APPENDIX 1

CONTENTS

1. INTRODUCTION

In accordance with condition 6.14 of the Waste licence Reg. No. W0211-01 bund integrity test reports were issued for all bunds at the AVR Environmental facility. These tests will be repeated in three years in accordance with the licence issued which stipulates a three year repeat cycle for the assessment.

6.14 *All tanks and pipelines shall be maintained impervious to the materials carried by or stored therein. The integrity and water tightness of all underground pipes, tanks, bunding structures and containers and their resistance to penetration by water or other materials carried or stored therein shall be tested and demonstrated by the licensee prior to use. This testing shall be carried out by the licensee at least once every three years thereafter and reported to the Agency on each occasion. A written record of all integrity tests and any maintenance or remedial work arising from them shall be maintained by the licensee.*

2. DESCRIPTION OF BUNDS

The site currently has the following designated containment areas, designed to retain liquid in the event of spillage of materials from vessels stored there in. They are:

1. The Diesel Fuel Oil Tank Bund – purchased unit
2. The Main Chemical Store Area – purchased units
3. Underground sludge reception bin

The areas which are the subject of this assessment are shown on the attached site plan.

(Note: the waste quarantine area is not considered to be an area designed to retain liquid. Any liquid generated from this area is pumped for treatment to the waste water treatment unit and this unit was therefore excluded from the scope of this assessment)

3. INTEGRITY ASSESSMENT

3.1 Fuel Oil Bund

The Fuel Oil Bund is an above ground structure. The unit is a Kingspan Ecosafe ES2600 double skinned tank measuring 2585mm x 1570mm x 1465mm high. The maximum capacity of the vessel is 2600lts. The vessel is designed and constructed in accordance with OFS T-100 (OFCERT No. 0641099913).

A bund certificate was issued by the manufacturer and is attached as appendix 2 to this report.

Recommendations

It is recommended that the bund be inspected as part of on site inspections and the hydrostatic test repeated to confirm the watertightness of the structure on a three year cycle.

3.2 Main Chemical Store

3.2.1 General

The Main Chemical Store is an enclosed covered 4 IBC Bunded Chemical Store – purchaswed from Chemstore (Model 4IBC-P) with following specifications.

Storage: 4 x 1000L IBC's stored on 2 levels.

Overall dimensions: (L x W x H) 3200 x 1900 x 3430mm

Construction: Robust all welded 100x50mm steel box section frame.

Sumps: Corrosion resistant polyethylene sump tray fitted under lower shelf level. Total Capacity: 1200L (**exceeds current EPA guidelines**, 110% of the single largest volume).

Shelving: Shelving constructed from parallel, 50x50mm box section steel, fully welded.

Access: Twin heavy duty hinged doors, **fully padlockable**.

Ventilation: Louvred cladding panels ensure airflow throughout the store.

Wall/Roof/Door Cladding: The profiled, single skin cladding is fabricated from a Zintec based, corrosion resistant alloy which is then Plastisol coated. Choice of colours. Standard colour: Goosewing Grey.

Finish: All steel coated with high specification 2-pack, chemical resistant, polyurethane finish system, designed for aggressive enviroments. C

Signage: Relevant safety signs fitted as standard on all units.

Specific signage available on request.

The unit is used to store chemicals used for the Waste Water Treatment unit - the list of chemicals is maintained in the site MSDS data management sheet

LIST OF MATERIAL SAFETY DATA SHEETS FOR CHEMICALS USED AT AVR ENVIRONMENTAL

Name	storage	Max Volume stored on site	
Sodium Hydroxide Liquor	i) Main chemical store – "chemstore proprietary unit"	i)	1000l
	ii) individual bund for IBC unit	ii)	1000l
Sodium Hypochlorite	i) Main chemical store – "chemstore proprietary unit"	iii)	1000l
	ii) individual bund for IBC unit	iv)	1000l
Sulphuric Acid	i) Main chemical store – "chemstore proprietary unit"	v)	1000l
	ii) individual bund for IBC unit	vi)	1000l
Total volume		vii)	6000l

3.2.2 Storage / Bund Capacities

- Waste Water Treatment Chemical Store total capacity = 4000Lts. (4x 1000l IBC unit)

Total volume of chemicals stored based on inventory = 6000Lts. (Max)

Bund volume required = 4800lLts. (based on 25% of the total volume of substance which could be stored within the bunded area or110% of the single largest volume) This is provided by the Chemstore Sump which is a Corrosion resistant polyethylene sump tray fitted under lower shelf level. Total Capacity: 1200L

And the two individual sumps supplied for the 1000l IBC units = 1200l

Assessment of Integrity and Watertigntness

An integrity certificate was issued with the Chemstore Proprietary Unit and is attached as appendix 3 to this report. An integrity cert is issued with each of the bunds for the IBC units and is attached as appendix 3

Recommendations

i. The proprietary 'Chemstore' unit and individual IBC bunds should be included in the site inspections to ensure that the nature and volume of any additional materials stored in it are compatible and that there is adequate retention for storage in the event of a spillage.

ii. The unit will be tested on a three year cycle in accordance with the requirements of the waste licence

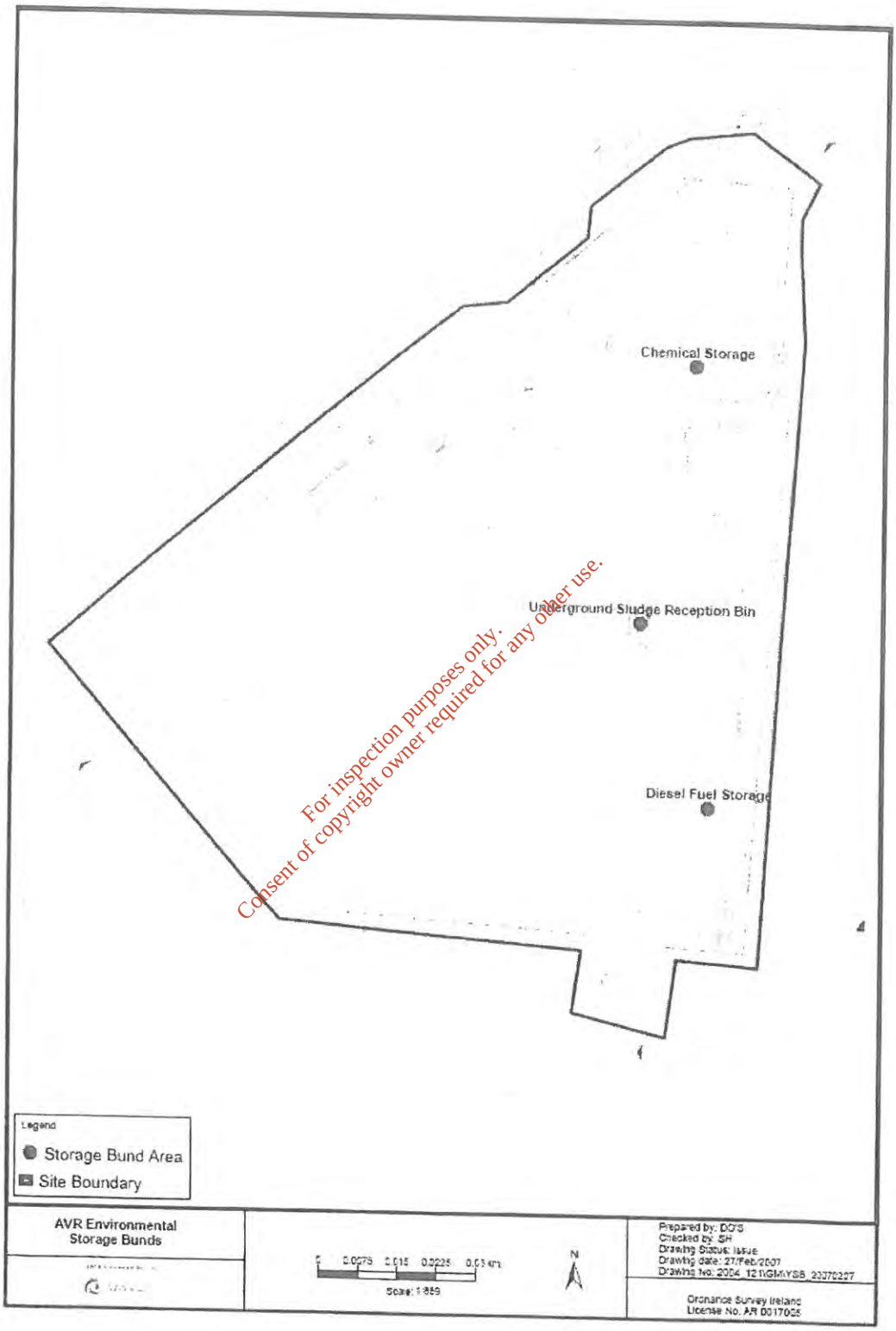
3.3 Sludge Reception bund

Sludge reception area – Consists of an internal underground concrete bund (L 8.9m, W 5.5, H 3.2. Volume = 156.6m3) designed to hold De-watered sludge. The plant has two reception bins, each with a capacity of 10m3 and an intermediate storage silo with a capacity of 50m3. The bund was designed and constructed in accordance with BS8007 – Concrete structures for the retention of liquids.

It was not feasible to fill this sump prior to operation so a visual inspection was by the site quality assurance structural engineer responsible for signing off on the construction of the sumps. The units are fit for purpose and constructed in accordance with BS8007. Attached as **appendix 4** is the bund integrity assessment.

The location of the facility is shown in the attached drawing (2004-121), appendix 1.

Appendix 1 -



Appendix 2 fuel oil bund cert

OFCERT SCHEME FOR CERTIFICATION OF OIL FIRING EQUIPMENT

The Oil Firing Technical Association for the Petroleum Industry certifies through its OFCERT scheme that the

KINGSPAN 2600BT BUNDED OIL STORAGE TANK

manufactured by

KINGSPAN GSP LIMITED

has been tested to standard

OFS T100

OFCERT

LICENCE NO:

by

POLYMER DEVELOPMENT CENTRE

CERTIFICATE NO:

has passed the requirements of that standard and has been awarded

OIL FIRING TECHNICAL ASSOCIATION

FOR THE PETROLEUM INDUSTRY

OFCERT LICENCE NO: 08-10999-13

Signed

Chairman OFCERT Directorate

Date 15th May 2001

OFCERT

Appendix 3 chemical storage bund certificate and IBC Certs

CHEMSTORE ENVIRONMENTAL
Design and Manufacture of Environmental Safety Solutions

Clondrinagh Ind. Estate,
Ennis Road, Limerick
Republic of Ireland.
Tel: 061-327792
Fax: 061-327985
Web: www.chemstore.ie
Email: sales@chemstore.ie

Bund Test Certificate

This is to certify that the bund/sump tested by our Qualified Engineer on the date shown below has passed.

Company:
Site:
Bund Reference No:
Model Code:
Bund Dimensions:
New Bund:

Hydrostatic Test Results

Bunds Materials of Construction:
Bund Lining:
Sump Test Capacity:
110% of Vol. of Largest Vessel:
25% of Total Storage Volume:
Bund Retention Volume:
Date of Test: 27/2/07 Pass:
Comments/Recommendations:

Readings	Time	Level (mm)
1		
2		
3		

Signed: Title: Engineer Date: 27/2/07

Company Signature:

In accordance with Chapter 6 of Environmental Protection Agency

Appendix 4 -sump bund certificate

FINBARR GANNON & CO. LTD CONSULTING ENGINEERS

2A, River House, Blackpool Park, Blackpool, Cork, Ireland
Tel: 021-4396960 • Fax: 021-4309606 • E-mail: office@fgcl.ie

Our Ref EC/RN/05-414

1st March 2007

Ms Sinead Hickey
SWS Natural Resources
Shinagh House
Bandon
Cork

Re: Sludge Reception Sump

Dear Sinead

I can confirm that the underground sludge reception sump has been designed in accordance with the requirements of BS8007 – Standard Code of Practice for the Design of Liquid Retaining Concrete Structures.

Furthermore, following a visual inspection, I can confirm that the structural integrity of the constructed sump is in compliance with the requirements of the aforementioned code of practice.

Yours Sincerely

EDDIE URMOND

V.A.T. Reg. No. IE8246033F
Co. Registered No. 248023

APPENDIX 2

SWS ENVIRONMENTAL SERVICES

Foxhole Facility:

Further Site Investigation Report

EPA Ref No: 211-1

SWS ENVIRONMENTAL SERVICES
SHINAGH HOUSE
BANDON
CO. CORK

SWS Environmental Services

MEMBER OF

SWS Group

Title: Foxhole Facility – Further Site Investigation Report
Project: Materials Recovery & Sludge Drying Facility at Foxhole
Client: AVR – Environmental Solutions Ltd.
Issue:
Job No.: 2004_121

Prepared and Checked by: _____ Date: _____

Authorised for issue by: _____ Date: _____

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 Context

AVR – Environmental Solutions Ltd received planning permission from Cork County Council to construct a Materials Recovery & Sludge Drying Facility at Foxhole, Youghal, Co. Cork in February 2005. Pursuant to this, a waste licence application was also submitted with the EPA in October 2004 (application no: 211-1).

The site at Foxhole is a brownfield site, having historically comprised part of the lands at Youghal Landfill (now adjacent to the site). As such, a varied level of man-made fill covers much of the site.

This report is at the request of the EPA to further determine the nature of the subsurface fill at the site in Foxhole.

1.2 Methodology

A desktop study of available geological information in the form of geotechnical reports, Geological Survey of Ireland data and compliance documentation for adjacent facilities was conducted to ascertain the context and setting of the site.

As part of the Environmental Impact Assessment for the proposed facility, a geotechnical investigation was conducted by Geotech Specialists Ltd at Foxhole in June-July 2004. The results of this investigation were submitted with the EIS as part of the Waste Licence Application. Borehole investigation was conducted as part of this study. The details of this report were examined as part of a desktop study to ascertain the appropriate means of further investigation.

A further investigation of the site was conducted in April 2005 comprising:

- a walkover reconnaissance to assess site conditions;
- an excavation of trial pits to determine the depth of fill;
- analysis of fill material.

In November 2005, independent geotechnical specialists IGSL were contracted to perform further site investigation work pre-construction. This took the form of a programme of borehole drilling including the installation of groundwater monitoring wells at the request of the EPA and a trial pit examination throughout the site.

1.3 Objective

The objective of the investigations on the site was to determine the extent and nature of deposited material at the site.

2.0 EXISTING SITUATION

2.1 Site Location

The area of the proposed development is zoned Industrial/Enterprise in the Cork County Development Plan 2003 (refer to Fig. 1.2 Cork County Planning Zones).

Youghal Landfill and Civic Amenity Centre which is operated by Cork County Council is adjacent to the site. Other facilities in the vicinity of the site include the Youghal National Car Test Centre, Foxhole IDA Industrial Estate c.350m away on the R634 out of the town and the Foxhole Business Park incorporating Millennium Court office buildings. The nearest dwelling house is at the junction of the site access road and the R634. The site is a brownfield site and currently used to store empty skips and containers.

2.2 Site Description

The site occupies a very low-lying elevation, as it is enclosed to a significant extent by the confluence of rivers that surrounds it. Elevations changes across the site are negligible in comparison to the surrounding landscape. The site is enclosed to a certain extent by the slightly more elevated terrain to the south, west and north of the site.

Site aspect is south facing with the minimal sloping degree of 0-1. Therefore, site exposure is greatest on the eastern and southern side of the site, across the Blackwater Estuary and Youghal Bay.

