B

Appendix B Borehole and Test Pit Logs

BH1A

BH1B

BH2A

BH2B

ВН3А

BH3B

BH3C

BH4A

BH4B

TP1

TP2

TP3

TP4

15	URS Wellington URS Wellington Phone: 64.4,496,3750 Pax: 64.4,496,3750 Pax: 64.4,496,3750		-	LC)G (OF I	DR	ILLH	OL	Ē			HOLE No.		В	H1A	
(PROJECT: Southern Landfill Consenting CLIENT: Wellington City Council GRID: DATUM:		C(EATURE D-ORDII AD GRO AD COLI	WG NATES: OUND:	N070 ml 130	#: 197(2 V, m!) m) m	5906) E			. AN		alley Floor M HORIZON	ΓAL:	90°		
INTERPRETATION	DESCRIPTION OF CORE COLOUR, WEATHERING, FABRIC, STRENGTH, ROCK TYPE, DEFECT SPACING, LITHOLOGICAL FEATURES (bedding, foliation, mineralogy, texture, cement etc) STRATIGRAPHIC NAME	CORE BOXES	sw www.WEATHERING	-5 CORE LOSS -10 / LIFT (%)	REDUCED LEVEL (RL)	DEРТН (m)	GRAPHIC LOG	10 20 30 SPT N-VALUE 40	SPT INTERVAL	PROMIN SHEAR A SCHISTO roughnes (OR S	ENT JOINTS AND CRUSH DSITY (attitud s, infilling, etc	CRIPTION density, water of	EAMS, SHATTER, ATION, ntinuity,	METHOD & SHIFT	HEAD TEST	.25 DRILL WATER .50 RETURN (%)	PIEZOMETER INSTALLATION
	Unweathered grey highly fractured GREYWACKE. Weat moderate strength. Fractures 2-5 cm spacing, dominant dips 20° and 45°, crosscutting. Quartz velning spacing 1-2cm, 1mm thick, dip 70°.	<-			129————————————————————————————————————	1—————————————————————————————————————	CL										
000	Unweathered grey fractured GREYWACKE. Weak. Fractures 2-5 cm spacing, dominant dlps 30° and 70°. Ruartz veining spacing 1-2cm, 1mm thick, dip 70°. BGED: JGP	on: 0 m	-24.0	m blanks	124	6—————————————————————————————————————	imm dia	meter uP\	rc,		LEVEL H	OLE DEPTH					LENGTH .11 m
		nachine	e slotte	d uPVC5	0mm dia	meter ul	٧C			lm -					m.		.1

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Engineering and Environmental Management

URS Wellington 160 Lambton Quay, Wellington Phone: 64.4.496.3750 Fax: 64.4.496.3755

LOG OF DRILLHOLE

HOLE No.

BH1A

PROJECT:

Southern Landfill Consenting Wellington City Council

FEATURE: Consent #:
WGN070197(25906)
CO-ORDINATES: mN, mE

LOCATION: Valley Floor

	CLIENT: Wellington City (GRID: DATUM:	Council		HAD	ORDIN GROU COLL		mh 130 130		,			ANGLE FROM HORIZON' DIRECTION:	ſAL:	90°			
NOTEDBEETATION	DESCRIPTION OF CORE OCULOR, WEATHERING, FABRIC, STRENG TYPE, DEFECT SPACING, LITHOLOGICAL F (bedding, foliation, mineralogy, toxture,	TH, ROCK CEATURES CO.	COKE BOXES	SW MW WEATHERING HW	-5 CORE LOSS -10 / LIFT (%)	REDUCED LEVEL (RL)	DEРТН (m)	GRAPHIC LOG	10 20 30 SPT N-VALUE 40	SPT INTERVAL	SAMPLES	DEFECT DESCRIPTION PROMINENT JOINTS, BEDDING, SEAMS, SHATTER, SHEAR AND CRUSH ZONES, FOLIATION, SCHISTOSITY (atitude, spading, continuity, roughness, infilling, etc.) (OR SOIL DESCRIPTION) (consistency, relative density, water content, plasticity, grading, group symbol etc.)	METHOD & SHIFT	HEAD TEST	.35 DRILL WATER .30 RETURN (%)	PIEZOMETER	INSTALLATION
	Unweathered grey fractured GREYW Fractures 2-5 cm spacing, dominant Quartz veining spacing 1-2cm, 1mm (continued)	/ACKE, Weak. dips 30° and 70°. thick, dip 70°.															
	Unweathered grey fractured GREYW strength. Fractures 5-10 cm spacing 70°, and 80°. Quartz veining spacin thick, cross cutting.	/ACKE, Moderate , dominant dips 30°, g 1-5cm, 1-3mm				119	11					e.					
			2			118— 	12										
						116—	14										
							15										
) 1 I I I I I I I I I I I I I I I I I I	Unweathered grey fractured GREYV strength. Fractures 1-4 cm spacing, 80° in one interval, 45°, 70° in anoth spacing 5-10cm, 2-3mm thick, cross	VACKE. Moderate dominant dips 70°, er. Quartz vein cutting.				114—	16-										
ILLING.GPJ AGS3_UK.GDI			3			113—	17-										
SOUTHERN LANDFIL DRILLING. GPJ						112-	18-										
- SOIL-GEN DESC SO	Unweathered grey fractured GREYV strength. Fractures 5-10 cm spacing Quartz vein spacing 3-4cm, 1-2mm to dominant dips 30°, 45°.	VACKE. Moderate g, dominant dip 70°. Ihick, cross cutting,				111-	19										
	LOGOTO LOGUETO	LDEMARKO.		:::		1 -	-	1::::] : : : :		L	DRILLING WATER LEVELS:]::::	1000	I EN	OTU

