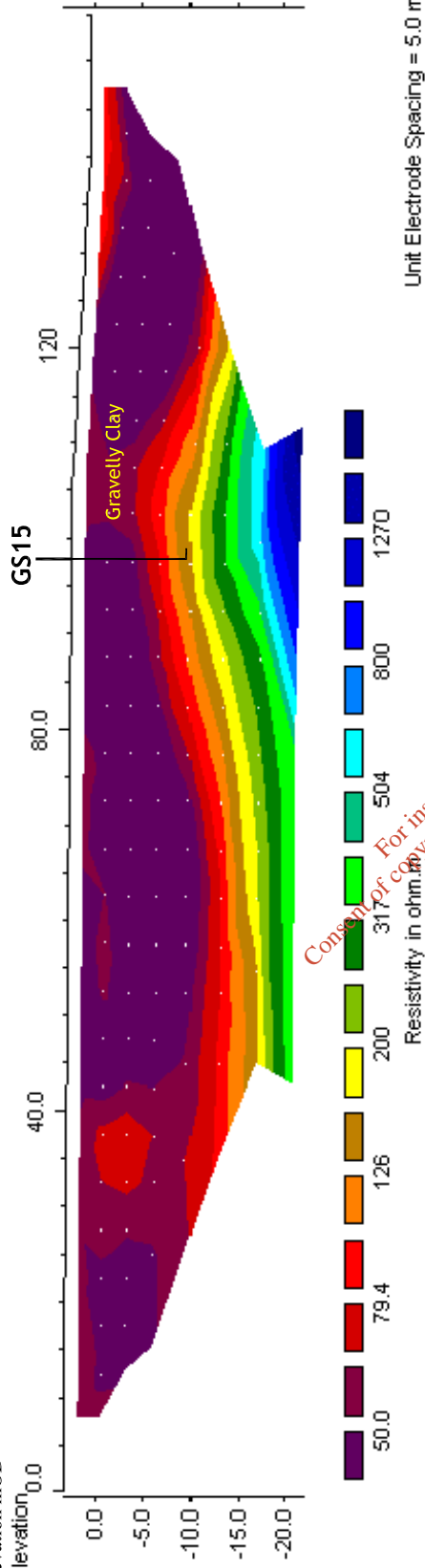


2D-Resistivity Profile 11 (Site B)

318142 E
256819 N
Elevation mOD
Elevation 0.0

318266 E
256735 N

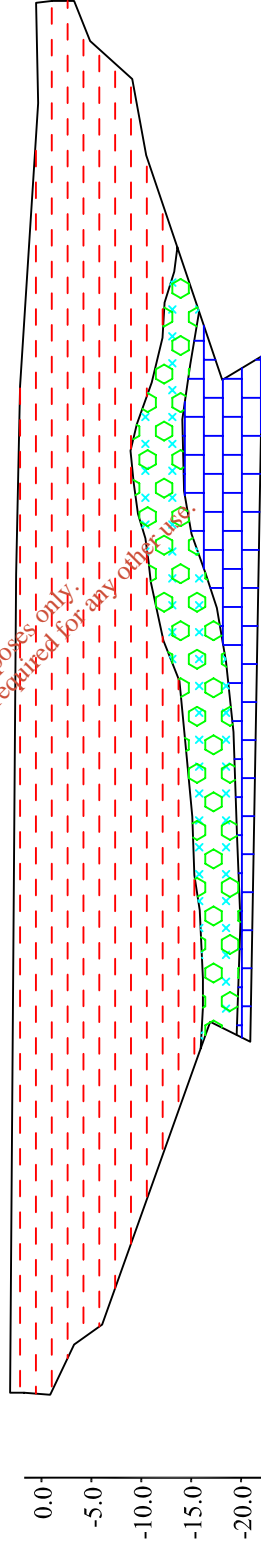
Modelled Data



Unit Electrode Spacing = 5.0 m.

Northwest

Southeast



Boulder Clay



Saturated Gravel / Weathered Rock



Limestone / Shale

Notes

Drawn	Kevin Galvin
Scale	1 / 750
Date	Mar 2004
Checked	Janez Hodgson
Based On	

Title:
**SECTION 11
INTERPRETATION
2D-RESISTIVITY PROFILE 11**

Job:
**FINGAL LANDFILL SITING
STUDY
(SITE B)**

Client:
RPSMCO

BMA GeoServices
Ground Engineering Consultants
Comhairleoir Cré-Innealtóireachta

BMA,
Strawhall Business Park,
Athy Road,
Carlow,
Ireland.

Phone: 353-59-9134488
Mobile: 087-8165810
Fax: 353-59-9134490
E-mail: kgalvin@bma.ie

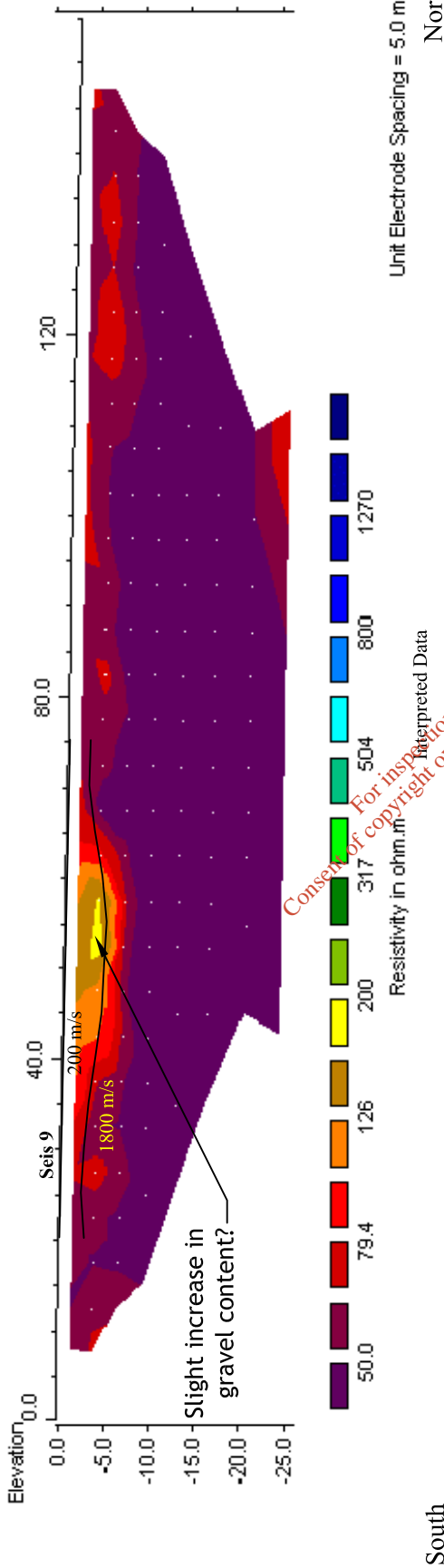
Page No: 1492/R11

2D-Resistivity Profile 12 (Site B)

317371 E
257925 N

317430 E
258067 N

Modelled Data



Notes:
None

Drawn	Kevin Galvin
Scale	1 / 750
Date	Mar 2004
Checked	Janez Hodgson
Based On	

Title:
SECTION 12
INTERPRETATION
2D-RESISTIVITY PROFILE 12

Job:
FINGAL LANDFILL SITING
STUDY
(SITE B)

Client:
RPSMCS

Page No: 1492/R12

BMA GeoServices
Ground Engineering Consultants
Comhairleoir Cré-Innealtóireachta

BMA,
Strawhall Business Park,
Athy Road,
Carlow,
Ireland.

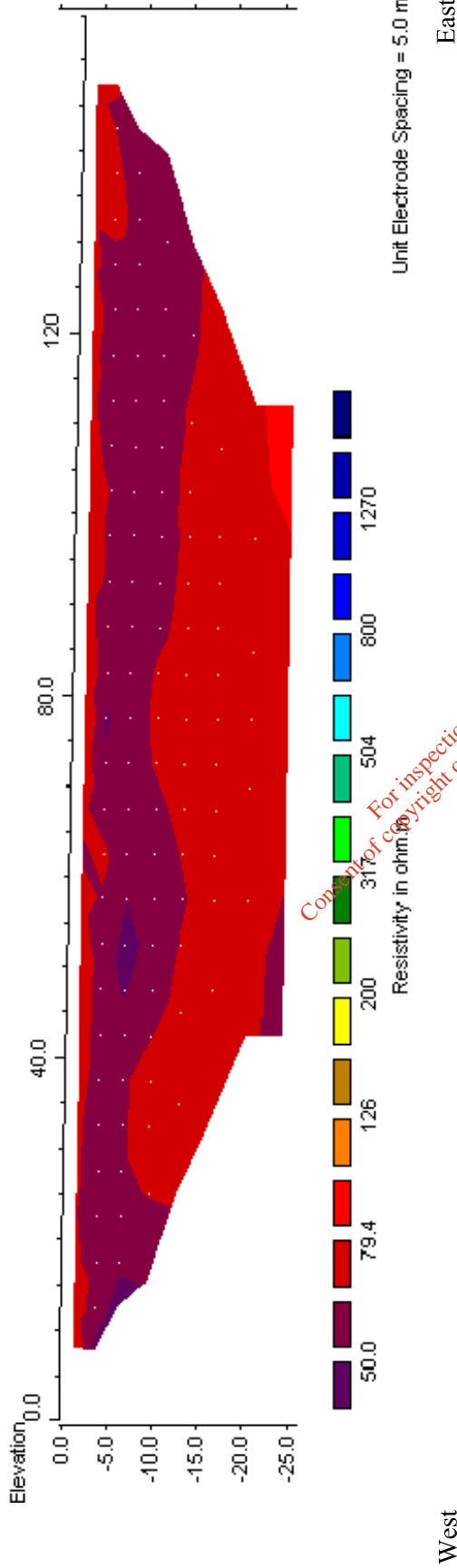
Phone: 353-59-913488
Mobile: 087-8165810
Fax: 353-59-9134490
E-mail: kgalvin@bma.ie

2D-Resistivity Profile 13 (Site B)

317564 E
257975 N

317711 E
257924 N

Modelled Data



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Notes

Drawn	Kevin Galvin
Scale	1 / 750
Date	Mar 2004
Checked	Janez Hodgson
Based On	

Title
SECTION 13
INTERPRETATION
2D-RESISTIVITY PROFILE 13

Job
FINGAL LANDFILL SITING
STUDY
(SITE B)

Client
RPSMCOS

BMA GeoServices
Ground Engineering Consultants
Comhairleoir Cré-Inneachaireachta

BMA,
Strawhall Business Park,
Athy Road,
Carlow,
Ireland.

Phone: 353-59-9134488
Mobile: 087-8165810
Fax: 353-59-9134490
E-mail: kgalvin@bma.ie

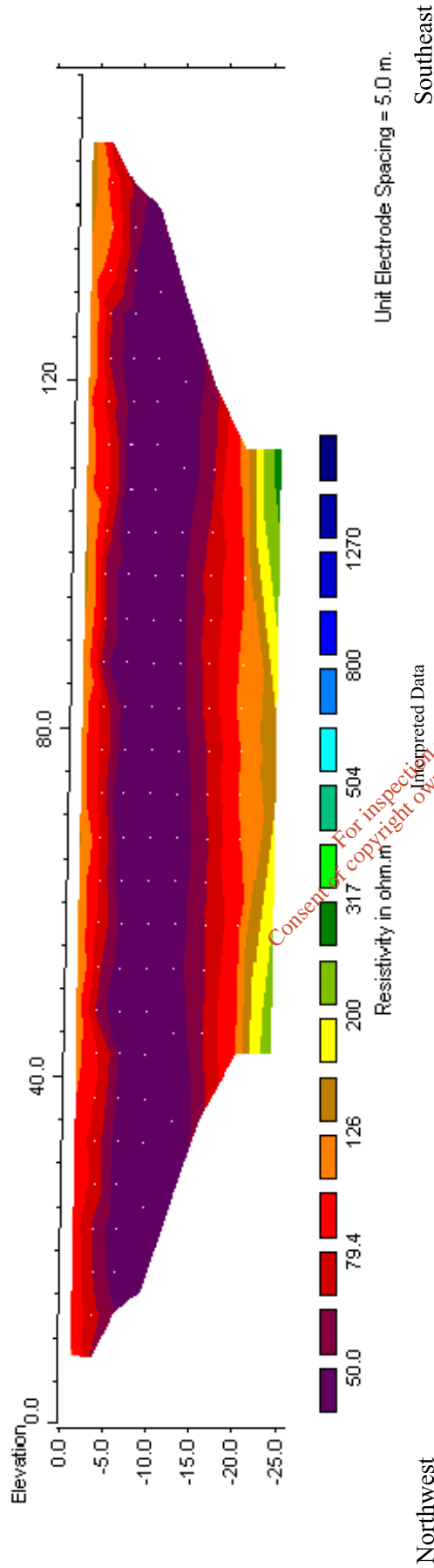
Drawn No: 1492/R13

2D-Resistivity Profile 14 (Site B)

318094 E
257620 N

Modelled Data

317932 E
257671 N



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Carlow,
Ireland.

Phone: 353-59-9134488
Mobile: 087-8165810
Fax: 353-59-9134490
E-mail: kgalvin@bma.ie

Page No: 1492/R14

Client:	RPSMCO
---------	--------

Job:	FINGAL LANDFILL SITING STUDY (SITE B)
------	---------------------------------------

Title:	SECTION 14 INTERPRETATION 2D-RESISTIVITY PROFILE 14
--------	---

Drawn:	Kevin Galvin
Scale:	1 / 750
Date:	Mar 2004
Checked:	Janes Hodgson
Based On:	

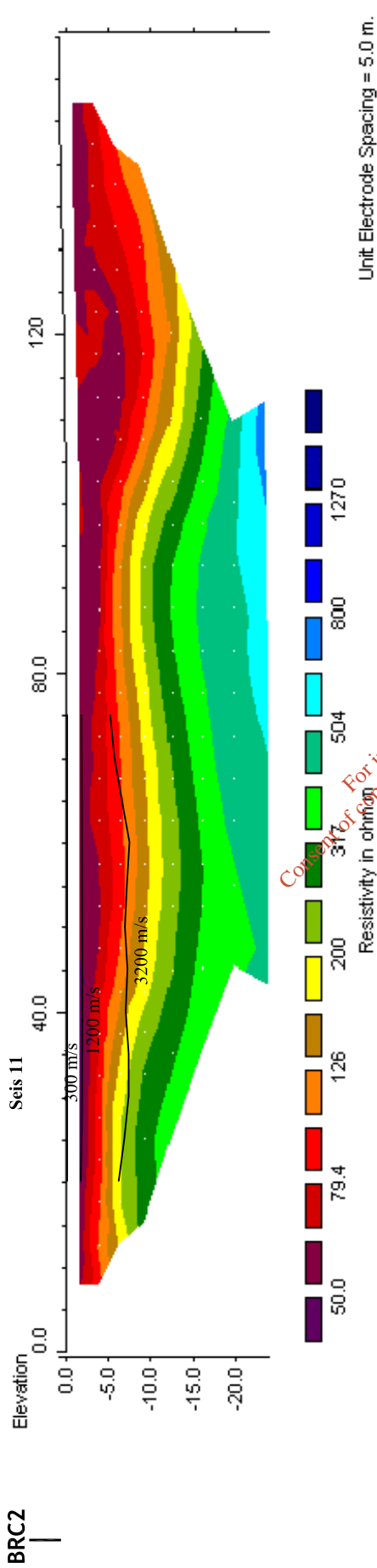
Notes:

2D-Resistivity Profile 15 (Site B)

317000 E
256781 N

317002 E
256931 N

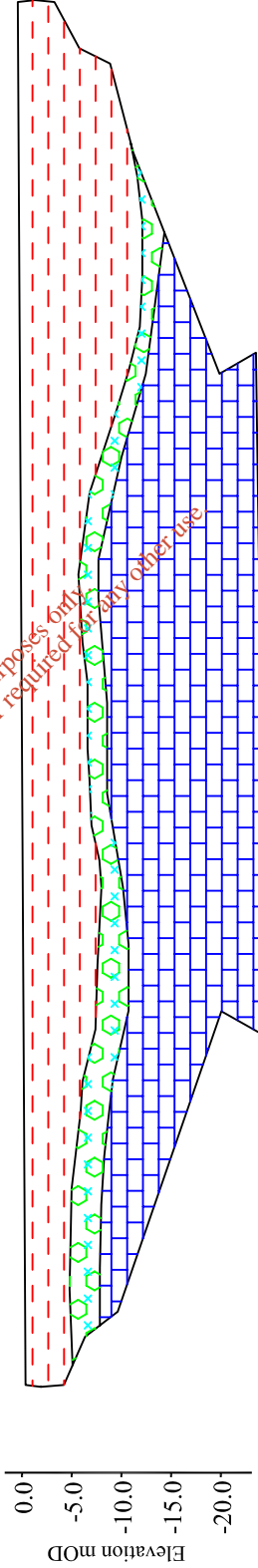
Modelled Data






South

North

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-  Boulder Clay
-  Saturated Gravel / Weathered Rock
-  Limestone / Shale

Notes:

Drawn: Kevin Galvin
Scale: 1 / 750
Date: Mar 2004
Checked: James Hodgson
Based On:

Title:
**SECTION 15
INTERPRETATION
2D-RESISTIVITY PROFILE 15**

Job:
**FINGAL LANDFILL SITING
STUDY
(SITE B)**

Client:
RPSMCS

BMA GeoServices
Ground Engineering Consultants
Comhairleoir Cré-Innealtóireachta

BMA,
Strawhall Business Park,
Athy Road,
Carlow,
Ireland.

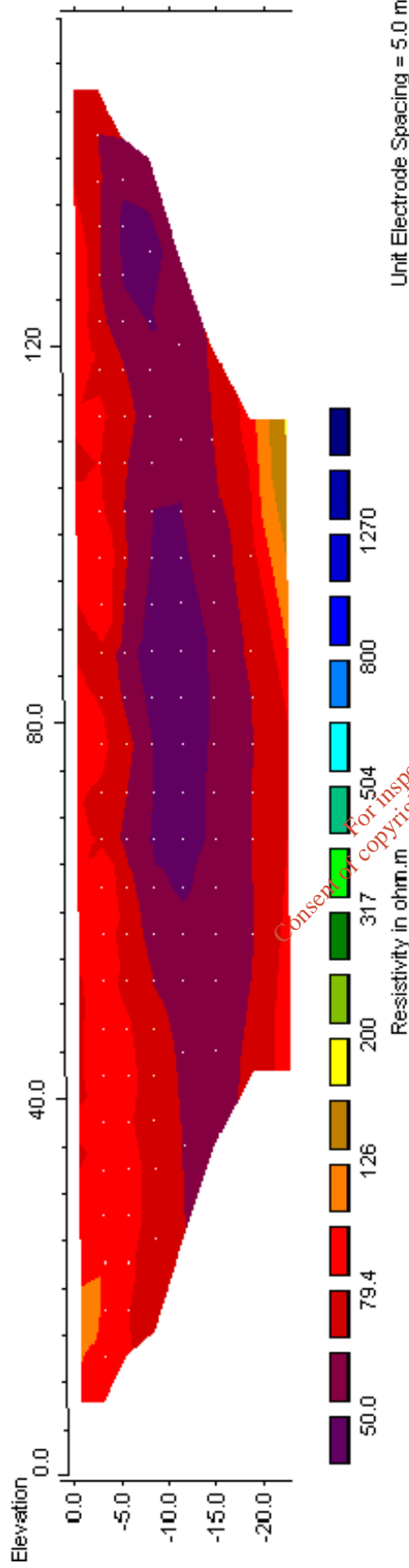
Phone: 353-59-9134488
Mobile: 087-8165810
Fax: 353-59-9134490
E-mail: kgalvin@bma.ie

2D-Resistivity Profile 16 (Site B)

317271 E
256585 N

317173 E
256709 N

Modelled Data



Southwest

Northwest

Elevation mOD

Notes:

Drawn	Kevin Galvin
Scale	1 / 750
Date	Mar 2004
Checked	Janez Hodgson
Based On	

Title:
SECTION 16
INTERPRETATION
2D-RESISTIVITY PROFILE 16

Job:
FINGAL LANDFILL SITING
STUDY
(SITE B)

Client:
RPSMCO

Drawn No: 1492/R16

BMA GeoServices
Ground Engineering Consultants
Comhairleoir Cré-Innealtóireachta

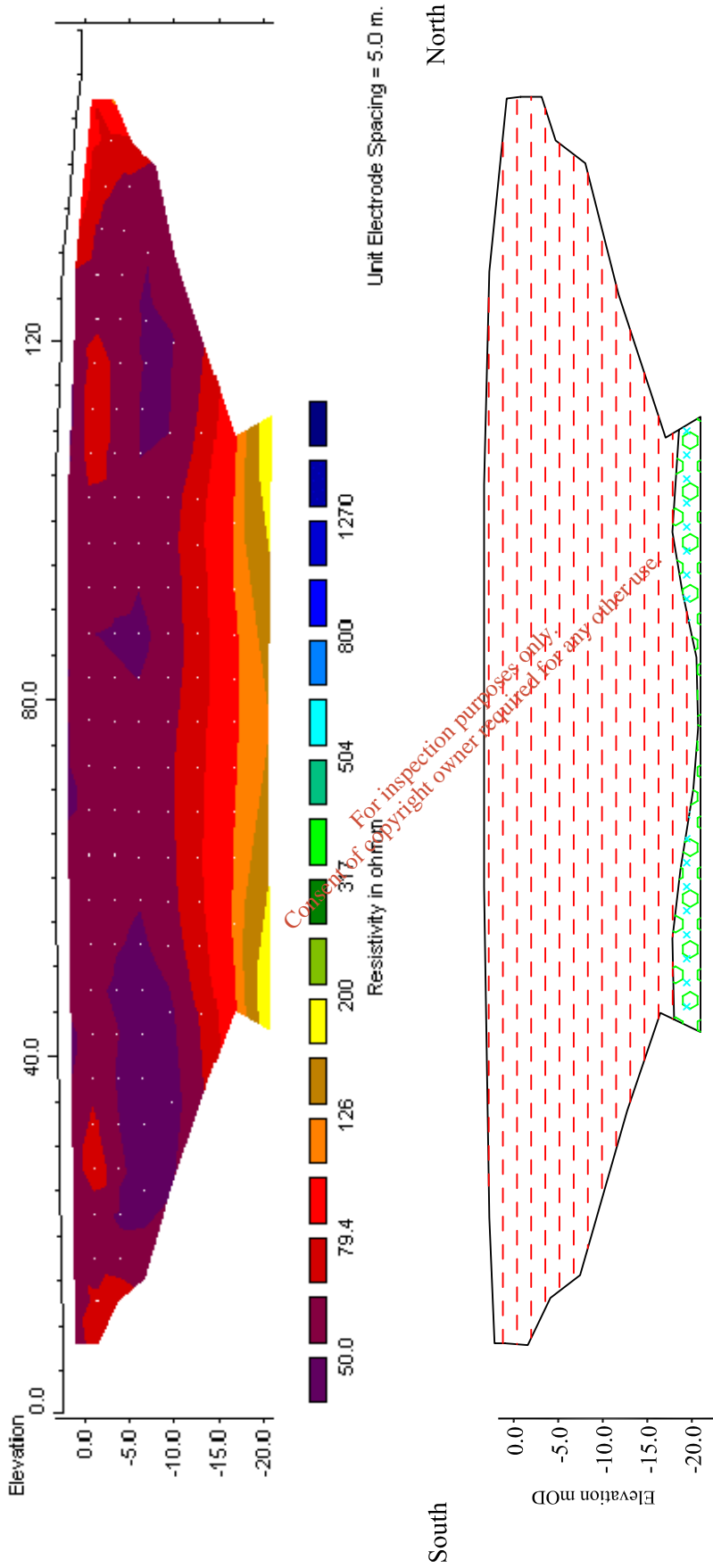
BMA,
Strawhall Business Park,
Athy Road,
Carlow,
Ireland.
Phone: 353-59-913488
Mobile: 087-8165810
Fax: 353-59-9134490
E-mail: kgalvin@bma.ie

2D-Resistivity Profile 17 (Site B)

317222 E
256706 N

317268 E
256856 N

Modelled Data



Notes:

Drawn: Kevin Galvin
Scale: 1 / 750
Date: Mar 2004
Checked: James Hodgson
Based On:

Title:
SECTION 17
INTERPRETATION
2D-RESISTIVITY PROFILE 17

Job:
FINGAL LANDFILL SITING
STUDY
(SITE B)

Client:
RPSMOS

BMA GeoServices
Ground Engineering Consultants
Comhairleoir Cré-Innealtréacha

BMA,
Strawhall Business Park,
Athy Road,
Carlow,
Ireland.

Phone: 353-59-9134488
Mobile: 087-8165810
Fax: 353-59-9134490
E-mail: kgalvin@bma.ie

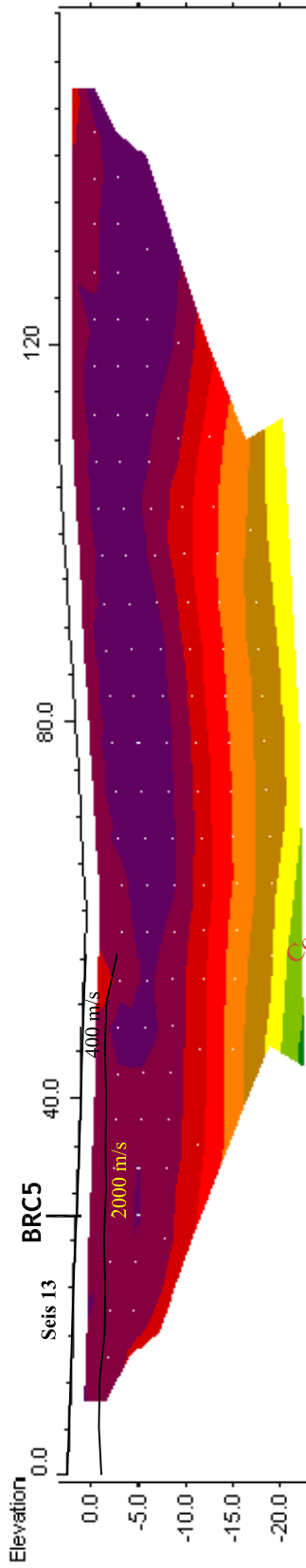
Page No: 1492/R17

2D-Resistivity Profile 18 (Site B)

317054 E
257237 N

317472 E
257386 N

Modelled Data

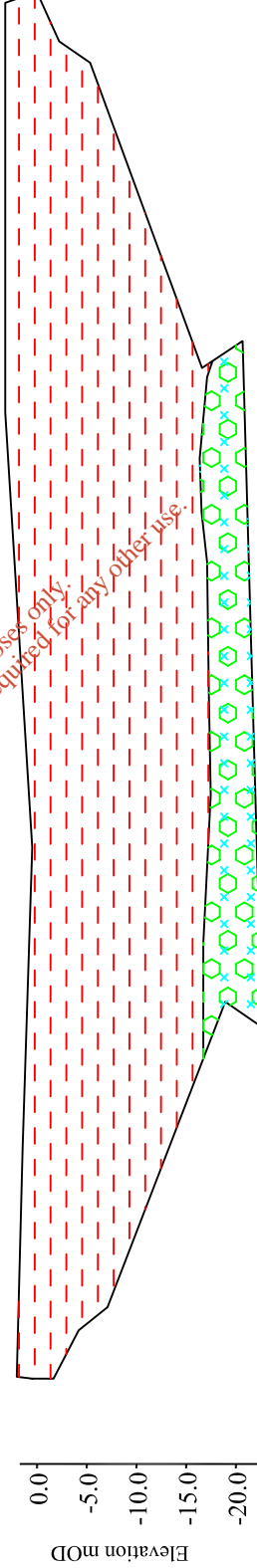


Resistivity in ohm.m

Unit Electrode Spacing = 5.0 m.

South

North



Boulder Clay



Saturated Gravel / Weathered Rock

Notes

Drawn	Kevin Galvin
Scale	1 / 750
Date	Mar 2004
Checked	Janez Hodgson
Based On	

Title:
SECTION 18
INTERPRETATION
2D-RESISTIVITY PROFILE 18

Job:
FINGAL LANDFILL SITING
STUDY
(SITE B)

Client:
RPSMOS

Dwg No: 1492/R/18

BMA GeoServices
Ground Engineering Consultants
Comhairleoirí Cré-Innealtóireachta

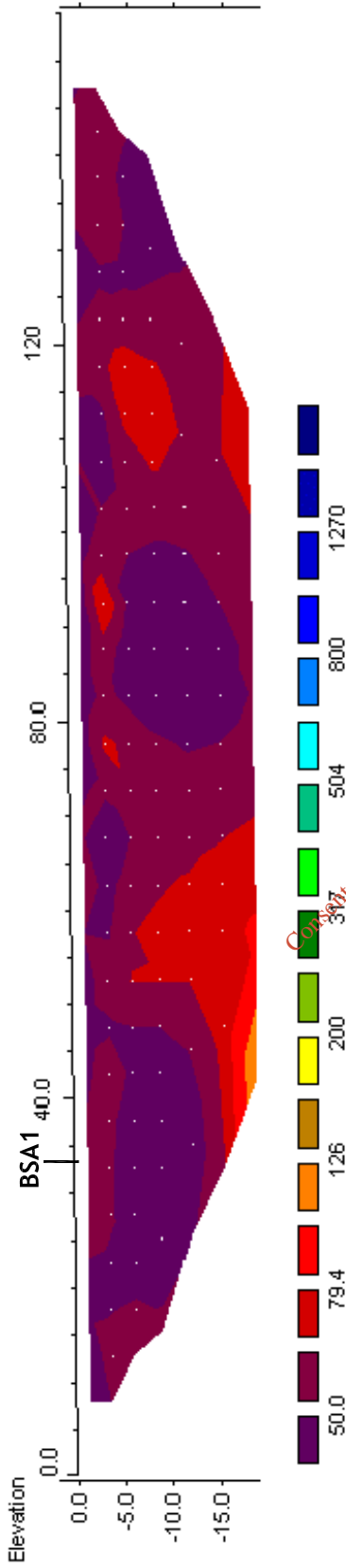
BMA,
Strawhall Business Park,
Athy Road,
Carlow,
Ireland.
Phone: 353-59-9134488
Mobile: 087-8165810
Fax: 353-59-9134490
E-mail: kgalvin@bma.ie

2D-Resistivity Profile 19 (Site B)

317429 E
257523 N

317362 E
257654 N

Modelled Data

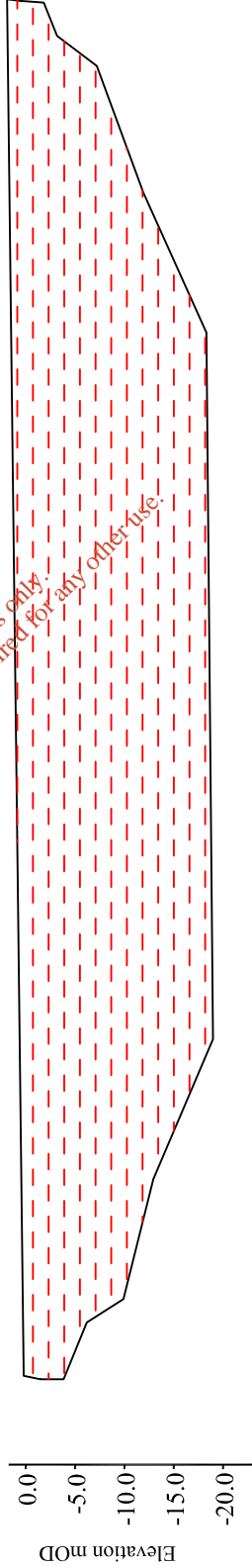


Resistivity in ohm.m
Interpreted Data


Unit Electrode Spacing = 5.0 m.

Southeast

Northwest



 Boulder Clay

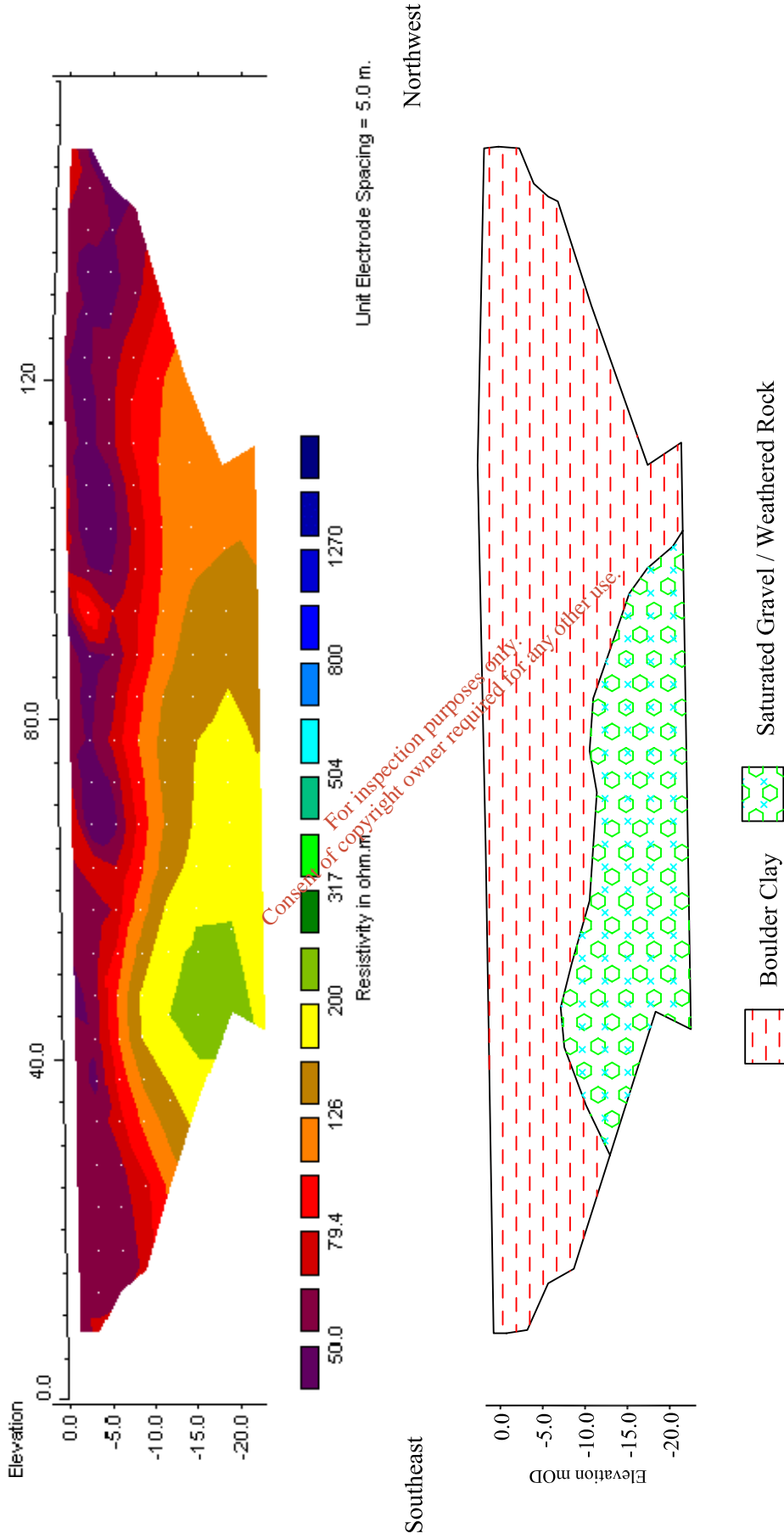
Notes: None	Drawn: Kevin Galvin	Title:	SECTION 19 INTERPRETATION 2D-RESISTIVITY PROFILE 19	Job:	FINGAL LANDFILL SITING STUDY (SITE B)	Client:	RPSMCO	 BMA GeoServices Ground Engineering Consultants Comhairleoirí Cré-Innealtóireachta BMA, Strawhall Business Park, Athy Road, Carlow, Ireland. Phone: 353-59-9134488 Mobile: 087-8165810 Fax: 353-59-9134490 E-mail: kgalvin@bma.ie
	Scale: 1 / 750	Date: Mar 2004	Checked: James Hodgson	Based On:	Page No: 1492/R19			

2D-Resistivity Profile 20 (Site B)

317138 E
257493 N

317161 E
257338 N

Modelled Data



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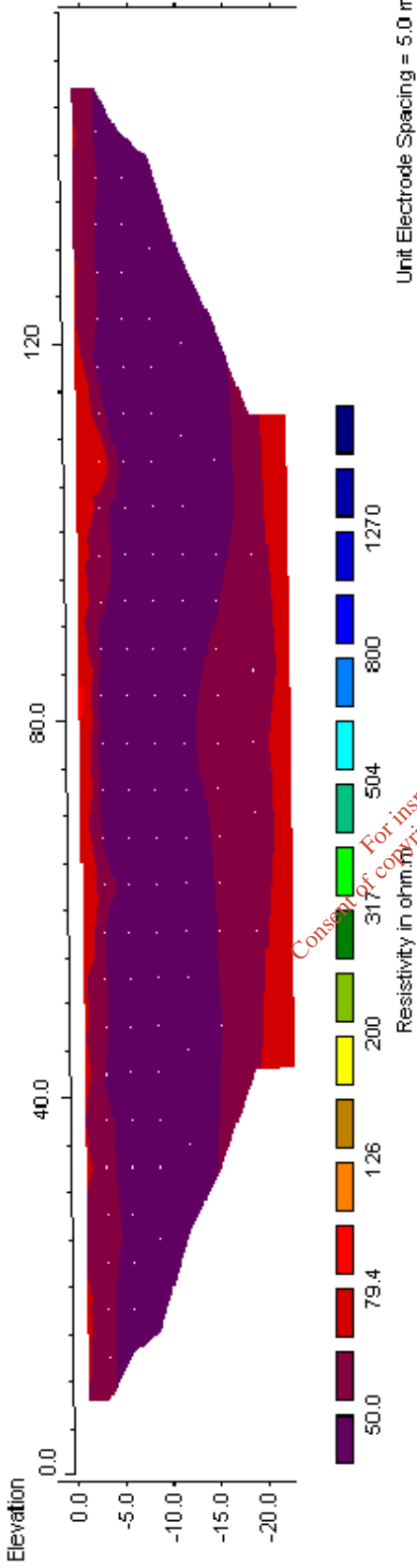
Notes:	Drawn: Kevin Galvin	Title:	SECTION 20 INTERPRETATION 2D-RESISTIVITY PROFILE 20	Job:	FINGAL LANDFILL SITING STUDY (SITE B)	Client:	RPSMCO
	Scale: 1 / 750	Date: Mar 2004	Checked: James Hodgson	Based On:			
<p>BMA GeoServices Ground Engineering Consultants Comhairleoir Cré-Innealtóireachta</p> <p>BMA, Strawhall Business Park, Athy Road, Carlow, Ireland.</p> <p>Phone: 353-59-9134488 Mobile: 087-8165810 Fax: 353-59-9134490 E-mail: kgalvin@bma.ie</p>							
<p>Page No: 1492/R20</p>							

2D-Resistivity Profile 21 (Site B)

317966 E
258053 N

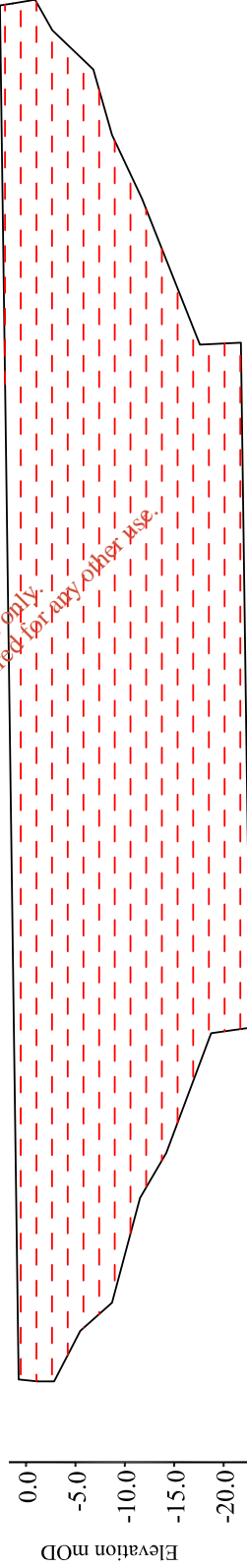
Modelled Data

317874 E
257937 N



Southwest

Northeast



Boulder Clay



Saturated Gravel / Weathered Rock

Notes:
None

Drawn: Kevin Galvin

Scale: 1 / 750

Date: Mar 2004

Checked: Jones Hodgson

Based On:

Title:

SECTION 21
INTERPRETATION
2D-RESISTIVITY PROFILE 21

Job:

FINGAL LANDFILL SITING
STUDY
(SITE B)

Client:

RPSMCS

Dwg No: 1492/B/R21

BMA GeoServices
Ground Engineering Consultants
Comhairleoinn Crí-Imeachtraíochta

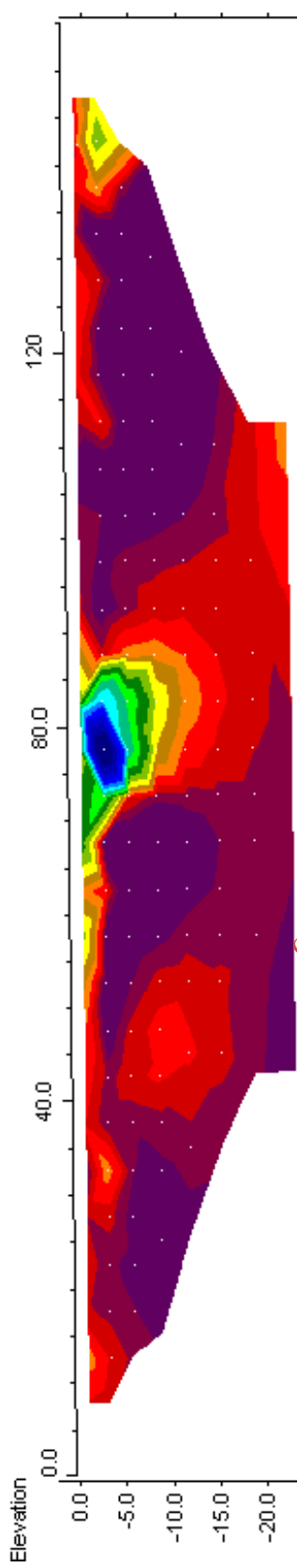
BMA,
Strawhall Business Park,
Athy Road,
Carlow,
Ireland.
Phone: 353-59-9134488
Mobile: 087-8165810
Fax: 353-59-9134490
E-mail: kgalvin@bma.ie

2D-Resistivity Profile 22 (Site B)

317488 E
257247 N

317459 E
258410 N

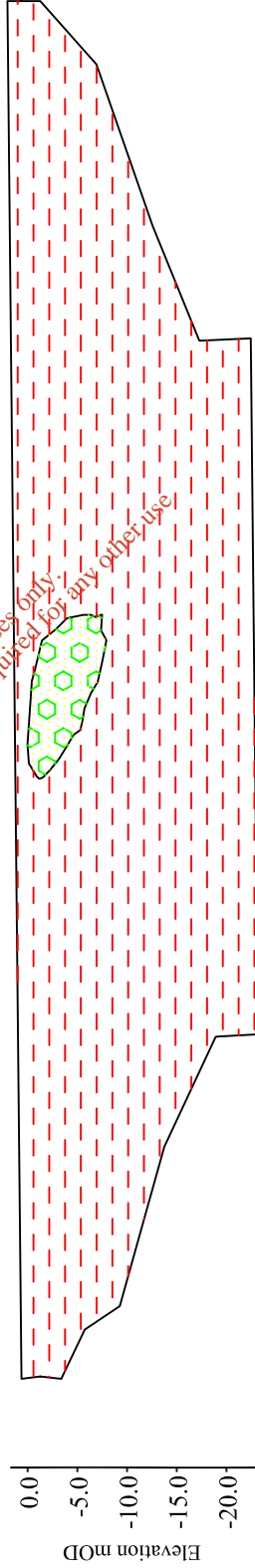
Modelled Data



Unit Electrode Spacing = 5.0 m.

South

North



Boulder Clay



Sand and Gravel

Notes

Drawn	Kevin Galvin
Scale	1 / 750
Date	Mar 2004
Checked	Jane Hoagson
Based On	

Title:
SECTION 22
INTERPRETATION
2D-RESISTIVITY PROFILE 22

Job:
FINGAL LANDFILL SITING
STUDY
(SITE B)

Client:
RPSMCO

Page No: 1492/R22

BMA GeoServices
Ground Engineering Consultants
Comhairleoir Cré-Innealtóireachta

BMA,
Strawhall Business Park,
Athy Road,
Carlow,
Ireland.
Phone: 353-59-9134488
Mobile: 087-8165810
Fax: 353-59-9134490
E-mail: kgalvin@bma.ie

Appendix B Interpreted Resistivity Sections – LONG 2004

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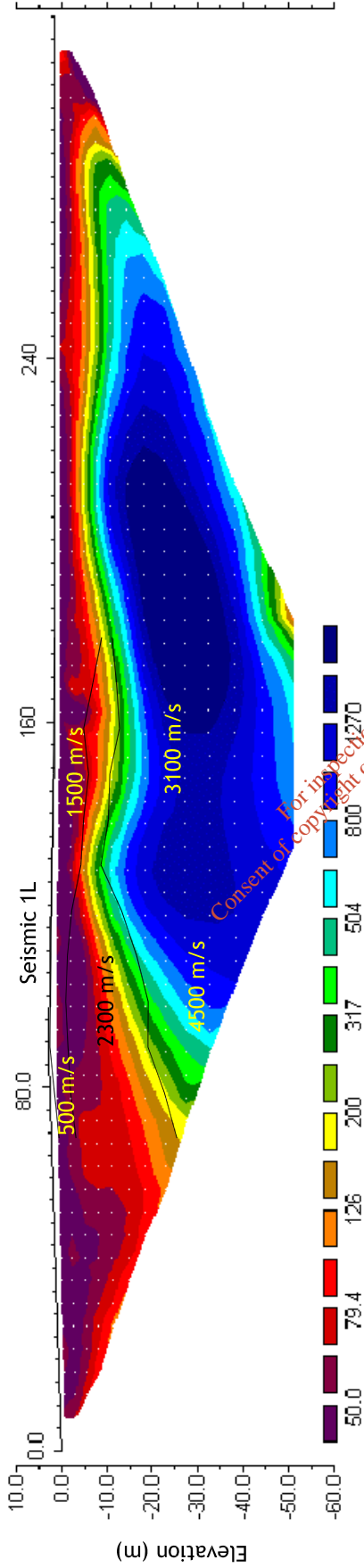
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2D-Resistivity Profile 1 Long

317524 E
255938 N

317497 E
256242 N

Inverted Data

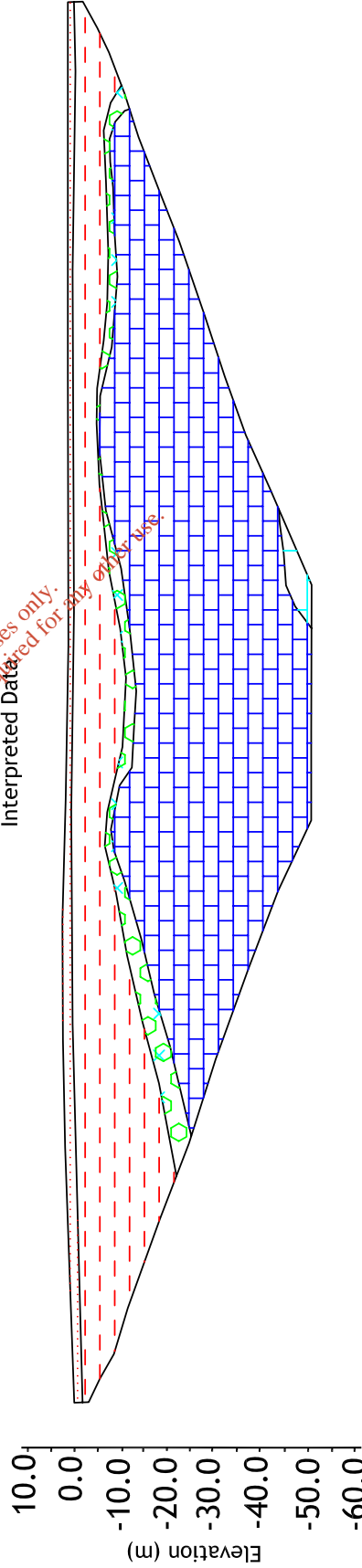


South

North

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Interpreted Data



Topsoil / Silty Clay



Boulder Clay



Saturated Gravel / Weathered Rock



Limestone / Shale



Change in Lithology /
Weathered Limestone?

BMA GeoServices
Ground Engineering Consultants
BMA
Stromhall Business Park,
Alby Road,
Corrow,
Ferland.

Phone: 353-59-9134488
Mobile: 087-2477923
Fax: 353-59-9134490
E-mail: bma@bma.ie

Model: **RMS ERROR**
1.3 %

Drawn:		North Grid:	
Name	Date	Name	Date
Resistivity Details			
Revision Details			
Revision Details			
Revision Details			

Title: SECTION 1 LONG
INTERPRETATION
2D-RESISTIVITY PROFILE 1
LONG

Job: FINGAL LANDELL SITING
STUDY (SITE B)

Client: RPS-MCOS

Dwg No: 1492/01

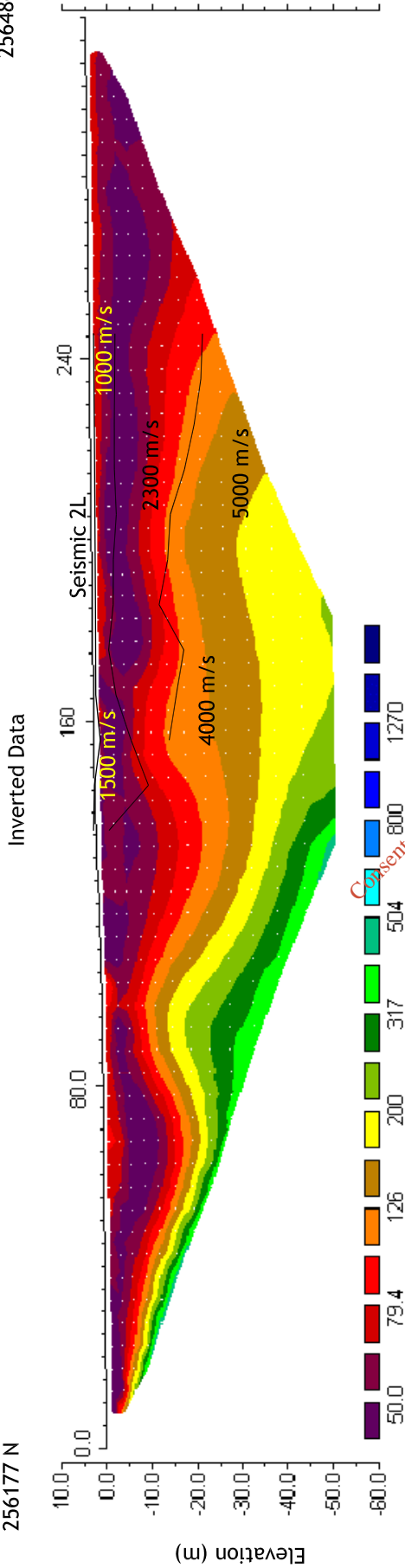
BMA GeoServices
Ground Engineering Consultants
BMA
Stromhall Business Park,
Alby Road,
Corrow,
Ferland.