The land cover classification within the site is categorised as built landscape and land cover within the hinterland is dominated by both wet and dry grassland. These land covers historically occupy the proposed site area in the form of scrub and rough grassland. The Cork County Development Plan 2003, supports the Landcover classification as the site is located in an area zoned for industrial and enterprise development.

The overall visual impression of the site is a brown field site with a complex of built anthropogenic structures such as high metal fencing and posts, telephone and electricity poles, Youghal Landfill and Civic Amenity Centre, the NCT Centre, Foxhole IDA Industrial Estate and Foxhole Business Park incorporating Millennium Court office buildings.

In the area of the site the bedrock consists mainly of the Waulsortian Limestones of Carboniferous age (c. 300 million years ago). The formation consists of massive, unbedded mounds of calcareous deposits in the form of mudstones, wackestones and packstones.

Devonian rocks in the area comprise the Ballysteen and Gyleen formations, part of what is termed the Old Red Sandstone.

The dominant soil type of the locality is the Acid Brown Earths/Brown Podzolics. Historical reclamation work on the adjacent Youghal Mudlands, has led some infill of the site. The site geotechnical investigation suggests this varies in depth from 0.2m to 2.3m across the site. The subsoils of the site are described in the site geotechnical report as sandy, slightly gravely clay and clayey, slightly gravely sand with thicknesses of 7.5-11.6m approx.

The site geotechnical investigation indicated that depth to groundwater across the site varied between 1.9-7.7m. Groundwater flow was determined to be in a northerly direction and is likely to be strongly influenced by the tidal regime.

2.3 Walkover Reconnaissance

A walkover of the site initiated the field examination. Vegetation cover is extensive toward the rear of the site and comprises scrub. It appears largely undisturbed. The front of the site is characterised by a pebbled, near-level surface where skips are stored. The ground in this area is either bare or showing evidence of recolonisation by grasses. Evidence of historical fly-tipping was noted at a location to the rear of the site.

2.4 Existing Water Quality

The adjacent Youghal Landfill is operated under a Waste Licence by Cork County Council. Results of groundwater and surface water monitoring for the landfill were examined to determine if water quality in the area was being affected by the existing conditions at the site.

In general at estuarine locations, physiochemical indicators of leachate intrusion into water bodies are at naturally elevated levels. This was found to be the case by Cork County Council in assessing the landfill, thus COD was chosen as the sole basis on which to gauge leachate influence on water quality. The sluice from the landfill entrance to the estuary is monitored at SW1, located directly opposite the site of the current investigation. Results from SW1 submitted as part of the Youghal Landfill Intensification programme show a low background COD level, which is assumed to vary with tidal & seasonal conditions.

Groundwater conditions are also monitored at the landfill. Studies associated with the landfill have demonstrated that the groundwater in the area is in hydraulic conductivity with the Blackwater Estuary, and thus subject to the influence of the tides. Landfill monitoring well MW4 is closest to the site of the current investigation. No historic monitoring has been carried out on the site.

3.0 SITE INVESTIGATION RESULTS

3.1 Trial Pit Examination April 2005

A series of trial pits were excavated across the site. The trial pits indicated the average depth of the waste materials. The trial pits also confirmed that the deposited material is not extensive across the site; rather instead it is confined to localised pockets and is generally of shallow depth (0.5 – 1.6 m). The waste, where encountered, is typically degraded domestic and builders' type wastes with plastics and ferrous objects being the only clearly identifiable features. Ground water ingress was noted at two of the trial holes, at depths approximate to the deposited material.

Table 3.1 Summary of Trial Pit Observations

ID	Depth of Pit (m)	Depth of Waste (m)	Depth to Groundwater (m)	Comments
TP1	2.24	0.48	1.2	-imported topsoil surface -black sandy material, some plastics, aerosols visible. - Hydrocarbon-type smell* - Vicinity of BH1 - Groundwater rose quickly - Thick, pale brown, clay material beneath waste
TP2	3.1	0.45	1.5	- similar to TP1 - wire materials also noted - no evidence of hydrocarbons - groundwater also rose quickly
TP3	3.5	1.2	Not encountered	- orange-brown to c.50cm with mixed materials - black decomposing material to 1.2m
TP4	2.2	Not encountered	Not encountered	- no waste material encountered beneath surface
TP5	2.3	Not encountered	Not encountered	- no waste material encountered beneath surface
TP6	2.6	0.6	Not encountered	- mix of soil, stone & plastics - no evidence of decomposing materials

* Diesel unit stored at this location previously – hydrocarbon smell may be associated with some leakage from this unit.

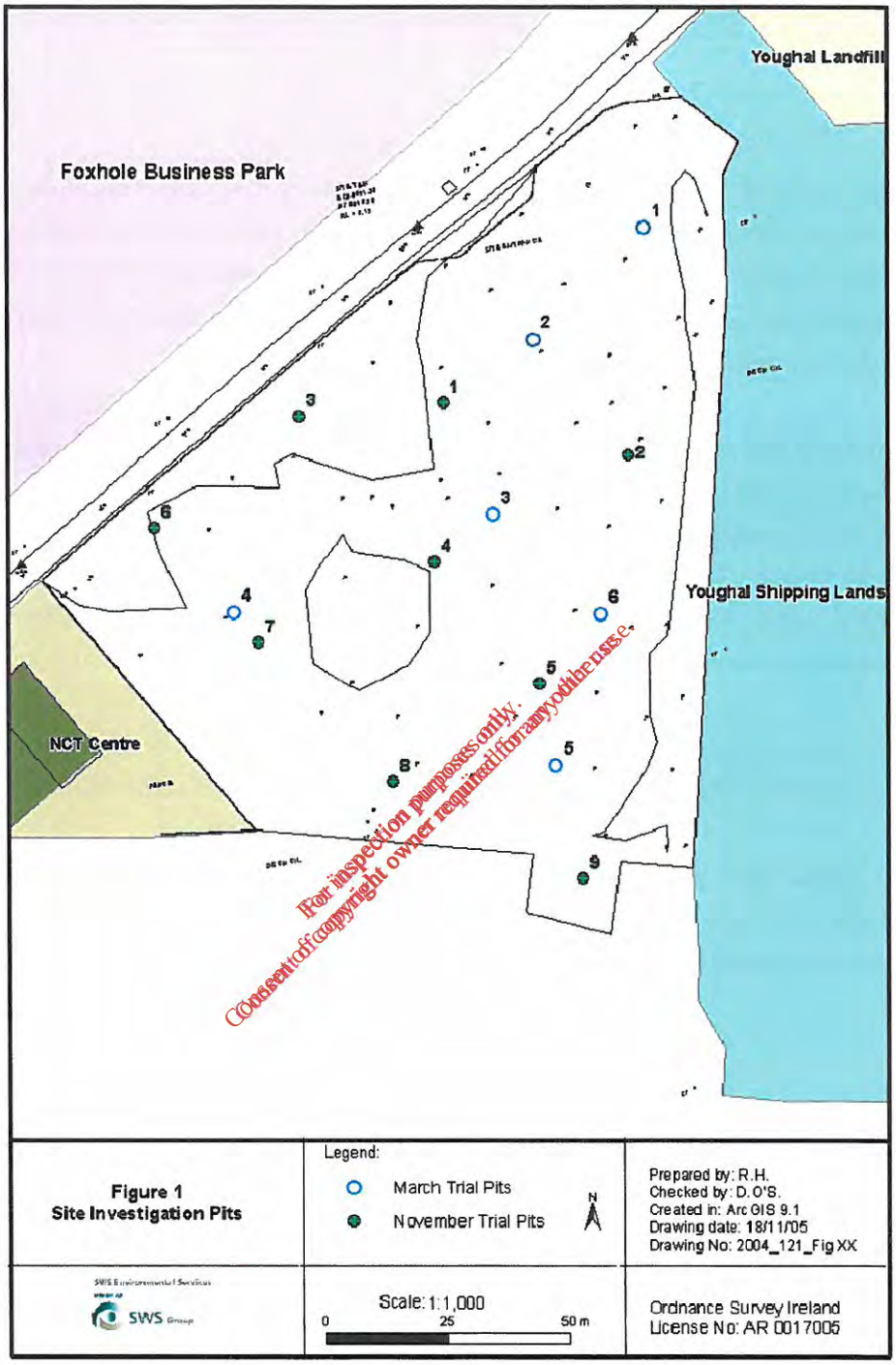
3.2 Site Investigation November 2005

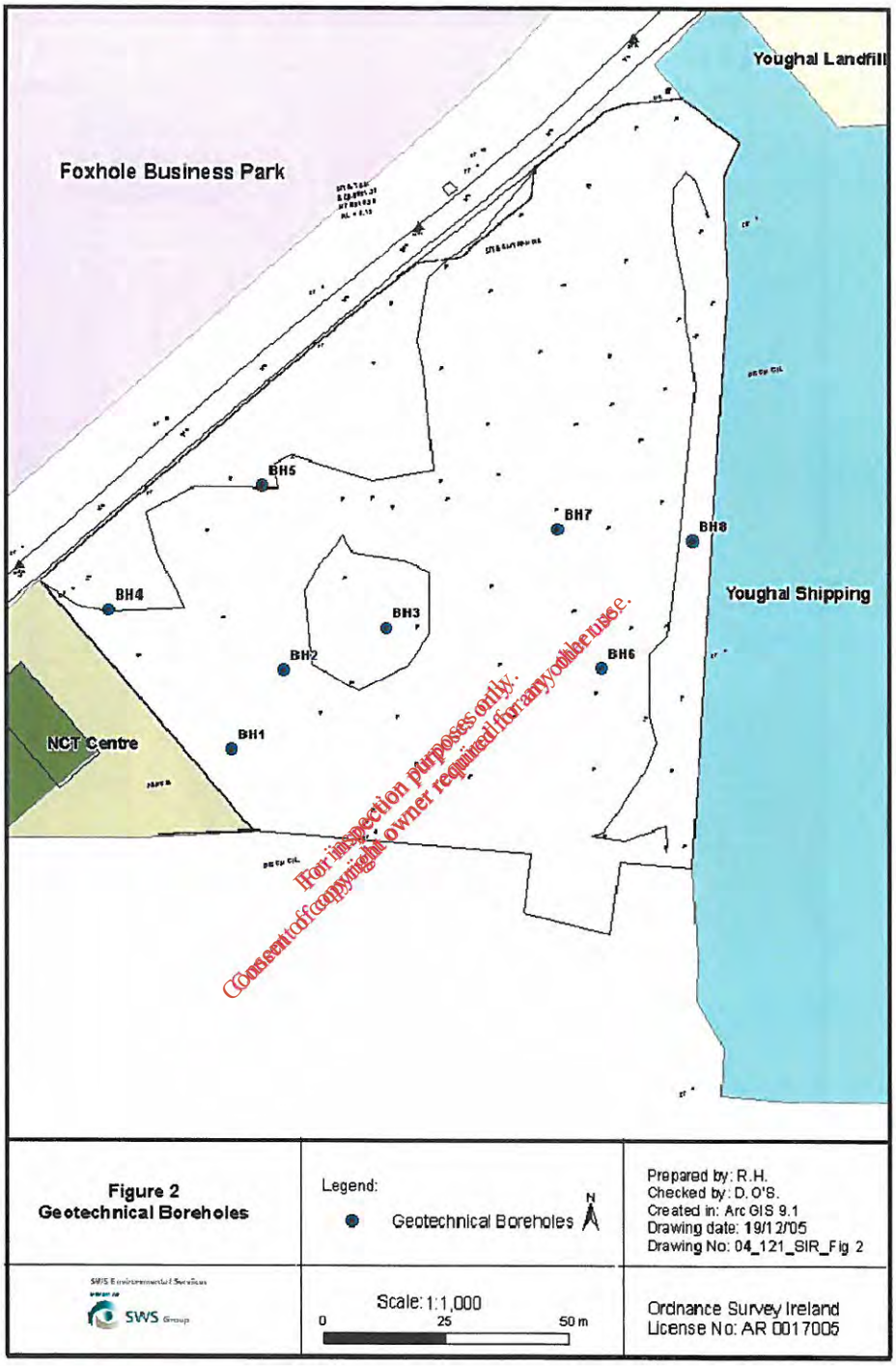
In November 2005, independent geotechnical specialists IGSL were contracted to perform further site investigation work. In total, 9 further pits were excavated with an extensive distribution across the site. Logs from these pits are contained in Appendix 2. This survey also confirmed that the fill material noted in previous surveys was limited to a maximum depth of 1.5m, but more commonly >1m deep.

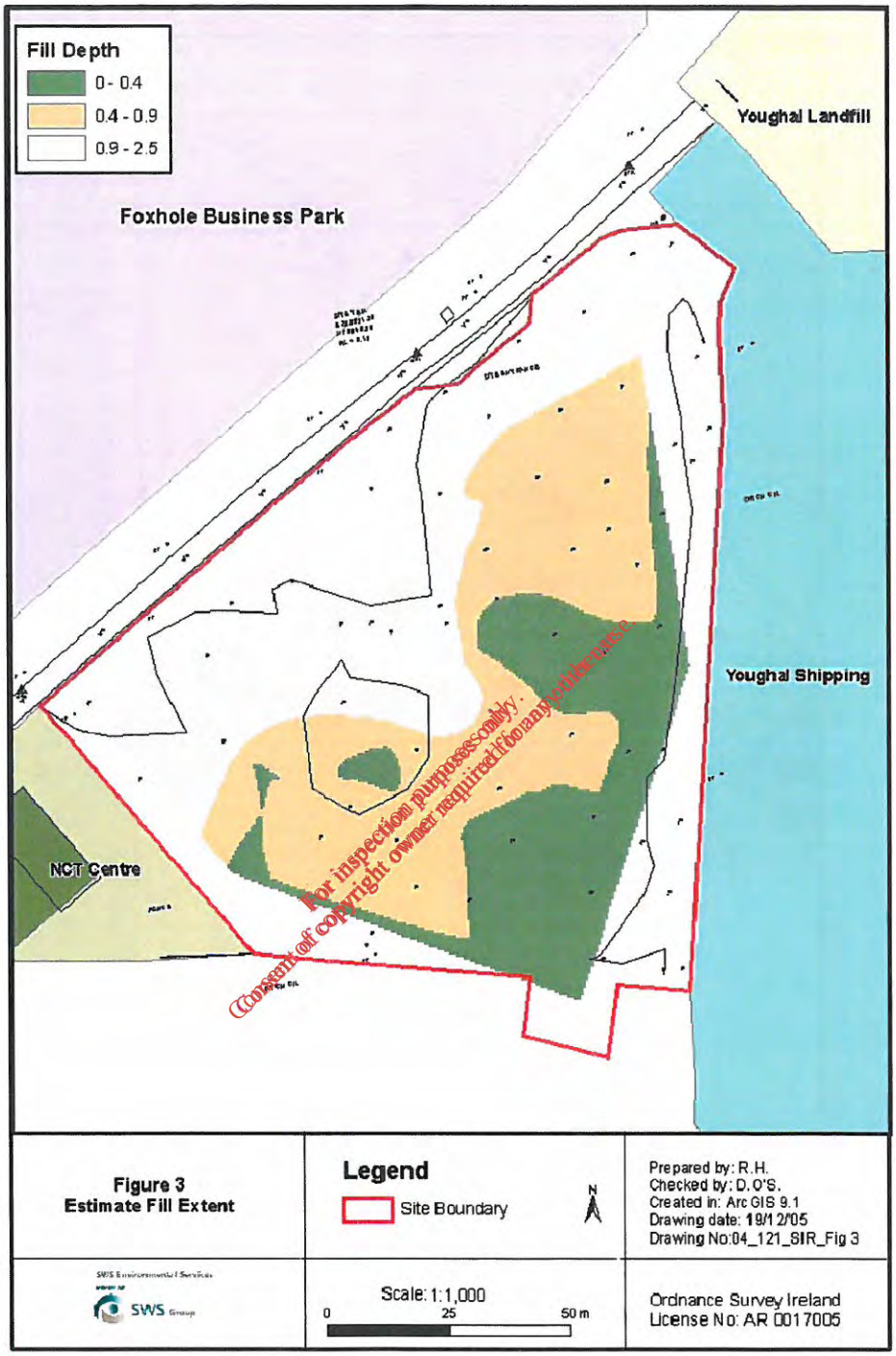
Eight boreholes were also drilled on–site. The logs of these boreholes are also contained in Appendix 2. As with previous surveys, it was noted that the extent and depth of the made ground was limited across the site. The made ground was found to be deeper on the western side of the site. This would concur would the surface expression of the fill area: mounds of building waste material are observed toward the western part of the site suggesting stockpiling on the surface of the site rather than landfilling activities.