GEOTECH DRILLHOLE - SOIL-GEN DESC SOUTHERN LANDFIL DRILLING GPJ AGS3 UK.GDT 1:

DRILLER: LR Websters LOGGED: JGP 2/08/2007 CHECKED:

TJM

Diamond Coring HQ

REMARKS: Well installation: 0 m - 24.0m blank screw together 50mm diameter uPVC, 24.0-30.0 m machine slotted uPVC50mm diameter uPVC Backfill: 0m-0.5m concrete, 0.5m-19.3m backfill, 19.3m-21.8m bentonite, 21.8m - 22.8m blinding sandl, 22.8m-30.11m 7/14 Walton Park sand. | DRILLING WATER LEVELS: | LEVEL | HOLE DEPTH | DATE/TIME | 0.00 | 30.11 | 22/08/2007 12:00:00 p.m.

HOLE LENGTH:

Sheet 2 of 4

HOLE URS Wellington 160 Lambton Quay, Wellington Phone: 64.4.496.3750 Fax: 64.4.496.3755 URS New Menagement BH1A LOG OF DRILLHOLE No. LOCATION: Valley Floor FEATURE: Consent #: WGN070197(25906)
CO-ORDINATES: mN, mE
HAD GROUND: 130 m Southern Landfill Consenting PROJECT: CLIENT: Wellington City Council ANGLE FROM HORIZONTAL: 90° GRID: 130 m DIRECTION: DATUM: HAD COLLAR: DEFECT DESCRIPTION DESCRIPTION OF CORE WEATHERING PIEZOMETER INSTALLATION PROMINENT JOINTS, BEDDING, SEAMS, SHATTER, SHEAR AND CRUSH ZONES, FOLIATION, SCHISTOSTY (attitude, spacing, continuity, roughness, Infilling, etc.) UCED LEVEL (RL) N-VALUE SPT INTERVAL DRILL WATER RETURN (%) CORE LOSS /LIFT (%) METHOD & SHIF Ê SAMPLES TEST COLOUR, WEATHERING, FABRIC, STRENGTH, ROCK TYPE, DEFECT SPACING, LITHOLOGICAL FEATURES bedding, foliation, mineralogy, texture, perment etc) STRATIGRAPHIC NAME GRAPHIC HEAD T SPT (OR SOIL DESCRIPTION) (consistency, relative density, water content, plasticity, grading, group symbol etc.) ង់ ន់ k NW AH ω 2 8 5 8 8 **8** Unweathered grey fractured GREYWACKE. Moderate strength. Fractures 5-10 cm spacing, dominant dip 70°, Quartz vein spacing 3-4cm, 1-2mm thick, cross cutting, dominant dips 30°, 45°.(continued) 109 21 Unweathered grey moderately fractured GREYWACKE. Moderately strong to weak. Fractures 1-5 cm spacing above 23.9m, 5-10cm spacing 23.9m - 28.16m. 107 23-106-24 105-25 104-26-AGS3_UK.GDT_11 103-27 DRILLING.GPJ 102-28-Unweathered grey moderately fractured GREYWACKE. Weak. Fractures 1-5 cm spacing, dominant dips 30°, 70°-80°. 101 29 DRILLING WATER LEVELS: HOLE LENGTH: LOGGED: DRILLER: Well installation: 0 m - 24.0m blank screw together 50mm diameter uPVC, 24.0-30.0 m machine slotted uPVC50mm diameter uPVC Backfill: 0m-0.5m concrete, 0.5m-19.3m backfill, 19.3m-21.8m bentonite, 21.8m - 22.8m blinding sandi, 22.8m-30.11m 7/14 Walton Park sand. LEVEL HOLE DEPTH 0,00 30,11 DATE/TIME 22/08/2007 12:00:00 p.m. JGP 2/08/2007 30.11 m Websters CHECKED: RIG: Sheet 3 of 4