Phone: 353-59-9134488
Mobile: 087-8163910
Fax: 353-59-9134490
E-mail: bma@bma.ie

2D-Resistivity Profile 2 Long

317482 E
256177 N

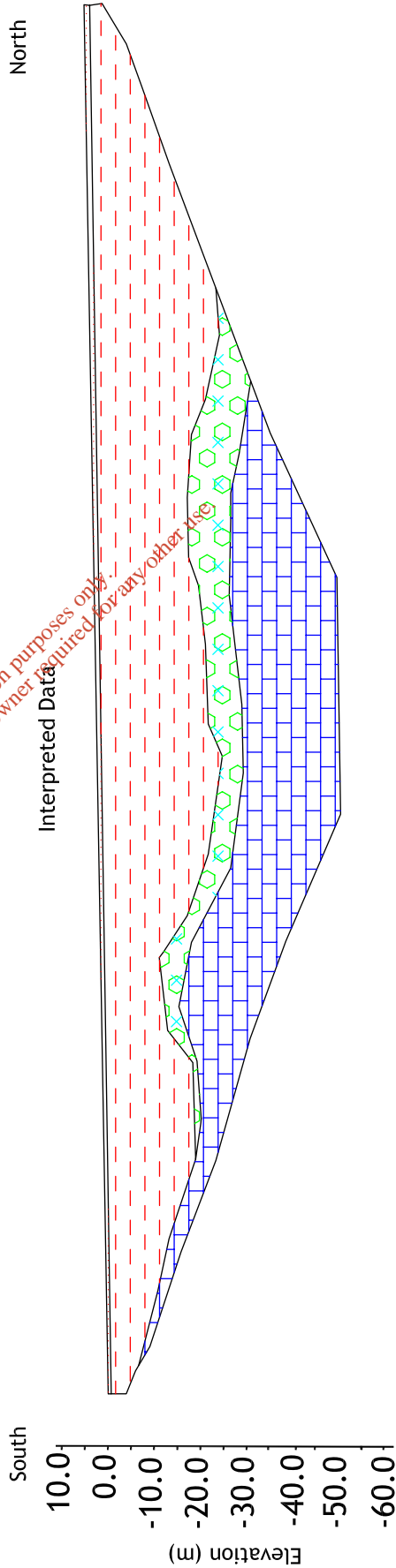
317525 E
256486 N



Resistivity in ohm.m

Unit Electrode Spacing = 5.00 m.

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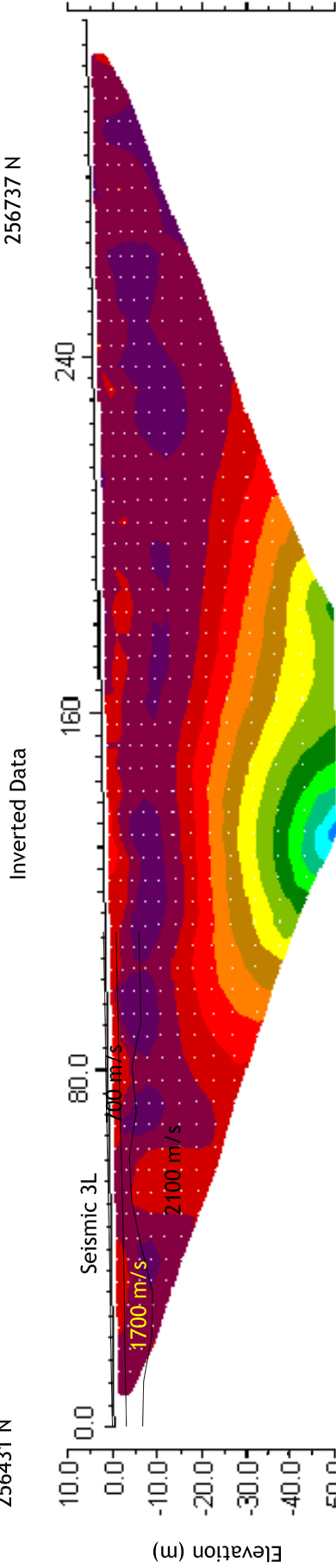
- Topsoil / Silty Clay
- Boulder Clay
- Saturated Gravel / Weathered Rock
- Limestone / Shale

BMA GeoServices Ground Engineering Consultants <small>Company No: C02-000000000000</small> BMA Strawhill Business Park, Athy Road, Carlow, Ireland.	Phone: 353-59-9134488 Mobile: 087-2477923 Fax: 353-59-9134490 E-mail: bma@carlowbma.ie
	Phone: 353-59-9134488 Mobile: 087-8169810 Fax: 353-59-9134490 E-mail: bma@carlowbma.ie
RMS ERROR 3.1 %	Note:
Title: SECTION 2 LONG INTERPRETATION 2D-RESISTIVITY PROFILE 2 LONG	Job: FINGAL LANDFILL SITING STUDY (SITE B)
Drawn: Kevin O'Leary Scale: 1:1 Date: July 2004 Checked: James Hodgson Revised Details: Issue By: Date: Rev Revised Details: Issue By: Date: Rev Revised Details: Issue By: Date: Rev	Client: RPS-MCOS Dwg No: 1492/02

2D-Resistivity Profile 3 Long

317474 E
256431 N

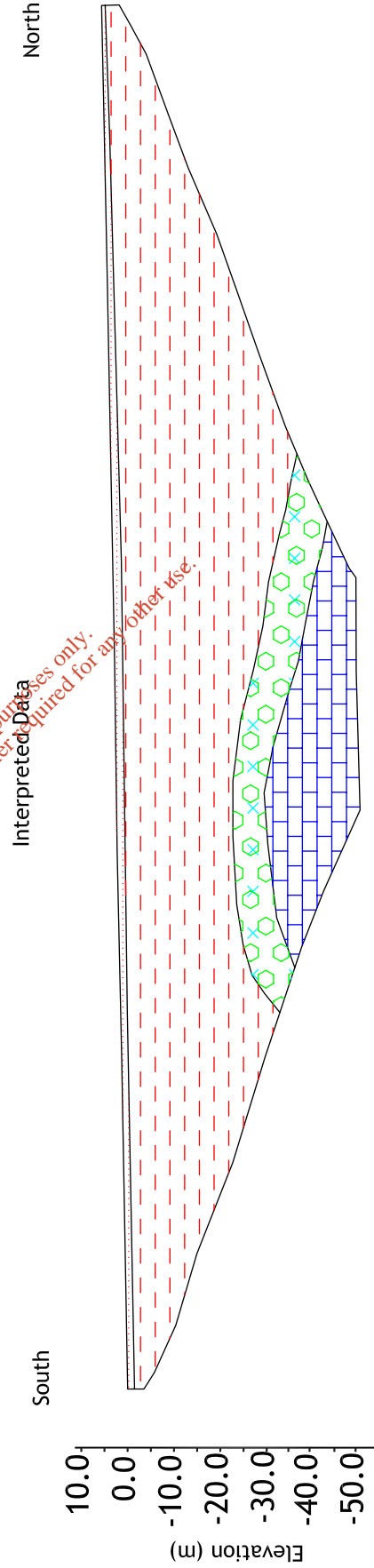
317492 E
256737 N



Copyright owner required for any other use.



Unit Electrode Spacing = 5.00 m.



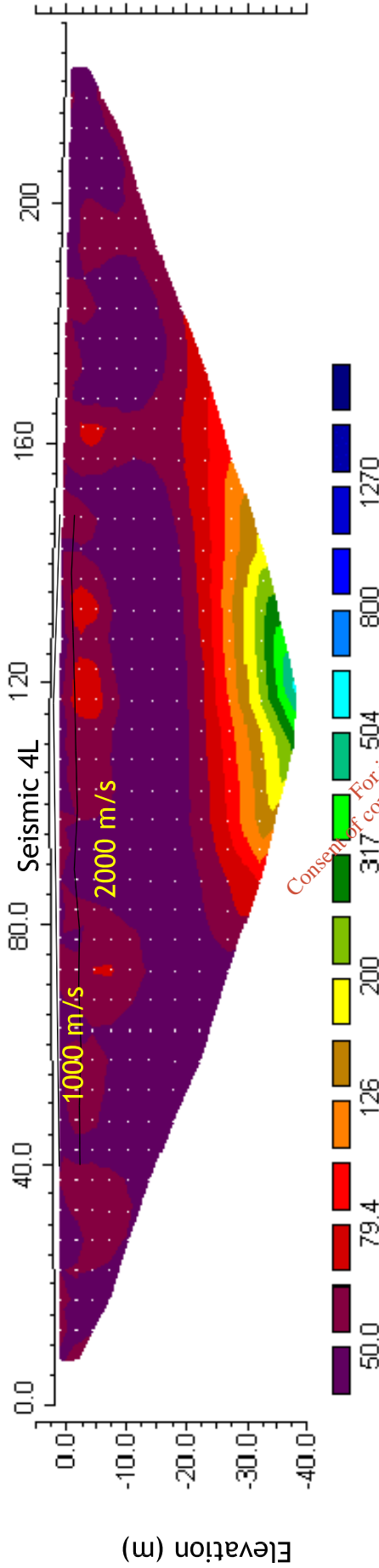
- Topsoil / Silty Clay
- Boulder Clay
- Saturated Gravel / Weathered Rock
- Limestone / Shale

<p>BMA GeoServices Ground Engineering Consultants <small>Company No: C04-00000000</small></p> <p>BMA Strawhill Business Park, Athy Road, Carlow, Ireland.</p> <p>Phone: 353-59-9134488 Mobile: 087-8168910 Fax: 353-59-9134490 E-mail: bma@carlowbma.ie</p>	<p>BMA GeoServices Ground Engineering Consultants <small>Company No: C04-00000000</small></p> <p>BMA Strawhill Business Park, Athy Road, Carlow, Ireland.</p> <p>Phone: 353-59-9134488 Mobile: 087-8168910 Fax: 353-59-9134490 E-mail: bma@carlowbma.ie</p>	<p>Job: FINGAL LANDFILL SITING STUDY (SITE B)</p> <p>Client: RPS-MCOS</p> <p>Drawn: Kevin O'Leary</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>Scale:</th> <th>Date:</th> <th>Checked:</th> <th>Revised Details:</th> </tr> <tr> <td>1:1</td> <td>June 2004</td> <td>James Hodgson</td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </table>	Scale:	Date:	Checked:	Revised Details:	1:1	June 2004	James Hodgson										<p>Title: SECTION 3 LONG INTERPRETATION 2D-RESISTIVITY PROFILE 3 LONG</p> <p>Notes: RMS ERROR 1.6 %</p>
Scale:	Date:	Checked:	Revised Details:																
1:1	June 2004	James Hodgson																	

2D-Resistivity Profile 4 Long

317472 E 317543 E
 256760 N 256970 N

Inverted Data

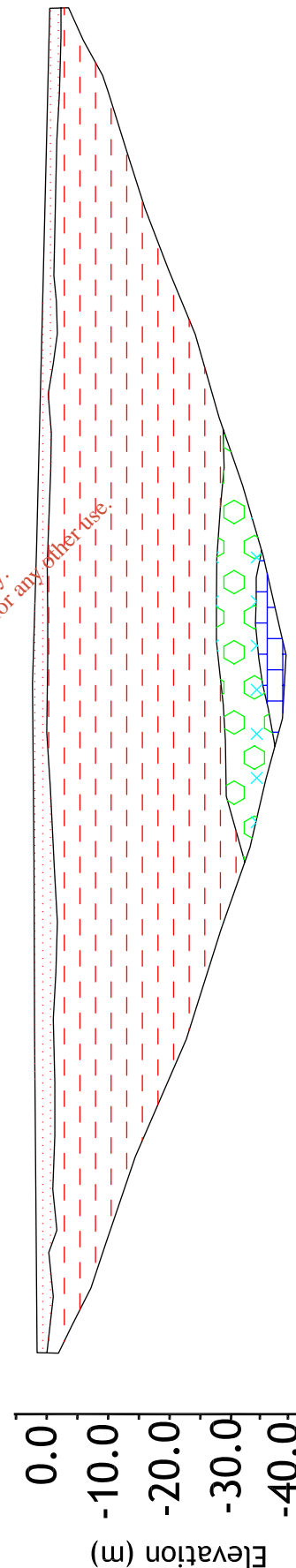


Resistivity in ohm.m
 Unit Electrode Spacing = 5.00 m.

Interpreted Data

North

South



- Topsoil / Silty Clay
- Boulder Clay
- Saturated Gravel / Weathered Rock
- Limestone / Shale

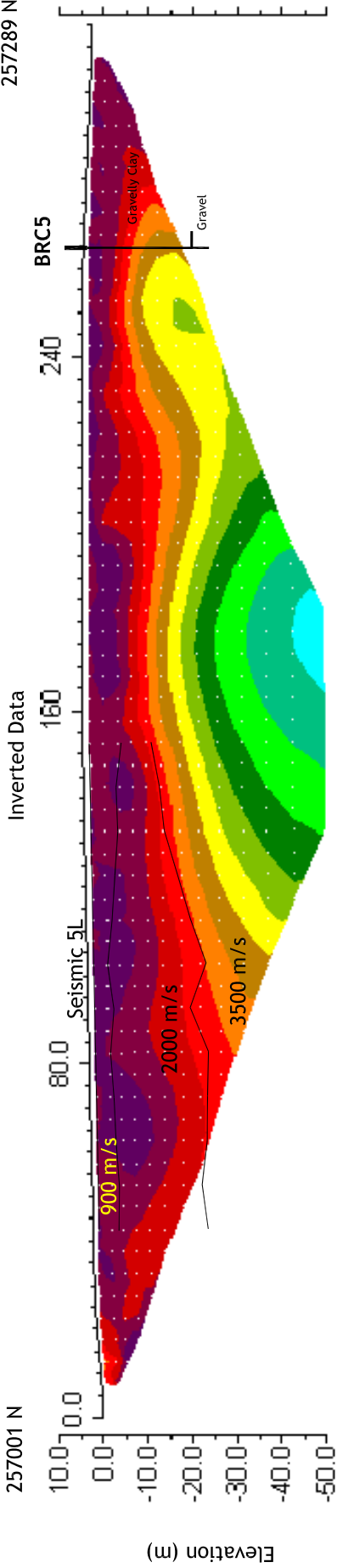
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	RMS ERROR 2.4 %
Name:	Section 4 Long Interpretation 2D-Resistivity Profile 4 Long
Job:	FINGAL LANDFILL SITING STUDY (SITE B)
Client:	RPS-MCOS
Drawn: Kevin Quinn Scale: 1:1 Date: June 2004 Checked: James Hodgson Issue By: _____ Date: _____ Revision Details: _____ Issue By: _____ Date: _____ Revision Details: _____ Issue By: _____ Date: _____ Revision Details: _____	Drawn: _____ Scale: _____ Date: _____ Checked: _____ Issue By: _____ Date: _____ Revision Details: _____ Issue By: _____ Date: _____ Revision Details: _____
Dir No: 1492/14	Date: 14/06/04

2D-Resistivity Profile 5 Long

317542 E
257001 N

317484 E
257289 N

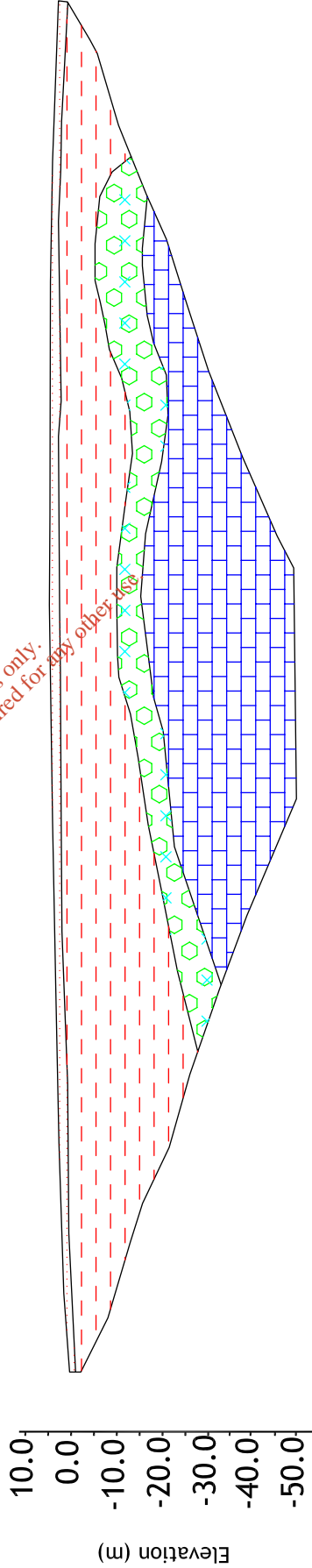


Unit Electrode Spacing = 5.00 m.

Interpreted Data
Consent of copyright owner required for any other use.

South

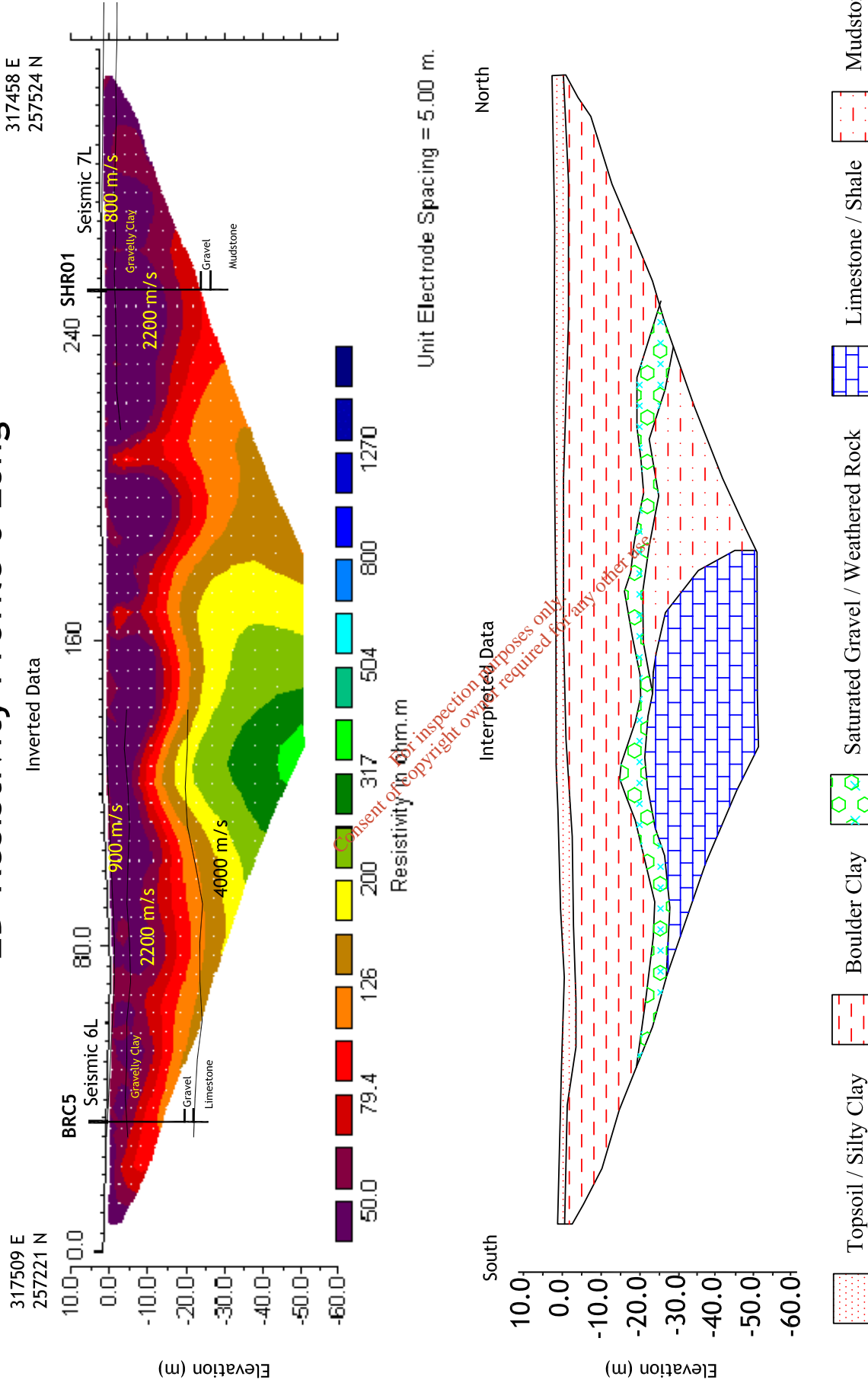
North



- Topsoil / Silty Clay
- Saturated Gravel / Weathered Rock
- Boulder Clay
- Limestone / Shale

<p>BMA GeoServices Ground Engineering Consultants Comhairleoir Oidhreachtacha</p> <p>BMA Strawhill Business Park, Athy Road, Carlow, Ireland.</p> <p>Phone: 353-59-913488 Mobile: 087-8169810 Fax: 353-59-913490 E-mail: bma@carlowbma.ie</p>		<p>BMA GeoServices Ground Engineering Consultants Comhairleoir Oidhreachtacha</p> <p>BMA Strawhill Business Park, Athy Road, Carlow, Ireland.</p> <p>Phone: 353-59-913488 Mobile: 087-8169810 Fax: 353-59-913490 E-mail: bma@carlowbma.ie</p>	
<p>Drawn: Kevin Galvin</p> <p>Scale: 1:1</p> <p>Date: June 2004</p> <p>Checked: James Hodgson</p> <p>Revised Details</p> <p>Issue By: Date: Rev:</p> <p>Revised Details</p> <p>Issue By: Date: Rev:</p> <p>Revised Details</p> <p>Issue By: Date: Rev:</p>		<p>Job: FINGAL LANDFILL SITING STUDY (SITE B)</p> <p>Client: RPS-MICOS</p> <p>Dir No: 1492/15</p>	
<p>Title: SECTION 5 LONG INTERPRETATION 2D-RESISTIVITY PROFILE 5 LONG</p>		<p>RMS ERROR 1.8 %</p>	

2D-Resistivity Profile 6 Long

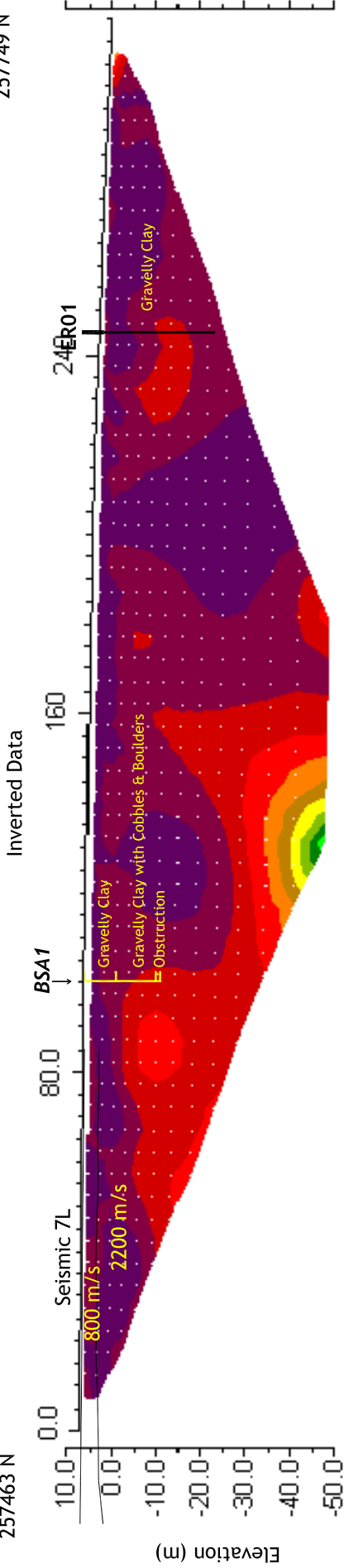


<p>BMA GeoServices Ground Engineering Consultants Consultants: C/- James Hodgsons</p> <p>BMA Stromhall Business Park, Alby Road, Corrow, Perth.</p> <p>Phone: 353-59-9134488 Mobile: 087-8163910 Fax: 353-59-9134490 E-mail: amccarroll@bma.ie</p>		<p>BMA GeoServices Ground Engineering Consultants Consultants: C/- James Hodgsons</p> <p>BMA Stromhall Business Park, Alby Road, Corrow, Perth.</p> <p>Phone: 353-59-9134488 Mobile: 087-8163910 Fax: 353-59-9134490 E-mail: amccarroll@bma.ie</p>																																	
<p>Client: RPS-MCOS</p>		<p>Client: RPS-MCOS</p>																																	
<p>Job: FINGAL LANDELL SITING STUDY (SITE B)</p>		<p>Job: FINGAL LANDELL SITING STUDY (SITE B)</p>																																	
<p>Title: SECTION 6 LONG INTERPRETATION 2D-RESISTIVITY PROFILE 6 LONG</p>		<p>Title: SECTION 6 LONG INTERPRETATION 2D-RESISTIVITY PROFILE 6 LONG</p>																																	
<p>Drawn: Kevin O'Leary</p>	<p>Scale: 1:1</p>	<p>Date: June 2004</p>	<p>Checked: James Hodgsons</p>																																
<p>Revision Details</p> <table border="1"> <tr> <th>Rev</th> <th>Date</th> <th>By</th> <th>For</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>	Rev	Date	By	For					<p>Revision Details</p> <table border="1"> <tr> <th>Rev</th> <th>Date</th> <th>By</th> <th>For</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>	Rev	Date	By	For					<p>Revision Details</p> <table border="1"> <tr> <th>Rev</th> <th>Date</th> <th>By</th> <th>For</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>	Rev	Date	By	For					<p>Revision Details</p> <table border="1"> <tr> <th>Rev</th> <th>Date</th> <th>By</th> <th>For</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>	Rev	Date	By	For				
Rev	Date	By	For																																
Rev	Date	By	For																																
Rev	Date	By	For																																
Rev	Date	By	For																																
<p>Notes: RMS ERROR 3.9 %</p>		<p>Notes: RMS ERROR 3.9 %</p>																																	
<p>Scale: 1:1</p>		<p>Scale: 1:1</p>																																	
<p>Date: June 2004</p>		<p>Date: June 2004</p>																																	
<p>Checked: James Hodgsons</p>		<p>Checked: James Hodgsons</p>																																	
<p>Revision Details</p> <table border="1"> <tr> <th>Rev</th> <th>Date</th> <th>By</th> <th>For</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>		Rev	Date	By	For					<p>Revision Details</p> <table border="1"> <tr> <th>Rev</th> <th>Date</th> <th>By</th> <th>For</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>		Rev	Date	By	For																				
Rev	Date	By	For																																
Rev	Date	By	For																																

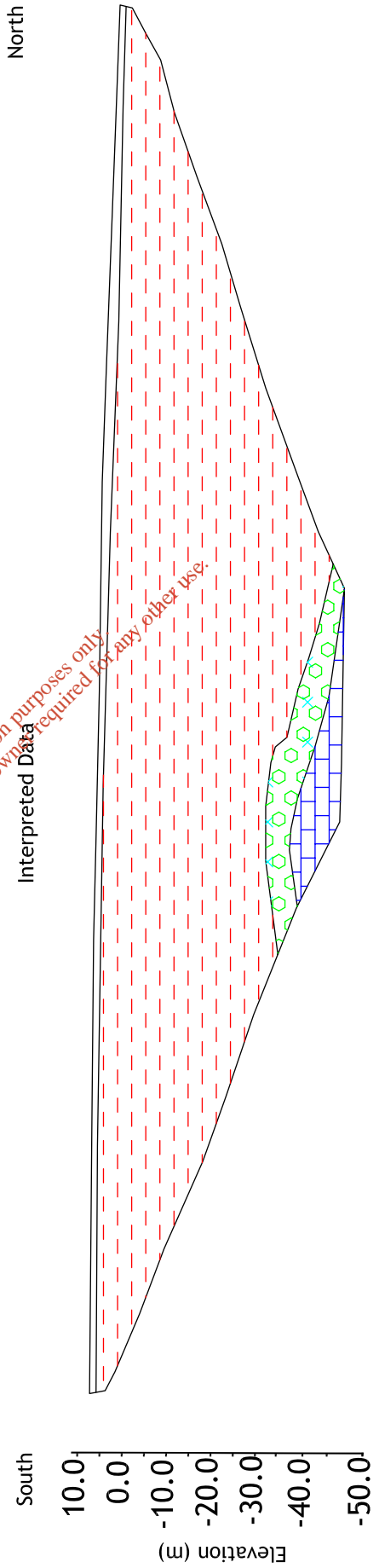
2D-Resistivity Profile 7 Long

317466 E
257463 N

317543 E
257749 N



Resistivity in Ohm-m



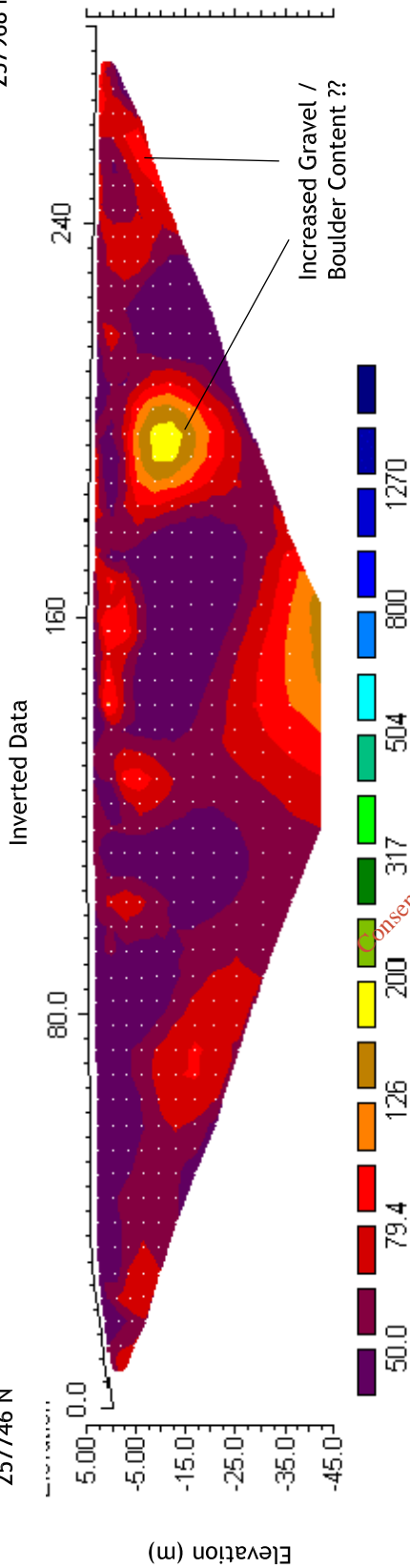
- Topsoil / Silty Clay
- Boulder Clay
- Saturated Gravel / Weathered Rock
- Limestone / Shale

<p>BMA GeoServices Ground Engineering Consultants <small>Consultants: Co-located</small></p> <p>BMA Strawhill Business Park, Athy Road, Carlow, Ireland.</p> <p>Phone: 353-59-913488 Mobile: 087-8165810 Fax: 353-59-913490 E-mail: bma@carlowbma.ie</p>	<p>BMA GeoServices Ground Engineering Consultants <small>Consultants: Co-located</small></p> <p>BMA Strawhill Business Park, Athy Road, Carlow, Ireland.</p> <p>Phone: 353-59-913488 Mobile: 087-8165810 Fax: 353-59-913490 E-mail: bma@carlowbma.ie</p>	<p>Client: RPS-MCOS</p> <p>Job: FINGAL LANDFILL SITING STUDY (SITE B)</p> <p>Title: SECTION 7 LONG INTERPRETATION 2D-RESISTIVITY PROFILE 7 LONG</p> <p>Drawn: Kevin Quinn Scale: 1:1 Date: June 2004 Checked: James Hodgson Revised: [Table with 3 columns: Issue, By, Date, Rev] Revised: [Table with 3 columns: Issue, By, Date, Rev] Revised: [Table with 3 columns: Issue, By, Date, Rev]</p>	<p>Notes: RMS ERROR 2.2 %</p>
<p>Dir No: 149217</p>		<p>Dir No: 149217</p>	

2D-Resistivity Profile 8 Long

317671 E
257968 N

317570 E
257746 N

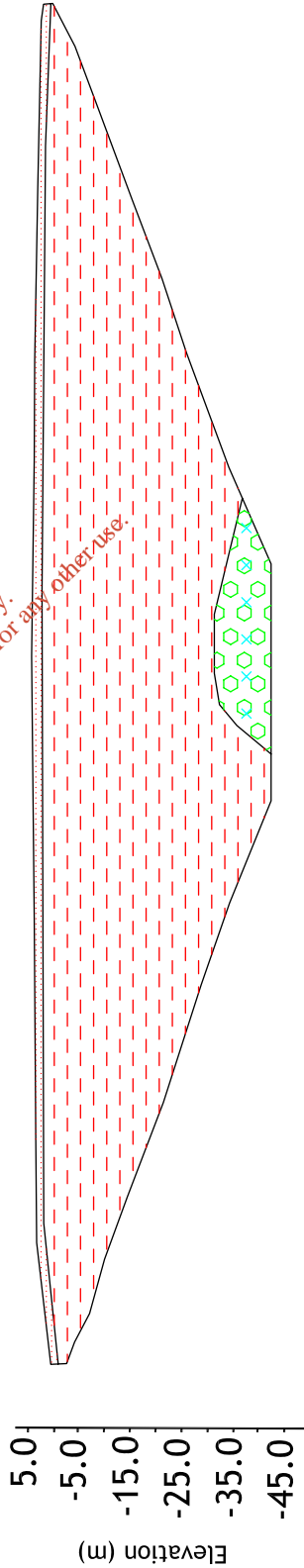


Unit Electro Spacing = 5.00 m.

North

South

Interpreted Data



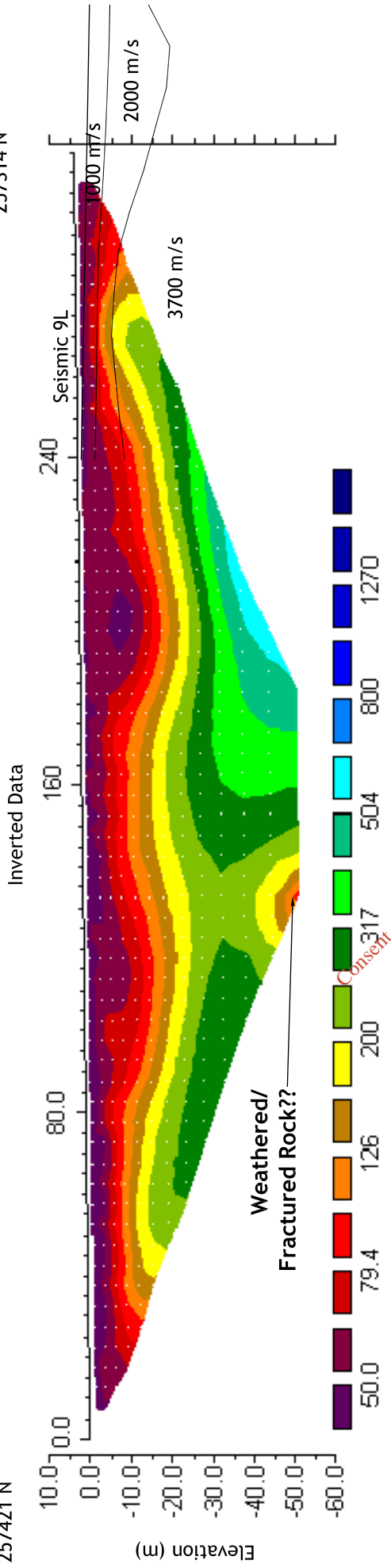
- Topsoil / Silty Clay
- Boulder Clay
- Saturated Gravel / Weathered Rock

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<p>Notes: RMS ERROR 2.2 %</p>		<p>Drawn: Kevin Galvin Scale: 1:1 Date: June 2004 Checked: James Hodgson Revised: _____ Issue: _____</p>	

2D-Resistivity Profile 9 Long

317130 E
257421 N

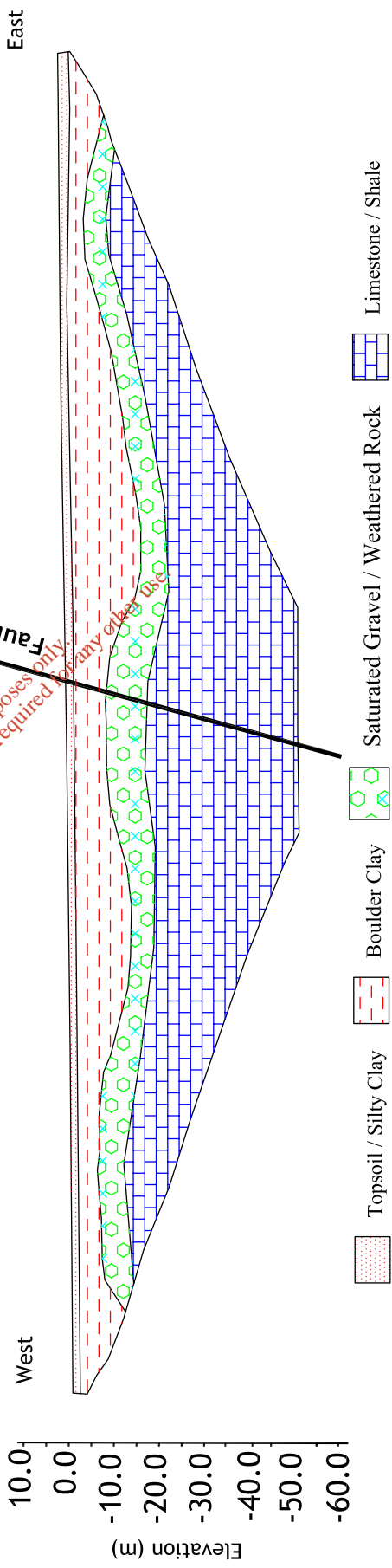
317410 E
257314 N



Resistivity in Ohm.m

Unit Electrode Spacing = 5.00 m.

Interpreted Data
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Ground Engineering Consultants
BMA
Strawhill Business Park,
Athy Road,
Carlow,
Ireland.
Phone: 353-59-9134488
Mobile: 087-2477923
Fax: 353-59-9134490
E-mail: bma@bma.ie

Note: **RMS ERROR 1.4 %**

Drawn: Kevin Galvin		Scale: 1:1		Date: June 2004		Checked: James Hodgson	
Issue	By	Date	Rev	Issue	By	Date	Rev

Title: SECTION 9 LONG INTERPRETATION 2D-RESISTIVITY PROFILE 9 LONG

Job: FINGAL LANDFILL SITING STUDY (SITE B)

Client: RPS-MCOS

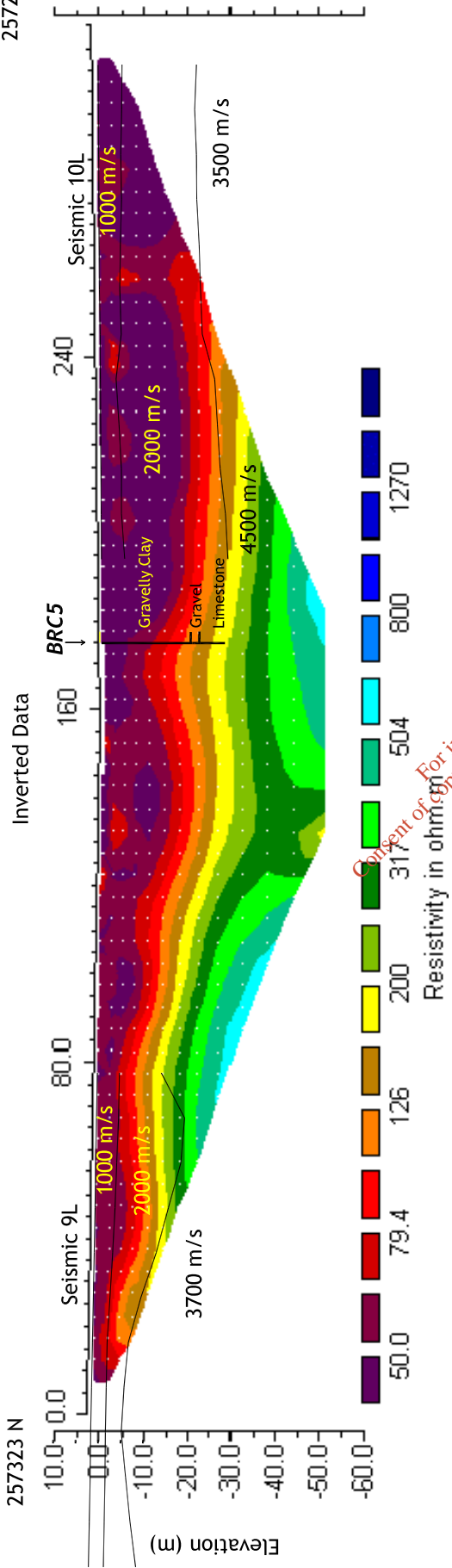
Dir No: 149219

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BMA
Strawhill Business Park,
Athy Road,
Carlow,
Ireland.
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Fax: 353-59-9134490
E-mail: bma@bma.ie

2D-Resistivity Profile 10 Long

317666 E
257278 N

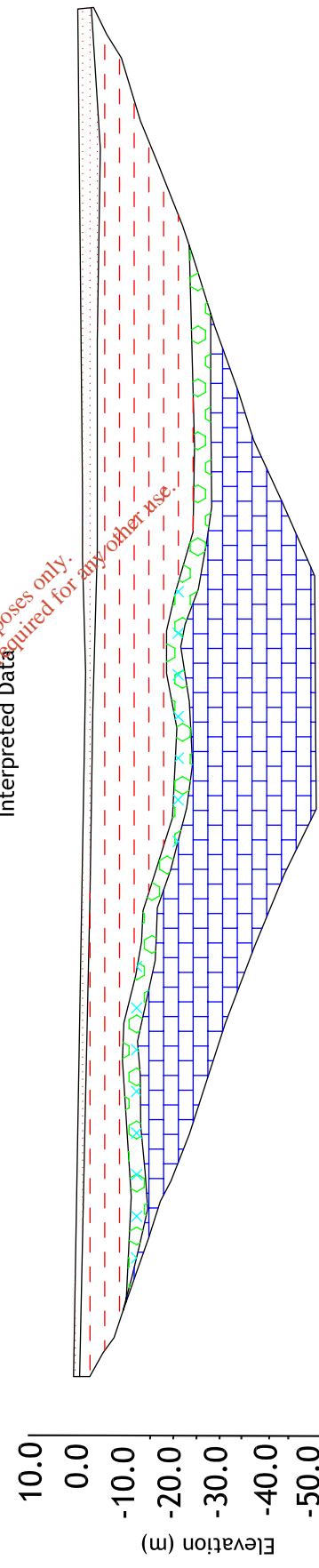
317365 E
257323 N



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East

West



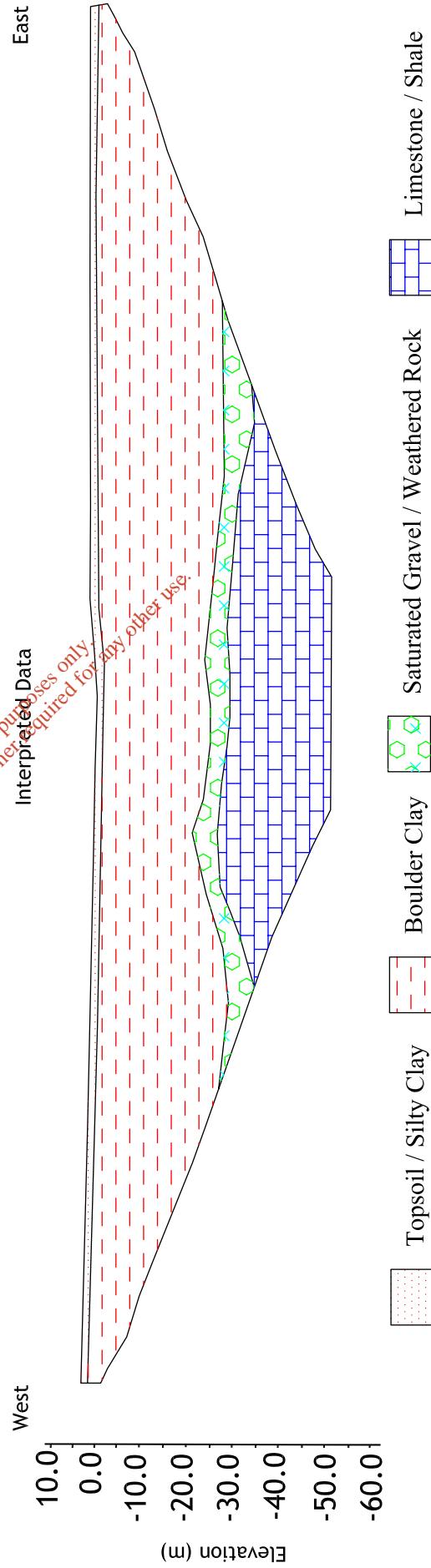
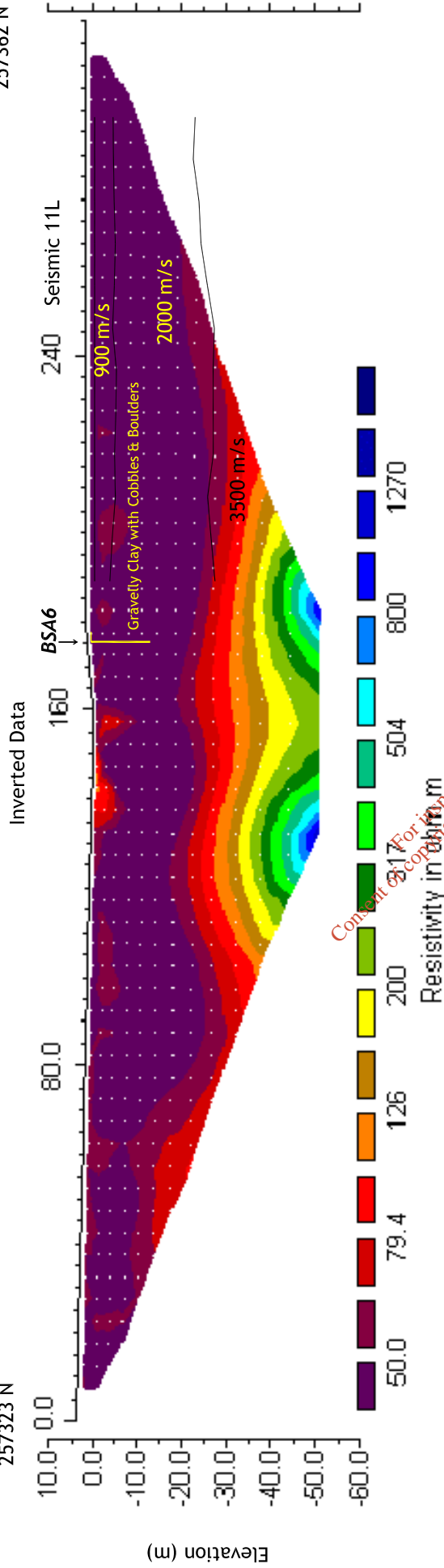
- Topsoil / Silty Clay
- Boulder Clay
- Saturated Gravel / Weathered Rock
- Limestone / Shale

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Scale:	1:1																										
Date:	June 2004																										
Checked:	James Hodgson																										
Revised:																											
Issue No:																											
Issue Date:																											
Issue By:																											
Issue For:																											
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Issue By:																											
Issue For:																											
<p>Drg No: 1492/110</p>																											

2D-Resistivity Profile 11 Long

317365 E
257323 N

317870 E
257362 N



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Carlow,
Ireland.
Phone: 353-59-9134488
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Fax: 353-59-9134490
E-mail: bma@carlowbma.ie

Notes:
RMS ERROR
2.7 %

Revision Details		Issue	By	Date	Rev

Title: SECTION 11 LONG INTERPRETATION 2D-RESISTIVITY PROFILE 11 LONG

Job: FINGAL LANDFILL SITING STUDY (SITE B)

Client: RPS-MCOS

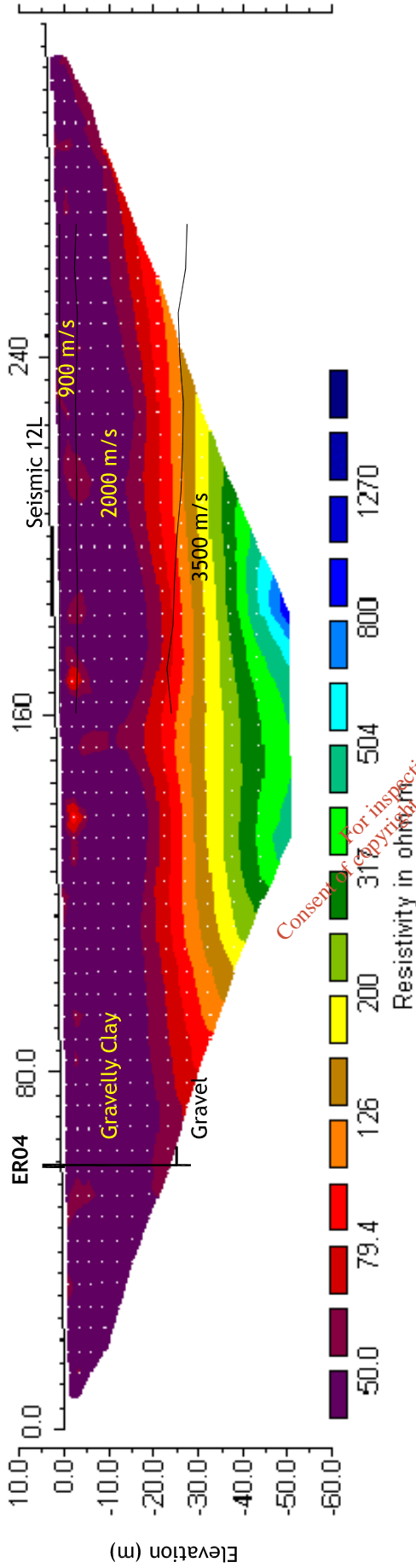
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2D-Resistivity Profile 12 Long

317798 E
257479 N

318080 E
257348 N

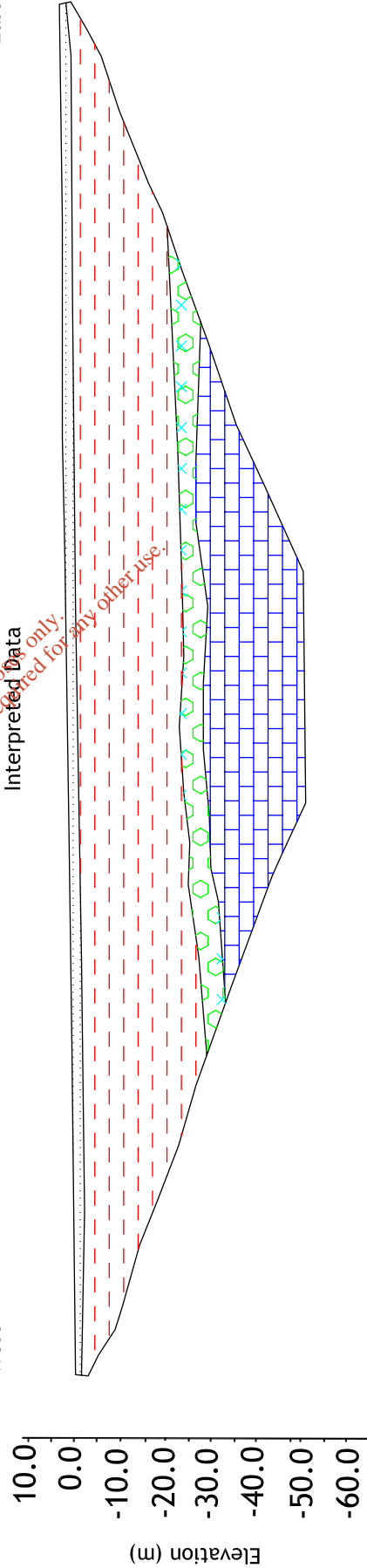
Inverted Data



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West

East



- Topsoil / Silty Clay
- Boulder Clay
- Saturated Gravel / Weathered Rock
- Limestone / Shale

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Athy Road,
Carlow,
Ireland.
Phone: 353-59-9134488
Mobile: 087-2477923
Fax: 353-59-9134490
E-mail: bma@bma.ie

Note: **RMS ERROR 2.5 %**

Revision Details		Revision Details		Revision Details							
Issue	By	Date	Rev	Issue	By	Date	Rev	Issue	By	Date	Rev

Drawn: Kevin Galvin
Scale: 1:1
Date: June 2004
Checked: James Hodgson
Revised:

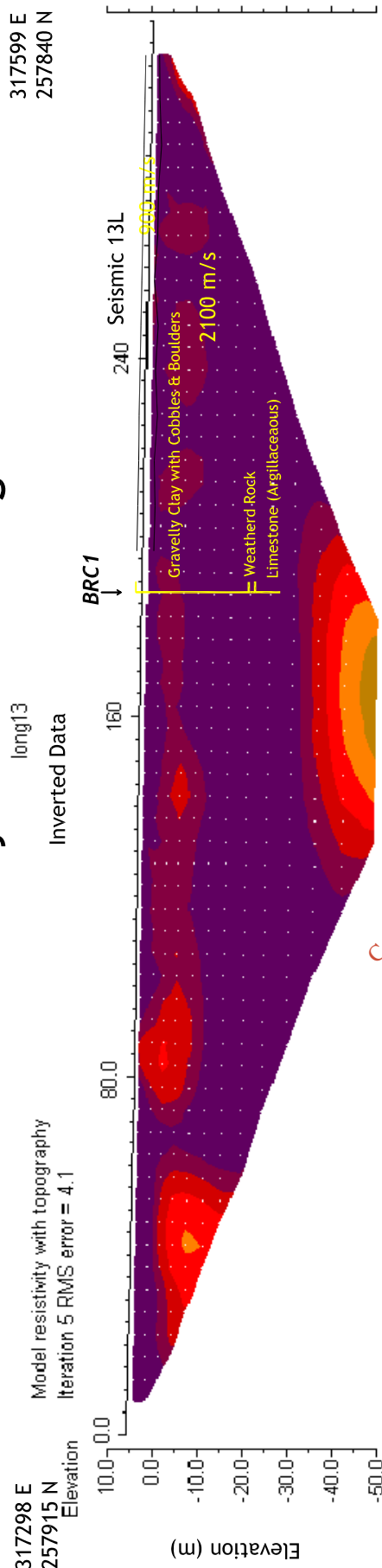
Job: FINGAL LANDFILL SITING STUDY (SITE B)

Client: RPS-MCOS

Dwg No: 1492/12

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2D-Resistivity Profile 13 Long

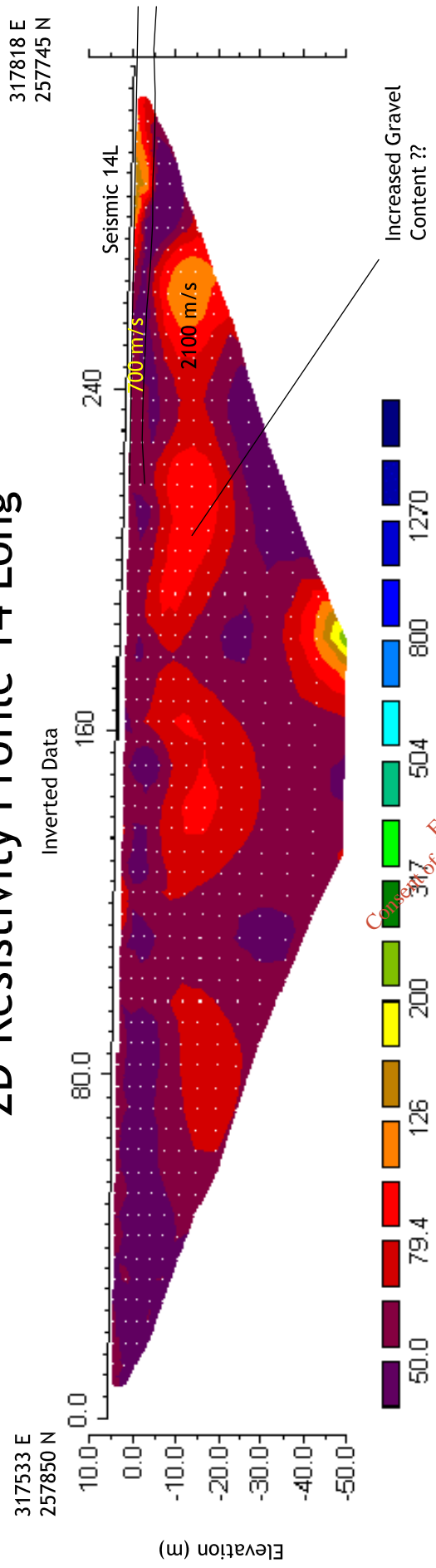


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Interpretation based on Borehole Data.