Stand pipes to facilitate ground water monitoring were installed at boreholes 4 and 6. For groundwater monitoring purposes these will be renamed MW1 and MW2 respectively.

The assessment concluded that overall the site is underlain by fluvio-glacial/glacio-marine subsoils of thick clay deposits interbedded with coarse granular material (i.e. sandy gravels). Sandy lenses likely associated with the River Blackwater are also observed on-site.







4.0 SUMMARY

Site investigation surveys have demonstrated that there is a significant component of fill material across much of the site which will require removal. Based on the available data, there is an estimated 7,000 to 11,000 cubic metres of material which will require disposal. The majority of this material comprises construction/demolition type waste containing such constituents as bricks, plastics and metals. Table 4.1 below lists the likely European Waste Catalogue codes that may apply to the fill material.

Table 4.1 EWC Codes

17 Construction and Demolition Wastes	
17 01 01	Concrete
17 01 02	Bricks
17 01 03	Tiles and ceramics
17 01 07	Mixture of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06
17 02 01	Wood
17 02 02	Glass
17 02 03	Plastic
17 03 02	Bituminous mixtures containing other than those mentioned in 17 03 01
17 04 01	Copper, bronze, brass
17 04 02	Aluminium
17 04 03	Lead
17 04 04	Zinc
17 04 05	Iron and steel
17 05 06	Tin
17 05 07	Mixed metals
17 04 11	Cables other than those mentioned in 17 04 10
17 05 04	Soil and stone other than those mentioned in 17 05 03
17 06 04	Insulation material other than those mentioned in 17 06 01 and 17 06 03
17 08 02	Gypsum-based construction materials other than those mentioned in 17 08 01
17 09 04	Mixed construction and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03

APPENDIX 1 April 2005 Survey

Plate 1: Trial Pit 1

Plate 2: Trial Pit 2

Plate 3: Trial Pit 3

Plate 4: Trial Pit 4

Plate 5: Location of Trial Pit 4

Plate 6: Trial Pit 5

Plate 7: Spoil from Trial Pit 6

APPENDIX 2 November 2005 Survey

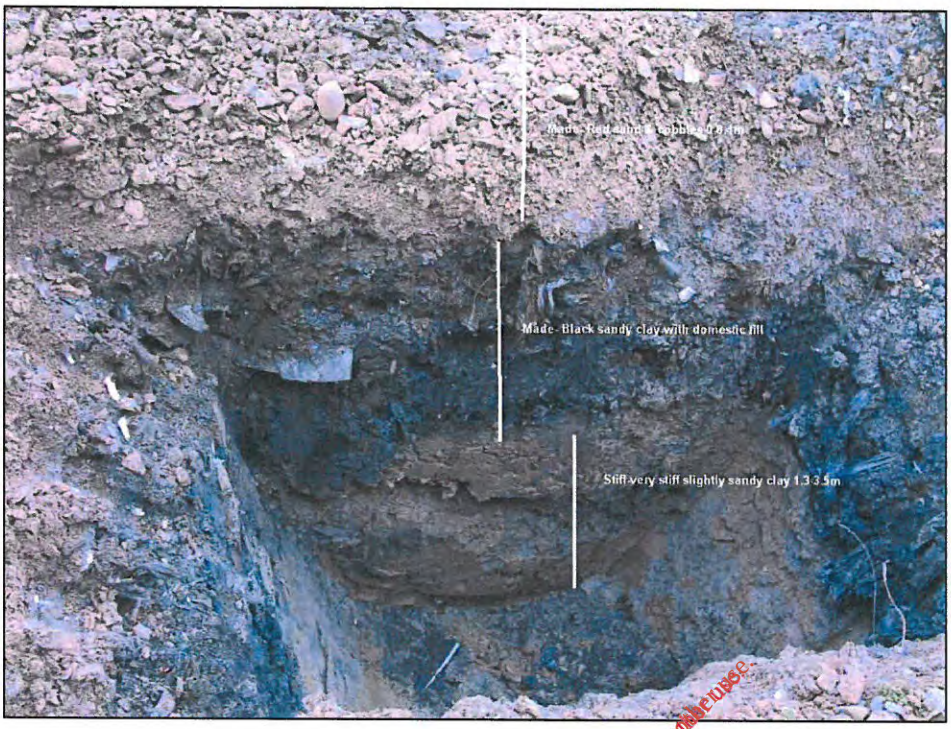


Plate 1: Section View of Trial Pit 1

Plate 2: Section View of Trial Pit 2

Plate 3: Section View of Trial Pit 3 – note thin layer of black fill material (c.0.5m)

Plate 4: Spoil from Trial Pit 4 – note absence of fill material

Plate 5: Section from Trial Pit 5 – note v thin layer of fill (c.0.3m)

Plate 6: Spoil from Trial Pit 6

Plate 7: Section from Trial Pit 7

Plate 8: Spoil from Trial Pit 8

Plate 9: Section from Trial Pit 9

Report on a Site Investigation
For
Waste Recovery Facility
Foxhole, Youghl
On behalf of
GWS Natural Resources Ltd.
DRAFT
Report No. 11303

Contents

Appendices

Report on a Site Investigation
For
Waste Recovery /Transfer
Sludge Drying Facility
Foxhole, Youghal
On behalf of
SWS Natural Resources Ltd.
DRAFT

Report No. 11303 Date December 2005

1.0 Introduction

The site for the proposed Waste Recovery and Sludge Drying Facility is on the east side of the River Blackwater, on the approach to Youghal Bridge.

An investigation of ground conditions was carried out to ascertain foundation requirements for the various buildings.

The programme of the investigation included boreholes and trial pits from which samples were recovered for both visual examination and laboratory testing.

This report contains the field and laboratory records and relates ground conditions to foundation design.

2.0 Ground Conditions

The boreholes and trial pits revealed some variations in the sub-soils conditions, both at upper levels, and at depth. The findings are summarised in the following paragraphs

2.1 Boreholes

Eight boreholes were constructed in the locations shown on the site plan enclosed in Appendix 4. The descriptions and depths of the various soils encountered are shown on the boring records enclosed in Appendix 1. Also shown on these records are the depths at which samples were recovered, the results of in-situ Standard Penetration Tests, and the groundwater conditions observed during the course of boring operations.

The boreholes generally revealed firm mottled grey and brown clay which is fissured in places, with tiny shell fragments. These deposits become stiff, and more gravelly with depth.

In some locations, granular deposits were encountered at depth, and were noted to the borehole terminal depths.

The borehole findings indicate that fill material is present in some areas, and is composed primarily of building waste and gravel.

At upper levels, the most significant findings are a layer of black sand, presumably fill, to a depth of 2.6 metres at borehole No.4 and a layer of clean brown sand which was encountered to a depth of 3.7 metres in borehole No.7.

While some boreholes remained dry, water ingress was noted in several locations, both at high level, in association with the made ground and granular layers, and at depth. Standpipes were installed in borehole No.4 and in borehole No.6, to facilitate long-term monitoring.

2.2 Trial Pits

Trial pits were excavated in an additional nine locations to facilitate close examination of the upper soils and to provide an assessment of stability and groundwater conditions.

The trial pits revealed made ground in several locations, and layers of sand, overlying and inter-bedded with the clay. Water ingress was noted in the made ground and sand layers, with associated instability.

3.0 Testing

The results of the in-situ Standard Penetration Tests are recorded as N-values, and are shown in the right-hand column of the boring records. The results of the laboratory tests are enclosed in Appendix 3.

3.1 Standard Penetration Tests

The N-value is the number of drop-hammer blows required to drive the test probe through a measured 300 mm penetration. The results are summarised on the enclosed N-value/Depth plot. While there is a general increase in N-value with depth, some low values were noted at depth. However, these appear to be associated with soil disturbance caused by hydraulic pressure from the water bearing layers. Low values at shallow depth are related to the made ground and sand layers.

3.2 Particle Size Distributions - to be completed

3.3 Index Properties - to be completed

3.4 Chemical Analysis - to be completed

4.0 Discussion

The investigation indicates that the sub-soils are fluvio-glacial, or possibly glacio-marine in origin with over-consolidated clay deposits inter-bedded with coarse granular material. As can be seen from Figure 3, there is no discernible pattern to the occurrence and depth to the granular deposits.

Part of the site has been in-filled with demolition waste although the depths are quite moderate, as shown on Figure 1. There is some evidence of loose sand, presumably alluvial in origin which may be related to the River Blackwater. The locations and depths of the sand deposits are shown on Figure 2.

The ground conditions are related to the various structures in the following paragraphs.

4.1 Material Recovery and Transfer Structure (BH1, 2, 3, 4, 5 and TP6, 7)

Towards the south-eastern end of this structure, boreholes No. 1, 2 and 3, and TP7, show firm to stiff clays and silts at nominal depth.

Variations are evident near the road frontage where there is an increase in the depth of fill. The fill depth is greatest at borehole No. 4, towards the north-western corner , where it reaches a depth of 2.6 metres. In addition, TP6 encountered sand below the fill.

From the aspect of structural foundations, the firm clays and silts will support foundation pressures of the order of 100 to 125 kN/m2. However, the prime considerations will be the depth of fill, and the transition to sand over part of the building area.

The most appropriate course of action will depend on the lateral extent of the sand and made ground. If the sand is localised, it may be possible to span over this area with ground beams, placing all of the structural foundations on the firm clays and silts. Similarly, isolated zones of deep fill can be removed, and replaced with suitably compacted granular fill. For foundations placed partially on clay and partially on sand, some differential movement is inevitable.

If the lateral extent of the deep fill and sand is significant, consideration could be given to ground improvement, using the Vibroflotation process with stone columns. This process will improve both the bearing capacity and uniformity of the sub-soils, permitting the use of conventional strip or pad foundations. This procedure can also be used over the floor area.

Piling is a further option, particularly where high column loads are anticipated. Piles can be driven to the dense granular soils and stiff gravelly clays in which the boreholes were terminated.

4.2 Sludge Reception and Discharge, Boiler, and Wood Chip Storage (Boreholes No. 6, 7 and 8, TP2 and TP5)

These buildings and installations are on the eastern side of the site.

In general, the boreholes and trial pits revealed firm to stiff sandy clay from nominal depths. These soils are underlain by coarse granular deposits in which the boreholes were terminated. The exception is borehole No.7 where a surface clay layer is underlain, at 1.6 metres, by loose water-bearing sand. The sand is present to a depth of 3.7 metres where it is underlain by firm clay and silt.

The firm to stiff clay deposits are suitable for founding purposes, and will support foundation pressures of the order of 150 kN/m2. However, the sand encountered by borehole No.7 is related to a water course and is unsuitable for founding purposes. The lateral extent of this channel or pond will determine the most practical foundation solution.

If the sand zone is extensive, consideration should be given to the use of ground improvement or piling.

4.3 Administration Building (TP1)

In this location, rubble and gravel fill is present to a depth of 1.3 metres where it is underlain by stiff sandy clay which will support foundation pressures of the order of 150 kN/m2. Since water ingress was noted at the base of the fill, prompt blinding of foundation excavations will be of importance.

4.4 Groundwater

It is important to appreciate that groundwater was encountered in some of the boreholes and in most of the trial pits and that the water table is probably within two metres of the present surface level. The standpipes in boreholes No.4 and 6 will detect any seasonal fluctuations in the water table.

While groundwater should not be a problem for conventional shallow foundations, groundwater control will be an important consideration for any sub-surface installations.

5.0 Summary

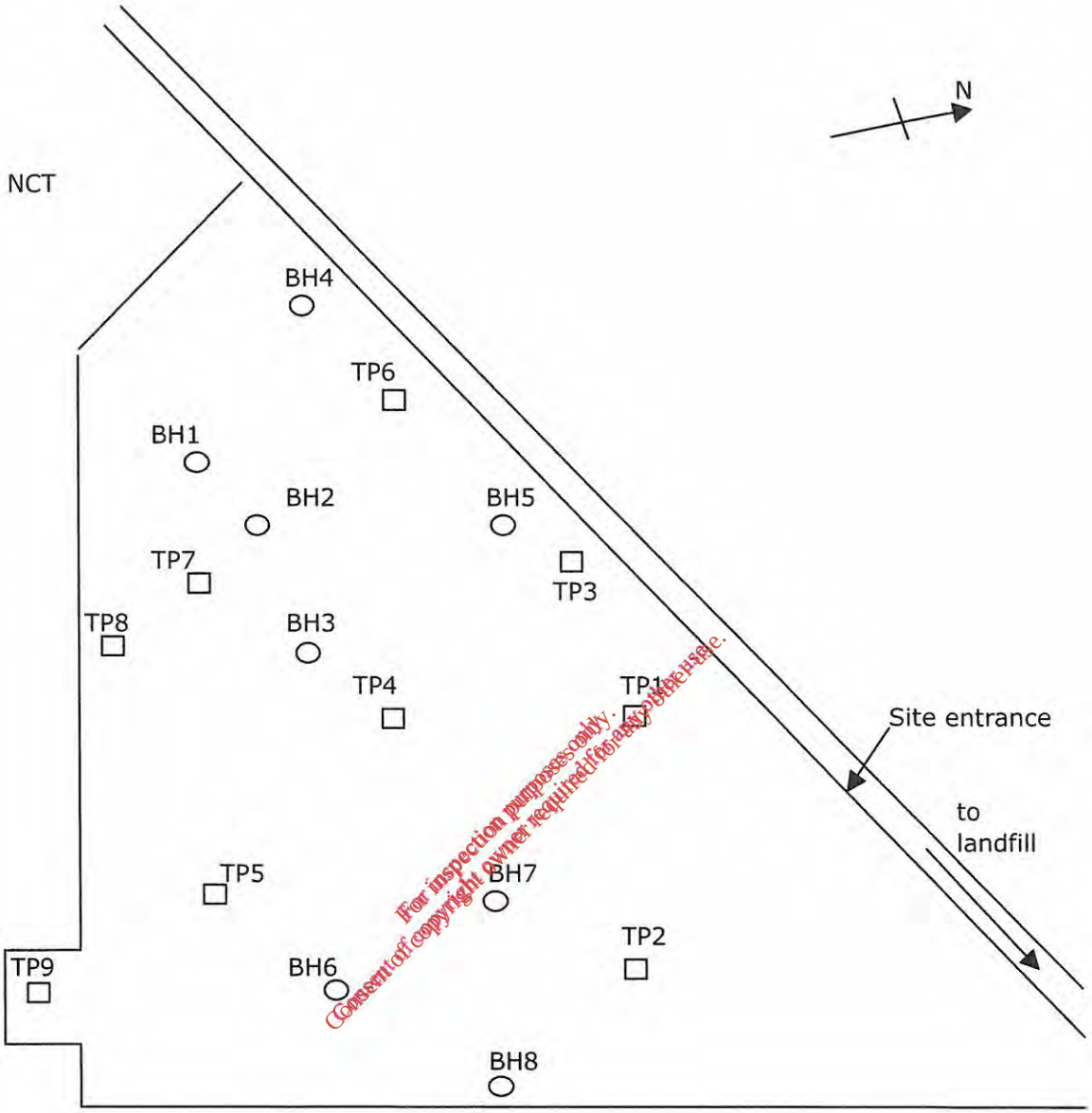
The investigation revealed that the site has been in-filled with demolition waste and gravel. The depth of fill is quite moderate, reaching a maximum depth of 2.6 metres near the western boundary. The sub-soils are composed primarily of firm to stiff silts and clays which are underlain, in places, by coarse granular deposits. However, there is evidence of sand deposits from surface level in some areas.

