OH(2) Sub No. 2A.

Recd From: Patrick Boyle

Date: 27/04/09 2.25pm.

Nevitt Lusk Action Group
Windfield
Nevitt
Lusk
Co Dublin

PROPOSED FINGAL LANDFILL

Comments
on the
Hydrogeological Risk Assessment

EPA Oral Hearing

27th April 2009

Patrick Boyle, B E
Hands Lane
Rush
Co Dublin

Introduction

My name is Patrick Boyle. I am a member of the Nevitt Lusk Action Group and a retired Irish Army Engineer. This document is a comment on a number of the issues raised in the ***Fingal Landfill Project, Hydrogeological Risk Assessment*** (HRA) conducted by RPS on behalf of Fingal County Council dated February 2009. These comments will focus principally on the lateral movement of groundwater in the saturated clay zone.

1 Perched Groundwater

The HRA asserts that the Groundwater in the clays immediately below the proposed landfill is ***perched***, i.e. that it has an unsaturated clay layer below it and above the underlying bedrock aquifer and that this layer is in all places at least 10metres thick. This is not proven by the data presented. Notwithstanding this the HRA asserts that compliance point for entry of List 1 substances is located at the bottom of the 10m clay strata. Were it to be the case that these unsaturated conditions did not exist or were only partially present, then there would be no geological barrier in the clays, and the compliance point would then be the groundwater immediately below the landfill.

2 Saturated Zone

On the other hand if the saturated clay below the water table is not perched then saturated conditions must exist down to the bedrock aquifer.

In either case a horizontal component of groundwater movement will occur in the saturated clay and this important fact has been omitted in the HRA Conceptual Model.

3 Recharge of surface streams

The shallow groundwater adjacent to the north, east, and south boundaries of the proposed site lie only a short distance and up-gradient to surrounding streams (marked A,B and C on the attached Site map). Recharge of the streams through saturated clay is thus likely, but this possibility was ignored in the HRA.

The NlAG has recently located a disused well which, until fairly recent times, was the principal source of water for the residents of the Nevitt. (see attached site map). The well lies within the deep ditch containing the stream marked **B** and is surrounded by a concrete casing (see attached photos). **This stream lies within the landfill footprint.**

The groundwater level in the well, which is the local water table, is the same as that of the adjacent stream i.e. the stream bed is accepting a direct entry of groundwater from the landfill site. In fact there is clear evidence that the stream bed has been artificially deepened for some distance upstream to facilitate the entry of groundwater.

4 Chemical analysis of stream water

The HRA has failed to investigate by way of chemical analysis the possible presence of groundwater in the local surface streams.

To this end the NLAG have commissioned a chemical analysis of the water from the stream adjacent to the well (Site A) and from stream A at the Five Roads flyover (Site B). The samples were taken after a short dry period when both streams were running low. The samples were analysed by Euro Environmental Services, Drogheda. The results (attached) show that in both cases ***the stream water shows characteristic properties of shallow groundwater*** and can be compared with the deep groundwater analysis in EIS VOL5, H&S, appendix A8.

5 Recharge of down-gradient bedrock aquifer

The HRA failed to analyse the lateral movement of groundwater in the saturated clay and the risk of down-gradient aquifer pollution.

Borehole data (attached) shows a steep gradient in the clay water table across the site from west to east (see site map, section A-A'). The direction of flow along this section is assumed to follow the topographic contours (see detailed topographic map attached). The Geophysics map Depth to Bedrock along this section shows that the depth varies from ~8meters up-gradient of the site, to ~30 m below the site, to ~8 m down-gradient to the east.(see attached map). The down-gradient section is characterised by shallowing gravels – eventually 5m below ground level at BRC4- directly overlying bedrock. The HRA failed to note that 10

metres of clay is no longer present in this down-gradient area and that a geological barrier is absent.(see Gravel Map and BRC4 borehole data).

The HRA has failed to identify the risk of pollution of streams and the bedrock aquifer immediately down-gradient of the site due to the lateral movement of groundwater in the saturated zone.

6 Local wells

The HRA conceptual model is over simplistic in that it fails to recognize that the movement of groundwater in the clays is likely to mirror the local topography. For example shallow groundwater in the south will exit the landfill site in a southerly direction i.e. in the direction of Kerrigans well.