- Topsoil / Silty Clay
- Boulder Clay
- Gravelly Clay / Weathered Rock
- Limestone / Shale

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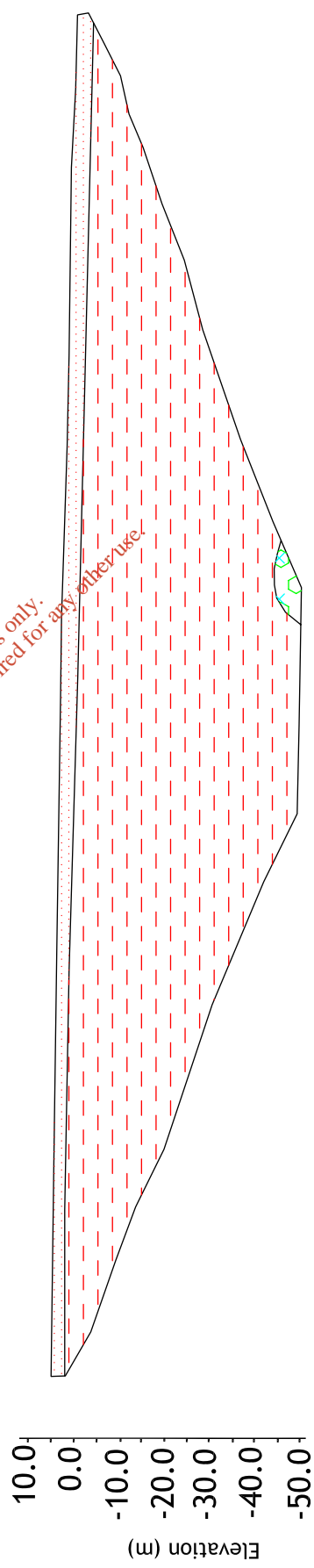
2D-Resistivity Profile 14 Long



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East

West



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E-mail: bma@carlow@bma.ie

Note:
RMS ERROR
2.6 %

Drawn:		Scale:		Date:		Checked:		Revised:	
Name	By	Date	Rev	Name	By	Date	Rev	Name	By
Kevin O'Leary	MA	June 2004		James Hodgson					

Title:
SECTION 14 LONG
INTERPRETATION
2D-RESISTIVITY PROFILE 14
LONG

Job:
FINGAL LANDFILL SITING
STUDY (SITE B)

Client:
RPS-MCOS

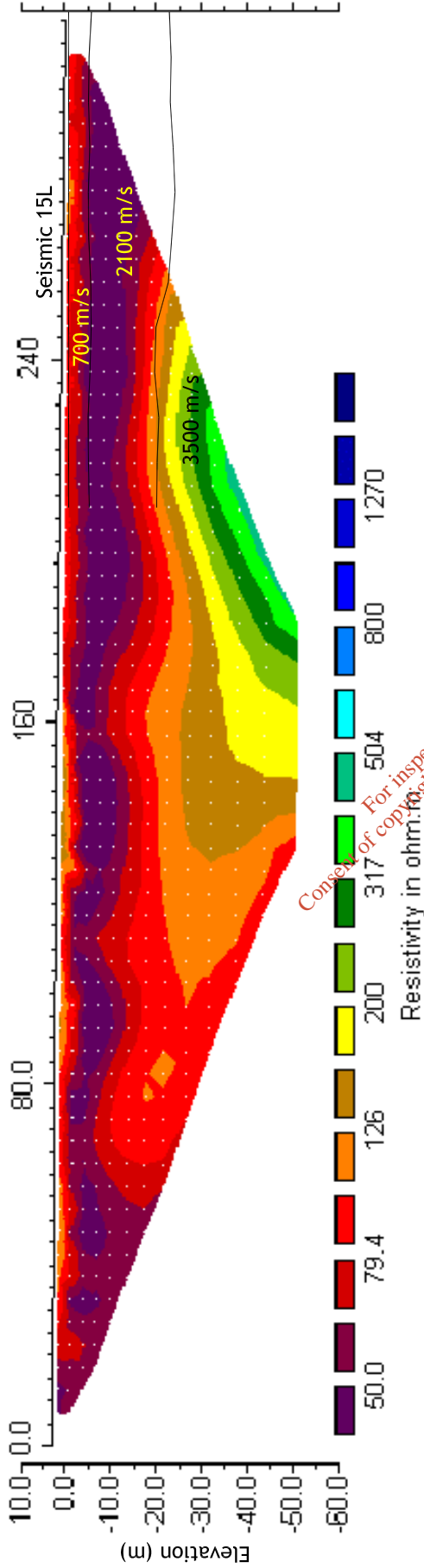
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E-mail: bma@carlow@bma.ie

2D-Resistivity Profile 15 Long

318034 E
257636 N

317757 E
257777 N

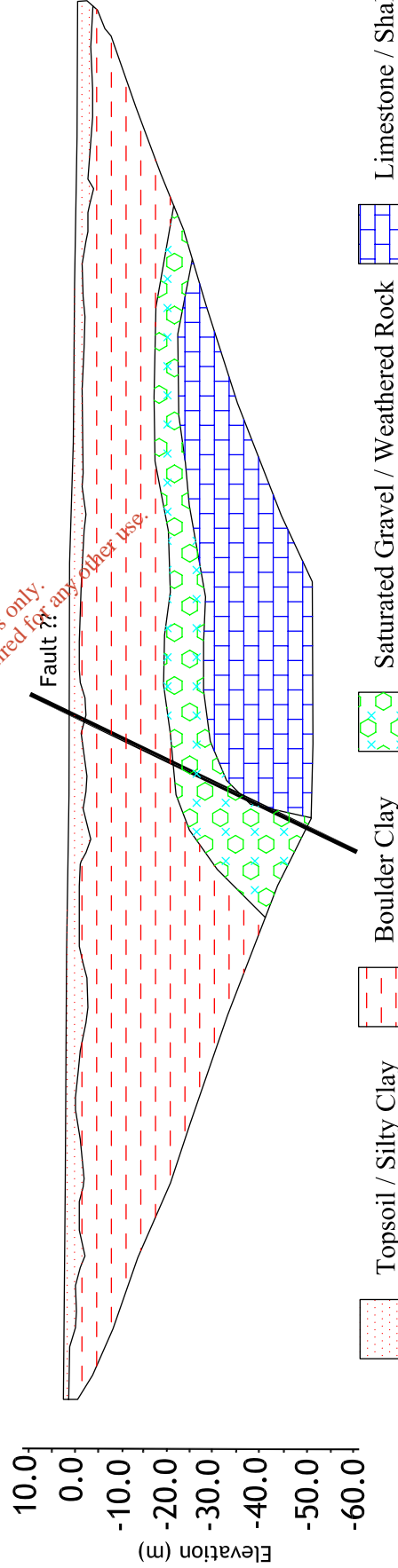
Inverted Data







East

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Interpreted Data



West

-  Topsoil / Silty Clay
-  Boulder Clay
-  Saturated Gravel / Weathered Rock
-  Limestone / Shale

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BMA
Strawhill Business Park,
Athy Road,
Carlow,
Ireland.
Phone: 353-59-9134488
Mobile: 087-2477923
Fax: 353-59-9134490
E-mail: bma@carlow@bma.ie

Note:
RMS ERROR
1.9 %

Drawn:		Scale:		Date:		Checked:		Revised:	
Issue	By	Issue	By	Issue	By	Issue	By	Issue	By

Title:
SECTION 15 LONG
INTERPRETATION
2D-RESISTIVITY PROFILE 15
LONG

Job:
FINGAL LANDFILL SITING
STUDY (SITE B)

Client:
RPS-MCOS

Dwg No:
1492/15

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Ground Engineering Consultants
Consultants: C&S/maul@bma.ie

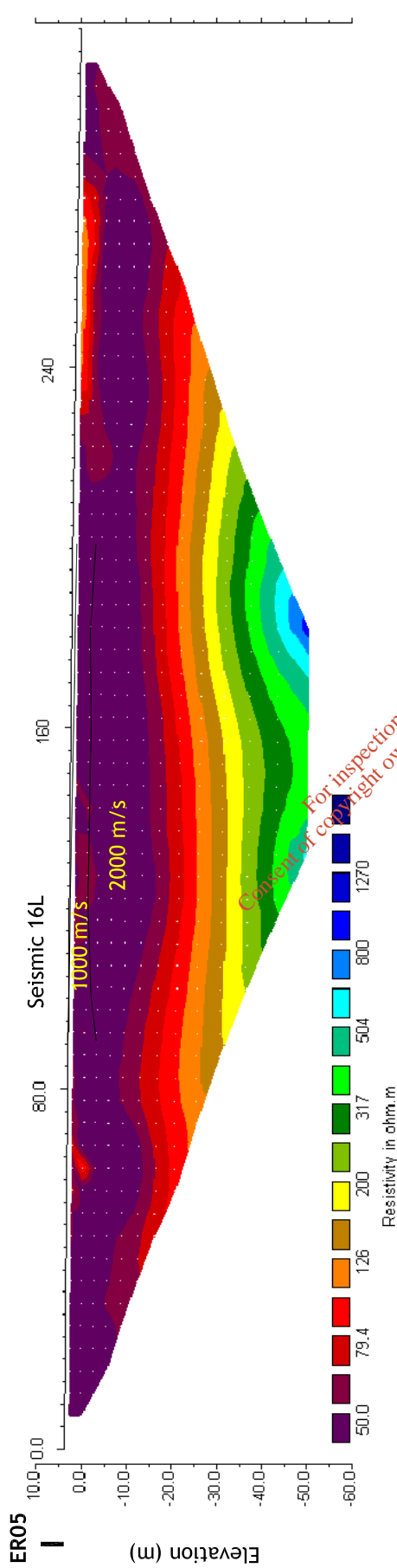
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Fax: 353-59-9134490
E-mail: bma@carlow@bma.ie

2D-Resistivity Profile 16 Long

317869 E
257047 N

317567 E
257110 N

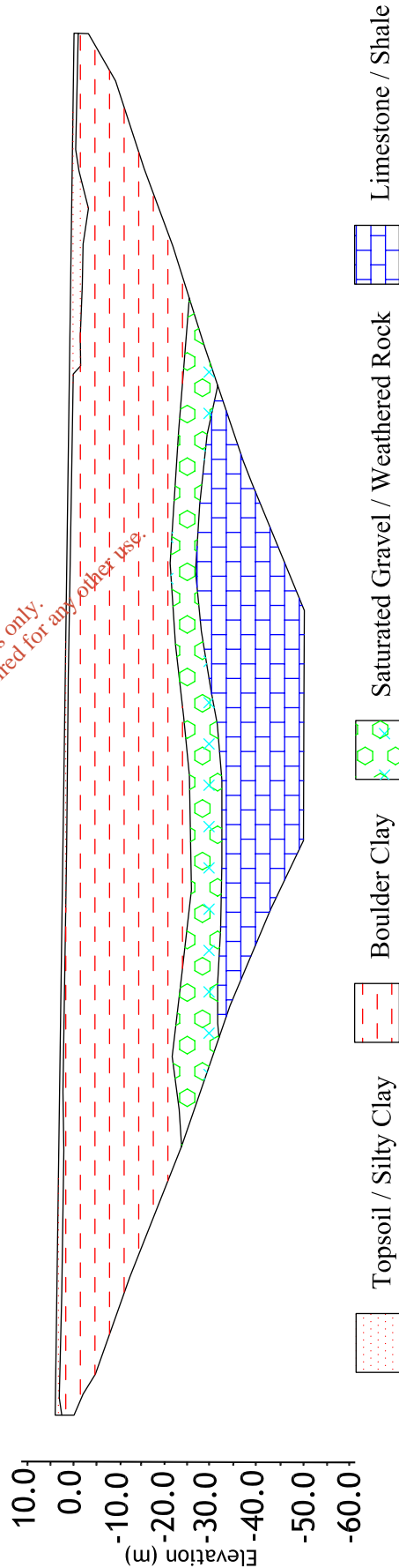
Inverted Data



West

Interpreted Data

East



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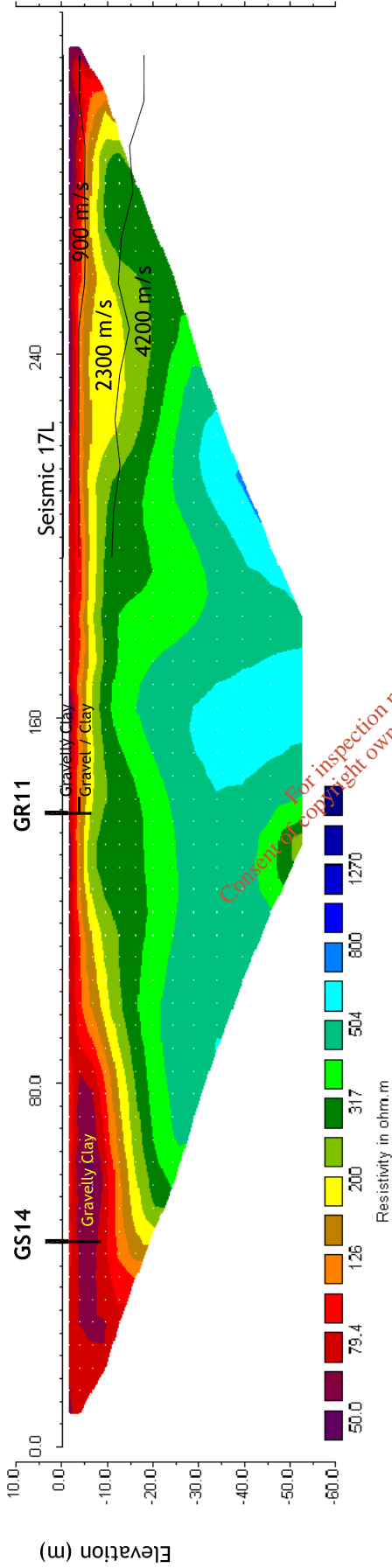
BMA GeoServices Ground Engineering Consultants <small>Company No: C01-00000000</small> BMA Strawhill Business Park, Athy Road, Carlow, Ireland. Phone: 353-59-913488 Mobile: 087-2477923 Fax: 353-59-913490 E-mail: bma@carlowbma.ie	BMA GeoServices Ground Engineering Consultants <small>Company No: C01-00000000</small> BMA Strawhill Business Park, Athy Road, Carlow, Ireland. Phone: 353-59-913488 Mobile: 087-2477923 Fax: 353-59-913490 E-mail: bma@carlowbma.ie	Note: RMS ERROR 0.76 %	Title: SECTION 16 LONG INTERPRETATION 2D-RESISTIVITY PROFILE 16 LONG	Job: FINGAL LANDFILL SITING STUDY (SITE B)	Client: RPS-MCOS	Dwg No: 1492/16
		Drawn: Kevin O'Leary Scale: 1:1 Date: June 2004 Checked: James Hodgson Revised: _____ Revised: _____ Revised: _____ Issue By: _____ Issue Date: _____ Issue Rev: _____	Issue By: _____ Issue Date: _____ Issue Rev: _____ Issue By: _____ Issue Date: _____ Issue Rev: _____ Issue By: _____ Issue Date: _____ Issue Rev: _____			

2D-Resistivity Profile 17 Long

317757 E
257777 N

318034 E
257636 N

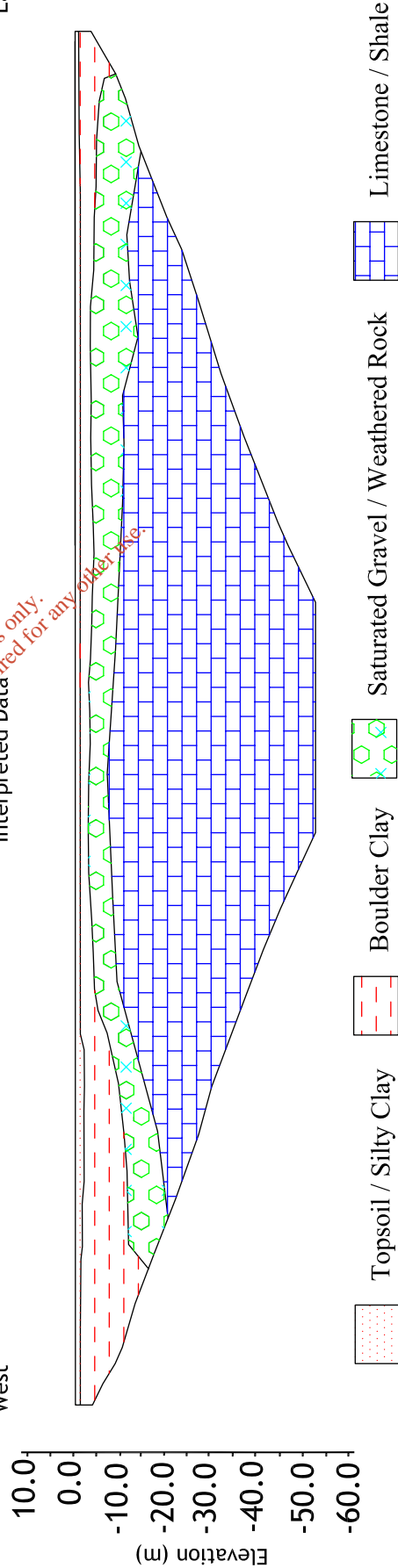
Inverted Data



West

Interpreted Data

East



Topsoil / Silty Clay

Boulder Clay

Saturated Gravel / Weathered Rock

Limestone / Shale

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Ground Engineering Consultants
BMA
Strawhill Business Park,
Athy Road,
Carlow,
Ireland.

Phone: 353-59-9134488
Mobile: 087-2477923
Fax: 353-59-9134490
E-mail: bma@carlowbma.ie

RMS ERROR
1.6 %

Revision Details	Issue	By	Date

Drawn:	Scale:	Date:	Checked:	Revised:	Revised:	Revised:
Kevin O'Leary	1:1	June 2004	James Hodgson			

THE: SECTION 17 LONG INTERPRETATION 2D-RESISTIVITY PROFILE 17 LONG

JOB: FINGAL LANDFILL SITING STUDY (SITE B)

Client: RPS-MCOS

Dwg No: 1492/17

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Carlow,
Ireland.

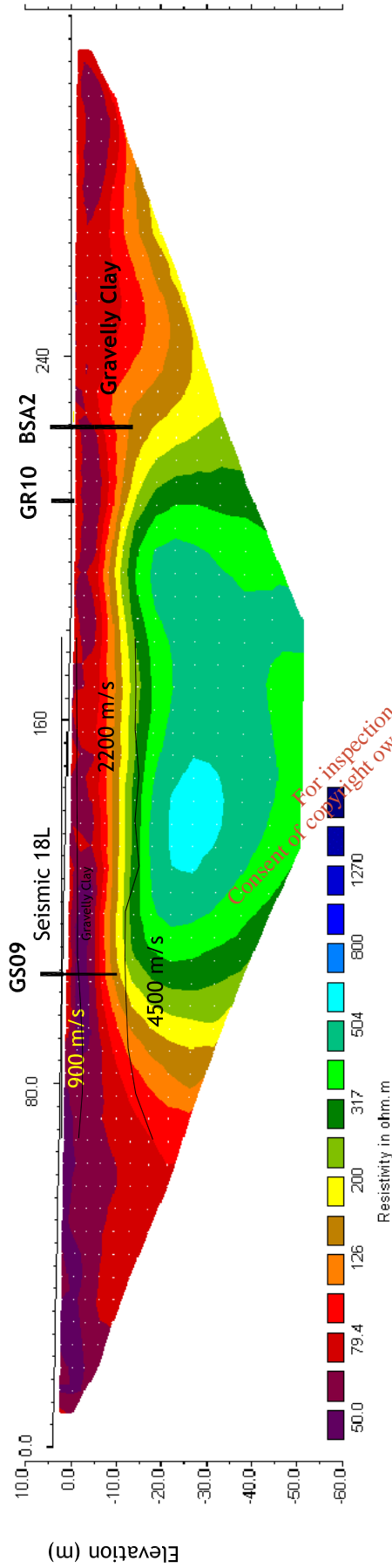
Phone: 353-59-9134488
Mobile: 087-8165810
Fax: 353-59-9134490
E-mail: bma@carlowbma.ie

2D-Resistivity Profile 18 Long

317757 E
256675 N

318057 E
256616 N

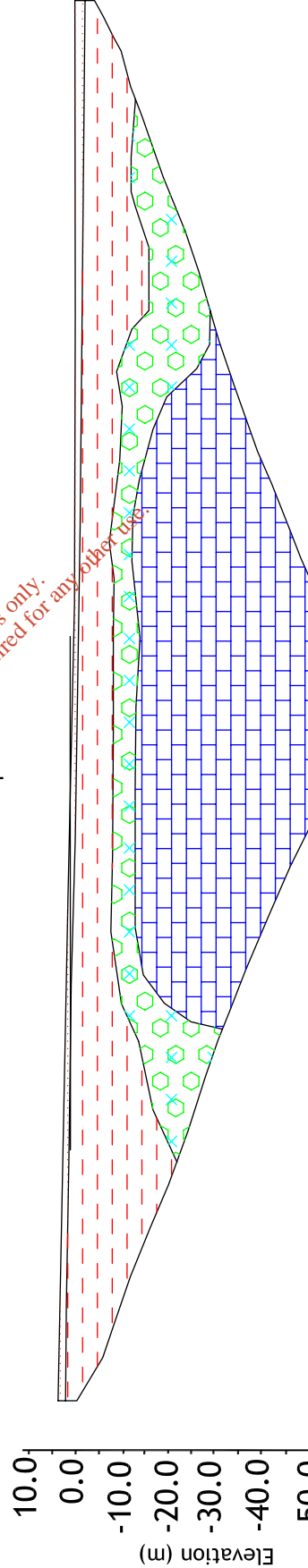
Inverted Data



West

East

Interpreted Data



Topsoil / Silty Clay

Boulder Clay

Saturated Gravel / Weathered Rock

Limestone / Shale

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Ground Engineering Consultants
BMA
Strawhill Business Park,
Athy Road,
Carlow,
Ireland.

RMS ERROR
1.3 %

Revision Details		Issue By	Date

Title: SECTION 18 LONG INTERPRETATION 2D-RESISTIVITY PROFILE 18 LONG

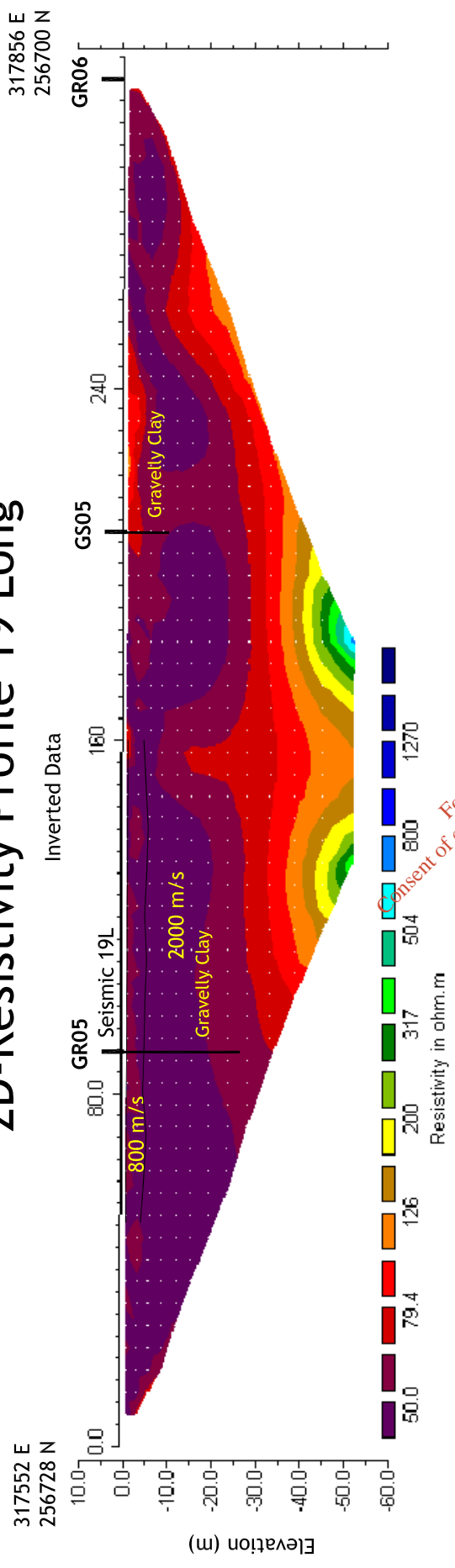
Job: FINGAL LANDFILL SITING STUDY (SITE B)

Client: RPS-MCOS

Dwg No: 1492/18

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Ground Engineering Consultants
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Ireland.
Phone: 353-59-9134488
Mobile: 087-8165810
Fax: 353-59-9134490
E-mail: bma@carlowbma.ie

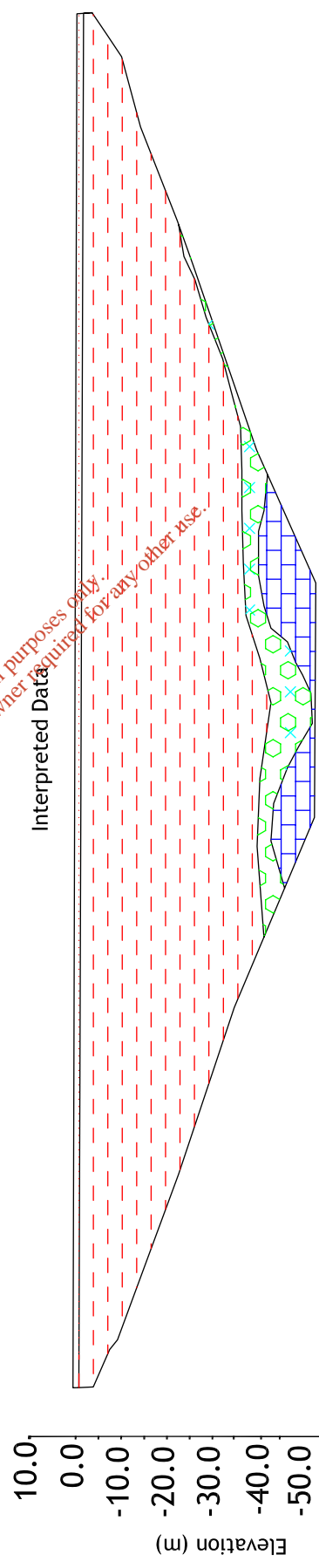
2D-Resistivity Profile 19 Long



East

West

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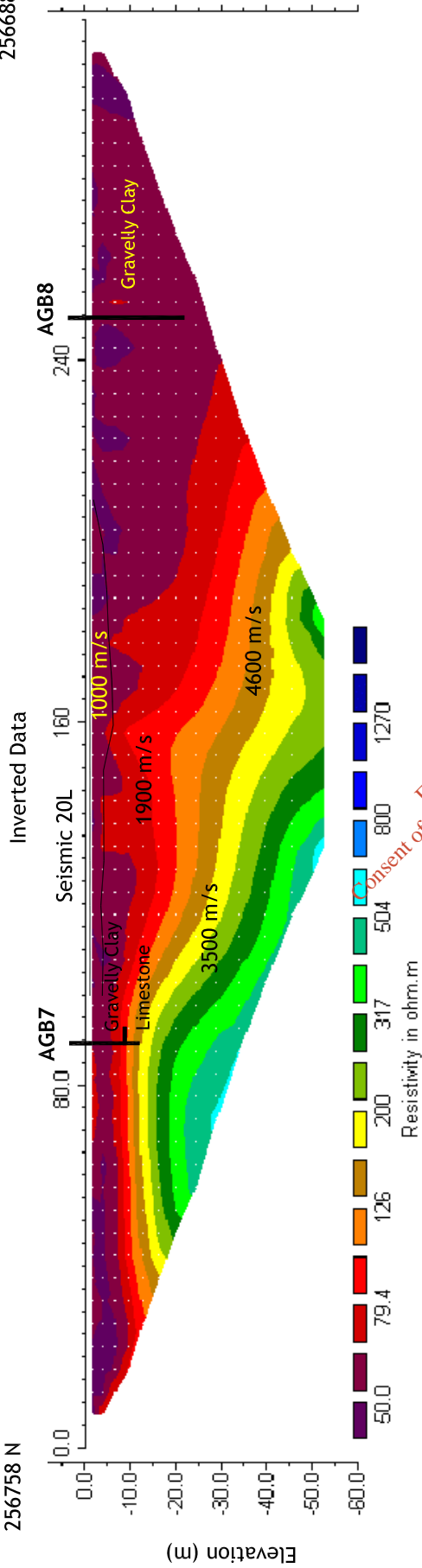
- Topsoil / Silty Clay
- Saturated Gravel / Weathered Rock
- Boulder Clay
- Limestone / Shale

<p>BMA GeoServices Ground Engineering Consultants <i>Consultants Co-located with</i></p> <p>BMA Strawhill Business Park, Athy Road, Carlow, Ireland.</p> <p>Phone: 353-59-9134488 Mobile: 087-8169810 Fax: 353-59-9134490 E-mail: bma@carlowbma.ie</p>	<p>BMA GeoServices Ground Engineering Consultants <i>Consultants Co-located with</i></p> <p>BMA Strawhill Business Park, Athy Road, Carlow, Ireland.</p> <p>Phone: 353-59-9134488 Mobile: 087-8169810 Fax: 353-59-9134490 E-mail: bma@carlowbma.ie</p>	<p>Client: RPS-MCOS</p> <p>Job: FINGAL LANDFILL SITING STUDY (SITE B)</p> <p>Title: SECTION 19 LONG INTERPRETATION 2D-RESISTIVITY PROFILE 19 LONG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">Drawn:</th> <th colspan="2">Scale:</th> <th colspan="2">Date:</th> <th colspan="2">Checked:</th> <th colspan="2">Revised:</th> </tr> <tr> <th>Name</th> <th>By</th> <th>Date</th> <th>Rev</th> <th>Name</th> <th>By</th> <th>Date</th> <th>Rev</th> <th>Name</th> <th>By</th> </tr> </thead> <tbody> <tr> <td>Kevin O'Leary</td> <td>MA</td> <td>July 2004</td> <td></td> <td>James Hodgson</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>Notes: RMS ERROR 1.0 %</p>	Drawn:		Scale:		Date:		Checked:		Revised:		Name	By	Date	Rev	Name	By	Date	Rev	Name	By	Kevin O'Leary	MA	July 2004		James Hodgson																									
Drawn:		Scale:		Date:		Checked:		Revised:																																												
Name	By	Date	Rev	Name	By	Date	Rev	Name	By																																											
Kevin O'Leary	MA	July 2004		James Hodgson																																																

2D-Resistivity Profile 20 Long

317059 E
256758 N

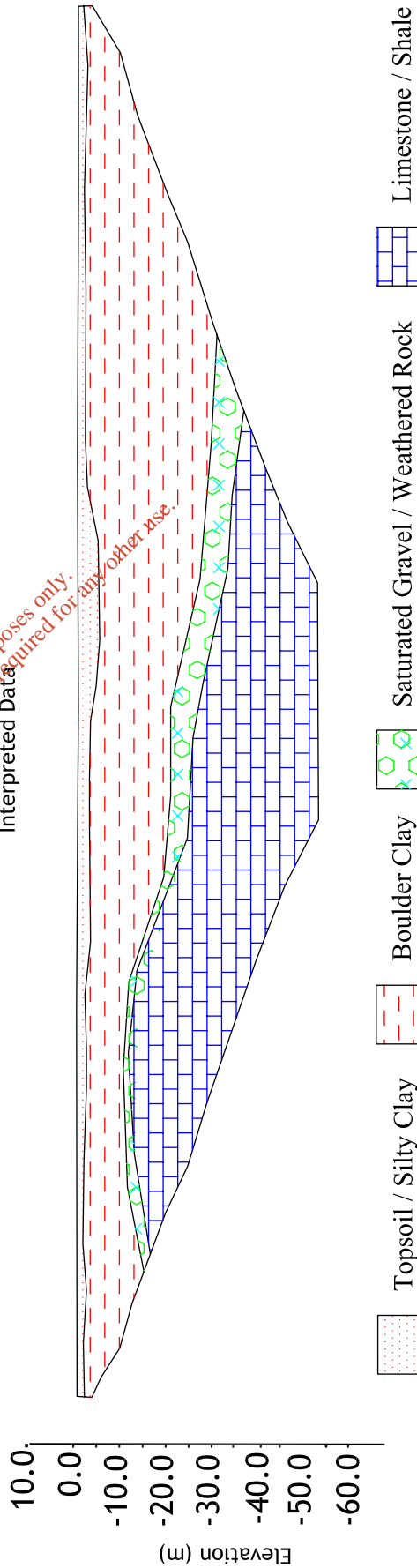
317358 E
256688 N



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East

West



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Fax: 353-59-913489
E-mail: bma@carlowbma.ie

Note:
RMS ERROR
1.4 %

Revision Details		Issue	By	Date	Rev

Drawn: Kevin O'Leary
Scale: 1:1
Date: July 2004
Checked: James Hodgson
Revised By: **Revised Date:** **Revised Date:** **Revised Date:**

Title:
SECTION 20 LONG
INTERPRETATION
2D-RESISTIVITY PROFILE 20
LONG

Job:
FINGAL LANDFILL SITING
STUDY (SITE B)

Client:
RPS-MCOS

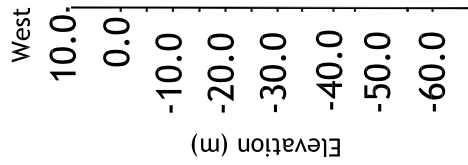
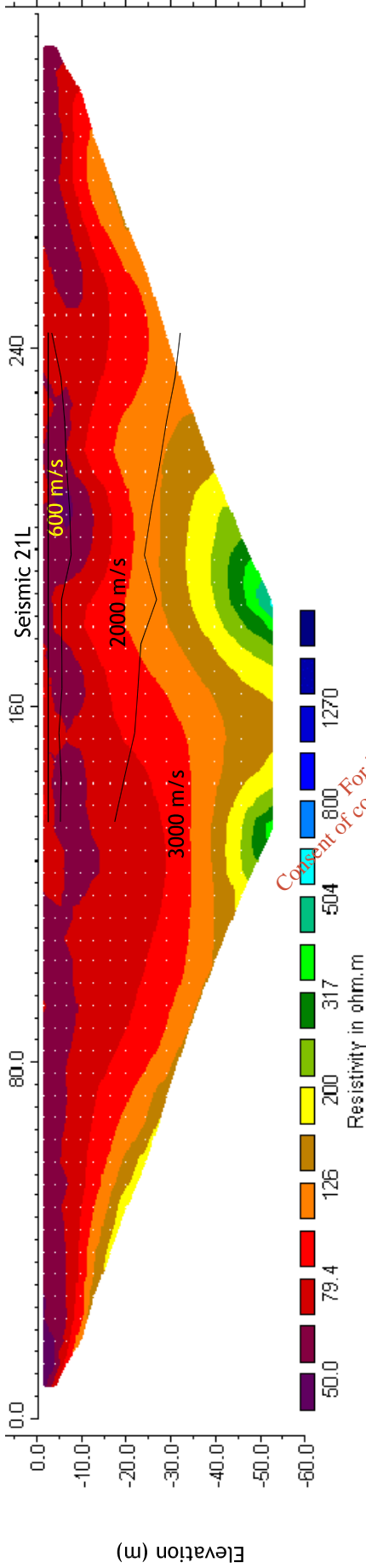
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Athy Road,
Carlow,
Ireland.
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Mobile: 087-8169810
Fax: 353-59-913490
E-mail: bma@carlowbma.ie

2D-Resistivity Profile 21 Long

317688 E
256166 N

317985 E
256183 N

Inverted Data



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- Topsoil / Silty Clay
- Boulder Clay
- Saturated Gravel / Weathered Rock
- Limestone / Shale

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Carlow,
Ireland.

Phone: 353-59-913488
Mobile: 087-2477923
Fax: 353-59-913490
E-mail: bma@carlowbma.ie

Notes:
RMS ERROR
0.73 %

Revision Details		Issue No.	Issue Date	Issue By	Issue For

Title: SECTION 21 LONG INTERPRETATION 2D-RESISTIVITY PROFILE 21 LONG

Job: FINGAL LANDFILL SITING STUDY (SITE B)

Client: RPS-MCOS

Dwg No: 1492/21

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BMA
Strawhill Business Park,
Athy Road,
Carlow,
Ireland.

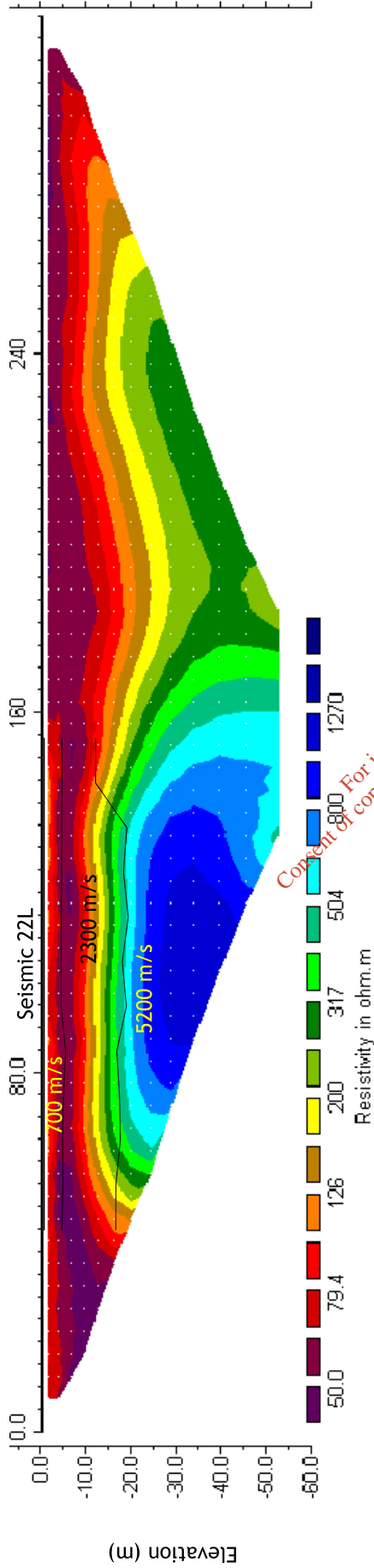
Phone: 353-59-913488
Mobile: 087-8169810
Fax: 353-59-913490
E-mail: bma@carlowbma.ie

2D-Resistivity Profile 22 Long

317462 E
256258 N

317754 E
256157 N

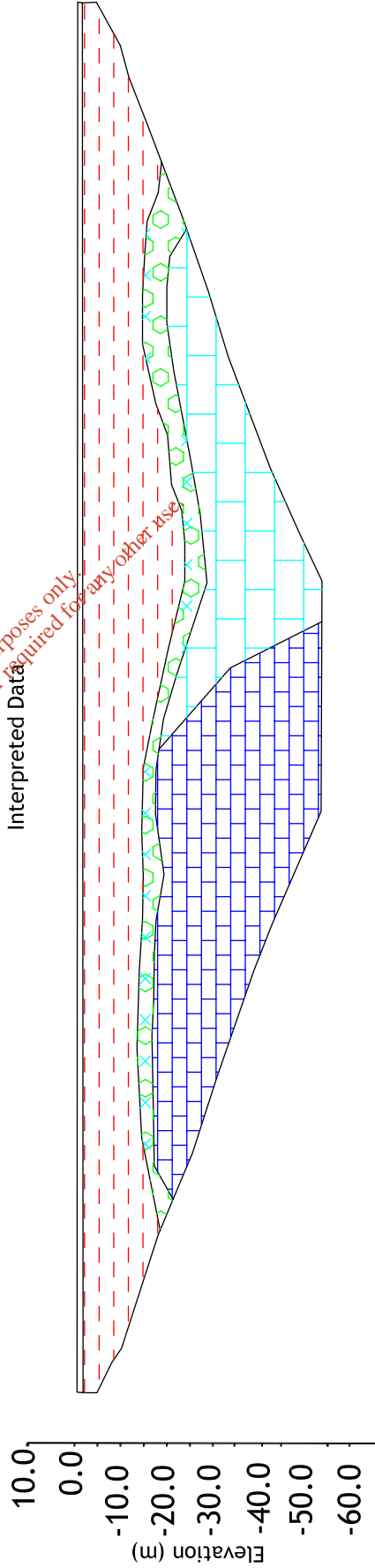
Inverted Data



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East

West



- Topsoil / Silty Clay
- Silty Clay
- Boulder Clay
- Saturated Gravel / Weathered Rock
- Limestone / Shale
- Weathered Limestone / Change in Lithology?

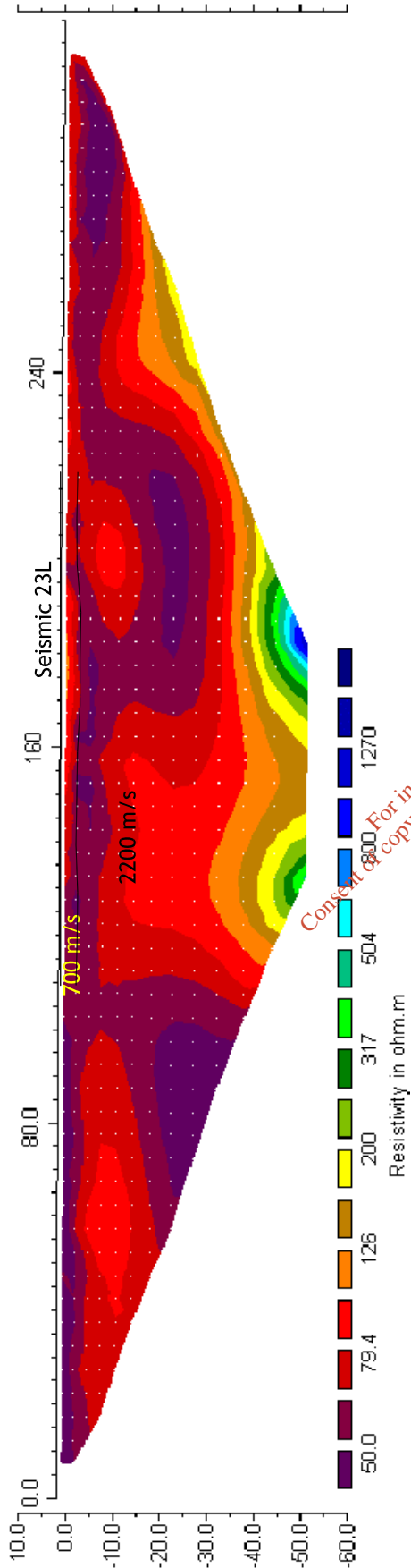
<p>BMA GeoServices Ground Engineering Consultants <i>Consultants: C&E/mauliroad.ie</i></p> <p>BMA Strawhill Business Park, Athy Road, Carlow, Ireland.</p> <p>Phone: 353-59-913488 Mobile: 087-2477923 Fax: 353-59-913490 E-mail: bma@carlow@bma.ie</p>	<p>BMA GeoServices Ground Engineering Consultants <i>Consultants: C&E/mauliroad.ie</i></p> <p>BMA Strawhill Business Park, Athy Road, Carlow, Ireland.</p> <p>Phone: 353-59-913488 Mobile: 087-2477923 Fax: 353-59-913490 E-mail: bma@carlow@bma.ie</p>	<p>Job: FINGAL LANDFILL SITING STUDY (SITE B)</p> <p>Client: RPS-MCOS</p>	<p>Title: SECTION 22 LONG INTERPRETATION 2D-RESISTIVITY PROFILE 22 LONG</p> <p>Drawn: Kevin O'Leary</p> <p>Scale: 1:1</p> <p>Date: July 2004</p> <p>Checked: James Hodgson</p> <p>Revised: _____</p>																
<p>Notes: RMS ERROR 0.71 %</p>		<p>Revision Details</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Issue</th> <th>By</th> <th>Date</th> <th>Rev</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>		Issue	By	Date	Rev												
Issue	By	Date	Rev																

2D-Resistivity Profile 23 Long

317233 E
256396 N

317504 E
256241 N

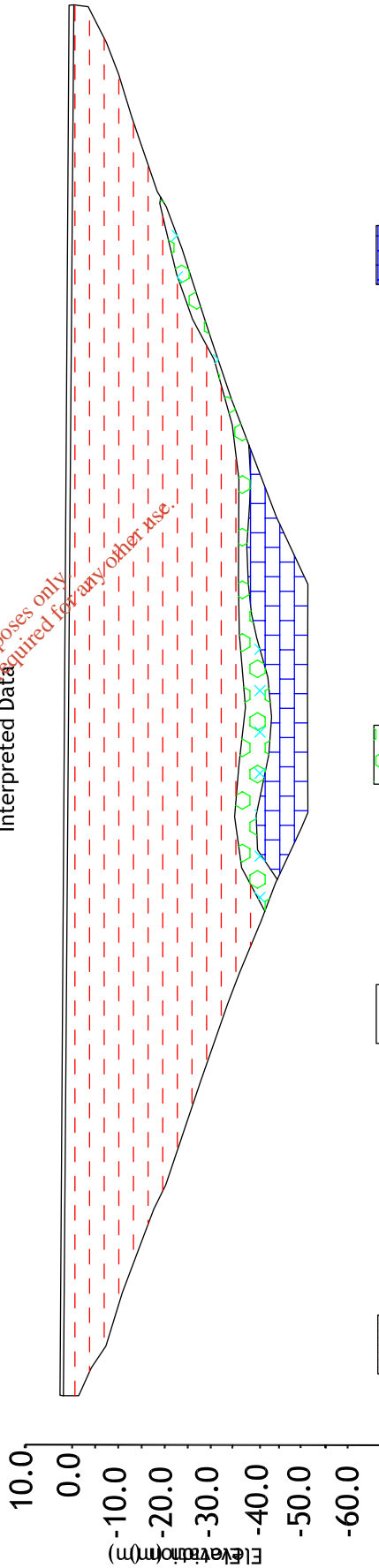
Inverted Data



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South

North



- Topsoil / Silty Clay
- Boulder Clay
- Saturated Gravel / Weathered Rock
- Limestone / Shale

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Strawhill Business Park,
Athy Road,
Carlow,
Ireland.
Phone: 353-59-9134488
Mobile: 087-2477923
Fax: 353-59-9134490
E-mail: bma@carlowbma.ie

Note: RMS ERROR
1.1 %

Drawn: Kevin O'Leary			
Scale:	1:1		
Date:	July 2004		
Checked:	James Hodgson		
Revised Details	Issue By	Date	Rev

THE: SECTION 23 LONG
INTERPRETATION
2D-RESISTIVITY PROFILE 23
LONG

JOB: FINGAL LANDFILL SITING
STUDY (SITE B)

Client: RPS-MCOS

Dwg No: 1492/13

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Athy Road,
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Phone: 353-59-9134488
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E-mail: bma@carlowbma.ie

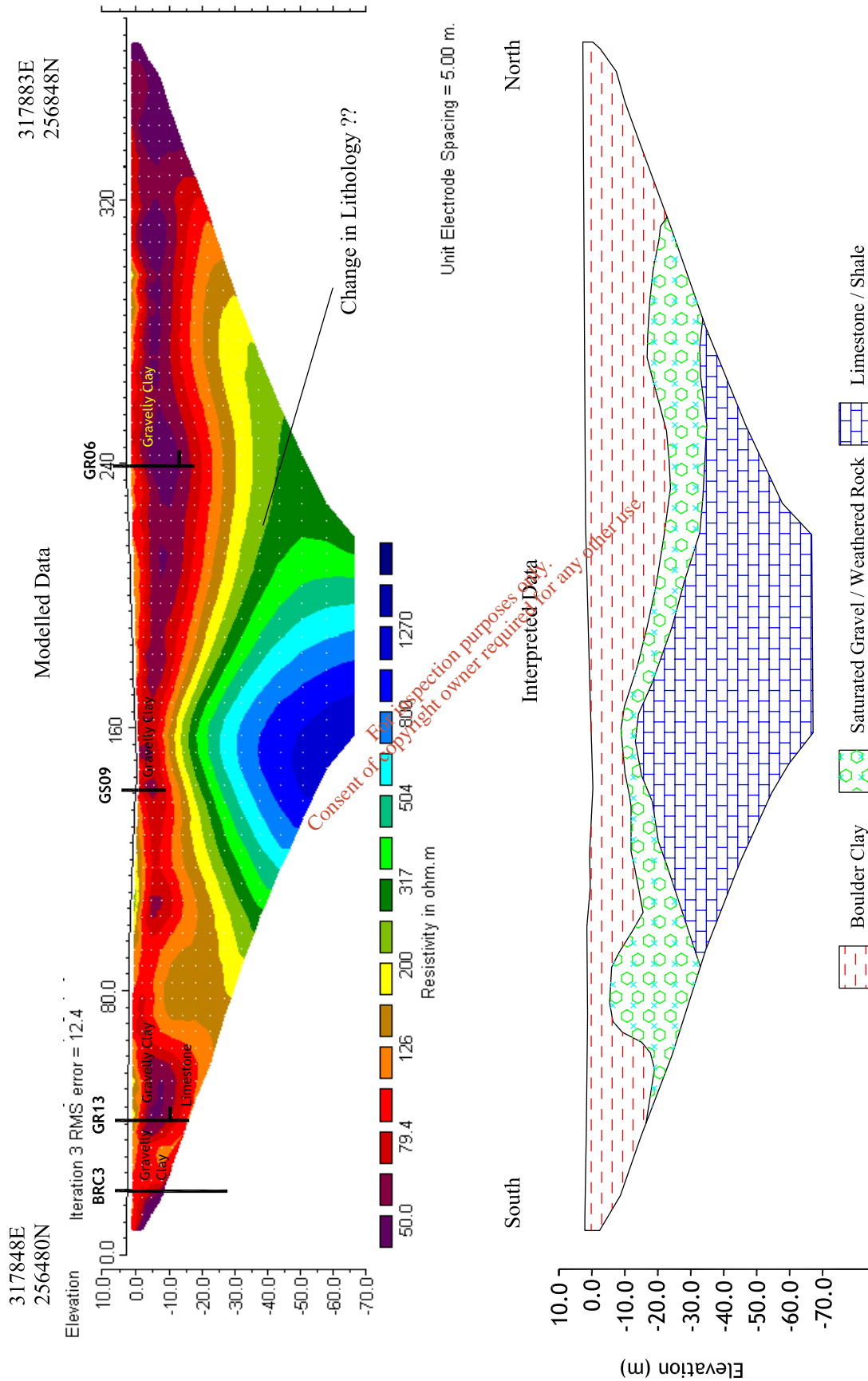
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Appendix B Interpreted Resistivity Sections – EIS 2005

