.6	0.061	4.11	2.11	25	582
SPRING A	SPRING	26/04/2016	7.17	616	<2	150	150	380	<0.2	96.4	<0.05	8.28	42.3	52	0.0884	12.9	8.73	70.7	3550
SPRING B	SPRING	26/04/2016	7.26	579	<2	175	175	383	<0.2	84.1	<0.05	<0.3	32.4	58.2	0.153	10.3	<1	39.9	125
SPRING C	SPRING	26/04/2016	6.93	326	<2	65	65	225	<0.2	42.8	<0.05	28.1	21.4	29.9	<0.019	6.06	<1	20.2	6
SPRING D	SPRING	26/04/2016	6.83	611	<2	220	220	409	0.543	56.1	<0.5	0.656	40.2	68.5	0.108	9.31	11.6	27.6	21000
SPRING E	SPRING	26/04/2016	7.03	347	<2	75	75	213	<0.2	53.7	<0.05	1.4	24.6	29.8	<0.019	8.06	<1	27.3	429
SPRING A	SPRING	01/02/2017	7.66	627	<2	175	175	411	<0.2	94.8	<0.05	11	44	65.9	<0.019	16.6	7.01	54.6	33.7
SPRING B	SPRING	01/02/2017	7.12	517	<2	150	150	360	<0.2	87.7	<0.05	3.41	27.2	62.1	2.24	10.6	4.96	42.6	37.4
SPRING C	SPRING	01/02/2017	6.9	332	<2	75	75	230	<0.2	41.2	<0.05	30.1	23.9	40.5	<0.019	7.31	<1	25.1	115
SPRING D	SPRING	31/01/2017	7.41	558	<2	185	185	430	0.242	63.2	0.111	30	36	80.5	0.111	9.4	19.9	25.3	37.3
SPRING E	SPRING	31/01/2017	7.45	51	<2	65	65	354	<0.2	136	<0.05	6.08	27.6	25.6	0.15	7.13	2.69	69.5	17.7
Spring A	Spring	22/08/2017	7.55	0.626	<2	190	190	445	0.834	98.4	0.236	4.1	31.3	54.5	0.128	13.1	7.59	56	26.7
Spring C	Spring	09/05/2017	7.11	0.387	<2	150	150	264	0.254	46	0.129	28	25	38.8	<0.019	7.81	1.01	24.2	170
Spring D	Spring	22/08/2017	7.77	0.615	<2	245	245	415	<0.2	64.1	<0.05	1.16	30.9	86.5	0.033	11	22.7	30.7	2.4
BH524CP	Superficial	01/07/2011	7.4	884			317	626	4.4	68	<0.03	2.24	102	79.1	-	24	68.6	40.3	
BH525CP	Superficial	01/07/2011	7	463			154	296	0	48	0	6.40	30	45	0	13.9	5.3	33	
BH526CP	Superficial	01/07/2011	7.8	816			324	490	0.6	72	0	0.72	68	80.8	0	24.1	4	68.9	
BH526RS	Superficial	01/07/2011	8	763			329	495	0.1	72	0.09	0.20	41	84.5	0	21.3	2.5	56.9	
BH524CP	Superficial	14/07/2014	7.52	839		314	314	627	9.5	50.33	<0.03	0.48	88	88	-	24	66.8	21.5	
BH525CP	Superficial	14/07/2014	6.3	354		49	49	268	0.09	56.19	<0.03	7.49	20	28	-	6	6.4	30.5	
BH310CP	Superficial	16/07/2014	6.65	570		240	240	263	0.03	41.25	<0.03	0.66	28	76	-	16	3.5	27	
BH526CP	Superficial	16/07/2014	7.53	618		279	279	421	0.34	52.21	<0.03	<0.11	27	66	-	22	2.3	42.4	
BH526RS	Superficial	23/07/2014	7.81	719		280	280	519	0.27	67.1	<0.03	<0.11	36	84	-	20	2.1	49.5	
BH526RS	Superficial	27/11/2014	8.08	678			305	-	0.387	65.5	<0.05	<0.3	33.8	71.2	<0.019	17.6	2	44.6	

Location	Sample type	Date	pH	Electrical conductivity @ 20degC (w)	Alkalinity (carbonate)	Alkalinity (bicarbonate)	Alkalinity (total)	Total Dissolved Solids (w)	Ammoniacal nitrogen as N or NH4 (w)	Chloride (w)	Nitrite as N or NO2 (w)	Nitrate as N or NO3 (w)	Sulphate (w)	Calcium (dissolved)	Total dissolved iron	Magnesium (dissolved)	Potassium (0.1mg/l) (dissolved)	Sodium (0.5mg/l) (dissolved)	Total Suspended Solids (1mg/l) (w)
BH524CP	Superficial	02/12/2014	8.01	734			250	-	4.05	61.5	<0.05	2.15	63.5	68.3	<0.019	19.4	39.1	32.8	
BH524CP	Superficial	02/12/2014	7.72	715			235	-	3.63	67.3	<0.05	2.55	63.6	67.4	<0.019	19.7	35.1	36.6	
BH526CP	Superficial	02/12/2014	8.26	665			275	-	0.422	56.4	<0.05	<0.3	31.4	64.9	<0.019	22.6	3.04	50.7	
BH524CP	Superficial	01/07/2011	7	706			117	447	0.7	102	0	5.99	63	47	0	21.5	13	59.8	
BH310CP	Superficial	03/03/2015	7.16	493	10	205	215	348	<0.3	37.9	<0.02	0.62	24.7	68.5	1.02	13.7	3.3	23.1	125
BH524CP	Superficial	03/03/2015	7.72	751	<2	245	245	501	3.97	77.2	<0.02	3.48	72.3	117	54.2	25.2	32.7	40.4	4350
BH525CP	Superficial	03/03/2015	7.02	313	<2	50	50	239	0.482	48.3	<0.02	6.55	17.7	27.3	4.83	7.08	5.91	28	1240
BH309CP	Superficial	04/03/2015	6.96	334	<2	90	90	226	0.334	41.1	<0.02	6.76	15	35.4	0.619	8.53	<1	22.4	112
BH309CP	Superficial	10/06/2015	7.86	518	<2	155	155	324	0.319	50.5	<0.015	8.02	25.3	61.6	<0.019	8.19	<1	30	21
BH524CP	Superficial	10/06/2015	7.74	832	<2	360	360	556	4.62	80.9	<0.015	3.91	84.3	65.5	0.14	18.9	36.3	41.1	5040
BH525CP	Superficial	10/06/2015	7.71	344	<2	50.2	50.2	246	<0.3	56.9	<0.015	7.25	23	25.8	<0.019	5.52	5.21	26.8	640
BH310CP	Superficial	11/06/2015	7.26	530	<2	225	225	352	0.595	37.3	<0.015	0.65	26.1	63.5	<0.019	12.1	2.94	21.1	254
BH310CP	Superficial	15/09/2015	7.03	577	<2	245	245	337	<0.3	39.6	<0.015	0.82	26.8	71.1	<0.019	13.8	3.12	25.3	134
BH309CP	Superficial	16/09/2015	6.98	406	<2	110	110	248	<0.3	44.7	<0.015	7.82	24.3	45.5	0.0387	8.88	<1	23.5	12500
BH524CP	Superficial	16/09/2015	7.91	767	<2	280	280	483	6.09	47.8	<0.015	1.04	83.1	75.9	0.133	19.1	52.4	25.7	9670
BH525CP	Superficial	16/09/2015	7.83	15.6	<2	65	65	135	<0.3	49.6	<0.015	5.99	22.4	26.7	<0.019	6.03	5.53	28.7	1560
BH524CP	Superficial	15/12/2015	7.67	678	<2	190	190	458	1.81	109	<0.015	3.21	50.1	1.77	0.21	18.4	<1	1.61	8760
BH525CP	Superficial	15/12/2015	7.14	296	<2	23.5	23.5	213	<0.3	69.5	<0.015	7.54	15.1	24.2	<0.019	5.19	5.48	26.3	652
BH309CP	Superficial	17/12/2015	7.89	301	<2	70	70	250	<0.3	42.4	<0.015	6.84	26.9	29.5	<0.019	6.34	<1	18.3	624
BH310CP	Superficial	18/12/2015	8.38	546	<2	225	225	333	<0.3	45.7	0.025	1.40	34.2	70.5	0.0267	12.2	6.41	24	23.5
BH526CP	Superficial	04/03/2015	7.73	582	<2	490	490	485	0.942	46.5	<0.02	<0.07	23.6	174	28.6	41.7	3.83	40.1	3730
BH526RS	Superficial	04/03/2015	7.76	908	<2	200	200	673	<0.3	177	<0.02	<0.07	23.1	88.8	0.243	25.3	2.15	54.5	<4
BH526CP	Superficial	11/06/2015	8.26	613	<2	270	270	407	0.464	52.5	<0.015	<0.07	33.3	55.8	0.0291	19.6	2.26	42.8	89
BH526RS	Superficial	11/06/2015	8.09	689	<2	280	280	428	0.489	67.9	<0.015	<0.07	35.3	77.5	0.254	19.1	1.88	43.7	<2
BH526CP	Superficial	15/09/2015	7.7	605	<2	260	260	348	0.334	45.8	<0.015	<0.07	24.2	65	0.174	19.8	2.13	38.3	279
BH526RS	Superficial	15/09/2015	7.62	692	<2	280	280	420	0.351	65.9	<0.015	<0.07	36.6	73.7	0.161	17.7	1.86	45.2	20
BH526CP	Superficial	18/12/2015	8.44	609	<2	315	315	360	0.557	50.8	<0.015	0.071	31.8	58.7	0.214	20.2	2.42	41.2	1930
BH526RS	Superficial	18/12/2015	8.44	670	<2	280	280	327	0.346	64	<0.015	<0.06	36.3	73.5	0.211	17.6	1.94	43.6	4.5
BH526RS	Superficial	26/04/2016	7.92	694	<2	275	275	429	0.426	64.2	<0.015	0.11	30.5	1.61	<0.019	0.352	<1	1.02	7
BH526CP	Superficial	26/04/2016	7.93	603	<2	390	390	388	0.452	50.6	<0.015	<0.07	25.9	<0.012	<0.019	<0.036	<1	<0.076	4750
BH310CP	Superficial	26/04/2016	7.38	508	<2	210	210	330	<0.3	41.7	<0.015	1.27	20.8	76.8	<0.019	14.9	4.42	29.1	45
BH309CP	Superficial	28/04/2016	7.02	320	<2	75	75	232	<0.3	39.8	<0.015	23.5	15	30.7	<0.019	7.58	1.05	20.4	2390
BH525CP	Superficial	28/04/2016	6.84	306	<2	37	37	218	<0.3	52.6	<0.015	5.65	22.4	23.1	<0.019	5.26	6.22	28.9	1130
BH524CP	Superficial	28/04/2016	7.73	677	<2	1640	1640	429	3.36	57.6	<0.015	1.3	57.1	54.2	1	15.1	30.5	36.4	11800
BH526RS	Superficial	02/08/2016	7.64	680	<2	275	275	422	0.399	62.1	<0.015	<0.07	34.3	83.6	0.19	18.6	2.2	47.7	<2
BH526CP	Superficial	02/08/2016	7.68	605	<2	310	310	434	0.631	49.8	<0.015	0.1	34	66.1	0.308	20.2	5.15	49.8	6620
BH310CP	Superficial	02/08/2016	7.07	539	<2	230	230	376	<0.3	40.3	<0.015	1.29	27	76.1	<0.019	13.8	3.58	25.7	22.5
BH309CP	Superficial	04/08/2016	7.05	356	<2	85	85	260	<0.3	47.2	<0.015	7.73	18.7	39	0.0368	9.19	<1	25.5	2420
BH525CP	Superficial	02/08/2016	6.81	328	<2	60	60	218	<0.3	50.4	<0.015	5.4	19.9	27.2	<0.019	5.33	6.15	28.9	5090
BH524CP	Superficial	02/08/2016	7.56	792	<2	680	680	514	6.7	36.6	<0.015	0.36	86.3	86.2	1.11	19.1	55.7	25.9	4620
BH310CP	Superficial	25/10/2016	7.2	551	<2	230	230	349	<0.3	40.2	<0.015	1.13	27.1	71.5	<0.019	13.8	3.21	25.4	32
BH524CP	Superficial	25/10/2016	7.49	79	<2	500	500	514	7.08	37.8	<0.015	0.39	82.5	78.9	0.893	19.4	62	24.1	2530
BH526RS	Superficial	25/10/2016	7.61	661	<2	275	275	428	0.36	66.5	<0.015	<0.07	35	75.5	0.174	18.4	1.8	46.7	<2

Location	Sample type	Date	pH	Electrical conductivity @ 20degC (w)	Alkalinity (carbonate)	Alkalinity (bicarbonate)	Alkalinity (total)	Total Dissolved Solids (w)	Ammoniacal nitrogen as N or NH4 (w)	Chloride (w)	Nitrite as N or NO2 (w)	Nitrate as N or NO3 (w)	Sulphate (w)	Calcium (dissolved)	Total dissolved iron	Magnesium (dissolved)	Potassium (0.1mg/l) (dissolved)	Sodium (0.5mg/l) (dissolved)	Total Suspended Solids (1mg/l) (w)
BH526CP	Superficial	25/10/2016	7.73	602	<2	310	310	389	0.37	53.3	<0.015	<0.07	30.7	58.3	0.119	21.1	2.28	45.6	1450
BH309CP	Superficial	26/10/2016	7.06	384	<2	100	100	258	<0.3	49.6	<0.015	8.34	20.5	38.3	<0.019	8.76	<1	24.6	980
BH525CP	Superficial	26/10/2016	6.71	333	<2	75	75	249	<0.3	54.5	<0.015	6.01	22.5	28.1	0.085	6.04	6.21	30.5	9200
BH526CP	Superficial	31/01/2017	7.88	583	<2	560	560	382	0.458	53.8	<0.015	<0.07	32.1	62.5	0.151	20.8	2.42	42.1	5260
BH310CP	Superficial	31/01/2017	7.36	536	<2	215	215	356	<0.3	44.5	<0.015	1.51	30.8	73.3	<0.019	14.6	4.19	24.2	35.5
BH526RS	Superficial	31/01/2017	7.81	654	<2	270	270	416	0.346	63.2	<0.015	<0.07	32.7	76.5	0.119	19.4	2.85	46.8	6.23
BH524CP	Superficial	01/02/2017	8.02	721	<2	345	345	481	6.07	41	<0.015	0.54	85.5	79.8	0.68	19.7	59.8	27.2	265
BH525CP	Superficial	01/02/2017	7.24	318	<2	55	55	216	<0.3	51.4	<0.015	7.91	22	28.1	<0.019	6.26	5.97	28.9	199
BH309CP	Superficial	03/02/2017	6.93	347	<2	95	95	230	<0.3	41.9	<0.015	5.81	23		<0.019	10.1	<1	22.8	978
BH309CP	Superficial	11-May-17	7.1	329	<2	85	85	247	<0.3	43.4	<0.02	7.77	19.40	37.6	<0.019	8.46	<1	23.60	90.4
BH310CP	Superficial	10/05/2017	7.35	499	<2	225	225	361	<0.3	43.1	<0.02	1.54	26.8	73.4	<0.019	109	3.46	25.2	4.75
BH525CP	Superficial	11/05/2017	6.61	329	<2	55	55	233	<0.3	52	<0.02	7.43	19.6	24.8	<0.019	7.95	5.62	28	773
BH526CP	Superficial	09/05/2017	8.22	553	<2	265	265	349	0.306	49.3	<0.02	<0.1	26.8	9.46	<0.019	2.18	<1	39.5	184
BH523RS	Superficial	09/05/2017	7.05	280	<2	75	75	184	<0.3	32.1	<0.02	4.79	21.7	8.16	<0.019	<0.76	<1	39.5	60.1
BH310CP	Superficial	23/08/2017	7.41	532	<2	225	225	364	<0.3	45.2	<0.06	1.64	28.1	77.1	<0.019	37.4	3.52	23.8	27.9
BH525CP	Superficial	25/08/2017	6.65	326	<2	90	90	247	<0.3	54.4	<0.06	7.09	21.4	29.3	<0.019	18	6.57	31.3	587
BH526CP	Superficial	24/08/2017	7.8	570	<2	310	310	368	0.418	53.4	<0.06	<0.07	29.6	60.2	0.462	264	2.55	46.6	1520
BH524CP	Superficial	21/08/2017	7.31	761	<2	425	425	494	5.81	30.5	<0.06	0.32	83.7	77.3	<0.019	399	60.2	21.5	1700
BH309CP	Superficial	25/08/2017	6.9	372	<2	115	115	271	<0.3	48.1	<0.06	8.79	21.70	42.4	<0.019	9.19	<1	27.00	172

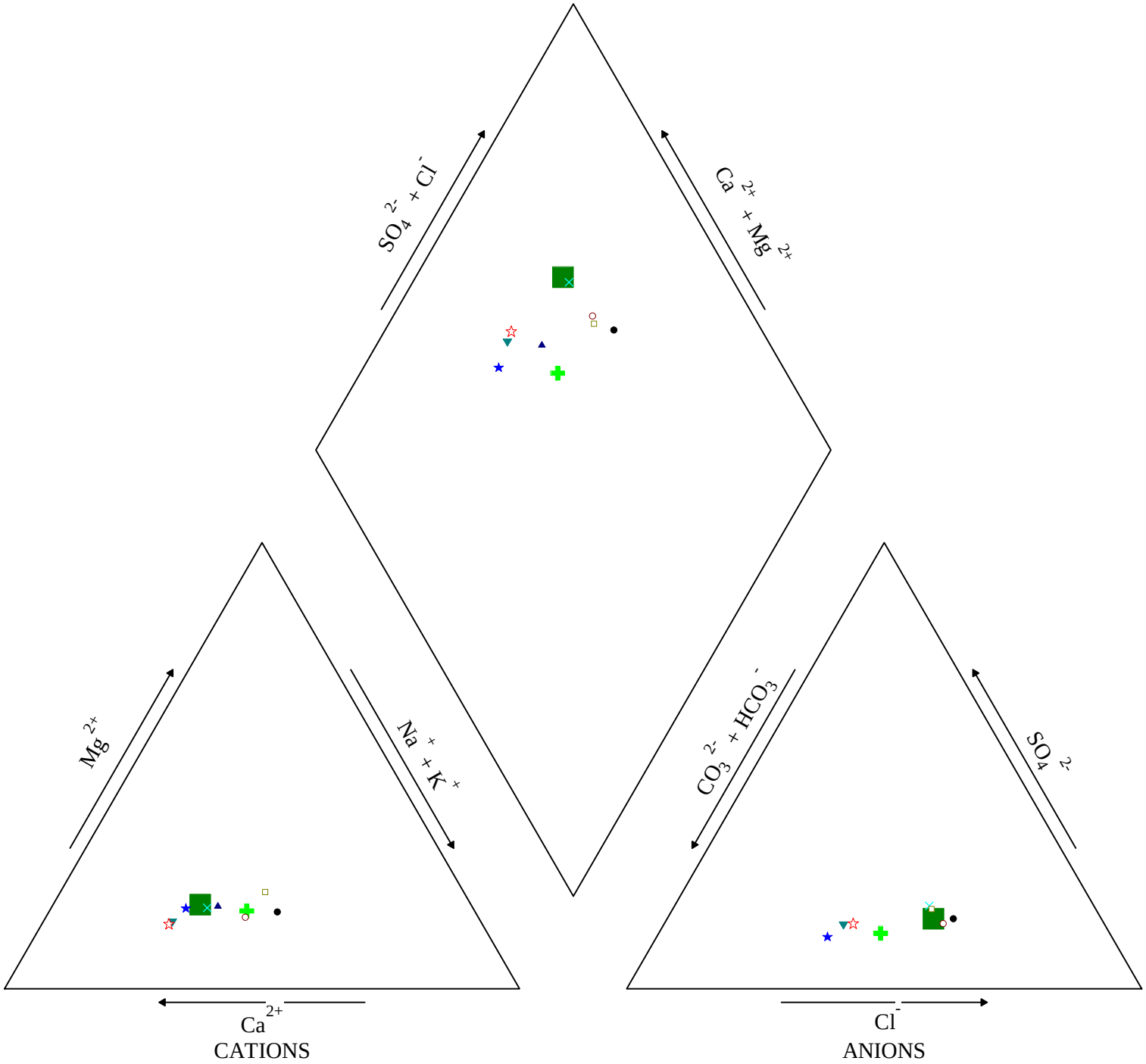
APPENDIX H.3 PIPER PLOTS

Tre'r Gof Flumes and Springs - Dec 15

EXPLANATION

- VN1
- VN2
- VN3
- VN4
- VN5
- Spring A
- Spring B
- Spring C
- Spring D
- Spring E

- 189
- 622

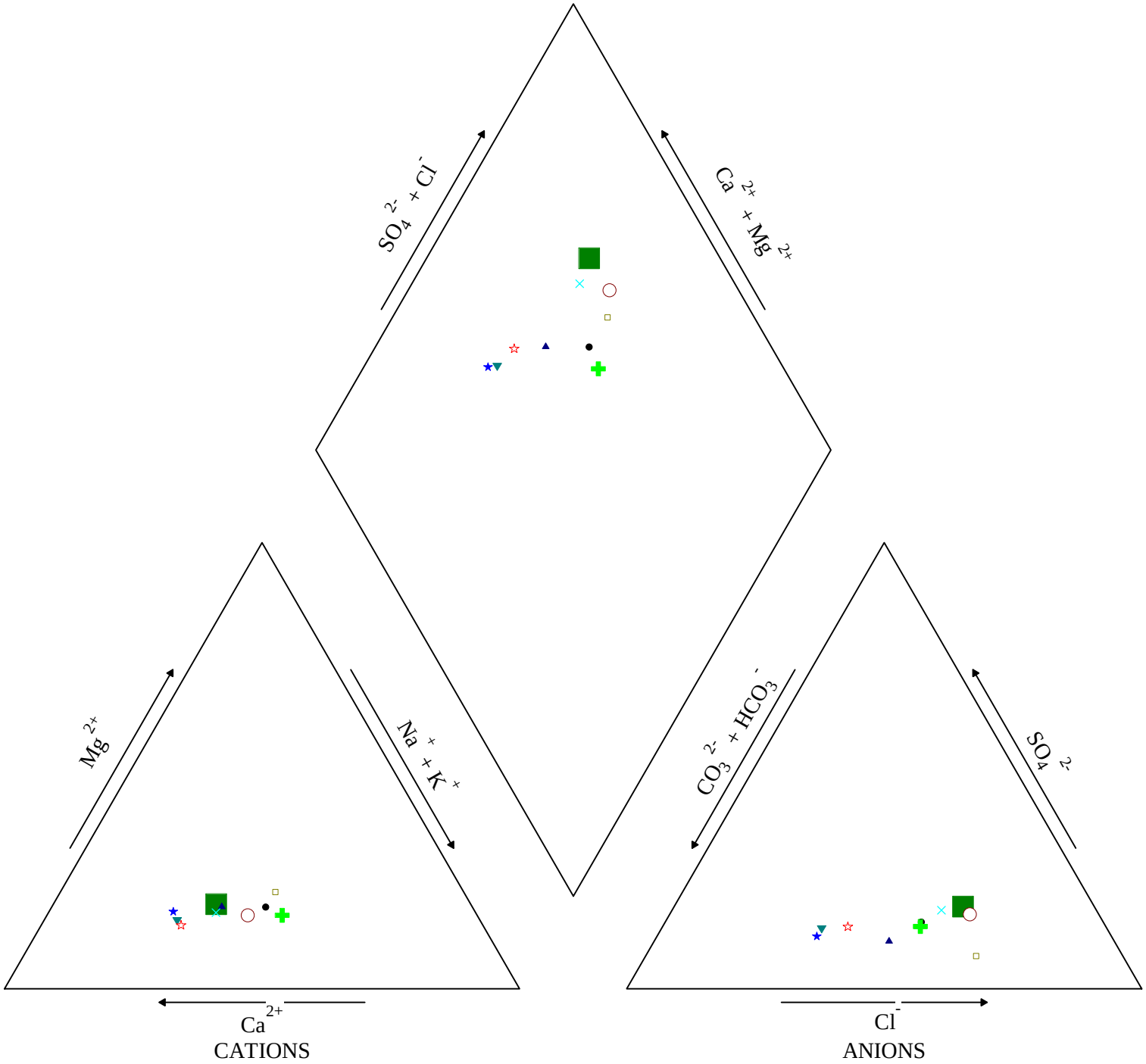


Tre'r Gof Flumes and Springs - Jan 15

EXPLANATION

- VN1
- VN2
- VN3
- VN4
- VN5
- Spring A
- Spring B
- Spring C
- Spring D
- Spring E

- 144
- 612

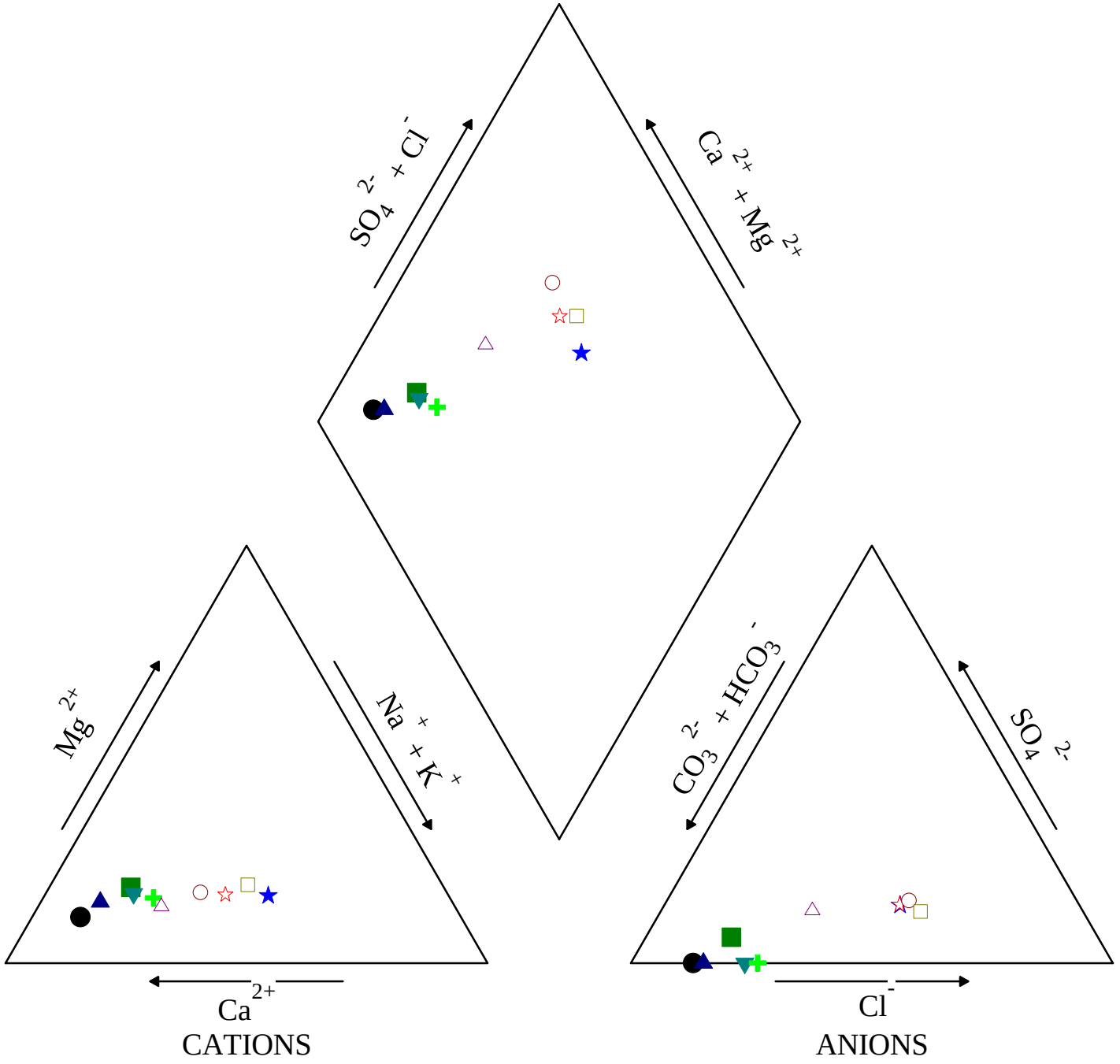


Tre'r Gof Springs and Flumes Feb-16

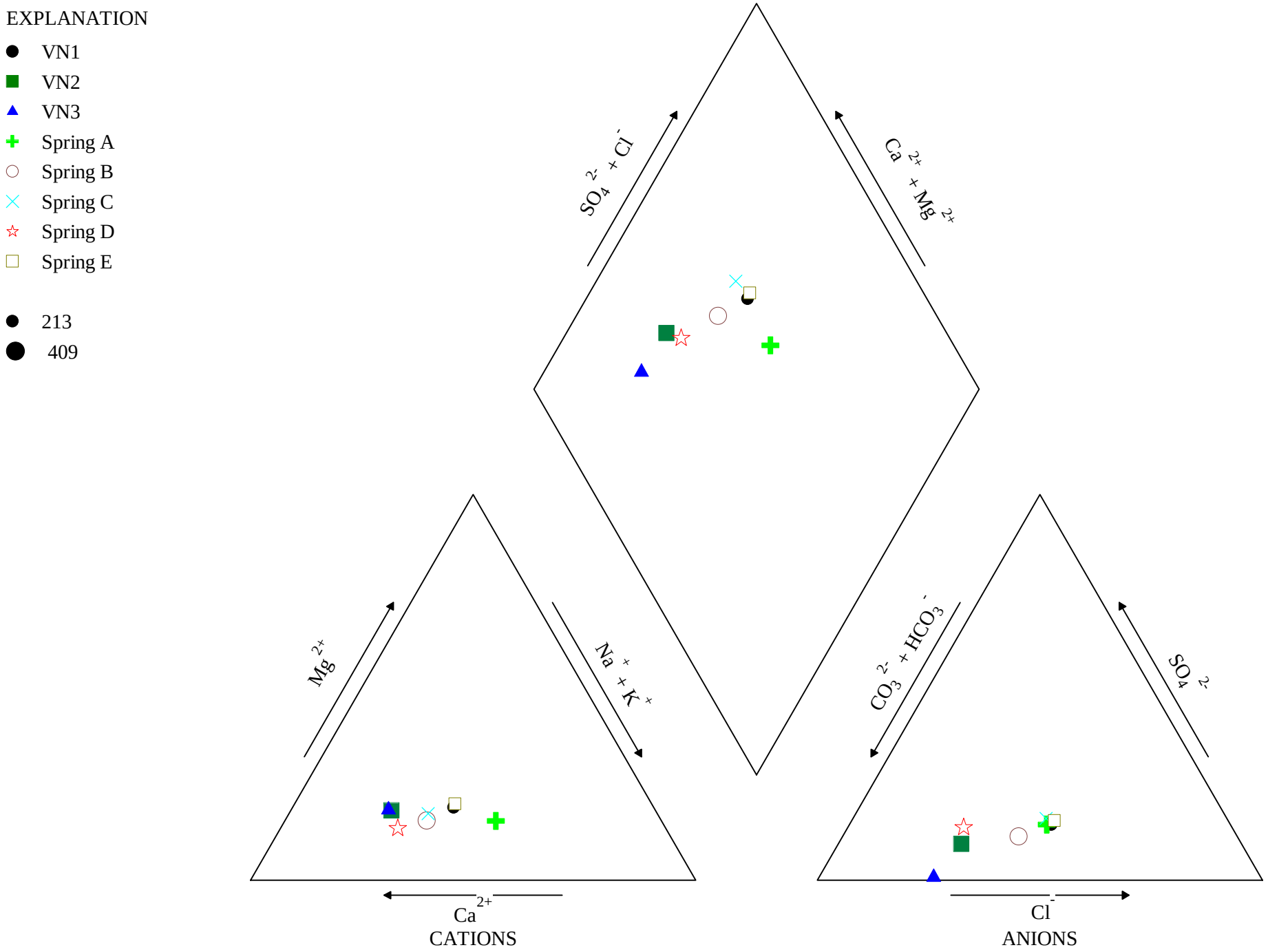
EXPLANATION

- SPRING A
- SPRING B
- SPRING C
- SPRING D
- SPRING E
- VN1
- VN2
- VN3
- VN4
- VN5

- 205
- 533



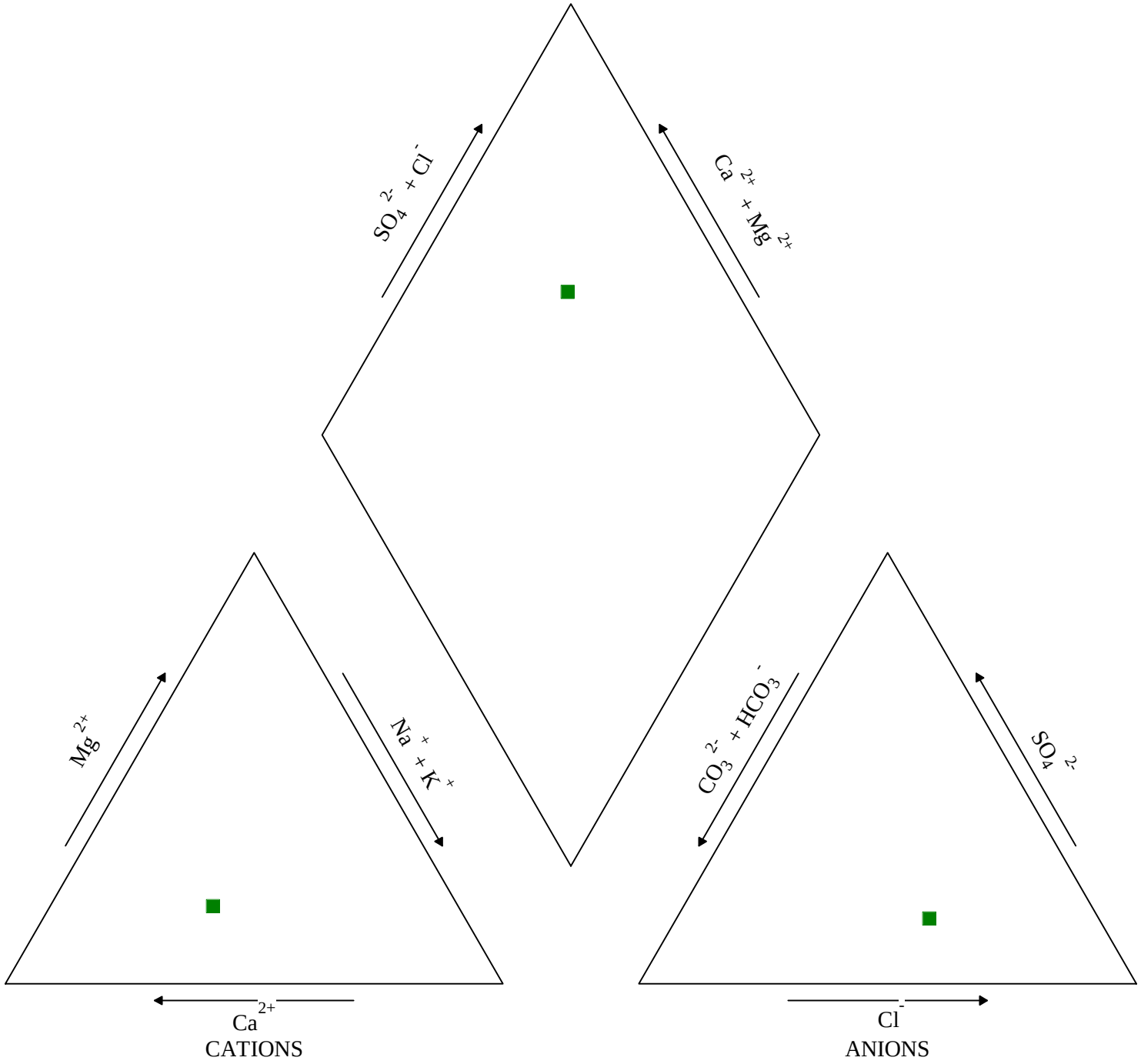
Tre'r Gof - Flumes and Springs April 2016