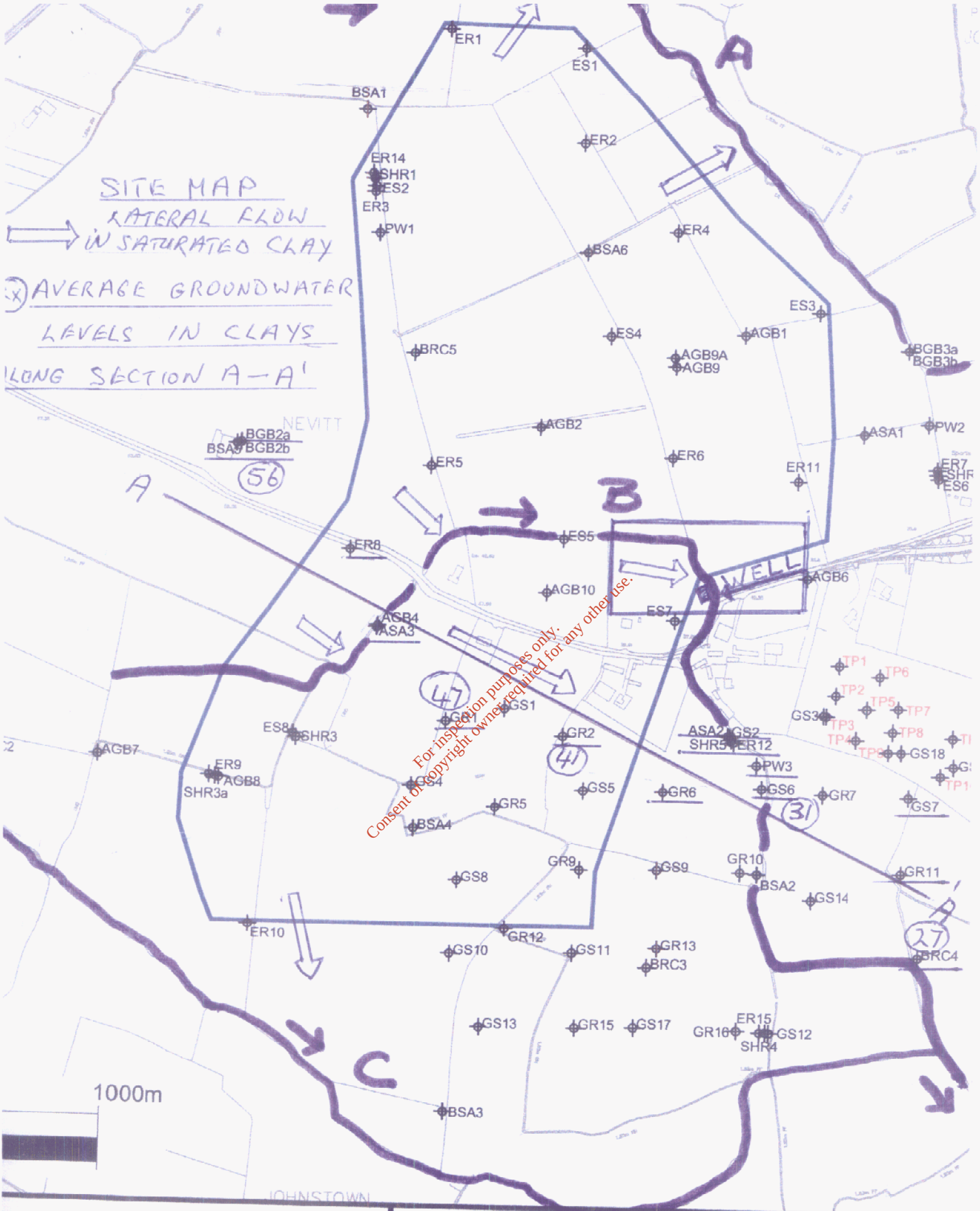
No analysis whatsoever of the risk posed to Kerrigans horticultural well has been carried out by the HRA. For example the extent of the cone of depression formed during continuous operation of the 1.2ML/Day pump has not been determined, nor the soiol conditions at Kerrigans well.