The silts, clays and coarse granular deposits are fluvio-glacial in origin and are, therefore, over-consolidated, and relatively incompressible. These soils are suitable for founding purposes, permitting the use of shallow strip or pad foundations over much of the site.

The shallow sand deposits are probably related to deposition from the River Blackwater and are, therefore, in a loose condition. Figure 2 shows the locations where sand was encountered. However, there is no distinct pattern and there could be further channels or pockets of sand over the site area.

Since the sand is generally unsuitable for founding purposes, it may be necessary to consider ground improvement or piling if the sand extends over a significant proportion of the area of any particular structure.

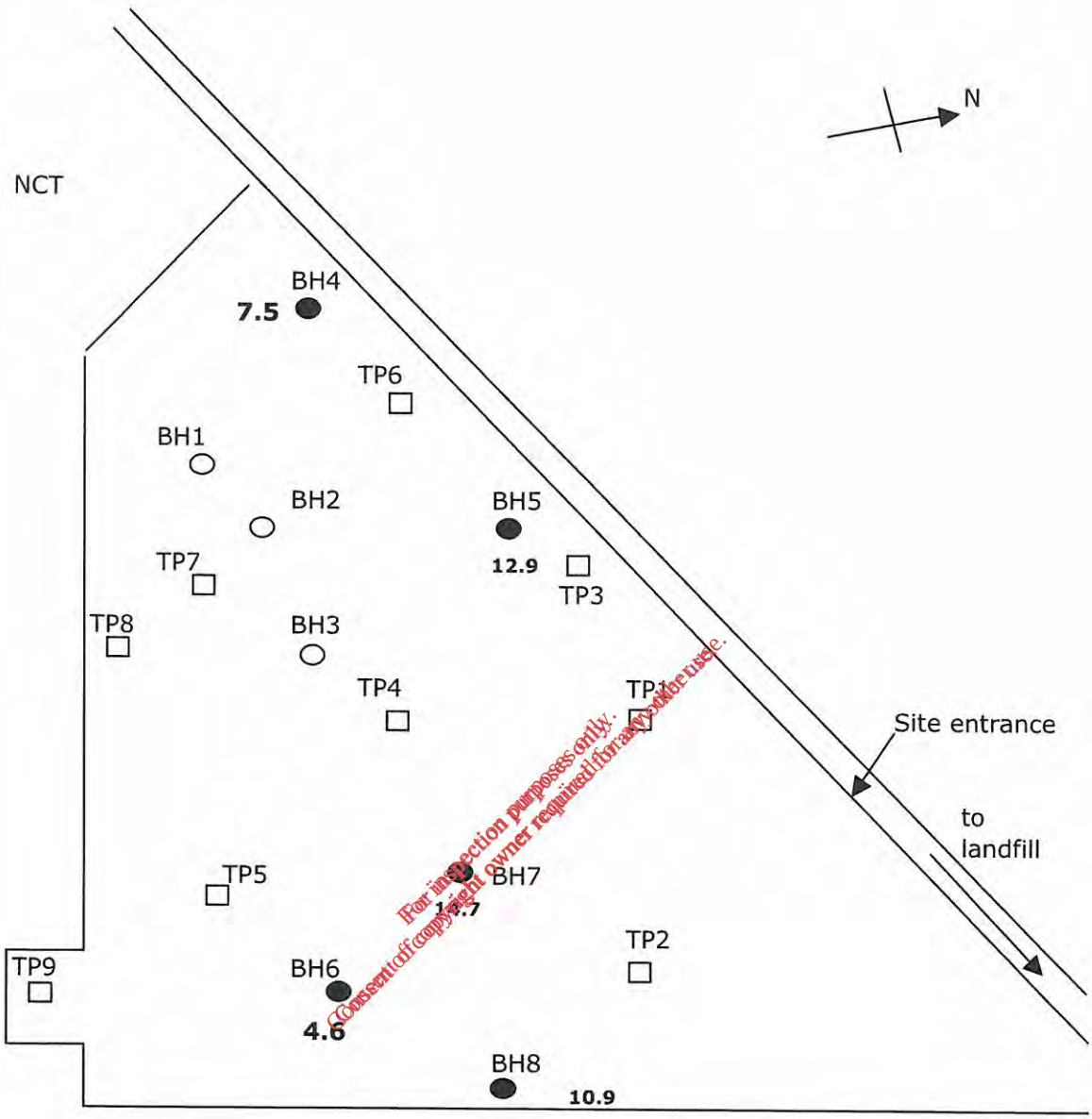
The high water table is an important consideration for deep excavations.



Youghal - Foxhole

11303

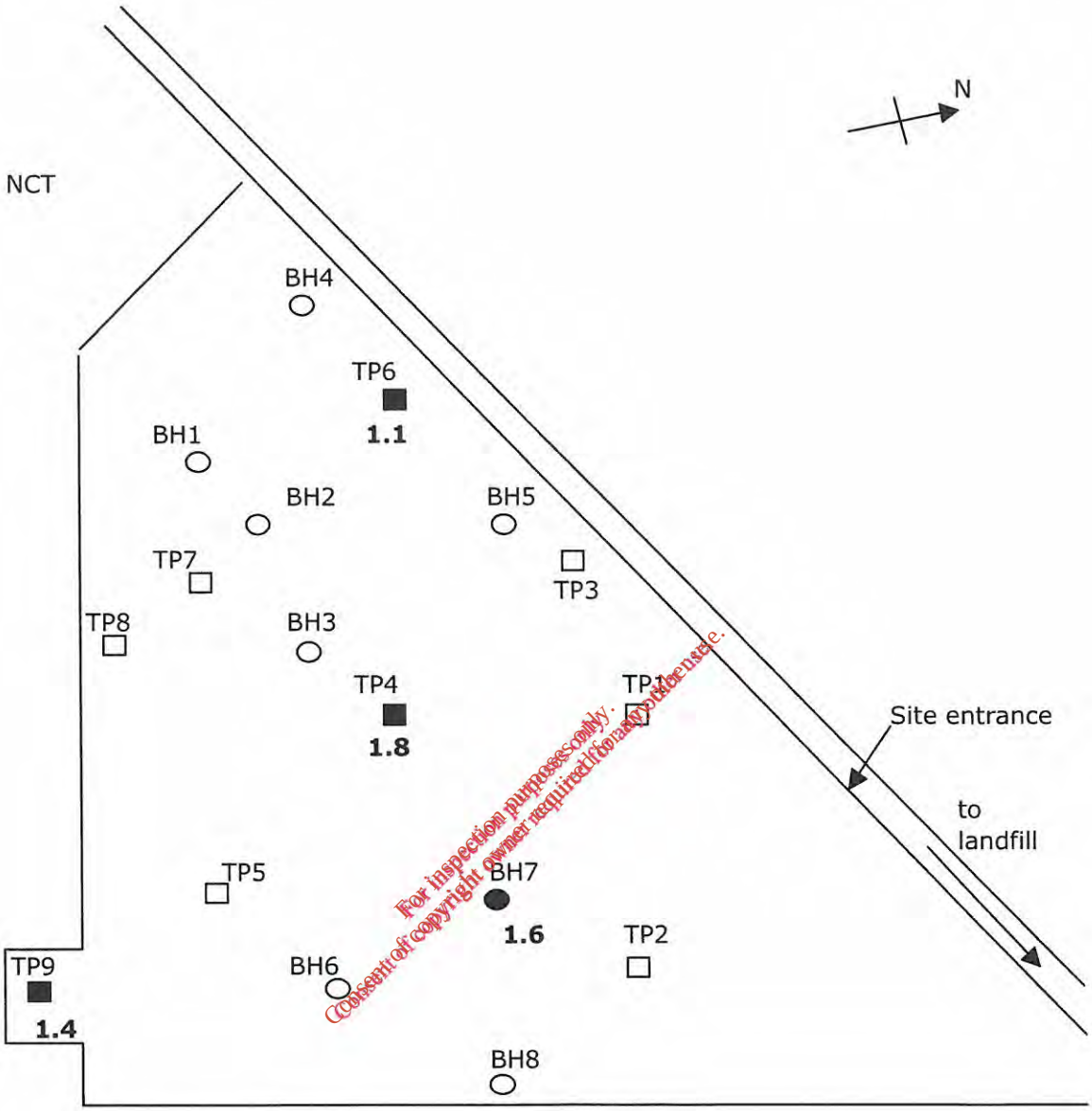
Fig.4



Youghal - Foxhole

11303

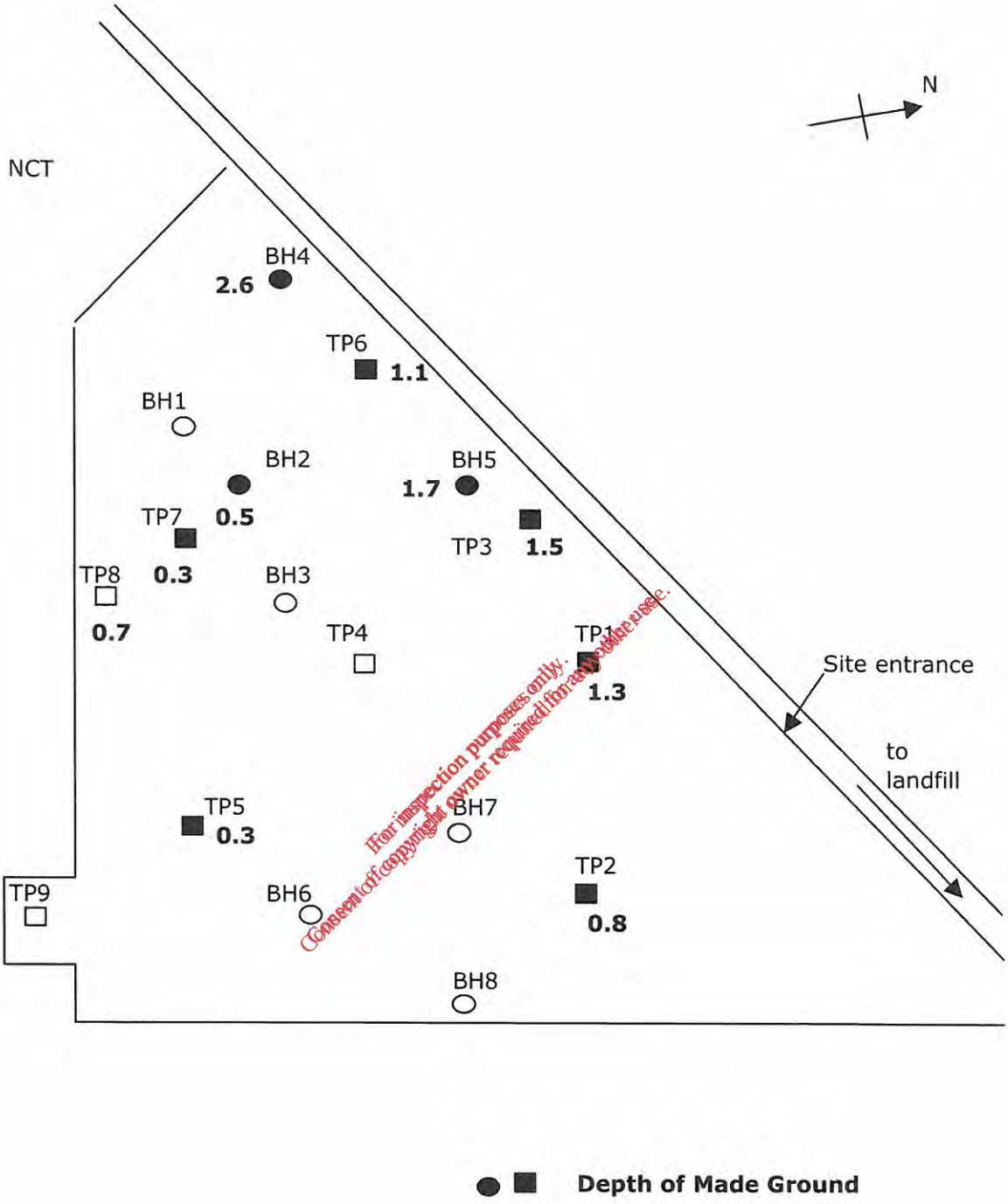
Fig.3



Youghal - Foxhole

11303

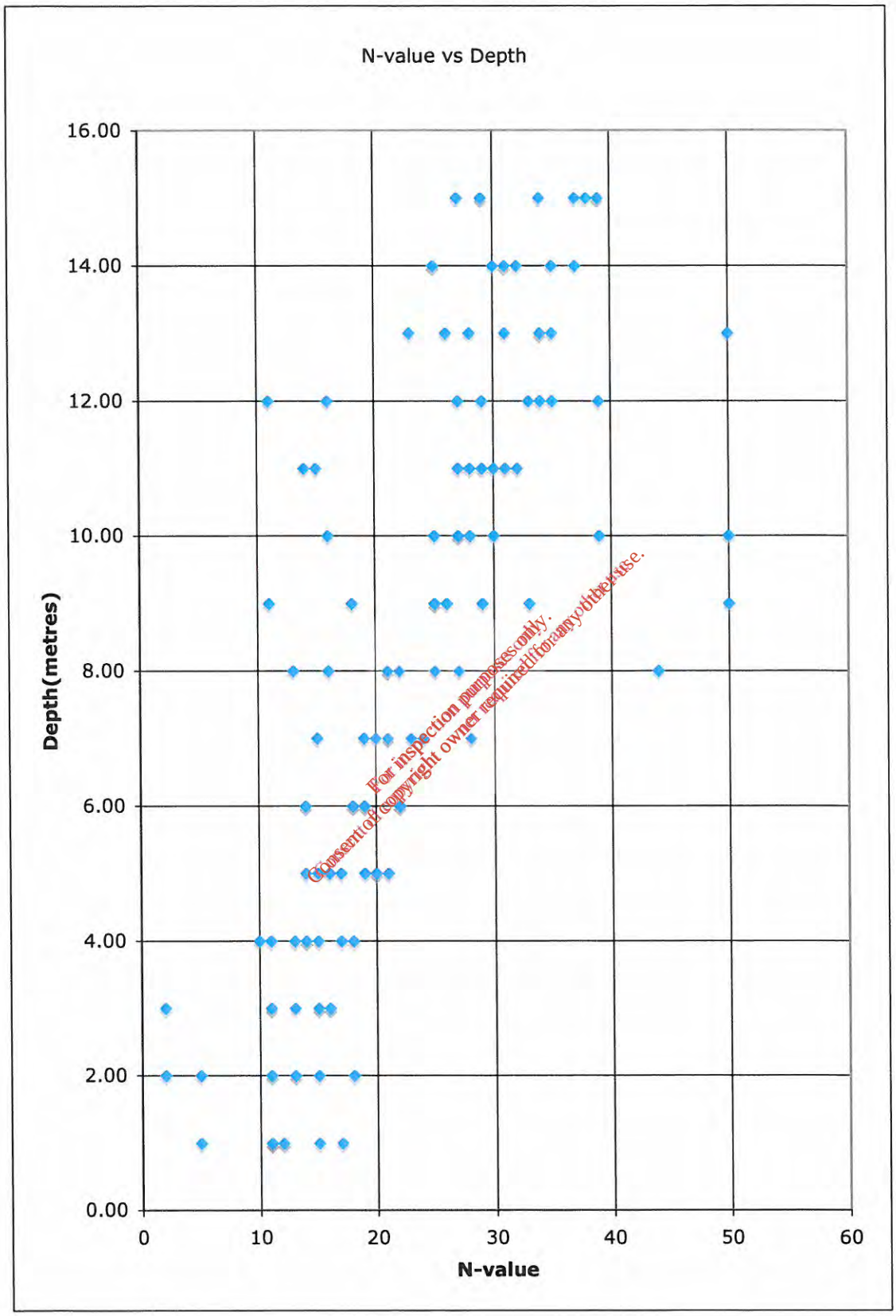
Fig. 2



Youghal - Foxhole

11303

Fig. 1



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Foxhole, Youghal

Fig 5

Appendix 1 Boring Records

REPORT NO: 11303	GEOTECHNICAL BORING RECORD	IGSL Ltd.
CONTRACT : Foxhole, Youghal		BOREHOLE NO: BH1 Sheet 1 of 2
CLIENT : ENGINEER : SWS Natural Resources Ltd	GROUND LEVEL (mOD) - BOREHOLE DIAMETER (mm) 200	DATE STARTED: 16/11/2005 DATE COMPLETED: 18/11/2005
CO-ORDINATES : E - N -	BOREHOLE DEPTH (m) 15.45 CASING DEPTH (m) 15.00	BORED BY: G. Clay