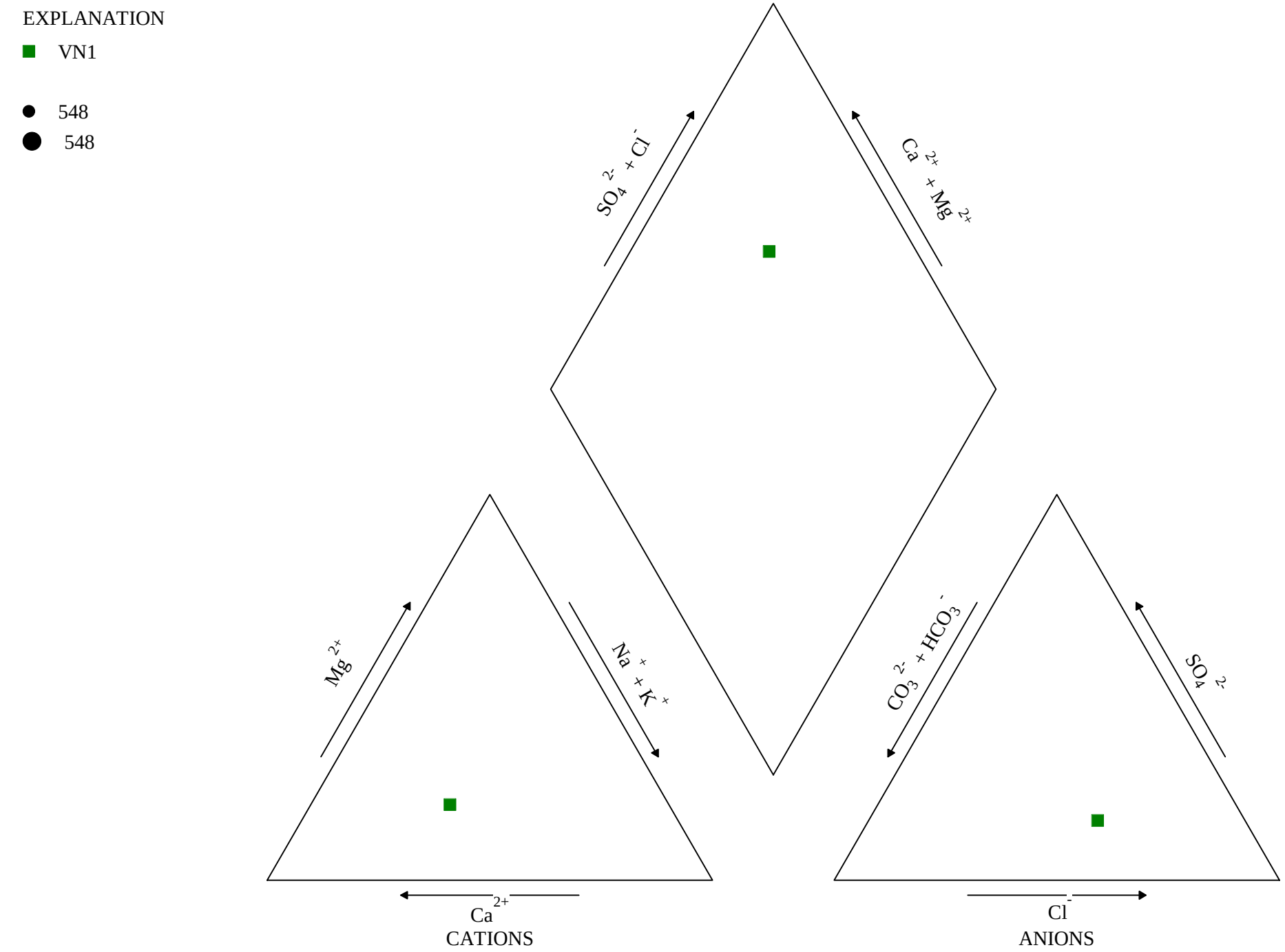
Tre'r Gof - Flumes and Springs August 2016