An anomaly which occurs on the groundwater contour maps at Borehole ER10 for the months of June and September 2005 has not been investigated. Levels drop from a normal 39mod to 32mod(see maps). This borehole is directly north and up-gradient of Kerrigans. There is therefore an obvious need to determine if the anomalies at ER10 could be due to drawdown at Kerrigans. Accidental pollution of Kerrigans well could have very serious consequences for public health, and the Fingal Horticultural industry as a whole, apart altogether from the obvious breach of the Drinking Water Directive.

In the matter of assessing the risk posed to local horticultural wells and the extent of consequential damage the HRA is entirely lacking.

In summary the HRA has failed to recognise and assess the risk of polluting local streams, the risk of down gradient pollution of the bedrock aquifer, and the threat to local horticultural wells.

P. Boyle B.E.

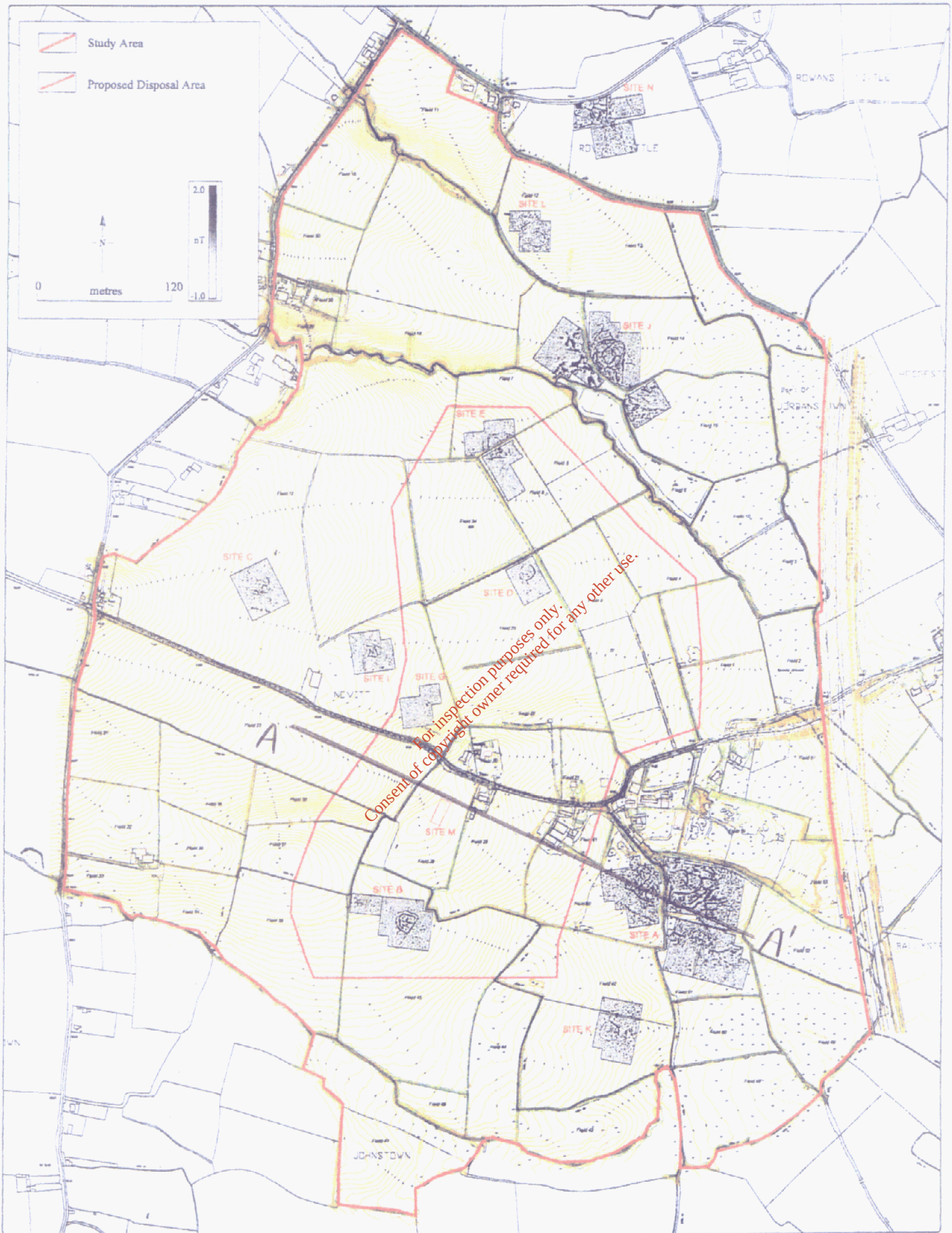


NOTES P. BOYLE. NLAG 26/4/09

1. This drawing is the property of RPS Consulting Engineers, it is a confidential document and must not be copied, used, or its content divulged without prior written consent.
2. All Levels refer to Ordnance Survey Datum, Malin Head.

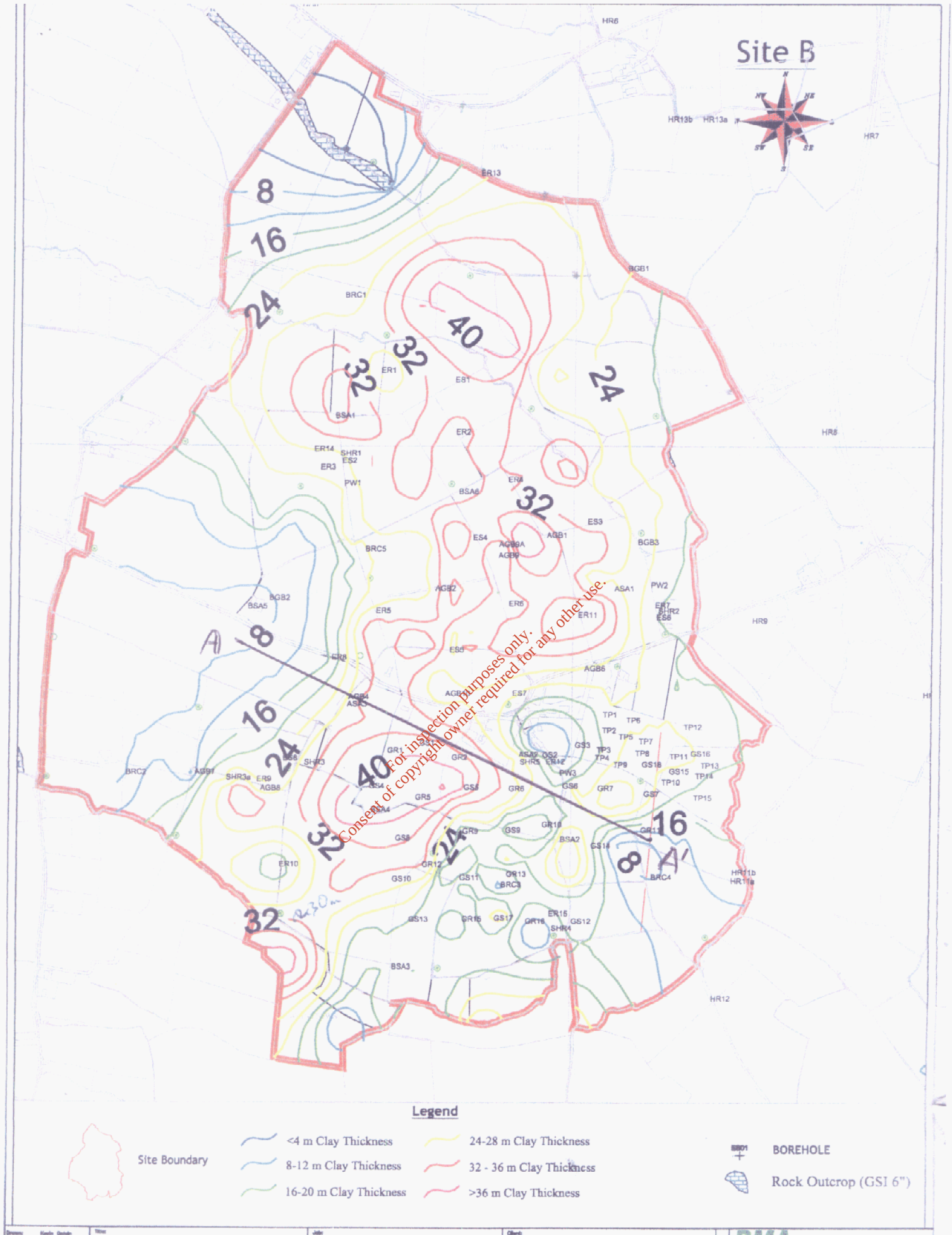
Consulting Engineers

Engineers, Carnegie House,
n Laoghaire, Co. Dublin, Ireland.