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES REF. NUMBER	SAMPLE TYPE	SAMPLES DEPTH (m)	SPT TYPE	FIELD TEST RESULTS	STAND PIPE DETAILS
0	TOPSOIL			0.30						
	Firm brown sandy CLAY/SILT				T3332	B	1.00	C	N=12	
1										
					T3333	B	2.00	C	N=13	
2				2.50						
	Firm grey CLAY/SILT				T3334	B	3.00	C	N=16	
3										
					T3335	B	4.00	C	N=17	
4										
					T3336	B	5.00	C	N=20	
5				5.50						
	Stiff grey sandy gravelly CLAY with some cobbles				T3337	B	6.00	C	N=19	
6										
					T3338	B	7.00	C	N=21	
7										
					T3339	B	8.00	C	N=25	
8										
					T3340	B	9.00	C	N=25	
9										
	Continued next sheet				T3341	B	10.00	C	N=28	
10										

Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
11.70	11.90	0.50	
13.40	13.70	0.75	
14.50	15.00	2.00	

Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
-	-	-	-	-	Dry

Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type

Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
18/11/2005	15.45	15.00	-	Borehole dry upon completion

REPORT NO: 11303	GEOTECHNICAL BORING RECORD	IGSL Ltd.
CONTRACT : Foxhole, Youghal		BOREHOLE NO: BH1 Sheet 2 of 2
CLIENT :	GROUND LEVEL (mOD) -	DATE STARTED: 16/11/2005
ENGINEER : SWS Natural Resources Ltd	BOREHOLE DIAMETER (mm) 200	DATE COMPLETED: 18/11/2005
CO-ORDINATES : E - N -	BOREHOLE DEPTH (m) 15.45	BORED BY: G. Clay
	CASING DEPTH (m) 15.00	

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES REF. NUMBER	SAMPLE TYPE	SAMPLES DEPTH (m)	SPT TYPE	FIELD TEST RESULTS	STAND PIPE DETAILS
10	Stiff grey sandy gravelly CLAY with some cobbles									
11					T3342	B	11.00	C	N=32	
12					T3343	B	12.00	C	N=39	
13					T3344	B	13.00	C	N=34	
14					T3345	B	14.00	C	N=37	
15					T3346	B	15.00	C	N=39	
	End of Borehole at 15.45 m			15.45						
16										
17										
18										
19										
20										

Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
11.70	11.90	0.50	
13.40	13.70	0.75	
14.50	15.00	2.00	

Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type

Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
-	-	-	-	-	Dry

Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
18/11/2005	15.45	15.00	-	Borehole dry upon completion

REPORT NO: 11303	GEOTECHNICAL BORING RECORD	IGSL Ltd.
CONTRACT : Foxhole, Youghal		BOREHOLE NO: BH2 Sheet 1 of 2
CLIENT : ENGINEER : SWS Natural Resources Ltd	GROUND LEVEL (mOD) - BOREHOLE DIAMETER (mm) 200	DATE STARTED: 18/11/2005 DATE COMPLETED: 18/11/2005
CO-ORDINATES : E - N -	BOREHOLE DEPTH (m) 15.45 CASING DEPTH (m) 15.00	BORED BY: G. Clay

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES REF. NUMBER	SAMPLES TYPE	SAMPLES DEPTH (m)	SPT TYPE	FIELD TEST RESULTS	STAND PIPE DETAILS
0	MADE GROUND consisting of clay and gravel			0.50						
1	Firm grey brown CLAY				T3347	B	1.00	C	N=15	
2	Firm brown grey CLAY			1.80	T3348	B	2.00	C	N=15	
3	Firm brown CLAY			2.60	T3349	B	3.00	C	N=15	
4					T3350	B	4.00	C	N=18	
5	Stiff grey slightly sandy slightly gravelly CLAY			4.70	T3351	B	5.00	C	N=21	
6					T3352	B	6.00	C	N=22	
7					T3353	B	7.00	C	N=28	
8					T3354	B	8.00	C	N=27	
9					T3355	B	9.00	C	N=29	
10	Continued next sheet				T3356	B	10.00	C	N=30	

Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
10.60	10.80	1.00	
12.80	13.00	0.50	
14.40	14.60	1.00	
14.80	15.00	1.75	

Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
-	-	-	-	-	Dry

Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type

Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
18/11/2005	15.45	15.00	-	Borehole dry upon completion

REPORT NO: 11303	GEOTECHNICAL BORING RECORD	IGSL Ltd.
CONTRACT : Foxhole, Youghal		BOREHOLE NO: BH2 Sheet 2 of 2
CLIENT : ENGINEER : SWS Natural Resources Ltd	GROUND LEVEL (mOD) - BOREHOLE DIAMETER (mm) 200 BOREHOLE DEPTH (m) 15.45 CASING DEPTH (m) 15.00	DATE STARTED: 18/11/2005 DATE COMPLETED: 18/11/2005
CO-ORDINATES : E - N -		BORED BY: G. Clay

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES REF. NUMBER	SAMPLE TYPE	SAMPLES DEPTH (m)	SPT TYPE	FIELD TEST RESULTS	STAND PIPE DETAILS
10	Stiff grey slightly sandy slightly gravelly CLAY									
11					T3357	B	11.00	C	N=29	
12					T3358	B	12.00	C	N=34	
				12.50						
	Stiff brown grey slightly sandy slightly gravelly CLAY									
13					T3359	B	13.00	C	N=35	
14					T3360	B	14.00	C	N=31	
15								C	N=39	
				15.45						
	End of Borehole at 15.45 m									
16										
17										
18										
19										
20										

Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
10.60	10.80	1.00	
12.80	13.00	0.50	
14.40	14.60	1.00	
14.80	15.00	1.75	

Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type

Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
-	-	-	-	-	Dry

Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
18/11/2005	15.45	15.00	-	Borehole dry upon completion

REPORT NO: 11303	GEOTECHNICAL BORING RECORD	IGSL Ltd.
CONTRACT : Foxhole, Youghal		BOREHOLE NO: BH3 Sheet 1 of 2
CLIENT : ENGINEER : SWS Natural Resources Ltd	GROUND LEVEL (mOD) - BOREHOLE DIAMETER (mm) 200 BOREHOLE DEPTH (m) 15.45 CASING DEPTH (m) 15.00	DATE STARTED: 19/11/2005 DATE COMPLETED: 19/11/2005
CO-ORDINATES : E - N -		BORED BY: G. Clay

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES REF. NUMBER	SAMPLE TYPE	SAMPLES DEPTH (m)	SPT TYPE	FIELD TEST RESULTS	STAND PIPE DETAILS
0	TOPSOIL			0.30						
	Light brown CLAY			0.90						
1	Firm light brown grey CLAY				T3361	B	1.00	C	N=11	
2					T3362	B	2.00	C	N=11	
3					T3363	B	3.00	C	N=11	
				3.80						
4	Firm grey CLAY				T3364	B	4.00	C	N=13	
5					T3365	B	5.00	C	N=15	
6					T3366	B	6.00	C	N=18	
7					T3367	B	7.00	C	N=20	
8					T3368	B	8.00	C	N=22	
	Stiff dark grey sandy slightly gravelly CLAY			8.50						
9					T3369	B	9.00	C	N=26	
10	Continued next sheet				T3370	B	10.00	C	N=27	

Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
11.80	11.90	0.75	.
13.60	13.90	1.00	.
14.70	15.00	2.00	

Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
5.50	5.50	-	3.00	20	Medium
10.40	10.40	-	9.40	20	Medium

Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type

Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
19/11/2005	15.45	15.00	10.00	End of borehole

REPORT NO: 11303	GEOTECHNICAL BORING RECORD	IGSL Ltd.
CONTRACT : Foxhole, Youghal		BOREHOLE NO: BH3 Sheet 2 of 2
CLIENT : ENGINEER : SWS Natural Resources Ltd	GROUND LEVEL (mOD) - BOREHOLE DIAMETER (mm) 200 BOREHOLE DEPTH (m) 15.45 CASING DEPTH (m) 15.00	DATE STARTED: 19/11/2005 DATE COMPLETED: 19/11/2005
CO-ORDINATES : E - N -		BORED BY: G. Clay

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES REF. NUMBER	SAMPLES SAMPLE TYPE	SAMPLES DEPTH (m)	SPT TYPE	FIELD TEST RESULTS	STAND PIPE DETAILS
10	Stiff dark grey sandy slightly gravelly CLAY									
	Firm brown SILT			10.40						
11					T3371	B	11.00	C	N=15	
	Firm becoming stiff grey slightly gravelly CLAY			11.80						
12					T3372	B	12.00	C	N=16	
13					T3373	B	13.00	C	N=23	
14					T3374	B	14.00	C	N=25	
15								C	N=27	
	End of Borehole at 15.45 m			15.45						
16										
17										
18										
19										
20										

Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
11.80	11.90	0.75	
13.60	13.90	1.00	
14.70	15.00	2.00	

Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type

Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
5.50	5.50	-	3.00	20	Medium
10.40	10.40	-	9.40	20	Medium

Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
19/11/2005	15.45	15.00	10.00	End of borehole

REPORT NO: 11303	GEOTECHNICAL BORING RECORD	IGSL Ltd.
CONTRACT : Foxhole, Youghal		BOREHOLE NO: BH4 Sheet 1 of 2
CLIENT :	GROUND LEVEL (mOD) -	DATE STARTED: 21/11/2005
ENGINEER : SWS Natural Resources Ltd	BOREHOLE DIAMETER (mm) 200	DATE COMPLETED: 21/11/2005
CO-ORDINATES : E - N -	BOREHOLE DEPTH (m) 15.45	BORED BY: G. Clay
	CASING DEPTH (m) 15.00	

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES REF. NUMBER	SAMPLE TYPE	SAMPLES DEPTH (m)	SPT TYPE	FIELD TEST RESULTS	STAND PIPE DETAILS
0	MADE GROUND consisting of clay, gravel, plastic and red brick									
1	MADE GROUND consisting of soft black sand			1.00	T3375	B	1.00	C	N=11	
2					T3376	B	2.00	C	N=5	
	Firm light brown CLAY			2.60						
3					T3377	B	3.00	C	N=11	
	Firm grey slightly gravelly CLAY			3.10						
4					T3378	B	4.00	C	N=14	
5					T3379	B	5.00	C	N=17	
	Stiff brown CLAY			5.80						
6					T3380	B	6.00	C	N=22	
7					T3381	B	7.00	C	N=23	
	Dense grey brown fine to coarse GRAVEL with some cobbles			7.50						
8					T3382	B	8.00	C	N=44	
9					T3383	B	9.00	C	N=33	
10	Continued next sheet				T3384	B	10.00	C	N=39	

Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
8.40	8.60	0.75	.
13.20	13.40	0.75	.
14.50	15.00	2.00	.

Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
1.00	1.00	-	0.50	20	Slow
7.50	7.50	-	4.10	20	Medium

Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type
21/11/2005	15.00	1.00	15.00	SP

Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
21/11/2005	15.45	15.00	5.00	End of borehole

REPORT NO: 11303	GEOTECHNICAL BORING RECORD	IGSL Ltd.
CONTRACT : Foxhole, Youghal		BOREHOLE NO: BH4 Sheet 2 of 2
CLIENT :	GROUND LEVEL (mOD) -	DATE STARTED: 21/11/2005
ENGINEER : SWS Natural Resources Ltd	BOREHOLE DIAMETER (mm) 200	DATE COMPLETED: 21/11/2005
CO-ORDINATES : E - N -	BOREHOLE DEPTH (m) 15.45	BORED BY: G. Clay
	CASING DEPTH (m) 15.00	

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES REF. NUMBER	SAMPLES SAMPLE TYPE	SAMPLES DEPTH (m)	SPT TYPE	FIELD TEST RESULTS	STAND PIPE DETAILS
10	Dense grey brown fine to coarse GRAVEL with some cobbles									
11					T3385	B	11.00	C	N=31	
12					T3386	B	12.00	C	N=35	
13					T3387	B	13.00	C	N=50/ 190mm	
14								C	N=35	
15								C	N=38	
	End of Borehole at 15.45 m			15.45						
16										
17										
18										
19										
20										

Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
8.40	8.60	0.75	.
13.20	13.40	0.75	.
14.50	15.00	2.00	.

Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
1.00	1.00	-	0.50	20	Slow
7.50	7.50	-	4.10	20	Medium

Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type
21/11/2005	15.00	1.00	15.00	SP

Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
21/11/2005	15.45	15.00	5.00	End of borehole

REPORT NO: 11303	GEOTECHNICAL BORING RECORD	IGSL Ltd.
CONTRACT : Foxhole, Youghal		BOREHOLE NO: BH5 Sheet 1 of 1
CLIENT : ENGINEER : SWS Natural Resources Ltd	GROUND LEVEL (mOD) - BOREHOLE DIAMETER (mm) 200	DATE STARTED: 24/11/2005 DATE COMPLETED: 24/11/2005
CO-ORDINATES : E - N -	BOREHOLE DEPTH (m) 0.90 CASING DEPTH (m) 0.90	BORED BY: G. Clay

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES: REF. NUMBER	SAMPLES: SAMPLE TYPE	SAMPLES: DEPTH (m)	SPT TYPE	FIELD TEST RESULTS	STAND PIPE DETAILS
0	MADE GROUND consisting of clay, sand, gravel, wood, metal and plastic									
1	Large obstruction			0.90						
	End of Borehole at 0.90 m									
2										
3										
4										
5										
6										
7										
8										
9										
10										

Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
0.90	0.90	2.00	

Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
-	-	-	-	-	Dry

Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type

Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
24/11/2005	0.90	0.90	-	Borehole dry upon completion

REPORT NO: 11303	GEOTECHNICAL BORING RECORD	IGSL Ltd.
CONTRACT : Foxhole, Youghal		BOREHOLE NO: BH5A Sheet 1 of 2
CLIENT : ENGINEER : SWS Natural Resources Ltd	GROUND LEVEL (mOD) - BOREHOLE DIAMETER (mm) 200 BOREHOLE DEPTH (m) 15.45 CASING DEPTH (m) 15.45	DATE STARTED: 24/11/2005 DATE COMPLETED: 28/11/2005
CO-ORDINATES : E - N -		BORED BY: G. Clay

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES REF. NUMBER	SAMPLE TYPE	SAMPLES DEPTH (m)	SPT TYPE	FIELD TEST RESULTS	STAND PIPE DETAILS
0	MADE GROUND consisting of clay, sand, gravel, wood, metal and plastic									
1					S4216	B	1.00	C	N=5	
	Firm brown CLAY			1.70						
2					S4217	B	2.00	C	N=11	
3					S4218	B	3.00	C	N=13	
	Firm brown SILT			3.90	S4219	B	4.00	C	N=10	
4										
	Firm brown CLAY			4.80						
5					S4220	B	5.00	C	N=16	
	Firm brown SILT			5.60						
6					S4221	B	6.00	C	N=14	
7					S4222	B	7.00	C	N=24	
8					S4223	B	8.00	C	N=16	
9					S4224	B	9.00	C	N=18	
10	Continued next sheet				S4225	B	10.00	C	N=16	

Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
13.60	13.80	0.75	.
14.50	14.80	1.00	.
14.90	15.00	2.00	.

Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
1.40	1.40	-	1.35	20	Seepage
12.90	12.90	-	7.30	20	Rapid

Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type

Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
28/11/2005	15.45	15.00	7.50	End of borehole

REPORT NO: 11303	GEOTECHNICAL BORING RECORD	IGSL Ltd.
CONTRACT : Foxhole, Youghal		BOREHOLE NO: BH5A Sheet 2 of 2
CLIENT : ENGINEER : SWS Natural Resources Ltd	GROUND LEVEL (mOD) - BOREHOLE DIAMETER (mm) 200	DATE STARTED: 24/11/2005 DATE COMPLETED: 28/11/2005
CO-ORDINATES : E - N -	BOREHOLE DEPTH (m) 15.45 CASING DEPTH (m) 15.45	BORED BY: G. Clay

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES REF. NUMBER	SAMPLES SAMPLE TYPE	SAMPLES DEPTH (m)	SPT TYPE	FIELD TEST RESULTS	STAND PIPE DETAILS
10	Firm brown SILT									
11					S4226	B	11.00	C	N=14	
12					S4227	B	12.00	C	N=11	
13	Medium dense grey brown slightly sandy fine to coarse GRAVEL			12.90	S4228	B	13.00	C	N=26	
14					S4229	B	14.00	C	N=25	
15					S4230	B	15.00	C	N=29	
	End of Borehole at 15.45 m			15.45						
16										
17										
18										
19										
20										

Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
13.60	13.80	0.75	
14.50	14.80	1.00	
14.90	15.00	2.00	

Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
1.40	1.40	-	1.35	20	Seepage
12.90	12.90	-	7.30	20	Rapid

Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type

Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
28/11/2005	15.45	15.00	7.50	End of borehole

REPORT NO: 11303	GEOTECHNICAL BORING RECORD	IGSL Ltd.
CONTRACT : Foxhole, Youghal		BOREHOLE NO: BH6 Sheet 1 of 2
CLIENT : ENGINEER : SWS Natural Resources Ltd	GROUND LEVEL (mOD) - BOREHOLE DIAMETER (mm) 200	DATE STARTED: 22/11/2005 DATE COMPLETED: 22/11/2005
CO-ORDINATES : E - N -	BOREHOLE DEPTH (m) 15.45 CASING DEPTH (m) 15.00	BORED BY: G. Clay

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES REF. NUMBER	SAMPLE TYPE	SAMPLES DEPTH (m)	SPT TYPE	FIELD TEST RESULTS	STAND PIPE DETAILS
0	TOPSOIL			0.30						
	Firm light grey slightly gravelly CLAY				T3388	B	1.00	C	N=12	
	Firm light brown grey CLAY			1.60	T3389	B	2.00	C	N=13	
	Firm dark brown grey CLAY			2.70	T3390	B	3.00	C	N=15	
					T3391	B	4.00	C	N=15	
	Medium dense becoming dense grey brown gravelly fine to medium SAND			4.50	T3392	B	5.00	C	N=20	
					T3393	B	6.00	C	N=18	
					T3394	B	7.00	C	N=19	
					T3395	B	8.00	C	N=21	
					T3396	B	9.00	C	N=25	
	Continued next sheet				T3397	B	10.00	C	N=25	

Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
7.40	7.60	0.75	
9.70	9.90	0.50	
12.50	12.70	0.75	
14.40	14.60	1.00	
14.80	15.00	2.00	

Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
4.80	4.80	-	2.70	20	Medium

Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type
21/11/2005	15.00	1.00	15.00	SP

Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
22/11/2005	15.45	15.00	3.00	End of borehole

REPORT NO: 11303	GEOTECHNICAL BORING RECORD	IGSL Ltd.
CONTRACT : Foxhole, Youghal		BOREHOLE NO: BH6 Sheet 2 of 2
CLIENT :	GROUND LEVEL (mOD) -	DATE STARTED: 22/11/2005
ENGINEER : SWS Natural Resources Ltd	BOREHOLE DIAMETER (mm) 200	DATE COMPLETED: 22/11/2005
CO-ORDINATES : E - N -	BOREHOLE DEPTH (m) 15.45	BORED BY: G. Clay
	CASING DEPTH (m) 15.00	

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES REF. NUMBER	SAMPLES SAMPLE TYPE	SAMPLES DEPTH (m)	SPT TYPE	FIELD TEST RESULTS	STAND PIPE DETAILS
10	Medium dense becoming dense grey brown gravelly fine to medium SAND									
11					T3398	B	11.00	C	N=30	
12					T3399	B	12.00	C	N=27	
13					T3400	B	13.00	C	N=31	
14					S4201	B	14.00	C	N=32	
15								C	N=34	
	End of Borehole at 15.45 m			15.45						
16										
17										
18										
19										
20										

Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
7.40	7.60	0.75	
9.70	9.90	0.50	
12.50	12.70	0.75	
14.40	14.60	1.00	
14.80	15.00	2.00	

Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
4.80	4.80	-	2.70	20	Medium

Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type
21/11/2005	15.00	1.00	15.00	SP

Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
22/11/2005	15.45	15.00	3.00	End of borehole

REPORT NO: 11303	GEOTECHNICAL BORING RECORD	IGSL Ltd.
CONTRACT : Foxhole, Youghal		BOREHOLE NO: BH7 Sheet 1 of 2
CLIENT : ENGINEER : SWS Natural Resources Ltd	GROUND LEVEL (mOD) - BOREHOLE DIAMETER (mm) 200	DATE STARTED: 15/11/2005 DATE COMPLETED: 16/11/2005
CO-ORDINATES : E - N -	BOREHOLE DEPTH (m) 15.45 CASING DEPTH (m) 15.00	BORED BY: G. Clay

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES REF. NUMBER	SAMPLES SAMPLE TYPE	SAMPLES DEPTH (m)	SPT TYPE	FIELD TEST RESULTS	STAND PIPE DETAILS
0	Firm brown mottled grey slightly gravelly CLAY									
1					T3318	B	1.00	C	N=11	
				1.60						
	Very loose brown fine SAND									
2					T3319	B	2.00	C	N=2	
3					T3320	B	3.00	C	N=2	
				3.70						
	Grey brown sandy GRAVEL									
4				4.00	T3321	B	4.00	C	N=11	
	Firm brown CLAY									
5					T3322	B	5.00	C	N=14	
				5.20						
	Firm grey CLAY									
6					T3323	B	6.00	C	N=14	
7					T3324	B	7.00	C	N=15	
				7.90						
8	Firm brown SILT				T3325	B	8.00	C	N=13	
9					T3326	B	9.00	C	N=11	
				9.80						
10	Continued next sheet				T3327	B	10.00	C	N=50/ 220mm	

Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
10.20	10.40	0.75	
10.80	11.00	0.75	
14.80	15.00	2.00	

Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
1.60	1.60	-	0.90	20	Medium
5.60	5.60	-	3.10	20	Rapid
14.60	14.60	-	2.00	20	Rapid

Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type

Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
16/11/2005	15.45	15.00	2.00	End of borehole

REPORT NO: 11303	GEOTECHNICAL BORING RECORD	IGSL Ltd.
CONTRACT : Foxhole, Youghal		BOREHOLE NO: BH7 Sheet 2 of 2
CLIENT : ENGINEER : SWS Natural Resources Ltd	GROUND LEVEL (mOD) - BOREHOLE DIAMETER (mm) 200	DATE STARTED: 15/11/2005 DATE COMPLETED: 16/11/2005
CO-ORDINATES : E - N -	BOREHOLE DEPTH (m) 15.45 CASING DEPTH (m) 15.00	BORED BY: G. Clay

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES REF. NUMBER	SAMPLE TYPE	SAMPLES DEPTH (m)	SPT TYPE	FIELD TEST RESULTS	STAND PIPE DETAILS
10	Stiff brown slightly sandy gravelly CLAY with some cobbles									
11					T3328	B	11.00	C	N=27	
	Stiff dark grey slightly sandy gravelly CLAY			11.40						
12					T3329	B	12.00	C	N=33	
13					T3330	B	13.00	C	N=28	
				13.90						
14	Stiff light brown sandy gravelly CLAY				T3331	B	14.00	C	N=31	
	Medium dense grey brown clayey GRAVEL			14.70						
15								C	N=29	
	End of Borehole at 15.45 m			15.45						
16										
17										
18										
19										
20										

Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
10.20	10.40	0.75	
10.80	11.00	0.75	
14.80	15.00	2.00	

Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
1.60	1.60	-	0.90	20	Medium
5.60	5.60	-	3.10	20	Rapid
14.60	14.60	-	2.00	20	Rapid

Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type

Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
16/11/2005	15.45	15.00	2.00	End of borehole

REPORT NO: 11303	GEOTECHNICAL BORING RECORD	IGSL Ltd.
CONTRACT : Foxhole, Youghal		BOREHOLE NO: BH8 Sheet 1 of 2
CLIENT : ENGINEER : SWS Natural Resources Ltd	GROUND LEVEL (mOD) - BOREHOLE DIAMETER (mm) 200	DATE STARTED: 23/11/2005 DATE COMPLETED: 23/11/2005
CO-ORDINATES : E - N -	BOREHOLE DEPTH (m) 15.45 CASING DEPTH (m) 15.45	BORED BY: G. Clay

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES REF. NUMBER	SAMPLE TYPE	SAMPLES DEPTH (m)	SPT TYPE	FIELD TEST RESULTS	STAND PIPE DETAILS
0	MADE GROUND consisting of clay, sand and gravel			0.40						
	Firm brown grey CLAY									
1					S4202	B	1.00	C	N=17	
2					S4203	B	2.00	C	N=18	
3					S4204	B	3.00	C	N=16	
4					S4205	B	4.00	C	N=14	
	Firm grey CLAY			4.80						
5					S4206	B	5.00	C	N=19	
6					S4207	B	6.00	C	N=19	
7					S4208	B	7.00	C	N=21	
8					S4209	B	8.00	C	N=21	
	Stiff brown sandy gravelly CLAY with some cobbles			8.40						
9					S4210	B	9.00	C	N=50/ 200mm	
10	Continued next sheet				S4211	B	10.00	C	N=27	

Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
9.30	9.50	1.00	.
12.60	12.80	0.75	.
13.80	13.90	1.00	.
14.90	15.00	2.00	

Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
7.80	7.80	-	5.80	20	Medium
9.90	9.90	-	4.90	20	Rapid

Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type

Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
23/11/2005	15.45	15.00	5.30	End of borehole

REPORT NO: 11303	GEOTECHNICAL BORING RECORD	IGSL Ltd.
CONTRACT : Foxhole, Youghal		BOREHOLE NO: BH8 Sheet 2 of 2
CLIENT :	GROUND LEVEL (mOD) -	DATE STARTED: 23/11/2005
ENGINEER : SWS Natural Resources Ltd	BOREHOLE DIAMETER (mm) 200	DATE COMPLETED: 23/11/2005
CO-ORDINATES : E - N -	BOREHOLE DEPTH (m) 15.45	BORED BY: G. Clay
	CASING DEPTH (m) 15.45	

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES REF. NUMBER	SAMPLES SAMPLE TYPE	SAMPLES DEPTH (m)	SPT TYPE	FIELD TEST RESULTS	STAND PIPE DETAILS
10	Stiff brown sandy gravelly CLAY with some cobbles									
				10.90						
11	Medium dense becoming dense grey brown gravelly fine to medium SAND				S4212	B	11.00	C	N=28	
12					S4213	B	12.00	C	N=29	
13					S4214	B	13.00	C	N=34	
14					S4215	B	14.00	C	N=30	
15								C	N=37	
	End of Borehole at 15.45 m			15.45						
16										
17										
18										
19										
20										

Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
9.30	9.50	1.00	.
12.60	12.80	0.75	.
13.80	13.90	1.00	.
14.90	15.00	2.00	.

Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type

Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
7.80	7.80	-	5.80	20	Medium
9.90	9.90	-	4.90	20	Rapid

Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
23/11/2005	15.45	15.00	5.30	End of borehole

Appendix 2 Trial Pit records

REPORT NO. 11303	TRIAL PIT RECORD	IGSL Ltd.

CONTRACT:	Foxhole, Youghal	Trial Pit No.:	TP1
		Sheet:	**Sheet 1 of 1**
CLIENT:		Excavation Method:	14T Tracked Excavator
ENGINEER:	SWS Natural Resources Ltd	Date Started:	23/11/2005
CO-ORDINATES:	E - N -	Date Completed:	23/11/2005
		Ground Level (mOD):	-

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation (mOD)	Water Strike (m)	Samples			Vane Test (KPa)	Hand Penetrometer (KPa)
						Ref. No.	Type	Depth (m)		
0.0	**MADE GROUND consisting of red sand and cobbles.**									
	MADE GROUND consisting of black sandy clay with plastic, glass and red brick.		0.40							
1.0						T310	B	1.00		
	Stiff grey brown very sandy CLAY		1.30							
	Stiff becoming very stiff grey brown slightly sandy CLAY		1.90							
2.0						T311	B	2.50		
3.0										
	End of Trial Pit at 3.50 m		3.50			T312	B	3.50		
4.0										

Groundwater Conditions: Seepage @ 1.3m

Stability: Pit walls stable

Remarks:

REPORT NO. 11303	TRIAL PIT RECORD	IGSL Ltd.

CONTRACT:	Foxhole, Youghal	Trial Pit No.:	TP2
		Sheet:	Sheet 1 of 1
CLIENT:		Excavation Method:	14T Tracked Excavator
ENGINEER:	SWS Natural Resources Ltd	Date Started:	23/11/2005
CO-ORDINATES:	E - N -	Date Completed:	23/11/2005
		Ground Level (mOD):	-

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation (mOD)	Water Strike (m)	Samples			Vane Test (KPa)	Hand Penetrometer (KPa)
						Ref. No.	Type	Depth (m)		
0.0	MADE GROUND consisting of black sandy clay with plastic, glass and red brick.									
	Stiff becoming very stiff grey brown sandy CLAY		0.80							
1.0						T313	B	1.50		
2.0						T314	B	2.50		
3.0										
	End of Trial Pit at 3.50 m		3.50			T315	B	3.50		
4.0										

Groundwater Conditions: No groundwater encountered

Stability: Pit walls stable

Remarks:

REPORT NO. 11303	TRIAL PIT RECORD	IGSL Ltd.