EXPLANATION

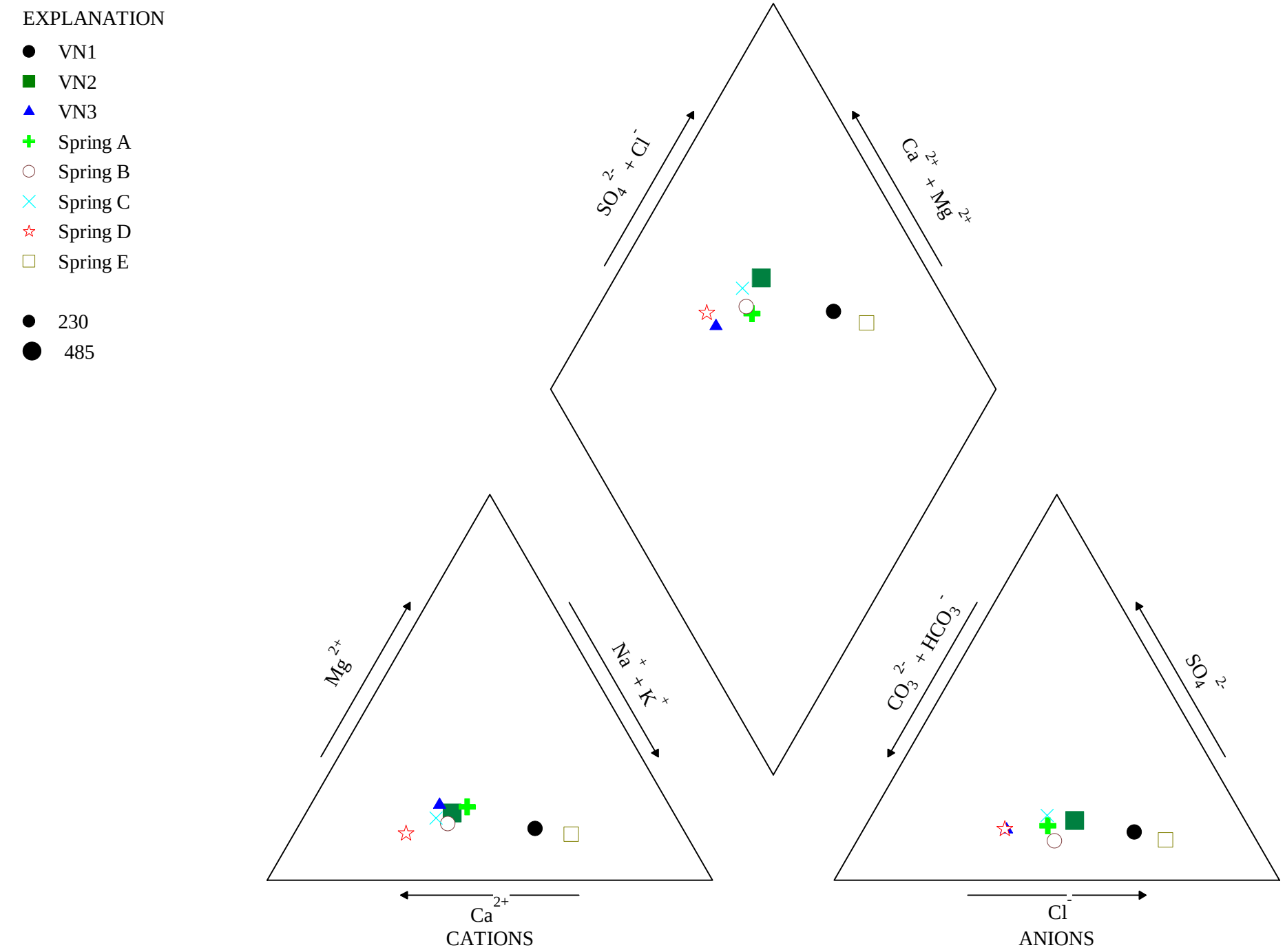
- VN1
- 568
- 568



Tre'r Gof - Flumes and Springs October 2016



Tre'r Gof - Flumes and Springs February 2017

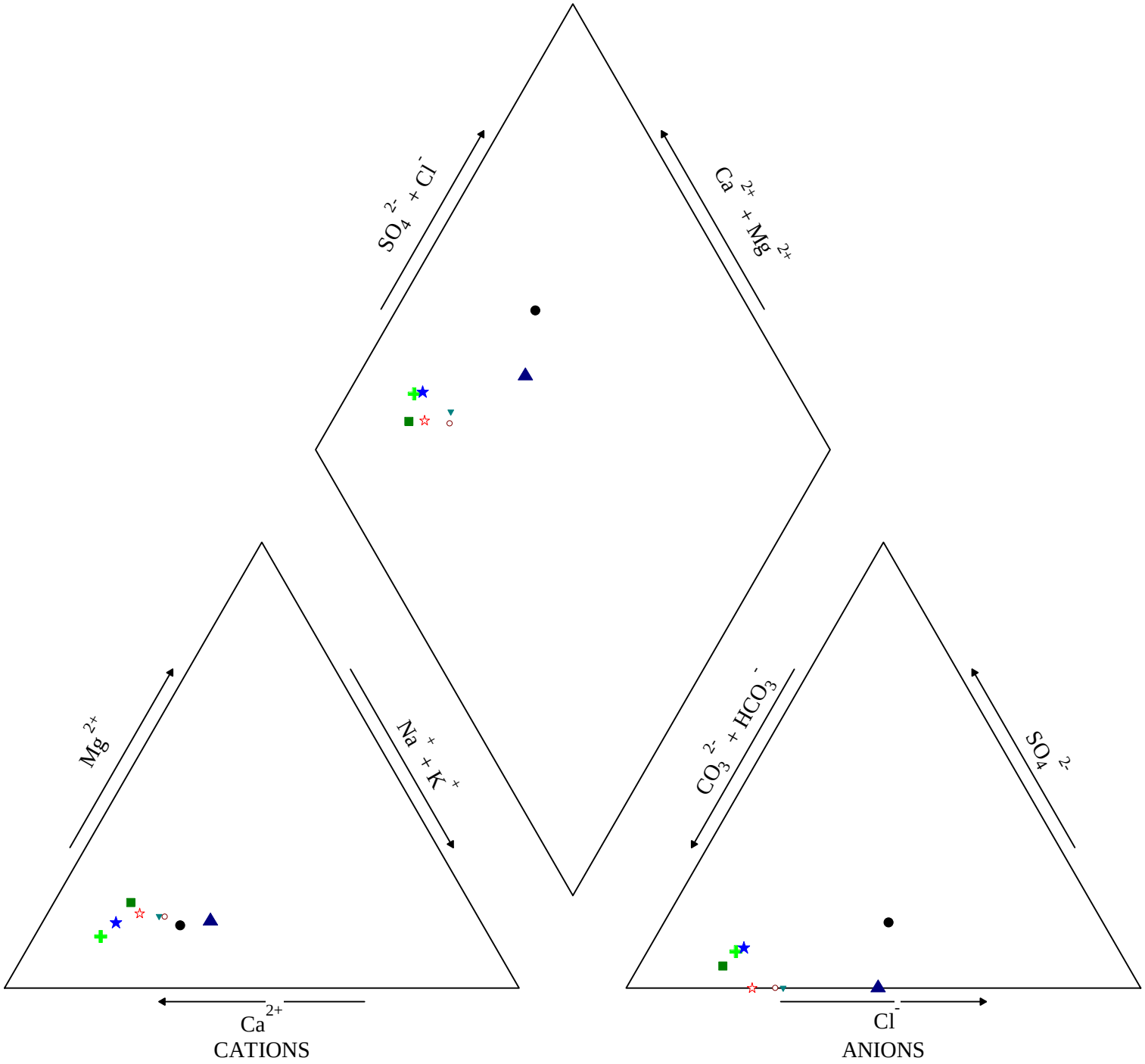


Tre'r Gof Piezometers Nov -15

EXPLANATION

- PZ1
- PZ2
- PZ3
- PZ4
- PZ5
- PZ6
- PZ7
- PZ8

- 369
- 669

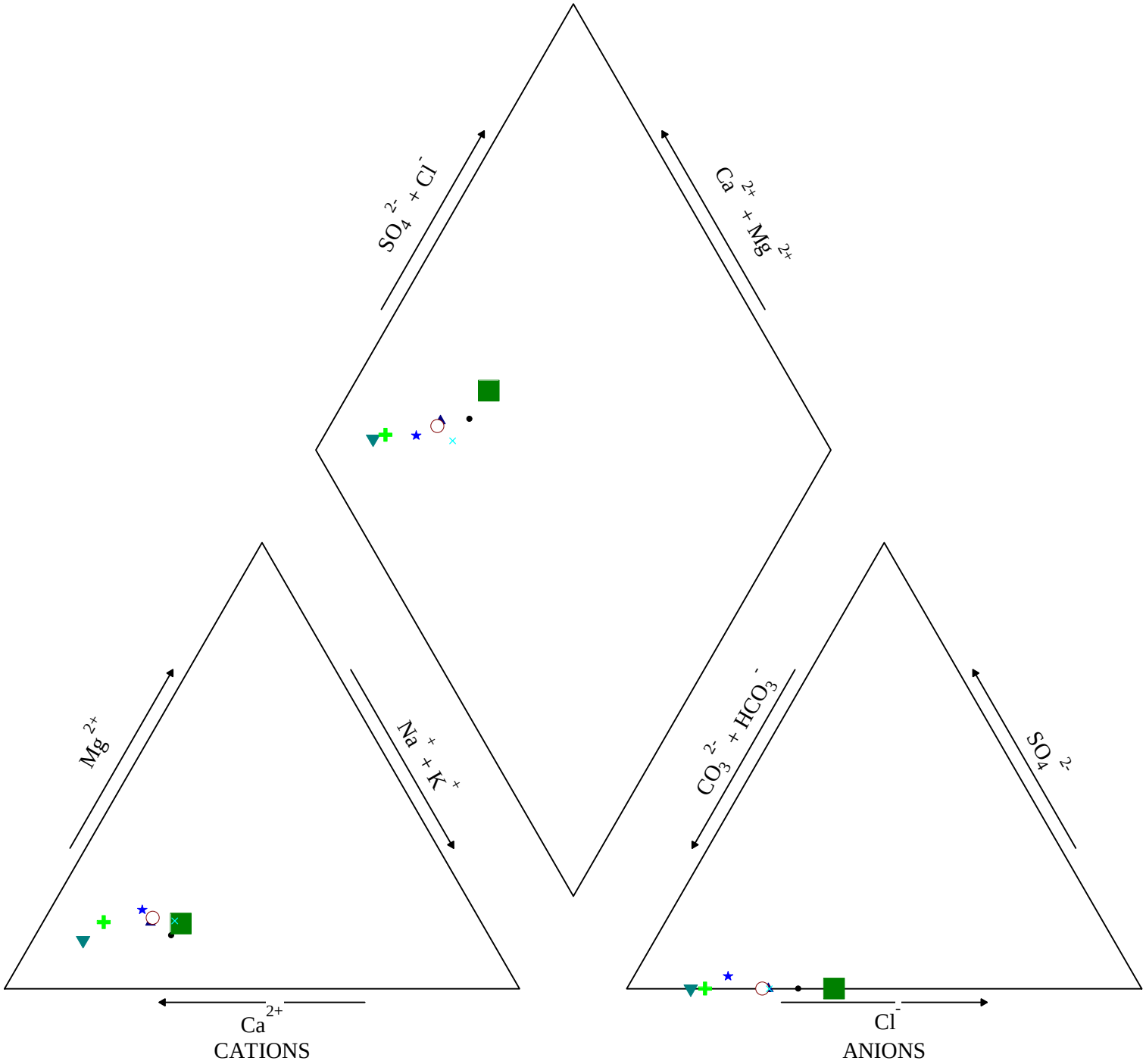


Tre'r Gof Piezometers - Dec 15

EXPLANATION

- PZ1
- PZ2
- PZ3
- PZ4
- PZ5
- PZ6
- PZ7
- PZ8 Fixed

- 296
- 706

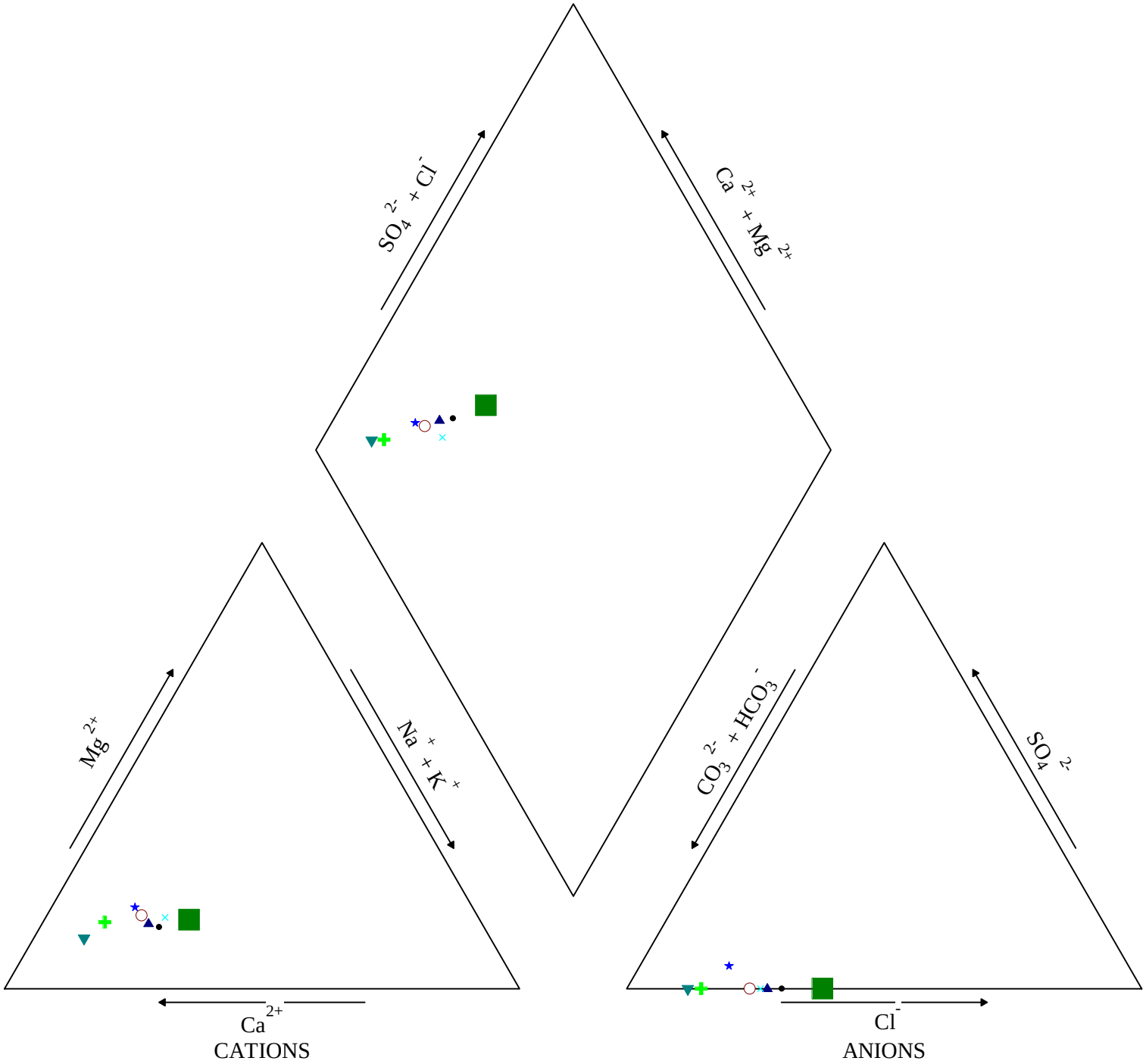


Tre'r Gof Piezometers - Jan 16

EXPLANATION

- PZ1
- PZ2
- PZ3
- PZ4
- PZ5
- PZ6
- PZ7
- PZ8 Fixed

- 337
- 784

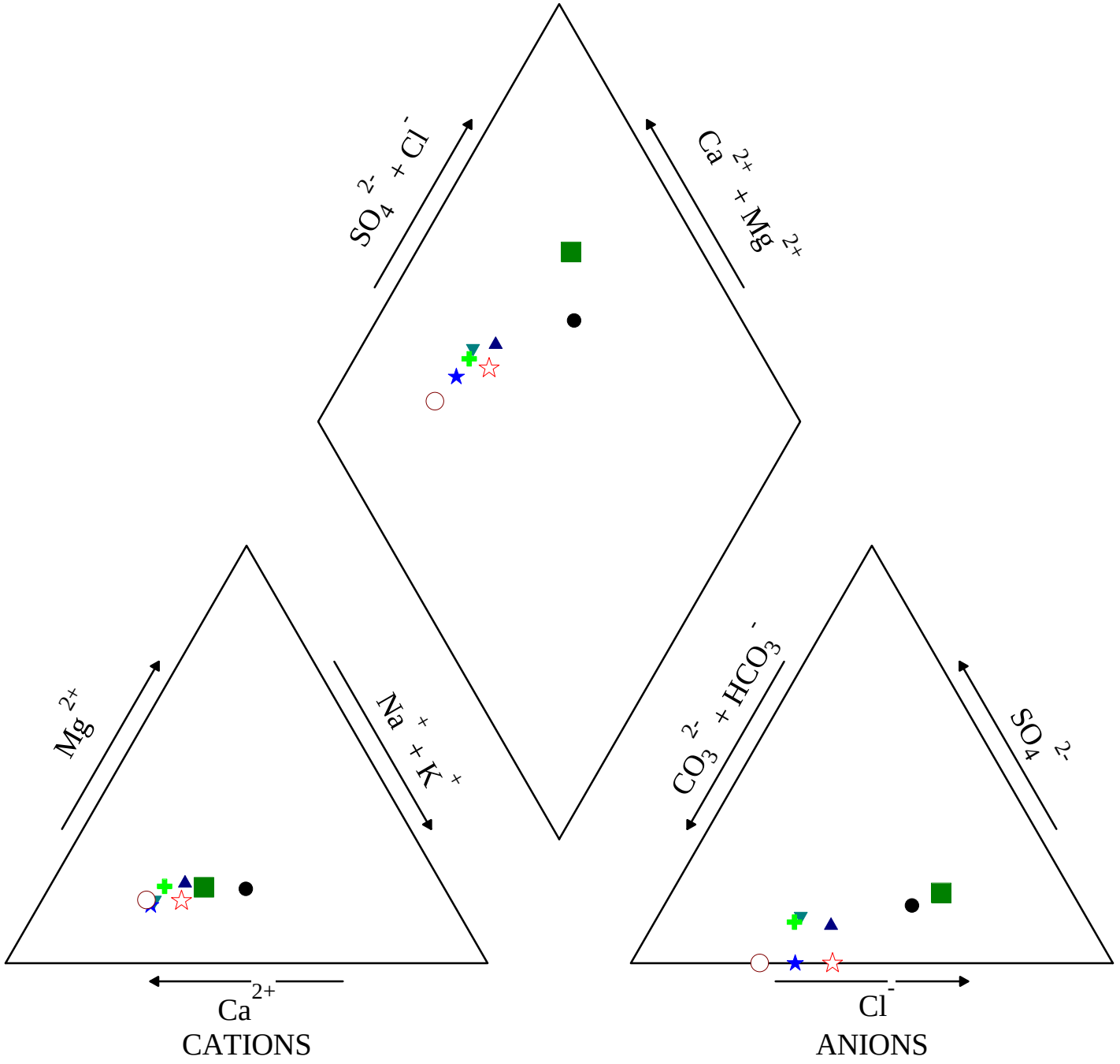


Tre'r Gof Piezometers Feb-16

EXPLANATION

- PZ1
- PZ2
- PZ3
- PZ4
- PZ5
- PZ6
- PZ7
- PZ8x

- 214
- 710

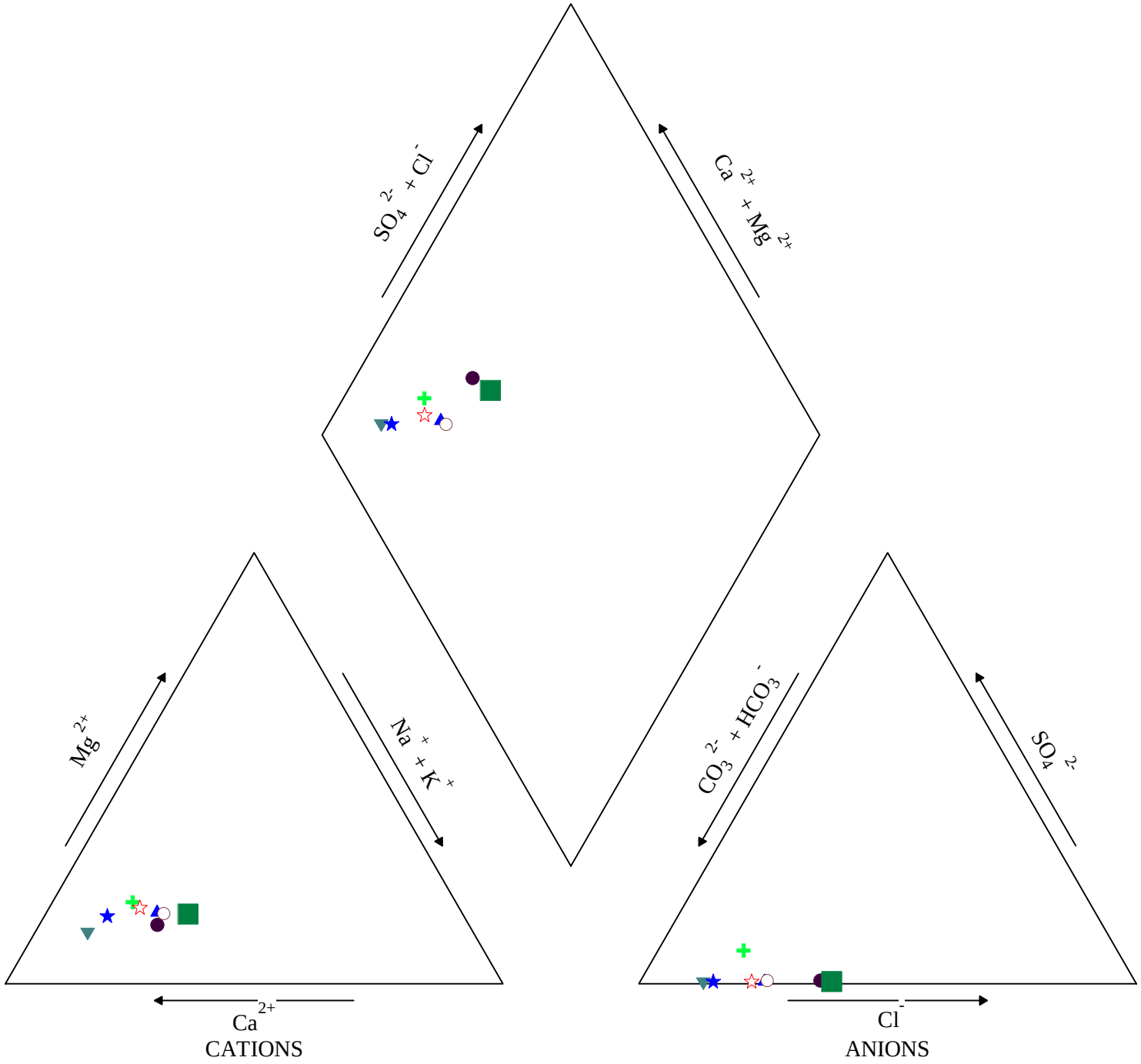


Tre'r Gof - Piezometers April 2016

EXPLANATION

- PZ1
- PZ2
- PZ3
- PZ4
- PZ5
- PZ6
- PZ7
- PZ8x

- 416
- 737

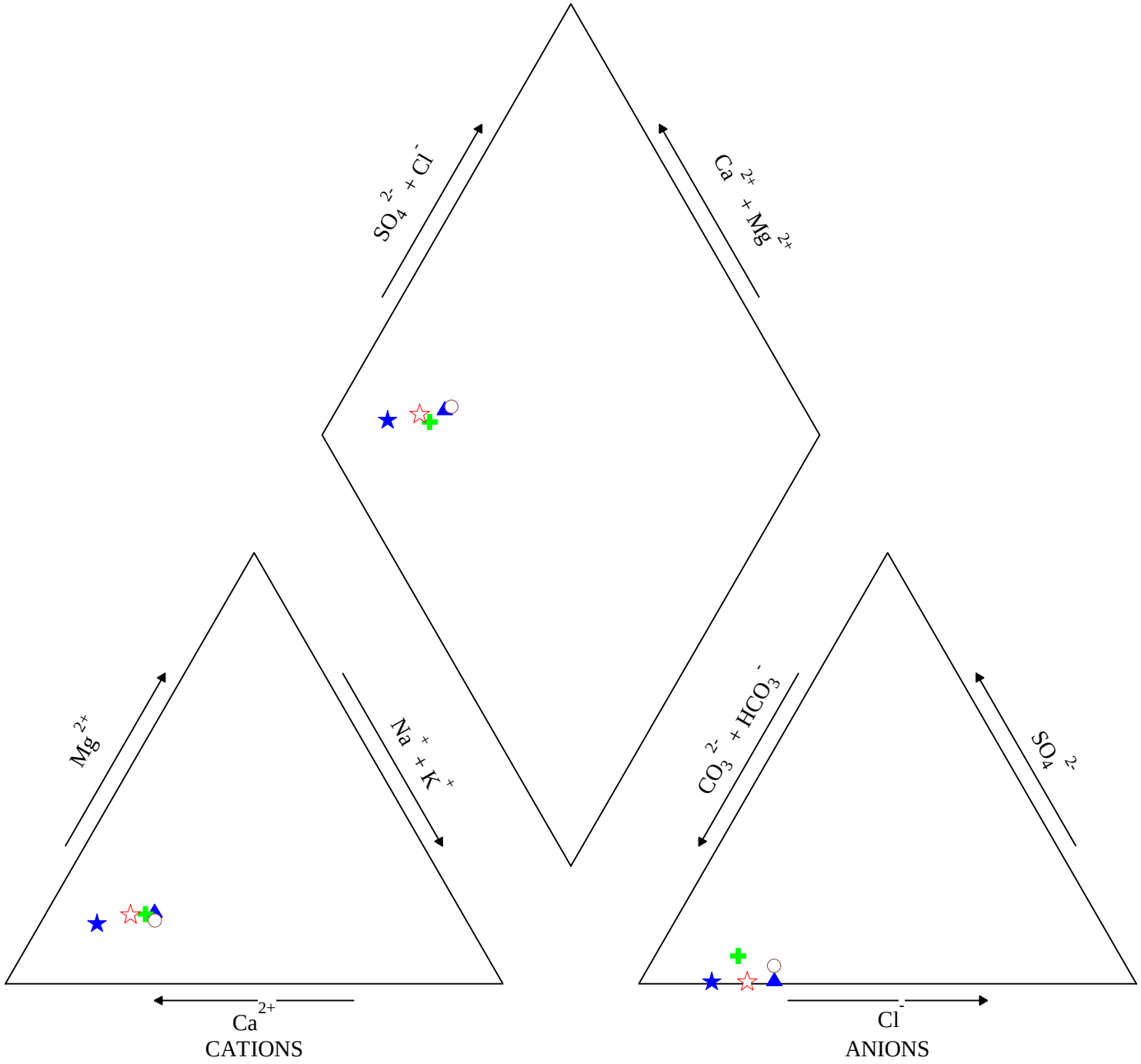


Tre'r Gof - Piezometers August 2016

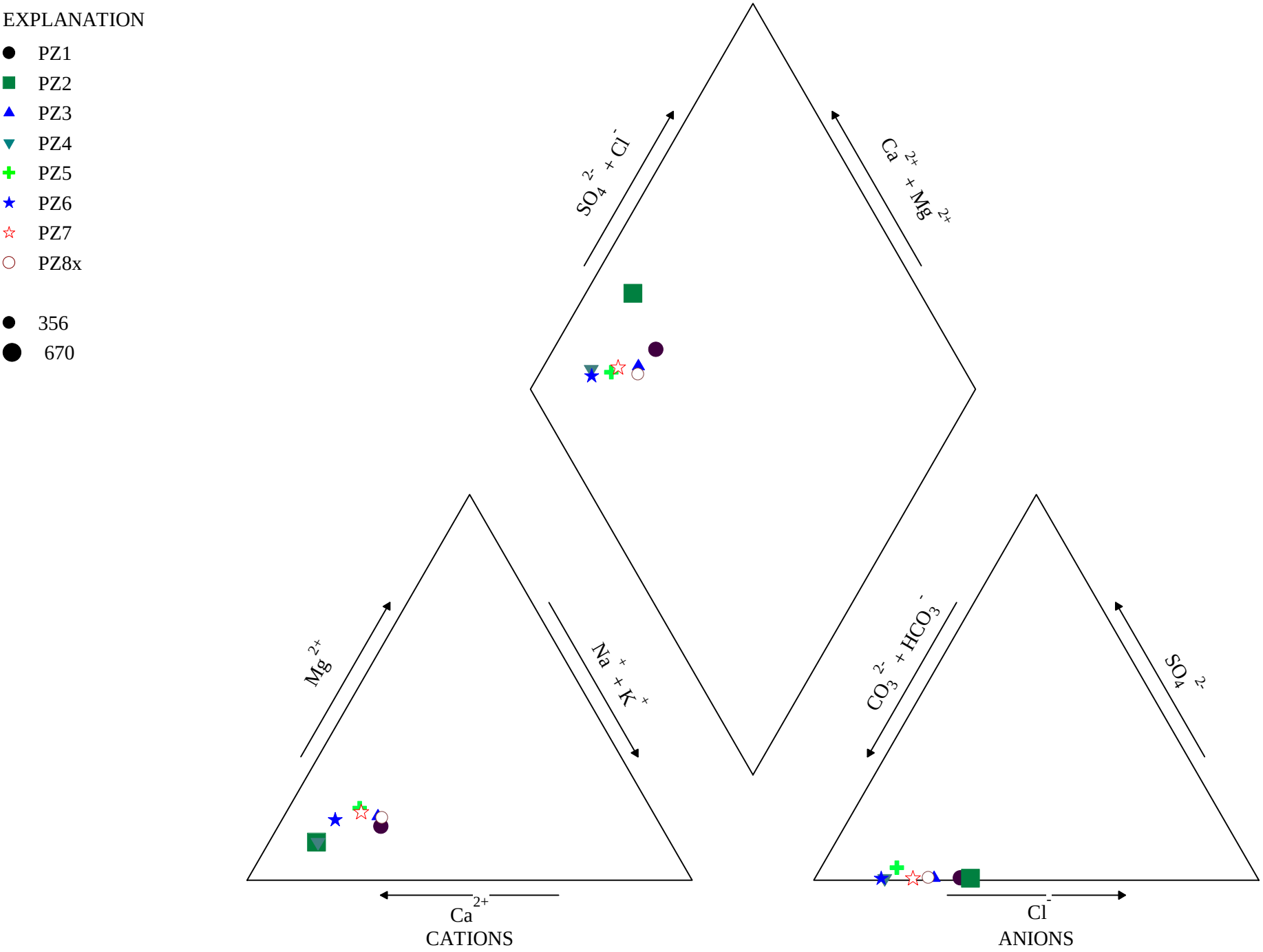
EXPLANATION

- PZ3
- PZ5
- PZ6
- PZ7
- PZ8x

- 351
- 545



Tre'r Gof - Piezometers October 2016

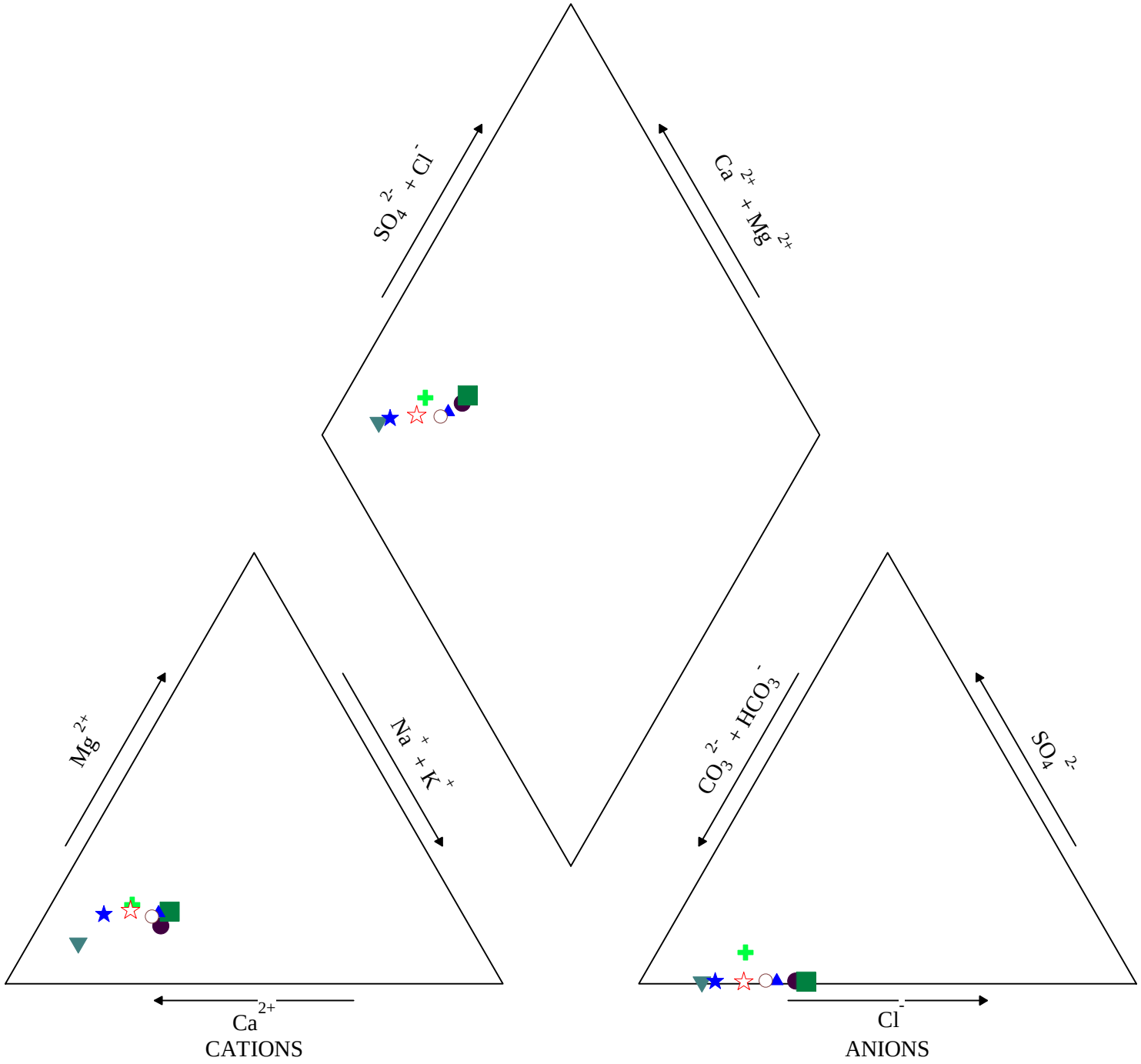


Tre'r Gof - Piezometers February 2017

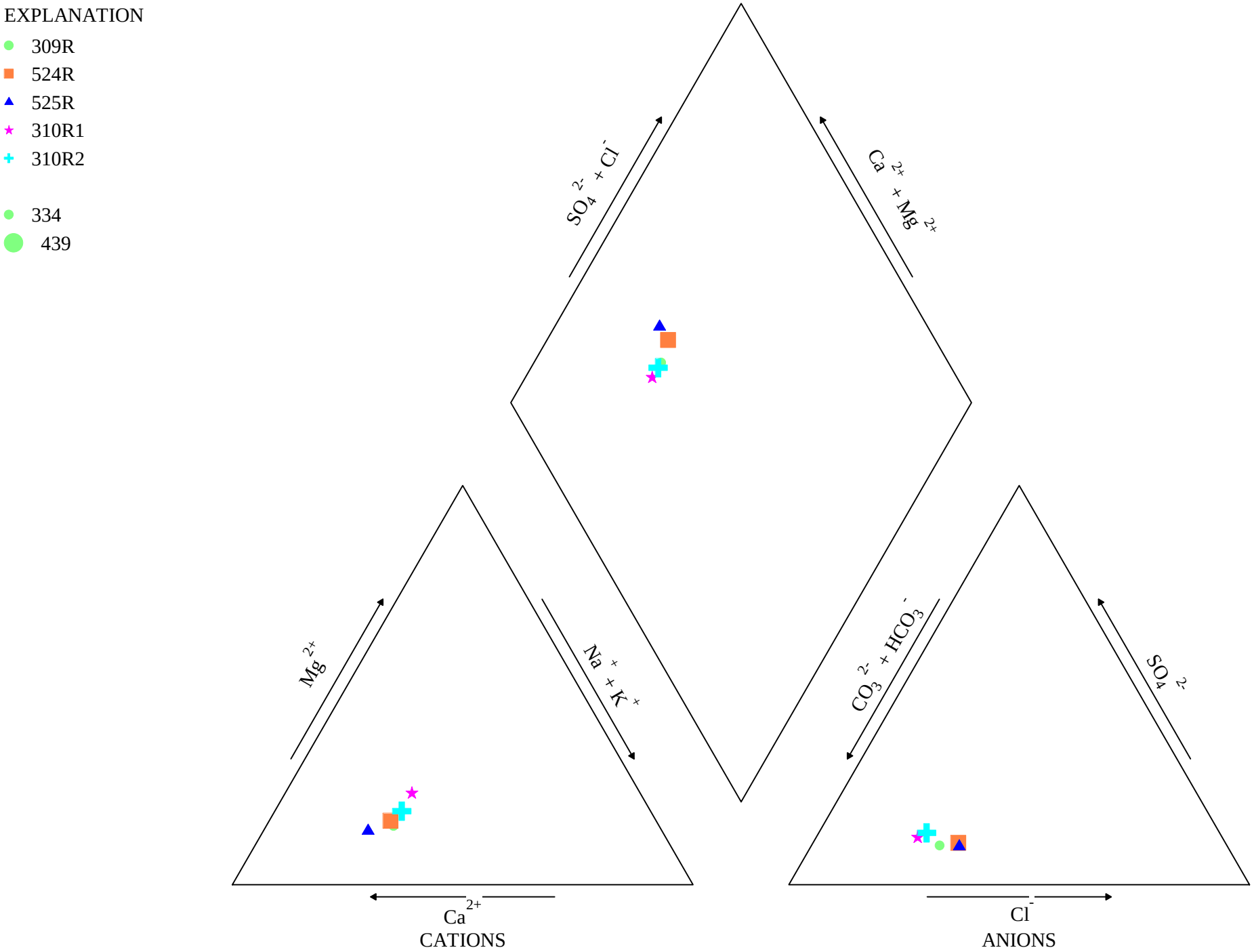
EXPLANATION

- PZ1
- PZ2
- PZ3
- PZ4
- PZ5
- PZ6
- PZ7
- PZ8x

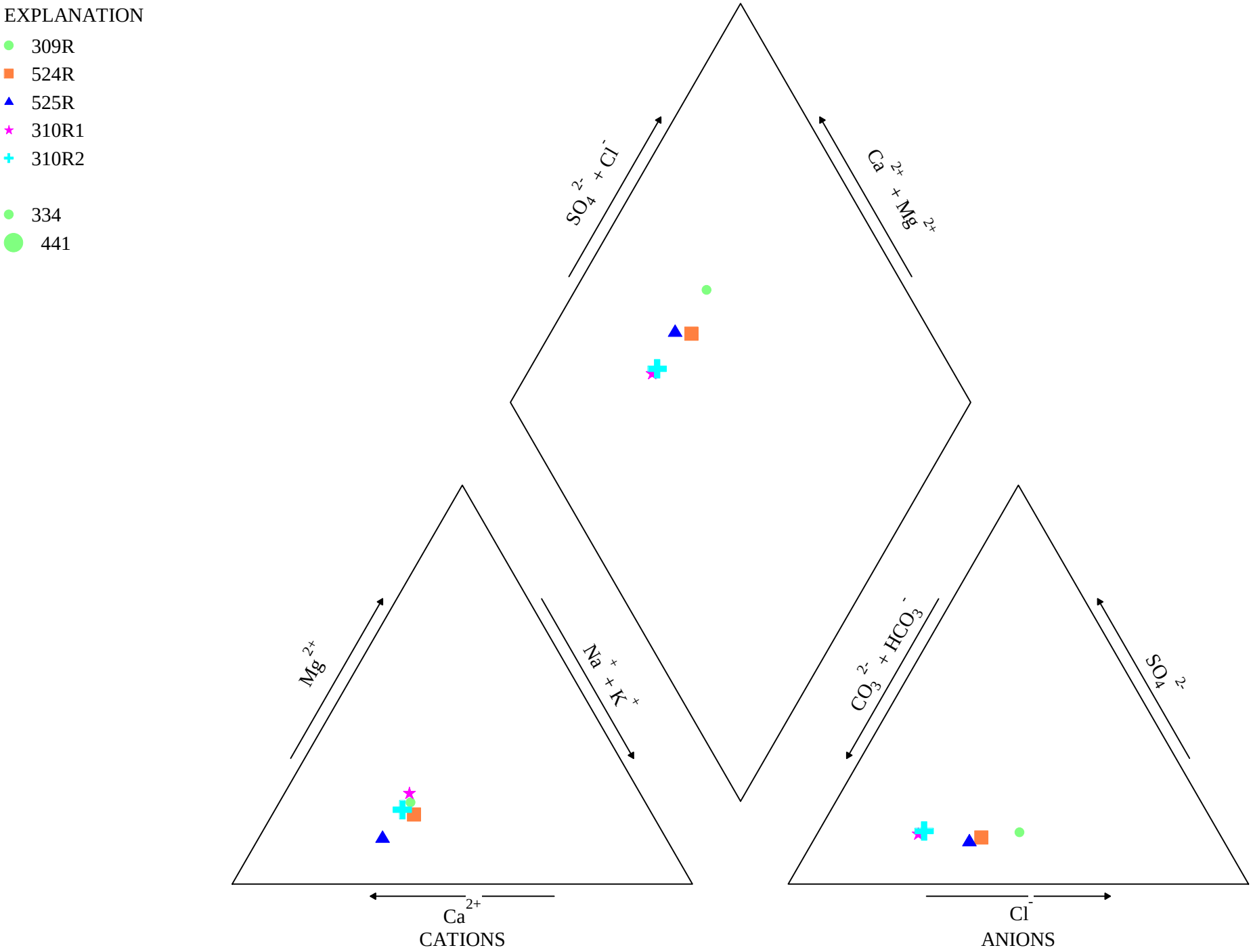
- 343
- 575



Tre'r Gof - Bedrock Boreholes March 2015



Tre'r Gof - Bedrock Boreholes June 2015

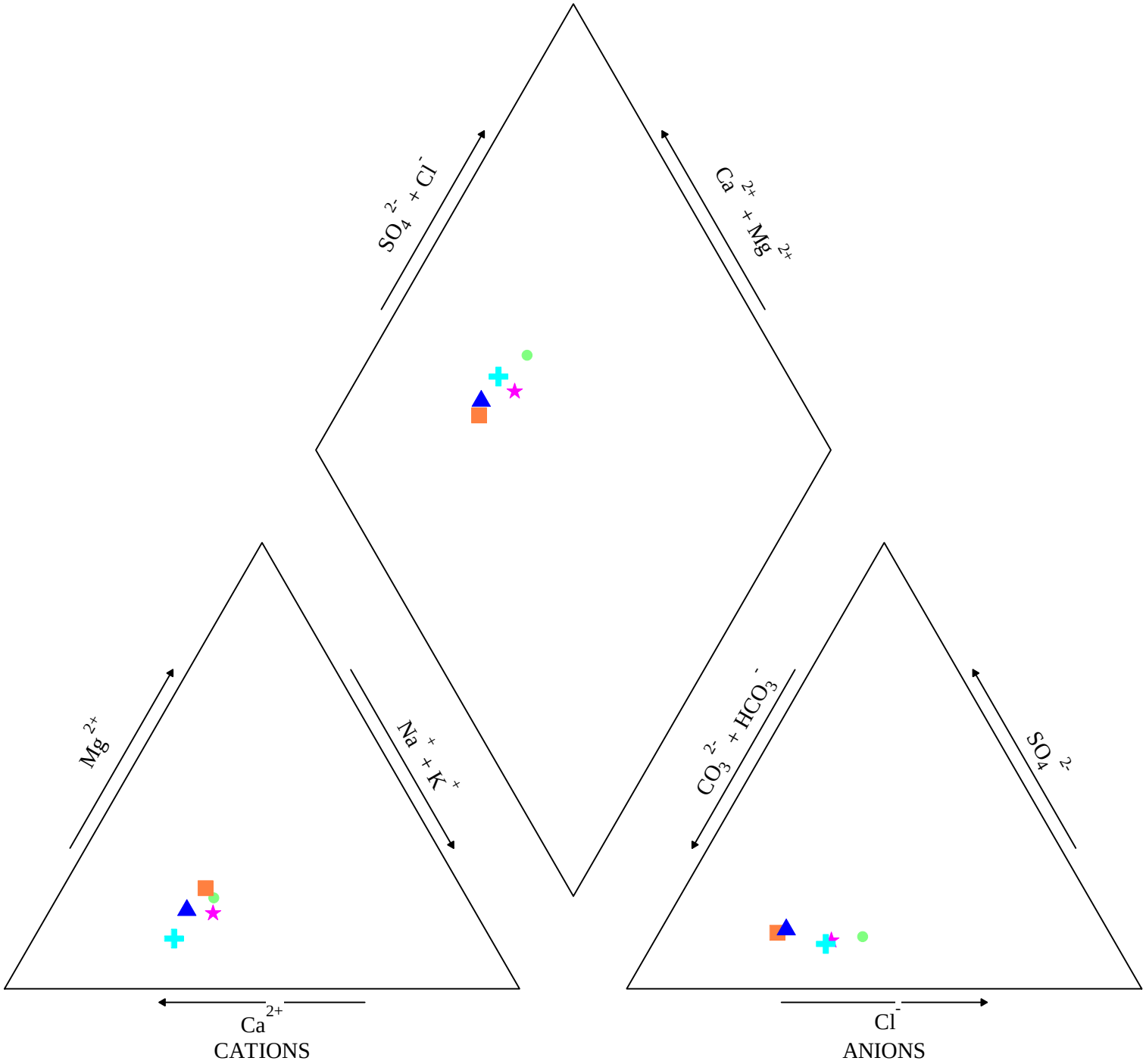


Tre'r Gof - Bedrock Boreholes September 2015

EXPLANATION

- 309R
- 524R
- 525R
- 310R1
- 310R2

- 214
- 433

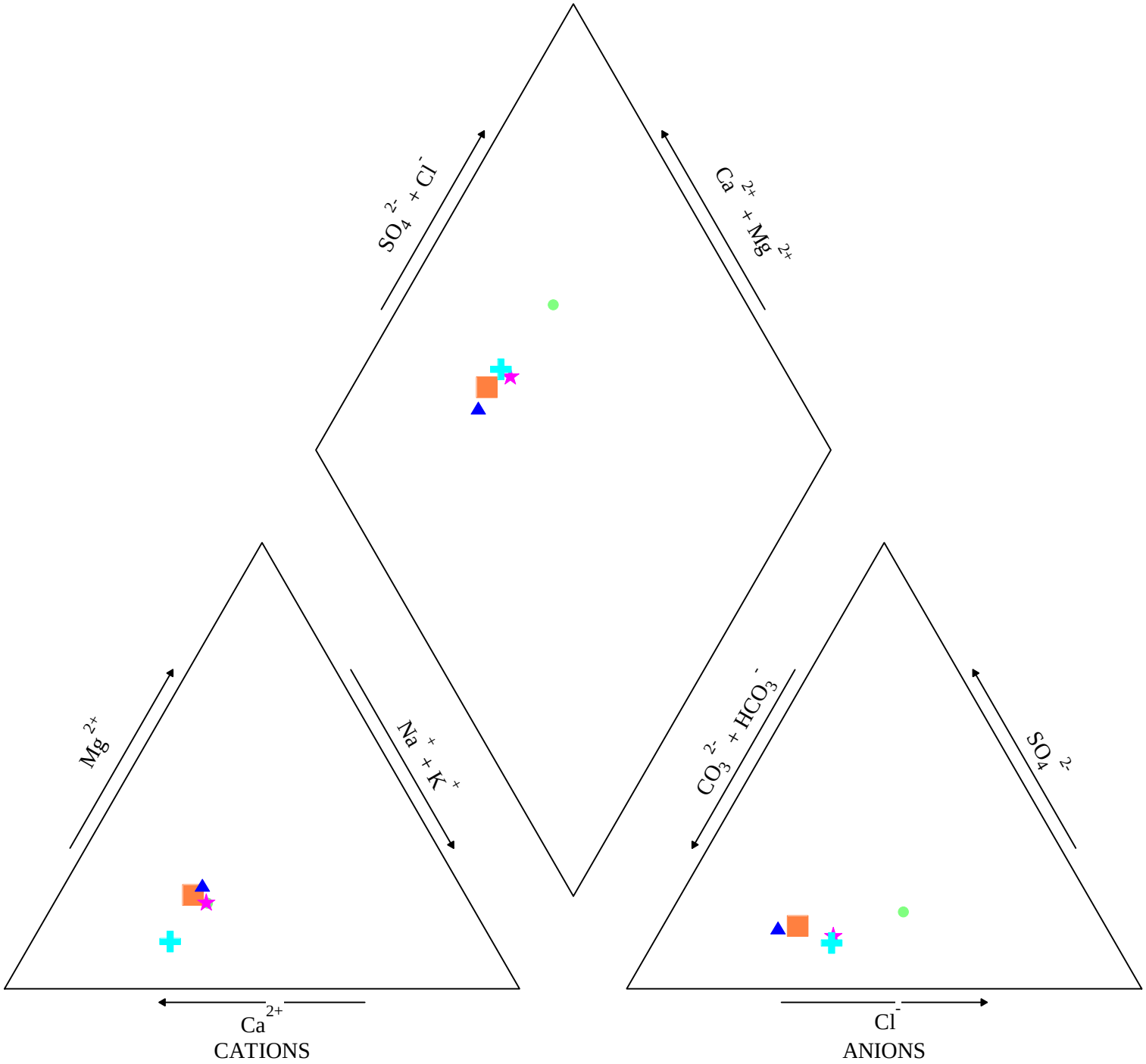


Tre'r Gof - Bedrock Boreholes December 2015