FINGAL LANDFILL PROJECT
TOPOGRAPHICAL SURVEY & GEOPHYSICAL RESULTS
FINGAL COUNTY COUNCIL

Margaret Gowen & Co Ltd
Archaeological Consultants & Project Managers



Legend

Site Boundary

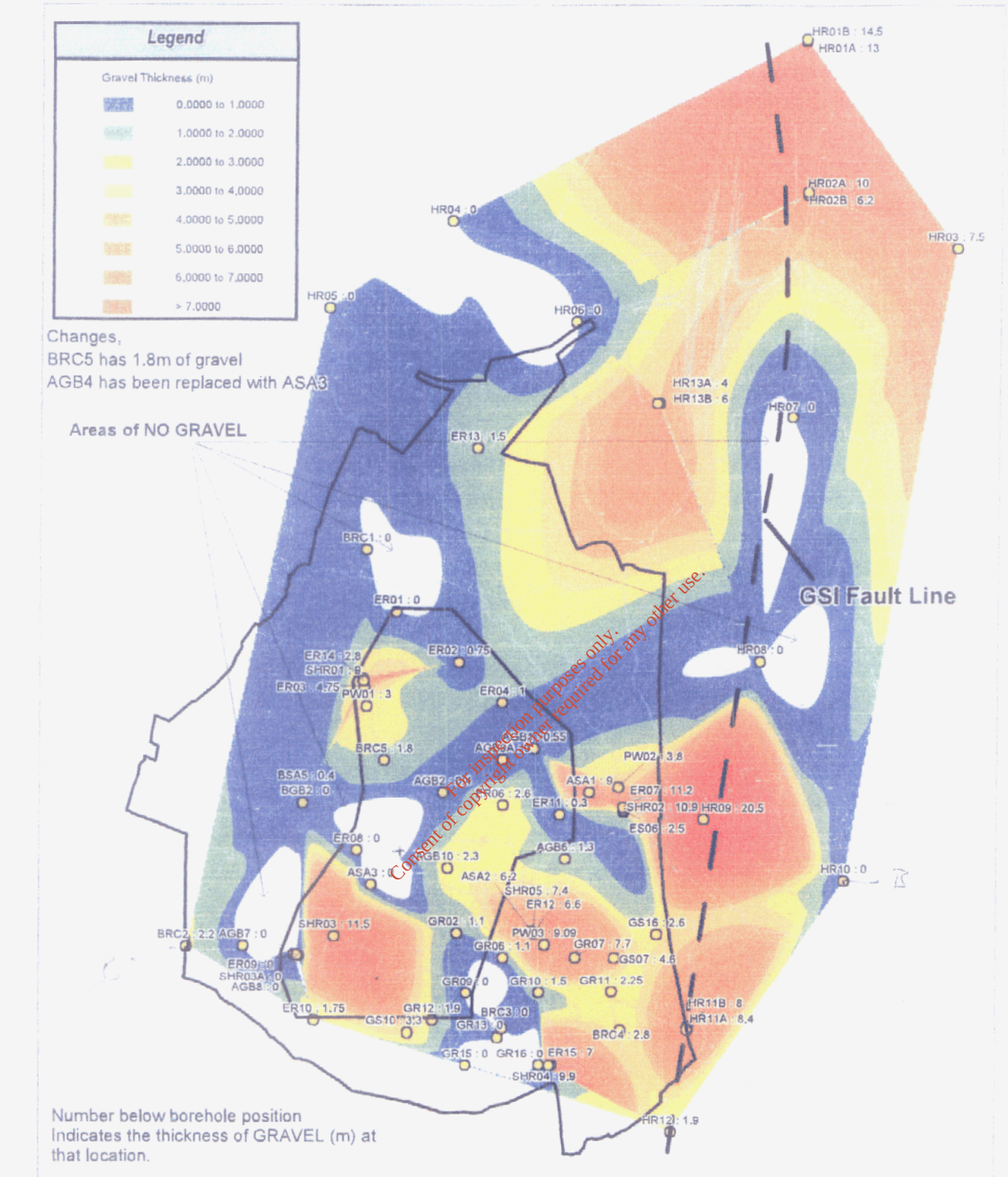
<4 m Clay Thickness
8-12 m Clay Thickness
16-20 m Clay Thickness
24-28 m Clay Thickness
32 - 36 m Clay Thickness
>36 m Clay Thickness