Diamond Coring HQ

TJM

URS Wellington 160 Lambton Quay, Wellington Phone: 64.4.496.3750 Fax: 64.4.495.3755 HOLE URS New Zealand BH1A LOG OF DRILLHOLE No. FEATURE: Consent #:
WGN070197(25906)
CO-ORDINATES: mN, mE LOCATION: Valley Floor PROJECT: Southern Landfill Consenting CLIENT: Wellington City Council HAD GROUND: 130 m ANGLE FROM HORIZONTAL: 90° GRID: 130 m HAD COLLAR: DIRECTION: DATUM: DESCRIPTION OF CORE DEFECT DESCRIPTION WEATHERING PROMINENT JOINTS, BEDDING, SEAMS, SHATTER, SHEAR AND CRUSH ZONES, FOLIATION, SCHISTOSITY (attitude, spacing, continuity, roughness, infilling, etc.) METHOD & SHIFT DRILL WATER RETURN (%) PIEZOMETER INSTALLATION (%) SSOT REDUCED LEVEI (RL) COLOUR, WEATHERING, FABRIC, STRENGTH, ROCK TYPE, DEFECT SPACING, LITHOLOGICAL FEATURES (bedding, foliation, mineralogy, texture, cement etc) STRATIGRAPHIC NAME DEPTH (m) CORE BOXES SAMPLES HEAD TEST SPT (OR SOIL DESCRIPTION) SPT (consistency, relative density, water content, plasticity, grading, group symbol etc.) SW MW HW **ki ki ki** 5884 99-31 98-32-96 95-35 36-SOUTHERN_LANDFIL_DRILLING.GPJ AGS3_UK.GDT 1 37 DRILLHOLE - SOIL- GEN DESC 39-DRILLER: LR Websters DRILLING WATER LEVELS: HOLE LENGTH: REMARKS: LOGGED: Well installation: 0 m - 24.0m blank screw together 50mm diameter uPVC, 24.0-30.0 m machine slotted uPVC50mm diameter uPVC Backfill: 0m-0.5m concrete, 0.5m-19.3m backfill; 19.3m-21.8m bentonite, 21.8m - 22.8m blinding sandi, 22.8m-30.11m 7/14 Walton Park sand. LEVEL HOLE DEPTH DATE/TIME 0.00 30.11 22/08/2007 12:00:00 p.m. JGP 2/08/2007 30.11 m CHECKED:

Sheet 4 of 4

RIG:

Diamond Coring HQ

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LOG OF DRILLHOLE

HOLE No.

BH1B

PROJECT: CLIENT:

Southern Landfill Consenting Wellington City Council

FEATURE: Consent #:
WGN070197(25906)
CO-ORDINATES: mN, mE
HAD GROUND: 130 m

LOCATION: Valley Floor

	TUM:			HAD	COLL	.AR:	130) m				DIRECTION:		90°		
lδl	ESCRIPTION OF CORE DLOUR, WEATHERING, FABRIC, STRENGTH, PE, DEFECT SPACING, LITHOLOGICAL FEAT adding, foliation, mineralogy, texture, ment etc) STRATIGRAPHIC NAME	ROCK TURES	CORE BOXES	sw mw WEATHERING HW	-5 CORE LOSS -30 / LIFT (%)	REDUCED LEVEL (RL)	ОЕРТН (m)	GRAPHIC LOG	10 20 30 SPT N-VALUE 40	SPT INTERVAL	SAMPLES	DEFECT DESCRIPTION PROMINENT JOINTS, BEDDING, SEAMS, SHATTER, SHEAR AND CRUSH ZONES, FOLLATION, SCHISTOSITY (attitude, spacing, continuity, roughness, infilling, etc.) (OR SOIL DESCRIPTION) (consistency, relative density, water content, plasticity, grading, group symbol etc.)	METHOD & SHIFT	HEAD TEST	25 ORILL WATER 26 RETURN (%)	PIEZOMETER INSTALLATION
	ole drilled using air rotary - no core rec	covery. For		GG .	ф.	129————————————————————————————————————	3		G. C.			gracing, group symbol etc.)			25.	
LOGO	GED: DRILLER: JGP LR Websters CKED: TJM Air Rotary HQ	REMARKS: Well installation: m machine slotte Backfill: 0m-0.3n sand.	ed u	ıPVC50n	nm diam	eter uPV	'C					DRILLING WATER LEVELS: LEVEL HOLE DEPTH DATE/ 0.10 11.00 22/08/2007 12:0		.m.	HOLE I	.00 m

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LOG OF DRILLHOLE

HOLE No.