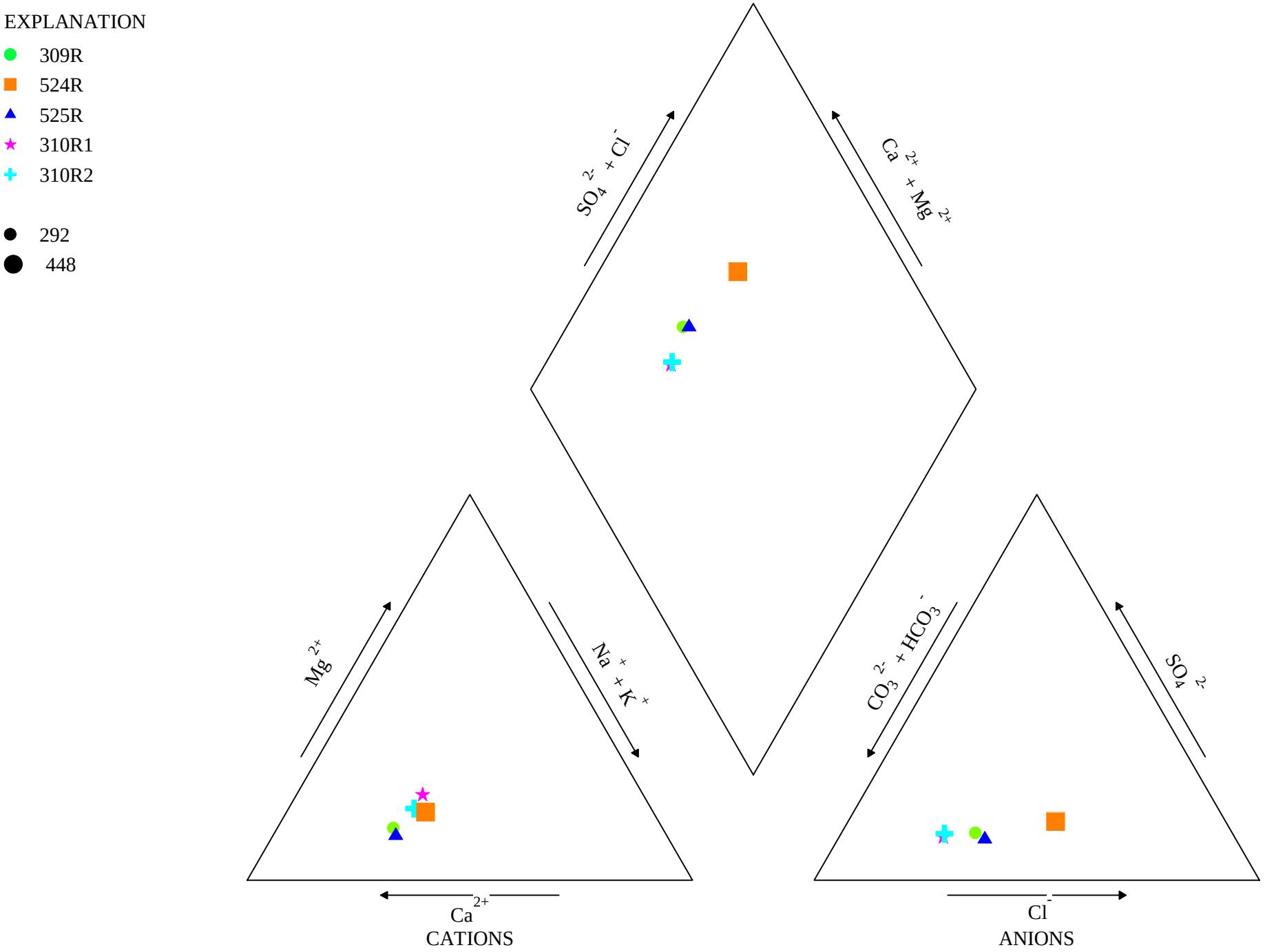
EXPLANATION

- 309R
- 524R
- 525R
- 310R1
- 310R2

- 254
- 352



Tre'r Gof - Bedrock Boreholes April 2016

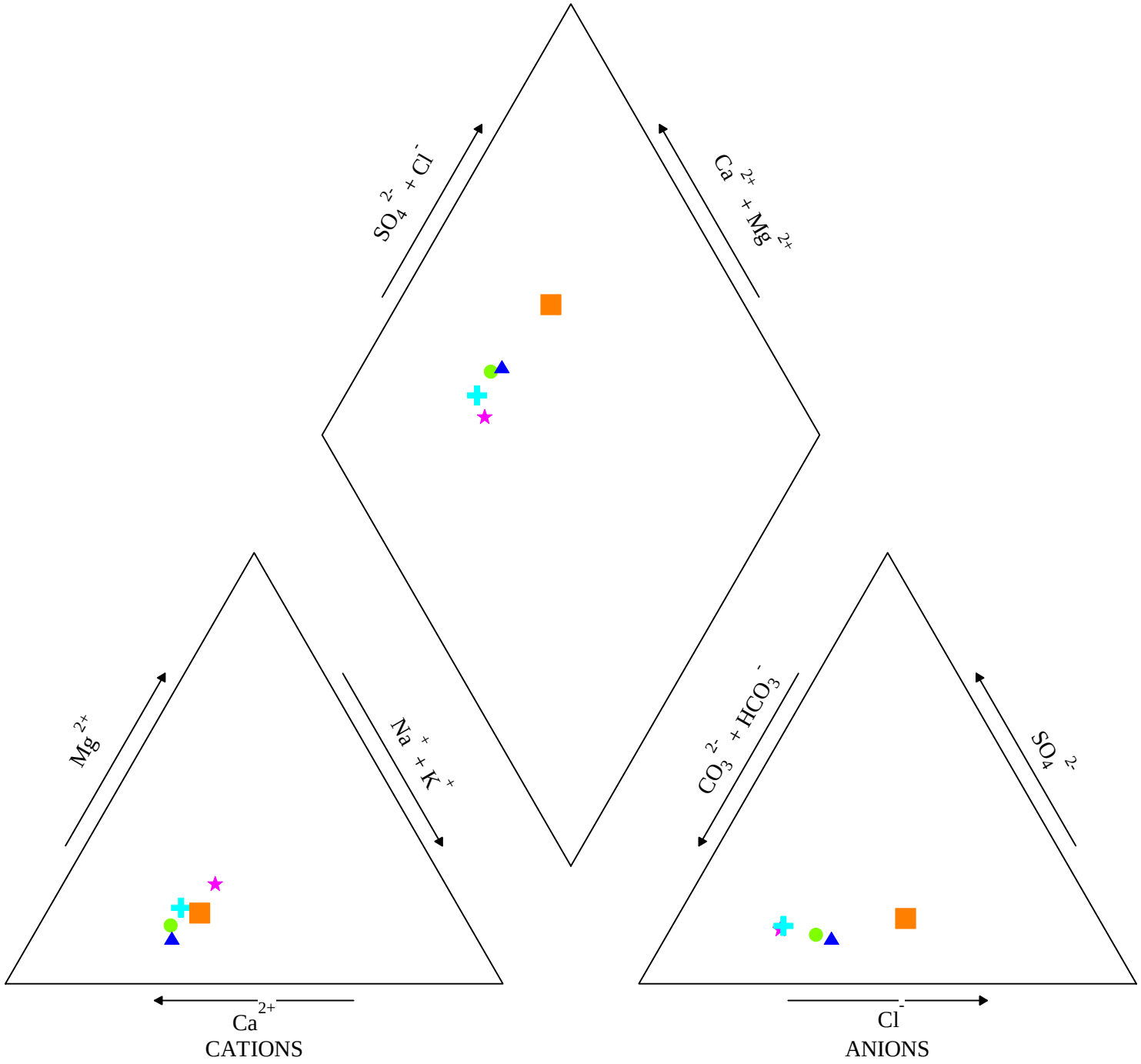


Tre'r Gof - Bedrock Boreholes August 2016

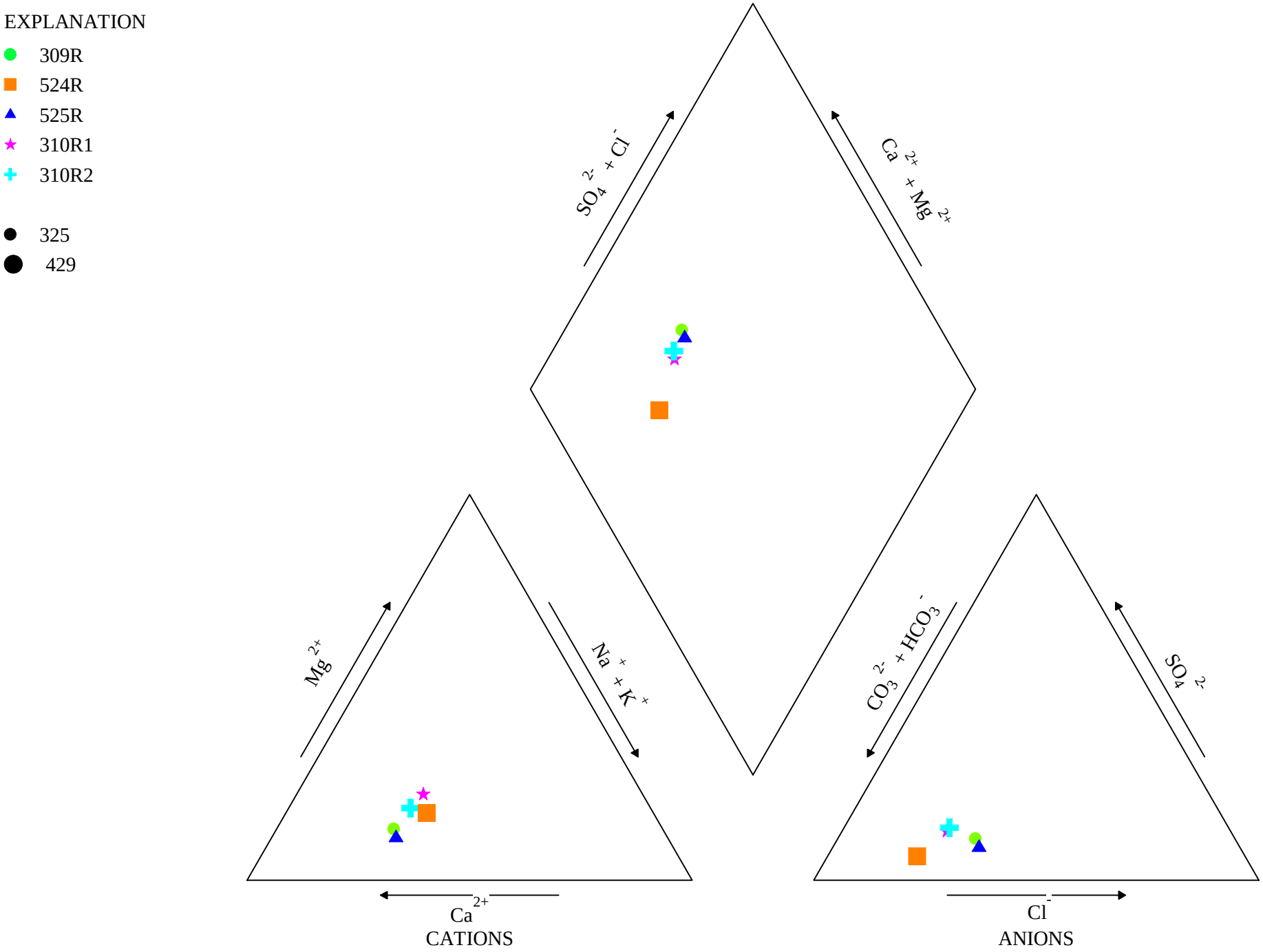
EXPLANATION

- 309R
- 524R
- 525R
- 310R1
- 310R2
- 309R
- 524R
- 525R
- 310R1
- 310R2

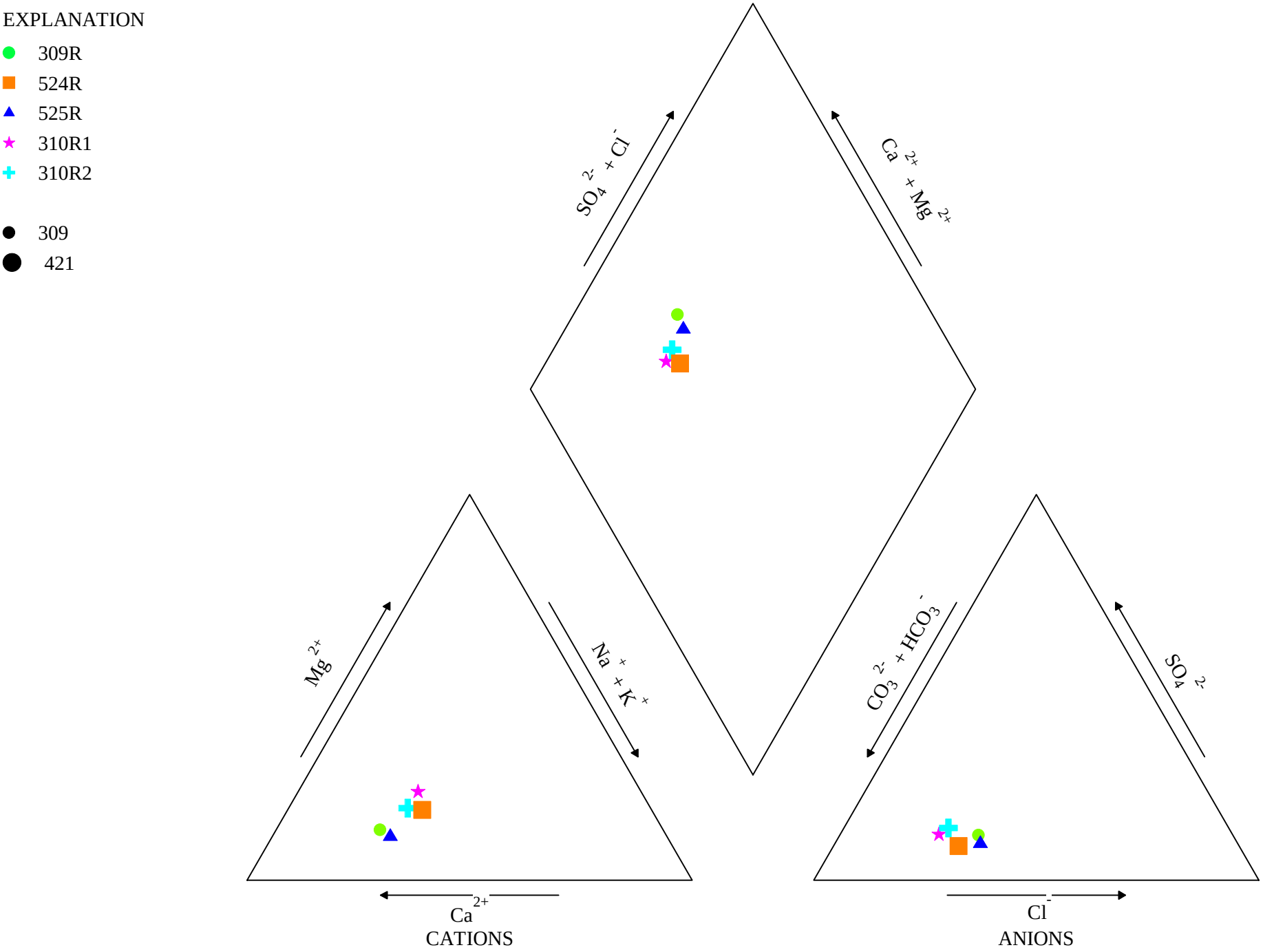
- 333
- 435



Tre'r Gof - Bedrock Boreholes October 2016



Tre'r Gof - Bedrock Boreholes February 2017

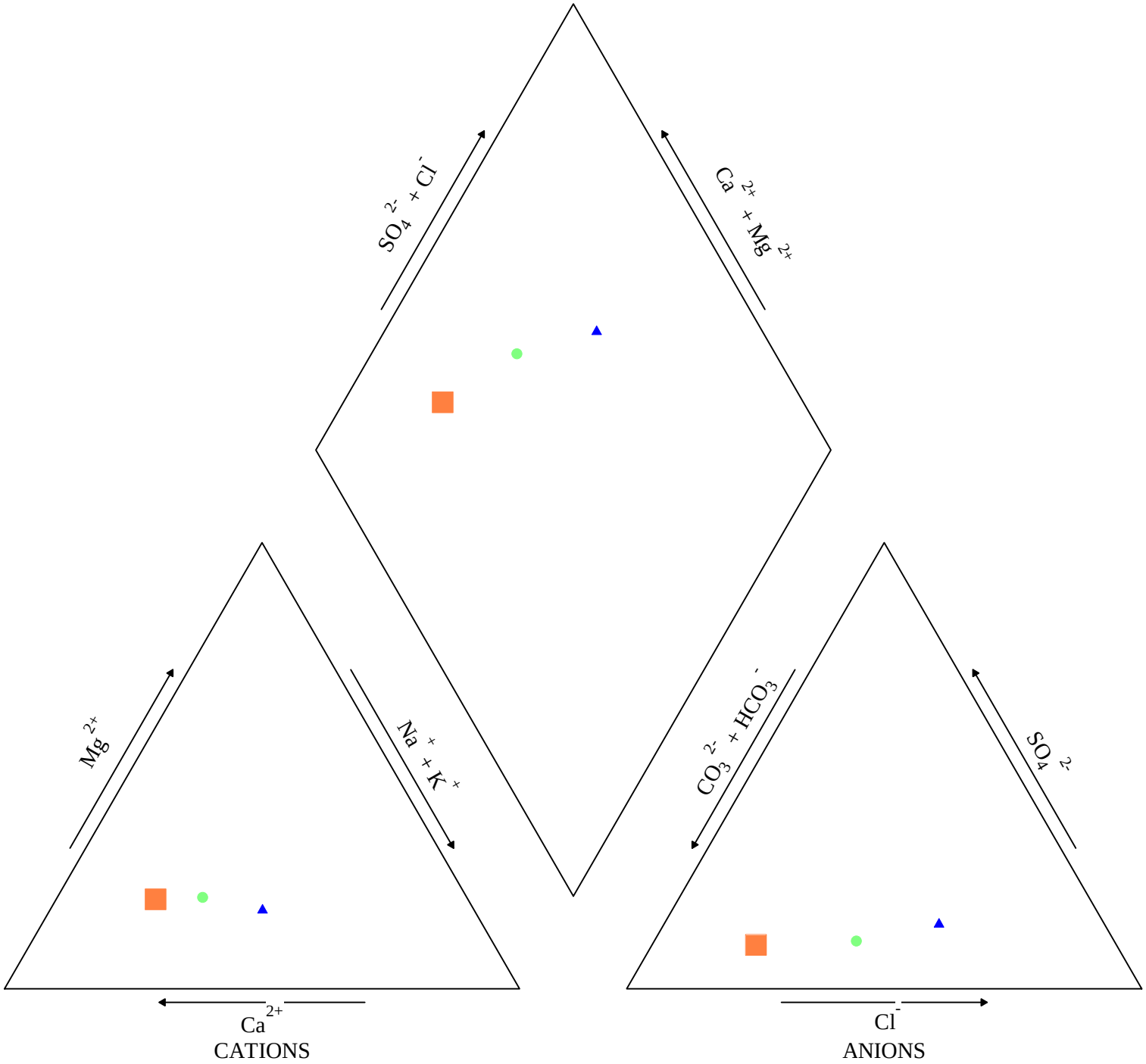


Tre'r Gof - Superficial Boreholes March 2015

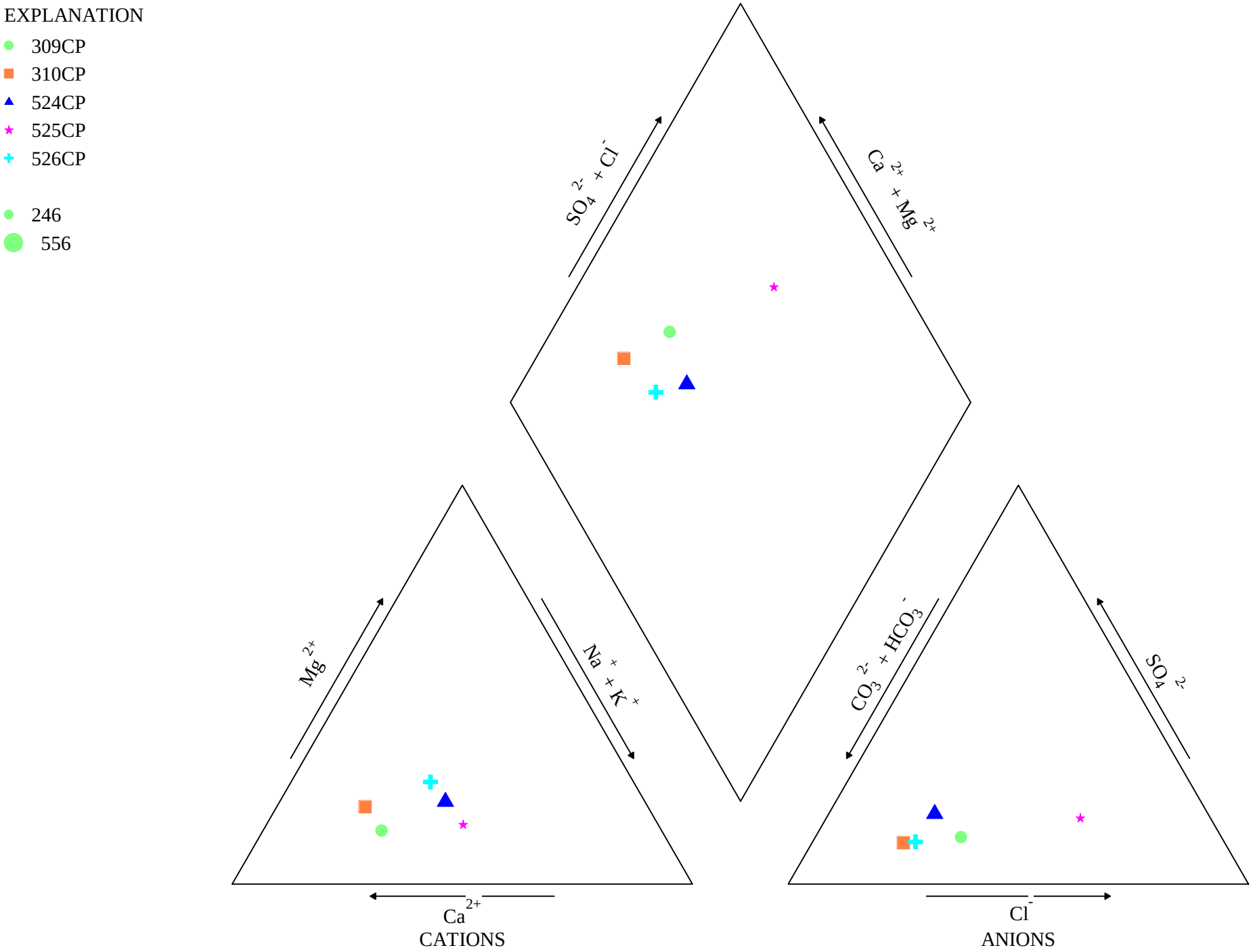
EXPLANATION

- 309CP
- 310CP
- 525CP

- 226
- 348



Tre'r Gof - Superficial Boreholes June 2015

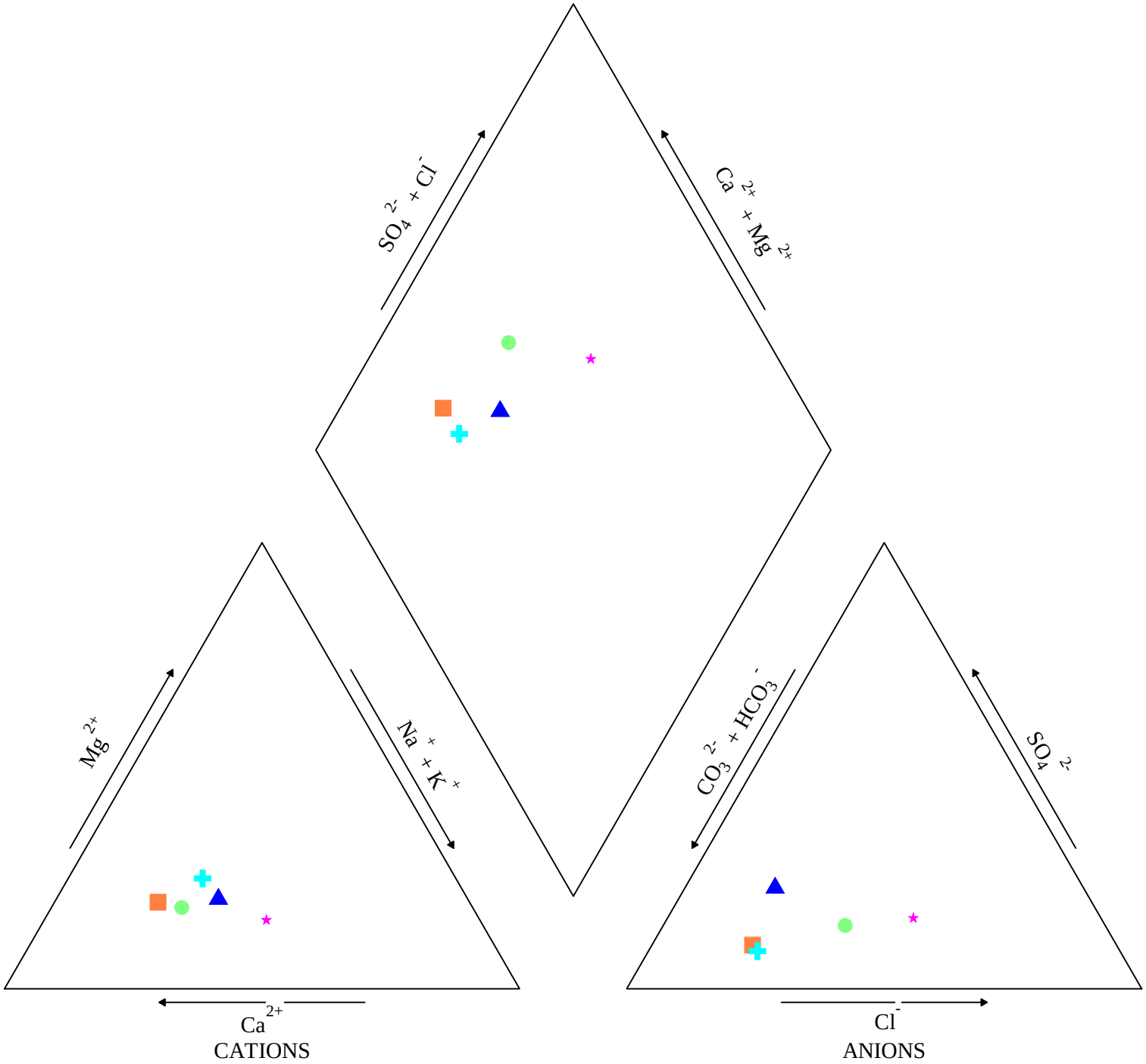


Tre'r Gof - Superficial Boreholes September 2015

EXPLANATION

- 309CP
- 310CP
- 524CP
- 525CP
- 526CP

- 135
- 483

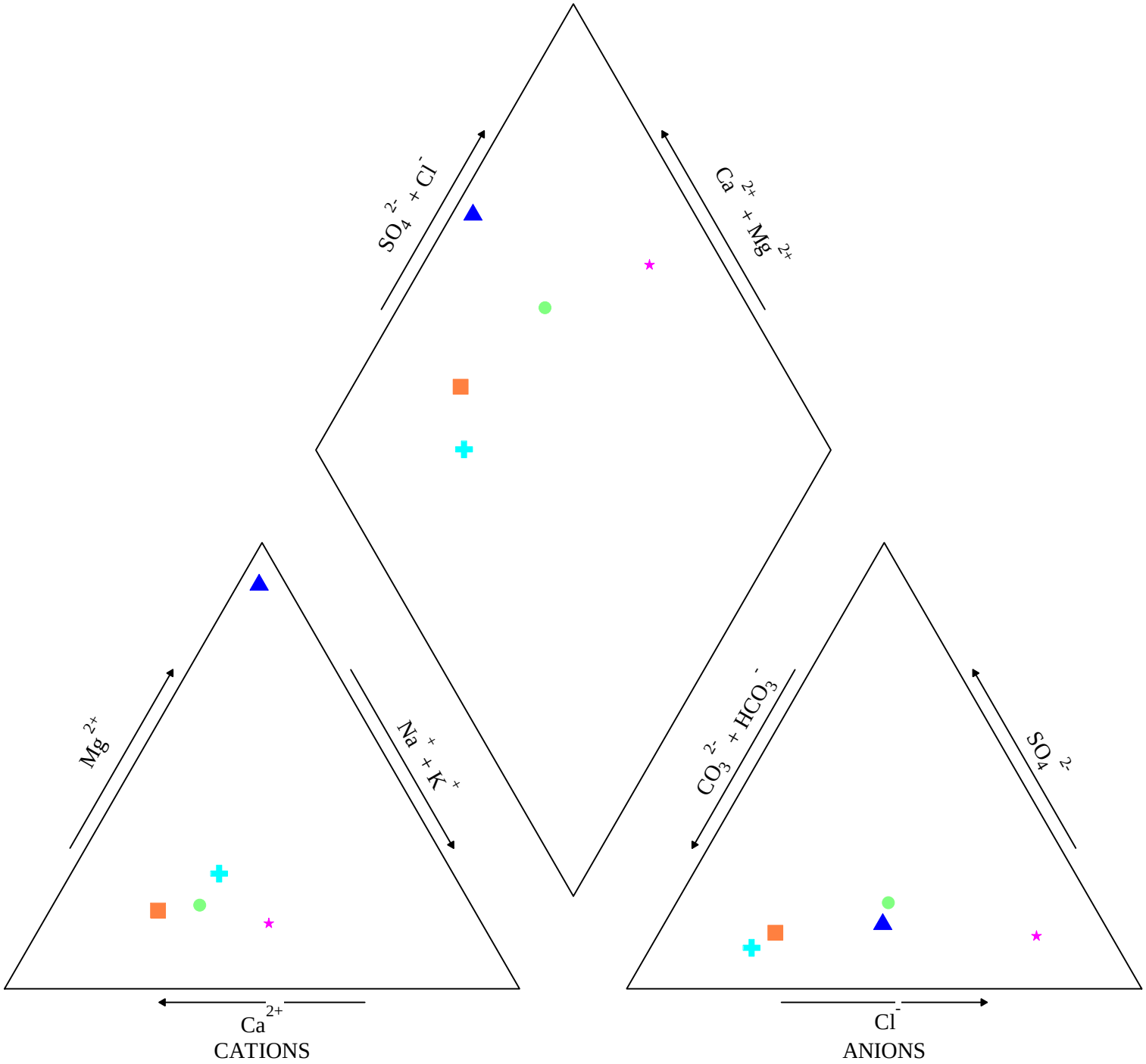


Tre'r Gof - Superficial Boreholes December 2015

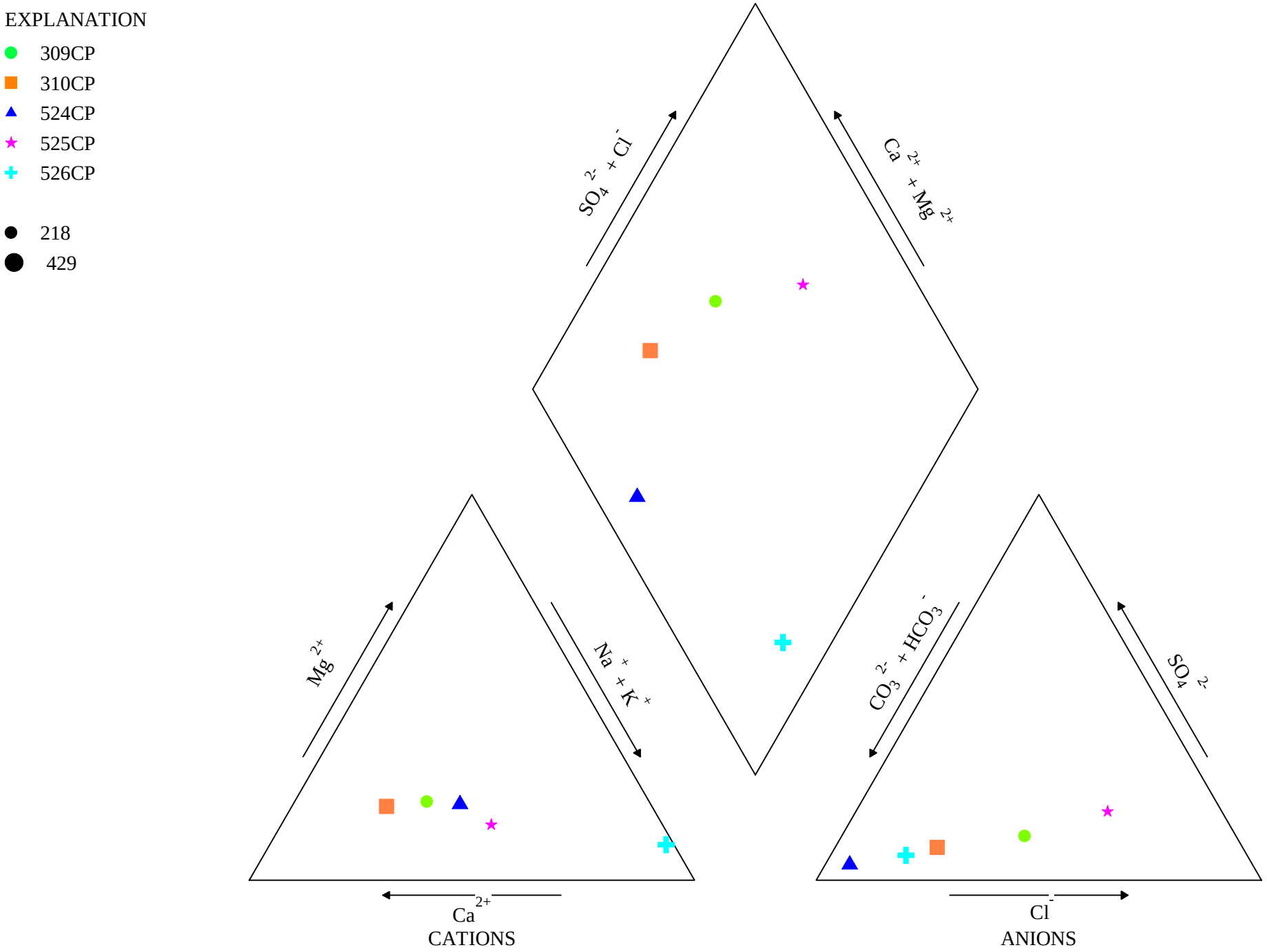
EXPLANATION

- 309CP
- 310CP
- 524CP
- 525CP
- 526CP

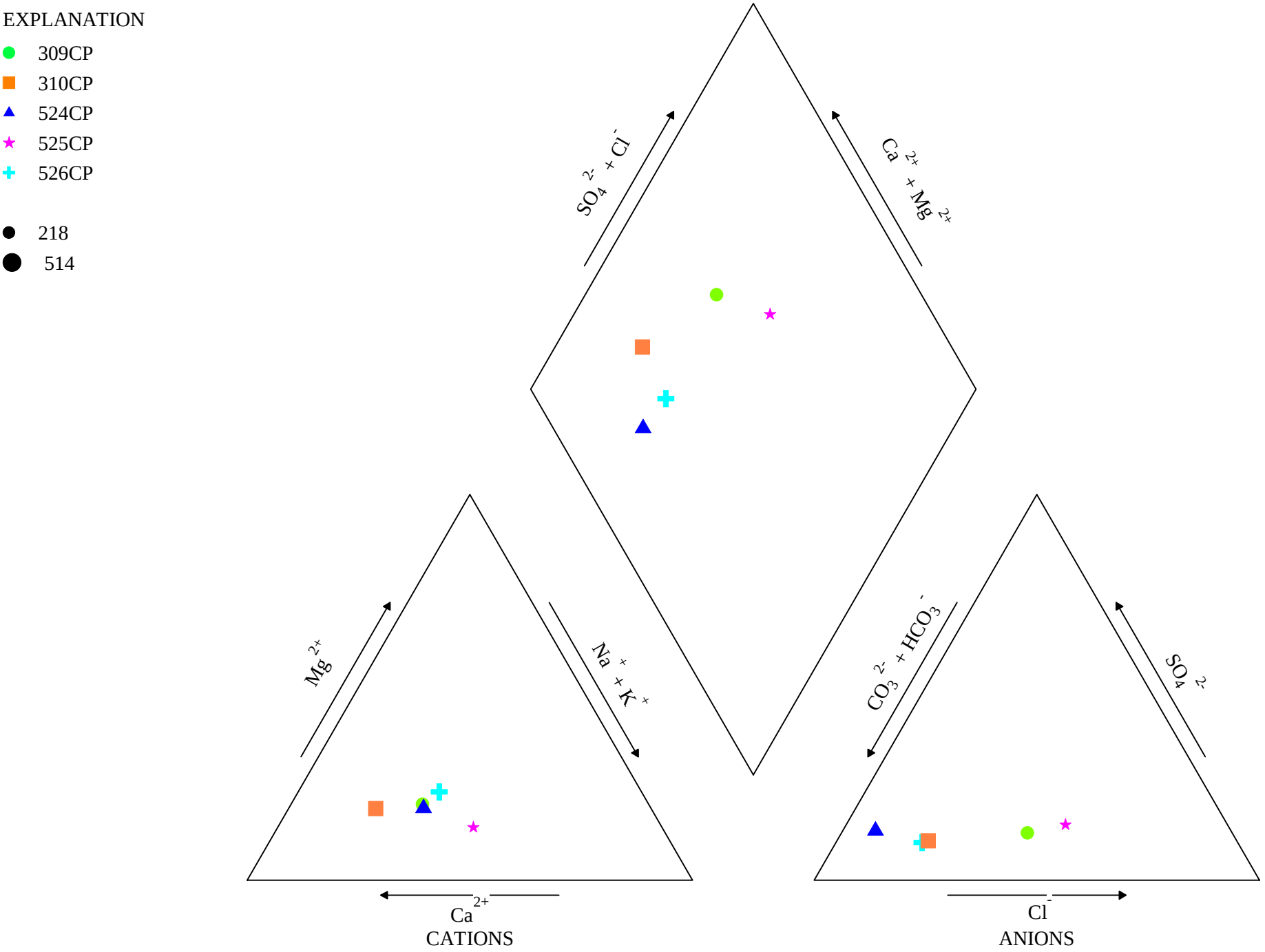
- 213
- 458



Tre'r Gof - Superficial Boreholes April 2016



Tre'r Gof - Superficial Boreholes August 2016

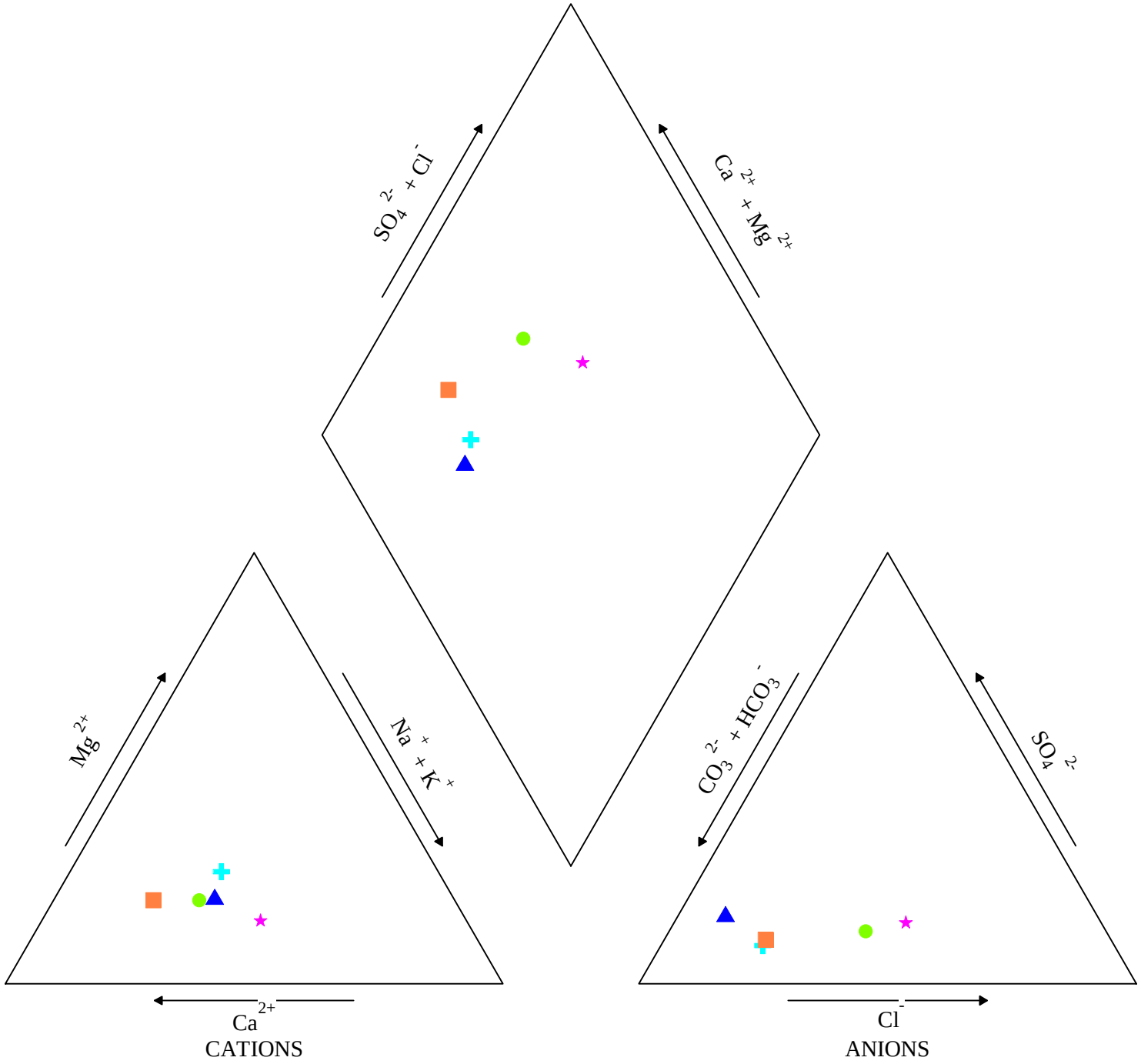


Tre'r Gof - Superficial Boreholes October 2016

EXPLANATION

- 309CP
- 310CP
- 524CP
- 525CP
- 526CP

- 249
- 514

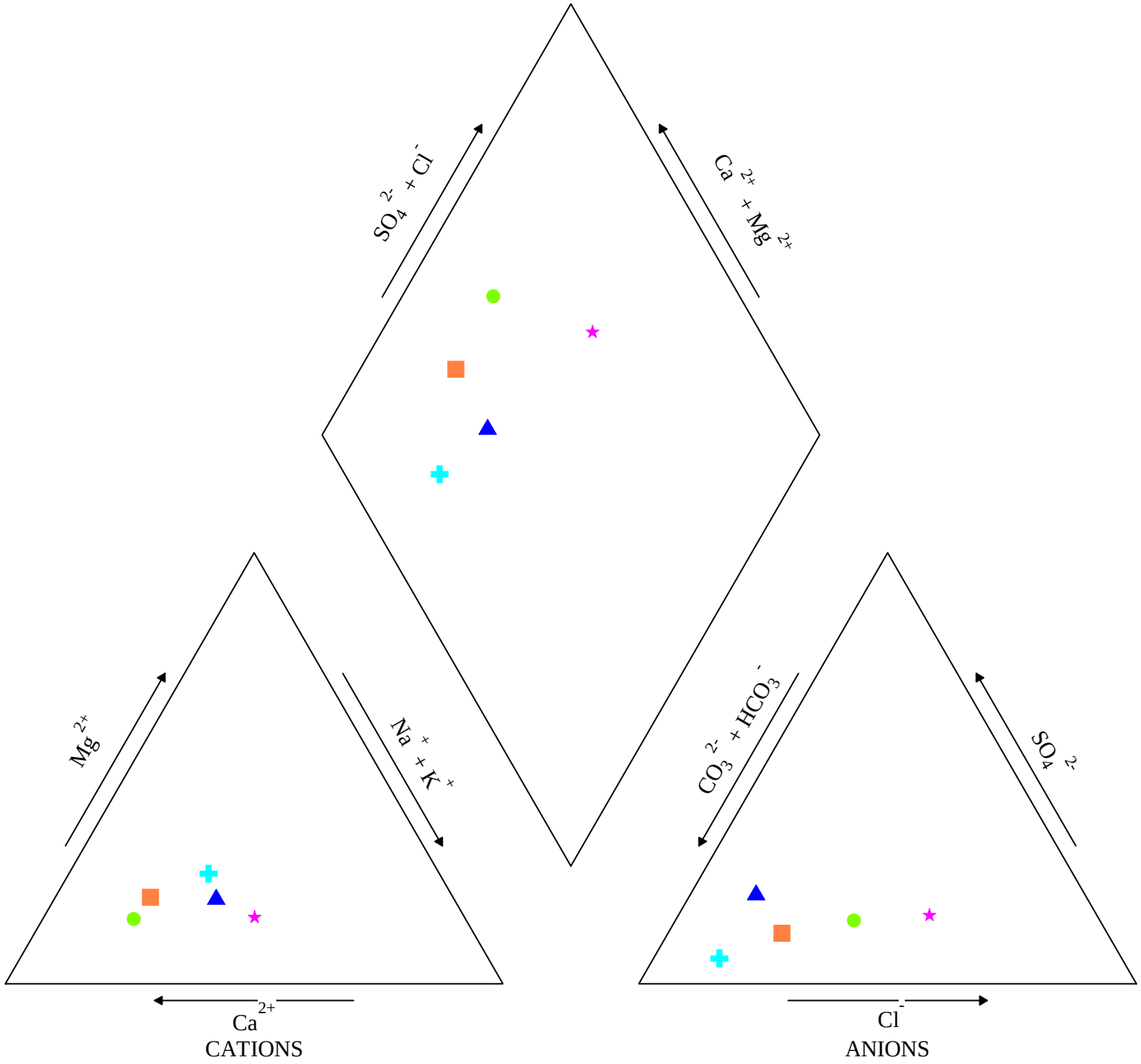


Tre'r Gof - Superficial Boreholes February 2017

EXPLANATION

- 309CP
- 310CP
- 524CP
- 525CP
- 526CP

- 216
- 481

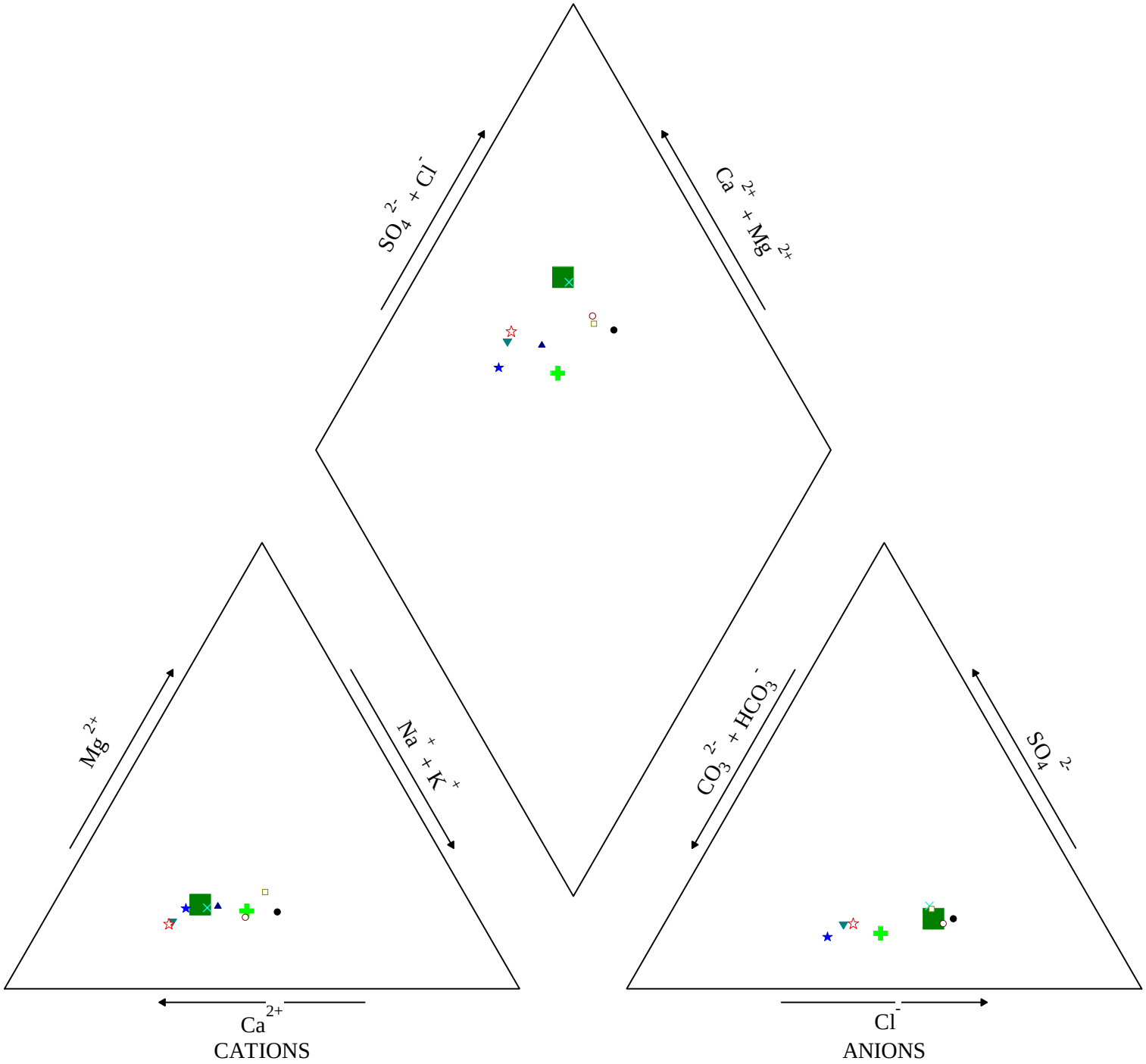


Tre'r Gof Flumes and Springs - Dec 15

EXPLANATION

- VN1
- VN2
- VN3
- VN4
- VN5
- Spring A
- Spring B
- Spring C
- Spring D
- Spring E