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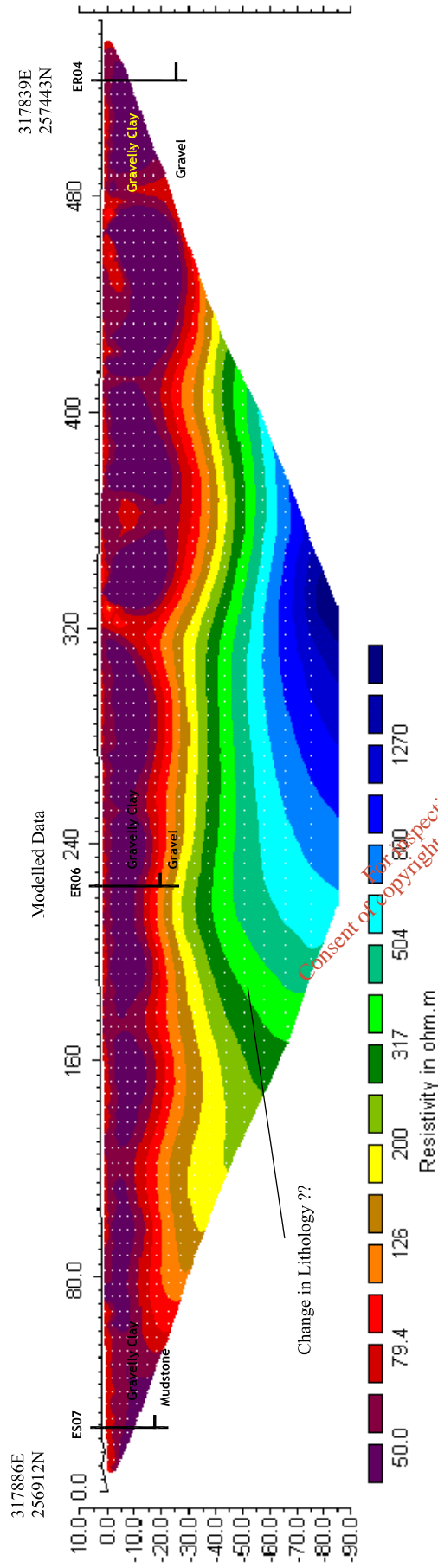
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2D-Resistivity Profile 1A (EIS_2005)



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<p>Drawn: Kevin O'Leary Scale: 1:1250 Date: March 2005 Checked: James Hodgson</p>		<p>Client: RPS-MCOS</p>																	
<p>Revision Details</p> <table border="1"> <thead> <tr> <th>Rev</th> <th>Date</th> <th>By</th> <th>Desc</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>		Rev	Date	By	Desc													<p>Job: FINGAL LANDFILL SITING STUDY (SITE B)</p>	
Rev	Date	By	Desc																
<p>Notes: RMS ERROR 12.4 %</p>		<p>Title: SECTION 1A INTERPRETATION 2D-RESISTIVITY PROFILE 1A (2005)</p>																	
<p>Revision Details</p> <table border="1"> <thead> <tr> <th>Rev</th> <th>Date</th> <th>By</th> <th>Desc</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>		Rev	Date	By	Desc													<p>Dwg No: 1492(2005)R1A</p>	
Rev	Date	By	Desc																

2D-Resistivity Profile 1B (EIS_2005)



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<p>Job: FINGAL LANDFILL SITING STUDY (SITE B)</p>		<p>Client: RPS-MCOS</p>																					
<p>Title: SECTION 1B INTERPRETATION 2D-RESISTIVITY PROFILE 1B (2005)</p>		<p>Client: RPS-MCOS</p>																					
<p>Drawn: Kevin Gavin</p> <p>Scale: N.T.S.</p> <p>Date: March 2005</p> <p>Checked: James Hodgson</p> <p>Based On:</p>		<p>Client: RPS-MCOS</p>																					
<table border="1"> <thead> <tr> <th>Revision Details</th> <th>Issue</th> <th>By</th> <th>Date</th> <th>Rev</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>		Revision Details	Issue	By	Date	Rev																<p>Client: RPS-MCOS</p>	
Revision Details	Issue	By	Date	Rev																			
<p>Notes: RMS ERROR 12.1 %</p>		<p>Client: RPS-MCOS</p>																					
<p>BMA GeoServices Ground Engineering Consultants</p> <p><small>Company/Unit Co.-Innabrehacha</small></p> <p>BMA, Strawhill Business Park, New Road, Cork, Ireland.</p> <p>Phone: 353-56-913488 Mobile: 353-56-913488 Fax: 353-56-913480 E-mail: bma@bma.ie</p>		<p>Client: RPS-MCOS</p>																					

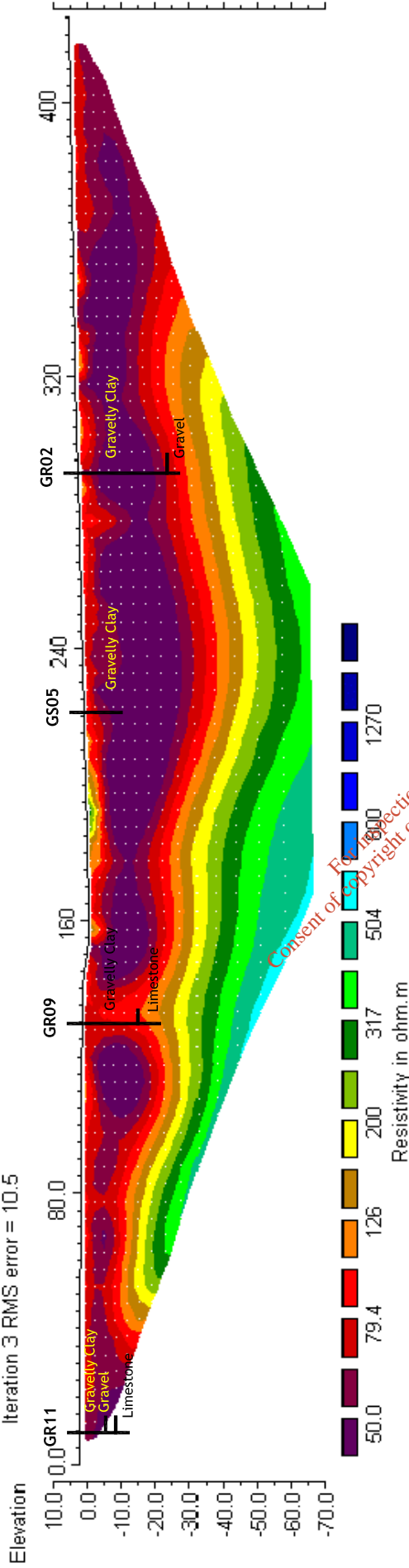
2D-Resistivity Profile 2A (EIS_2005)

317751E
256498N

317696E
256907N

Modelled Data

Iteration 3 RMS error = 10.5

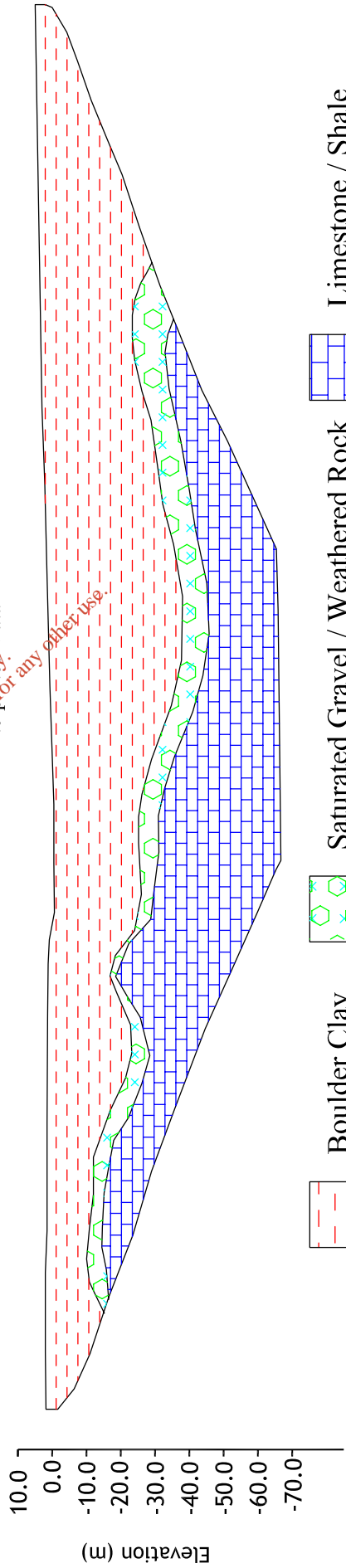


Unit Electrode Spacing = 5.00 m.

South

North

Interpreted Data



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Co. Cork,
Ireland.

Phone: 353-56-913488
FAX: 353-56-913480
E-mail: bma@bma.ie

Notes: RMS ERROR 10.5 %

Revision Details		Revision Details		Revision Details	
Rev	Date	Rev	Date	Rev	Date

Drawn: Kevin Gavin
Scale: 1:1250
Date: March 2005
Checked: James Hodgson
Based On:

Title: SECTION 2A
INTERPRETATION
2D-RESISTIVITY PROFILE
2A 2005

Job: FINGAL LANDFILL SITING
STUDY (SITE B)

Client: RPS-MCOS

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Combairteoir Cú-Imeachbhracha

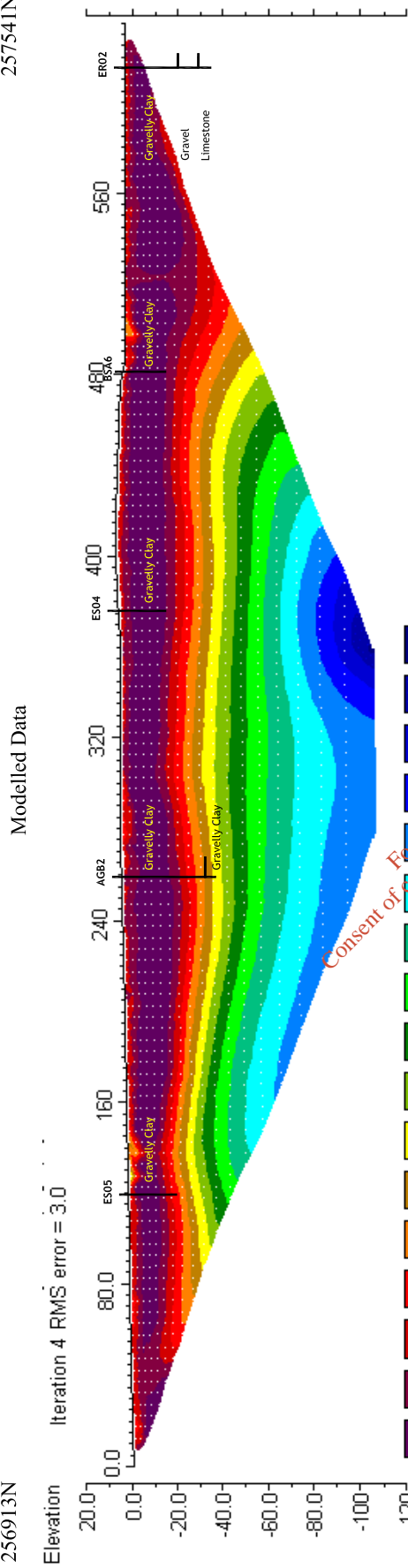
BMA,
Strawhall Business Park,
Moy Road,
Carrigrohane,
Co. Cork,
Ireland.

Phone: 353-56-913488
FAX: 353-56-913480
E-mail: bma@bma.ie

2D-Resistivity Profile 2B (EIS_2005)

317704E
257541N

317735E
256913N

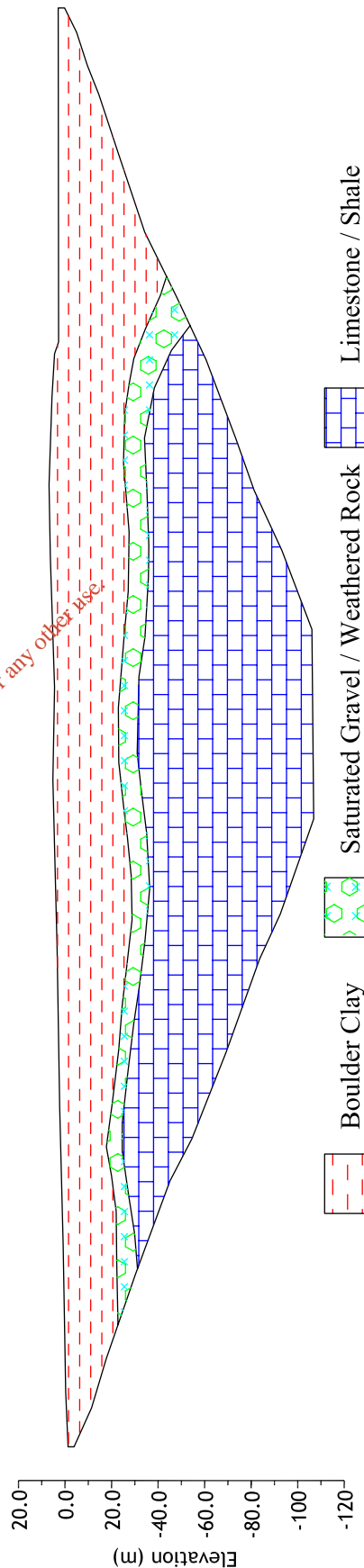


Unit Electrode Spacing = 5.00 m.

North

South

Interpreted Data



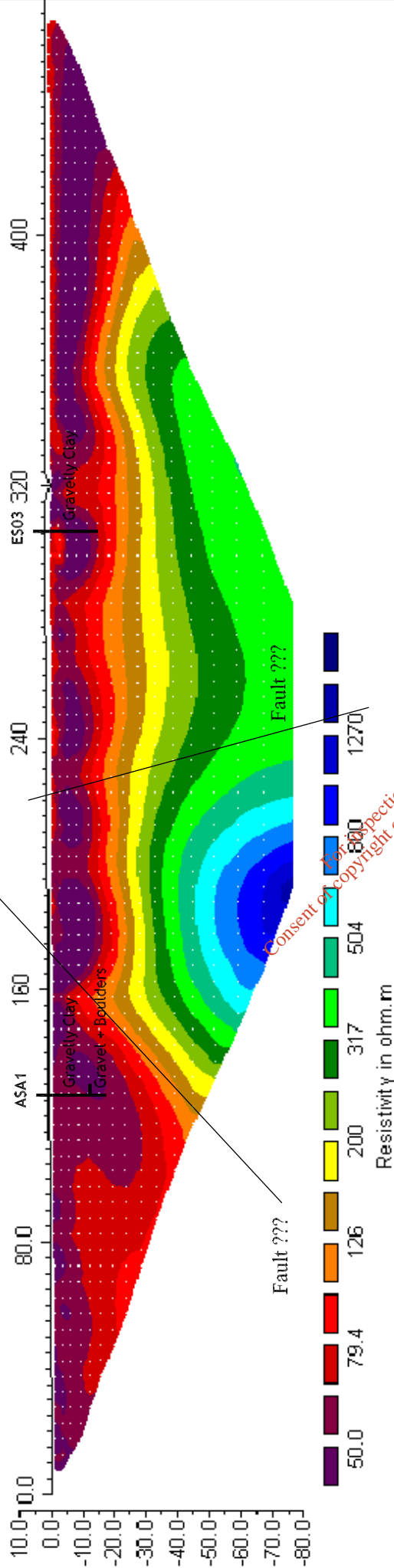
<p>BMA GeoServices Ground Engineering Consultants</p> <p><small>Combairteoir Cú-Imeachtraíochta</small></p> <p>BMA, Strawhill Business Park, 17th Road, Carrigrohane, Inland.</p> <p>Phone: 353-59-913488 FAX: 353-59-913480 E-mail: bma@bma.ie</p>		<p>BMA GeoServices Ground Engineering Consultants</p> <p><small>Combairteoir Cú-Imeachtraíochta</small></p> <p>BMA, Strawhill Business Park, 17th Road, Carrigrohane, Inland.</p> <p>Phone: 353-59-913488 FAX: 353-59-913480 E-mail: bma@bma.ie</p>																	
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Rev	Date	By	For																
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Rev	Date	By	For																

2D-Resistivity Profile 3 (EIS_2005)

318053E
257020N

317979E
257460N

Modelled Data

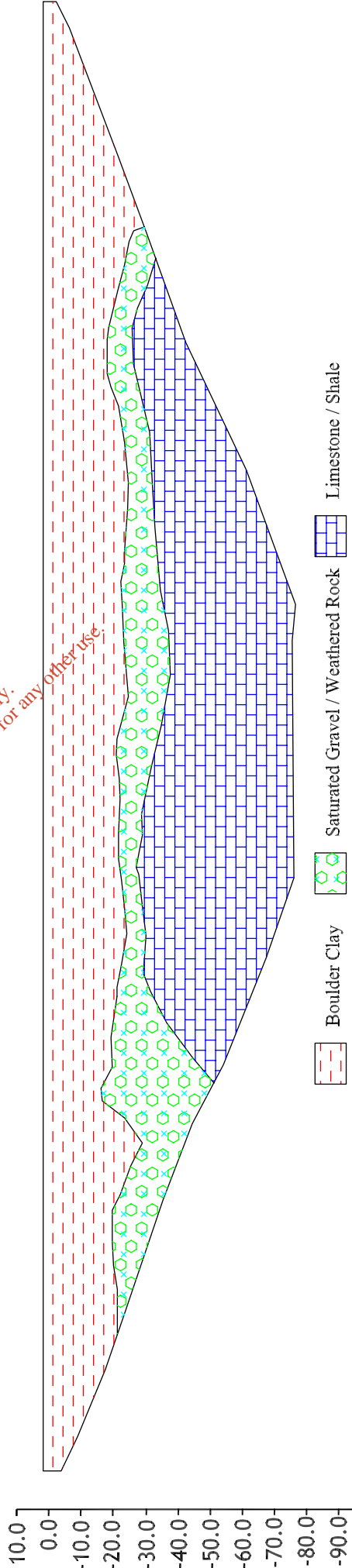


Unit Electrode Spacing = 5.00 m.

South

Interpreted Data

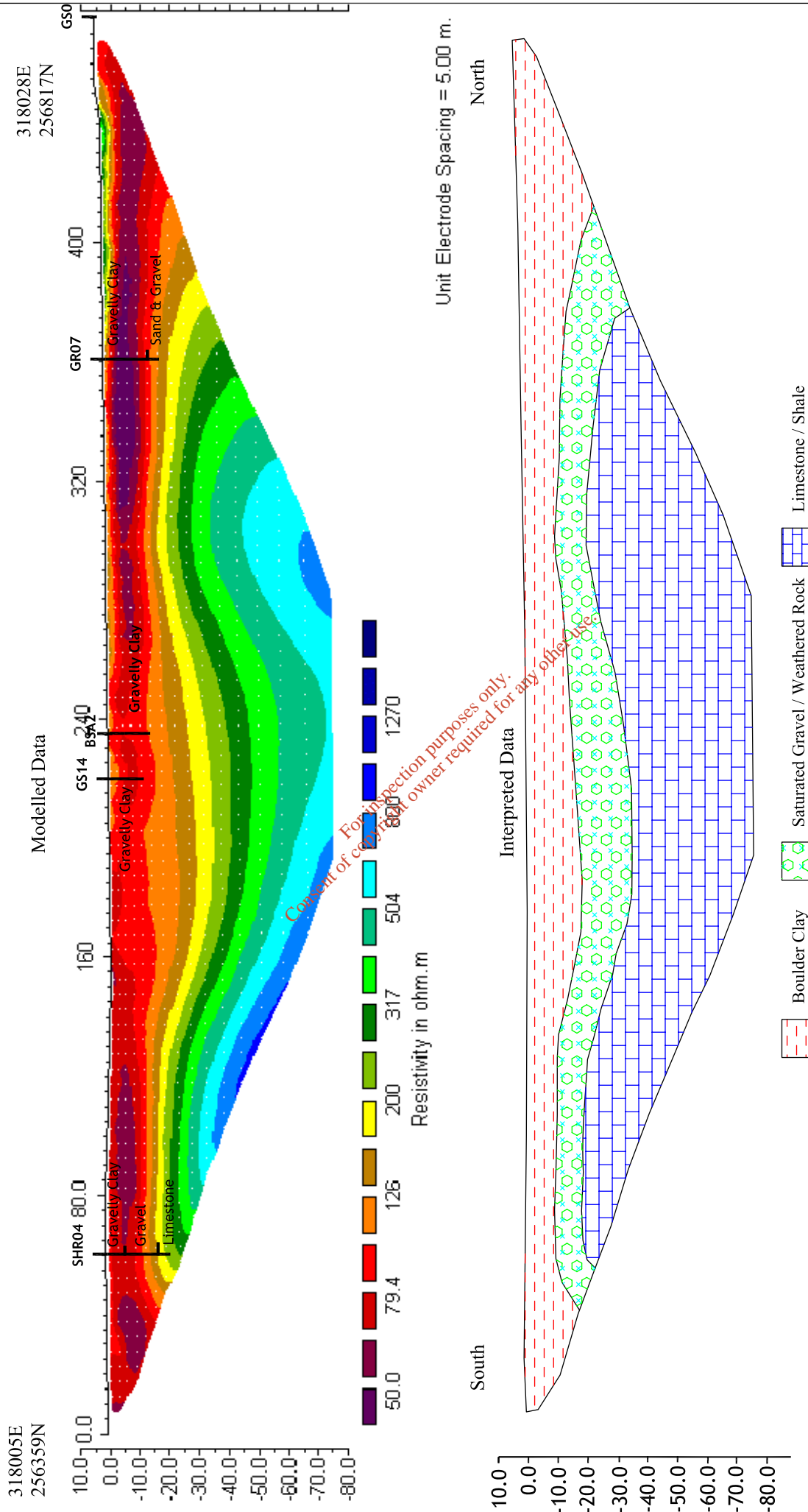
North



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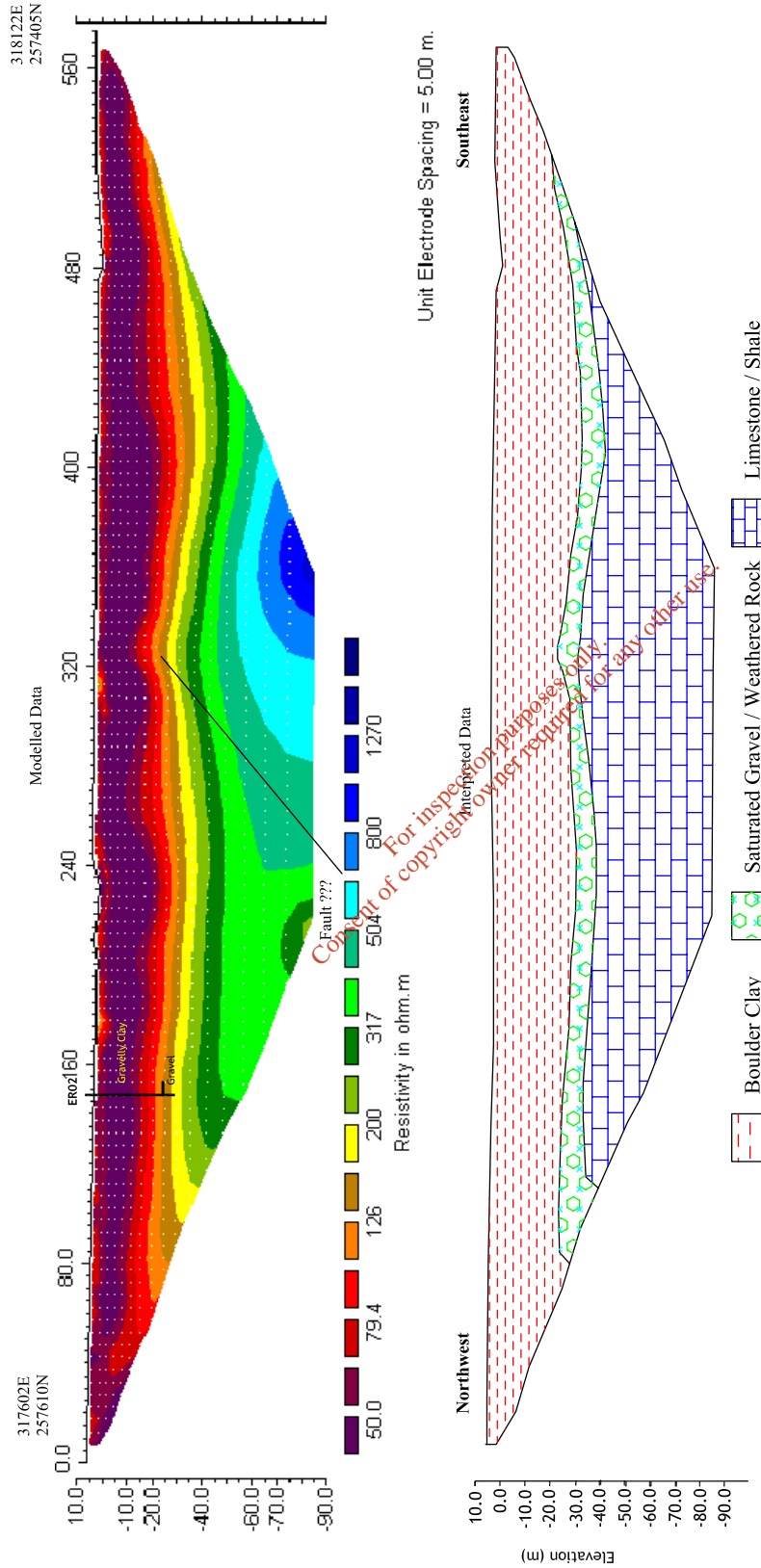
<p>BMA GeoServices Ground Engineering Consultants</p> <p>BMA, Strawhall Business Park, Mill Road, Carrow, Drogheda, Co. Dub. Ireland.</p> <p>Phone: 353-56-913488 FAX: 353-56-913480 E-mail: bma@bma.ie</p>	<p>BMA GeoServices Ground Engineering Consultants</p> <p>BMA, Strawhall Business Park, Mill Road, Carrow, Drogheda, Co. Dub. Ireland.</p> <p>Phone: 353-56-913488 FAX: 353-56-913480 E-mail: bma@bma.ie</p>	<p>Client: RPS-MCOS</p> <p>Job: FINGAL LANDFILL SITING STUDY (SITE B)</p> <p>Title: SECTION 3 INTERPRETATION 2D-RESISTIVITY PROFILE 3 (2005)</p> <p>Drawn: Kevin O'Leary Scale: 1:1250 Date: March 2005 Checked: James Hodgson</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">Revision Details</th> <th>Issue By</th> <th>Date</th> <th>Rev</th> </tr> </thead> <tbody> <tr> <td>James Hodgson</td> <td>James Hodgson</td> <td>James Hodgson</td> <td>James Hodgson</td> <td>James Hodgson</td> </tr> <tr> <td>James Hodgson</td> <td>James Hodgson</td> <td>James Hodgson</td> <td>James Hodgson</td> <td>James Hodgson</td> </tr> <tr> <td>James Hodgson</td> <td>James Hodgson</td> <td>James Hodgson</td> <td>James Hodgson</td> <td>James Hodgson</td> </tr> </tbody> </table>	Revision Details		Issue By	Date	Rev	James Hodgson	James Hodgson	James Hodgson	James Hodgson	James Hodgson	James Hodgson	James Hodgson	James Hodgson	James Hodgson	James Hodgson	James Hodgson	James Hodgson	James Hodgson	James Hodgson	James Hodgson	<p>Notes: RMS ERROR 4.1 %</p>
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2D-Resistivity Profile 3B (EIS_2005)



<p>BMA GeoServices Ground Engineering Consultants</p> <p>BMA, Stewball Business Park, Stewball Road, Carron, Inverclyde, Glasgow, Scotland, G81 1XU</p> <p>Phone: 01463-5513488 Fax: 01463-5513480 E-mail: bma@bma.ie</p>		<p>BMA GeoServices Ground Engineering Consultants</p> <p>BMA, Stewball Business Park, Stewball Road, Carron, Inverclyde, Glasgow, Scotland, G81 1XU</p> <p>Phone: 01463-5513488 Fax: 01463-5513480 E-mail: bma@bma.ie</p>																																																																													
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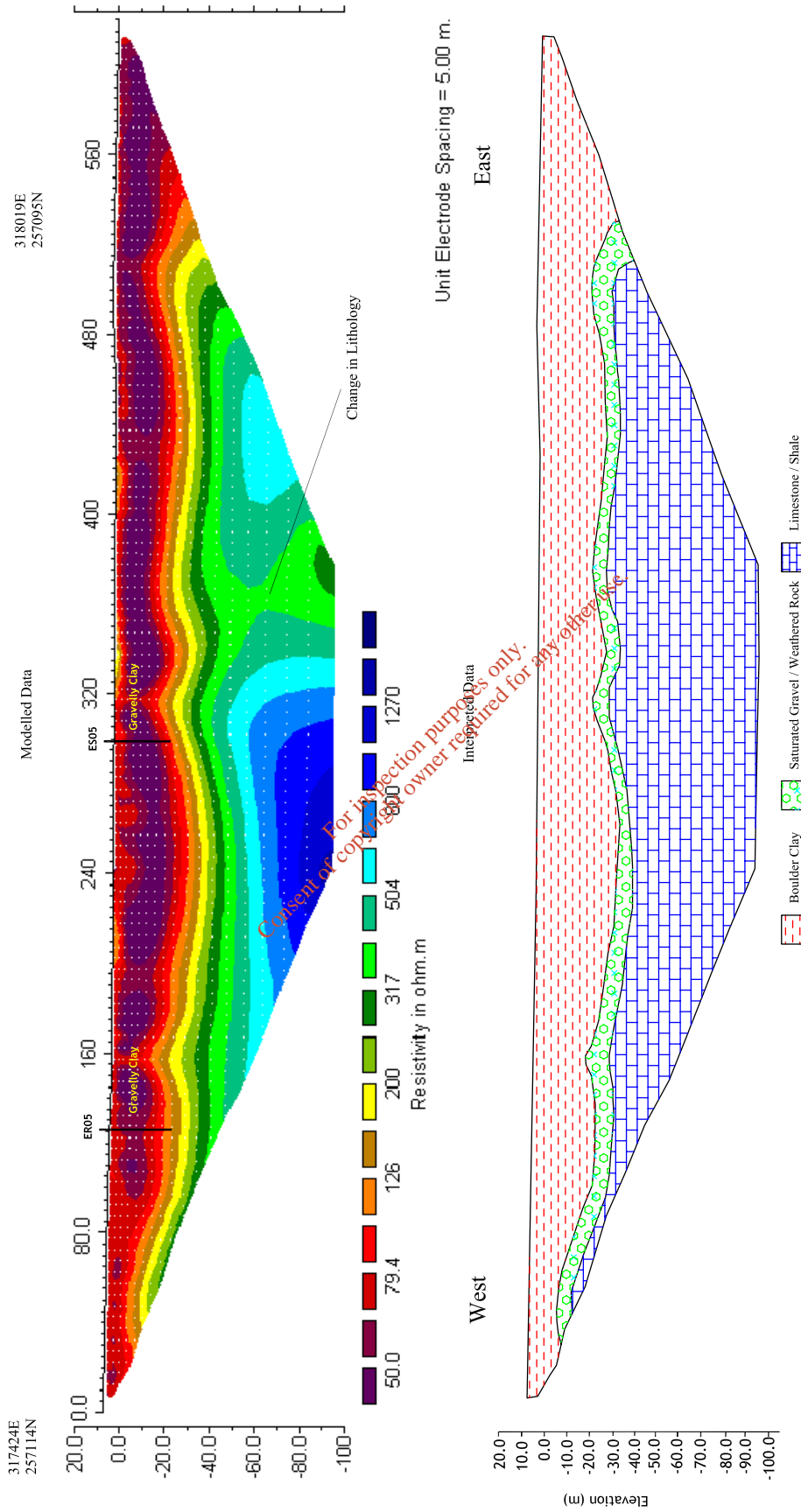
2D-Resistivity Profile 4 (EIS_2005)



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<p>Drawn: Kevin Gavin</p> <p>Scale: 1:2,000</p> <p>Date: March 2005</p> <p>Checked: James Hodgson</p> <p>Based On:</p>		<p>Revision Details</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Revision Details</th> <th>Issue</th> <th>By</th> <th>Date</th> <th>Rev</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>		Revision Details	Issue	By	Date	Rev															
Revision Details	Issue	By	Date	Rev																			

2D-Resistivity Profile 5 (EIS_2005)



BMA GeoServices
Ground Engineering Consultants
Combairteoir Cú-Imeachbhracha

BMA,
Strawhall Business Park,
Strawhall Road,
Carlow,
Ireland.

Phone: 353-59-913488
FAX: 353-59-913480
E-mail: bma@bma.ie

Notes:

RMS ERROR 4.4 %

Revision Details		Revision Details		Revision Details	
Rev	Date	Rev	Date	Rev	Date

Drawn:	Kevin Gavin
Scale:	1:2000
Date:	March 2005
Checked:	James Hodgson
Based On:	

Title:

SECTION 5
INTERPRETATION
2D-RESISTIVITY PROFILE
5(2005)

Job:

FINGAL LANDFILL SITING
STUDY (SITE B)

Client:

RPS-MCOS

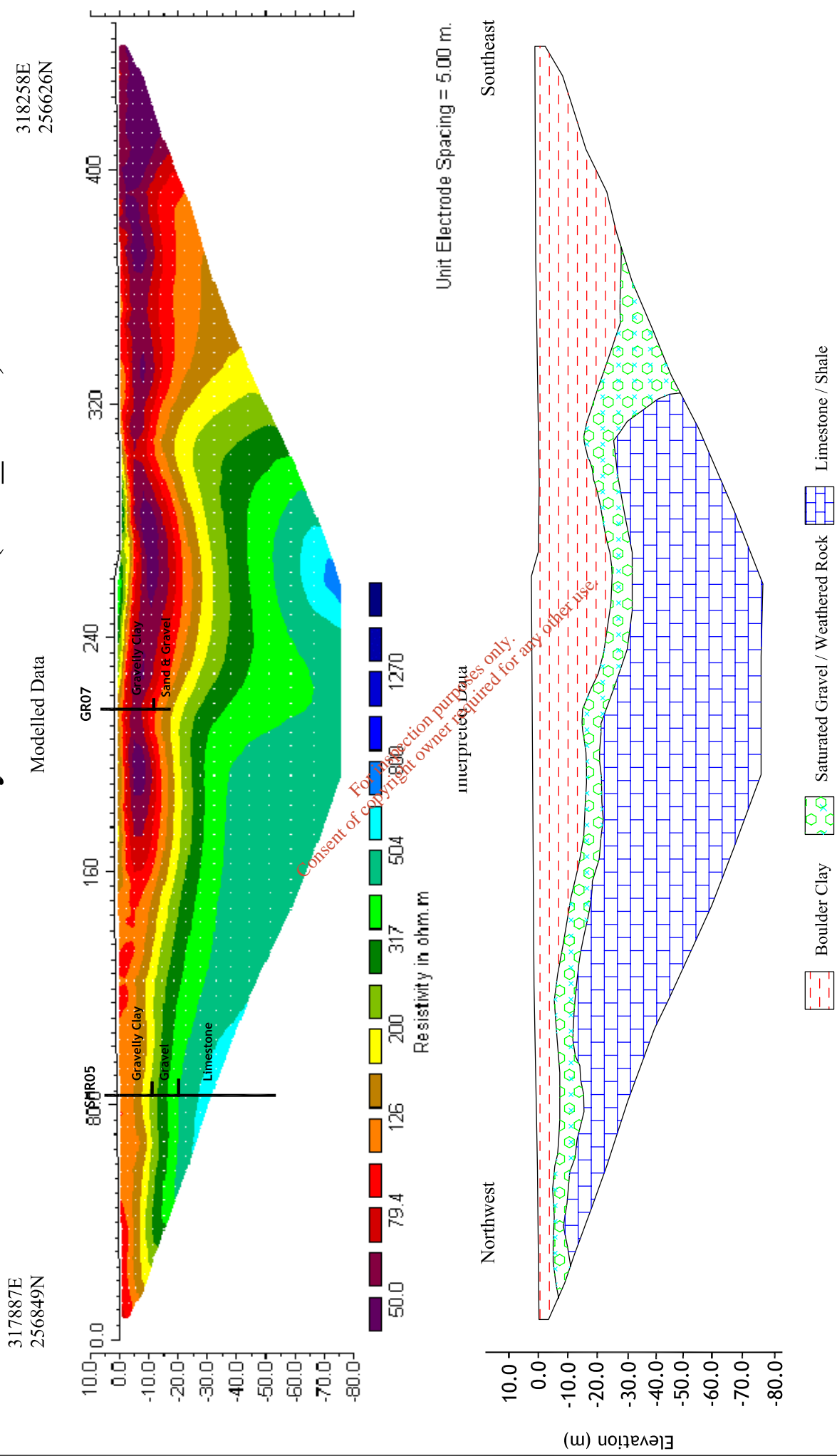
BMA GeoServices
Ground Engineering Consultants
Combairteoir Cú-Imeachbhracha

BMA,
Strawhall Business Park,
Strawhall Road,
Carlow,
Ireland.

Phone: 353-59-913488
FAX: 353-59-913480
E-mail: bma@bma.ie

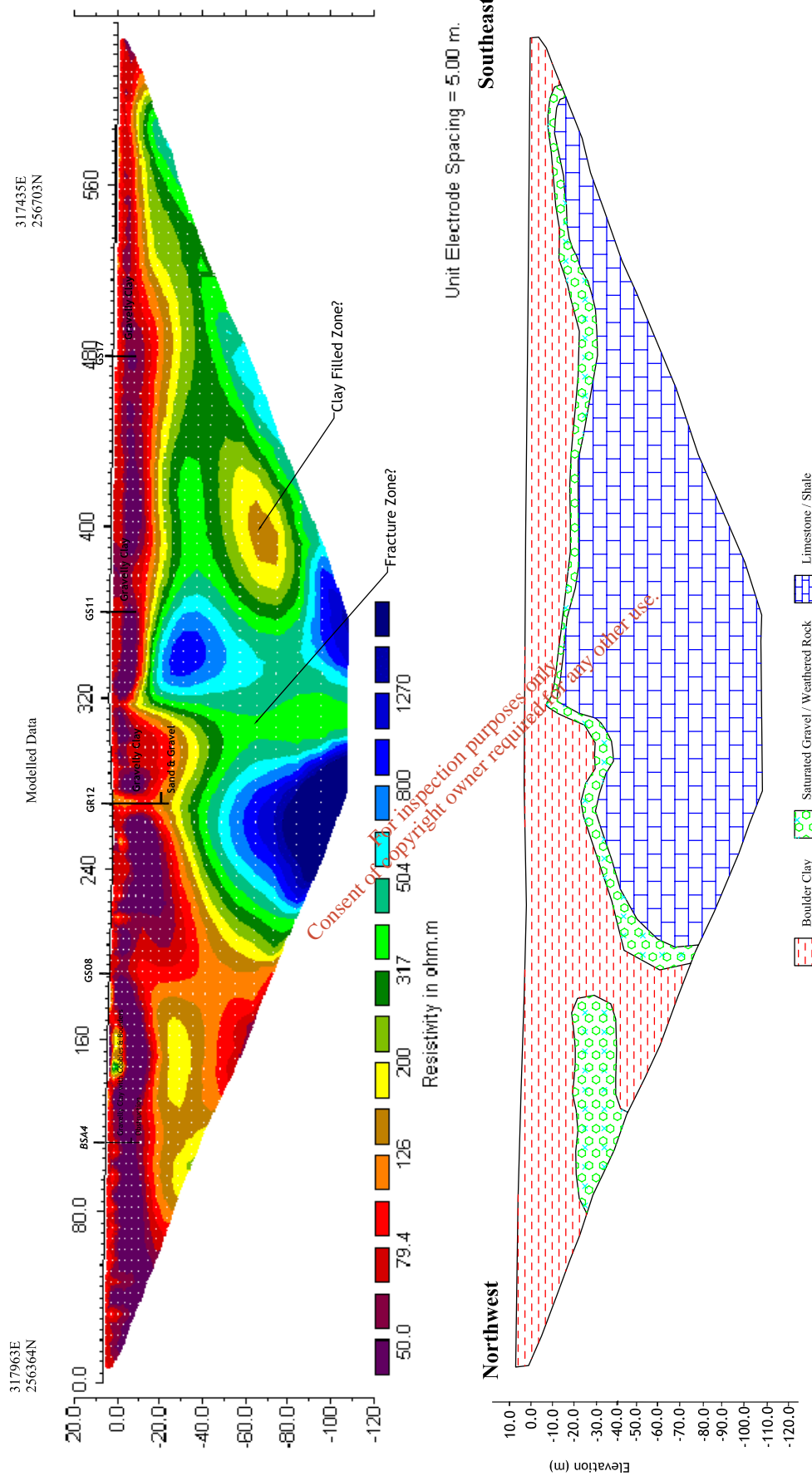
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2D-Resistivity Profile 5B (EIS_2005)



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2D-Resistivity Profile 6 (EIS_2005)



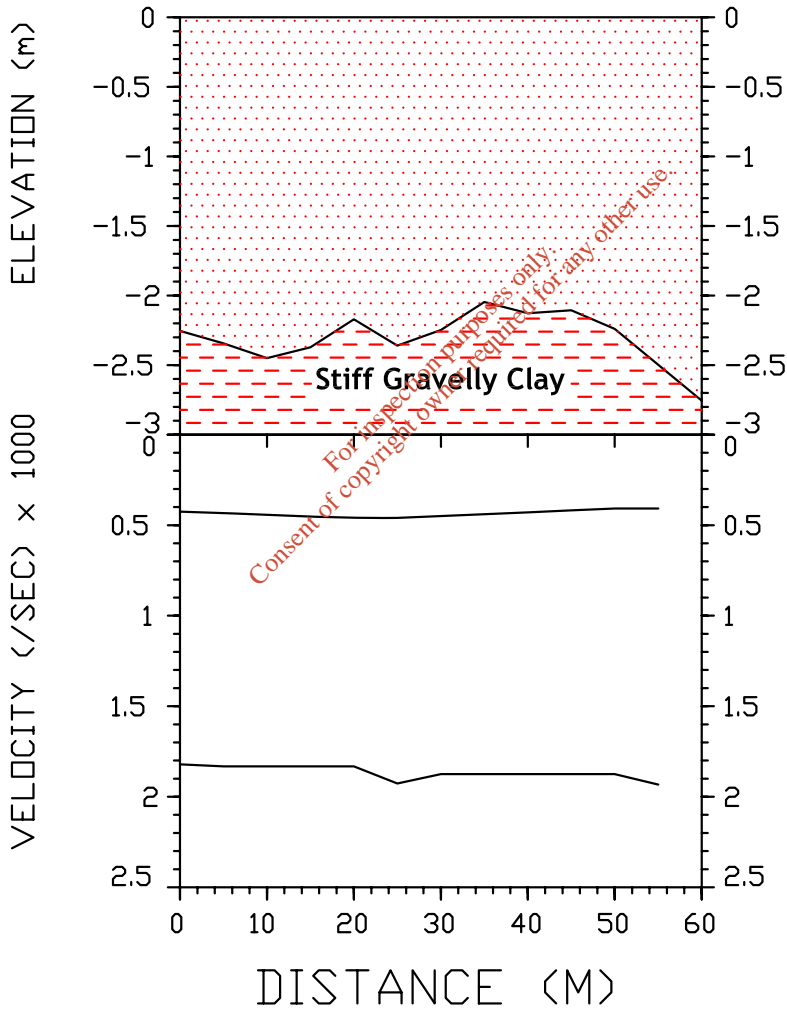
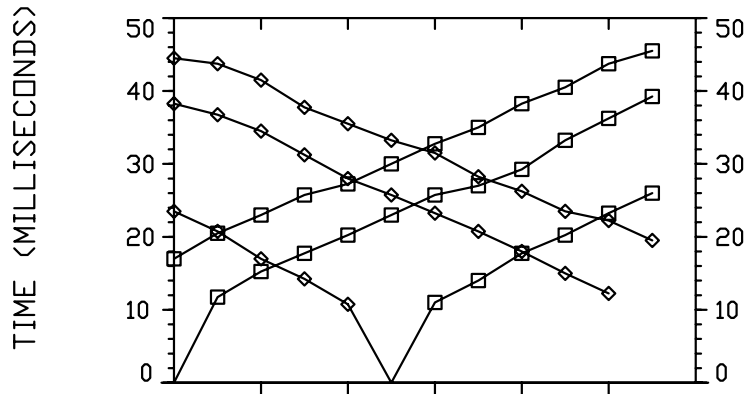
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<p>Client: RPS-MCOS</p>		<p>Client: RPS-MCOS</p>	
<p>Job: FINGAL LANDFILL SITING STUDY (SITE B)</p>		<p>Job: FINGAL LANDFILL SITING STUDY (SITE B)</p>	
<p>Title: SECTION 6 INTERPRETATION 2D-RESISTIVITY PROFILE 6(2005)</p>		<p>Title: SECTION 6 INTERPRETATION 2D-RESISTIVITY PROFILE 6(2005)</p>	
<p>Drawn: Kevin Gavin Scale: 1:2,000 Date: March 2005 Checked: James Hodgson</p>		<p>Drawn: Kevin Gavin Scale: 1:2,000 Date: March 2005 Checked: James Hodgson</p>	
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Revision Description	Revision Description	Revision Description	Revision Description
Revision By	Revision By	Revision By	Revision By
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<p>BMA GeoServices Ground Engineering Consultants</p> <p>BMA, Stewball Business Park, Stewball Road, Carrigrohane, Cork, Ireland.</p> <p>Phone: 353-56-913488 Mobile: 353-56-913480 Fax: 353-56-913480 E-mail: bma@bma.ie</p>		<p>BMA GeoServices Ground Engineering Consultants</p> <p>BMA, Stewball Business Park, Stewball Road, Carrigrohane, Cork, Ireland.</p> <p>Phone: 353-56-913488 Mobile: 353-56-913480 Fax: 353-56-913480 E-mail: bma@bma.ie</p>	

Appendix C Interpreted Seismic Refraction Sections

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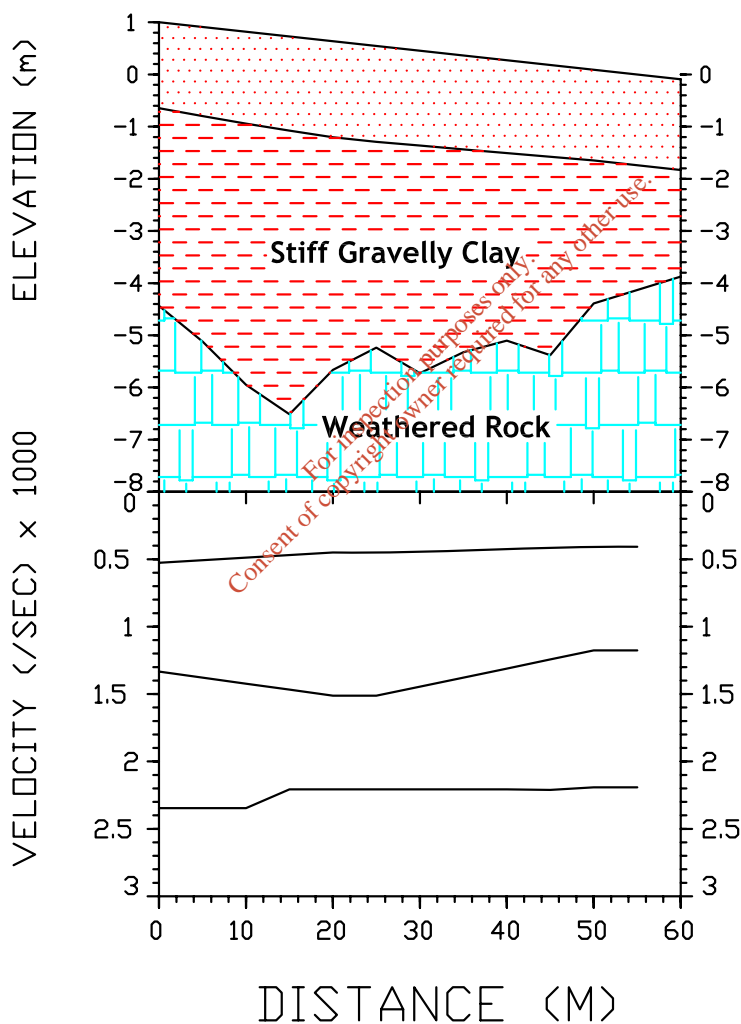
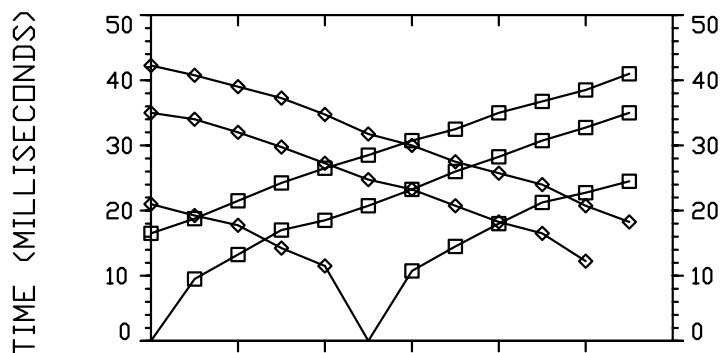
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Spread 1B



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Data Set: SB1	Date: 10/FEB/1999	Azimuth: S-N	
Equipment: GEOMETRICS Sna	Spread: 1		

Spread 2B



for RPSMCOS

by: BMA GeoServices Ltd.