BH1B

Southern Landfill Consenting Wellington City Council PROJECT: CLIENT: GRID:

LOCATION: Valley Floor

FEATURE: Consent #:
WGN070197(25906)
CO-ORDINATES: mN, mE
HAD GROUND: 130 m

ANGLE FROM HORIZONTAL: 90°

	GRID: DATUM:		GROU COLL		130 130	m m			ANGLE FROM HORIZONT DIRECTION:	AL:	90°		
NOTEDBOOTATION	DESCRIPTION OF CORE COLOUR, WEATHERING, FABRIC, STRENGTH, ROCK TYPE, DEFECT SPACING, LITHOLOGICAL FEATURES (bedding, foliation, mineralogy, texture, comment etc) STRATIGRAPHIC NAME	sw mw WEATHERING hw	-10 CORE LOSS -50 / LIFT (%)	REDUCED LEVEL (RL)	DEPTH (m)	GRAPHIC LOG	20 30 SPT N-VALUE 40	SPT INTERVAL SAMPLES	DEFECT DESCRIPTION PROMINENT JOINTS, BEDDING, SEAMS, SHATTER, SHEAR AND CRUSH ZONES, FOLLATION, SCHISTOSITY (attitude, spacing, continuity, roughness, infilling, etc.) (OR SOIL DESCRIPTION) (consistency, relative density, water content, plasticity, grading, group symbol etc.)	METHOD & SHIFT	HEAD TEST	25 DRILL WATER 30 RETURN (%)	PIEZOMETER INSTALLATION
	Hole drilled using air rotary - no core recovery. For geological details, see BH1A log.(continued)			110		:							
GEOTECH DAILE-SOIL-GEN DESC SOUTHERN LANDTIL DRILLING, GPJ AGSS UNGDT 1:				118	11								
- L. 1.0. L.	LOGGED: DRILLER: REMARKS: JGP LR Well installation: 0 m Websters m machine slotted up	- 2.0 m	blank p	ush toge	ther 50mi	m dian	neter uPVC	2.0	DRILLING WATER LEVELS: m - 11	IME 0:00 =		i .	LENGTH: .00 m
ט פרט ורטיי	CHECKED: RIG: m machine slotted up Backfill: 0m-0.3m cor sand. TJM Air Rotary HQ	ncrete, 0	qiam),3 - 1,3i	n bentor	nite, 1.3m	-11m :	7/14 Walto	n Park		-,00 p		Sheet	2 of 2

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LOG OF DRILLHOLE

HOLE No.

BH2A

PROJECT:

Southern Landfill Consenting Wellington City Council

LOCATION: Wind Turbine

CLIENT: GRID: DATUM:

ANGLE FROM HORIZONTAL: 90°

	DATUM:		HA	D COL	LAR:	290) m				DIRECTION	ON:		-		
INTERPRETATION	DESCRIPTION OF CORE COLOUR, WEATHERING, FABRIC, STRENGTH, ROCK TYPE, DEFECT SPACING, LITHOLOGICAL FEATURES (bedding, foliation, mineralogy, texture, cement etc) STRATIGRAPHIC NAME	CORE BOXES	sw mw WEATHERING Hw	-5 CORE LOSS -10 / LIFT (%)	REDUCED LEVEL (RL)	DEPTH (m)	GRAPHIC LOG	10 20 30 SPT N-VALUE 40	SPT INTERVAL	PROMI SHEAR SCHIST roughn	ECT DESCRIPTION INENT JOINTS, BEDDING RAND CRUSH ZONES, F TOSITY (attitude, spacing ess, infilling, etc.) SOIL DESCRIPTION TO THE CONTROL OF THE CONTROL TO	G, SEAMS, SHATTER, FOLIATION, continuity,	METHOD & SHIFT	HEAD TEST	25 DRILL WATER 50 RETURN (%)	PIEZOMETER INSTALLATION
_	No core recovery	\vdash	S € £		ļ			5888	\vdash	grading	, group symbol etc.)		<u></u>	 		\// \ \ \/
					289—	1							12/04/2007			
					287—	3										
	Highly weathered light yellow orange fractured GREYWACKE. Alternating bands (approx 10 cm thick) of very weak to extremley weak brock. Extremley weak bands: Silly sand, very soft, moist, moderate plasticity, minor fine gravel.				286	4	× × × × × × × × × × × × × × × × × × ×									
	moderate plasticity, minor fine gravel.				285—	5— 1———————————————————————————————————	××××××××××××××××××××××××××××××××××××××						orning water dip water at 13.2m			
		1			283—		× × × × × × × × × × × × × × × × × × ×						momi			
					282-	8 - 1 - 1	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx									
					281-	9-	× × × × × × × × × × × × × × × × × × ×									
.C	DGGED: DRILLER: REMARKS: JGP LR/HW/LG Well installation:					-	× × × × × × × × × × × × × × × × × × ×				DRILLING WA	TER LEVELS: PTH DATE/T			HOLE	LENGTH:

DRILLHOLE - SOIL- GEN DESC SOUTHERN_LANDFIL_DRILLING.GPJ AGS3_UK GDT 19.

DRILLER: LR/HW/LG Websters GGED: JGP 1/08/2007 CHECKED: RIG:

TJM

Diamond Coring HQ

Well installation: 0 m - 89.5 m blank screw together 50mm diameter uPVC, 89.5 m - 104.5 m machine slotted uPVC50mm diameter uPVC
Backfill: 1m-4m bentonite, 4m-16m backfill, 16m-18m bentonite, 18m - 36m backfill, 36m-38m bentinite, 38m-53.5m backfill, 53.5m-56m bentinite, 56m-74.5m backfill, 74.5m-80.5m bentonite, 80.5m-82.0m blinding sand, 82.0m-101.5m 7/14 Walton Park sand, 101.5m-104.5m hole collapse around piezo.

| DRILLING WATER LEVELS: | LEVEL | HOLE DEPTH | DATI | 3.62 | 14.75 | 21/07/2007 7: 3.86 | 59.96 | 20/08/2007 7: 11.27 | 41.58 | 30/07/2007 7: 11.27 | 41.58 | 30/07/2007 7: 12.32 | 88.50 | 9/08/2007 7: 12.70 | 104.11 | 16/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 7: 10.10 | 107/08/2007 R LEVELS:

DATE/TIME

21/07/2007 7:30:00 a.m.
2/08/2007 7:30:00 a.m.
25/07/2007 7:30:00 a.m.
30/07/2007 7:30:00 a.m.
9/08/2007 7:30:00 a.m.
4/08/2007 7:30:00 a.m.
4/08/2007 7:30:00 a.m.
4/08/2007 7:30:00 a.m.

104.50 m Sheet 1 of 11

URS New Zealand

URS Wellington 160 Lambton Quay, Wellington Phone: 64.4.496.3750 Fax: 64.4.496.3755

LOG OF DRILLHOLE

FEATURE: Consent #:
WGN070197(25906)
CO-ORDINATES: mN, mE

LOCATION: Wind Turbine

No.

HOLE

BH2A

PROJECT:

Southern Landfill Consenting Wellington City Council

l	CLIENT: Wellington City Council GRID: DATUM:		HA	-ORDIN D GROU D COLL	JND:	mi 290	V, m̀E) m) m	=					GLE FR	OM HORIZ N:	ZONTA	L:	90° -		
INTERPRETATION	DESCRIPTION OF CORE COLOUR, WEATHERING, FABRIC, STRENGTH, ROCK TYPE, DEFECT SPACING, LITHOLOGICAL FEATURES (bedding, foliation, mineralogy, texture, cement etc) STRATIGRAPHIC NAME	CORE BOXES	v WEATHERING	CORE LOSS /LIFT (%)	REDUCED LEVEL (RL)	DEPTH (m)	GRAPHIC LOG	SPT N-VALUE	SPT INTERVAL	SAMPLES	(OR SC	NT JOINTS, ID CRUSH 2 SITY (attitude infilling, etc IL DESC y, relative d	BEDDING, ZONES, FO e, spacing, c.) CRIPTIC lensity, water	SEAMS, SHAT LIATION, continuity,	TER,	METHOD & SHIFT	HEAD TEST	25 DRILL WATER 50 RETURN (%)	PIEZOMETER INSTALLATION
F	Moderately weathered dark orange-brown GREYWACKE	+	WW WH		_	_	× × × ×	2888 2888	Н		grading, gr	oup dymoon				П			
	with quartz veins, veins 5-10mm thick dipping 30-70°, fractures at 5-15cm spacing, black staining, weathering of fracture planes, two dominant orientations, 30° and 70° dip, very minor orange clay in some fractures (most clean (continued)	n)			279—	11-	× × × × × × × × × × × × × × × × × × ×									3/04/2007			
	Moderately weathered dark orange GREYWACKE brown				-		× × × × × × × × × × × × ×									-			
	greywacke, 2-3cm thick bedding at 14.5m and 17.3m, approximately horizontal quartz veins, 5-10mm thick, 2-10cm spacing, crosscutting all angles (on fracture plane in some cases), weak to very weak. Highly fracture on 2-10cm scale, crosscutting fractures 20° 70° & 60°, some intervals silty sand bound fragments.	-			278— - - - - -	12	× × × × × × × × × × × × × × ×												
					277—	13-	× × × × × × × × × × × × × × × × × × ×												
					276—	14	× × × × × × × × × × × × × × × × × × ×												
					275—	15-	× × × × × × × × × × × × × × × × × × ×												
					274—	16-	× × × × × × × × × × × × × × × × × × ×												
		ď	,		273	17-	× × × × × × × × × × × × × × × × × × ×												
							× × × × × × ×												
	Highly weathered dark yellow brown, GREYWACKE, fractured 2-5cm, crosscutting fractures 80°, 20° & 30°, moderately weathered fractures with monor slity clay, approximately 60 % weak (40% very weak, soft clayey si				272-	18-	× × × × × × × × × × × × × × × × × × ×												
	approximately 60 % weak (40% very weak, soft clayey siminor sand, weathered greywacke). Weak sections are highly fractured.	1111			271-	19-	× × × × × ×												
L	OGGED: DRILLER: REMARKS: JGP LR/HW/LG Well installati 1/08/2007 Websters 104.5 m mad	ion: 6	0 m - 89	5 m blank	screwt	ogether	50mm		PVC) C, 8'	9.5 m -		NG WA HOLE DE 14.75		DATE/TI	ME	::::		LENGTH 4.50 m