- 189
- 622

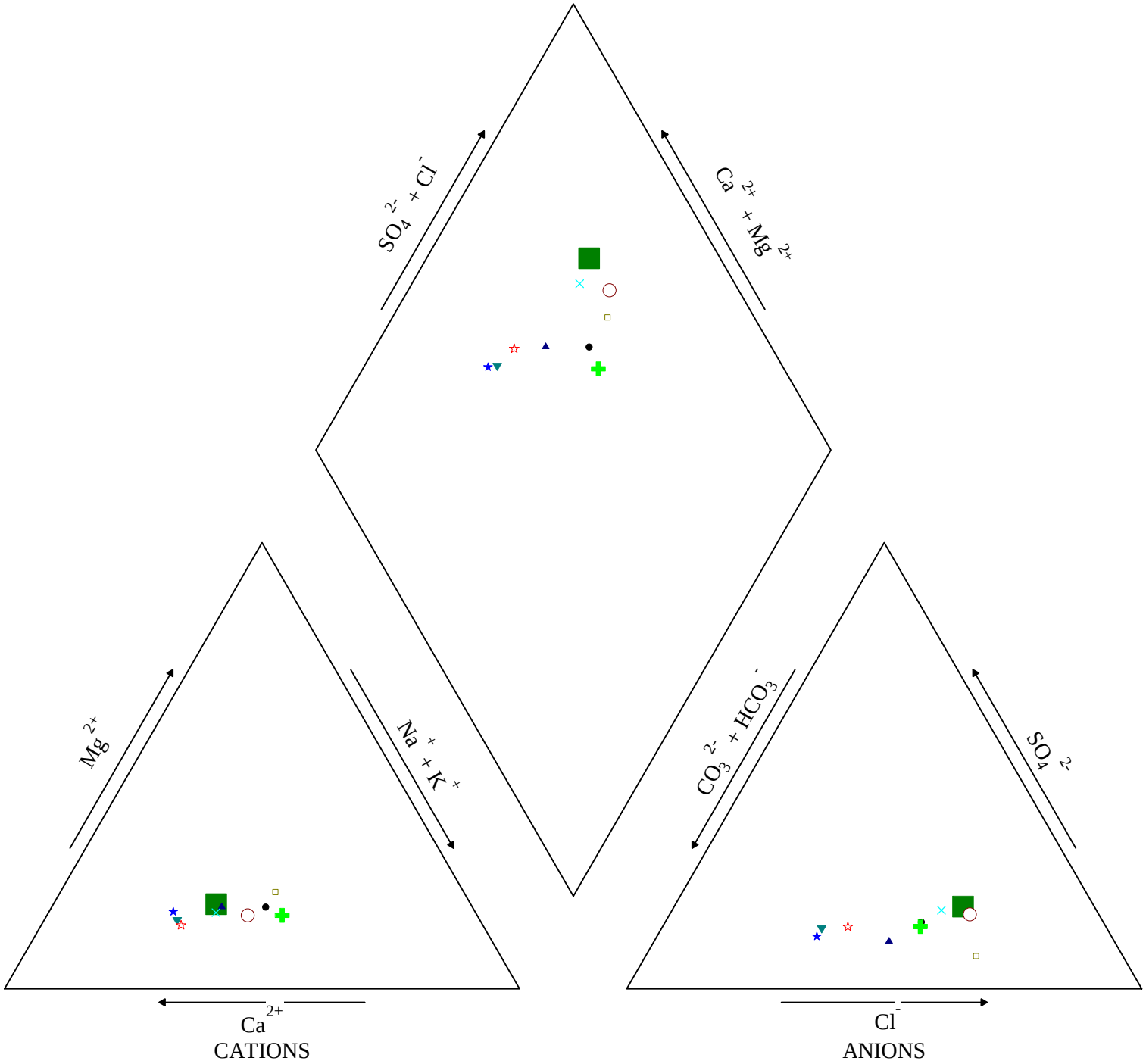


Tre'r Gof Flumes and Springs - Jan 15

EXPLANATION

- VN1
- VN2
- VN3
- VN4
- VN5
- Spring A
- Spring B
- Spring C
- Spring D
- Spring E

- 144
- 612

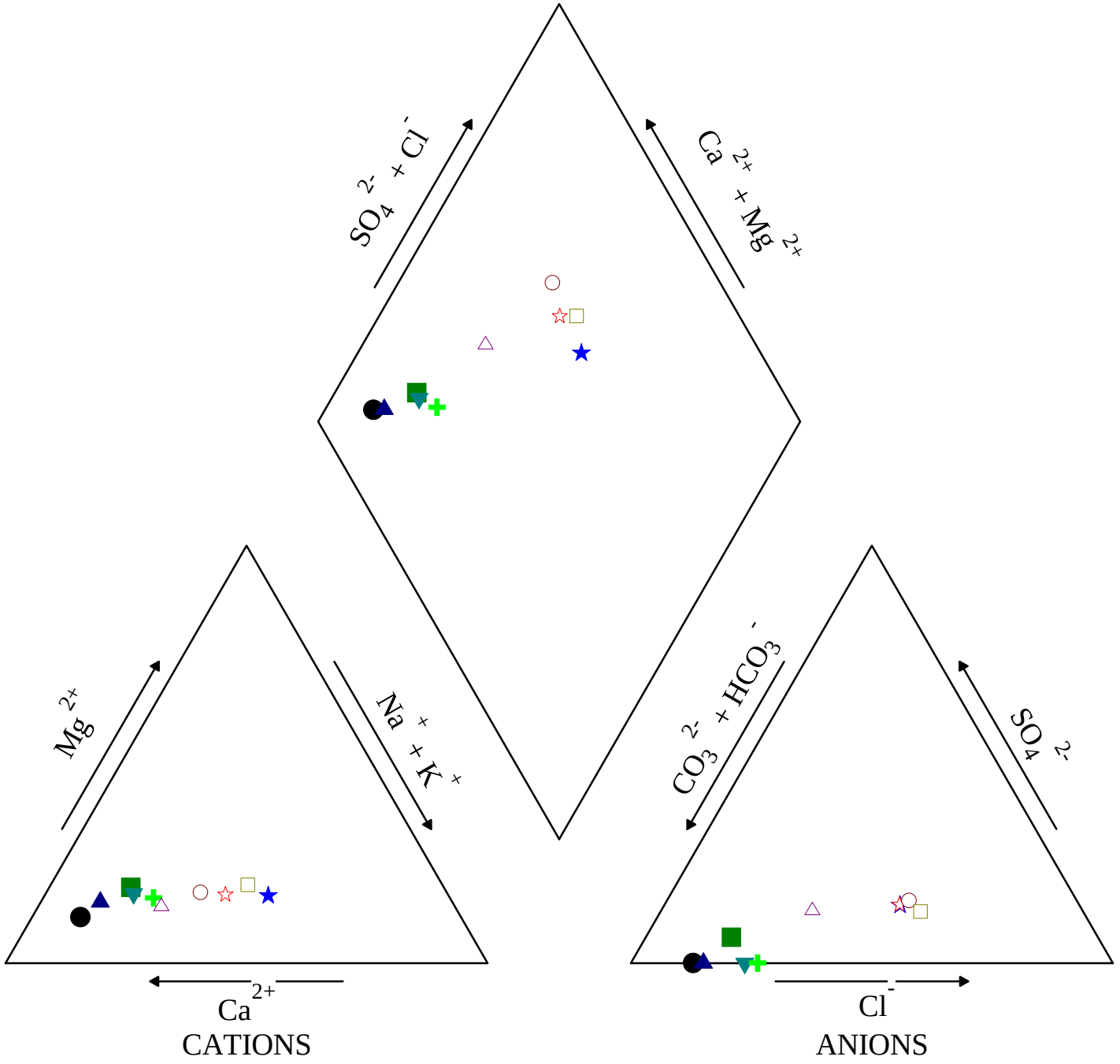


Tre'r Gof Springs and Flumes Feb-16

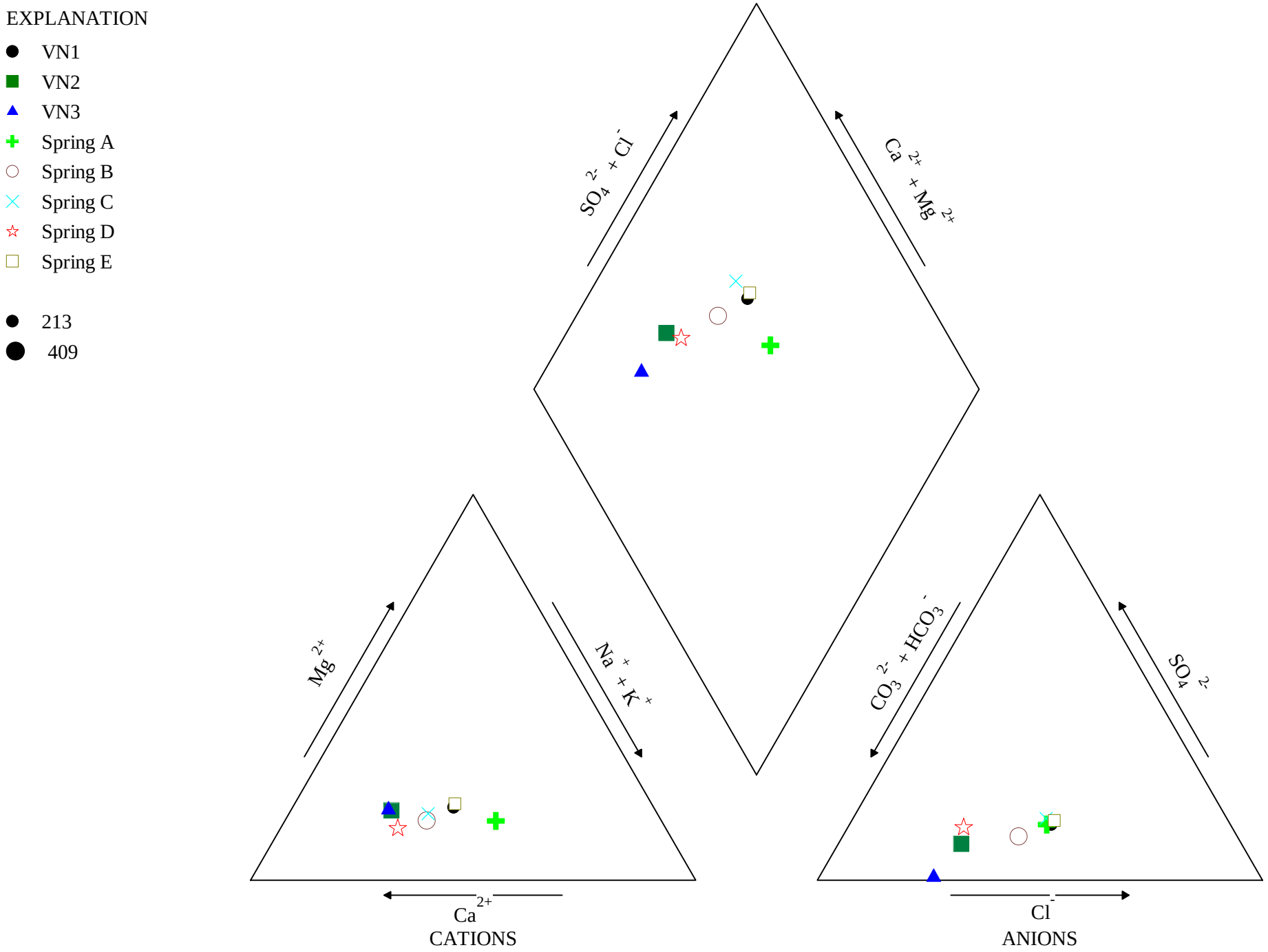
EXPLANATION

- SPRING A
- SPRING B
- SPRING C
- SPRING D
- SPRING E
- VN1
- VN2
- VN3
- VN4
- VN5

- 205
- 533



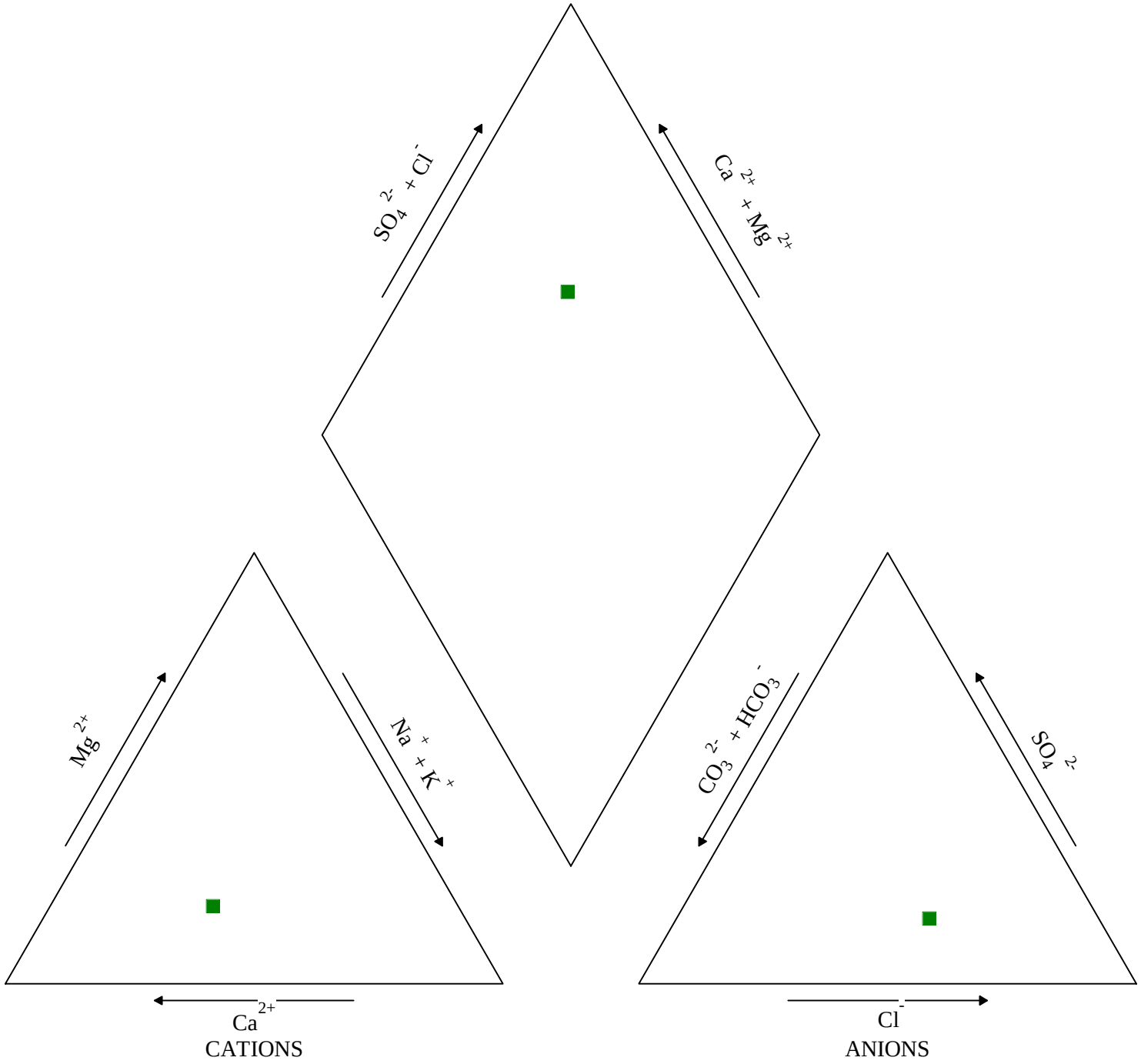
Tre'r Gof - Flumes and Springs April 2016



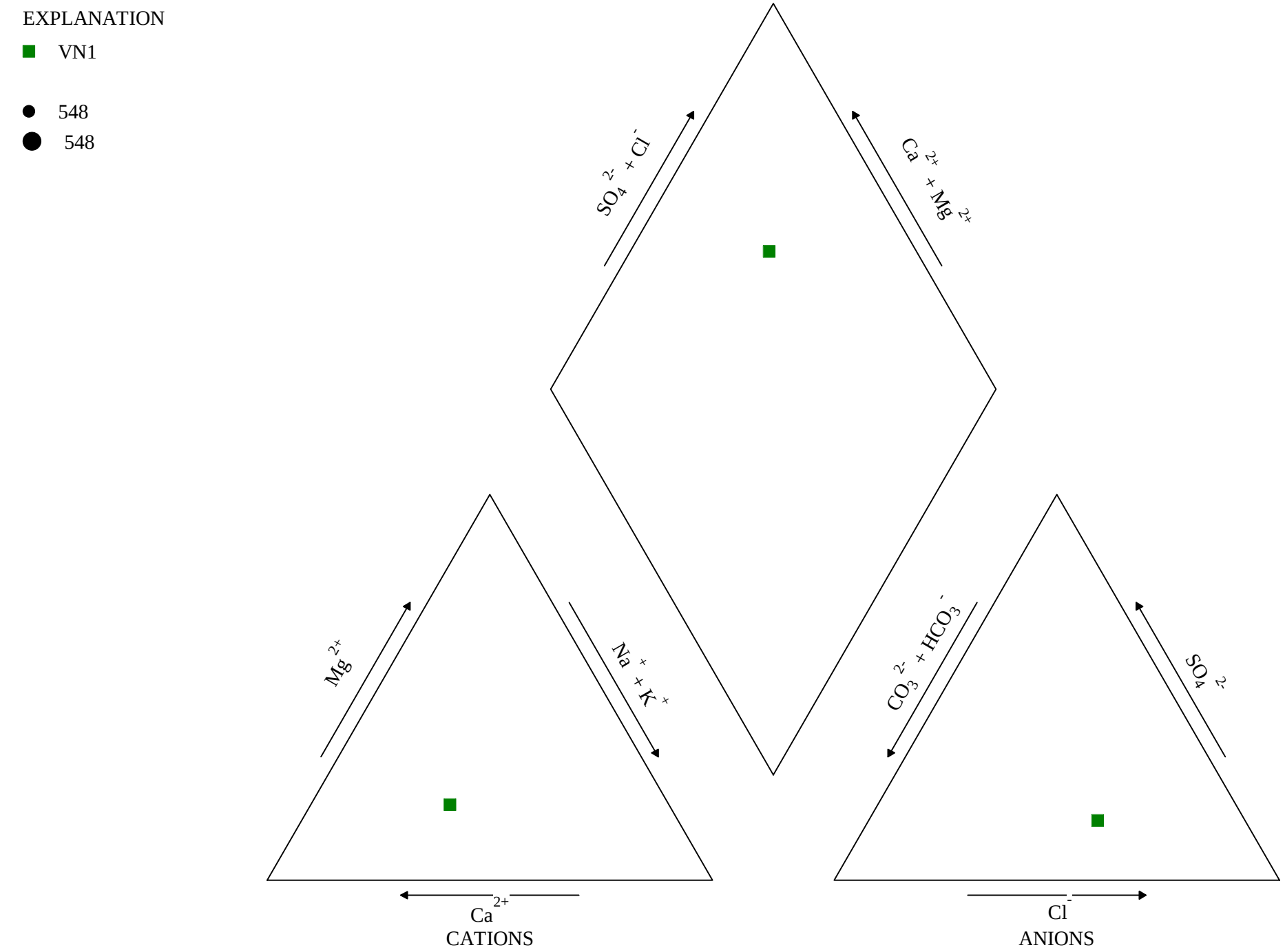
Tre'r Gof - Flumes and Springs August 2016