Data Set: SB2

Date: 10/FEB/199

Equipment: GEOMETRICS Sna

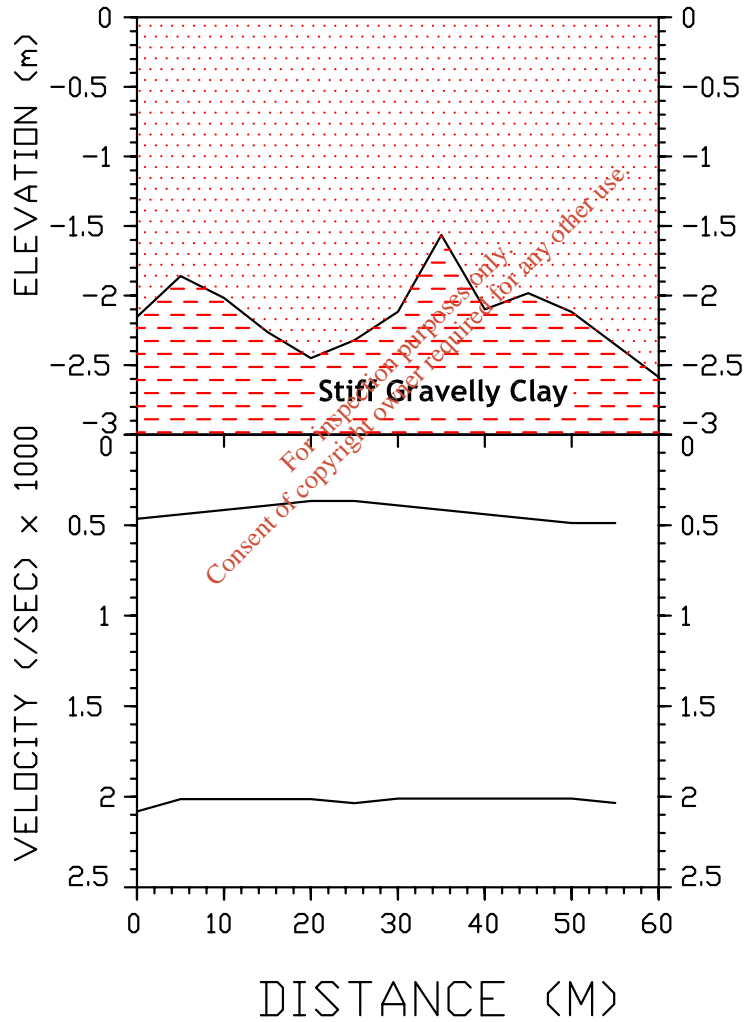
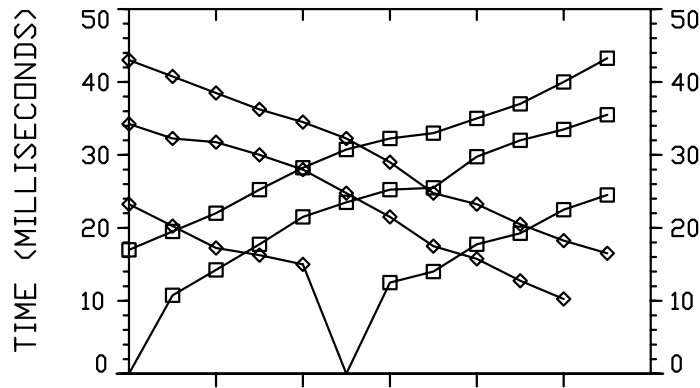
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Fingal Landfill

Site B
DUBLIN

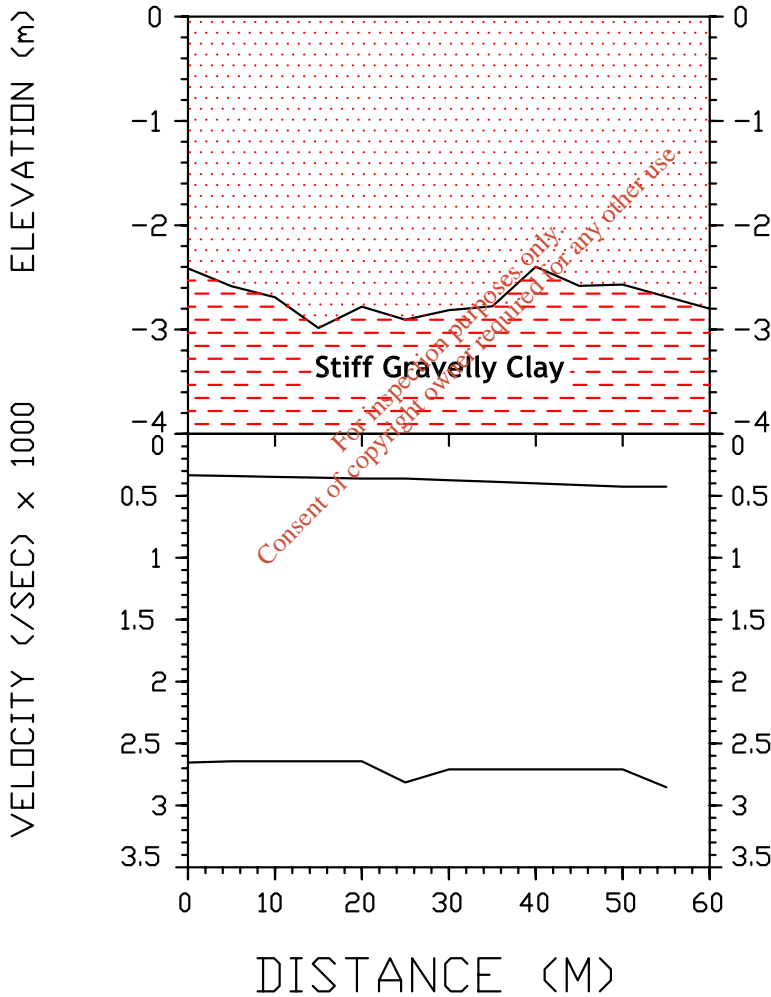
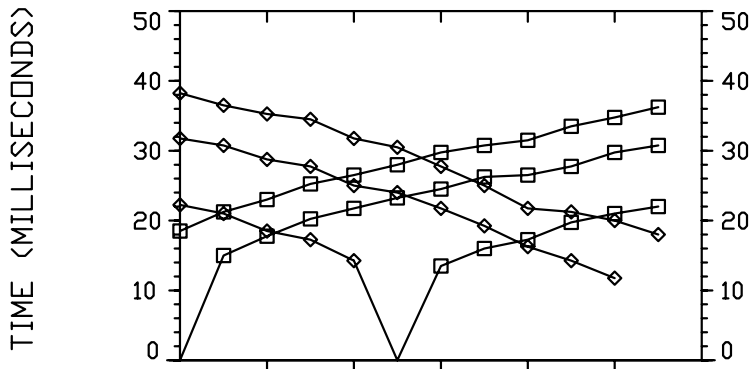
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Spread 3B



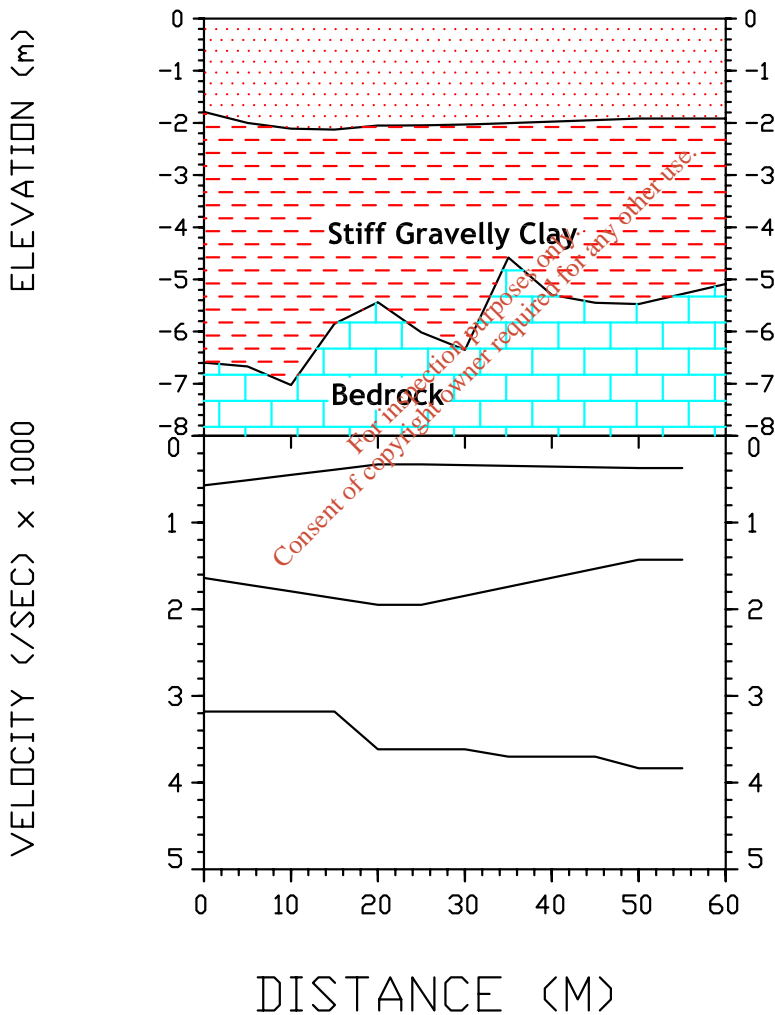
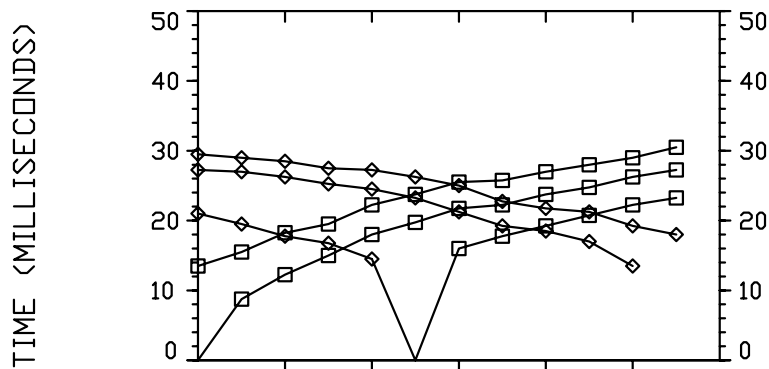
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Spread 4B



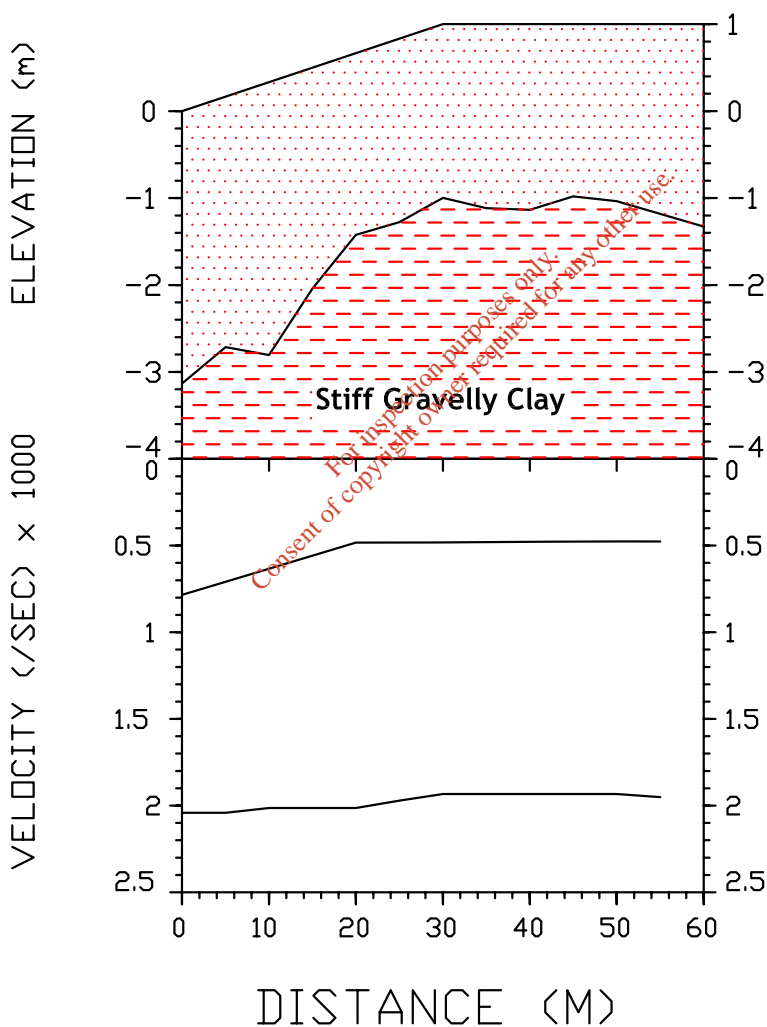
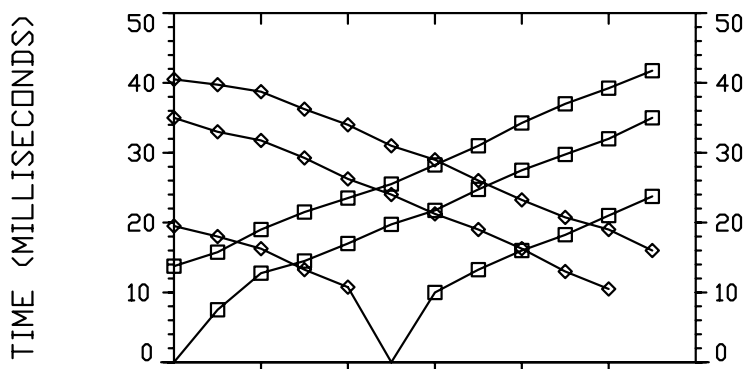
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Spread 5B



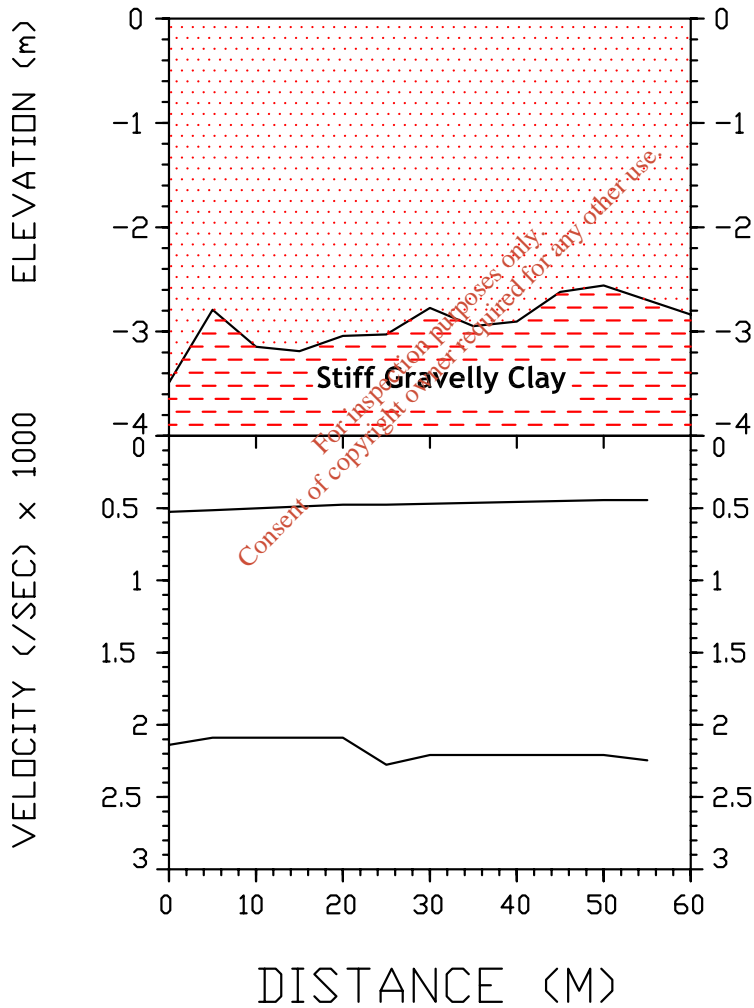
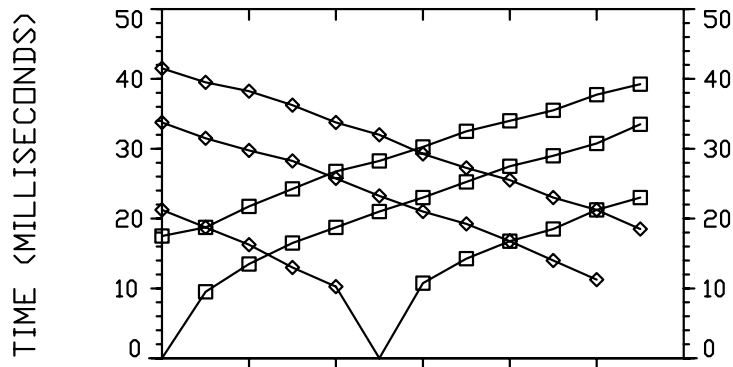
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Spread 6B



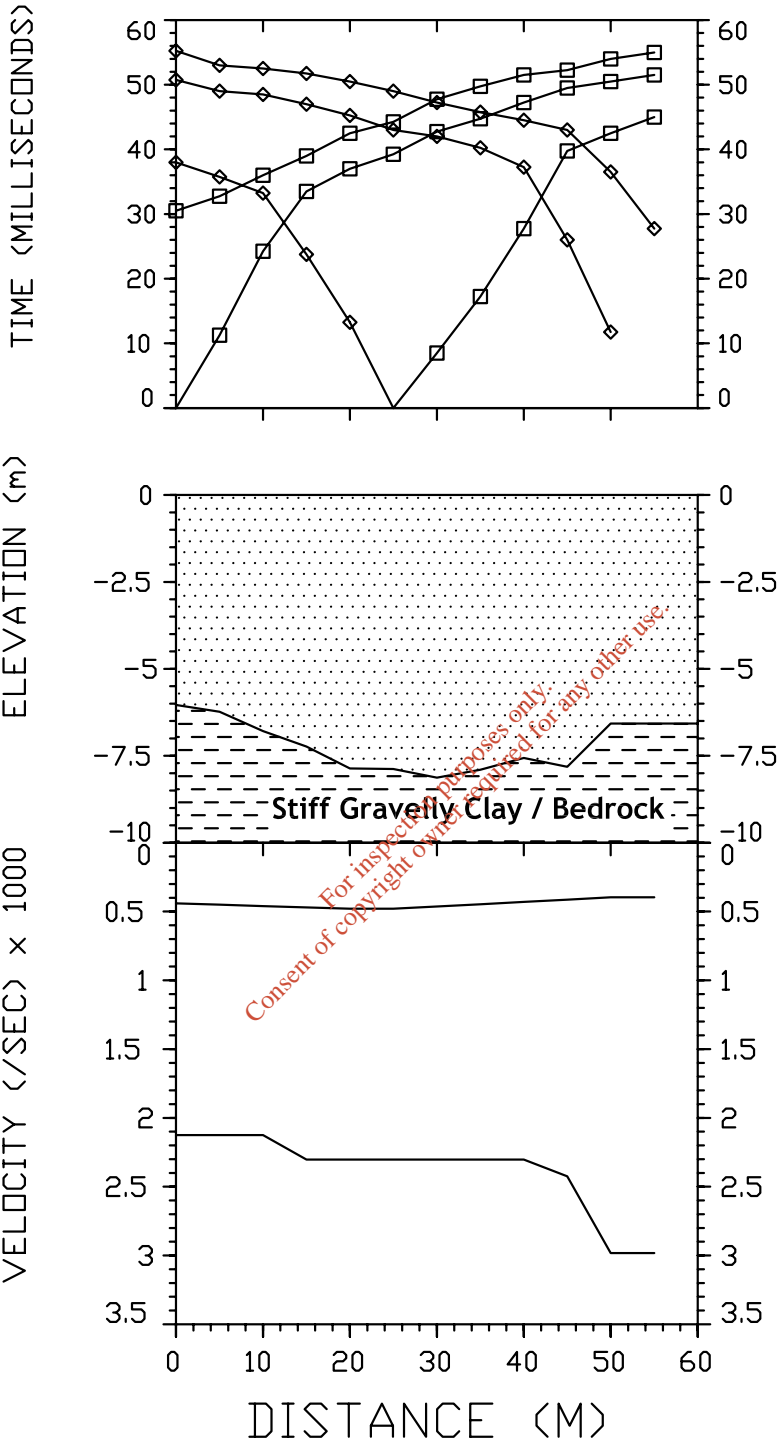
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Spread 7B



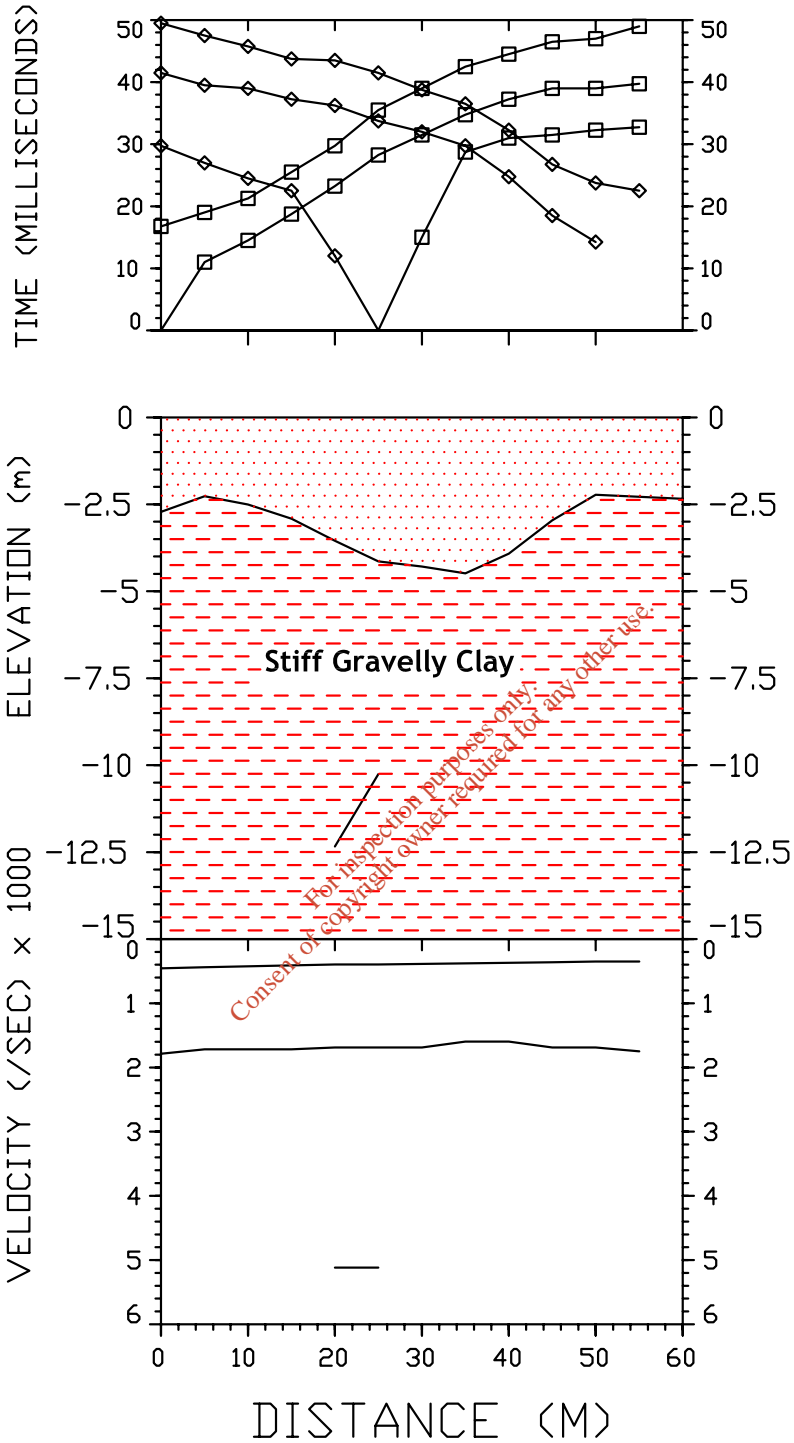
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Spread 8B



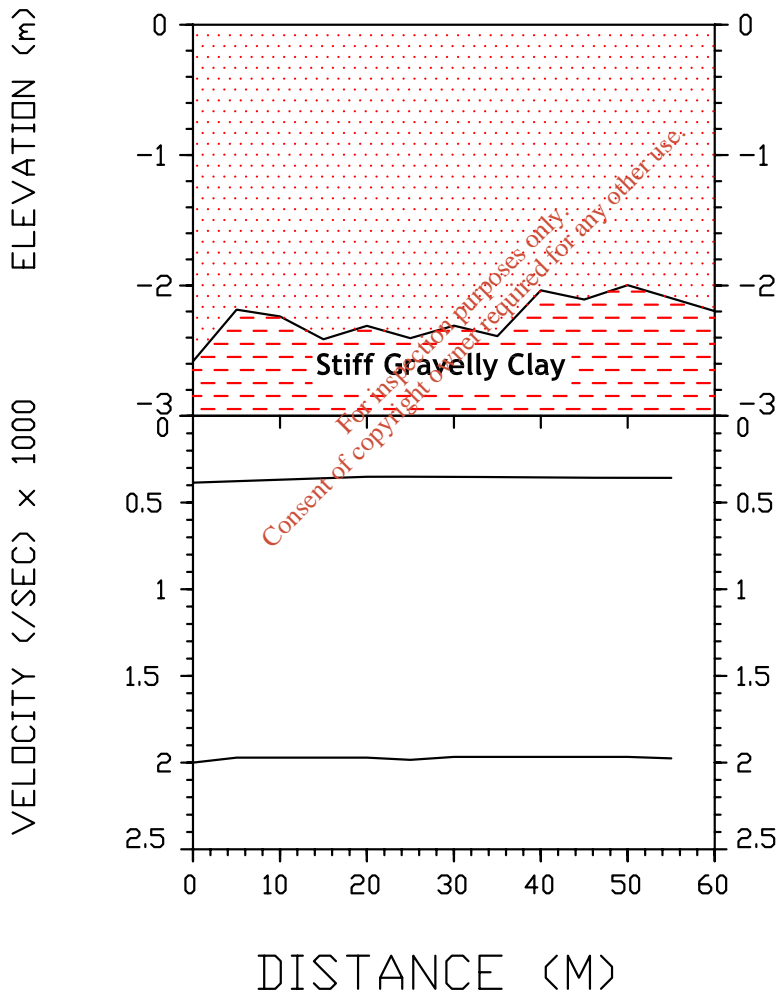
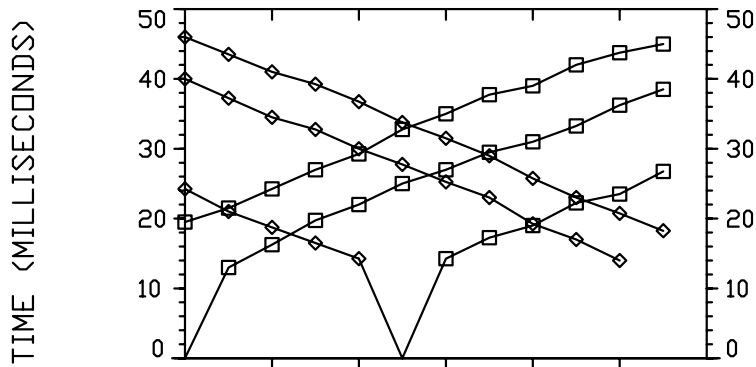
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Spread 9B



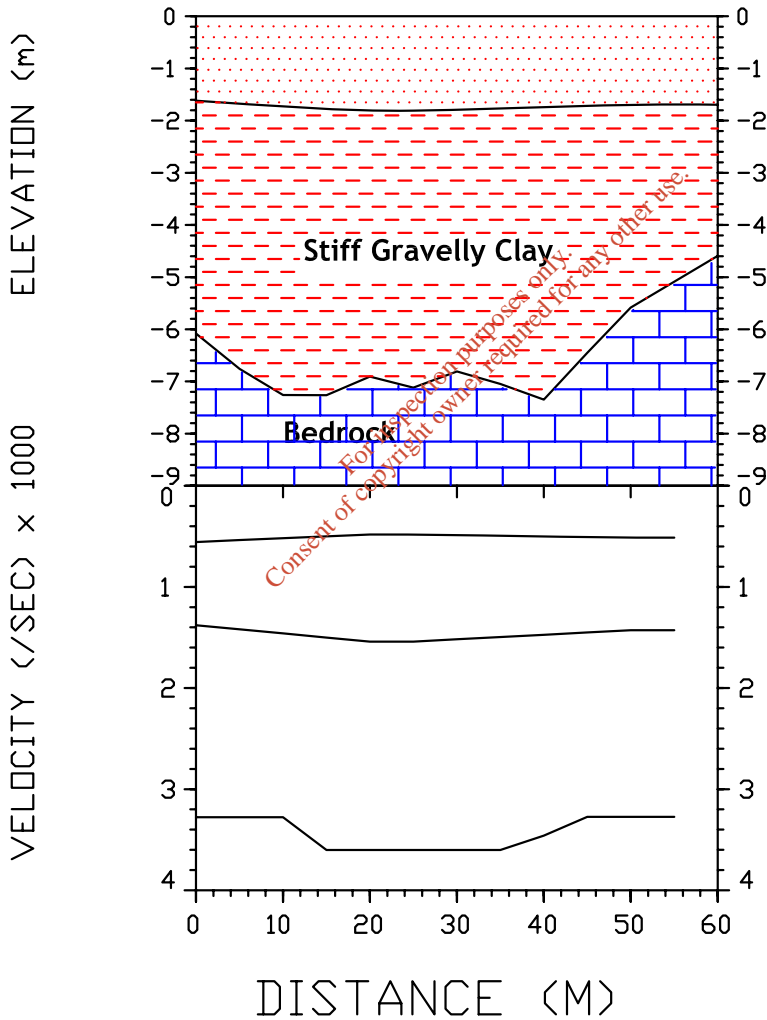
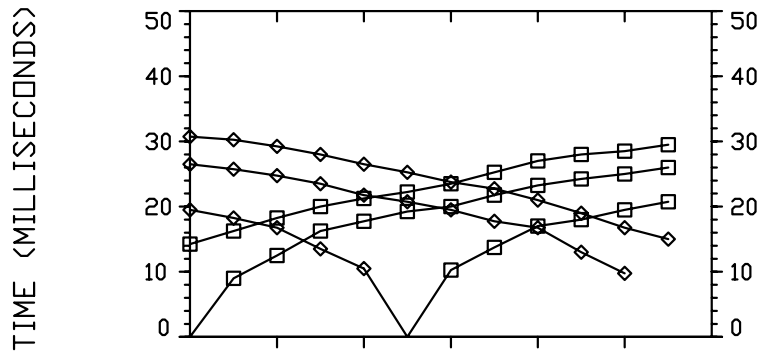
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Spread 10B



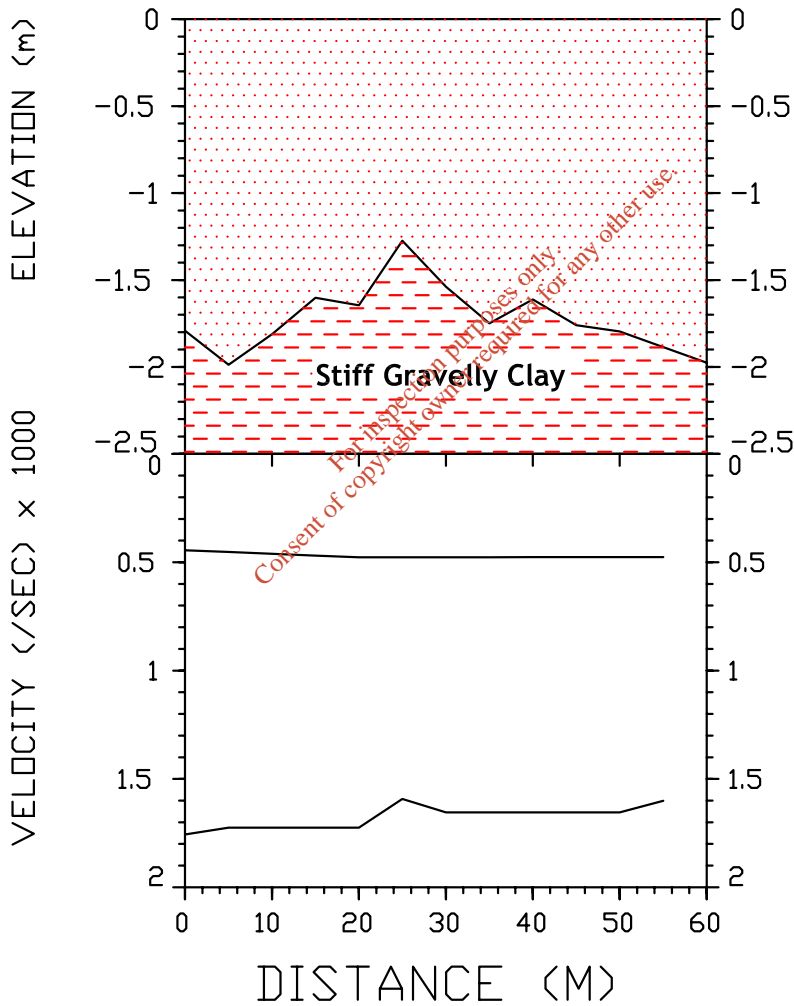
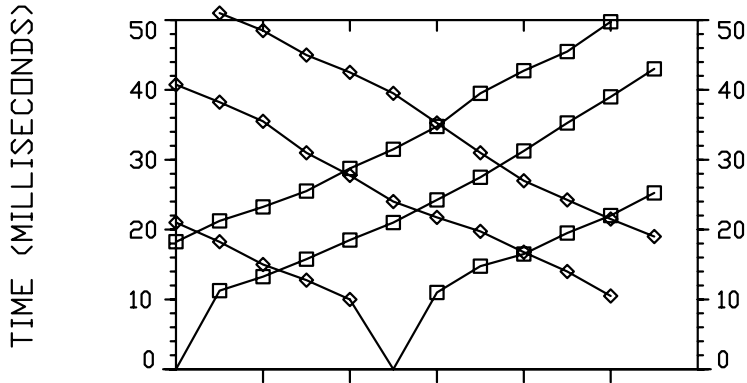
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Spread 11B



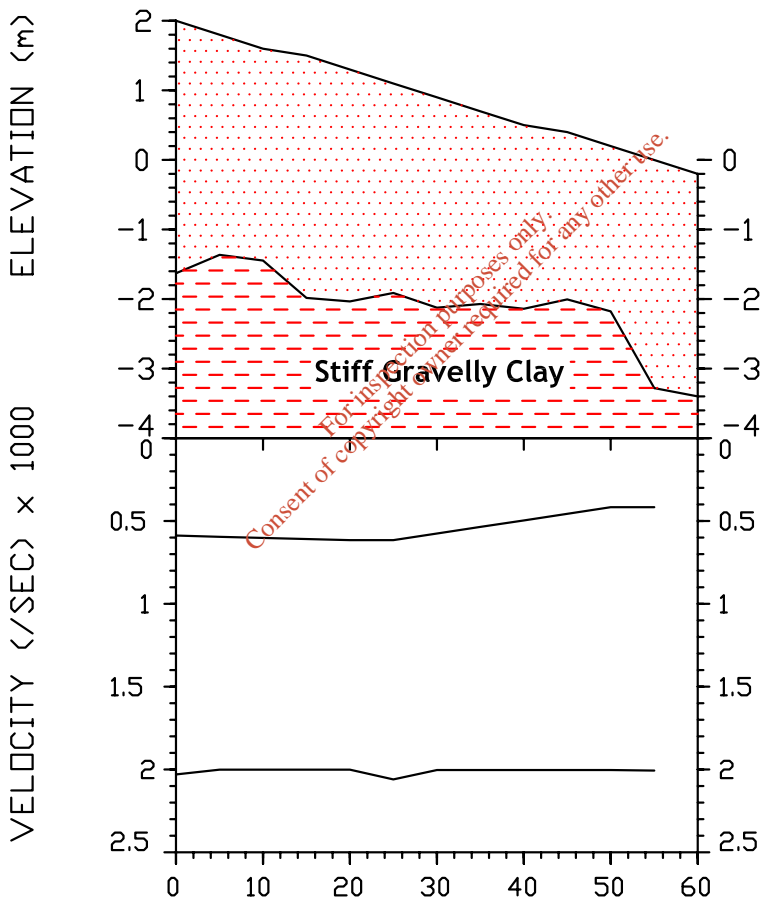
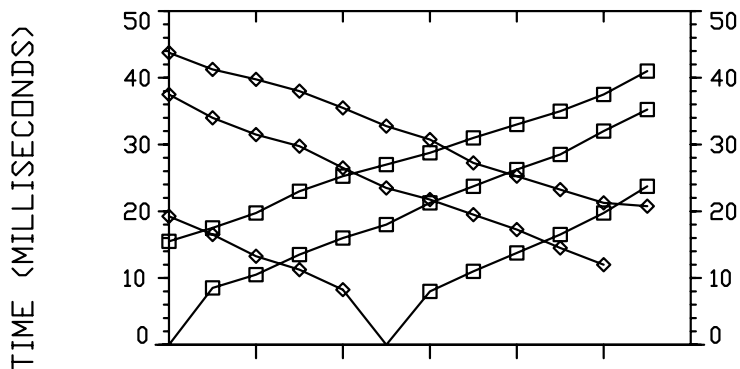
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Spread 12B



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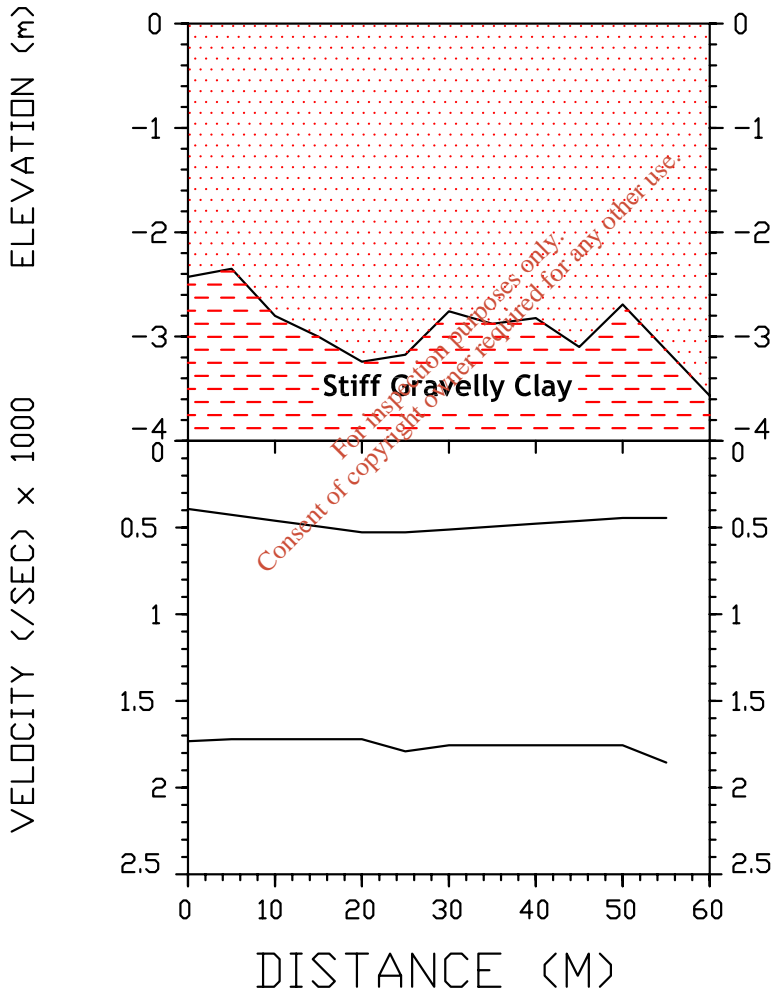
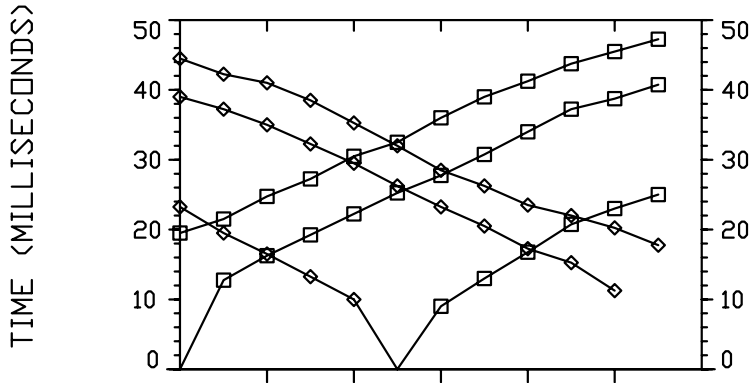
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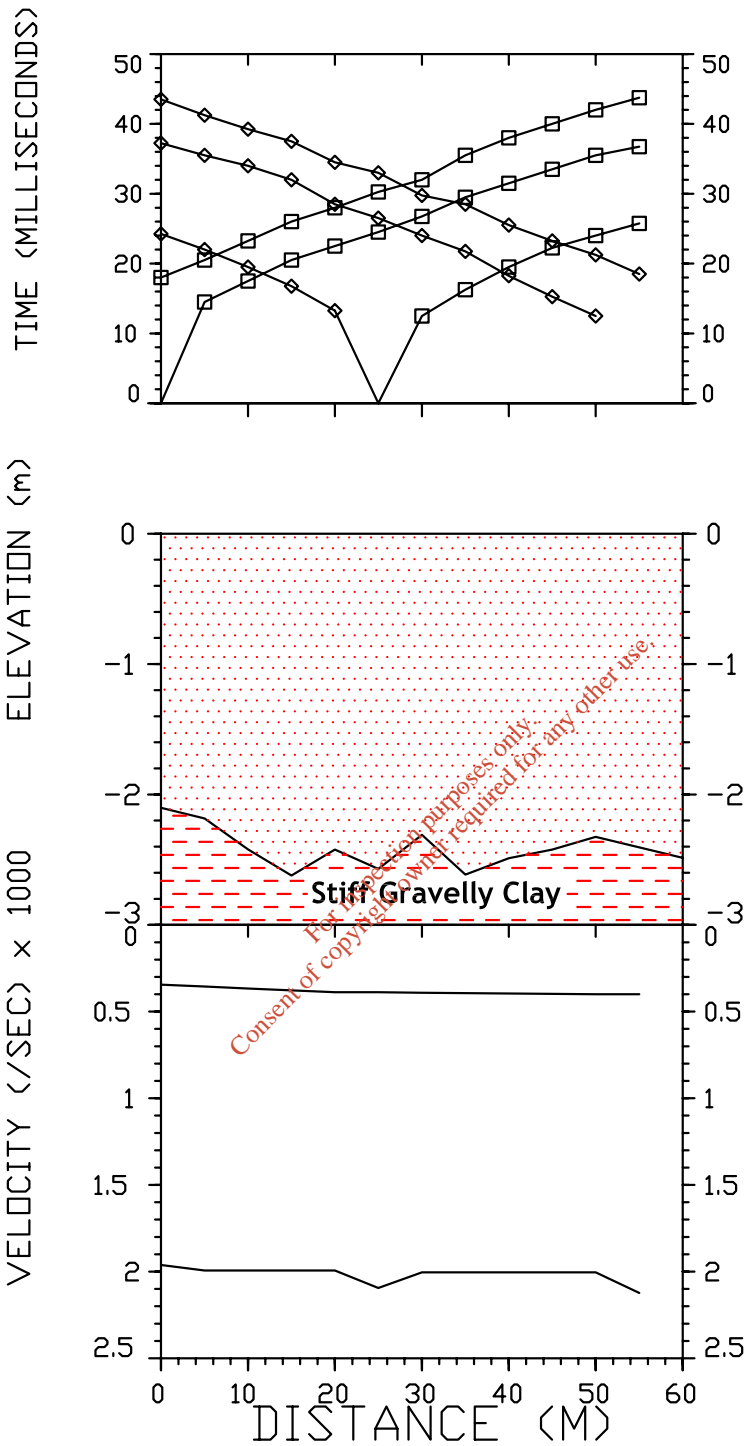
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Equipment: GEOMETRICS Sna	Spread: 13		

Spread 14B



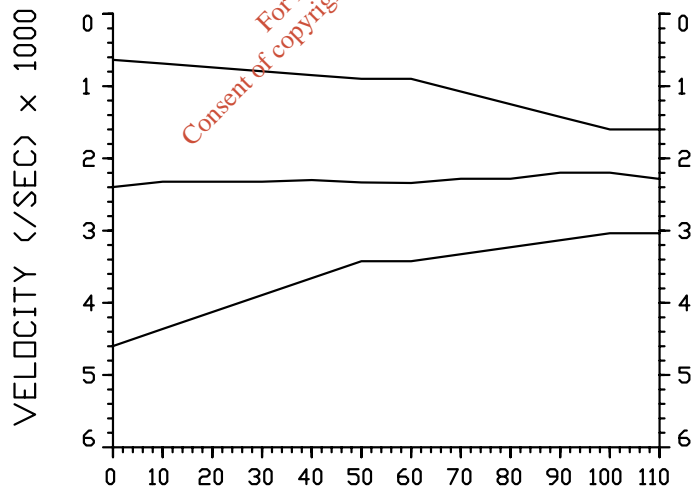
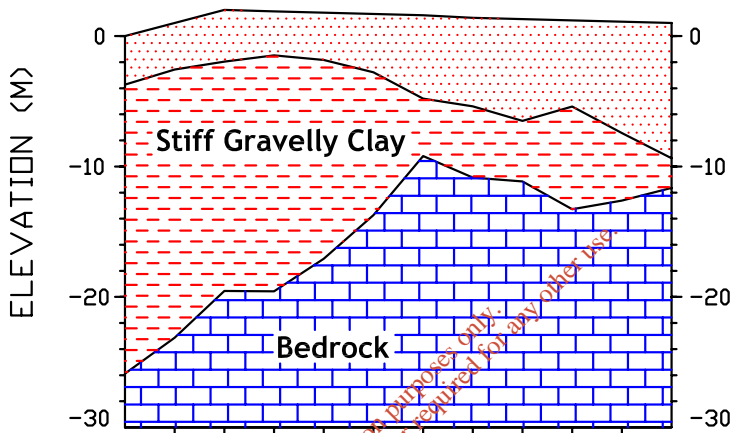
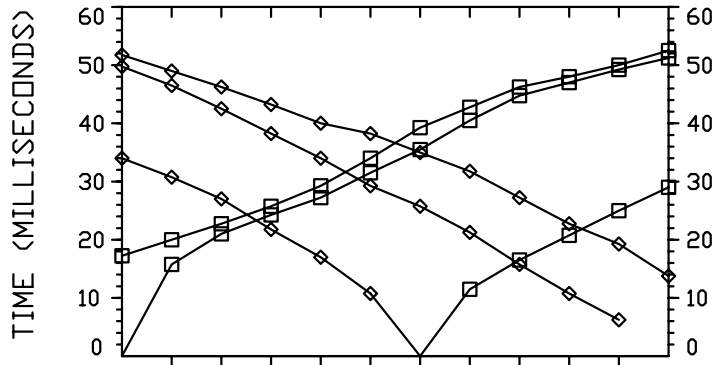
for RPSM COS		Fingal Landfill	
by: BMA GeoServices Ltd.		Site B DUBLIN	
Data Set: SB14	Date: 18/FEB/199	Azimuth: S-N	
Equipment: GEOMETRICS Sna	Spread: 14		

Spread 15B



for RPSMCOS		Fingal Landfill	
by: BMA GeoServices Ltd.		Site B DUBLIN	
Data Set: SB15	Date: 18/FEB/199	Azimuth: S-N	
Equipment: GEOMETRICS Sna	Spread: 15		

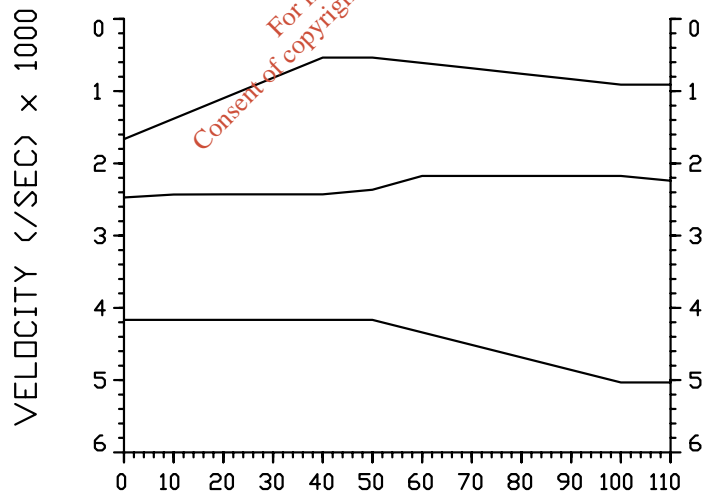
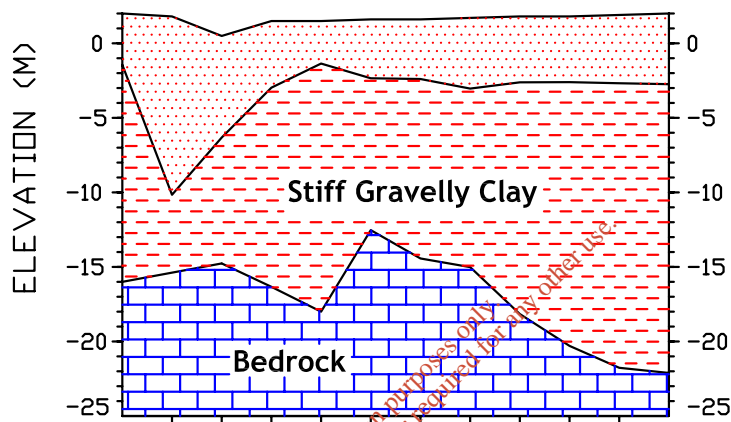
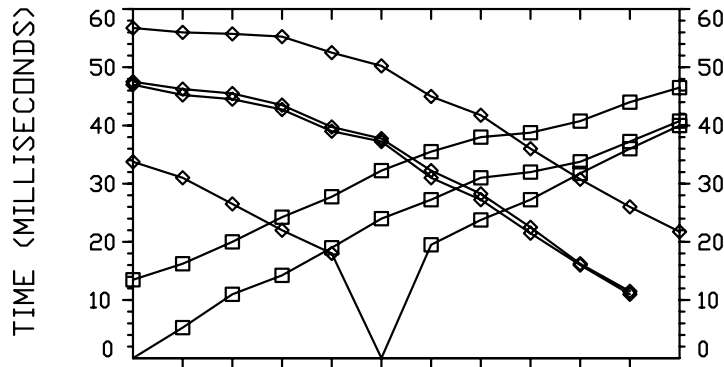
Spread 1L



DISTANCE (m)

for RPSMCOS		Fingal Landfill	
by: BMA GeoServices Ltd.		Site B	
Data Set: S1B	Date: 23/JUN/04	Fingal	
Equipment: GEOMETRICS Sna	Spread: 1	Azimuth: S-N	

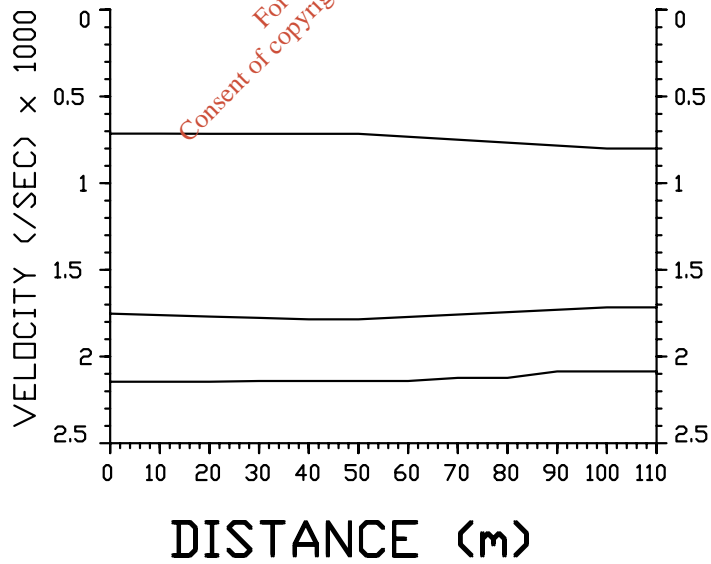
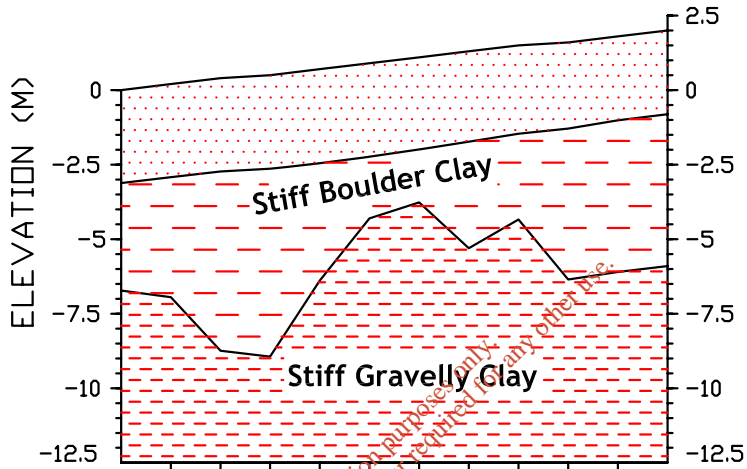
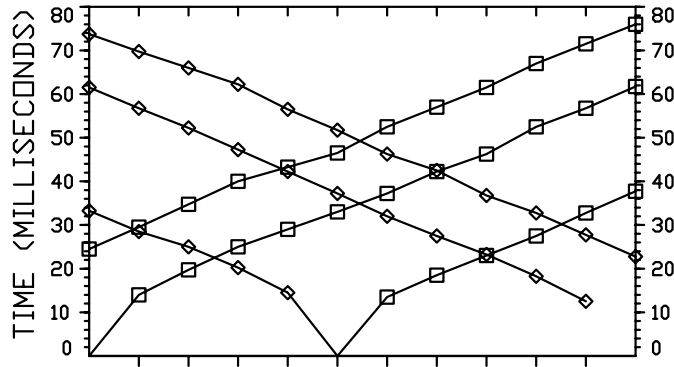
Spread 2L