BOREHOLE
Rock Outcrop (GSI 6")

Drawn: Kevin Dolan	MAP 2b DEPTH TO BEDROCK CONTOUR MAP	DUBLIN LANDFILL SITING STUDY (SITE B) EIS SERIES GEOPHYSICS	RPS MCOS
Scale: 1 / 7,000 @ A3			
Date: Apr 2006			
Checked: Jim Hodgson			
Issued On:			

Dwg No.: 18.9/EIS/2b

BMA GeoServices
Ground Engineering Consultants
Comhairleoiri Cré-Innealtóireachta
BMA,
Strowhall Business Park,
Athy Road,
Carlow,
Ireland.
Phone: 353-59-9134488
Mobile: 087-2477823
Fax: 353-59-9134490
E-mail: bmacarlow@bma.ie



Not all boreholes will have reached the base of the GRAVEL due to refusal.

Ordnance Survey

Project	Fingal Landfill Project	Figure	21.2
Title	Extent of Gravel Deposits Underlying Low-Permeability Superficial Deposits		

Fingal County Council
Comhairle Contae Fhine Gall

RPS Consulting Engineers
West Pier Business Campus, Dun Laoghaire, Co Dublin
Fax. 01-2805676
E. ireland@rpsgroup.com
W. www.rpsgroup.com/ireland

Issue Details			
Drawn:	DF	Project No.	MDR0303
Checked:	WO	File Ref.	
Approved:	FC		MDR0303MI0003A02
Scale:	1:15,000 @ A4	Drawing No.	Rev.
Date:	05.03.2009	MI0003	A02

Notes

REPORT NO. 9716

GEOTECHNICAL CORE LOG RECORD

IGSL Ltd.

CONTRACT: Dublin Landfill Siting Study

CLIENT: Fingal County Council
ENGINEER: RPS-MCOS

CO-ORDINATES: 256513.26
318174.24

CORE DIAMETER (mm): 74
GROUND LEVEL (mOD): 30.06

INCLINATION (Degrees): 90

FLUSH: Air/Mist

DRILLHOLE NO: BRC4
SHEET: Sheet 1 of 2

DATE STARTED: 24/05/2002
DATE COMPLETED: 25/05/2004

DRILLED BY: IGSL
LOGGED BY: DO'S

DOWNHOLE DEPTH (m) | CORE RUN DEPTH (m) | T.C.R.% | S.C.R.% | R.Q.D.% | Fracture Spacing (mm) 0 250 500 | UCS (MPa) | POINT LOAD Is(50) MPa | SYMBOLIC LOG | ELEVATION (mOD) | DEPTH (m) | SPT (N value) | STANDPIPE DETAILS | GEOTECHNICAL DESCRIPTION

OPEN HOLE DRILLING: No recovery, observed by driller as returns of brown sandy gravelly clay with occasional cobbles and bolders.

0 0 0

25.06 5.00

OPEN HOLE DRILLING: No recovery, observed by driller as returns of gravels

22.26 7.80

OPEN HOLE DRILLING: No recovery, observed by driller as returns of weathered rock