EXPLANATION

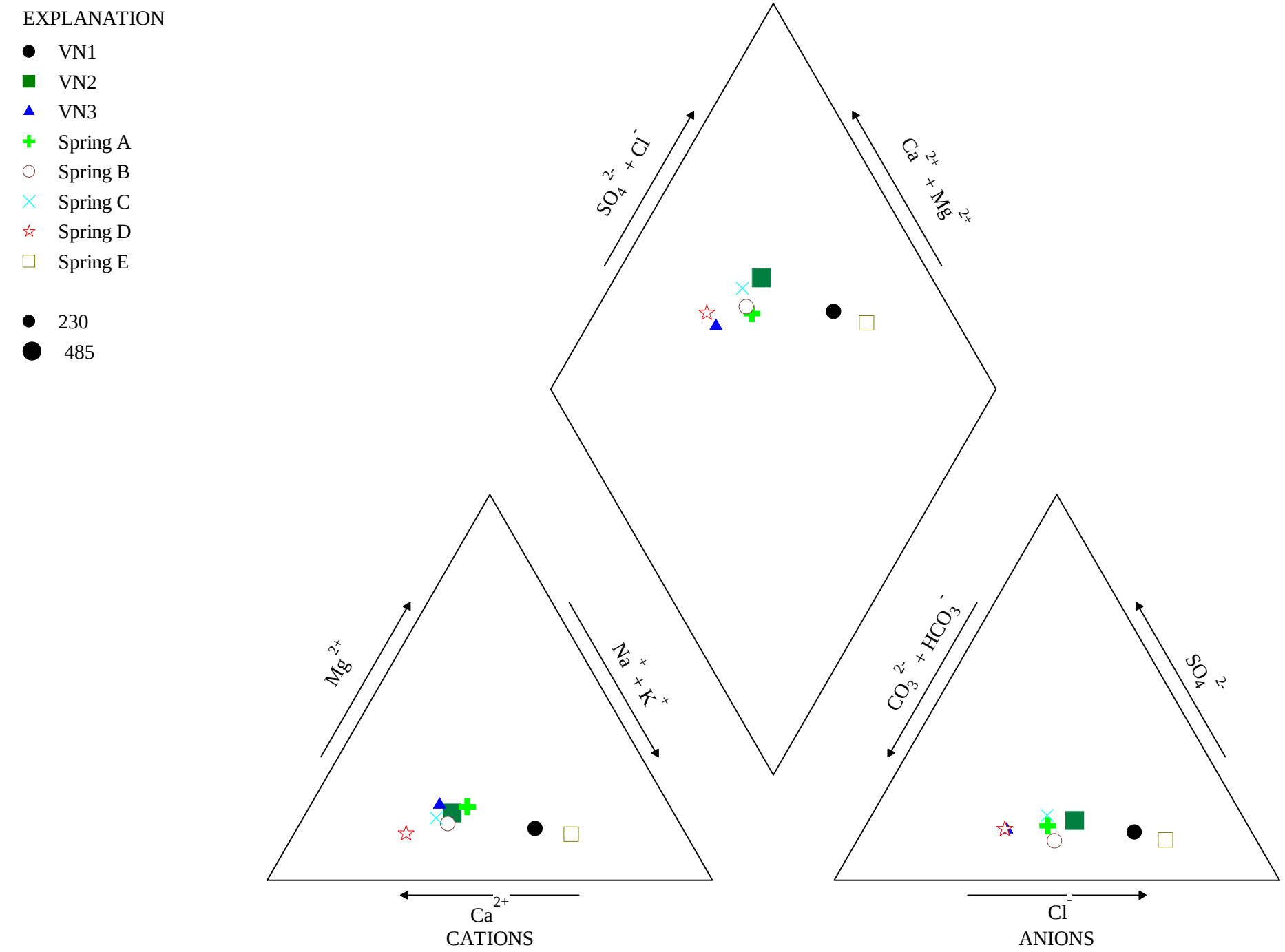
- VN1
- 568
- 568



Tre'r Gof - Flumes and Springs October 2016



Tre'r Gof - Flumes and Springs February 2017

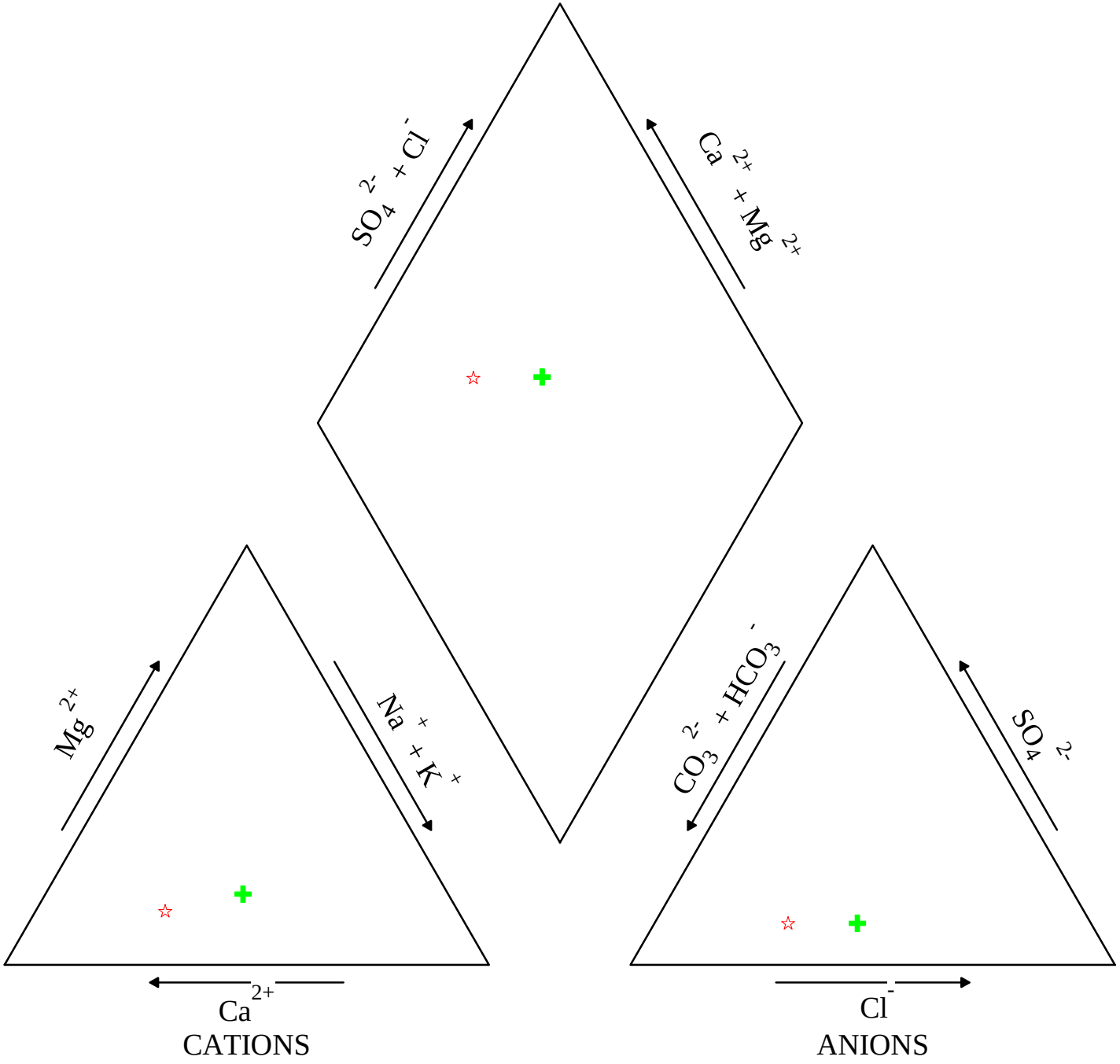


Tre'r Gof - Flumes and Springs August 2017

EXPLANATION

- VN2
- Spring A
- Spring D

- 415
- 477

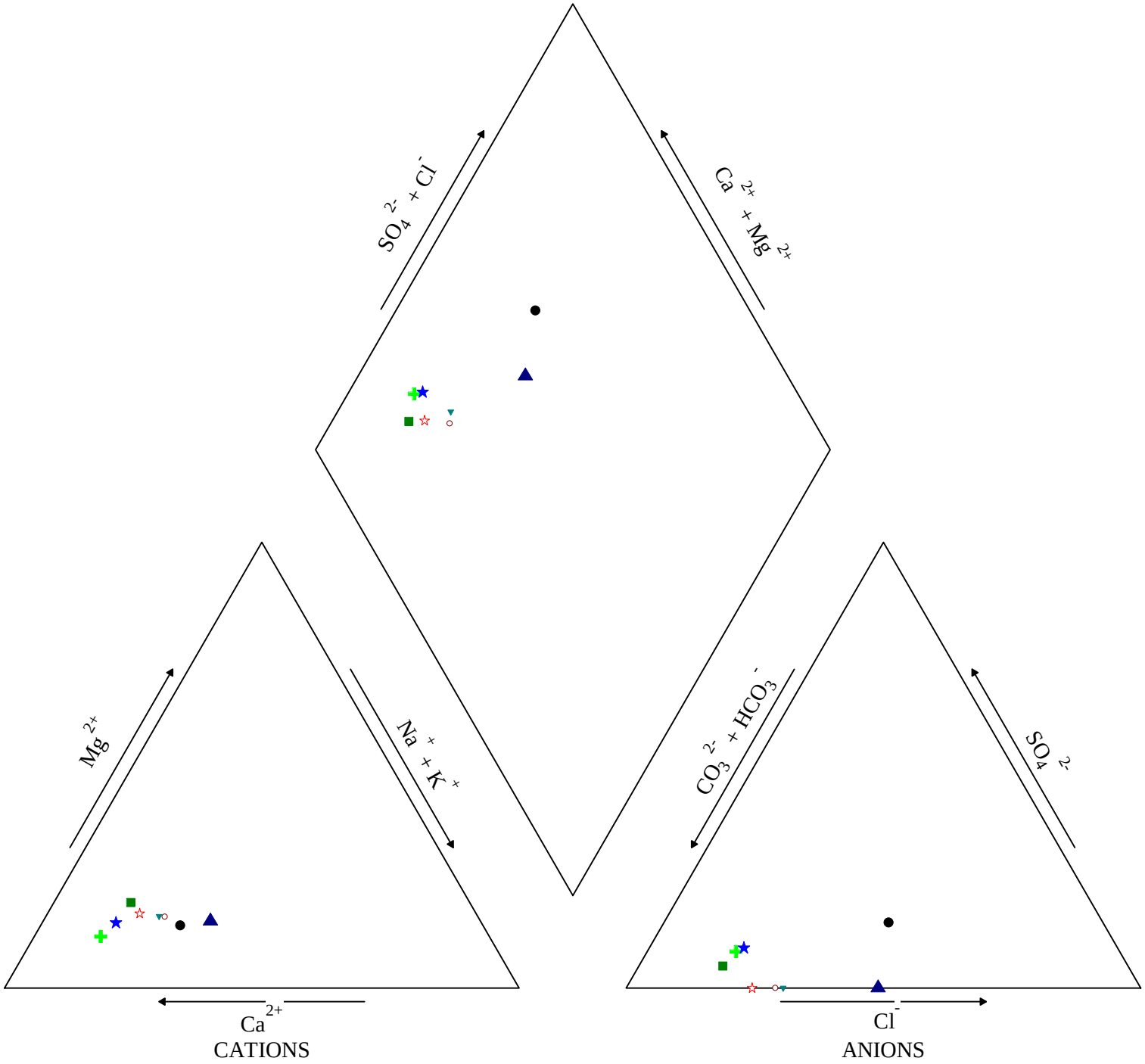


Tre'r Gof Piezometers Nov -15

EXPLANATION

- PZ1
- PZ2
- PZ3
- PZ4
- PZ5
- PZ6
- PZ7
- PZ8

- 369
- 669

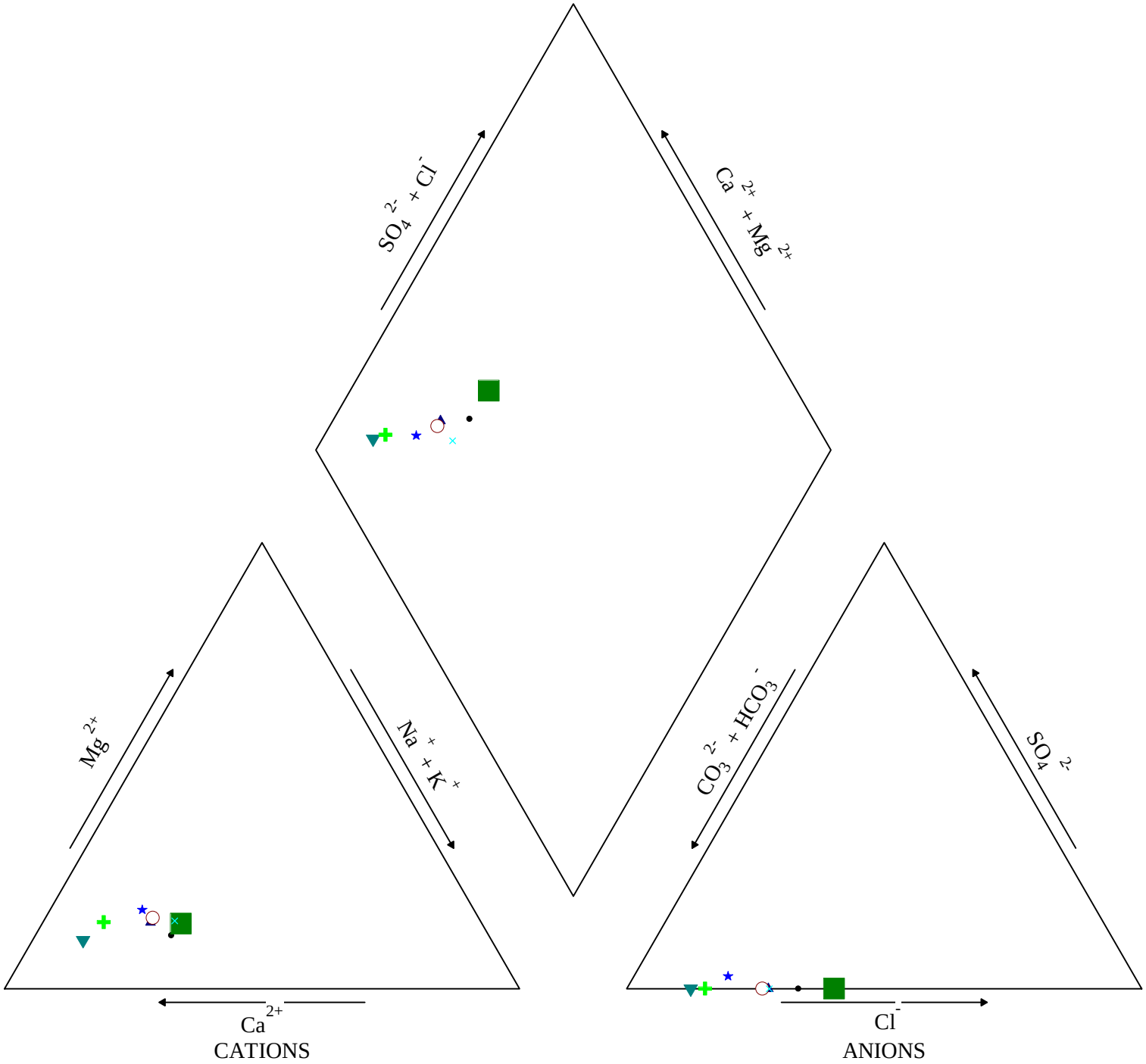


Tre'r Gof Piezometers - Dec 15

EXPLANATION

- PZ1
- PZ2
- PZ3
- PZ4
- PZ5
- PZ6
- PZ7
- PZ8 Fixed

- 296
- 706

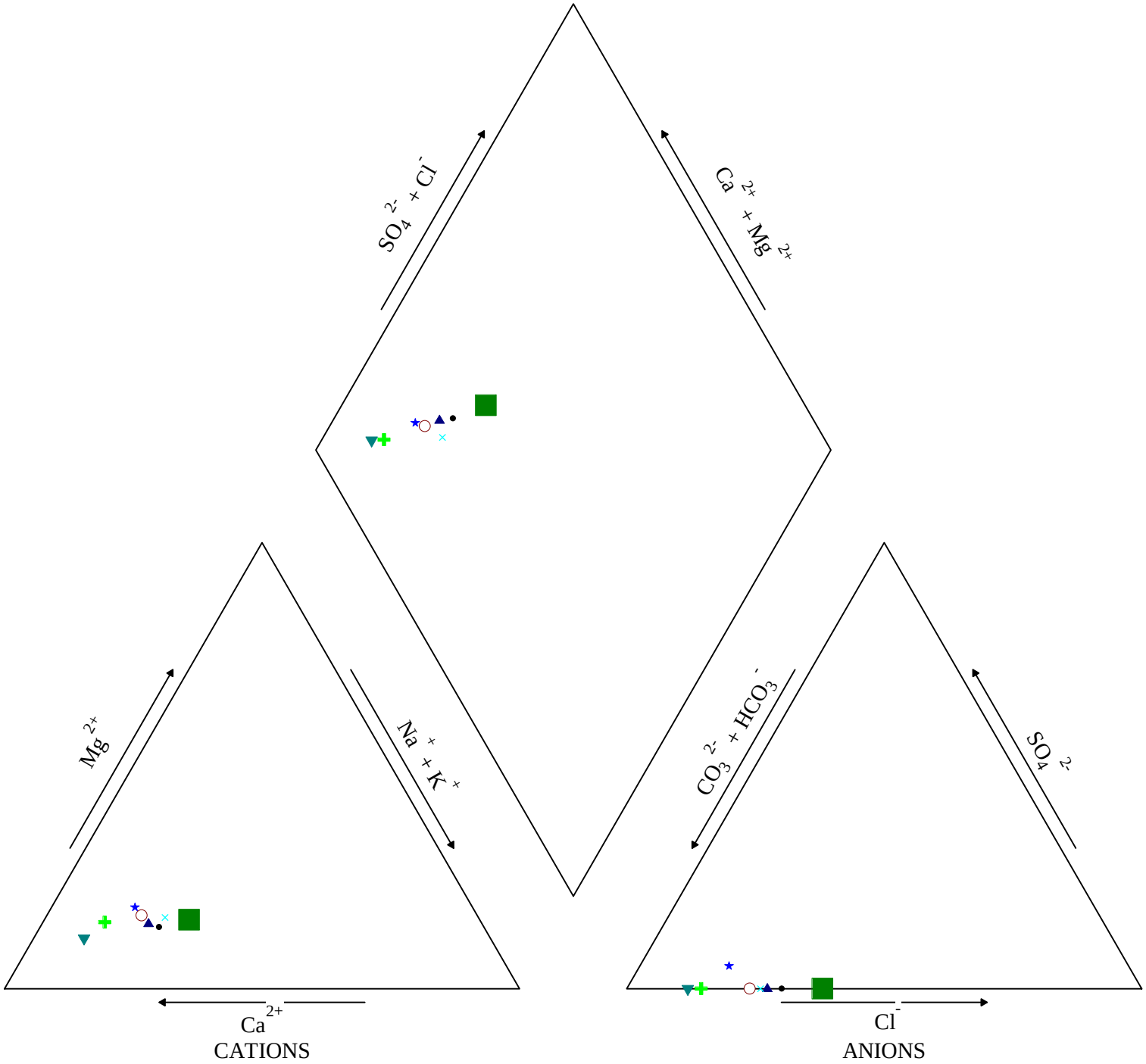


Tre'r Gof Piezometers - Jan 16

EXPLANATION

- PZ1
- PZ2
- PZ3
- PZ4
- PZ5
- PZ6
- PZ7
- PZ8 Fixed

- 337
- 784

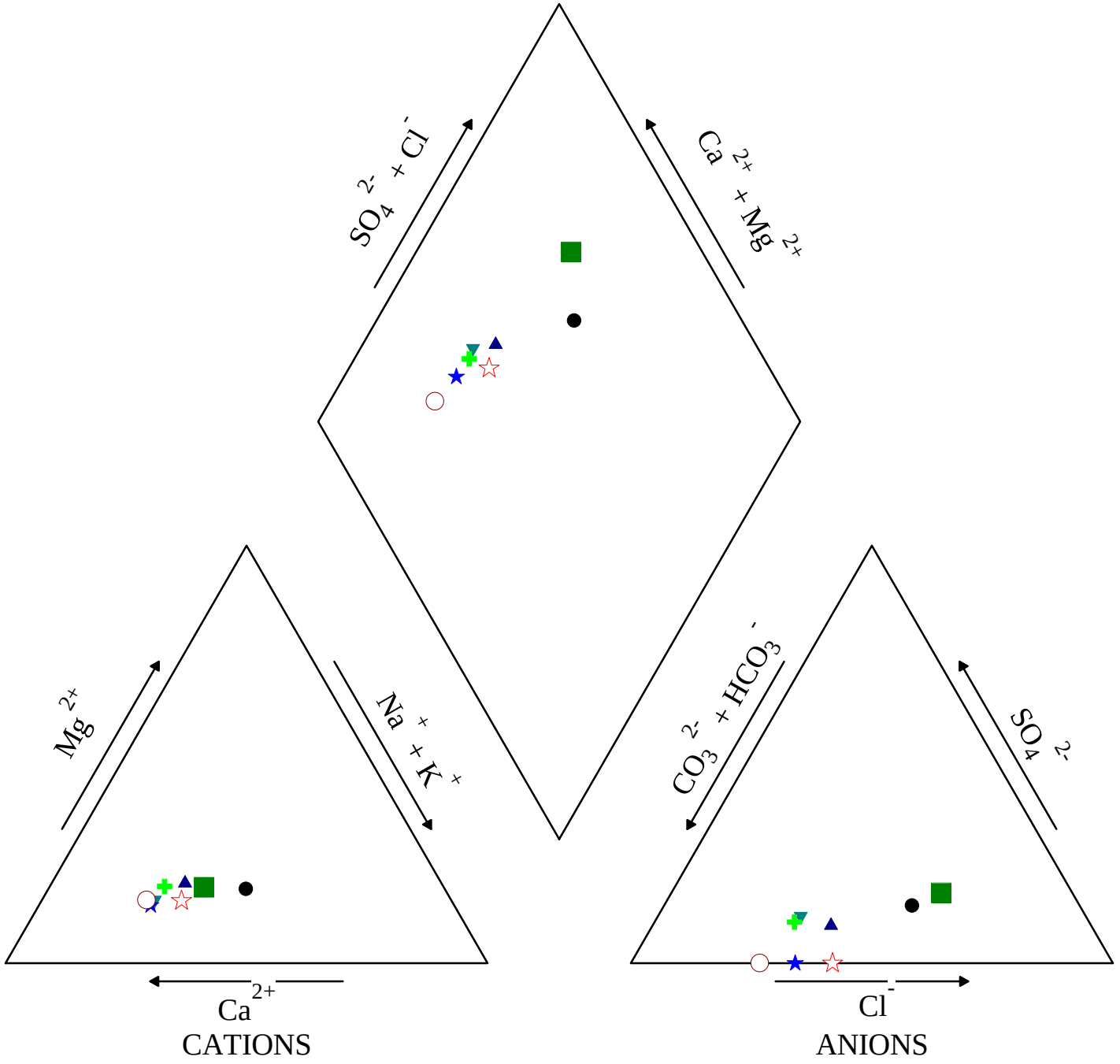


Tre'r Gof Piezometers Feb-16

EXPLANATION

- PZ1
- PZ2
- PZ3
- PZ4
- PZ5
- PZ6
- PZ7
- PZ8x

- 214
- 710

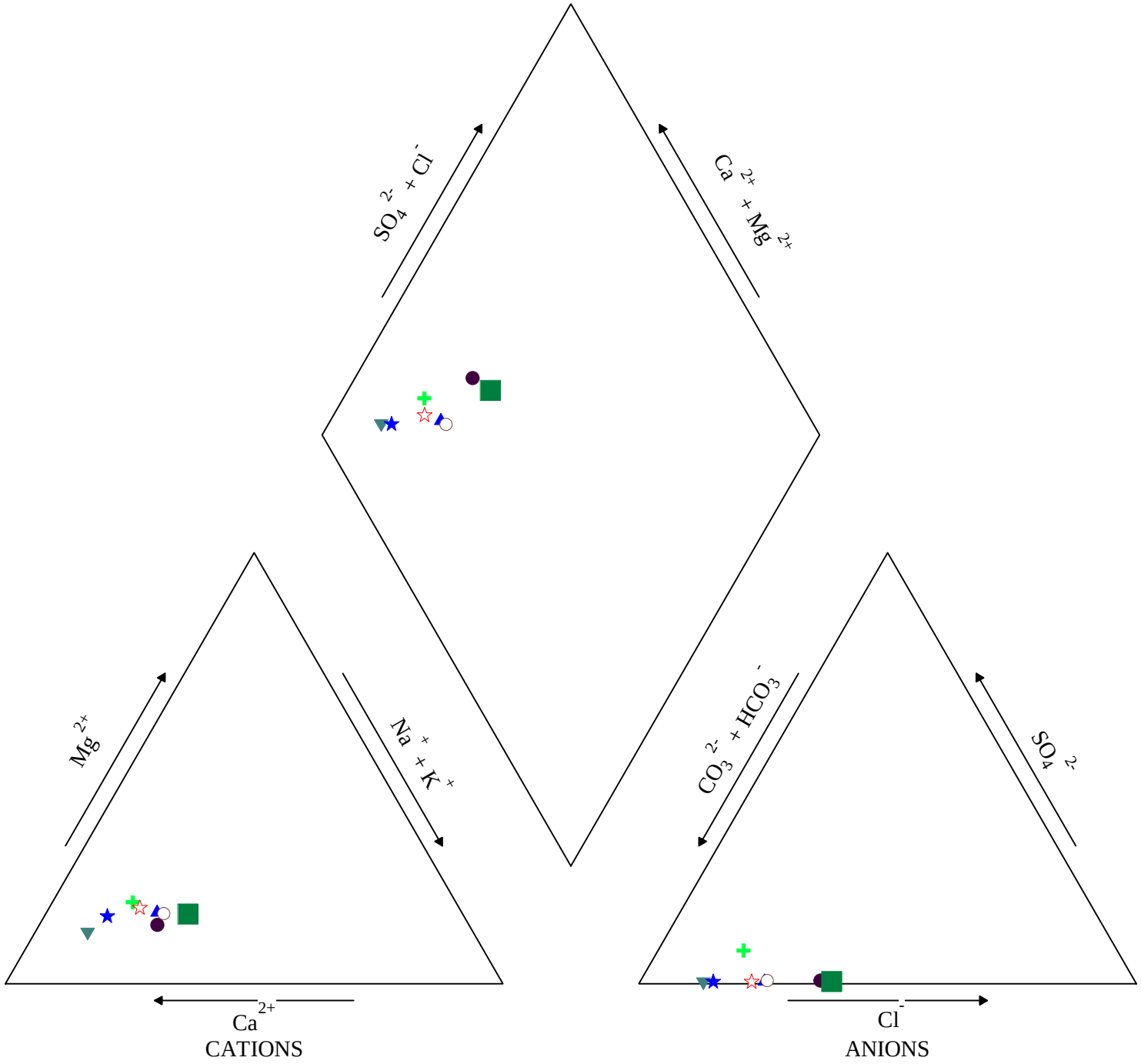


Tre'r Gof - Piezometers April 2016

EXPLANATION

- PZ1
- PZ2
- PZ3
- PZ4
- PZ5
- PZ6
- PZ7
- PZ8x

- 416
- 737

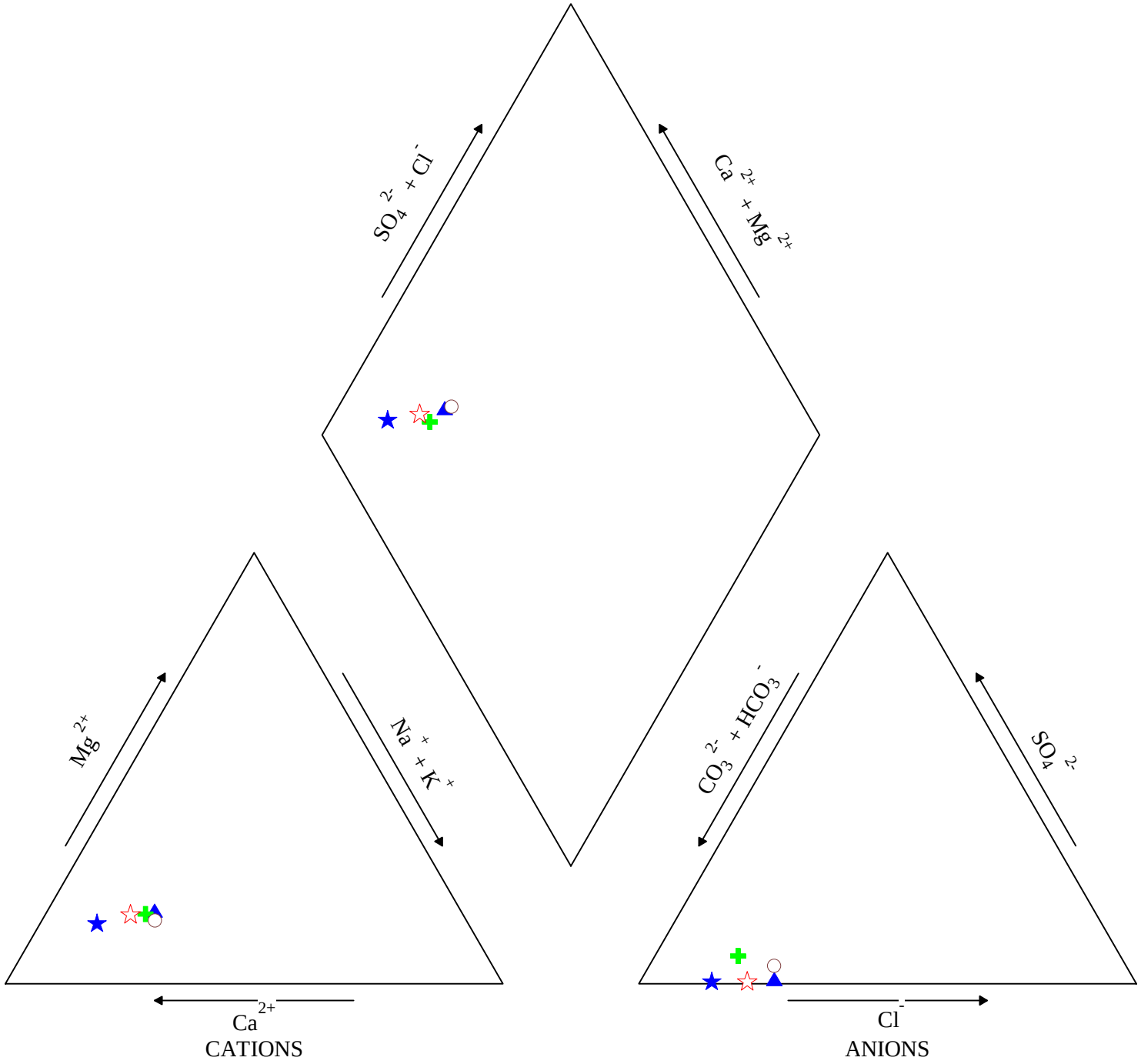


Tre'r Gof - Piezometers August 2016

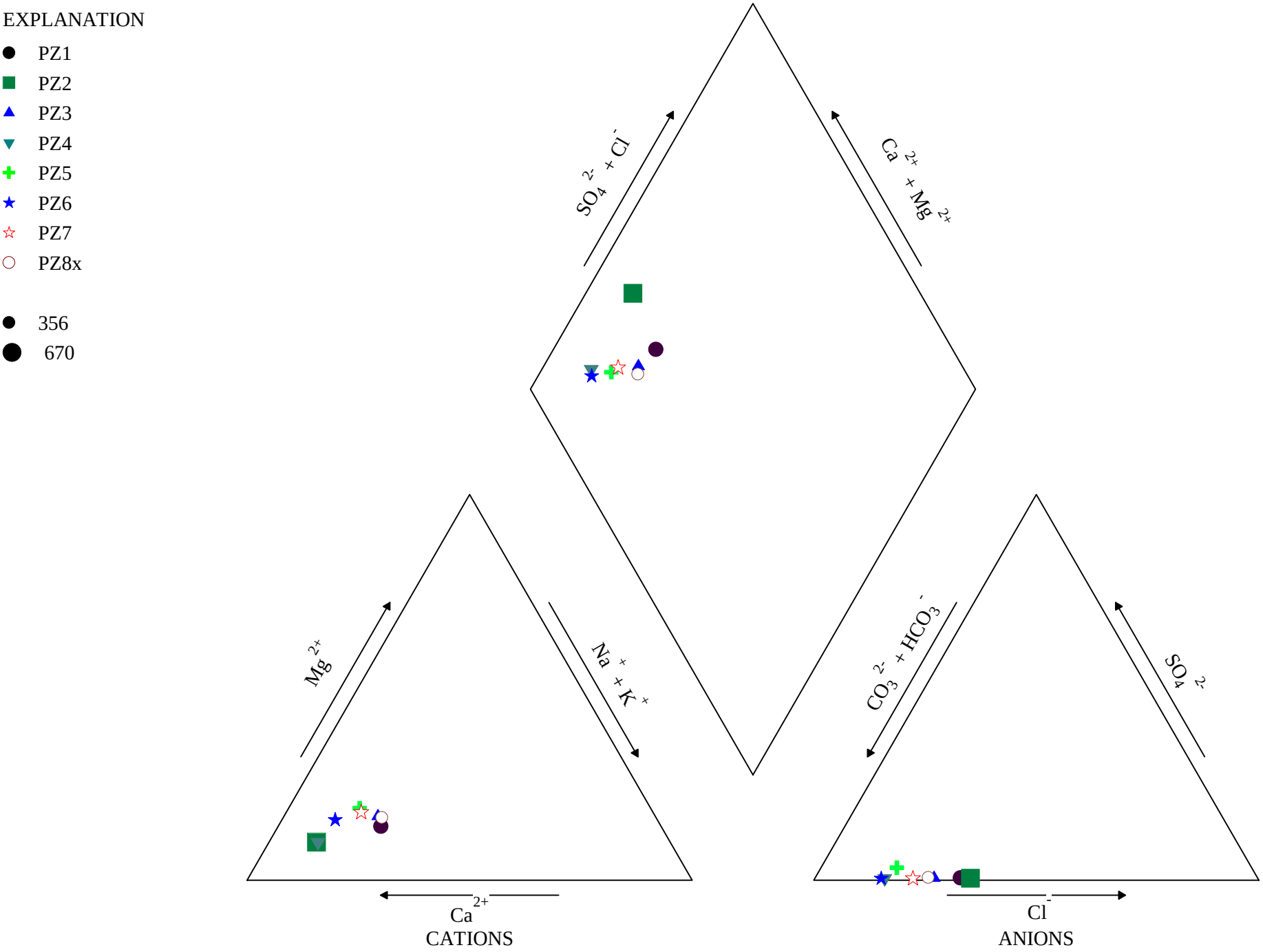
EXPLANATION

- PZ3
- PZ5
- PZ6
- PZ7
- PZ8x

- 351
- 545



Tre'r Gof - Piezometers October 2016

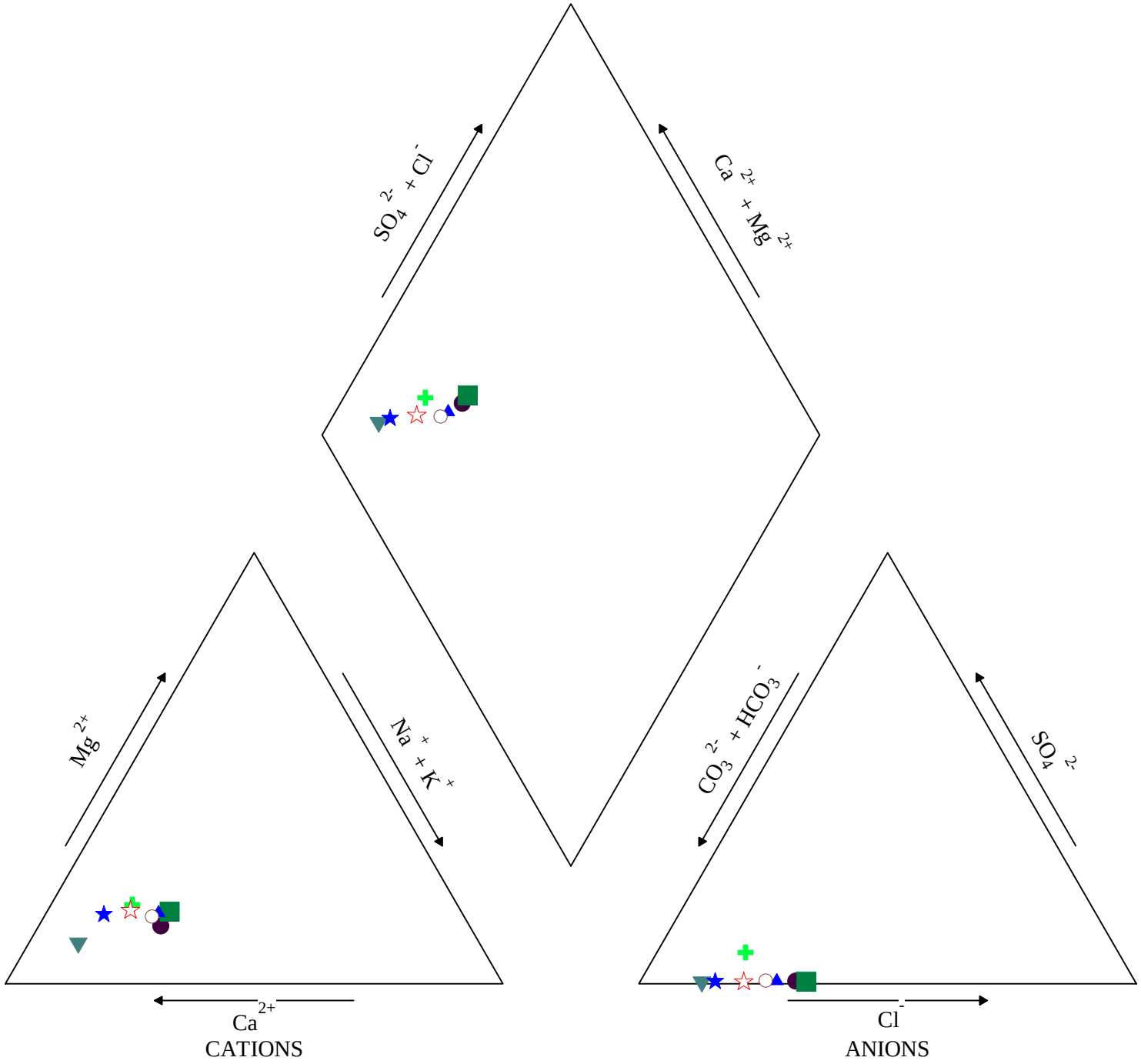


Tre'r Gof - Piezometers February 2017

EXPLANATION

- PZ1
- PZ2