GEOTECH DRILLHOLE - SOIL- GEN DESC SOUTHERN LANDFIL DRILLING. GPJ AGS3 UK. GDT 19.

1/08/2007 Websters CHECKED: RIG: Diamond Coring HQ

Well installation: 0 m - 89.5 m blank screw together 50mm diameter uPVC, 89.5 m - 104.5 m machine slotted uPVC50mm diameter uPVC Backfill; 1m-4m bentonite, 4m-16m backfill, 16m-18m bentonite, 18m - 36m backfill, 36m-33m bentinite, 38m-53.5m backfill, 53.5m-56m bentinite, 56m-74.5m backfill, 74.5m-80.5m bentonite, 80.5m-82.0m blinding sand, 82.0m-101.5m 7/14 Walton Park sand, 101.5m-104.5m hole collapse around plezo.

DATE/TIME 21/07/2007 7:30:00 a.m. 2/08/2007 7:30:00 a.m. 25/07/2007 7:30:00 a.m. 30/07/2007 7:30:00 a.m. 9/08/2007 7:30:00 a.m. 16/08/2007 7:30:00 a.m. 3.62 3.86 5.08 11.27 12.32 12.70 14.75 59.96 30.24 41.68 88.60 104.11 4/08/2007 7:30:00 a.m. 13/08/2007 7:30:00 a.m. 70.61 98,87 13.30

Sheet 2 of 11

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LOG OF DRILLHOLE

HOLE

BH2A

4/08/2007 7:30:00 a.m. 13/08/2007 7:30:00 a.m.

13.30

70.61 98.87

PROJECT: Southern Landfill Consenting

FEATURE: Consent #: WGN070197(25906)

LOCATION: Wind Turbine

Highly weathered dark yellow-brown weak GREYWACKE, fractures 5-10cm scale, 70°-80° & 20° (more fractured section 21.2-21.4m), minor clayey silt weathered fractures quartz veins not apparent over this interval. Incomplete core recovery, broken highly weathered dark yellow- brown GREYWACKE, weathered gravel and cobble sized fragments. Moderately weathered yellow-grey GREYWACKE, fractures 5-10cm spacing, 30° and 70°, occasional quartz veins on fracture planes, also black weathering on most planes, (but no sediment), weak.	4	269—	21	***** ***** ***** ***** ***** *****					
Incomplete core recovery, broken highly weathered dark yellow- brown GREYWACKE, weathered gravel and cobble sized fragments. Moderately weathered yellow-grey GREYWACKE, fractures 5-10cm spacing, 30° and 70°, occasional quartz yelns on fracture planes, also black weathering on most		- - - - - -	-	× × × × × × × × × × × × × × × × × × ×					
fractures 5-10cm spacing, 30° and 70°, occasional quartz veins on fracture planes, also black weathering on most		266-	24-	××					1
		» -		× × × × × × × × × × × × × × × × × × ×					
Incomplete core recovery, yellow, orange-brown, highly weathered gravel and cobble sized angular clasts in slity sand matrix, soft. Highly weathered yellow-brown, highly fractured (5cm spacing) GREYWACKE, fractures 80°, 60° and 50°, crosscutting, minor clayey slit in fractures, black weathering on fracture surfaces, weak to very weak.	5	265	25-	× × × × × × × × × × × × × × × × × × ×					
		263—	27-	× × × × × × × × × × × × × × × × × × ×					
Highly weathered yellow-brown, highly fractured (5cm spacing) GREYWACKE, fractures 85°, 20° and 30°, quartz veins at 30° in line with fractures. no fines, weak.		262— 	28-	× × × × × × × × × × × × × × × × × × ×					
Moderately weathered brown-grey GREYWACKE, fractured (10-15cm spacing) 70° and 45°, weak to moderately strong, black and yellow weathering in fractures, no fines, weak. OGGED: DRILLER: REMARKS: JGP LR/HW/LG Well installation:		-	-	× × × × × × × × × ×		ILLING WATE		HOLE LE	NG.