21.81 8.25

8.25

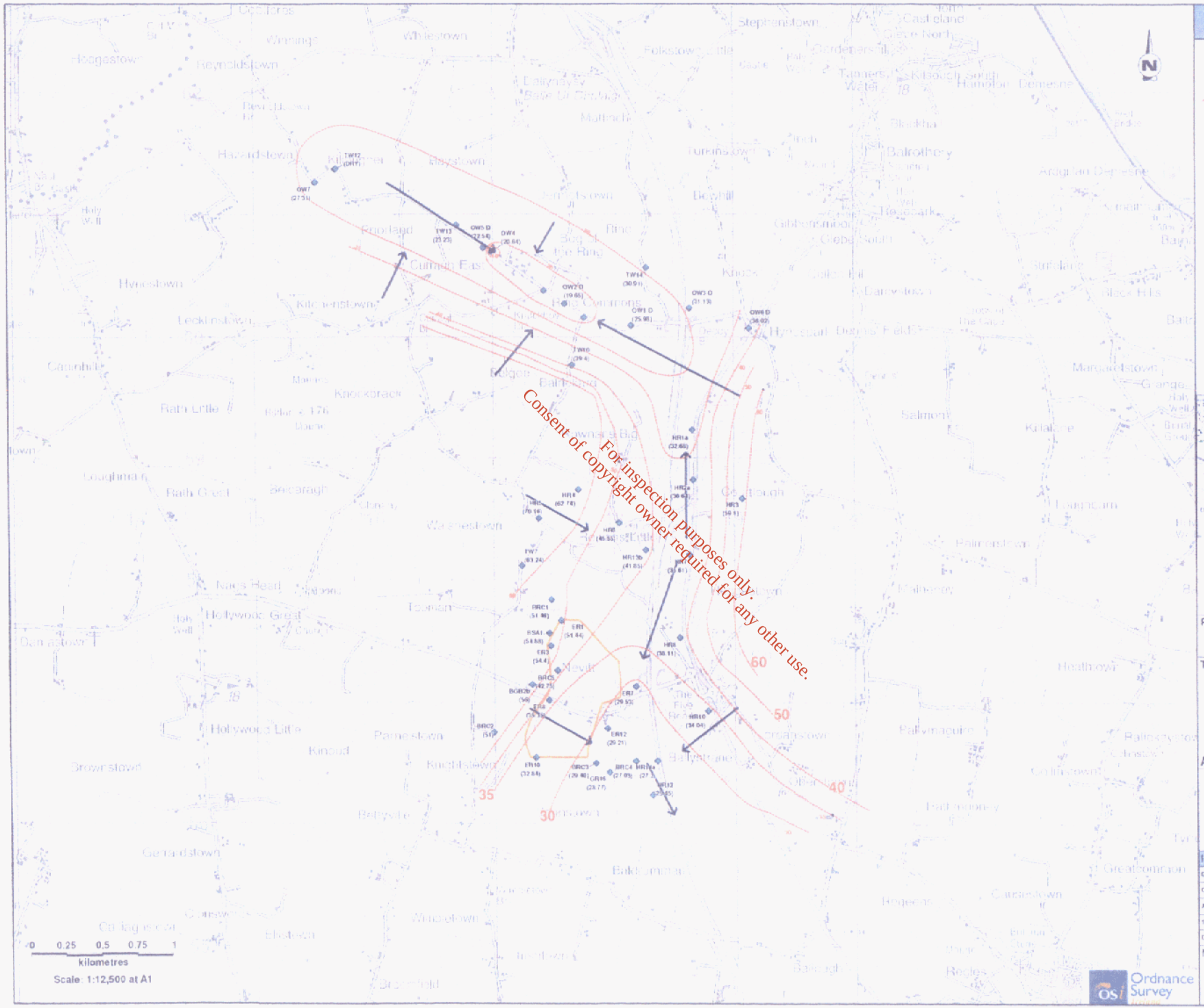
Strong to locally moderately strong, thinly bedded to thinly laminated.

Continued next sheet

100 61 26

REMARKS: Water encountered at 2.0m, water at 0.2m at end of drilling. Packer tests carried out - see packer result sheet. 1hr extra over move.

INSTALLATION DETAILS
Installation Type : SP
Depth to Response Zone top (m) : 4.60
Depth to Response Zone bottom (m) : 11.30
Comments : Gravel 7.6-4.6m, seal 11.3-7.6 & 4.6-2.0m, headworks



Fingal County Council

Project
Fingal Landfill

Title
Groundwater Contours Bedrock 24th June 2005

APPENDIX A 5.1

RPS Consulting Engineers

Issue Details

Drawn		Project No	
Checked		File Ref	
Approved			
Scale		Drawing No	Rev
Date			

Notes