CONTRACT:	Foxhole, Youghal	Trial Pit No.:	TP3
		Sheet:	**Sheet 1 of 1**
CLIENT:		Excavation Method:	14T Tracked Excavator
ENGINEER:	SWS Natural Resources Ltd	Date Started:	23/11/2005
CO-ORDINATES:	E - N -	Date Completed:	23/11/2005
		Ground Level (mOD):	-

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation (mOD)	Water Strike (m)	Samples Ref. No.	Samples Type	Samples Depth (m)	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0	**MADE GROUND consisting of black sandy clay with plastic, glass and red brick.**									
1.0	**MADE GROUND consisting of black sandy clay with steel, glass and plastic.**		1.00							
	Very stiff grey brown slightly sandy CLAY.		1.90			T329	B	1.70		
2.0										
3.0						T330	B	3.00		
	End of Trial Pit at 3.50 m		3.50							
4.0										

Groundwater Conditions: Seepage @ 1.5m

Stability: Pit walls stable

Remarks:

REPORT NO. 11303	TRIAL PIT RECORD	IGSL Ltd.

CONTRACT:	Foxhole, Youghal	Trial Pit No.:	TP4
		Sheet:	**Sheet 1 of 1**
CLIENT:		Excavation Method:	14T Tracked Excavator
ENGINEER:	SWS Natural Resources Ltd	Date Started:	23/11/2005
CO-ORDINATES:	E - N -	Date Completed:	23/11/2005
		Ground Level (mOD):	-

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation (mOD)	Water Strike (m)	Samples			Vane Test (KPa)	Hand Penetrometer (KPa)
						Ref. No.	Type	Depth (m)		
0.0	**TOPSOIL**		0.10							
	Firm becoming stiff grey brown very sandy CLAY									
1.0						T331	B	1.00		
	Light brown fine to coarse SAND		1.80		▽	T332	B	1.90		
2.0										
	End of Trial Pit at 2.30 m		2.30							
3.0										
4.0										

Groundwater Conditions: Rapid ingress @ 2.1m

Stability: Major pit wall collapse below 1.8m due to water ingress, forcing completion of pit

Remarks:

REPORT NO. 11303	TRIAL PIT RECORD	IGSL Ltd.

CONTRACT:	Foxhole, Youghal	Trial Pit No.:	TP5
		Sheet:	**Sheet 1 of 1**
CLIENT:		Excavation Method:	14T Tracked Excavator
ENGINEER:	SWS Natural Resources Ltd	Date Started:	23/11/2005
		Date Completed:	23/11/2005
CO-ORDINATES:	E - N -	Ground Level (mOD):	-

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation (mOD)	Water Strike (m)	Samples			Vane Test (KPa)	Hand Penetrometer (KPa)
						Ref. No.	Type	Depth (m)		
0.0	**MADE GROUND consisting of black sandy clay with plastic, glass and red brick.**									
	Stiff becoming very stiff grey brown sandy CLAY		0.30							
1.0					▽	T316	B	1.50		
2.0						T317	B	2.50		
3.0										
	End of Trial Pit at 3.50 m		3.50			T318	B	3.50		
4.0										

Groundwater Conditions: Seepage @ 1.6m

Stability: Pit walls stable

Remarks:

REPORT NO. 11303	TRIAL PIT RECORD	IGSL Ltd.

CONTRACT:	Foxhole, Youghal	Trial Pit No.:	TP6
		Sheet:	**Sheet 1 of 1**
CLIENT:		Excavation Method:	14T Tracked Excavator
ENGINEER:	SWS Natural Resources Ltd	Date Started:	23/11/2005
		Date Completed:	23/11/2005
CO-ORDINATES:	E - N -	Ground Level (mOD):	-

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation (mOD)	Water Strike (m)	Samples			Vane Test (KPa)	Hand Penetrometer (KPa)
						Ref. No.	Type	Depth (m)		
0.0	**MADE GROUND consisting of black sandy clay with plastic, glass and red brick.**									
	MADE GROUND consisting of black sandy clay with steel		0.70							
1.0	**Light brown fine to medium SAND**		1.10			T327	B	1.00		
						T328	B	1.50		
2.0										
3.0	**End of Trial Pit at 3.00 m**		3.00		▽					
4.0										

Groundwater Conditions: Medium ingress @ 3.0m

Stability: Major pit wall collapse due to water ingress, forcing completion of pit

Remarks:

REPORT NO. 11303	TRIAL PIT RECORD	IGSL Ltd.

CONTRACT:	Foxhole, Youghal	Trial Pit No.:	TP7
		Sheet:	Sheet 1 of 1
CLIENT:		Excavation Method:	14T Tracked Excavator
ENGINEER:	SWS Natural Resources Ltd	Date Started:	23/11/2005
		Date Completed:	23/11/2005
CO-ORDINATES:	E - N -	Ground Level (mOD):	-

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation (mOD)	Water Strike (m)	Samples Ref. No.	Samples Type	Samples Depth (m)	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0	MADE GROUND consisting of black sandy clay with plastic, glass and red brick.									
			0.30							
	Stiff becoming very stiff grey brown slightly sandy CLAY									
1.0										
						T324	B	1.50		
2.0										
						T325	B	2.50		
3.0										
	End of Trial Pit at 3.30 m		3.30							
						T326	B	3.50		
4.0										

Groundwater Conditions: No groundwater encountered

Stability: Pit walls stable

Remarks:

REPORT NO. 11303	TRIAL PIT RECORD	IGSL Ltd.

CONTRACT:	Foxhole, Youghal	Trial Pit No.:	TP8
		Sheet:	Sheet 1 of 1
CLIENT:		Excavation Method:	14T Tracked Excavator
ENGINEER:	SWS Natural Resources Ltd	Date Started:	23/11/2005
CO-ORDINATES:	E - N -	Date Completed:	23/11/2005
		Ground Level (mOD):	-

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation (mOD)	Water Strike (m)	Samples Ref. No.	Samples Type	Samples Depth (m)	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0	MADE GROUND consisting of black sandy clay with plastic, glass and red brick.									
	Stiff becoming very stiff grey brown slightly sandy CLAY		0.70							
1.0						T321	B	1.50		
2.0						T322	B	2.50		
3.0										
	End of Trial Pit at 3.50 m		3.50			T323	B	3.50		
4.0										

Groundwater Conditions: No groundwater encountered

Stability: Pit walls stable

Remarks:

REPORT NO. 11303	TRIAL PIT RECORD	IGSL Ltd.

CONTRACT:	Foxhole, Youghal	Trial Pit No.:	TP9
		Sheet:	**Sheet 1 of 1**
CLIENT:		Excavation Method:	14T Tracked Excavator
ENGINEER:	SWS Natural Resources Ltd	Date Started:	23/11/2005
CO-ORDINATES:	E - N -	Date Completed:	23/11/2005
		Ground Level (mOD):	-

Depth (m)	Geotechnical Description	Legend	Depth (m)	Elevation (mOD)	Water Strike (m)	Samples Ref. No.	Samples Type	Samples Depth (m)	Vane Test (KPa)	Hand Penetrometer (KPa)
0.0	**TOPSOIL**		0.10							
	Red brown gravelly fine to coarse SAND with many sub-rounded cobbles									
1.0						T319	B	1.00		
	Light brown slightly gravelly fine to coarse SAND		2.40							
2.0										
						T320	B	2.50		
3.0										
	End of Trial Pit at 3.20 m		3.20							
4.0										

Groundwater Conditions: Medium ingress @ 3.2m

Stability: Major pit wall collapse due to water ingress, forcing completion of pit

Remarks:

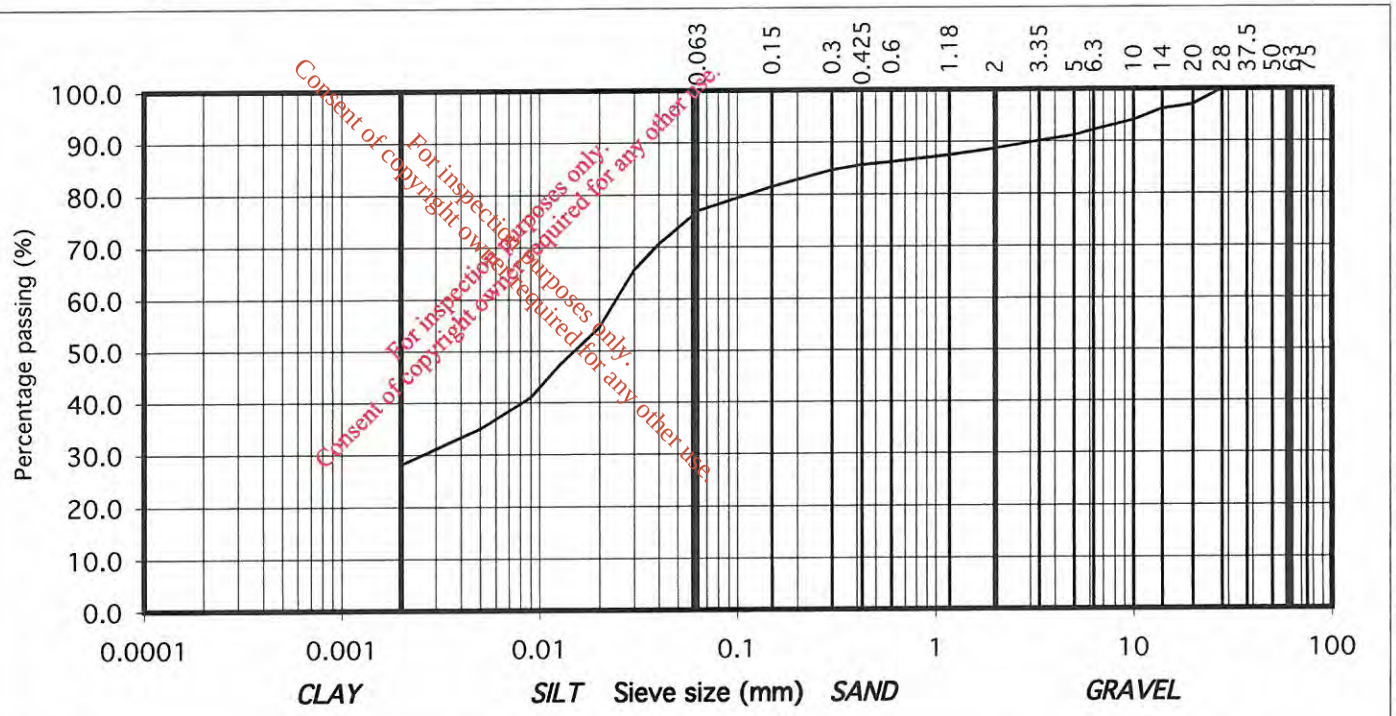
Appendix 3 Laboratory Test Results

Determination of Particle Size Distribution

BS1377:Part2:1990 , clauses 9.2

particle size	% passing	
75	100.0	COBBLES
63	100.0	
50	100.0	
37.5	100.0	
28	100.0	
20	97.1	GRAVEL
14	96.2	
10	94.0	
6.3	92.1	
5	91.1	
3.35	90.0	
2	88.5	
1.18	87.4	
0.6	86.1	SAND
0.425	85.5	
0.3	84.5	
0.15	81.4	
0.063	76.8	
0.04	70.4	
0.03	65.5	
0.02	54.5	SILT/CLAY
0.013	47.7	
0.009	40.9	
0.005	34.8	
0.002	28.0	

Contract No: 11303
Contract: FOXHOLE YOUGHAL CO.CORK
BH/TP No: BH 7
SAMPLE No.: 3329
DEPTH (m): 12.00
TEST METHOD: Wet sieve and hydrometer
DESCRIPTION: Brown slightly sandy, slightly gravelly, CLAY



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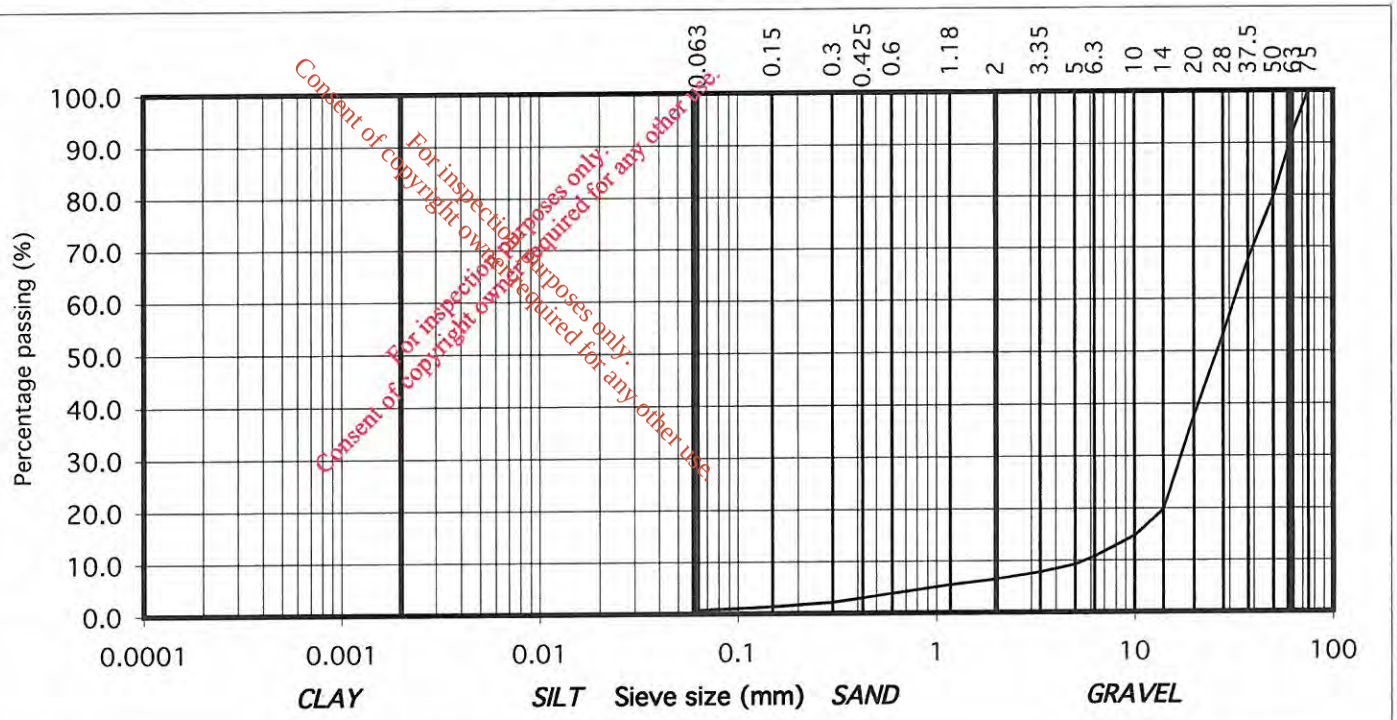
Determination of Particle Size Distribution

BS1377:Part2:1990 , clauses 9.2

particle size	% passing	
75	100.0	COBBLES
63	92.1	GRAVEL
50	79.6	
37.5	67.5	
28	53.1	
20	37.7	
14	19.7	
10	14.7	
6.3	10.7	
5	9.2	
3.35	7.8	
2	6.5	SAND
1.18	5.4	
0.6	3.7	
0.425	2.9	
0.3	2.2	
0.15	1.3	
0.063	0.7	SILT/CLAY
0.04	#N/A	
0.03	#N/A	
0.02	#N/A	
0.013	#N/A	
0.009	#N/A	
0.005	#N/A	
0.002	#N/A	