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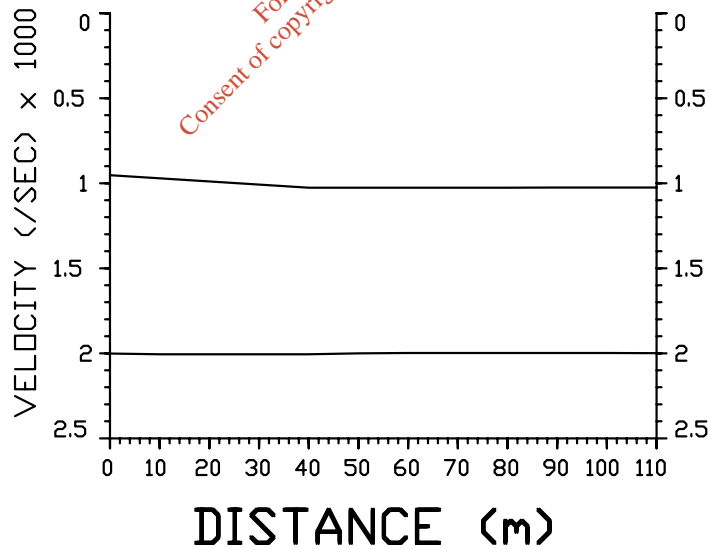
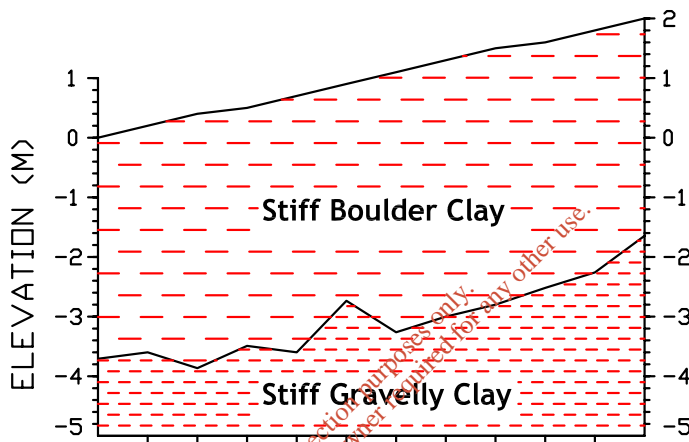
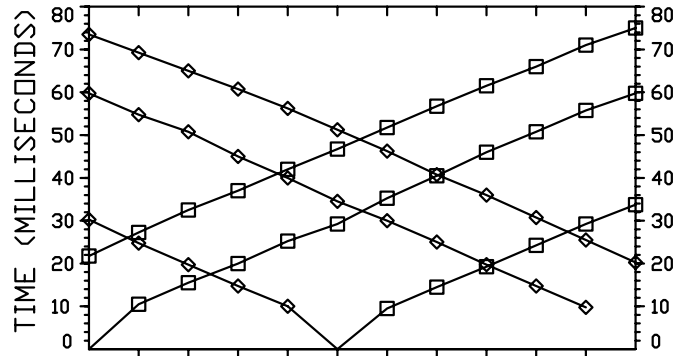
for RPSMCOS		Fingal Landfill	
by: BMA GeoServices Ltd.		Site B	
Data Set: S2B	Date: 23/JUN/04	Fingal	
Equipment: GEOMETRICS Sna	Spread: 2L	Azimuth: S-N	

Spread 3L



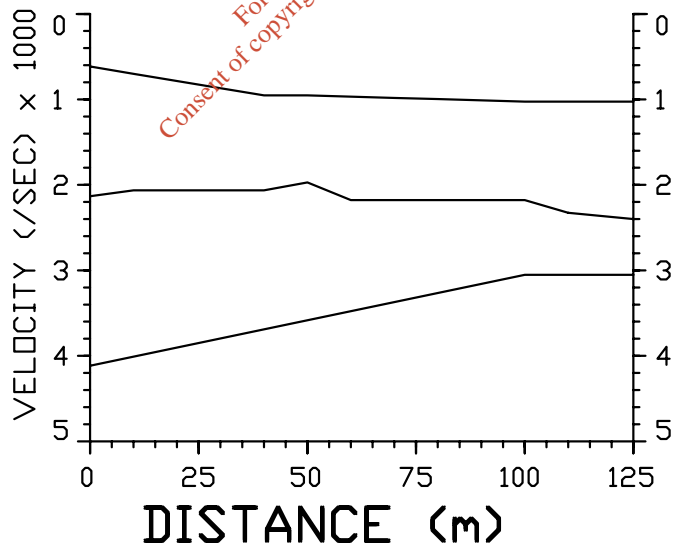
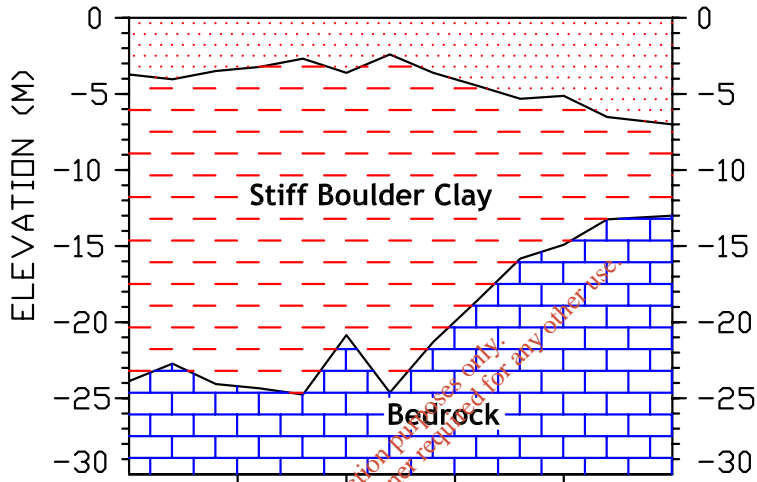
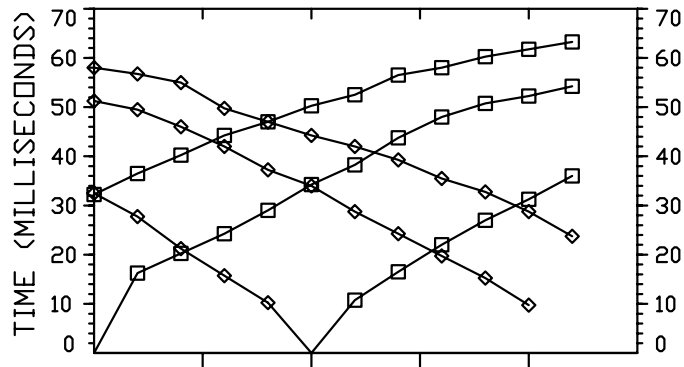
for: RPSMCOS		Fingal Landfill	
by: BMA GeoServices Ltd.		Site B	
Data Set: S3B	Date: 23/JUN/04	Fingal	
Equipment: GEOMETRICS Sma	Spread: 3L	Azimuth: S-N	

Spread 4L



for: RPSMCOS		Fingal Landfill	
by: BMA GeoServices Ltd.		Site B	
Data Set: S4B	Date: 22/JUN/04	Fingal	
Equipment: GEOMETRICS Sna	Spread: 4L	Azimuth: S-N	

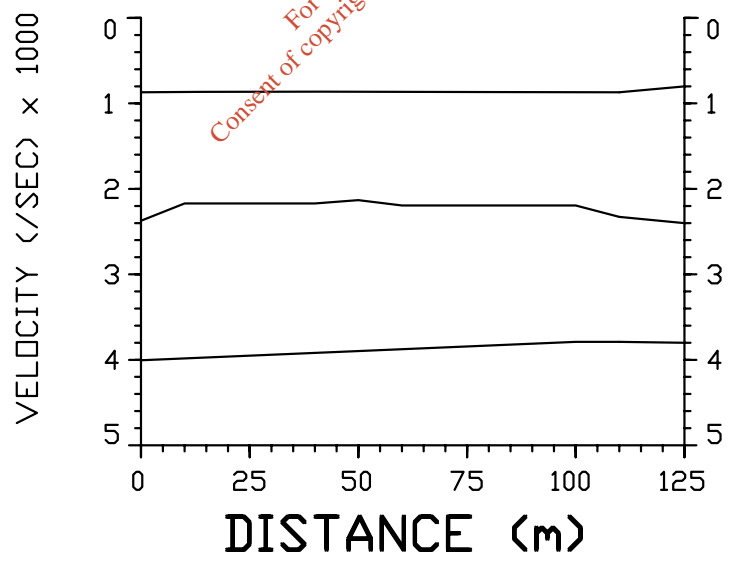
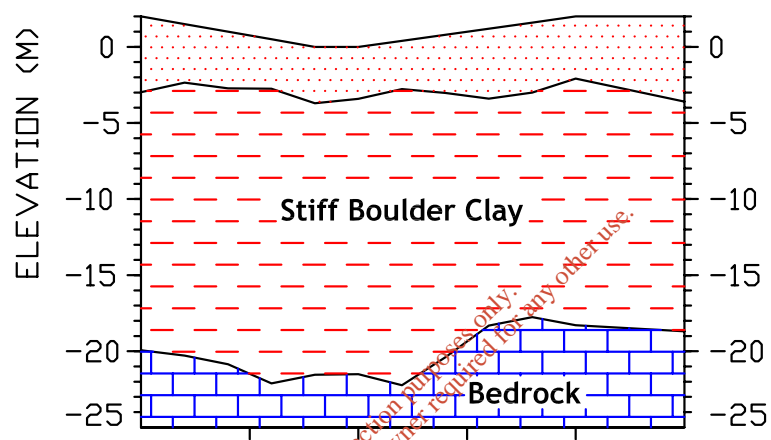
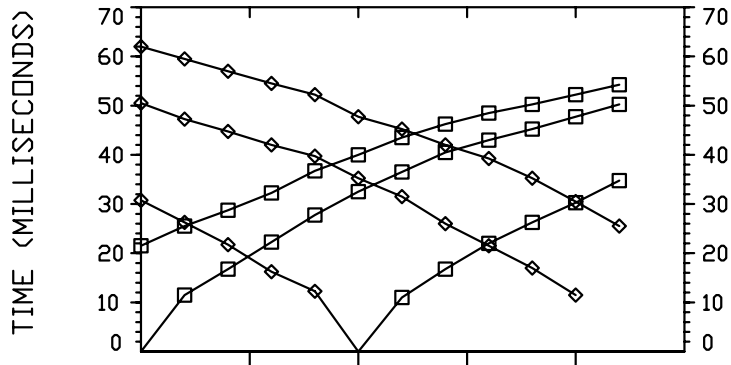
Spread 5L



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for: RPSMCOS		Fingal Landfill	
by: BMA GeoServices Ltd.		Site B	
Data Set: S5B	Date: 15/JUN/04	Fingal	
Equipment: GEOMETRICS Sna	Spread: 5L	Azimuth: S-N	

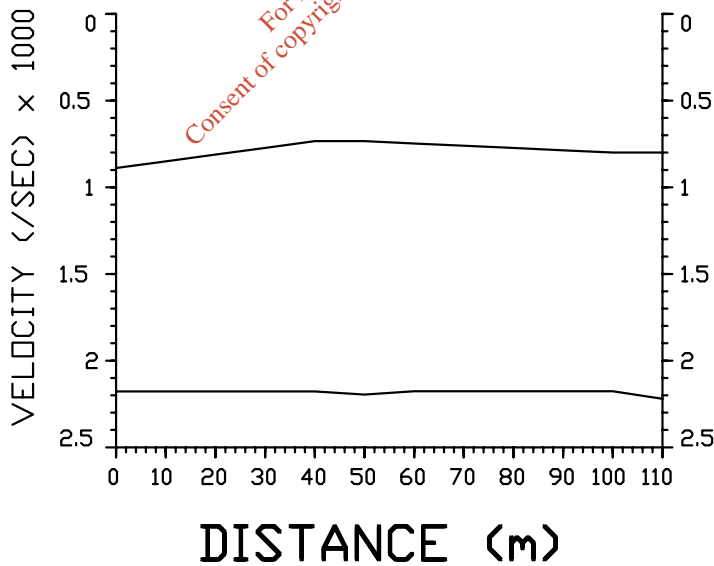
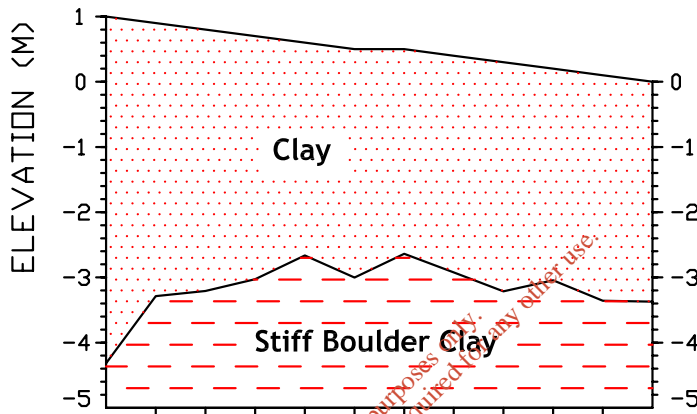
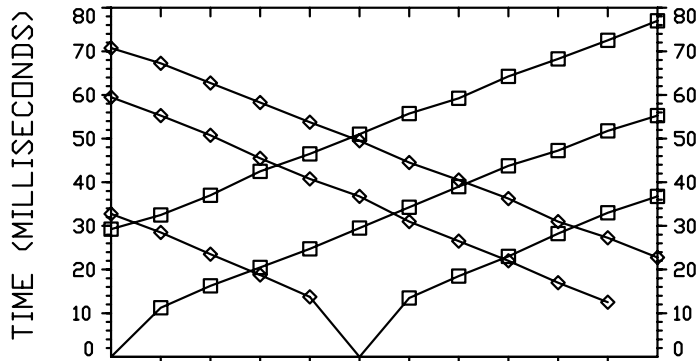
Spread 6L



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for: RPSMCOS		Fingal Landfill	
by: BMA GeoServices Ltd.		Site B	
Data Set: S6B	Date: 15/JUN/04	Fingal	
Equipment: GEOMETRICS Sna	Spread: 6L	Azimuth: S-N	

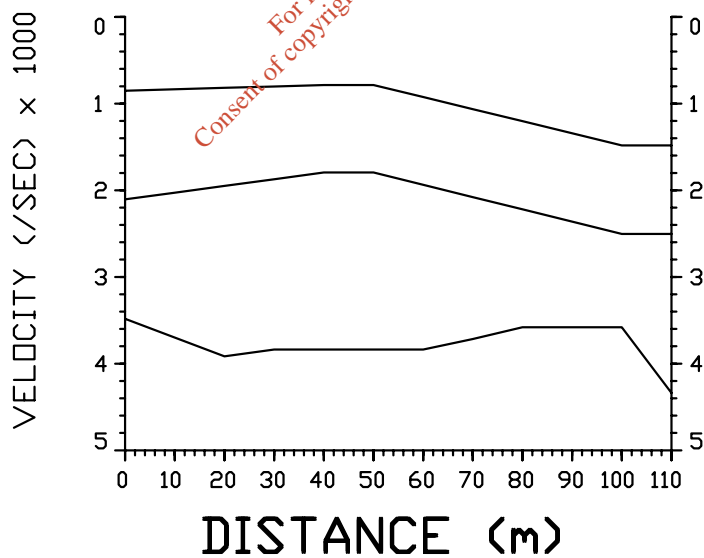
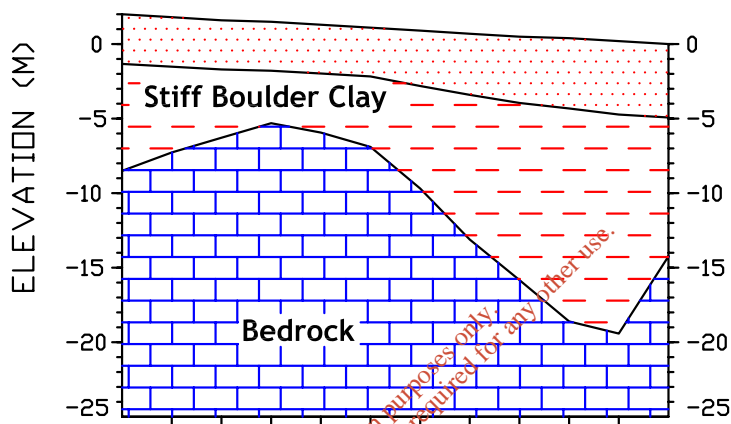
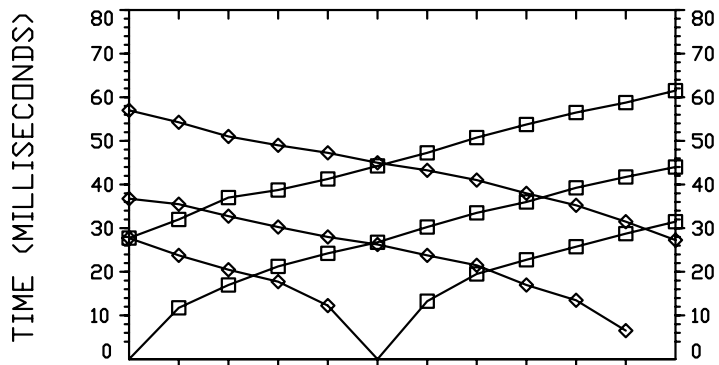
Spread 7L



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for: RPSMCOS		Fingal Landfill	
by: BMA GeoServices Ltd.		Site B	
Data Set: S7B	Date: 16/JUN/04	Fingal	
Equipment: GEOMETRICS Sna	Spread: 7L	Azimuth: S-N	

Spread 9L



for RPSMCOS

by: BMA GeoServices Ltd.

Data Set: S9B

Date: 16/JUN/04

Equipment: GEOMETRICS Sna

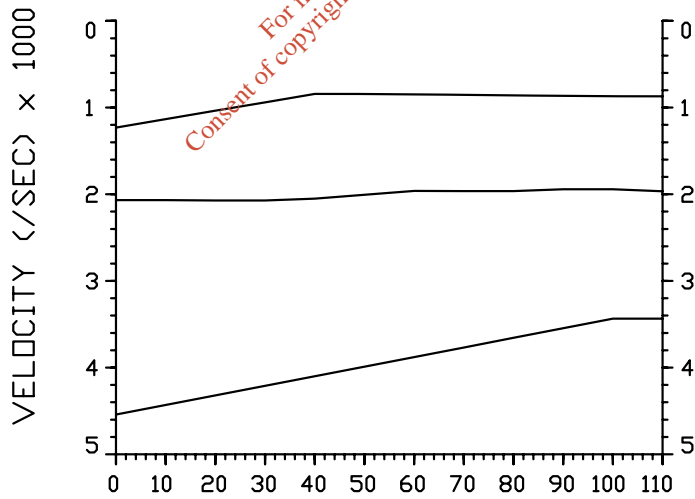
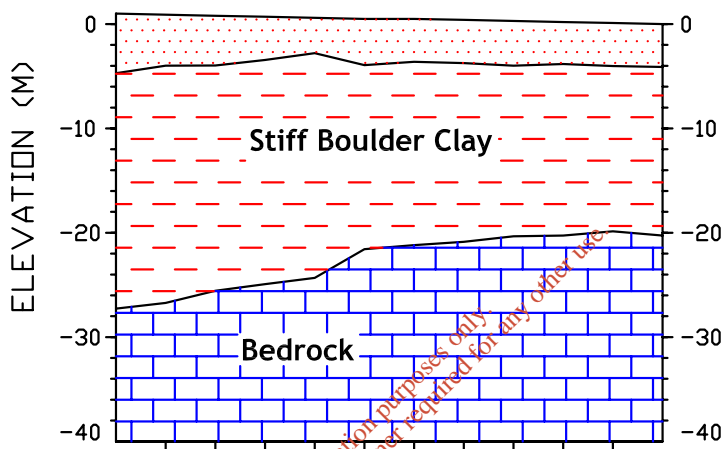
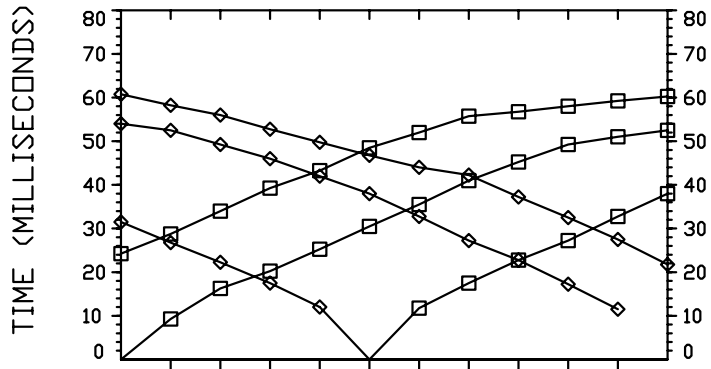
Spread: 9L

Fingal Landfill

Site B
Fingal

Azimuth: W-E

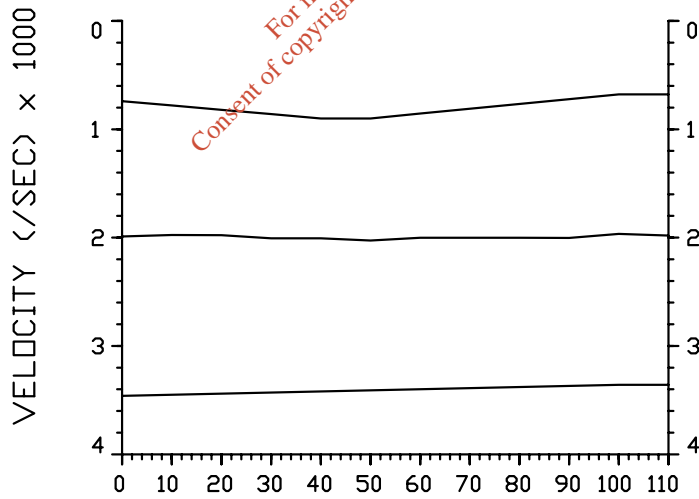
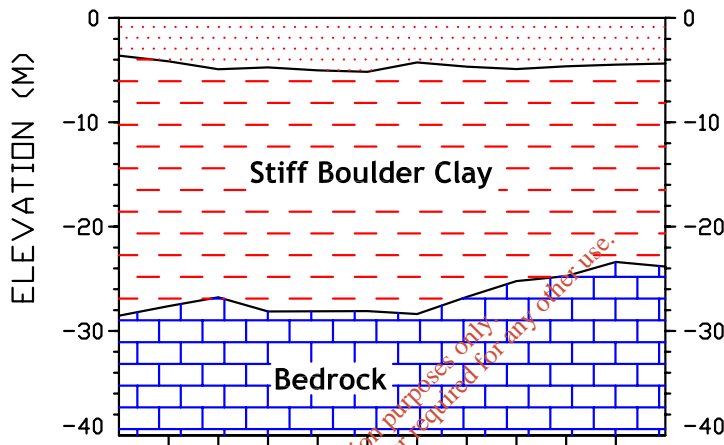
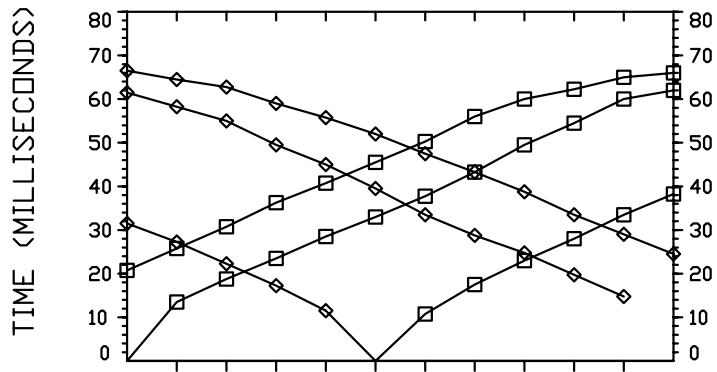
Spread 10L



DISTANCE (m)

for: RPSMCOS		Fingal Landfill	
by: BMA GeoServices Ltd.		Site B	
Data Set: S10B	Date: 23/JUN/04	Fingal	
Equipment: GEOMETRICS Sna	Spread: 10L	Azimuth: W-E	

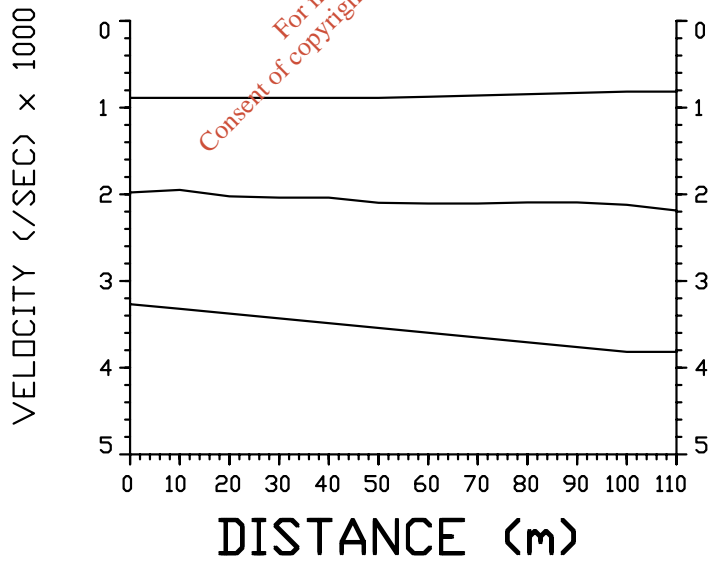
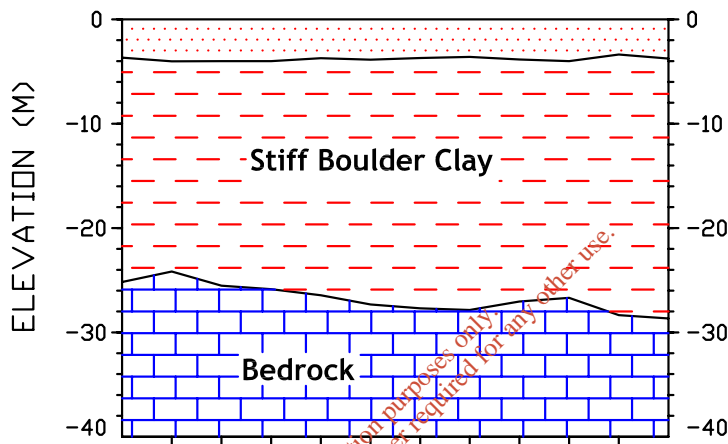
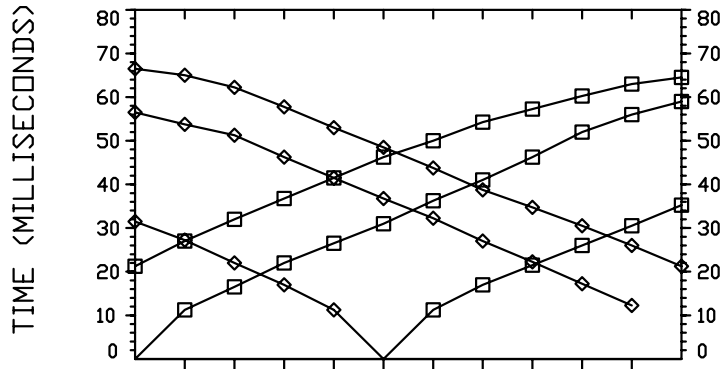
Spread 11L



DISTANCE (m)

for: RPSMCOS		Fingal Landfill	
by: BMA GeoServices Ltd.		Site B	
Data Set: S11B	Date: 22/JUN/04	Fingal	
Equipment: GEOMETRICS Sna	Spread: 11L	Azimuth: W-E	

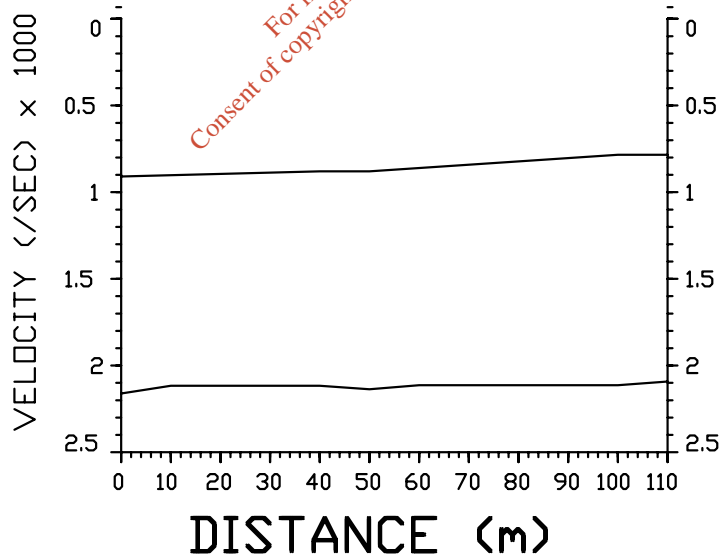
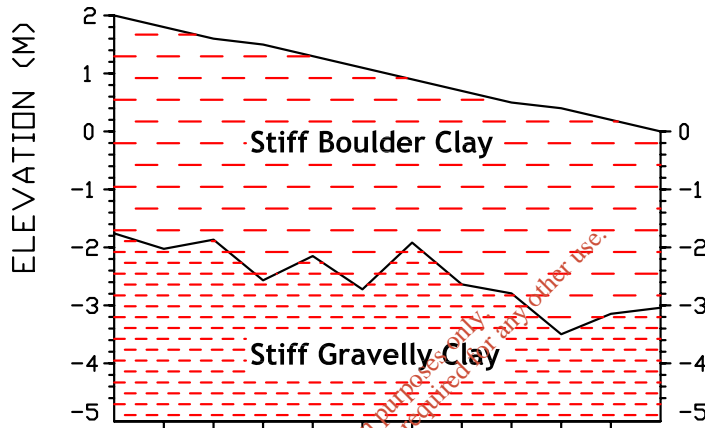
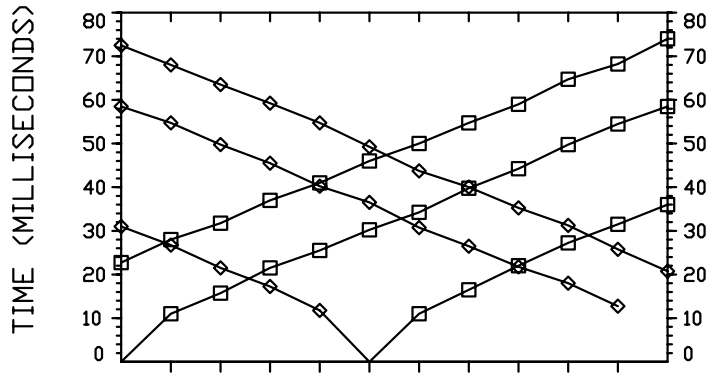
Spread 12L



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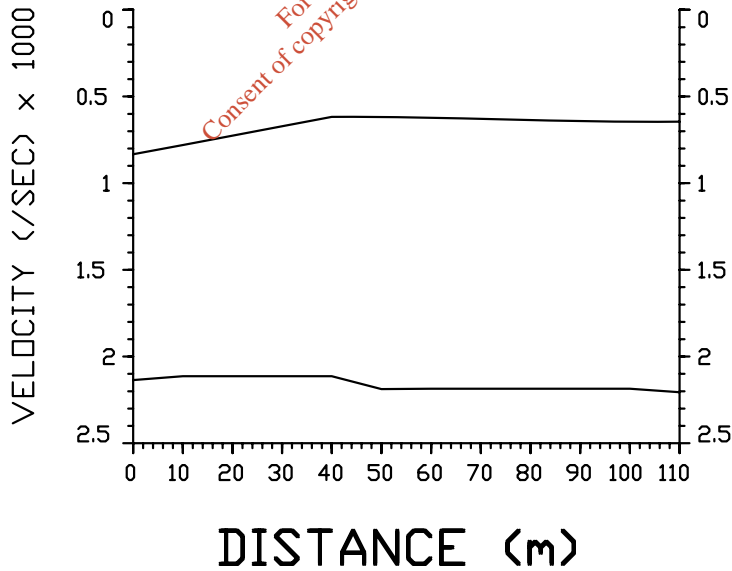
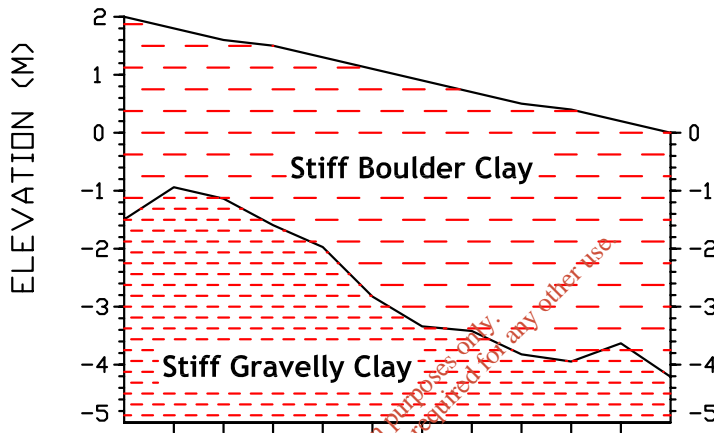
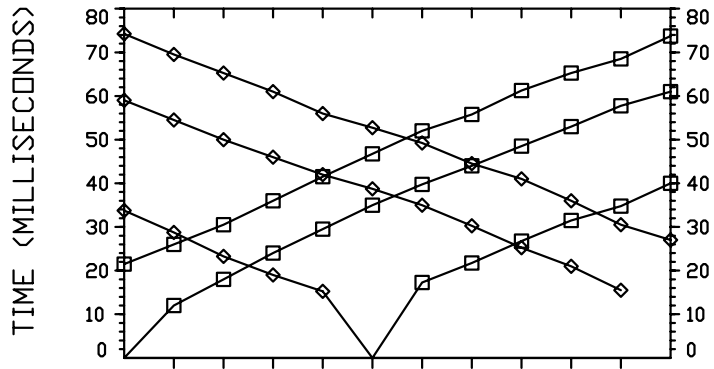
for: RPSMCOS		Fingal Landfill	
by: BMA GeoServices Ltd.		Site B	
Data Set: S12B	Date: 19/JUN/04	Fingal	
Equipment: GEOMETRICS Sna	Spread: 12L	Azimuth: W-E	

Spread 13L



for: RPSMCOS		Fingal Landfill	
by: BMA GeoServices Ltd.		Site B	
Data Set: S13B	Date: 18/JUN/04	Fingal	
Equipment: GEOMETRICS Sna	Spread: 13L	Azimuth: W-E	

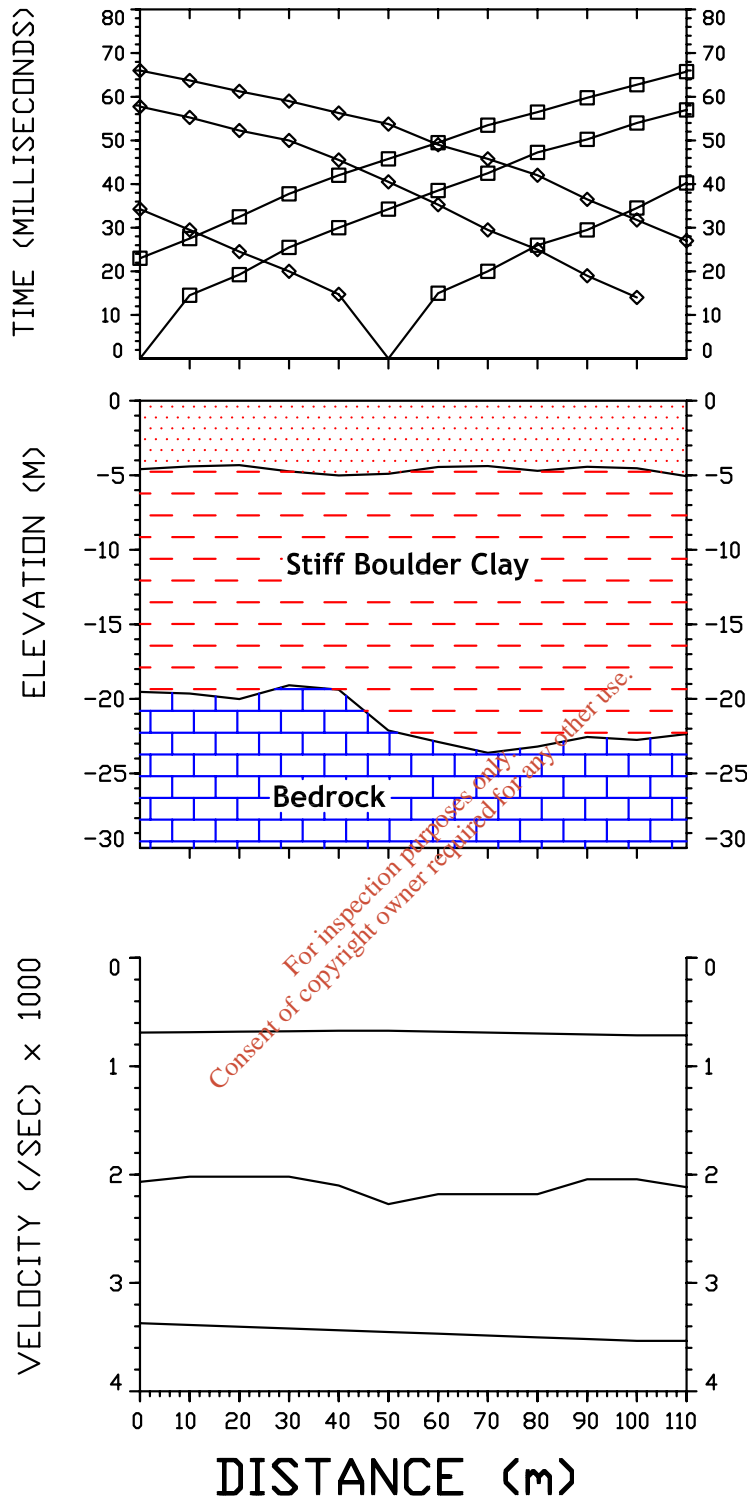
Spread 14L



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for: RPSMCOS		Fingal Landfill	
by: BMA GeoServices Ltd.		Site B	
Data Set: S14B	Date: 18/JUN/04	Fingal	
Equipment: GEOMETRICS Sna	Spread: 14L	Azimuth: W-E	

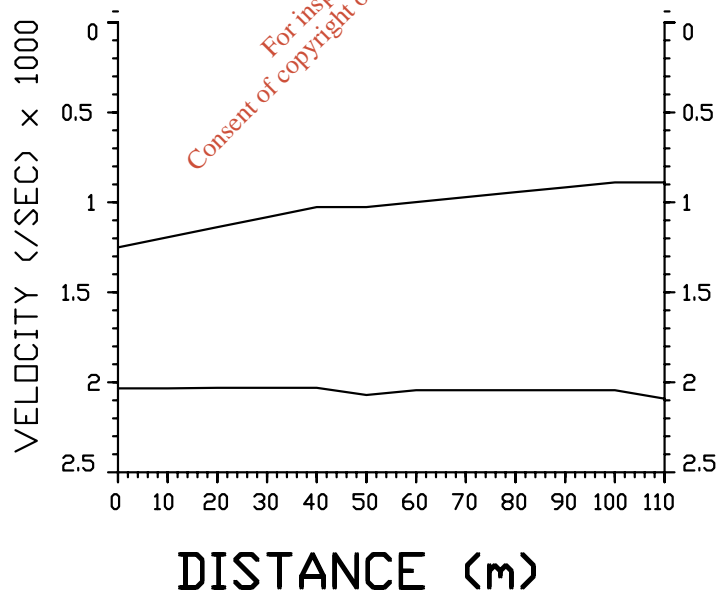
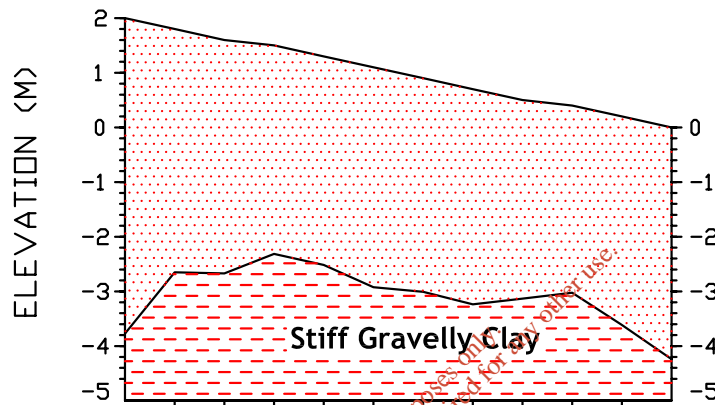
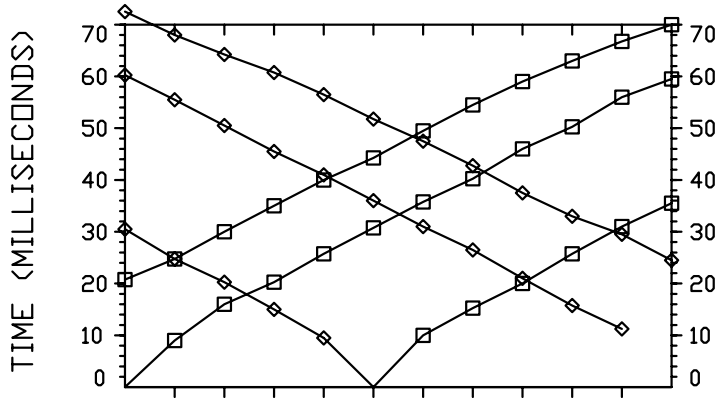
Spread 15L



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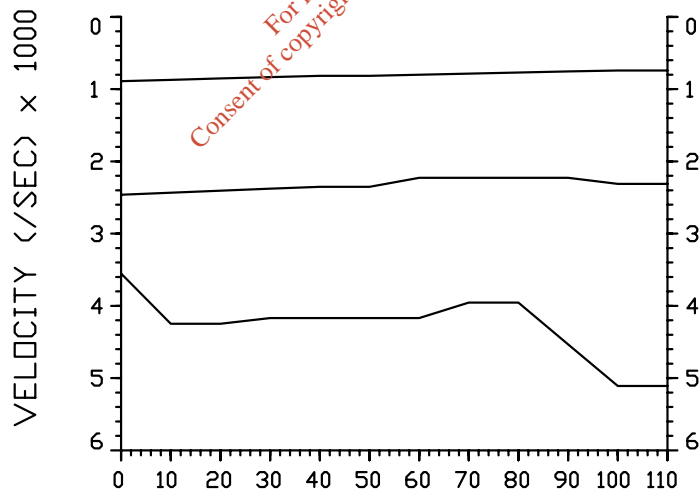
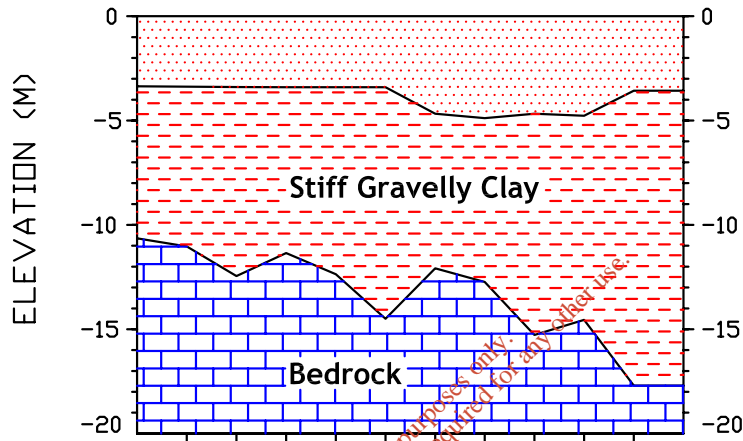
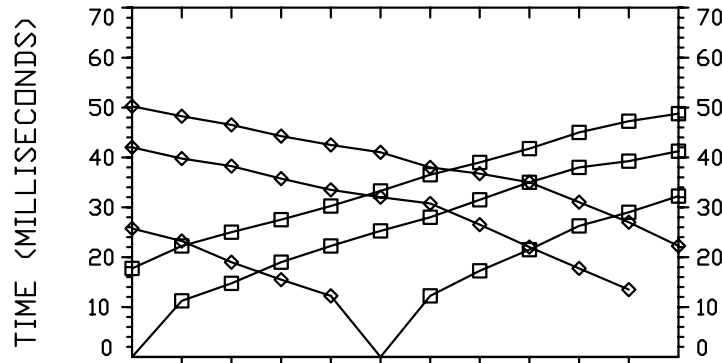
for: RPSMCOS		Fingal Landfill	
by: BMA GeoServices Ltd.		Site B	
Data Set: S15B	Date: 18/JUN/04	Fingal	
Equipment: GEOMETRICS Sna	Spread: 15L	Azimuth: W-E	

Spread 16L



for RPSMCOS		Fingal Landfill	
by: BMA GeoServices Ltd.		Site B	
Data Set: S16B	Date: 10/JUL/04	Fingal	
Equipment: GEOMETRICS Sna	Spread: 16L	Azimuth: W-E	

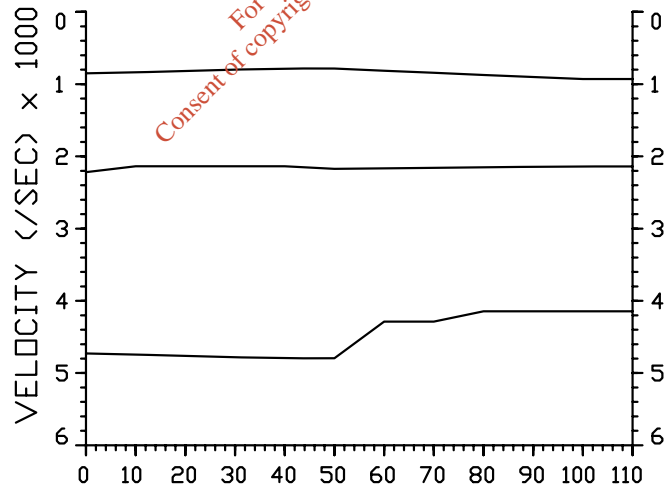
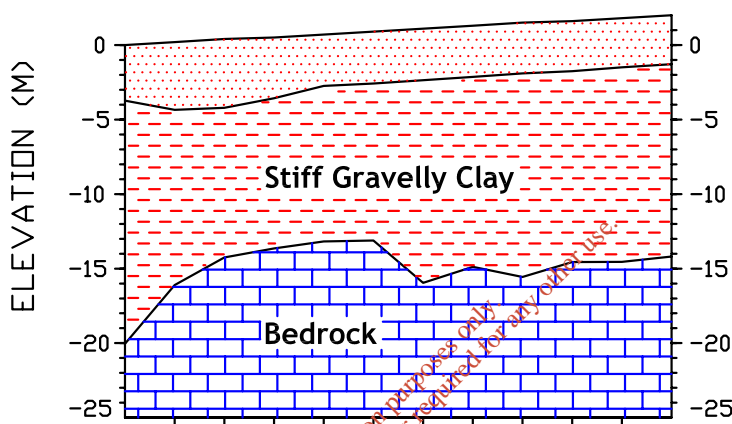
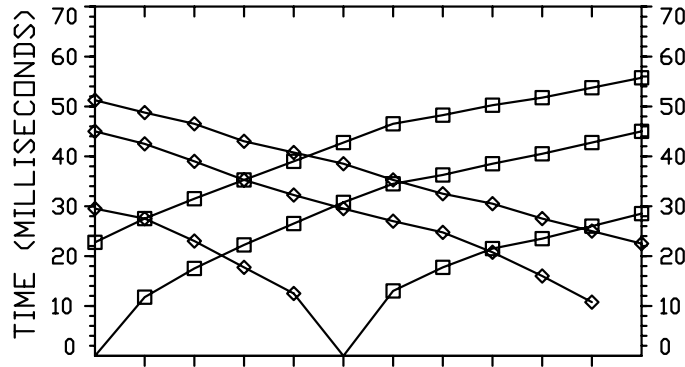
Spread 17L



DISTANCE (m)

for RPSMCOS		Fingal Landfill	
by: BMA GeoServices Ltd.		Site B	
Data Set: S17B	Date: 13/JUL/04	Fingal	
Equipment: GEOMETRICS Sna	Spread: 17L	Azimuth: W-E	

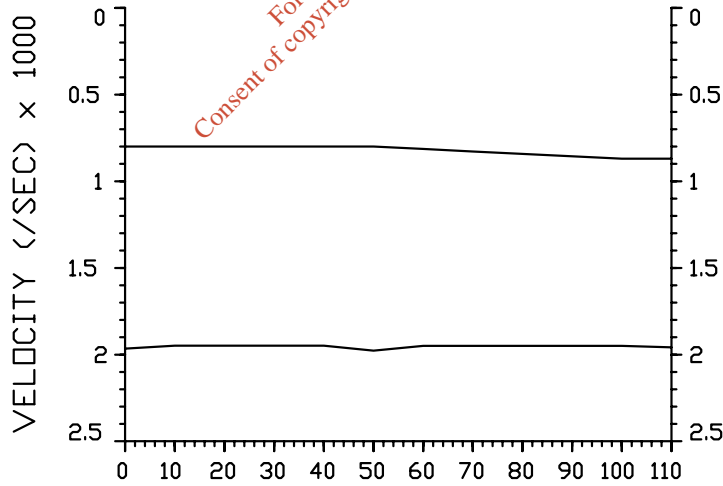
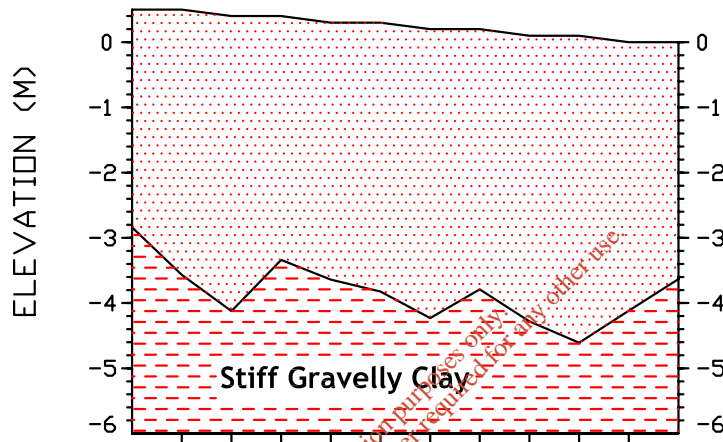
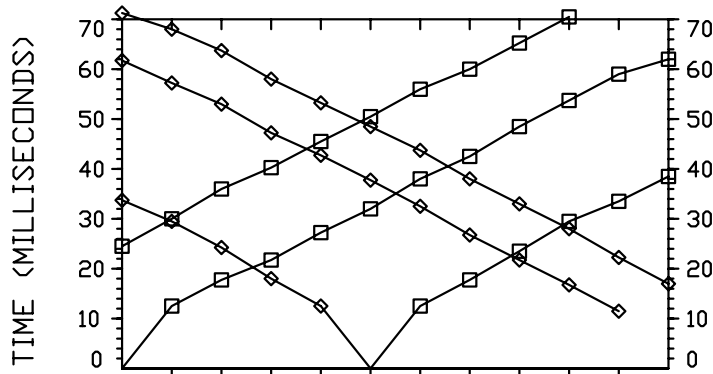
Spread 18L



DISTANCE (m)

for RPSMCOS		Fingal Landfill	
by: BMA GeoServices Ltd.		Site B	
Data Set: S18B	Date: 13/JUL/04	Fingal	
Equipment: GEOMETRICS Sna	Spread: 18L	Azimuth: W-E	