- PZ3
- PZ4
- PZ5
- PZ6
- PZ7
- PZ8x

- 343
- 575

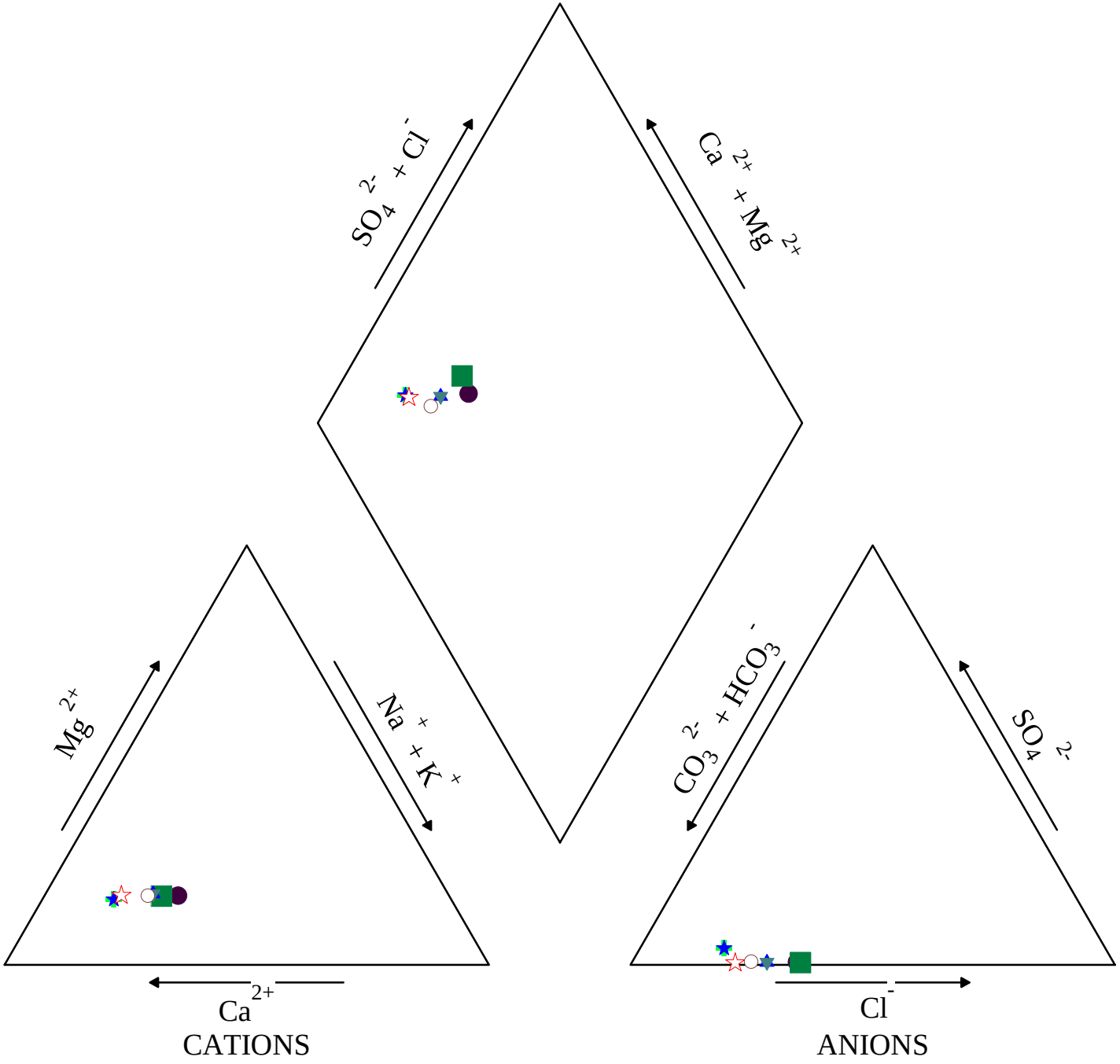


Tre'r Gof - Piezometers May 2017

EXPLANATION

- PZ1
- PZ2
- PZ3
- PZ4
- PZ5
- PZ6
- PZ7
- PZ8x

- 360
- 593

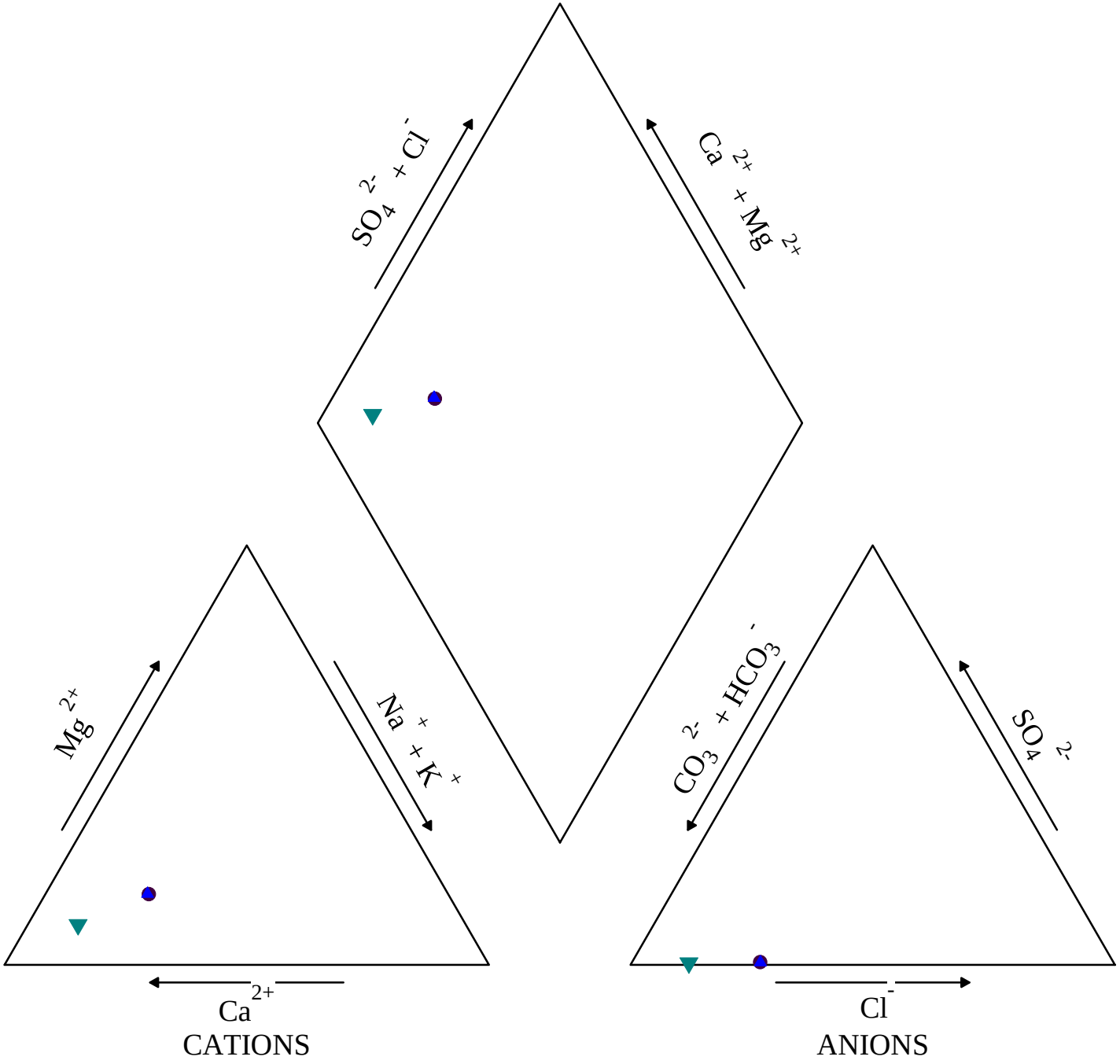


Tre'r Gof - Piezometers August 2017

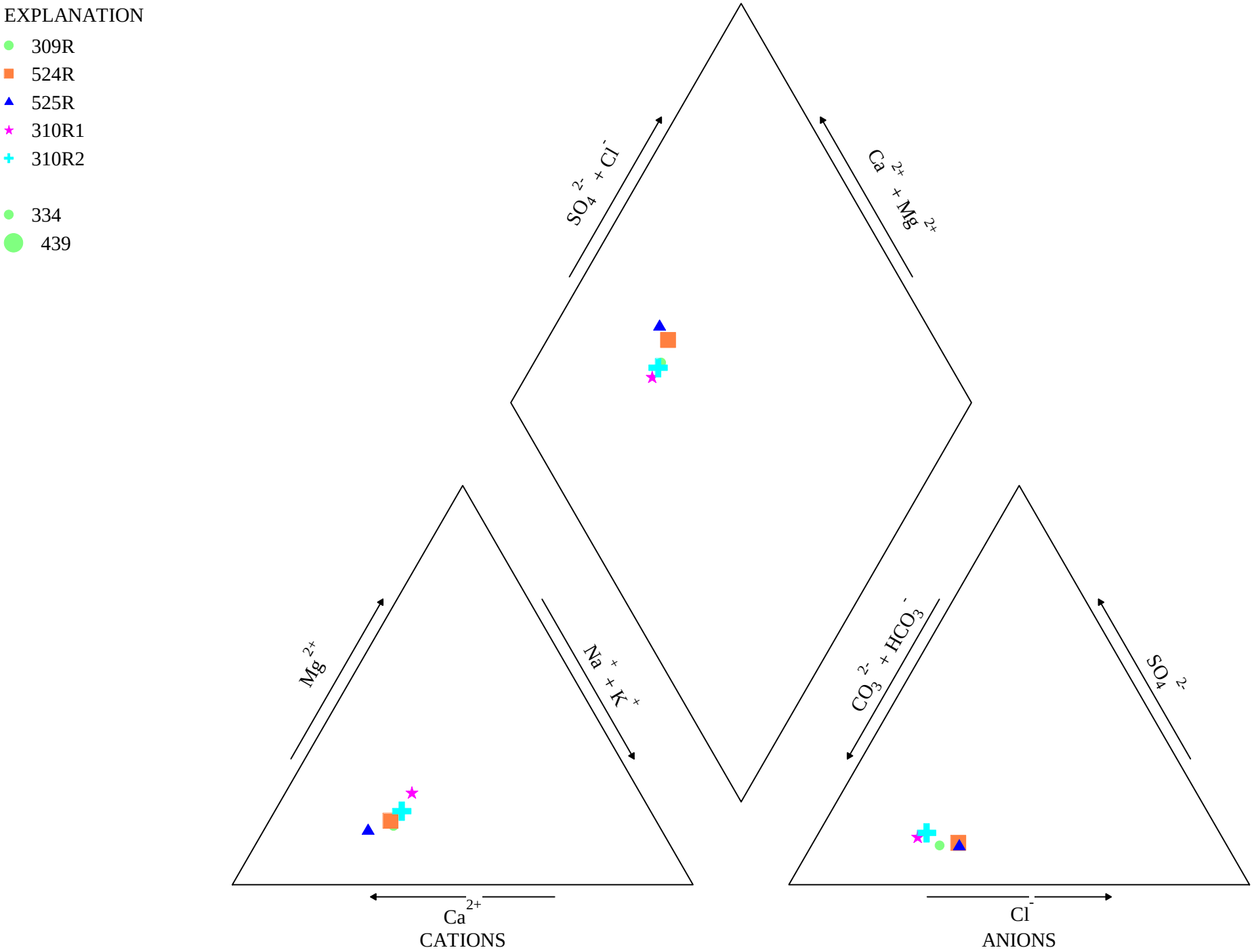
EXPLANATION

- PZ1
- PZ2
- PZ3
- PZ4
- PZ5
- PZ6
- PZ7
- PZ8x

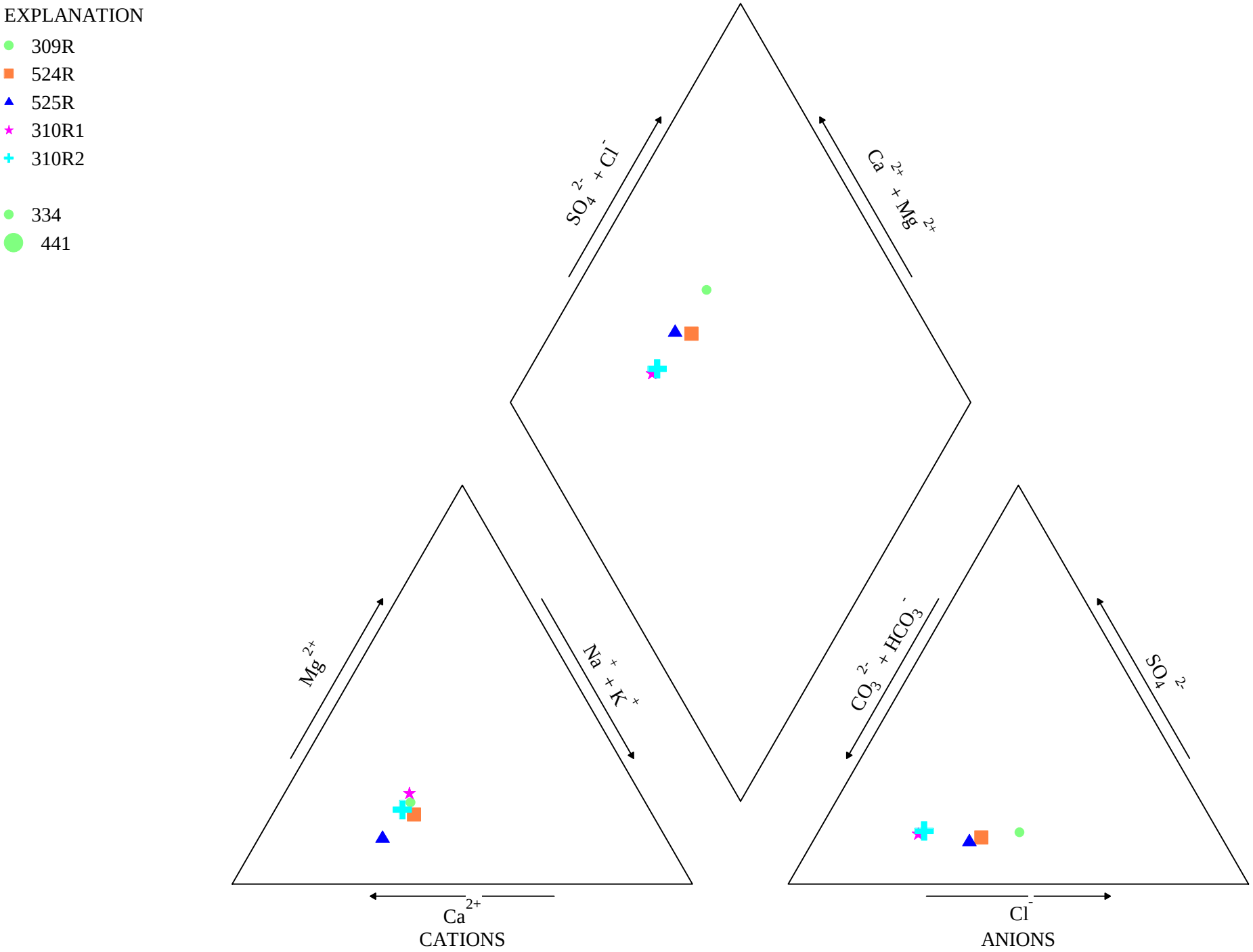
- 461
- 528



Tre'r Gof - Bedrock Boreholes March 2015



Tre'r Gof - Bedrock Boreholes June 2015

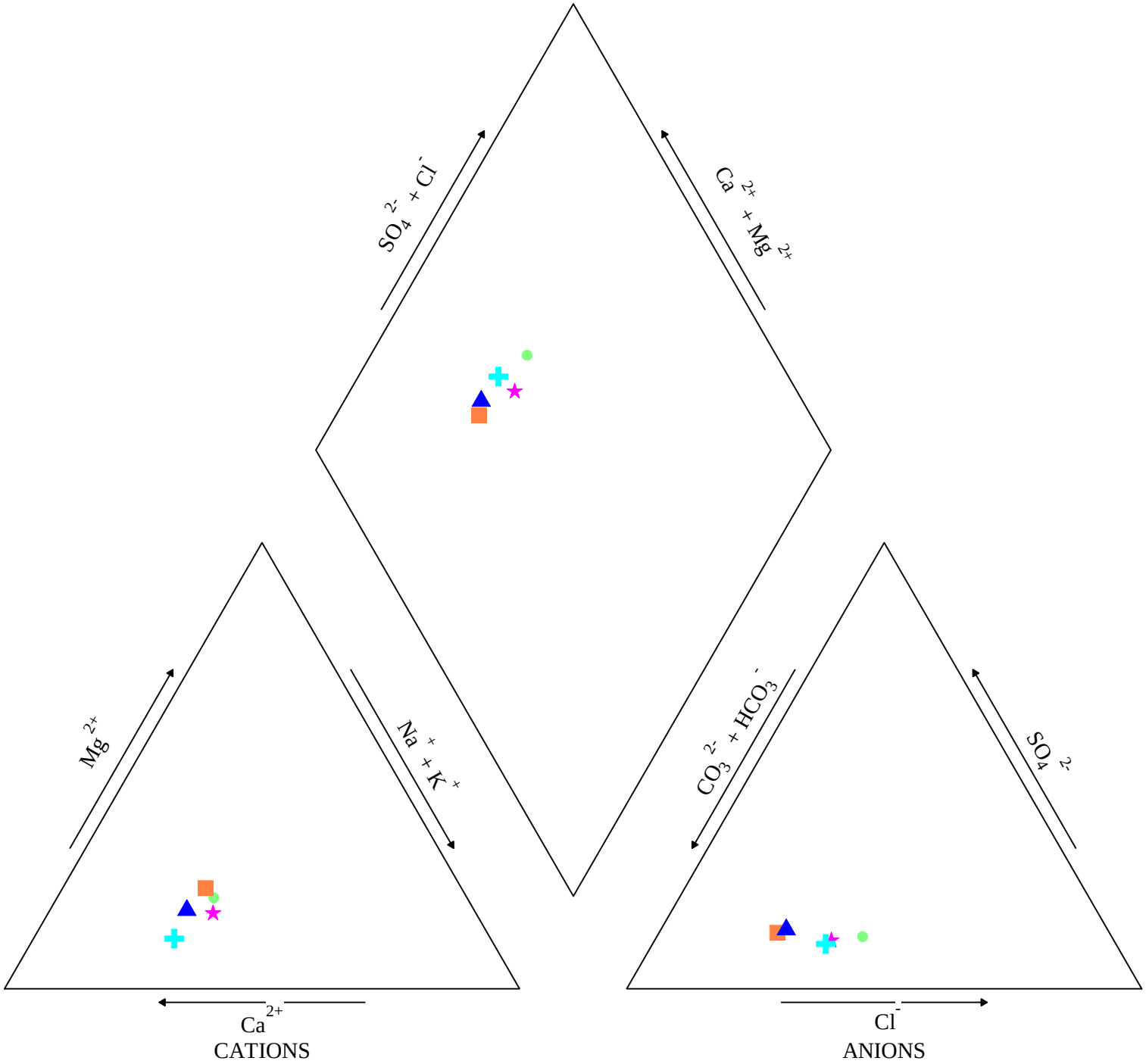


Tre'r Gof - Bedrock Boreholes September 2015

EXPLANATION

- 309R
- 524R
- 525R
- 310R1
- 310R2

- 214
- 433

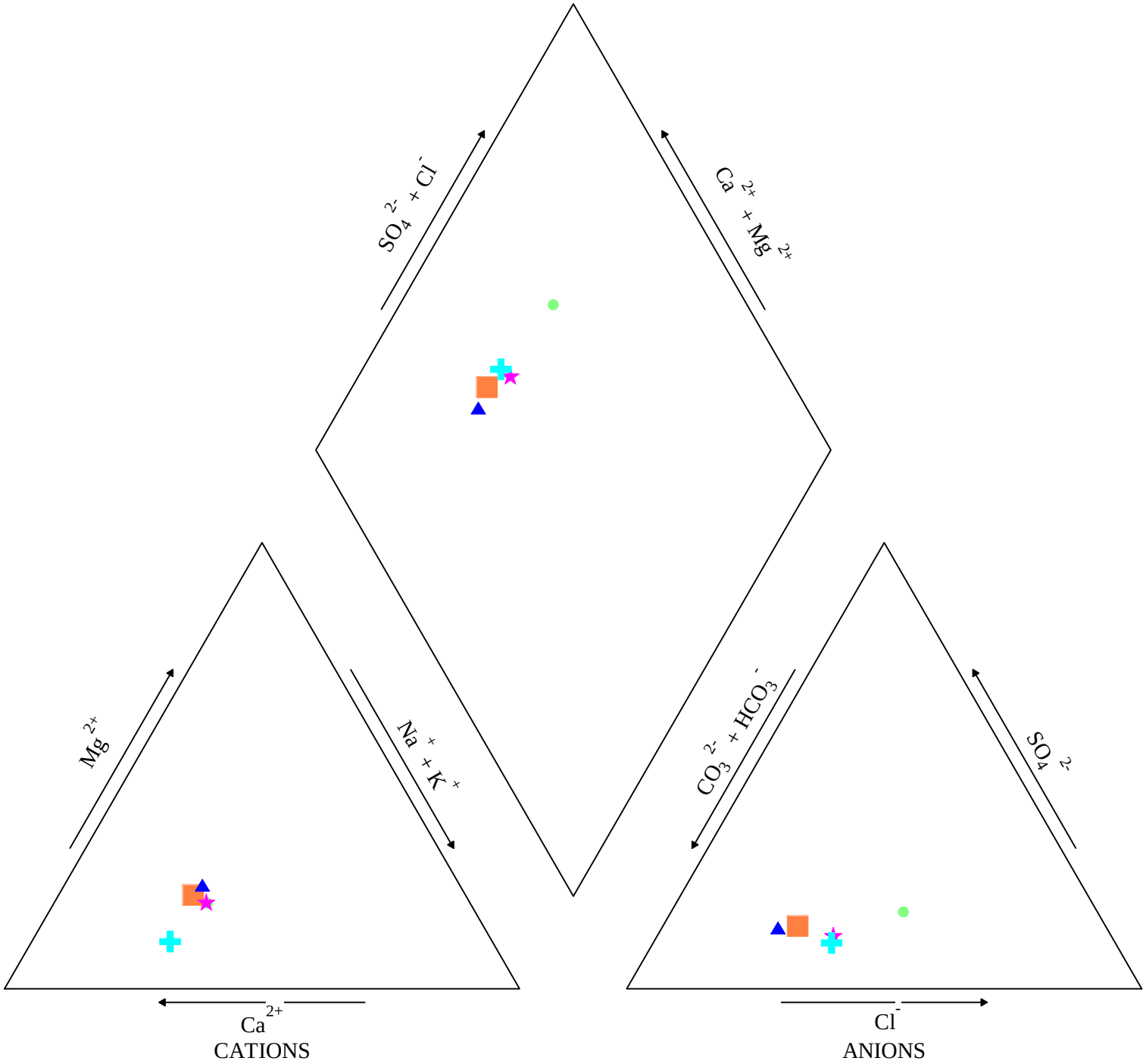


Tre'r Gof - Bedrock Boreholes December 2015

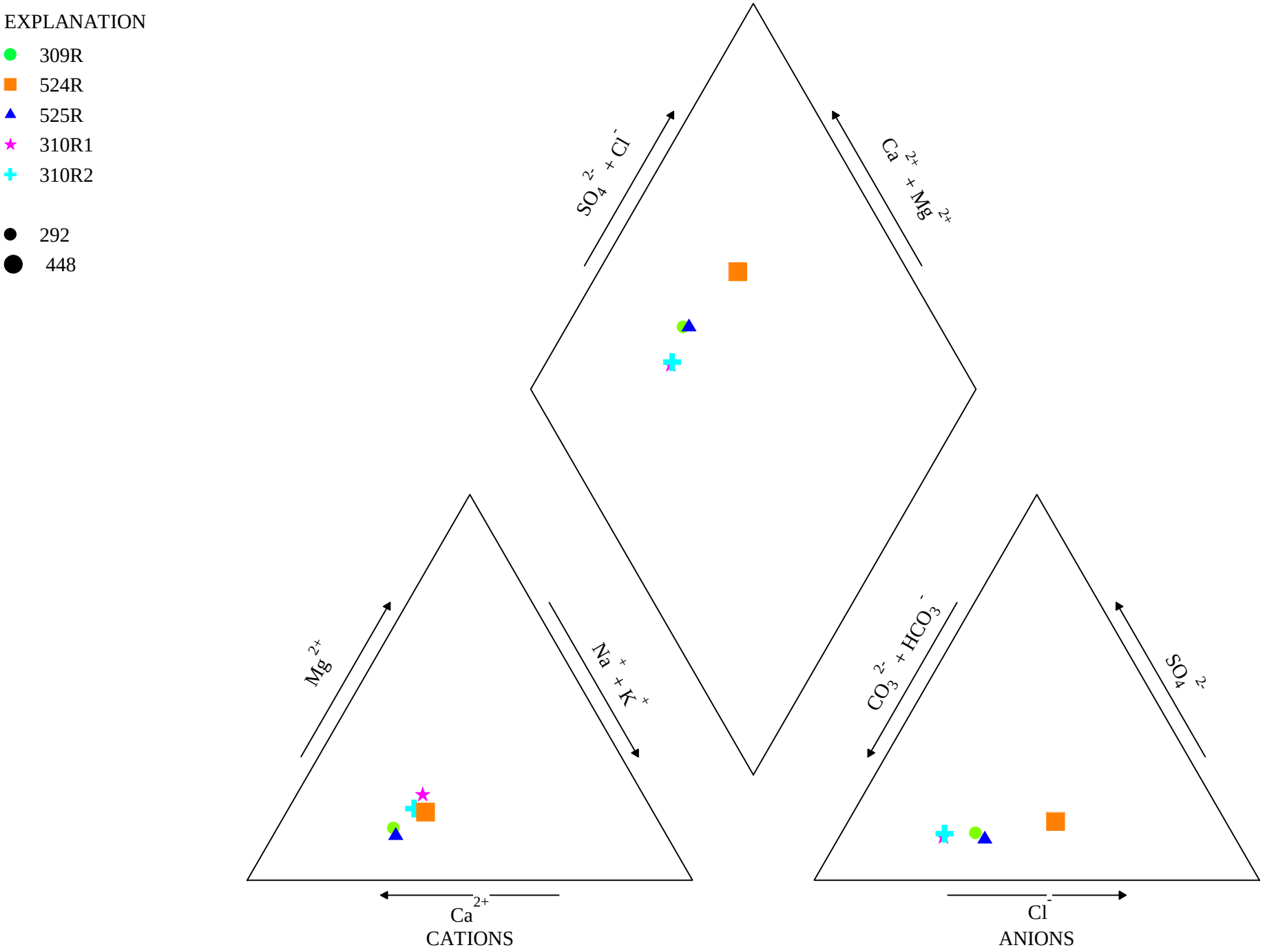
EXPLANATION

- 309R
- 524R
- 525R
- 310R1
- 310R2

- 254
- 352



Tre'r Gof - Bedrock Boreholes April 2016

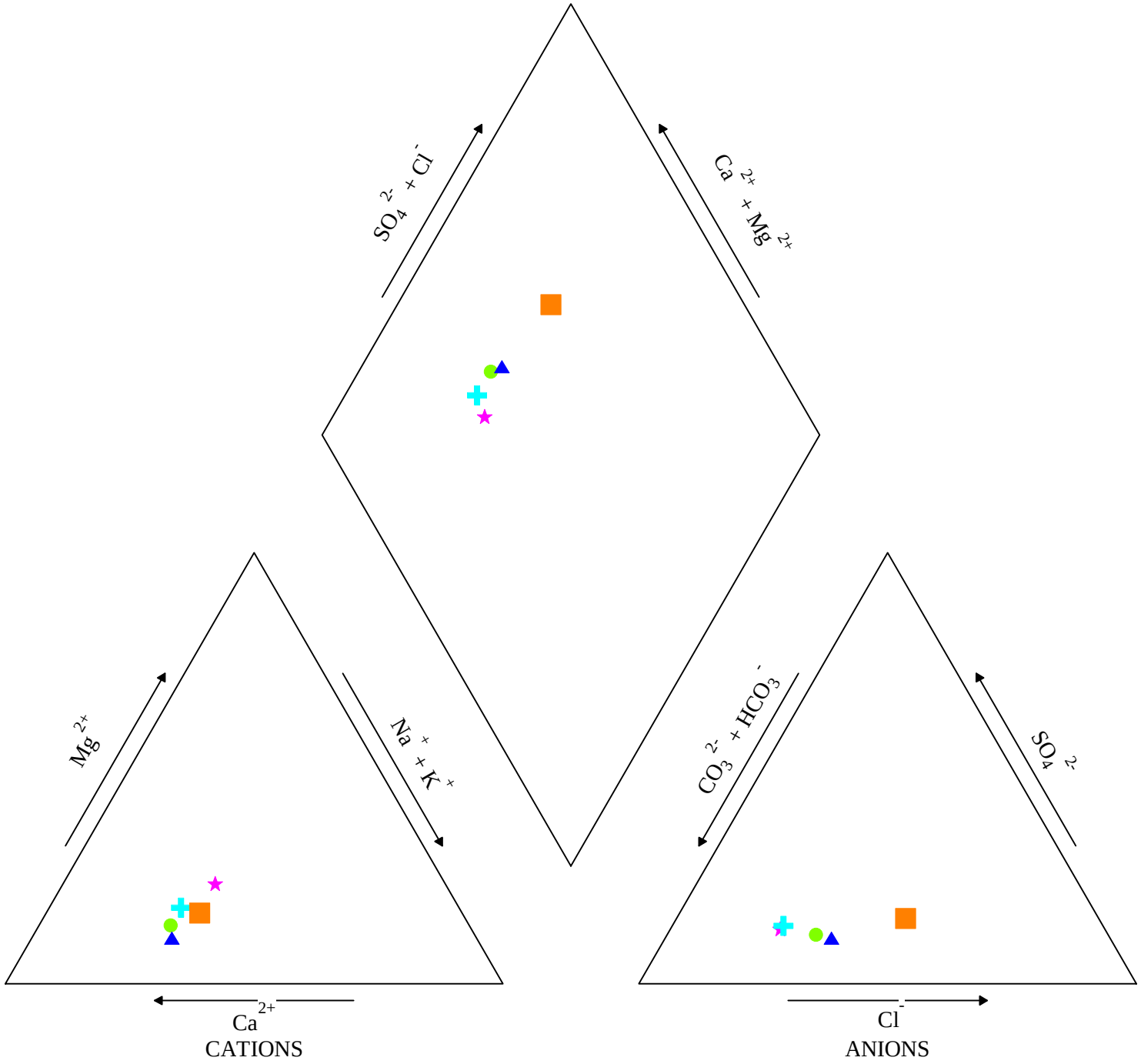


Tre'r Gof - Bedrock Boreholes August 2016

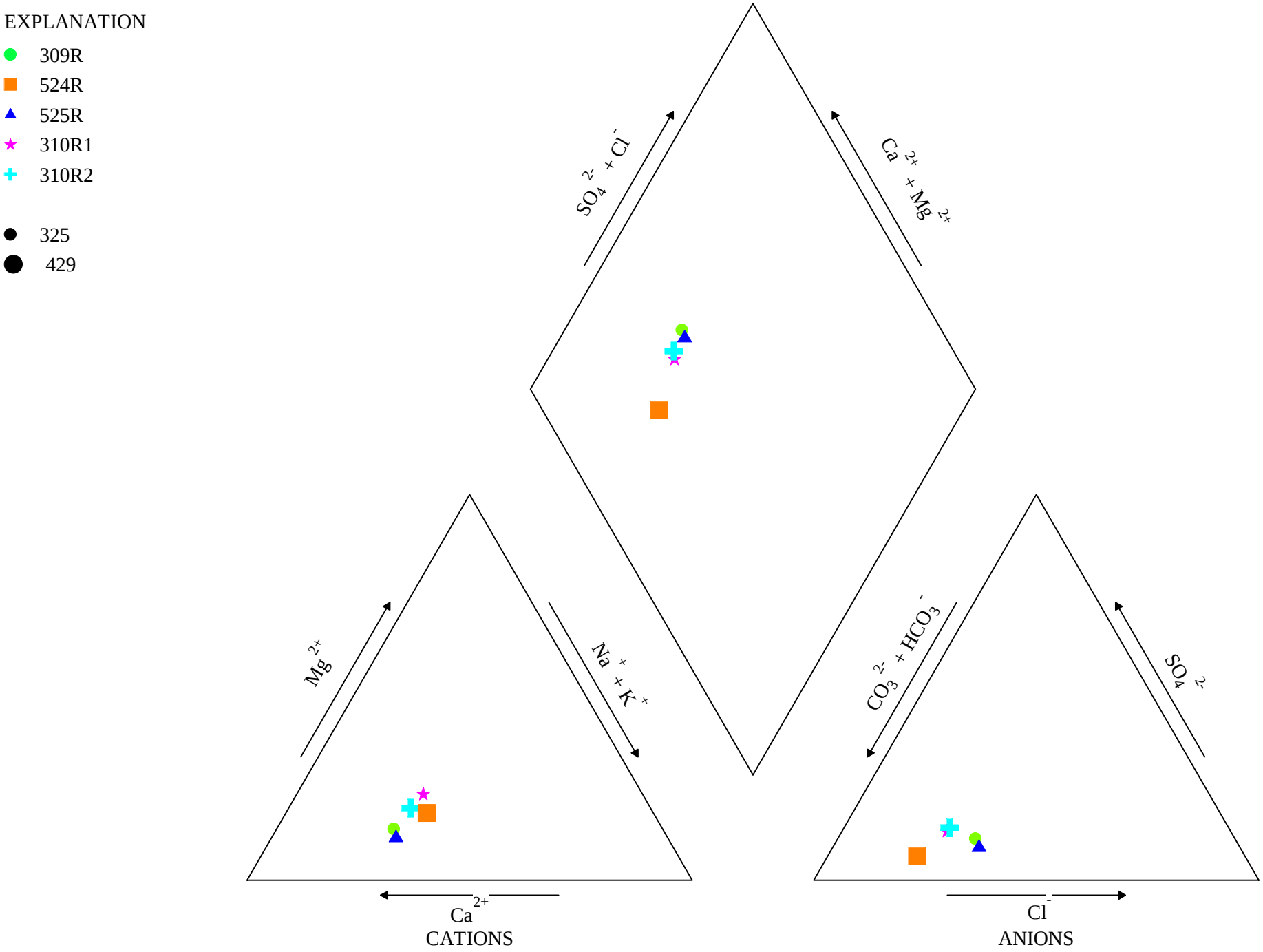
EXPLANATION

- 309R
- 524R
- 525R
- 310R1
- 310R2
- 309R
- 524R
- 525R
- 310R1
- 310R2

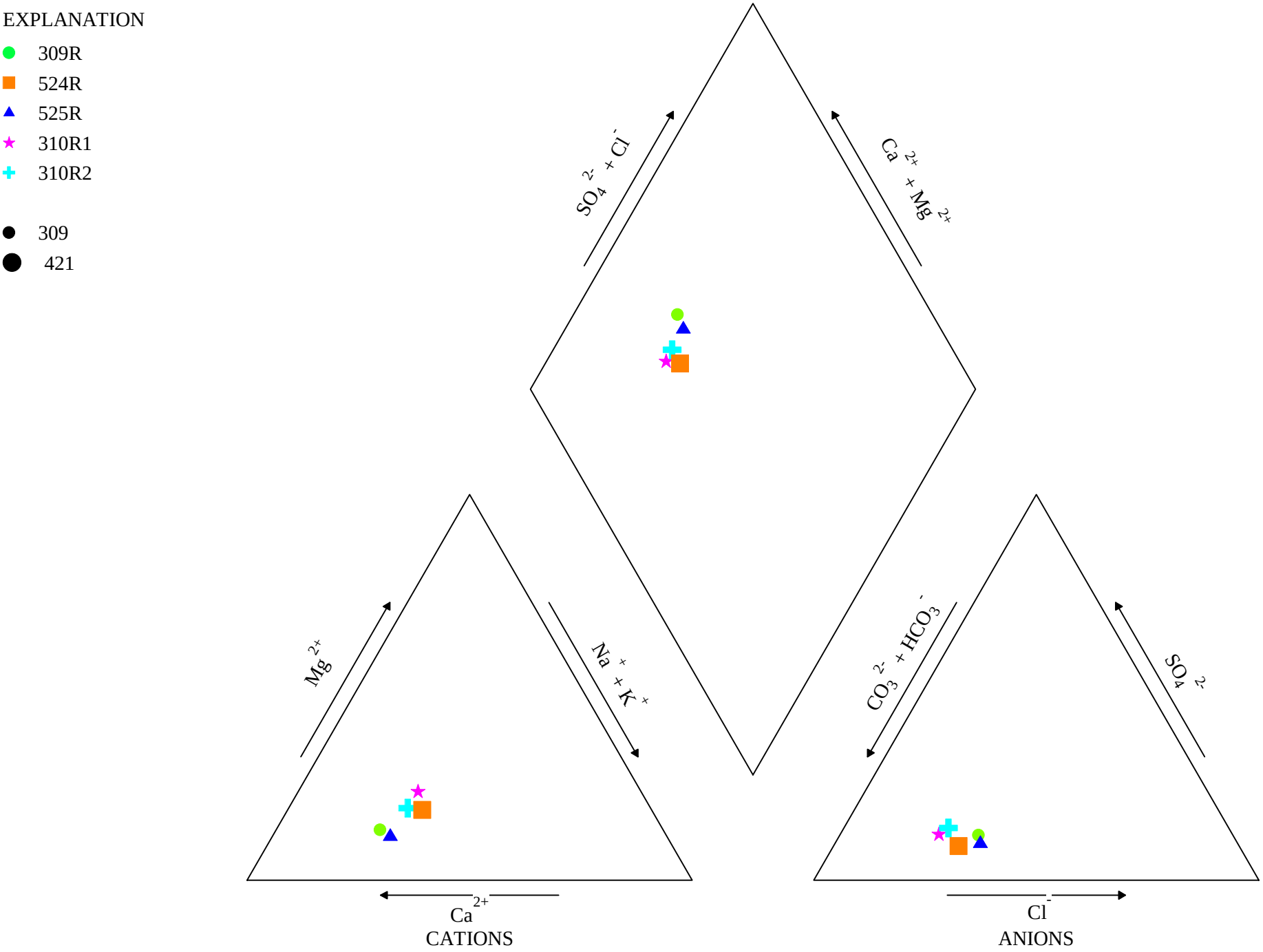
- 333
- 435



Tre'r Gof - Bedrock Boreholes October 2016



Tre'r Gof - Bedrock Boreholes February 2017

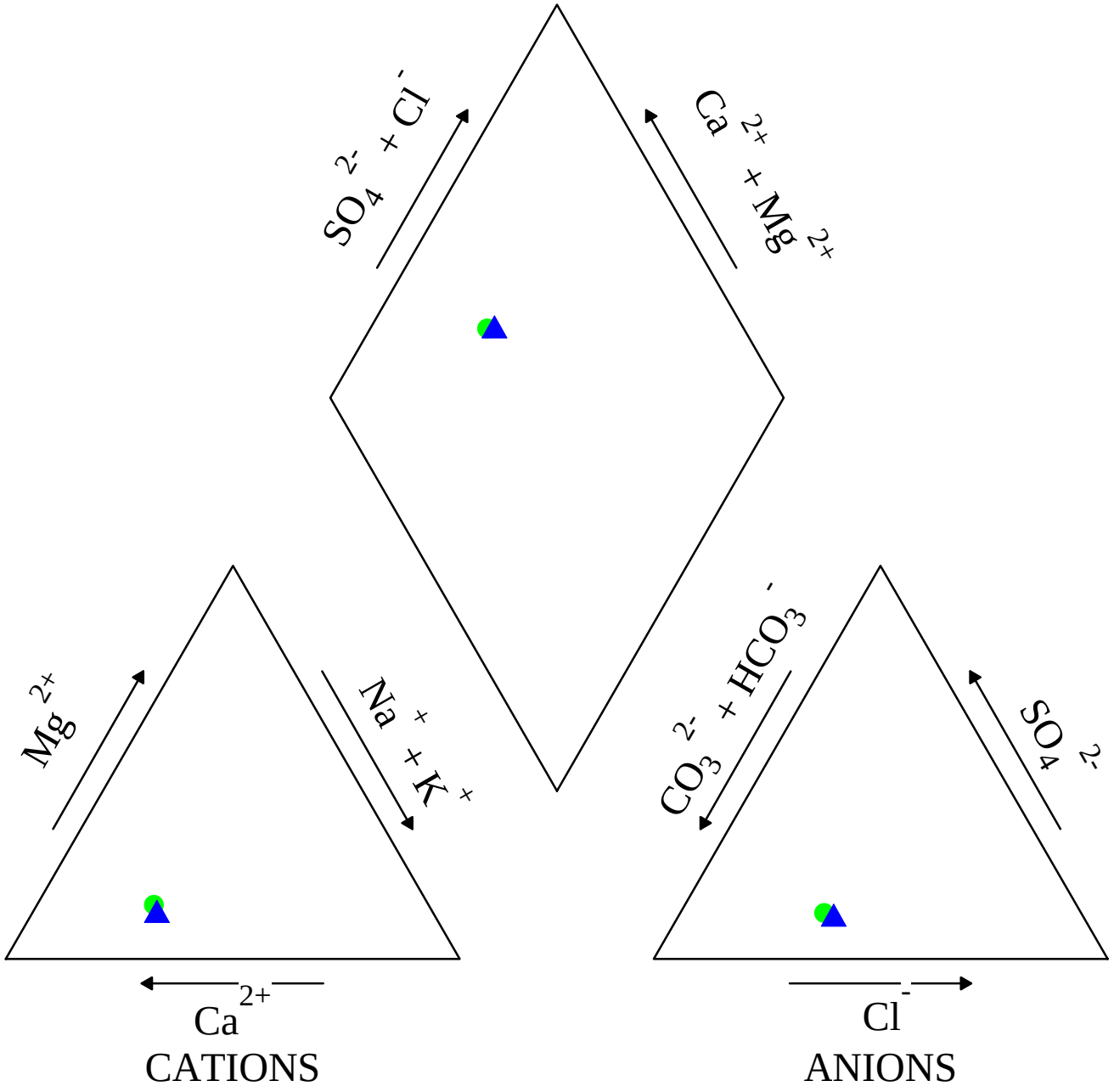


Tre'r Gof - Bedrock Boreholes May 2017

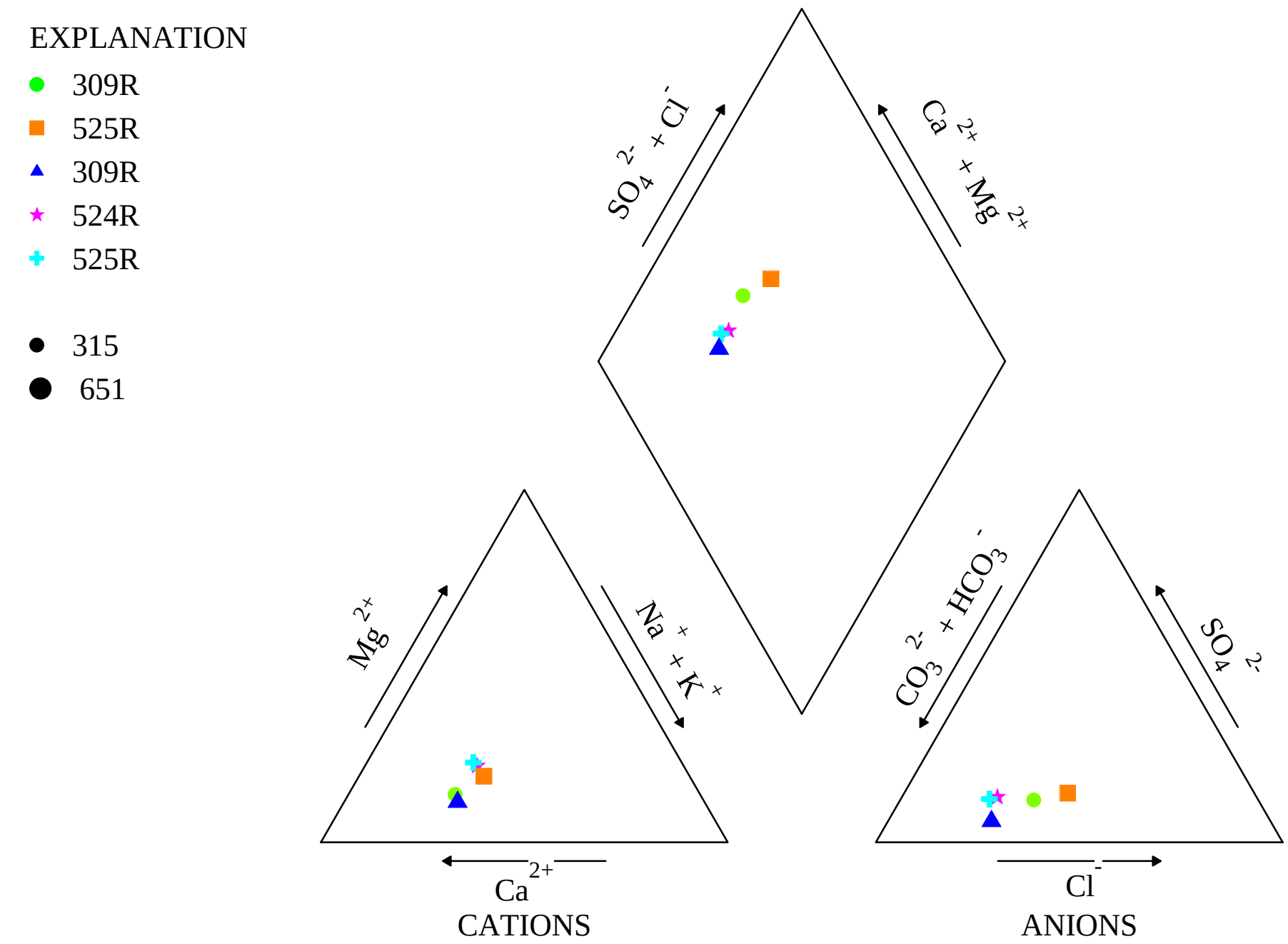