Contract No: 11303
Contract: FOXHOLE YOUGHAL CO.CORK
BH/TP No: BH 6
SAMPLE No.: 3394
DEPTH (m): 7.00
TEST METHOD: Wet sieve
DESCRIPTION: Grey brown slightly clayey/silty, sandy, GRAVEL with some cobbles



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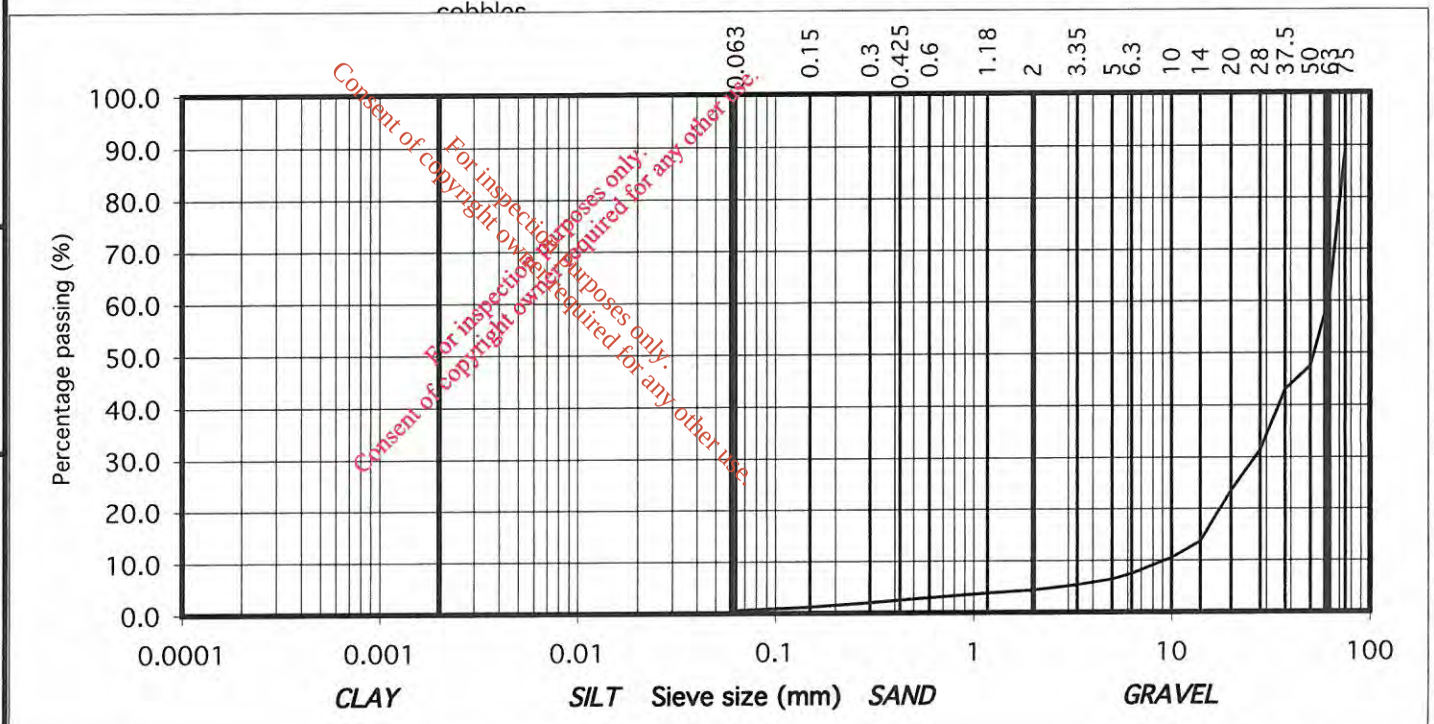
Determination of Particle Size Distribution

BS1377:Part2:1990 , clauses 9.2

particle size	% passing	
75	89.2	COBBLES
63	61.3	GRAVEL
50	47.4	
37.5	43.0	
28	31.3	
20	23.4	
14	13.7	
10	10.4	
6.3	7.4	
5	6.4	
3.35	5.3	
2	4.4	SAND
1.18	3.8	
0.6	2.9	
0.425	2.5	
0.3	2.0	
0.15	1.1	
0.063	0.6	SILT/CLAY
0.04	#N/A	
0.03	#N/A	
0.02	#N/A	
0.013	#N/A	
0.009	#N/A	
0.005	#N/A	
0.002	#N/A	

Contract No: 11303
Contract: FOXHOLE YOUGHAL CO.CORK
BH/TP No: BH 4
SAMPLE No.: 3382
DEPTH (m): 8.00
TEST METHOD: Wet sieve
DESCRIPTION: Grey brown slightly clayey/silty, slightly sandy, GRAVEL with many cobbles



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	D CONNOLLY	21/12/05			

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REPORT NO.	SULPHATE ANALYSIS							IGSL
CONTRACT:	FOXHOLE YOUGHAL CO.CORK						CONTRACT NO	11303
BH/TP NO.	DEPTH (M)	SAMPLE NO.	SAMPLE TYPE	TEST CODE	% Passing 2mm	SULPHUR TRIOXIDE		(so3 X 1.2)	pH
						WATER SO3 g/L	TOTAL SOIL so3 %	TOTAL SOIL so 4 %	VALUE
BH 1	2.00	3333	D	S	98.6		0.038	0.046	8.1
BH 3	5.00	3365	D	S	96.7		0.045	0.054	7.7
BH 6	2.00	3389	D	S	77		0.016	0.019	6.4
BH 8	2.00	4203	D	S	94.2		0.038	0.046	8.0

TEST CODE: W = WATER S = SOIL A = AQUEOUS SOIL EXTRACT(2:1)

Summary of Classification Tests

BS1377:Part 2:1990, clauses 3.2, 4.3, 5.3 & 5.4

BH/TP No.	Sample No.	Depth (m)	Sample Type	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index	<425µm %	Preparation	Description	Classification
BH 1	3333	2.00	D	21.2	49	25	24	96.9	WS	Mottled brown slightly sandy CLAY with occasional fine gravel	C I
BH 1	3343	12.00	D	17.2	40	17	23	88.4	WS	Brown slightly sandy slightly gravelly CLAY	C I
BH 2	3350	4.00	D	23.2	47	20	27	98.0	WS	Mottled brown slightly sandy CLAY with occasional fine gravel	C I
BH 3	3365	5.00	D	23.2	38	19	19	91.1	WS	Mottled brown slightly sandy slightly gravelly CLAY	C I
BH 6	3389	2.00	D	20.9	48	20	28	93.2	WS	Mottled brown slightly sandy slightly gravelly CLAY	C I
BH 7	3323	6.00	D	48.5	40	19	21	98.4	WS	Mottled grey brown slightly sandy CLAY	C I
BH 7	3329	12.00	D	27.3	52	20	32	85.5	WS	Brown slightly sandy slightly gravelly CLAY	C H
BH 8	4203	2.00	D	21.8	44	19	25	95.2	WS	Mottled brown slightly sandy CLAY with occasional fine gravel	C I

Notes: NAT - tested as received WS - Wet sieved (425µm) NP - Non Plastic

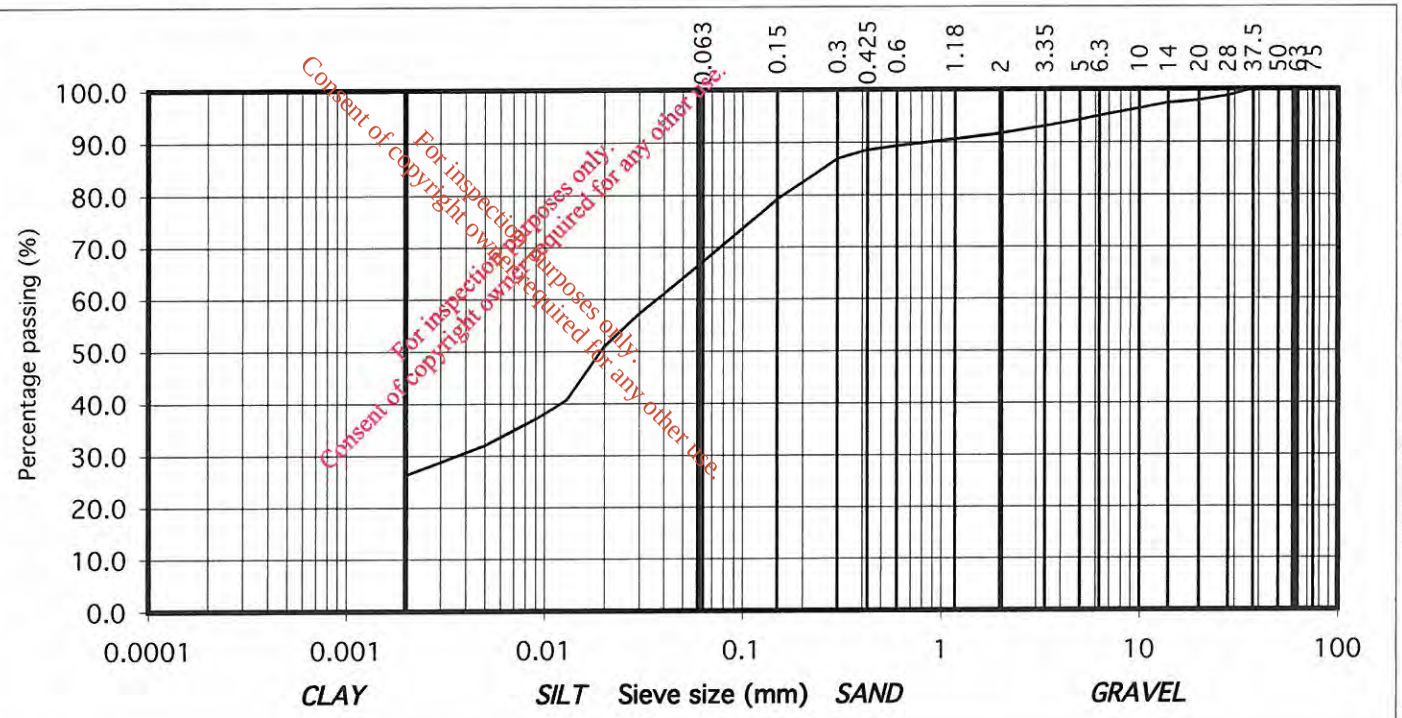
IGSL	Contract	FOXHOLE YOUGHAL CO.CORK			Contract No. 11303
	Compiled By	Date	Checked By	Date	Page
	D CONNOLLY	21/12/05			of

Determination of Particle Size Distribution

BS1377:Part2:1990 , clauses 9.2

particle size	% passing	
75	100.0	COBBLES
63	100.0	
50	100.0	
37.5	100.0	
28	98.7	
20	97.9	GRAVEL
14	97.4	
10	96.4	
6.3	95.0	
5	94.1	
3.35	92.9	
2	91.7	
1.18	90.6	
0.6	89.3	SAND
0.425	88.4	
0.3	86.8	
0.15	79.2	
0.063	67.1	
0.04	60.9	
0.03	57.1	
0.02	51.0	SILT/CLAY
0.013	40.7	
0.009	37.0	
0.005	31.8	
0.002	26.2	

Contract No: 11303
Contract: FOXHOLE YOUGHAL CO.CORK
BH/TP No: BH 1
SAMPLE No.: 3343
DEPTH (m): 12.00
TEST METHOD: Wet sieve and hydrometer
DESCRIPTION: Brown slightly sandy, slightly gravelly, CLAY



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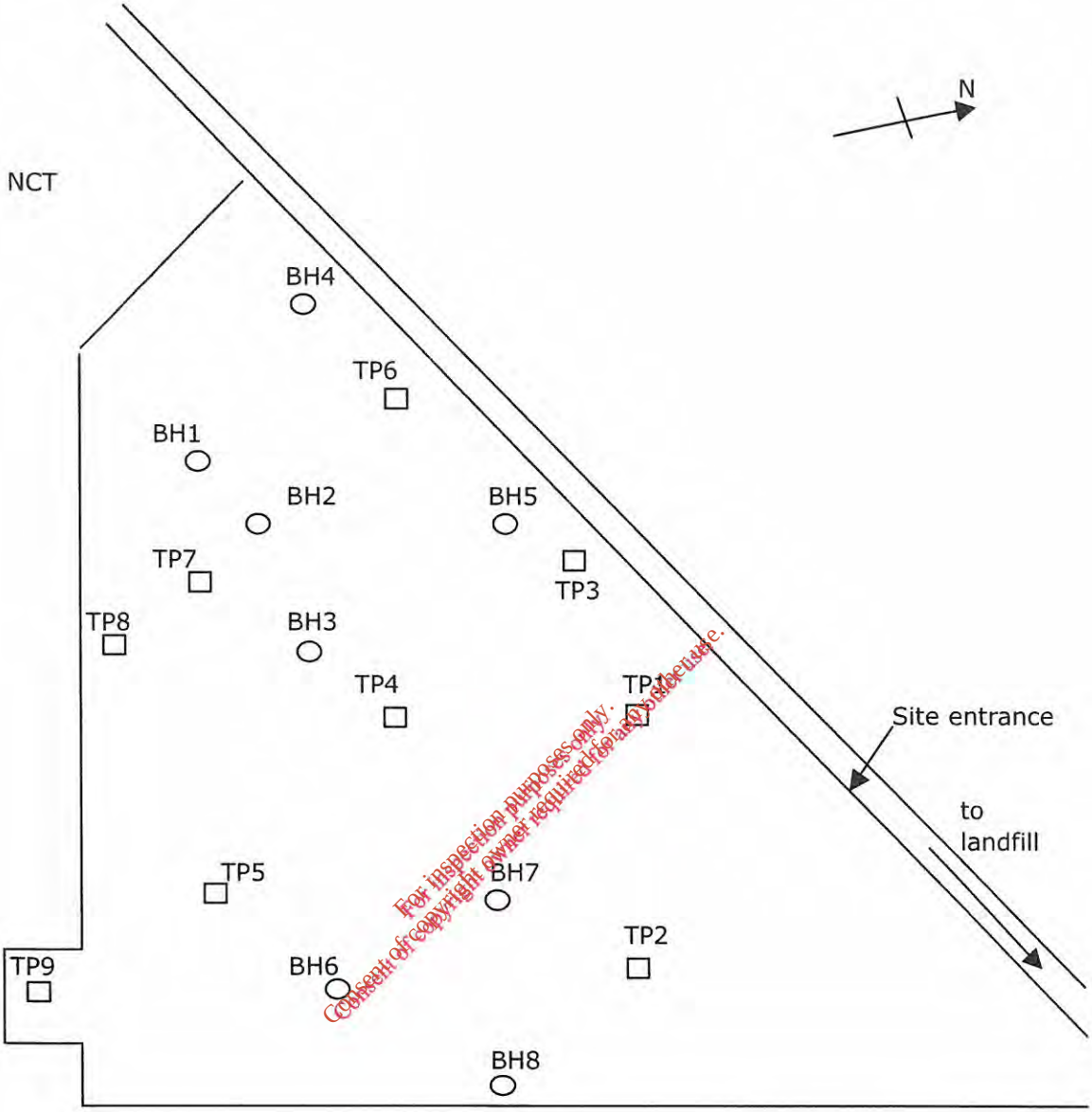
Appendix 4 Site Plan



Youghal - Foxhole

11303

Fig.4