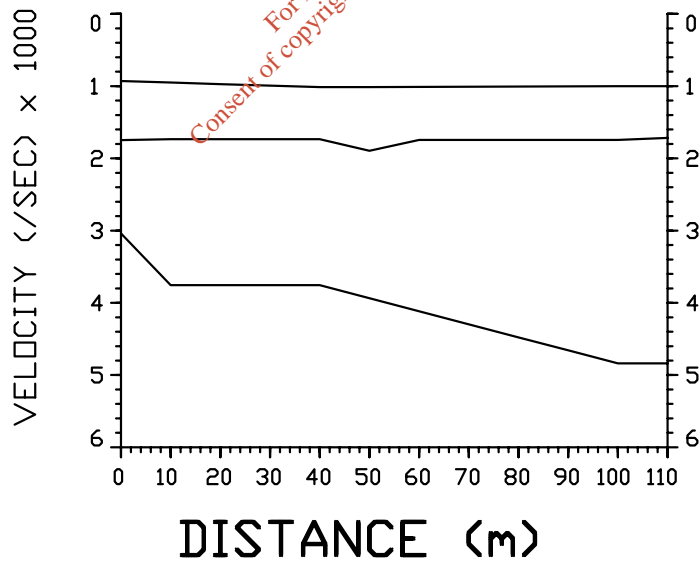
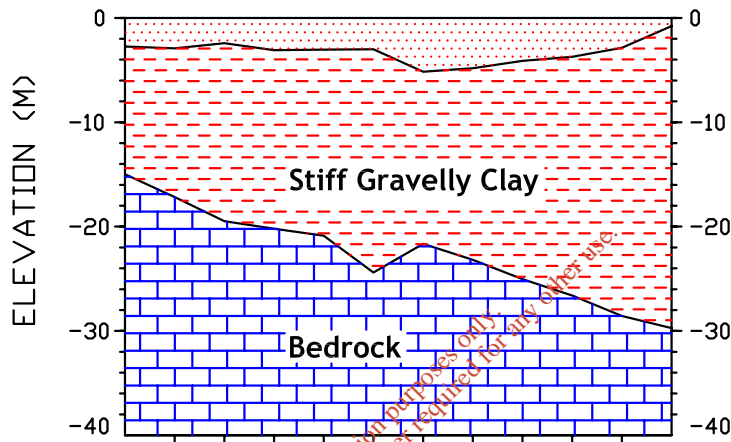
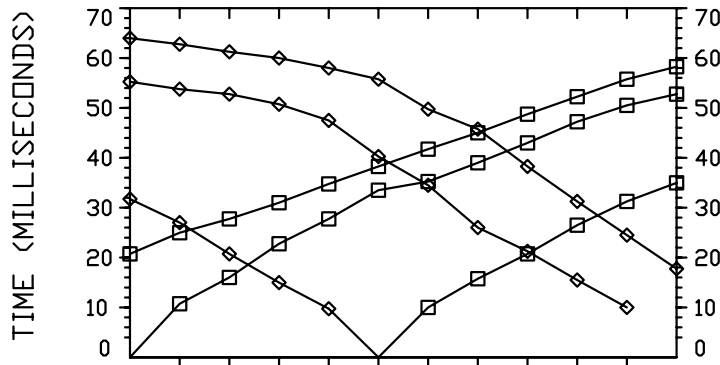
Spread 19L



DISTANCE (m)

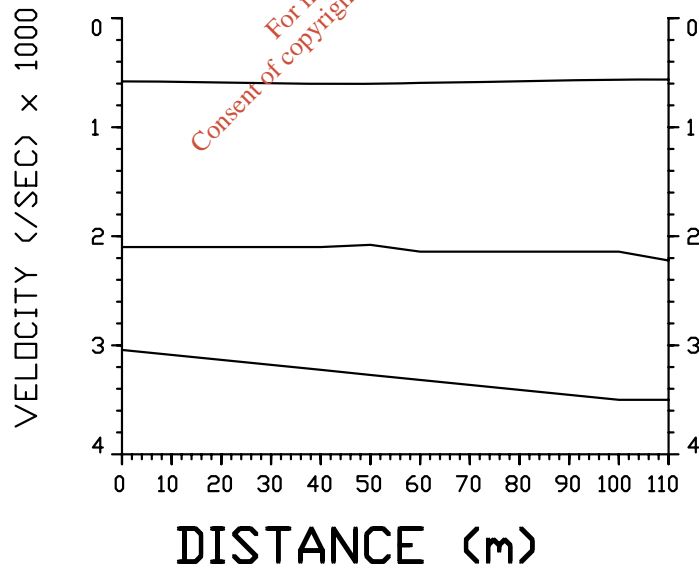
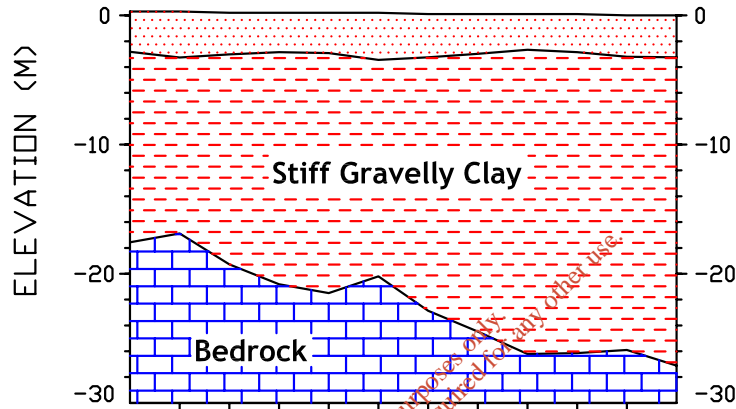
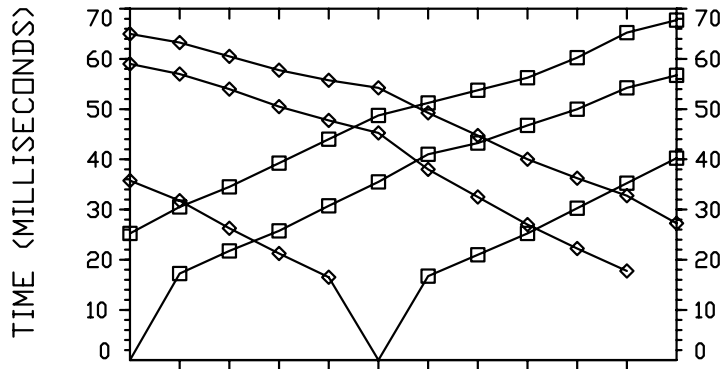
for RPSMCOS		Fingal Landfill	
by: BMA GeoServices Ltd.		Site B	
Data Set: S19B	Date: 20/JUL/04	Fingal	
Equipment: GEOMETRICS Sna	Spread: 19L	Azimuth: W-E	

Spread 20L



for RPSMCOS		Fingal Landfill	
by: BMA GeoServices Ltd.		Site B	
Data Set: S20B	Date: 20/JUL/04	Fingal	
Equipment: GEOMETRICS Sna	Spread: 20L	Azimuth: W-E	

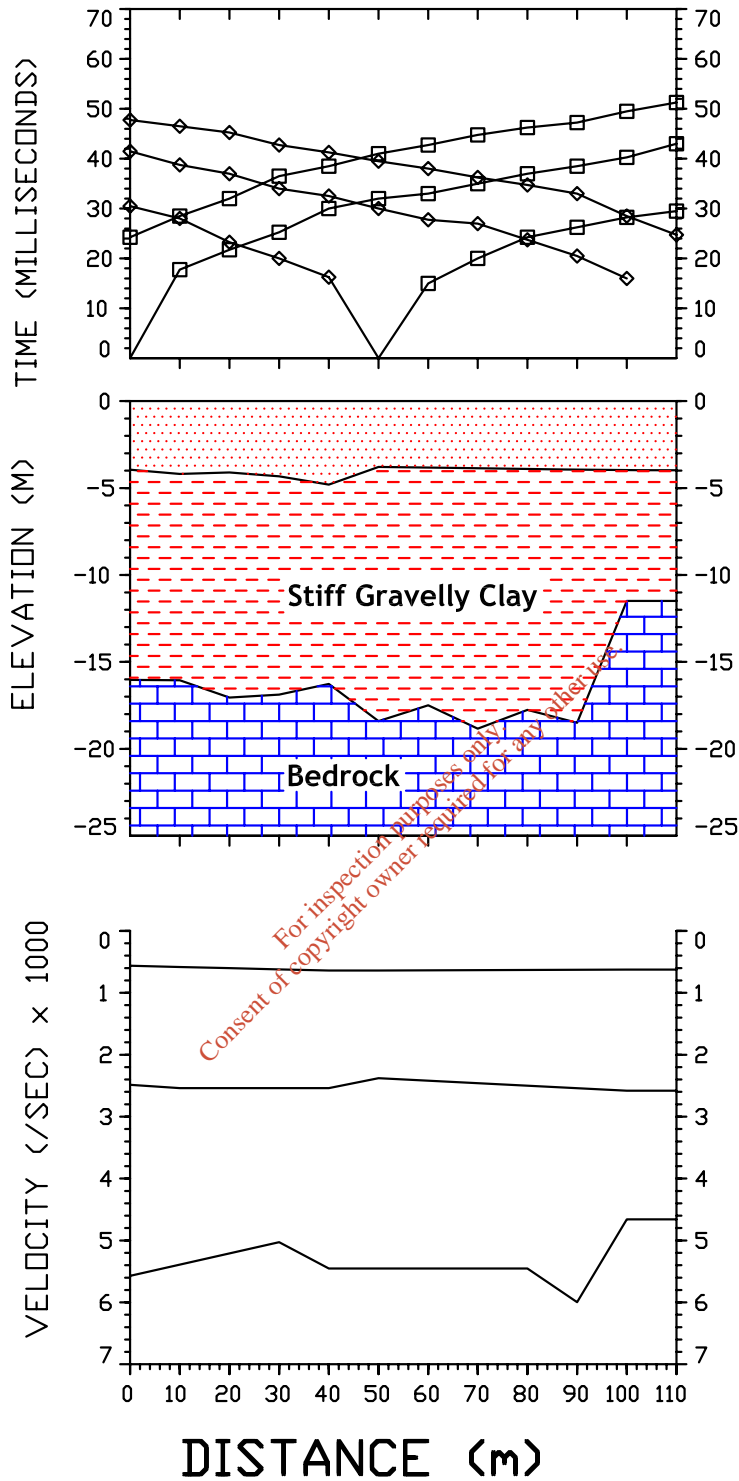
Spread 21L



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for RPSMCOS		Fingal Landfill	
by: BMA GeoServices Ltd.		Site B	
Data Set: S21B	Date: 20/JUL/04	Fingal	
Equipment: GEOMETRICS Sna	Spread: 21L	Azimuth: W-E	

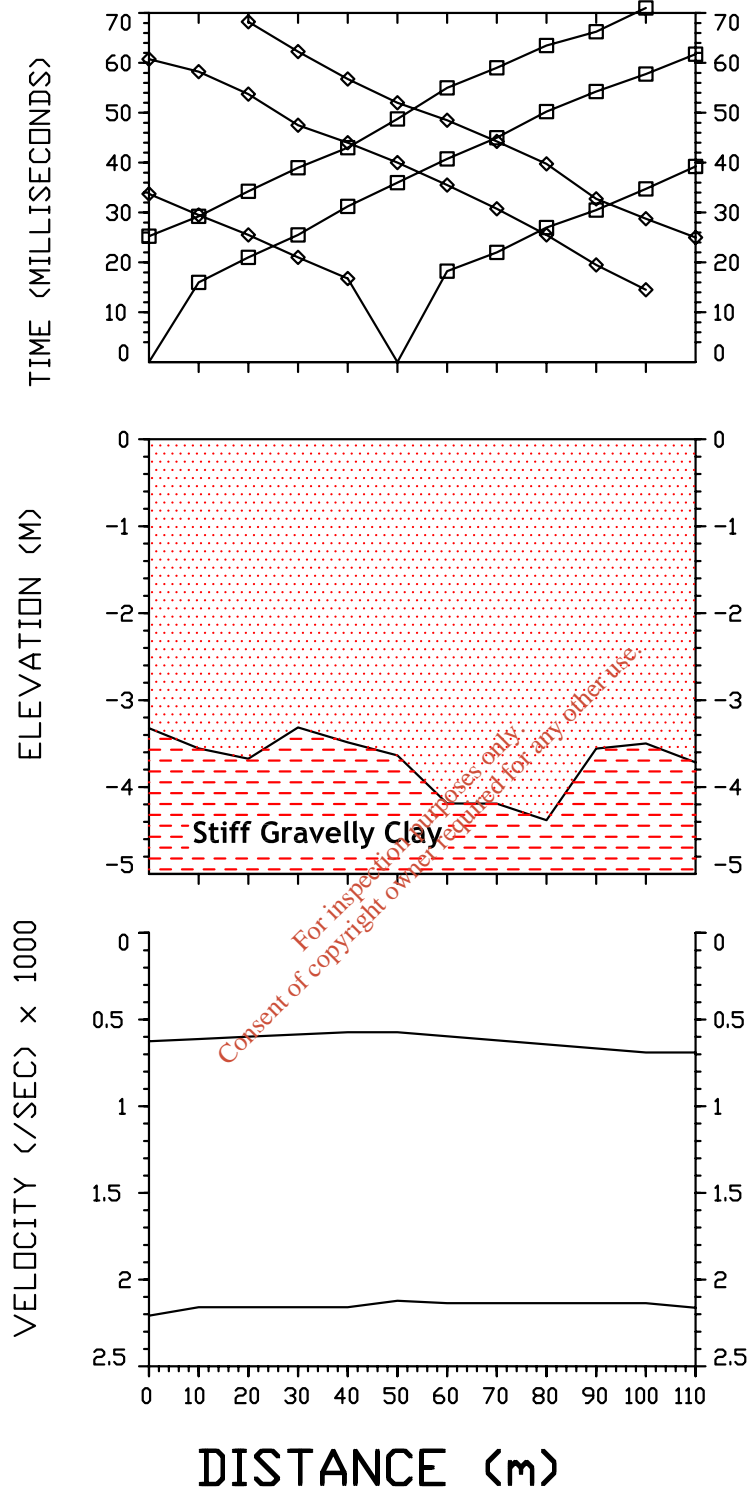
Spread 22L



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for RPSMCOS		Fingal Landfill	
by: BMA GeoServices Ltd.		Site B	
Data Set: S22B	Date: 21/JUL/04	Fingal	
Equipment: GEOMETRICS Sna	Spread: 22L	Azimuth: W-E	

Spread 23L



for RPSM COS		Fingal Landfill	
by: BMA GeoServices Ltd.		Site B	
Data Set: S23B	Date: 23/JUL/04	Fingal	
Equipment: GEOMETRICS Sna	Spread: 23L	Azimuth: W-E	

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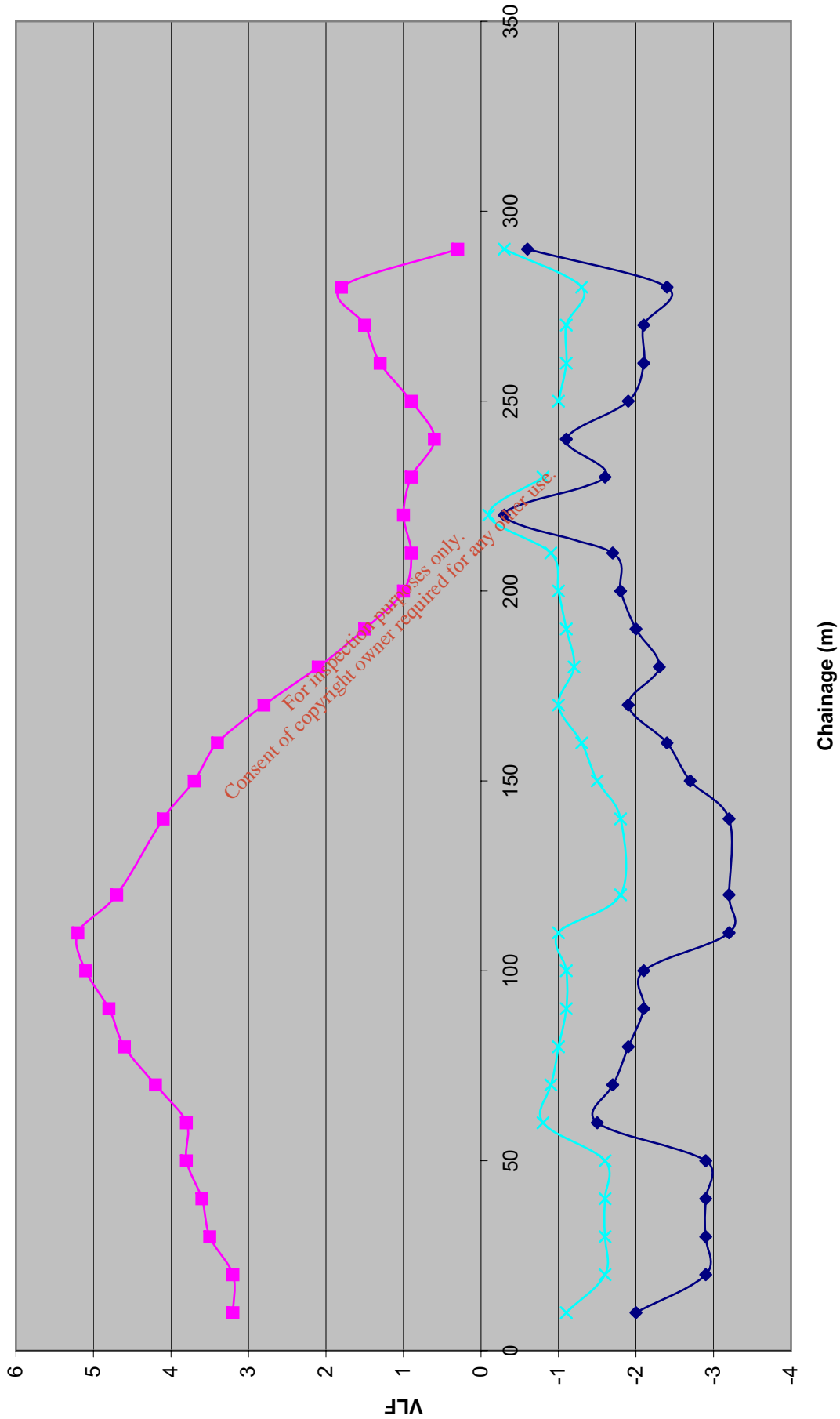
Appendix D

VLF sections

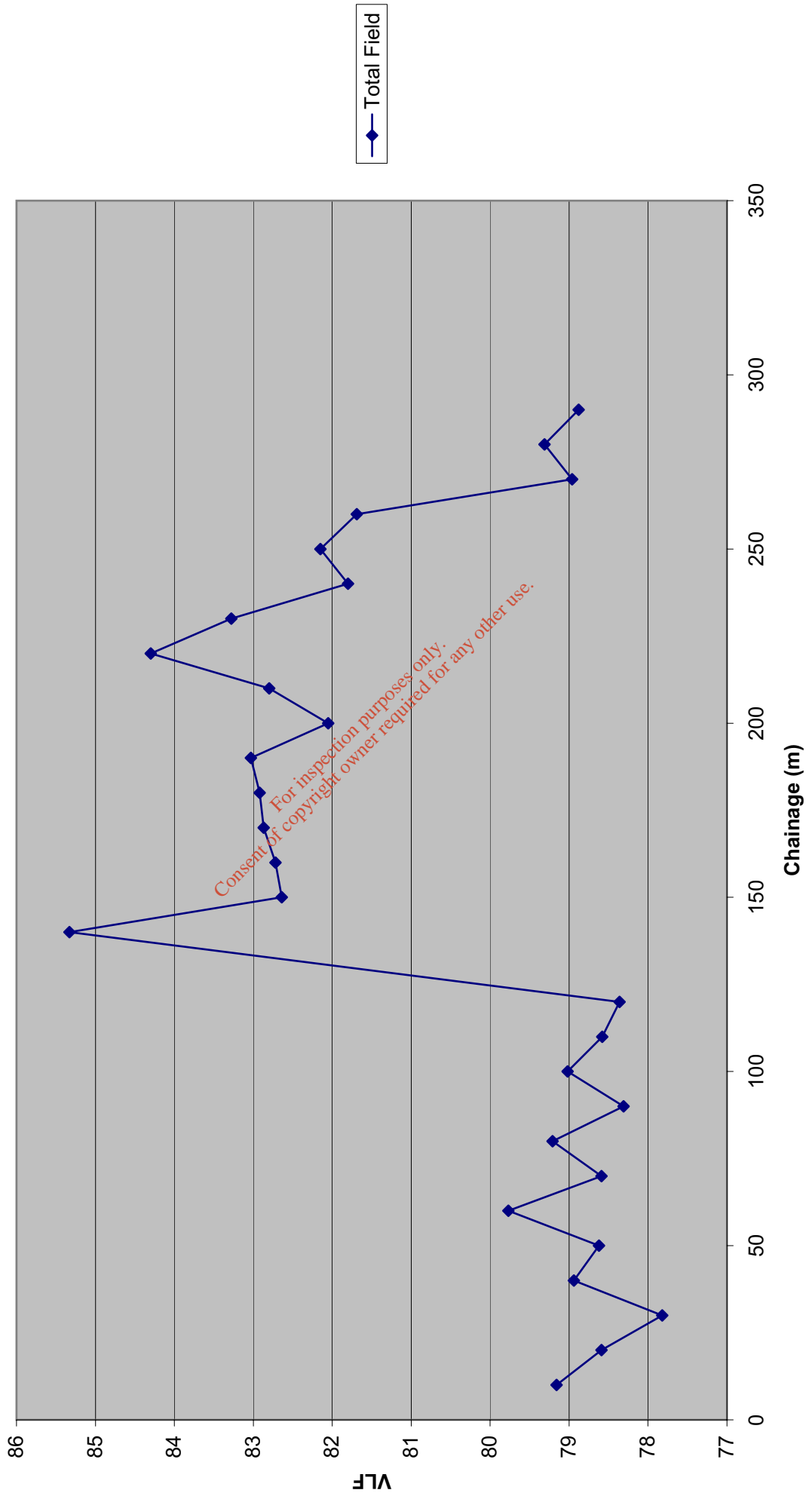
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Line 1 and 2

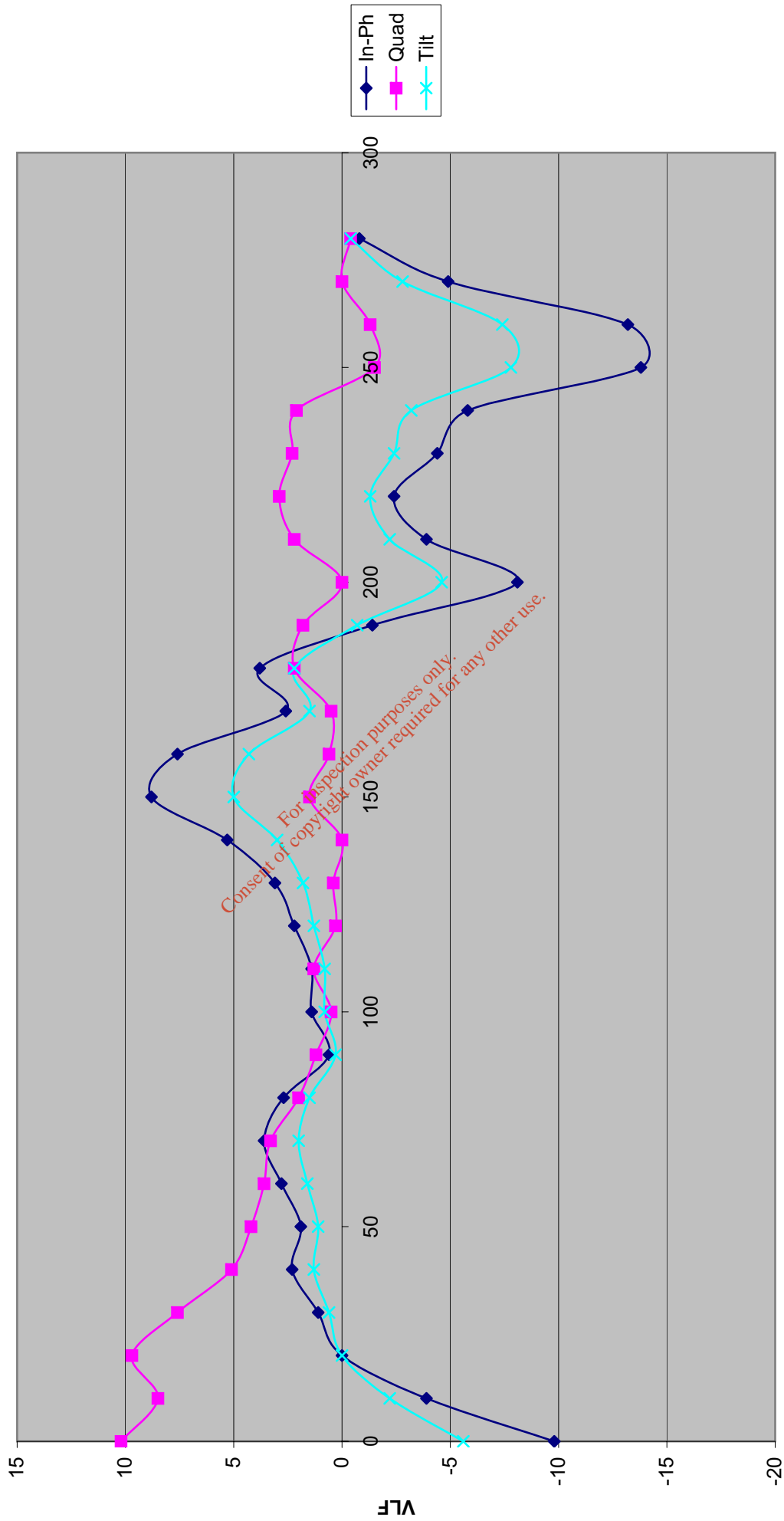


Site B Line 1+2

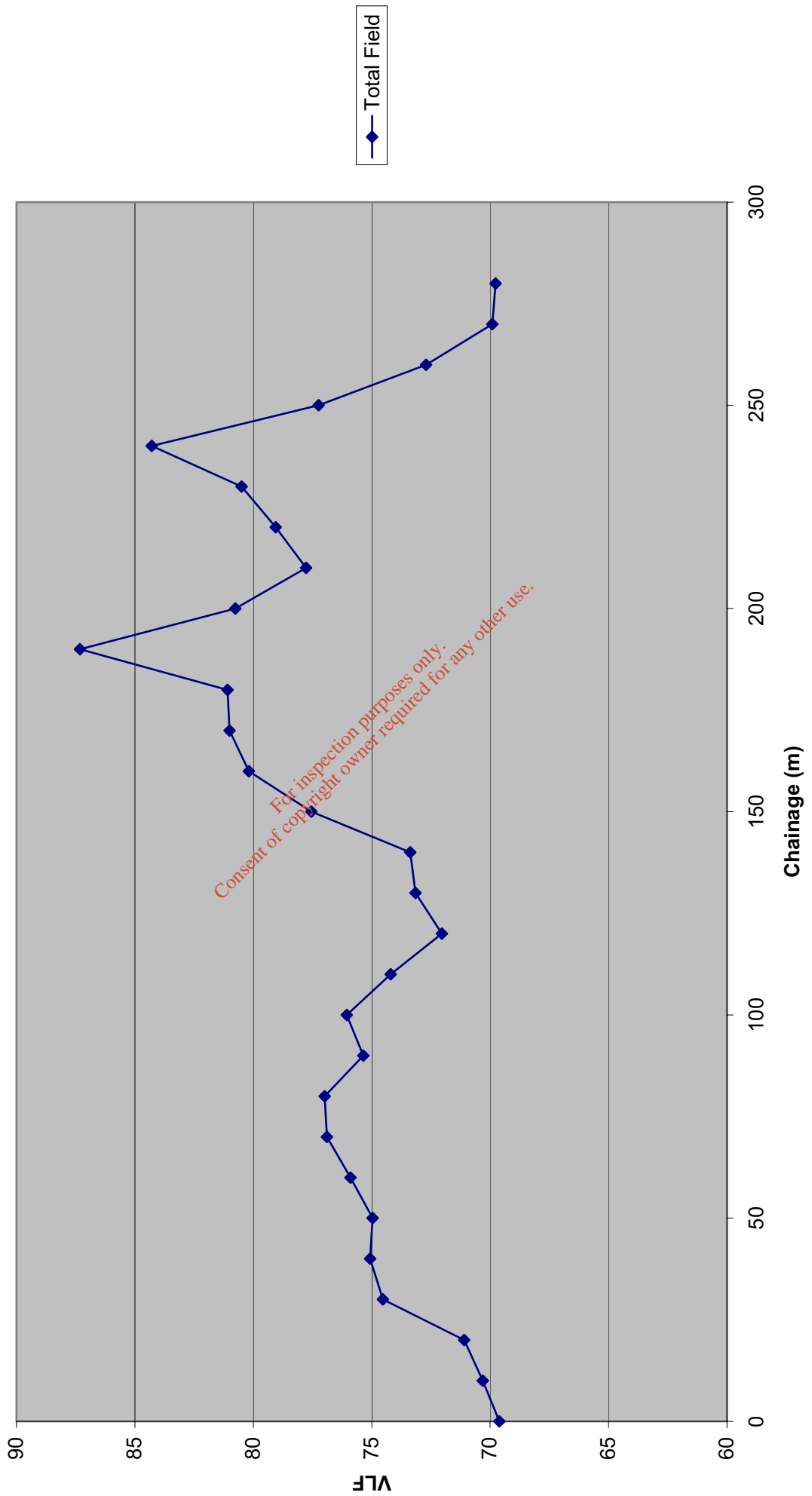


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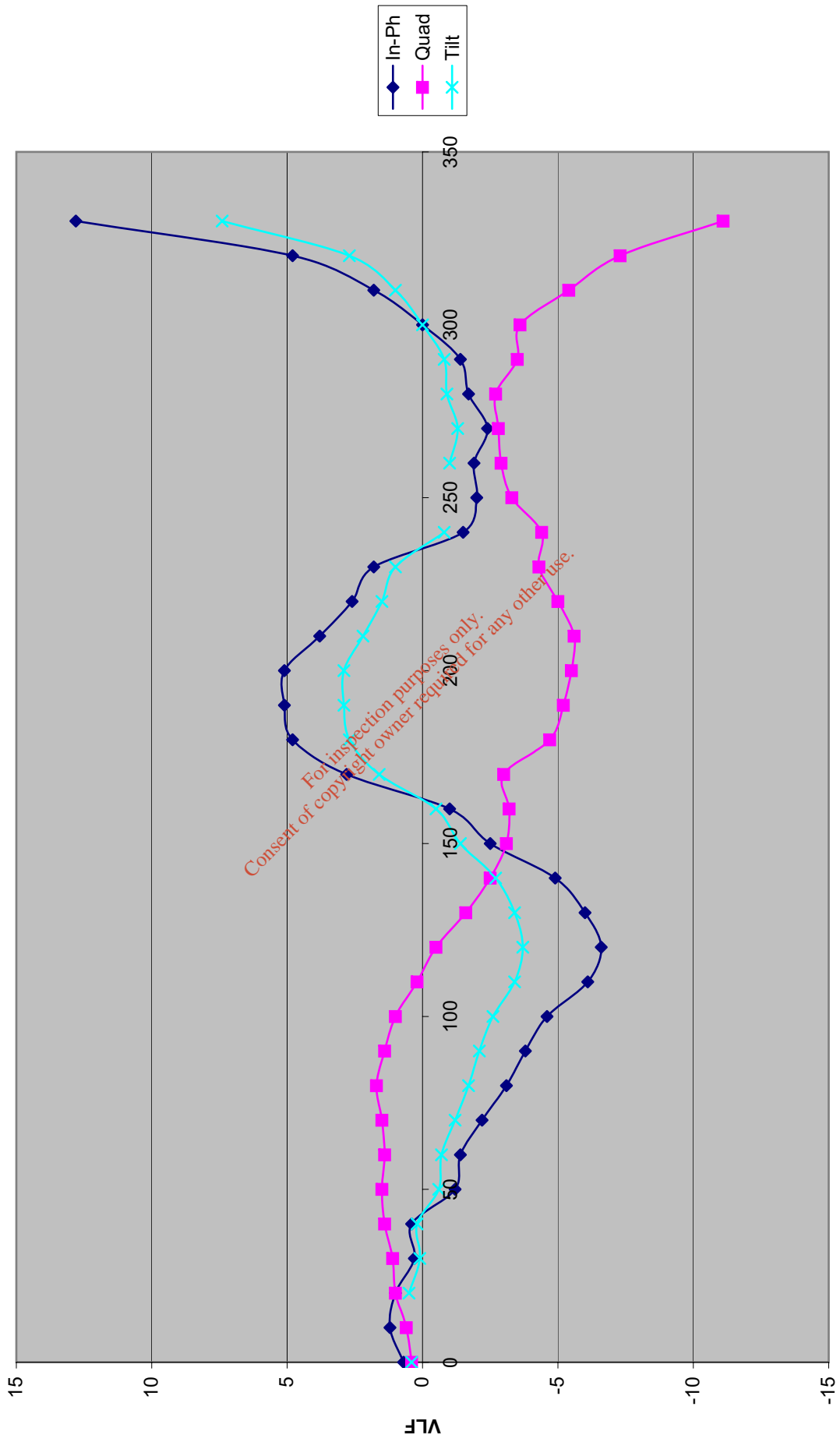
Site B Line 3



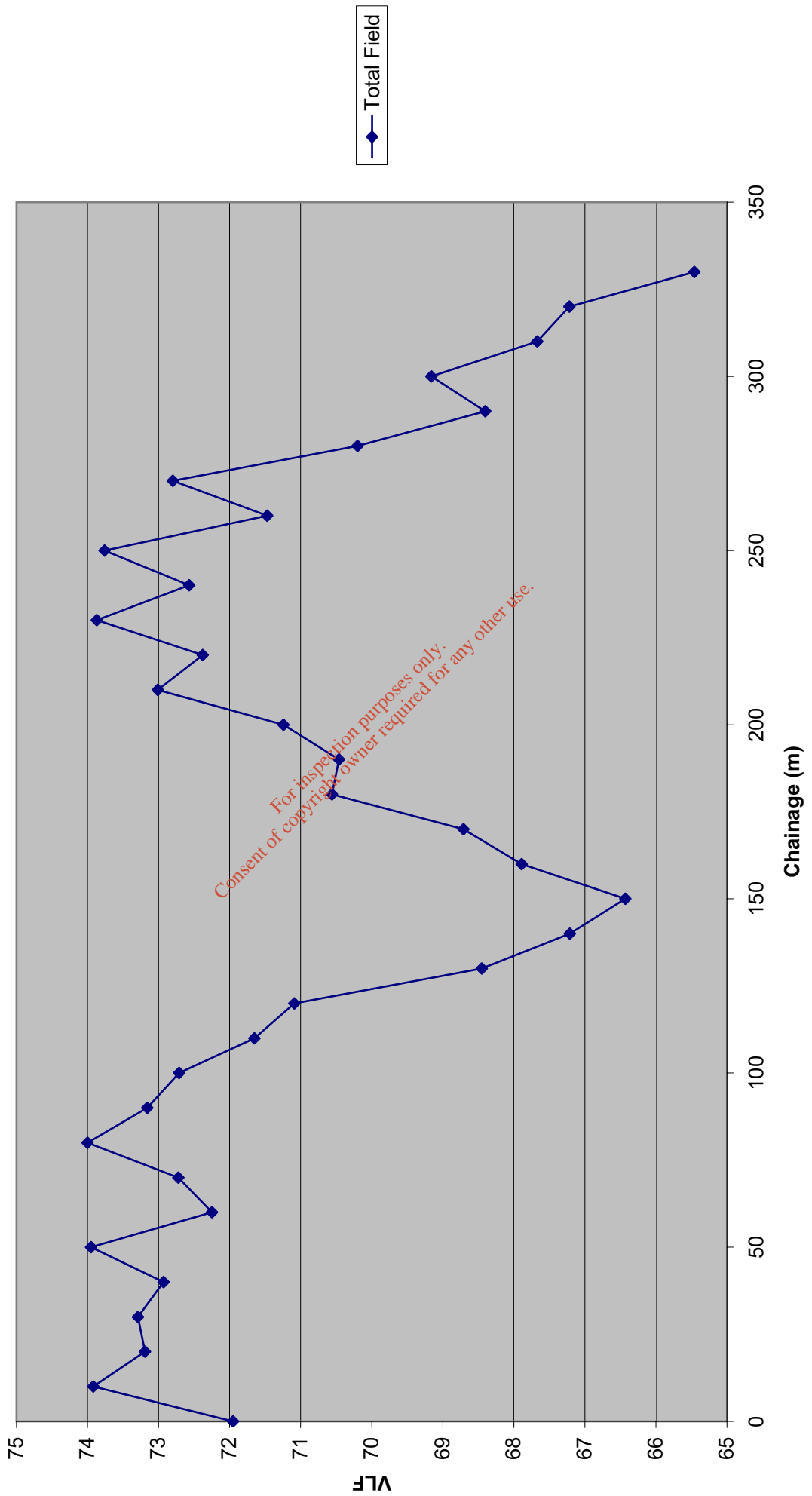
Site B Line 3 Total Field



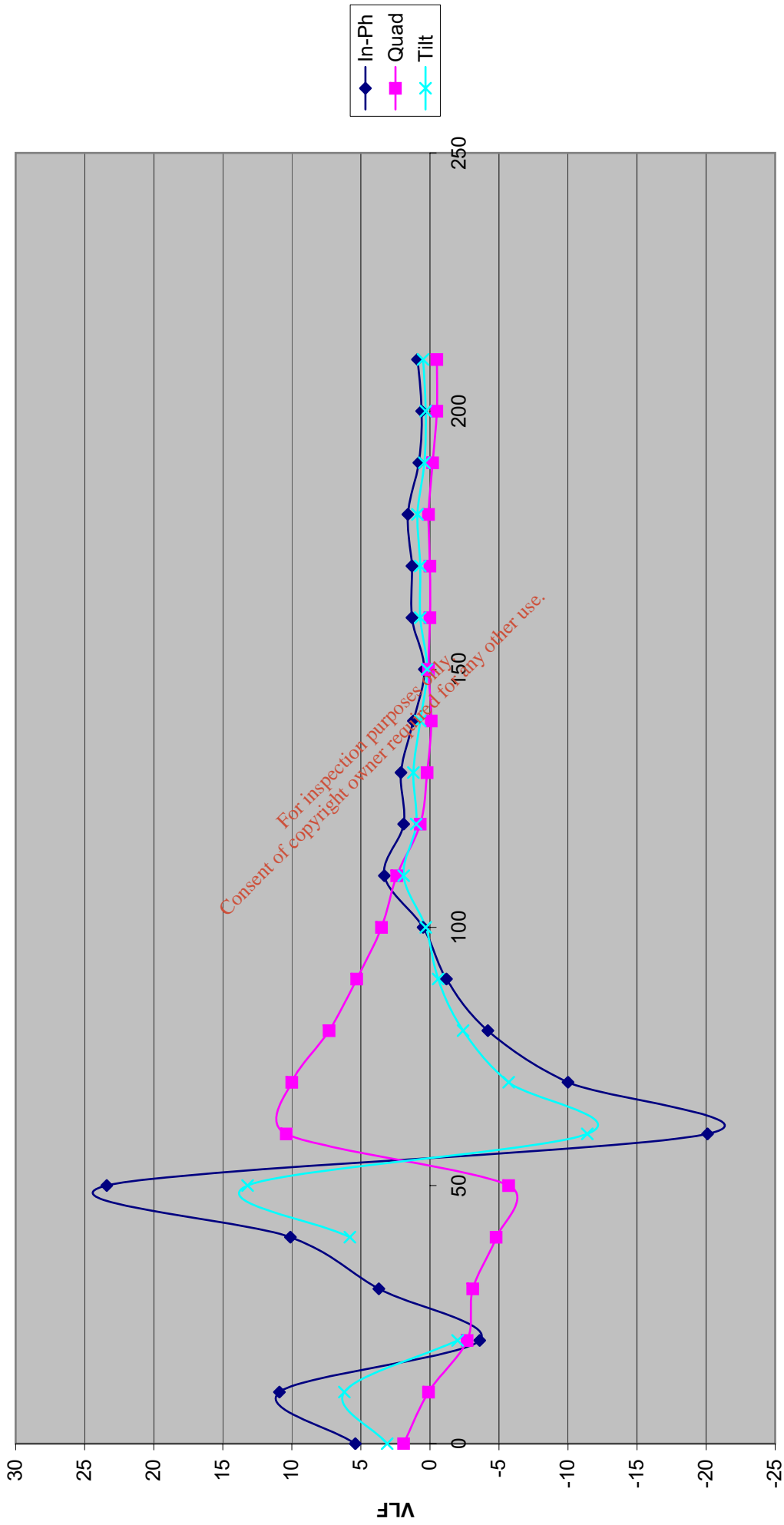
Site B Line 4



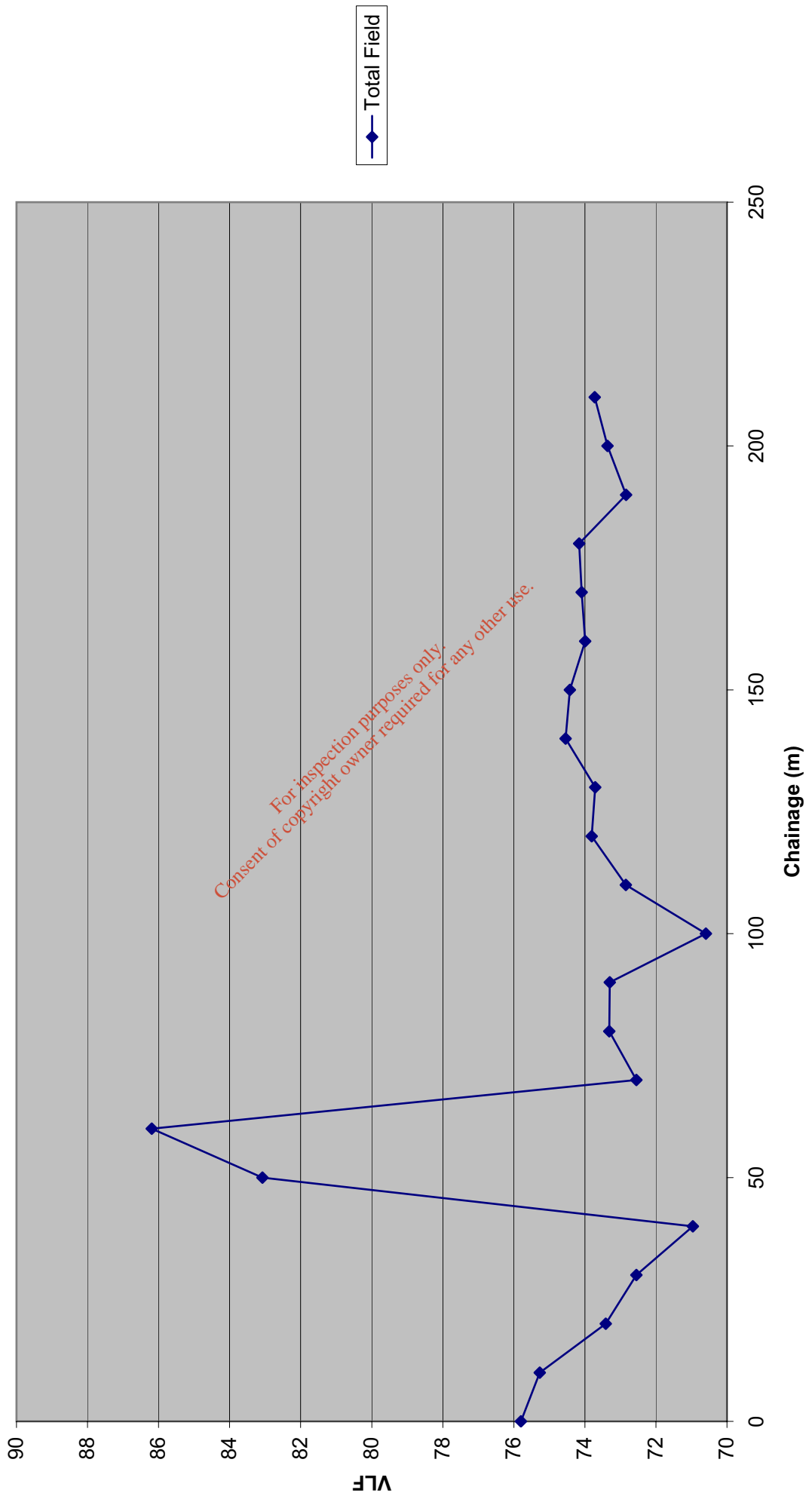
Site B Line 4 Total Field



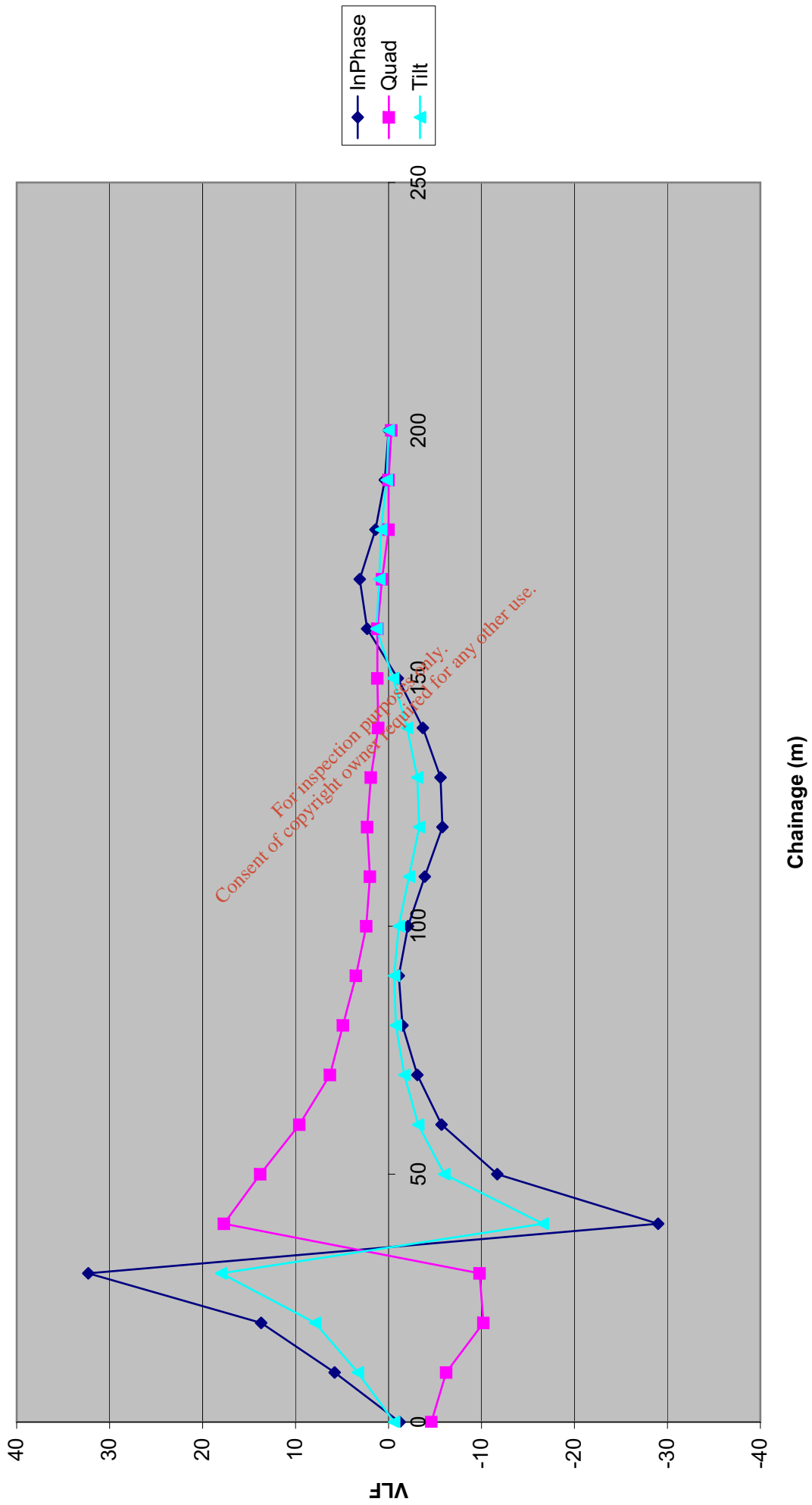
Site B Line 5



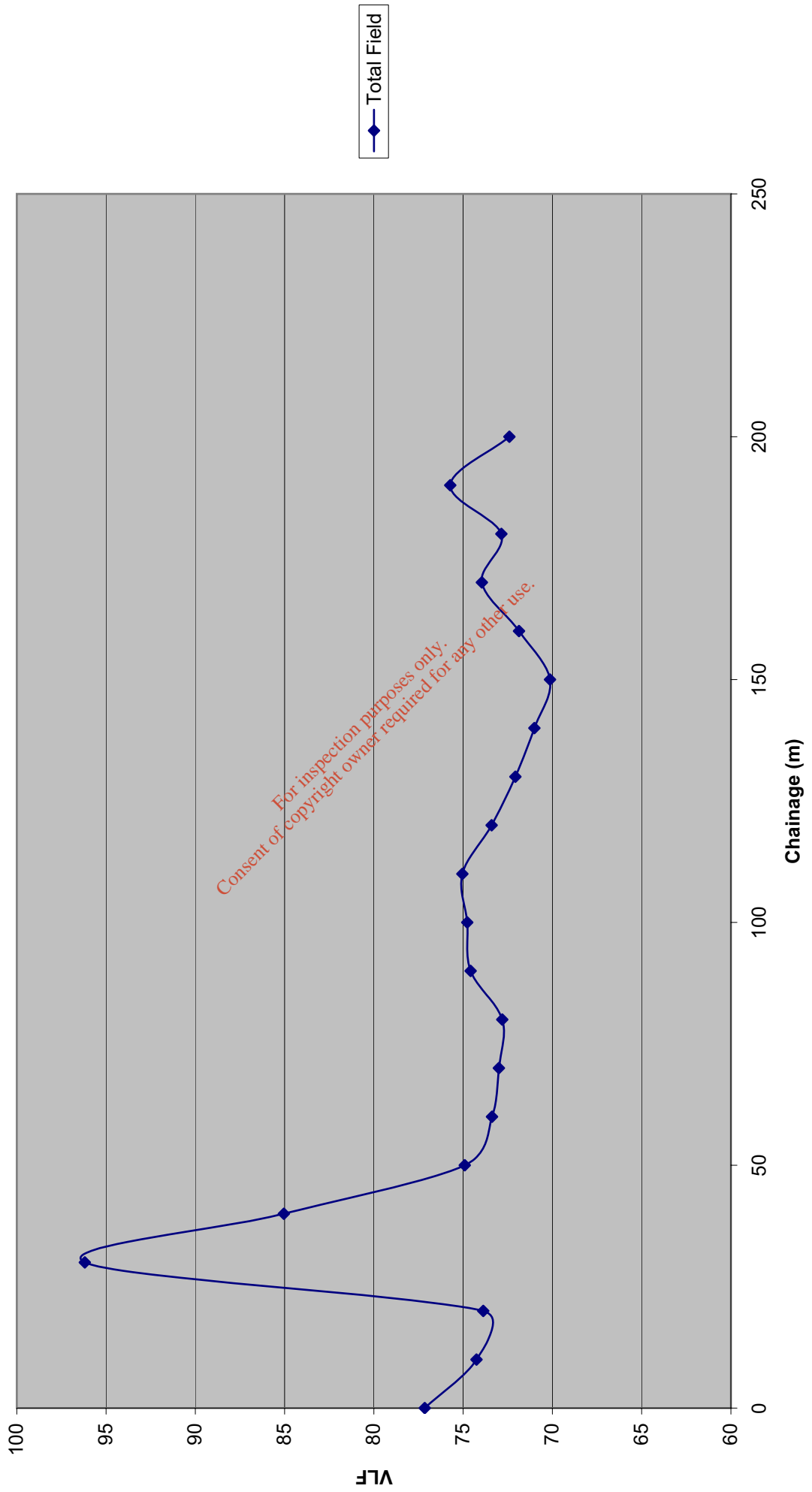
Site B Line 5 Total Field



Site B Line 6

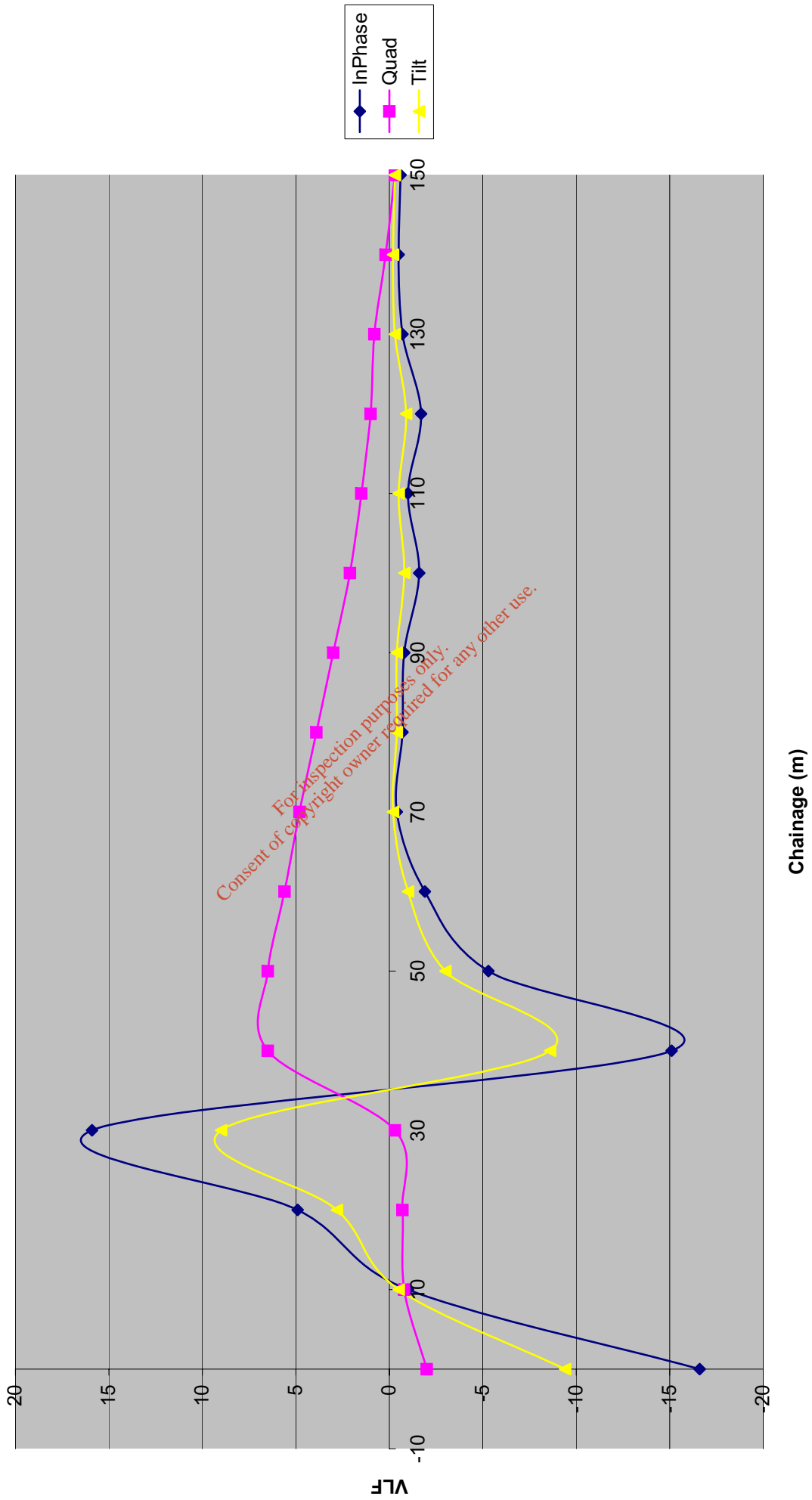


Site B Line 6 (Total Field)