EXPLANATION

- 309R
- 525R

- 300
- 381



Tre'r Gof - Bedrock Boreholes August 2017

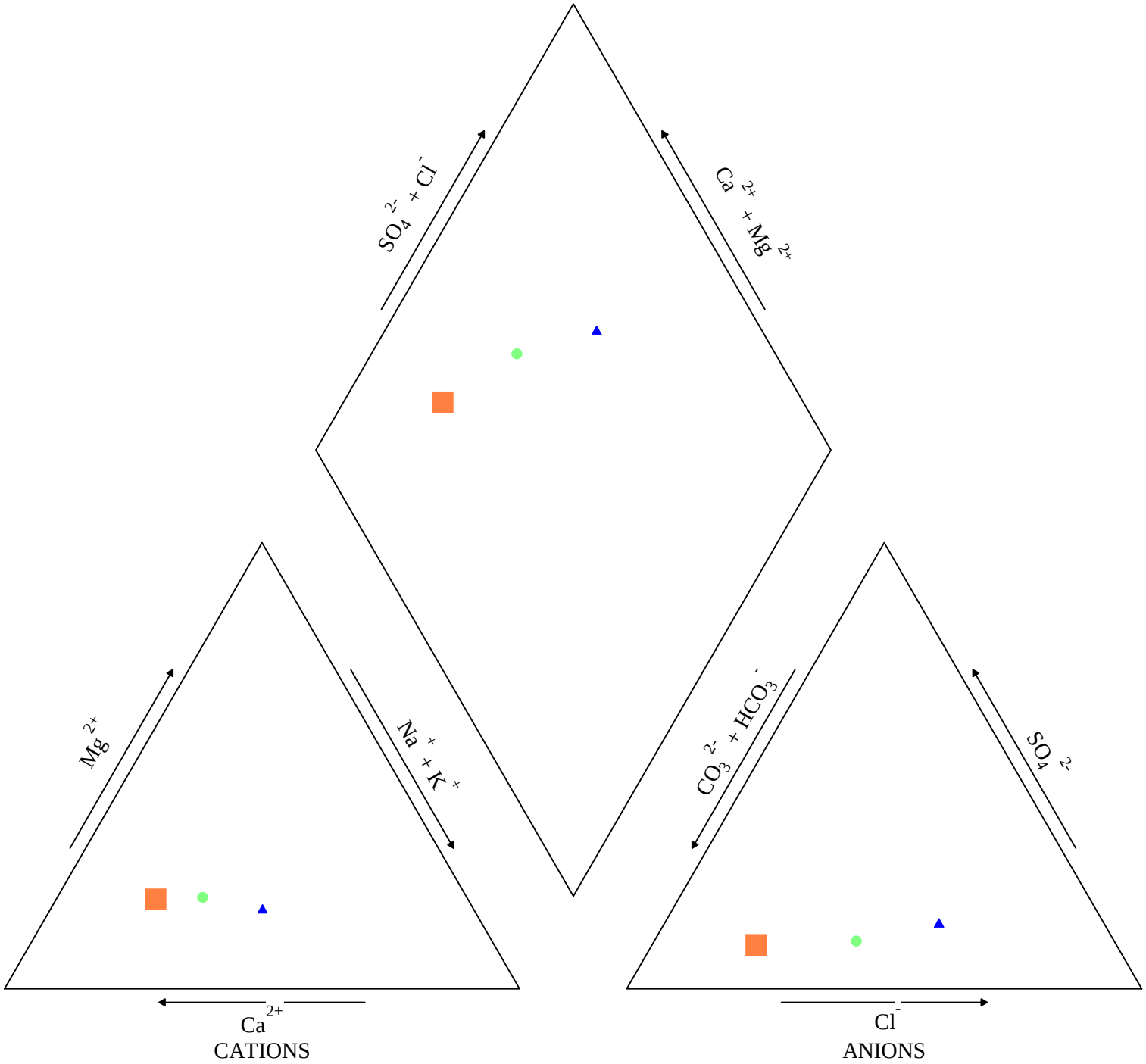


Tre'r Gof - Superficial Boreholes March 2015

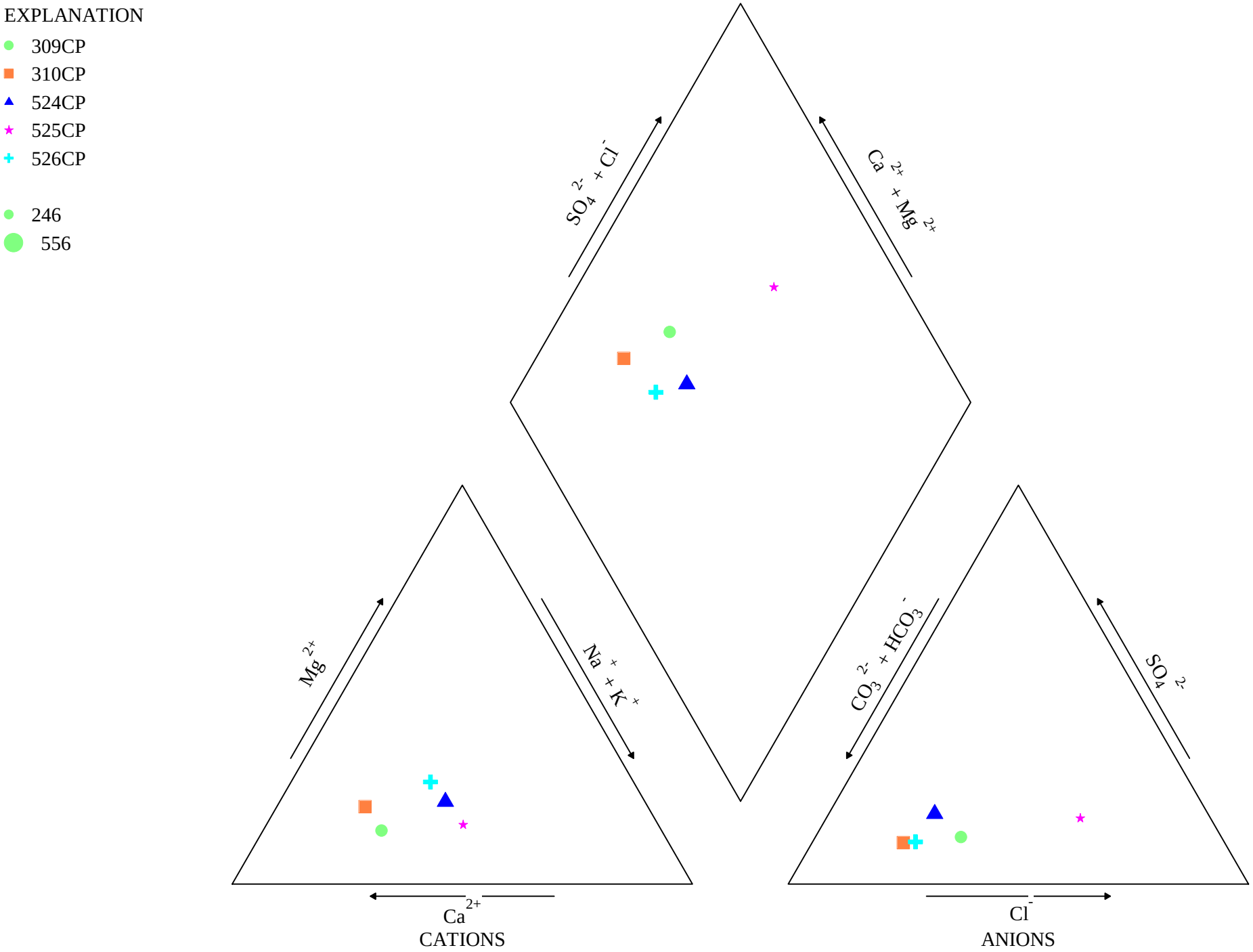
EXPLANATION

- 309CP
- 310CP
- 525CP

- 226
- 348



Tre'r Gof - Superficial Boreholes June 2015

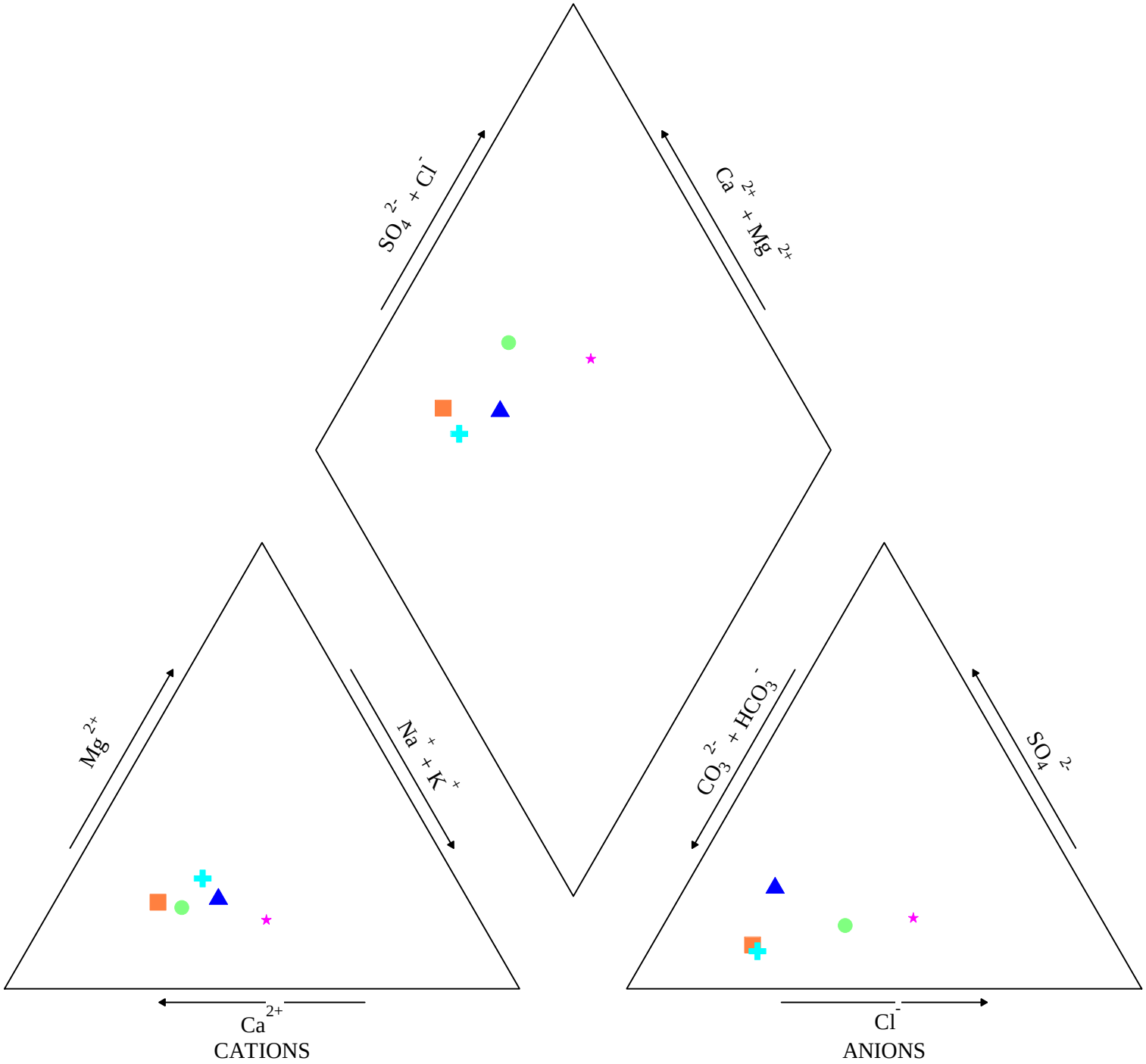


Tre'r Gof - Superficial Boreholes September 2015

EXPLANATION

- 309CP
- 310CP
- 524CP
- 525CP
- 526CP

- 135
- 483

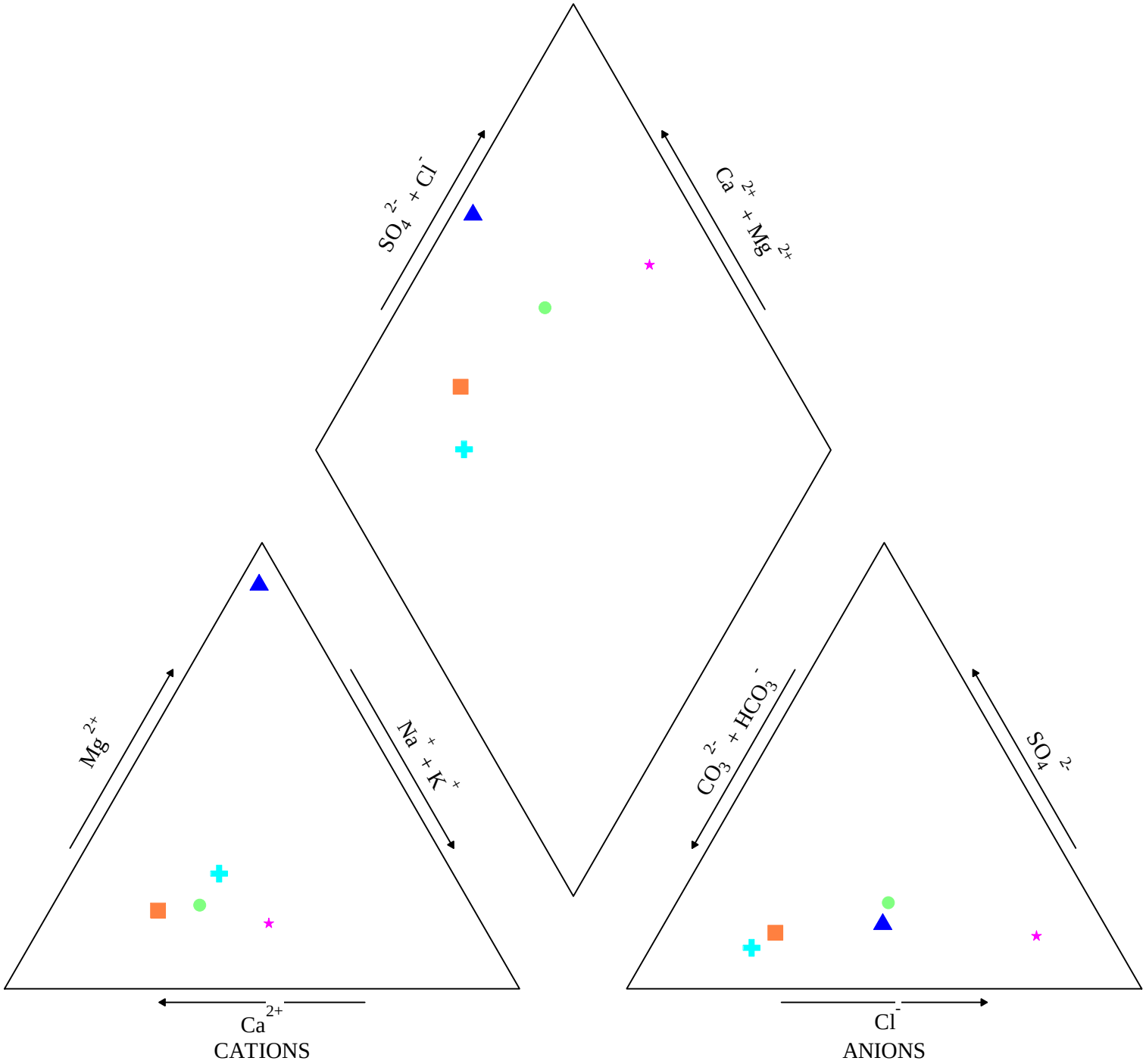


Tre'r Gof - Superficial Boreholes December 2015

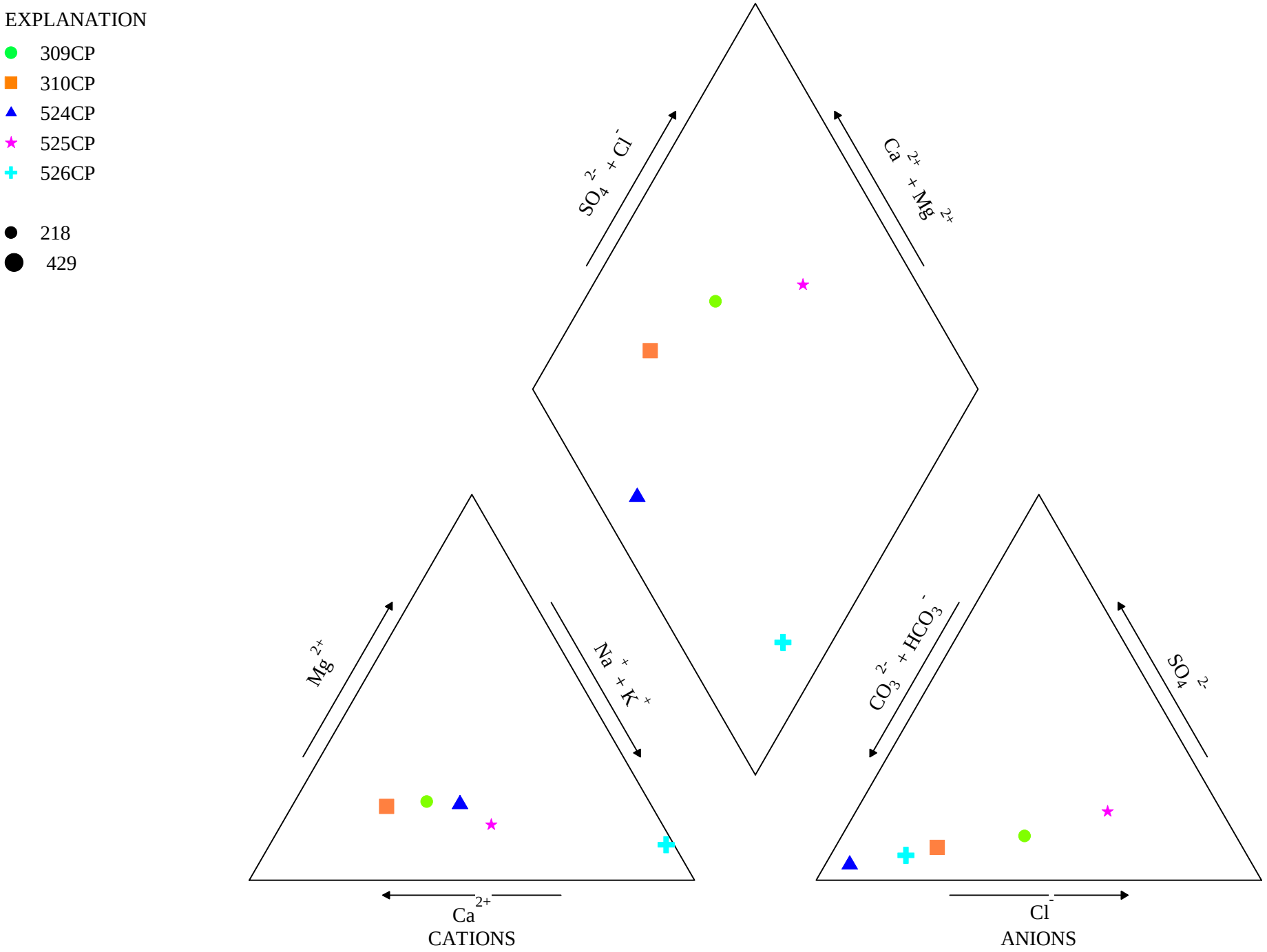
EXPLANATION

- 309CP
- 310CP
- 524CP
- 525CP
- 526CP

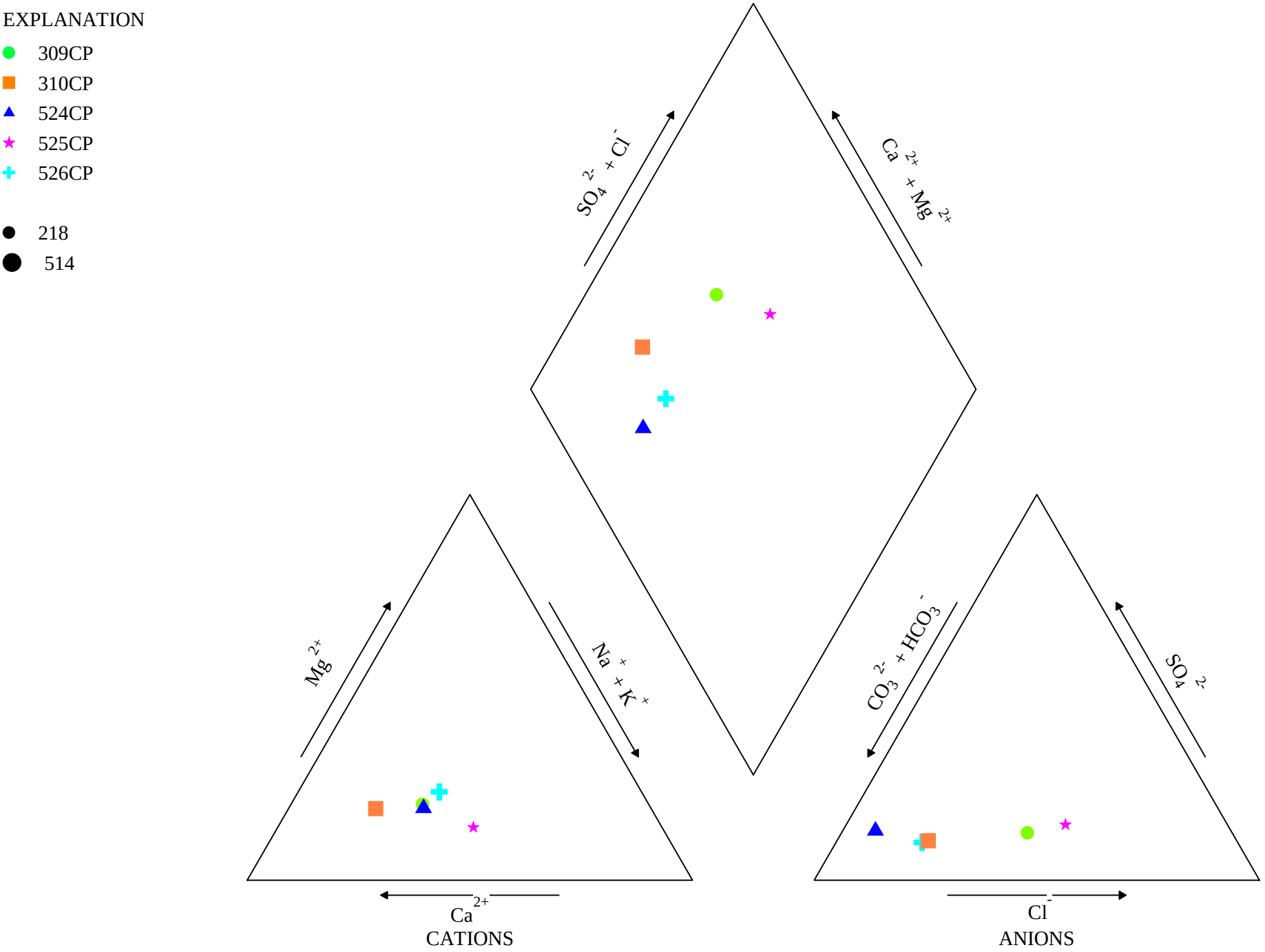
- 213
- 458



Tre'r Gof - Superficial Boreholes April 2016



Tre'r Gof - Superficial Boreholes August 2016

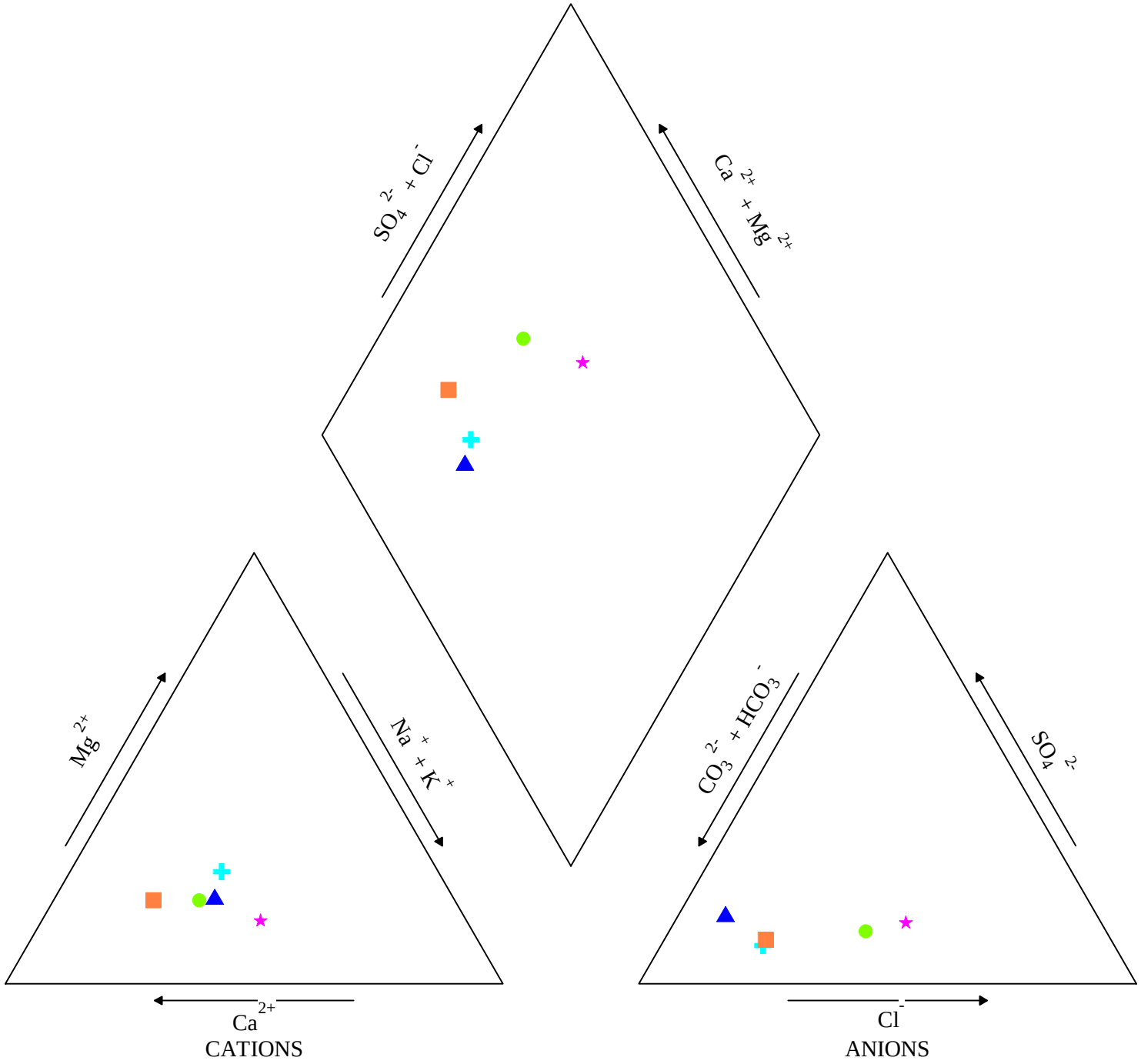


Tre'r Gof - Superficial Boreholes October 2016

EXPLANATION

- 309CP
- 310CP
- 524CP
- 525CP
- 526CP

- 249
- 514

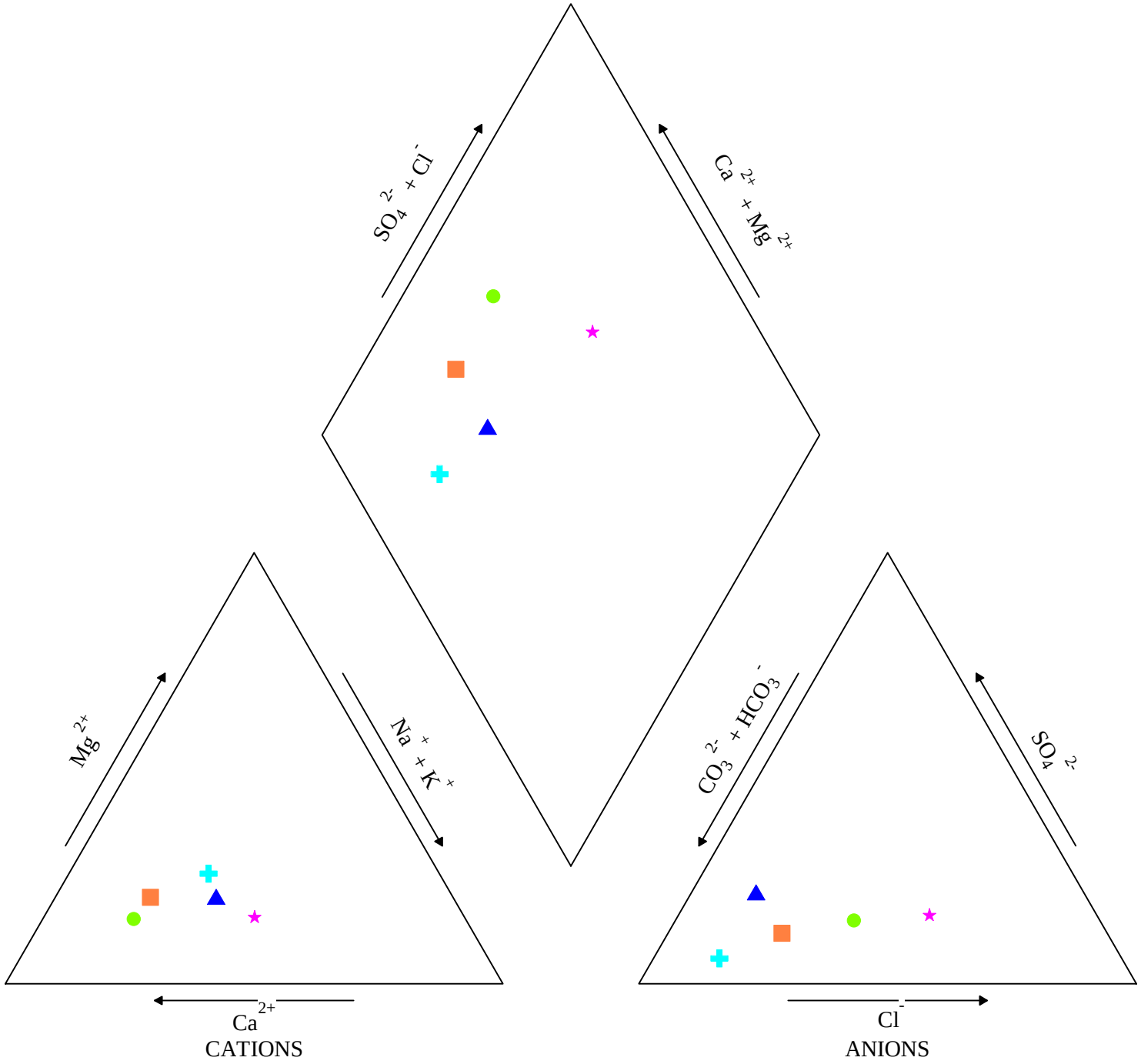


Tre'r Gof - Superficial Boreholes February 2017

EXPLANATION

- 309CP
- 310CP
- 524CP
- 525CP
- 526CP

- 216
- 481

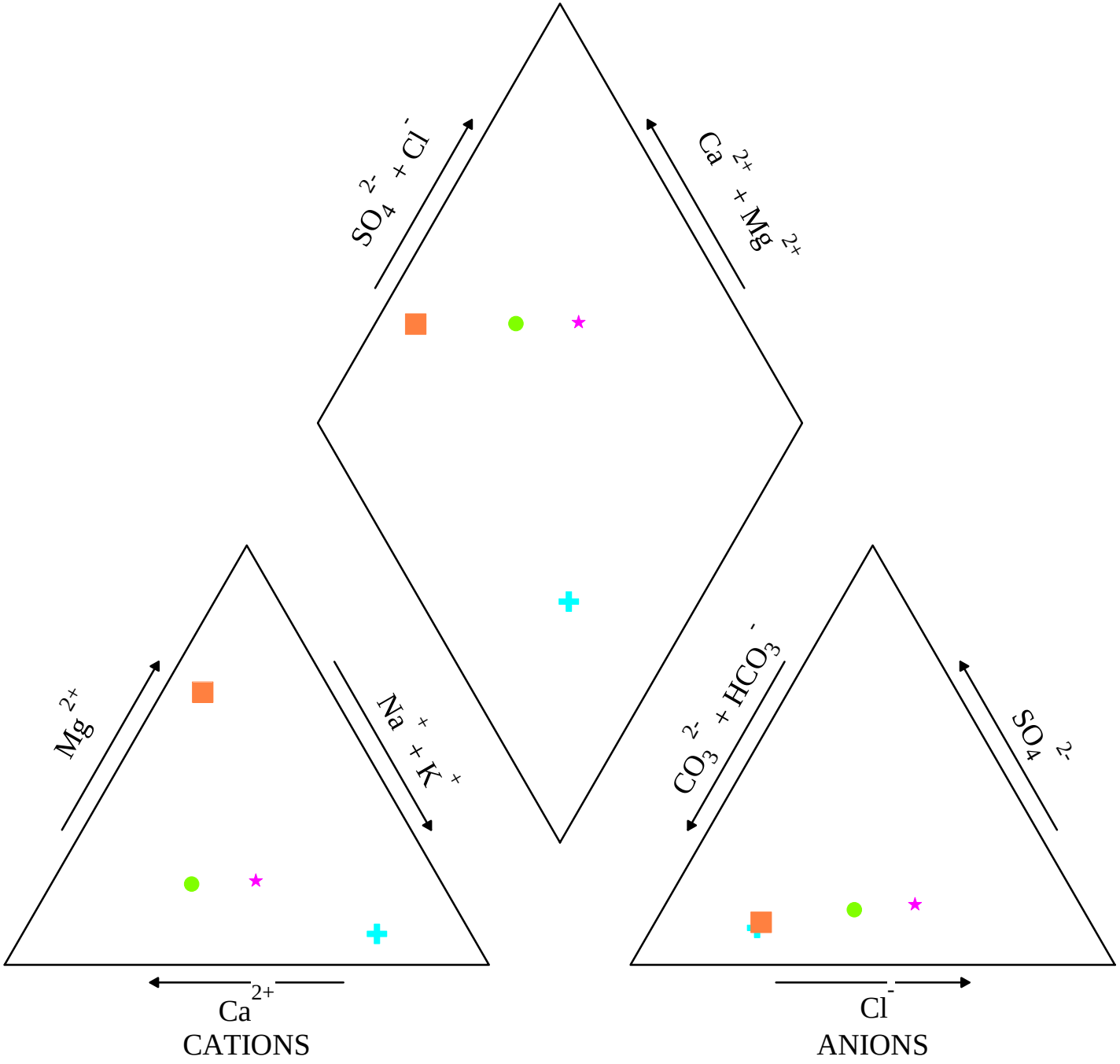


Tre'r Gof - Superficial Boreholes May 2017

EXPLANATION

- 309CP
- 310CP
- 524CP
- 525CP
- 526CP

- 233
- 361



Tre'r Gof - Superficial Boreholes August 2017

EXPLANATION

- 309CP
- 310CP
- 524CP
- 525CP
- 526CP

- 247
- 494