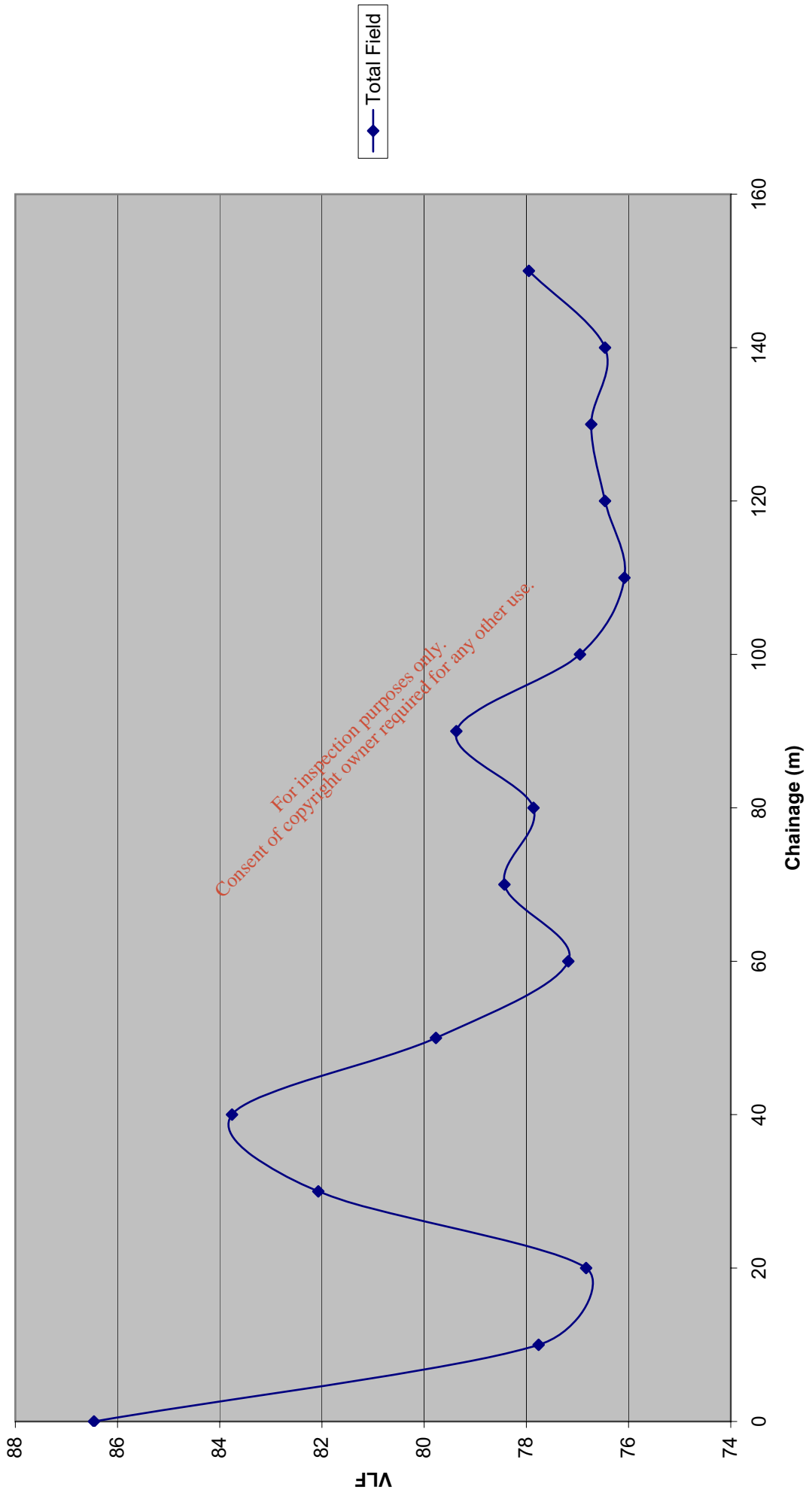


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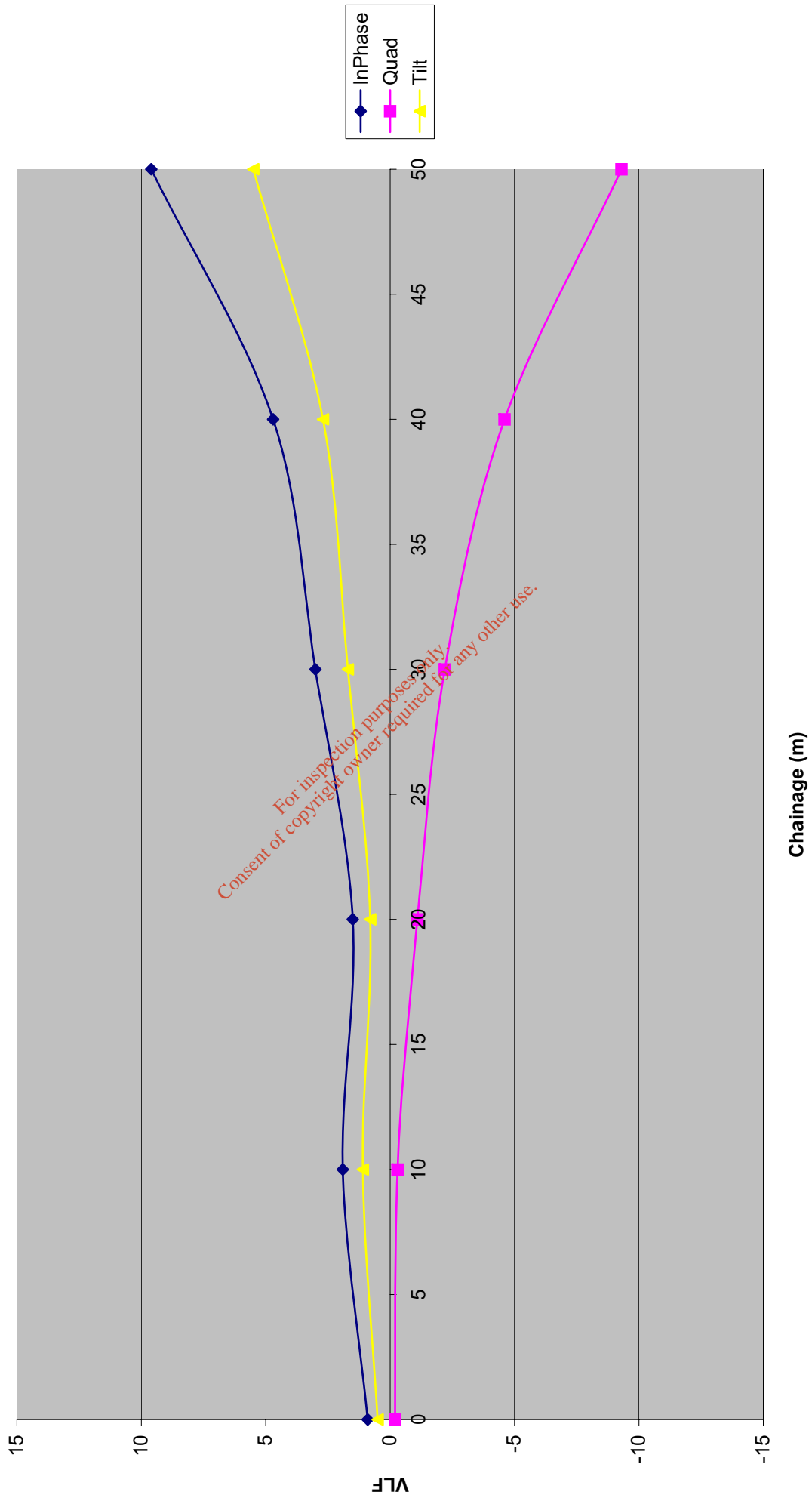
Site B Line 7



Site B Line 7 (Total Field)

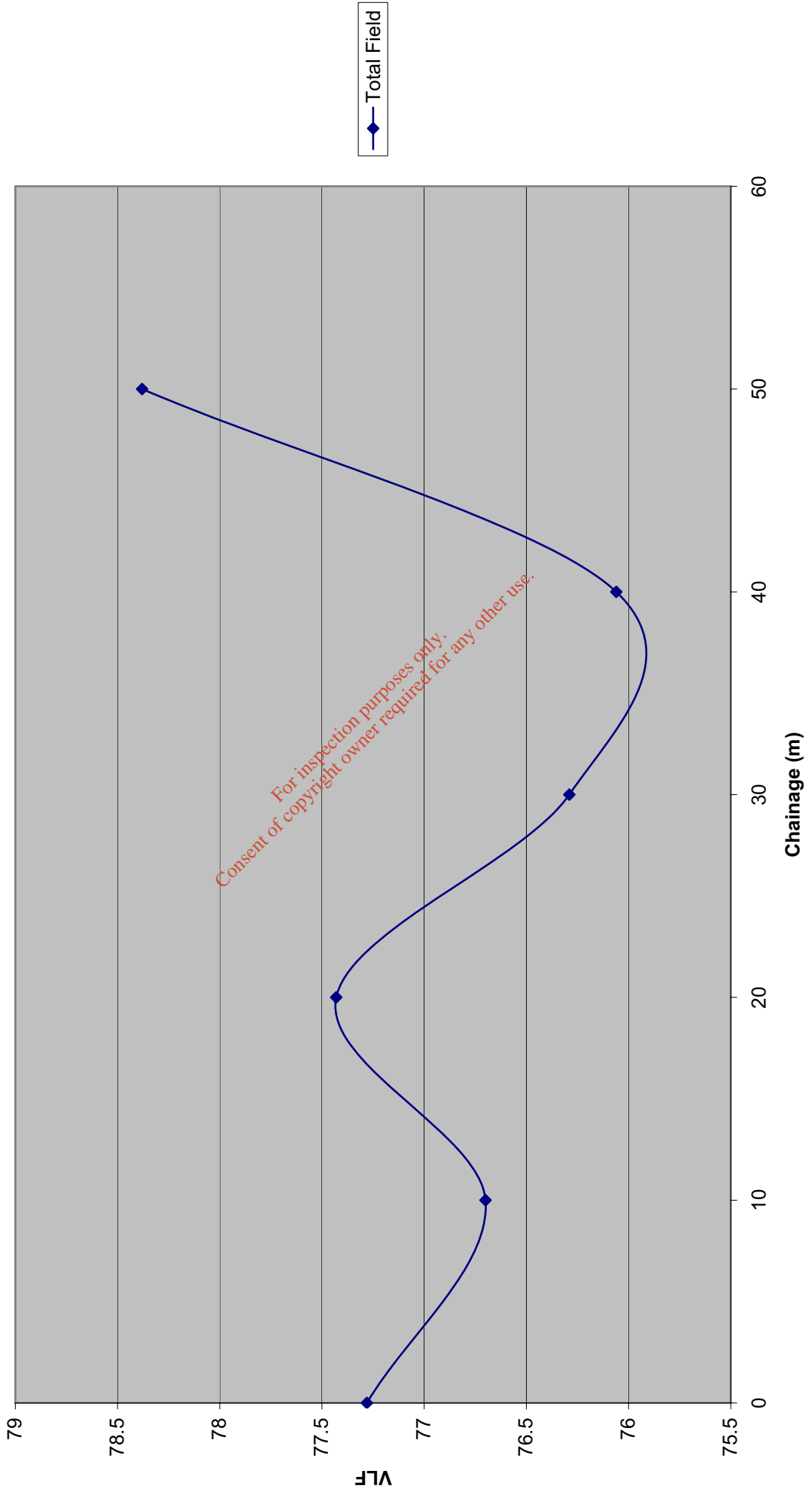


Site B Line 8

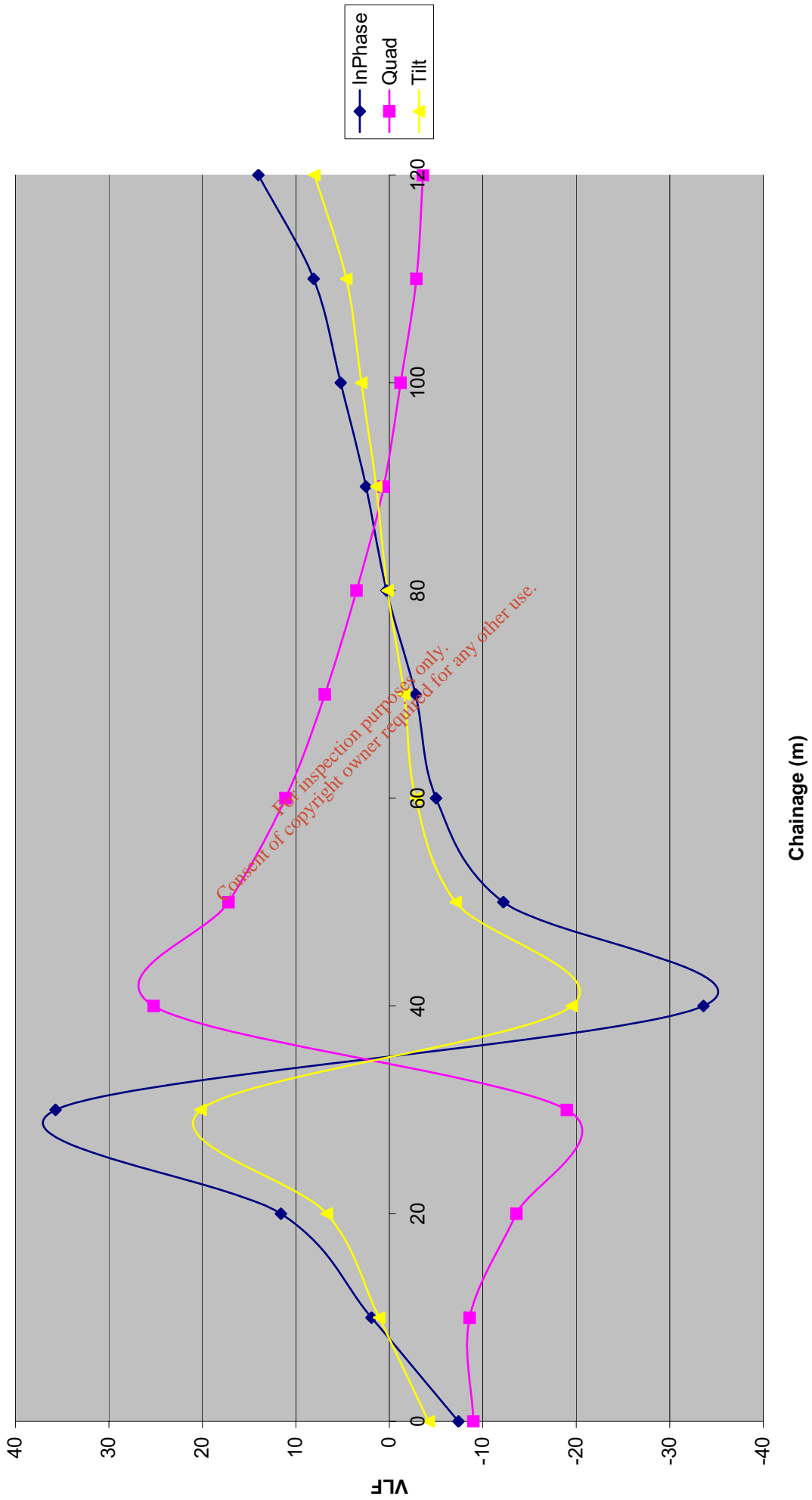


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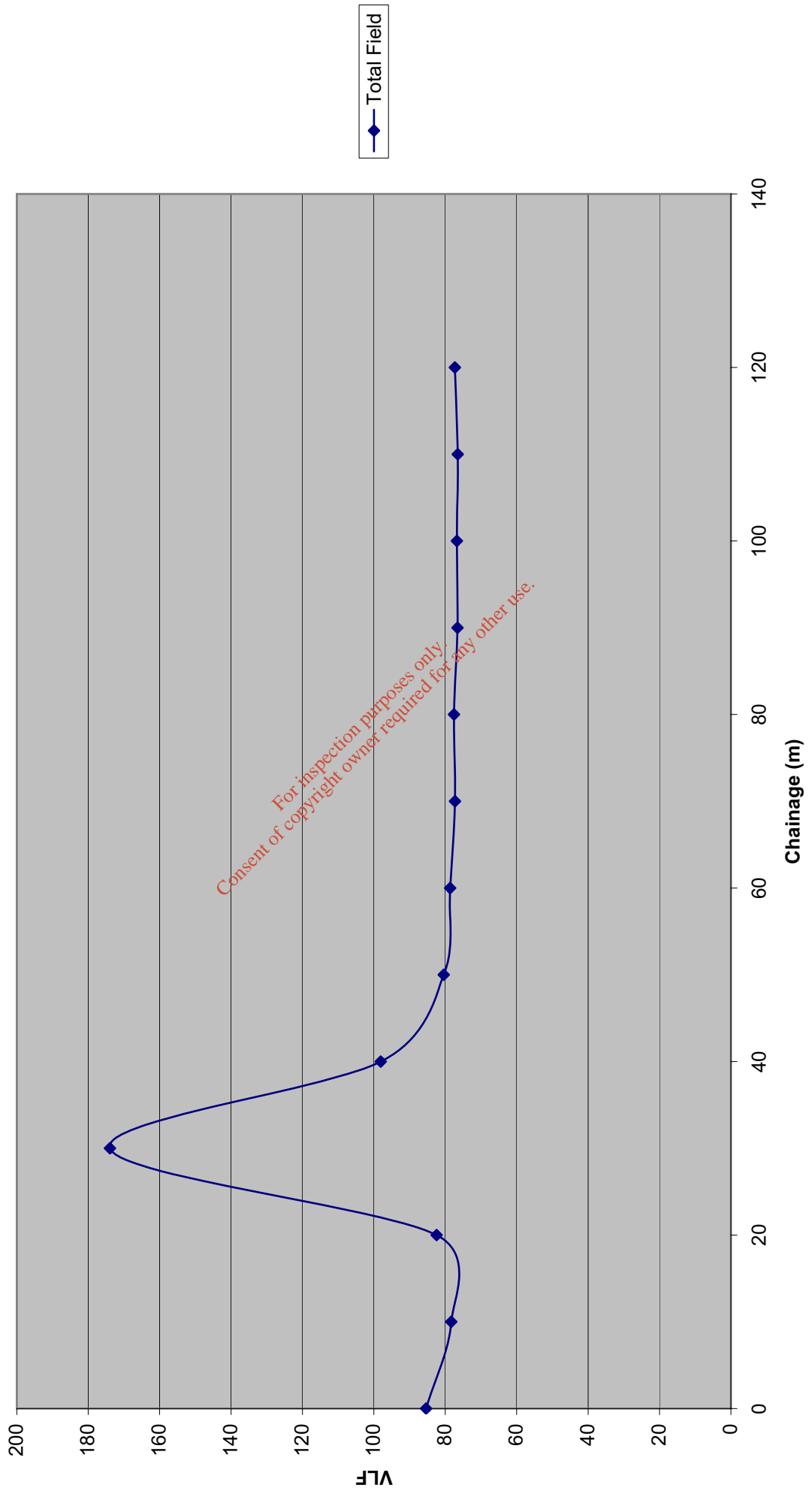
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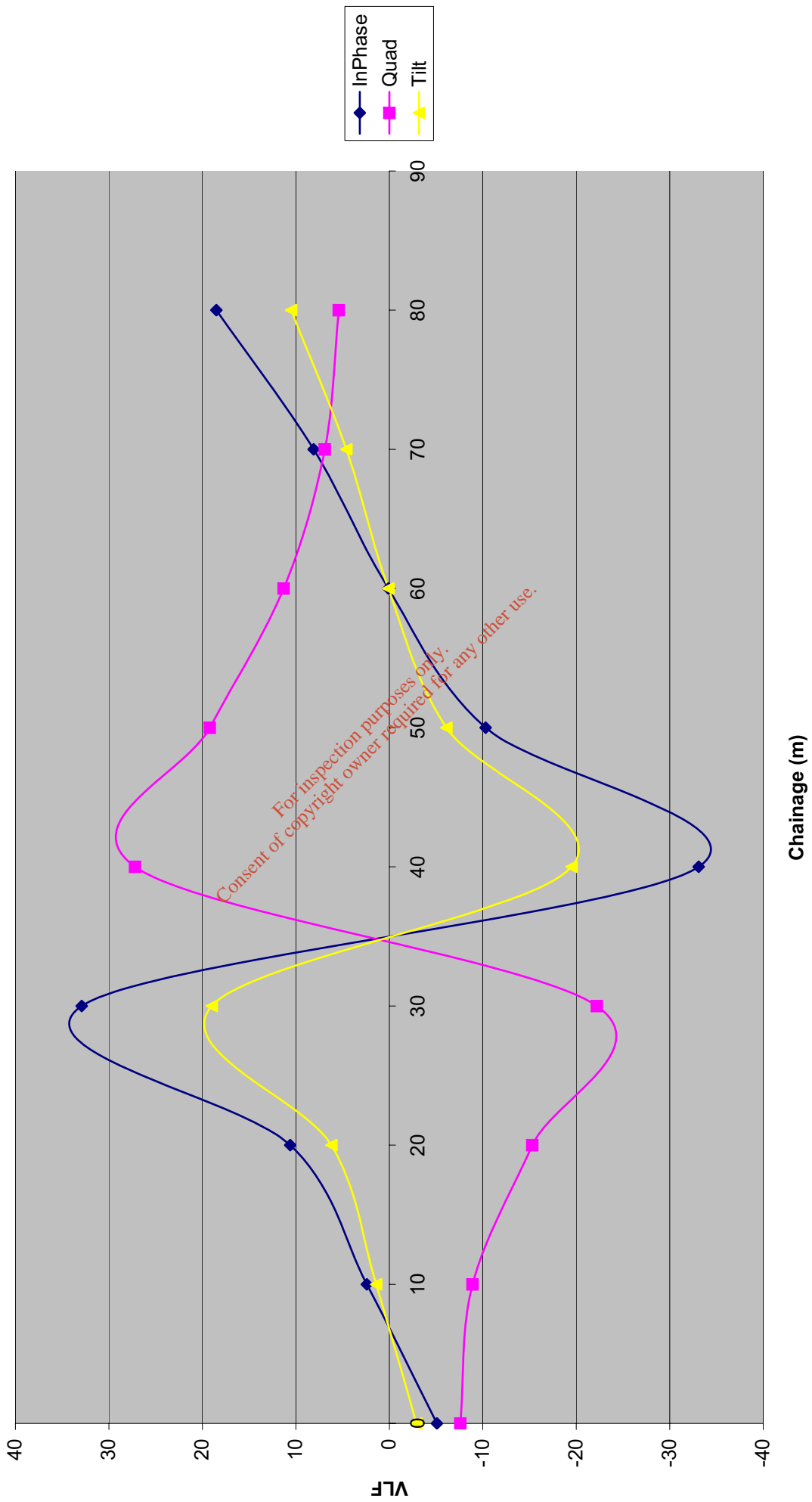
Site B Line 9



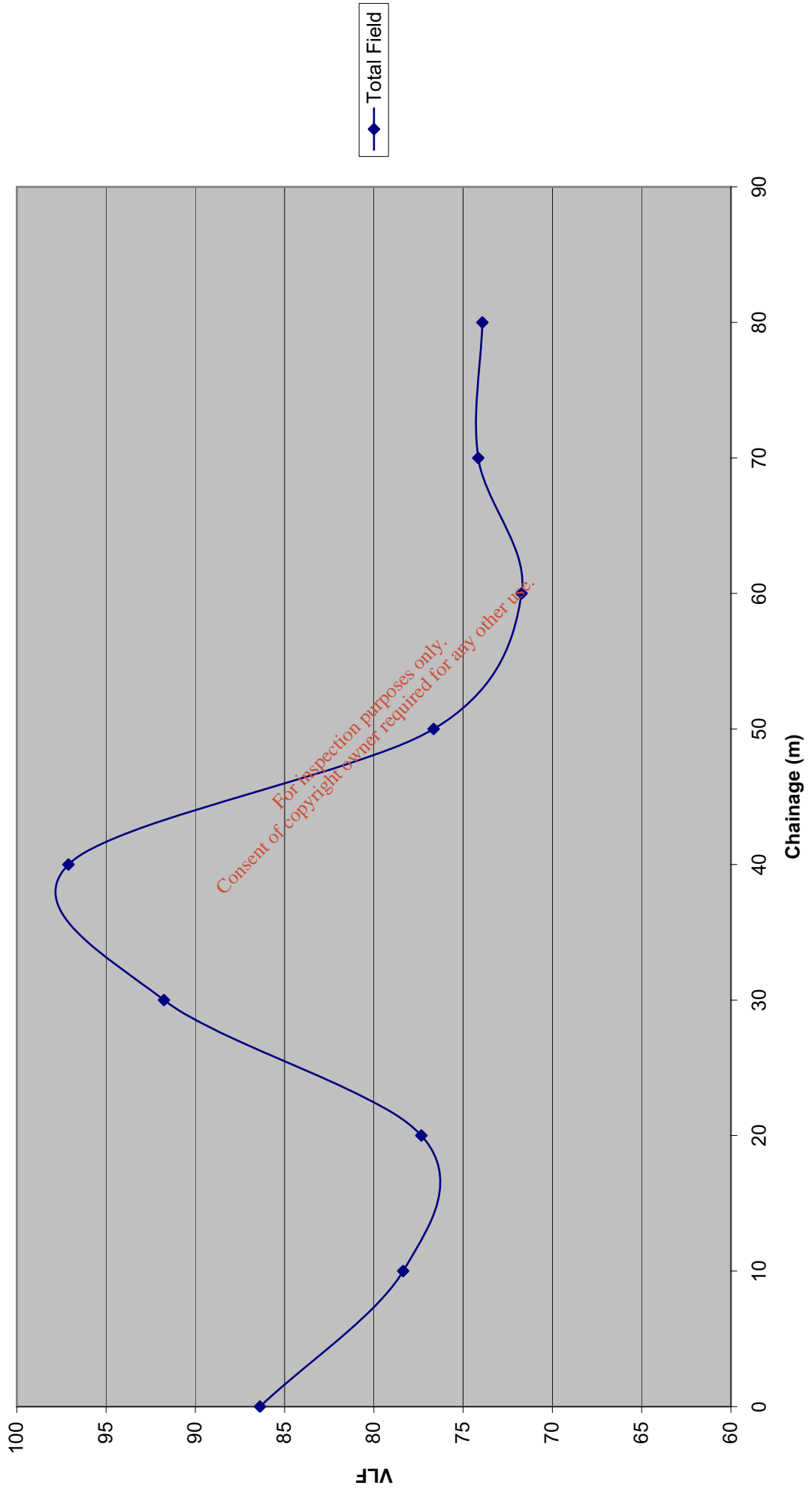
Site B Line 9 (Total Field)



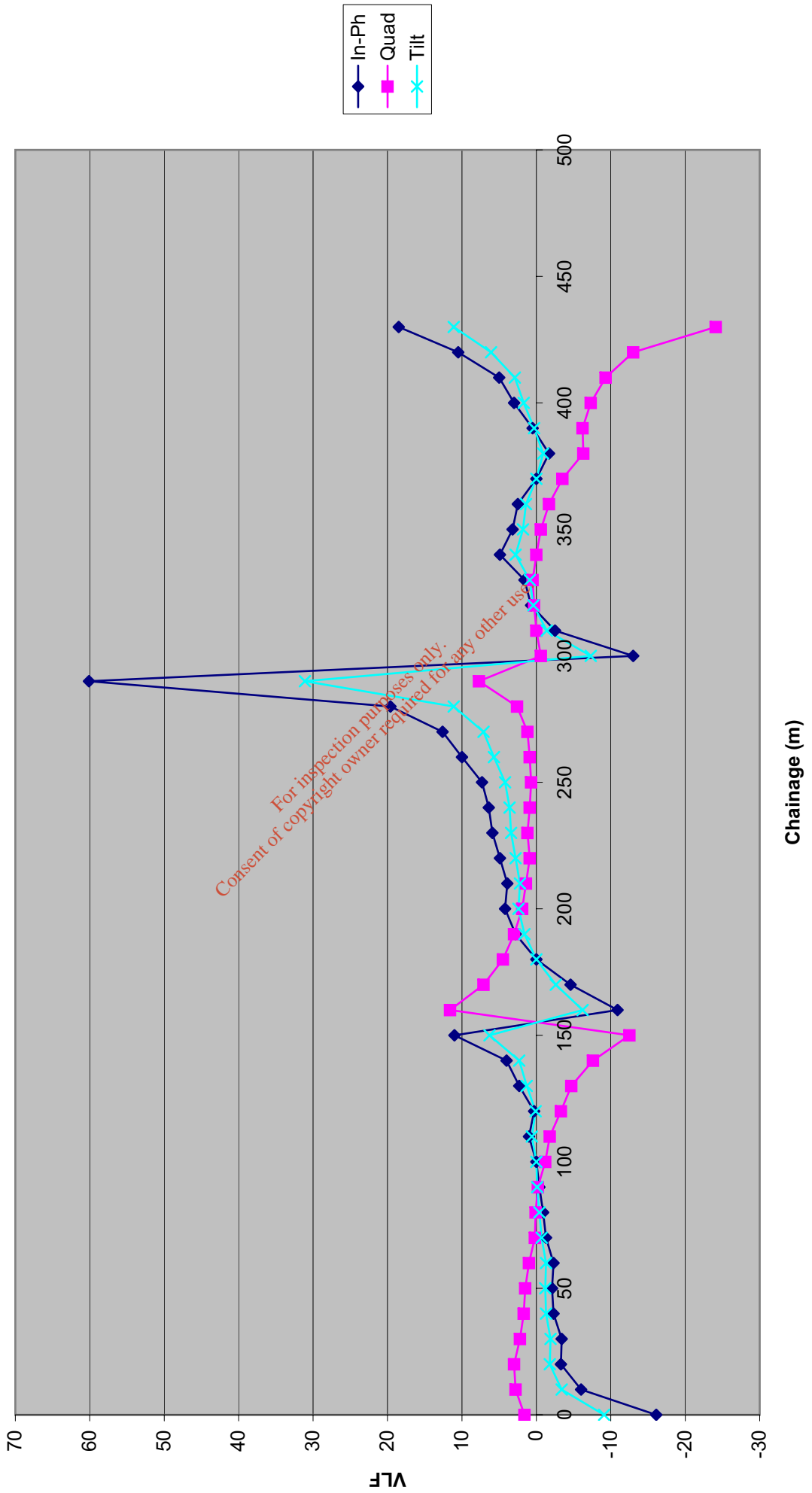
Site B Line 10



Site B Line 10 (Total Field)

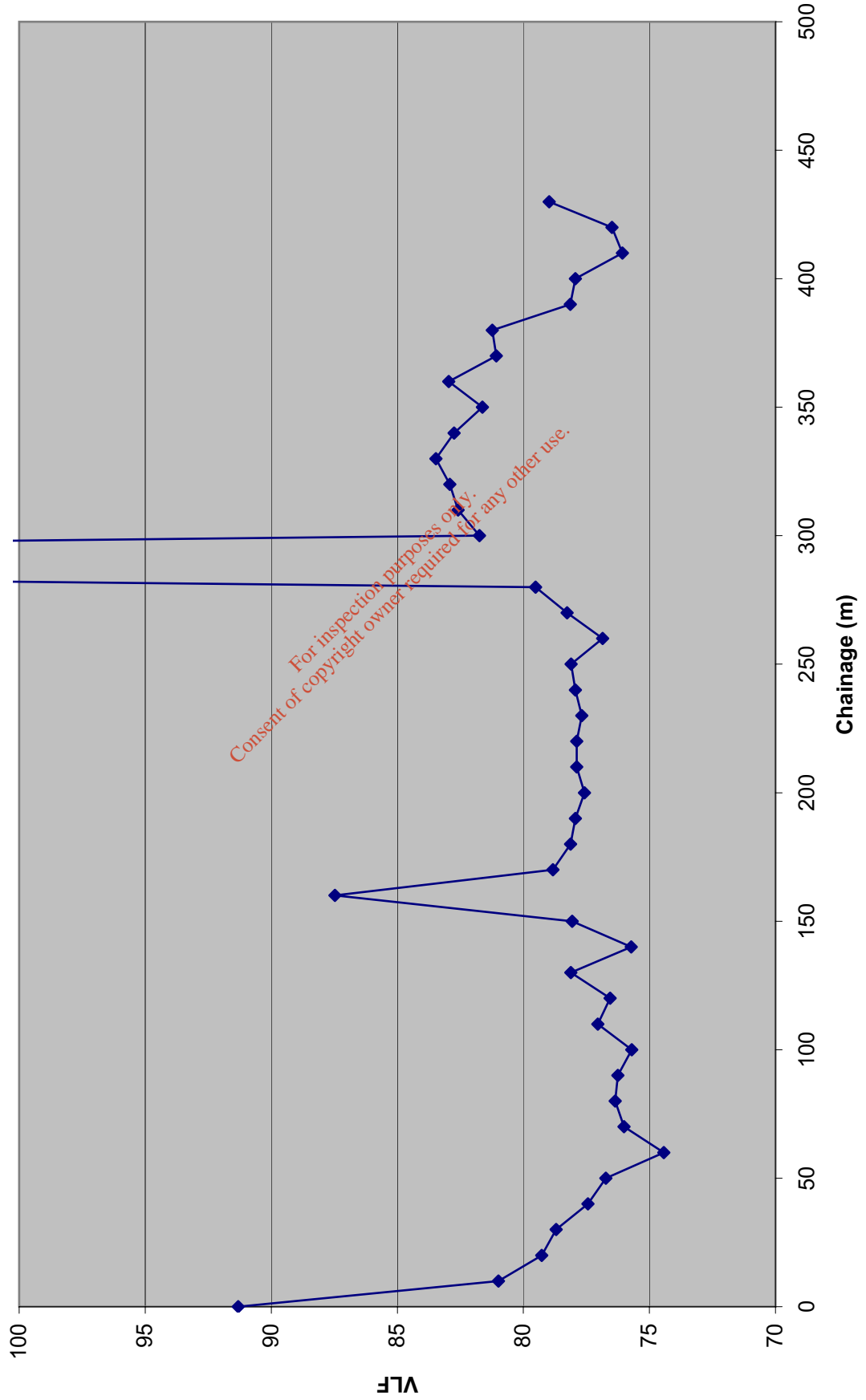


Site B Line 11

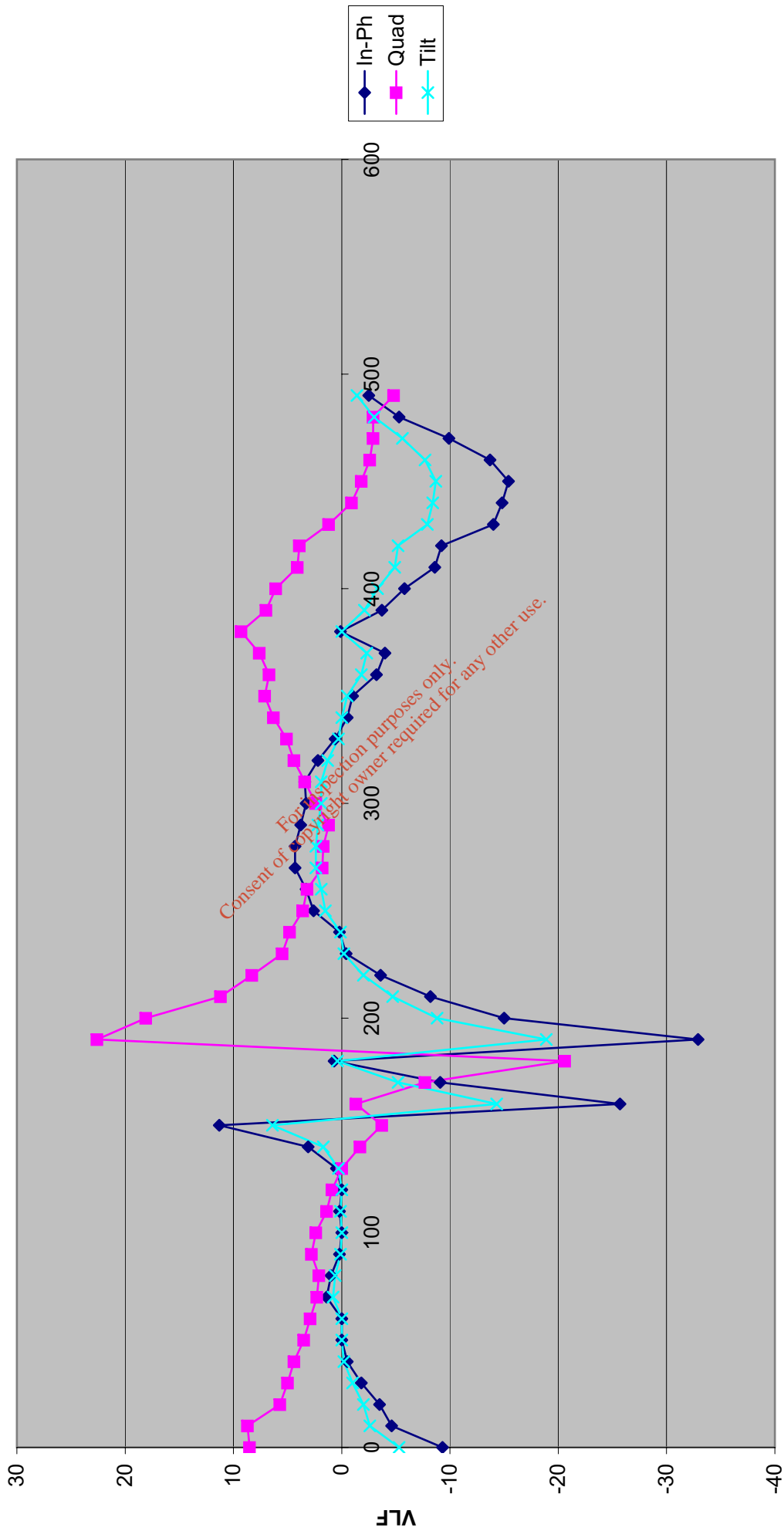


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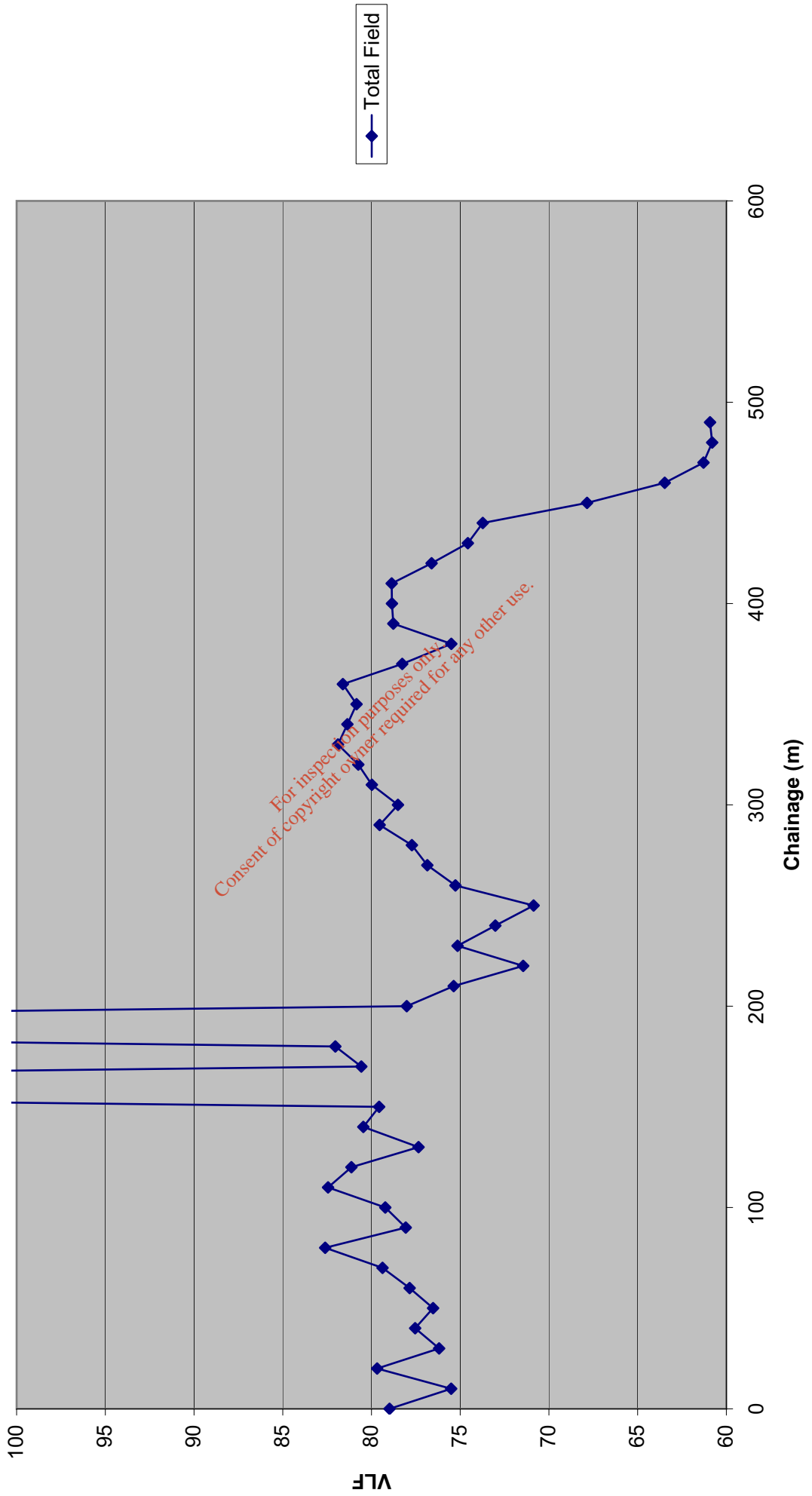
Site B Line 11 Total Field



Site B Line 12



Site B Line 12 Total Field



Appendix E Geophysical Methodology.

E1. Methods Used

- E1.1 2D-Resistivity Profiling
- E1.2 Seismic Refraction Profiling
- E1.3 VLF

E2. Equipment Used

- E2.1 2D-Resistivity Profiling
- E2.2 Seismic Refraction Profiling
- E2.3 VLF

E3. Field Procedure

- E3.1 2D-Resistivity Profiling
- E3.2 Seismic Refraction Profiling
- E3.3 VLF

E4. Data Processing

- E4.1 2D-Resistivity Profiling
- E4.2 Seismic Refraction Profiling
- E4.3 VLF

E5. Error Analysis

- E5.1 2D-Resistivity Profiling
- E5.2 Seismic Refraction Profiling
- E5.3 VLF

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E1. Methods Used

E1.1 2D-Resistivity Profiling

A basic measurement technique in resistivity work is the Wenner array, whereby four electrodes are planted along a line in the ground and a current is introduced through the two outer electrodes. The potential difference across the two inner electrodes is then measured and the resistance (physical unit: Ohm) is determined as the quotient of the potential and the current. All measurements are made with a resistivity meter.

To obtain the resistivity (physical unit: Ohm * m), which is a quantity independent of test conditions and characteristic for different soils and liquids, the following formula is applied:

$$\text{Resistivity} = 2\pi * \text{Spacing} * \text{Resistance}$$

In 2D-Resistivity a large number of resistivity measurements are taken both laterally and vertically in order to map changes in material types in these directions. This is achieved in a very efficient way by connecting a series of electrodes to the resistivity meter and using a computer to control the process of data collection and storage.

E1.2 Seismic Refraction Profiling

This method measures the travel times of the refracted seismic waves through the overburden and rock material and allows an assessment of the thickness and quality of the materials to be made. More compact materials tend to have higher seismic velocities. The depth range of the method varies with geophone spacing but for typical engineering surveys is of the order of 1 to 30 m.

E1.3 VLF

Very Low Frequency (VLF) surveying is a continuous-wave (frequency domain) electromagnetic technique that utilises high power, low frequency radio transmissions as the source. Eleven major transmitters located across the globe generate these transmissions, providing a range of frequencies from 3kHz to 24kHz. Their primary use is in communication with submerged submarines and for long-range radio positioning.

Sensed at a distance greater than a few tens of kilometres the EM transmissions act as plane waves propagating outwards horizontally. When these waves intersect a buried conductor they induce eddy currents that generate a secondary magnetic field concentric around the source of the currents. The strength of the eddy currents is greatest when the long axis of the conductor is oriented parallel to the direction of propagation (i.e. on a radial from the active transmitter). In this orientation the magnetic vector is acting tangentially. Modern VLF instruments enable measurements to be carried out at a number of different frequencies in sequence in order to ensure

optimum secondary field signal strength. However, the orientation of the survey lines still has to be chosen to lie perpendicular to the expected orientation of the targets.

E2. Equipment Used

E2.1 2D-Resistivity Profiling

The Tigre resistivity meter, a multi-core cable with 32 - 128 takeouts and 32 - 128 stainless steel electrodes were deployed and used to measure the resistivity sections.

The RES2DINV software was used for processing and viewing the data immediately after the survey (Campus Geophysical Instruments, 1997).

E2.2 Seismic Refraction Profiling

The seismic data was recorded using a 12-channel Geometrics Smartseis signal enhancement seismograph with a seismic cable and 12 vertical geophones. The seismic source was a hammer and a striking plate.

E2.3 VLF

An Scintrex ENVI VLF meter was used for the survey. The ENVI is a versatile portable VLF receiver. It can be integrated with the ENVI magnetometer/gradiometer system to conduct a full mag/em survey. The instrument does not require ground contact and can be operated by one person.

E3. Field Procedure

The locations of the geophysical measurements are shown on Maps 1 and 2

E3.1 2D Resistivity Profiling

A total of 45 2D-Resistivity profiles were undertaken across the site during the three geophysical investigations.

At each profile location one - four 5 m spacing resistivity cables with 32 take-outs were used. Contact resistance measurements were taken prior to the survey and salt solution was used where a poor electrical contact between the ground and electrode was discovered. Data was stored and checked using a field lap-top.

E3.2 Seismic Refraction Profiling

In total thirty-one seismic refraction spreads were recorded. All seismic spreads consisted of 12 collinear geophones at a spacing of 4 or 5 m. Records from five different positions were taken on each p-wave spread (2 x off-end, 2 x end, 1 x middle) to ensure optimum coverage of all refractors. A hammer and plate were used as seismic sources.

E3.2 VLF

Readings were taken along a number of profiles in the eastern part of the site and to the east of the site

A Garmin 12 XL GPS receiver was used to record the start and end of each profile. The locations of the conductivity readings are displayed on Map 1a.

E4. Data Processing

E4.1 2D-Resistivity Profiling

The field data were stored in computer files and converted within the CAMPUS resistivity meter. The resulting files were loaded into RES2DINV (Campus Geophysical Instruments, 1997), where an inversion with up to 5 iterations of the measured data was carried out for each profile to obtain a 2D-Depth model of the resistivities.

These 2D-Resistivity models and interpreted geology are displayed within the results section. The horizontal axis shows distance along the profile, while the depth (b.g.l.) is indicated at the sides. Constant contour intervals and colour codes have been used for the interpreted sections.

Note: Care should be taken when using these sections. The data displayed is real physical data that can be measured with a high repeatability, but transforming resistivities directly into geological layers requires interpretation of the geophysical results.

E4.2 Seismic Refraction Profiling

The data were processed as follows:

- (i) 'First breaks' were picked on the field records and travel-time plots constructed for each spread.
- (ii) Seismic velocity phases were picked on each travel-time plot and the thickness of each velocity unit was calculated using the intercept - time method (Redpath, 1973).

The data processing was carried out using the "FIRSTPIX" and "GREMIX" computer programs (Interpex, 1997, 1998). The travel-time graphs, depth sections and velocity graphs for each spread are contained in Appendix B.

E4.3 VLF

The data was downloaded from the meter and displayed on Excel graphs as a function of, in-phase, tilt angle, gradient and total filed against the chainage. The main VLF anomalies were picked where the VLF data switched from positive to negative.

E5. Error Analysis

The interpretation is based on the available factual information, typical geophysical responses of known materials and the experience of the author. The problem of non-uniqueness should also be considered for the modelling and interpretation of geophysical data.

E5.1 2D-Resistivity Profiling

Recorded data is restricted by the array used during the collection of data and should be noted. A degree of fit between the measured apparent resistances and the inverted resistivities is calculated by the program, allowing an assessment of the degree of confidence of the inverted data. A damping factor can be applied to smooth erroneous data points. However, resolution lessens with an increased damping factor.

It must be noted that geological interpretations from inverted resistivity data are only interpretations based on experience of the interpreter and known resistivity values of materials. Interpretations are based on contouring and smoothness constraints performed by the inversion.

E5.2 Seismic Refraction Profiling

It should be noted that layer thickness' are modeled from the seismic data, areas of greatest coverage (i.e. the centre of the spread) will have the greatest accuracy. At the edges of the spread less ray coverage reduces the accuracy of layer interpretation and thickness calculation.

Noisy data due to (wind / rain / local noise) will result in less accurate picking of the seismic traces hence resulting in increased errors or layer calculation.

Approximate errors for velocities are estimated to be +/- 10%. Errors for the calculated layer thickness are of the order of +/-15%. Possible errors due to the "hidden layer" and "velocity inversion" effects may also occur (Soske, 1959).

E5.3 VLF

VLF ground conductivity can be measured with a repeatability of 2% over typical ground, allowing the detection and accurate mapping of areas of very low conductivity contrast. VLF is sensitive to the orientation of the transmitters and their strength of signal. Great care should be taken regarding the interpretation of VLF anomalies. Either a qualitative or quantitative interpretation is based on the requirements of the interpreter and what information is extracted from the data.

VLF data is limited in its investigations by the relatively high and limited range of operating frequencies and a large spatially distributed primary field.

Depth of penetration is dependant on the skin depth a function of the conductivity of the terrain and the frequency of the source transmitter.

Qualitative interpretations can be made from the general anomaly shape however, a number of variations in the field and data can result in a number of different interpretations. Great care is required for any interpretation.

The VLF will only yield useful information only in those situations where the anomaly to be studied presents a significant and unambiguous conductivity contrast with the surrounding medium. In continuous surveys to assess ground conditions only a crude assessment of material type can be made.