URS Wellington 160 Lambton Quay, Wellington Phone: 64.4.496.3750 Fax: 64.4.496.3755 HOLE URS New Zealand LOG OF DRILLHOLE Wind Turbine FEATURE: Consent #: LOCATION: WGN070197(25906) res: mN, mE Southern Landfill Consenting PROJECT: Wellington City Council CO-ORDINATES: CLIENT: HAD GROUND: 290 m ANGLE FROM HORIZONTAL: 90° GRID: HAD COLLAR: 290 m DIRECTION: DATUM: DEFECT DESCRIPTION DESCRIPTION OF CORE WEATHERING PROMINENT JOINTS, BEDDING, SEAMS, SHATTER, SHEAR AND CRUSH ZONES, FOLIATION, SCHISTOSITY (atitude, spacing, continuity, roughness, infilling, etc.) N-VALUE LEVEL SPT INTERVAL METHOD & SHIF (%) $\widehat{\mathbf{E}}$ COLOUR, WEATHERING, FABRIC, STRENGTH, ROCK TYPE, DEFECT SPACING, LITHOLOGICAL FEATURES (bedding, foliation, mineralogy, texture, cement etc) STRATIGRAPHIC NAME GRAPHIC 10EC (P.E.) SPT (OR SOIL DESCRIPTION) REDU (consistency, relative density, water content, plasticity, grading, group symbol etc.) NA WH iù 습 iò **금 임 용 4** Highly to moderately weathered, brown-grey, highly fractured GREYWACKE, weak, fractures 5cm spacing, 30° and 50°, minor clayey silt, black weathering in fractures. 31 258-32 Moderately weathered brown-grey , highly fractured GREYACKE, very weak to weak, fractures 3-5cm spacing, 30°, 45° and 80°, black brown weathering and minor silty clay in fractures, occassinal 5-10cm thick quartz veins, 1-2mm crosscutting, quartz veins frequent. 33 34 Moderately weathered brown-grey, highly fractured GREYACKE, externely weak to weak, (alternating bands o silty clay matrix bound clasts and weathered rock core), fractures 1-5cm spacing, generally with clayey silt infilling, 45° and 70°. 255 35 36-254 DRILLING.GPJ AGS3_UK.GDT 253 37 38 Poor core recovery, moderately weathered angular cobbles of GREYWACKE, brown-grey, no fines, 10mm thick quartz veln. 39

SOUTHERN_LANDFIL_ SOIL-GEN DESC

LOGGED:

JGP 1/08/2007 LR/HW/LG Websters CHECKED: RIG: Diamond Coring HQ

DRILLER:

REMARKS: Well installation: 0 m - 89.5 m blank screw together 50mm diameter uPVC, 89.5 m -

Veril installation: 0 IT-93-71 brain software together open of commitmentaried in Vo, 03-811-104.5 m machine slotted uPVC50mm diameter uPVC
Backfill: 1m-4m bentonite, 4m-16m backfill, 16m-18m bentonite, 18m - 36m backfill, 36m-38m bentinite, 38m-53.5m backfill, 53.5m-56m bentinite, 56m-74.5m backfill, 74.5m-80.5m bentonite, 80.5m-82.0m bilinding sand, 82.0m-101.5m 7/14 Walton Park sand, 101.5m-104.5m hole collapse around piezo.

| LEVEL | HOLE DEPTH | 3.62 | 14.75 | 3.86 | 59.96 | 5.08 | 30.24 | 11.27 | 41.68 | 12.32 | 88.60 | 12.70 | 104.11 | DATE/TIME
21/07/2007 7:30:00 a.m.
2/08/2007 7:30:00 a.m.
25/07/2007 7:30:00 a.m.
30/07/2007 7:30:00 a.m.
9/08/2007 7:30:00 a.m.
16/08/2007 7:30:00 a.m. 13/08/2007 7:30:00 a.m. HOLE LENGTH:

104.50 m

Sheet 4 of 11

DRILLING WATER LEVELS:

BH2A

DRILL WATER RETURN (%)

23 23 25

HEAD TEST

PIEZOMETER INSTALLATION

CLIENT:

URS Wellington
160 Lambton Quay, Wellington
Phone: 64.4.496.3750
Fax: 64.4.496.3755

Southern Landfill Consenting Wellington City Council

LOG OF DRILLHOLE

LOCATION: Wind Turbine

FEATURE: Consent #:
WGN070197(25906)
CO-ORDINATES: mN, mE
HAD GROUND: 290 m

HOLE

No.

BH2A

CLIENT: Wellington City Council GRID: DATUM:	HAD	ORDINATES: GROUND: COLLAR:	mN, mE 290 m 290 m		ANGLE FROM HORIZON DIRECTION:	ГАL: 90° -	
DESCRIPTION OF CORE COLOUR, WEATHERING, FABRIC, STRENGTH, ROCK TYPE, DEFECT SPACING, LITHOLOGICAL FEATURES (bedding, foliation, mineralogy, texture, cement eto) STRATIGRAPHIC NAME		S CORE LOSS S / LIFT (%) REDUCED LEVEL (RL)	DEPTH (m) GRAPHIC LOG	SPT N-VALUE SPT N-VALUE SAMPLES Underson SAMPLES SAMPL	ECT DESCRIPTION NENT JOINTS, BEDDING, SEAMS, SHATTER, AND CRUSH ZONES, FOLLATION, TOSITY (attitude, spacing, continuity, ses, infilling, etc.) SOIL DESCRIPTION) lency, relative density, water content, plasticity, group symbol etc.)	METHOD & SHIFT HEAD TEST	25 DRILL WATER 30 RETURN (%) PREZOMETER INSTALLATION
Poor core recovery, moderately weathered angular cobbles of GREYWACKE, brown-grey, no fines, 10 thick quartz vein. (continued)			- x x x x x x x x x x x x x x x x x x x				
Slightly to moderally weathered grey-black, modera fractured GREYWACKE, moderately strong to stron fractures 10-20cm spacing, dominnant angles 40° a fractures have minor clay fill, no weathering or fract Quartz vein 1-5mm thick, spacing 1-5cm, all angles	d 65°	249	41 × × × × × × × × × × × × × × × × × × ×				
		248	42				
Moderately weathered brown-grey fractured GREYWACKE, weak to very weak, fractures 3-5cn spacing, 30°, 70° and 45°, all core shatters under li hammer blow.	it	247	43 × × × × × × × × × × × × × × × × × × ×				
	6	246	44————————————————————————————————————				
		245	45————————————————————————————————————				
136		244	46——×× 				
IG-GFU AGSS_UK.G		243—	47————————————————————————————————————				
ANDPILLORIELIN		242—			·		
Moderately weathered brown-grey fractured GREYWACKE, weak, fractures 2-5cm spacing, crosscutting 20°, 45° and 70°, fractures frequently with silty clay, quartz veining on much of the core. LOGGED: JOP LOGGED: JOP L/MWILG Well ins 104.5 n Backfill	ed	241—					
LOGGED: DRILLER: REMARI	01		- X X - X X - X X - X X - X X - X X		DRILLING WATER LEVELS:		HOLE LENGTH:
LOGGED: DRILLER. REMARK JGP LR/HW/LG Well ins 1/08/2007 Websters 104.5 m	allation: 0 m - 89.5 n machine slotted uP\	√C50mm diame	eter uPVC	diameter uPVC, 89.5 m - onite, 18m - 36m backfill,	LEVEL HOLE DEPTH DATE 3.62 14.75 21/07/2007 7:3 3.86 59.96 2/08/2007 7:3 5.08 30.24 25/07/2007 7:3	0;00 a.m.	104.50 m

CHECKED:

TJM

RIG:

Diamond Coring HQ

104.b m machine slotted uPVC50mm diameter uPVC
Backfill: 1m-4m bentonite, 4m-16m backfill, 16m-18m bentonite, 18m - 36m backfill,
36m-38m bentinite, 38m-53.5m backfill, 53.5m-56m bentinite, 56m-74.6m backfill,
74.5m-80.5m bentonite, 80.5m-82.0m blinding sand, 82.0m-101.5m 7/14 Walton
Park sand, 101.5m-104.5m hole collapse around plezo.

2/08/2007 7:30:00 a.m. 25/07/2007 7:30:00 a.m. 30/07/2007 7:30:00 a.m. 9/08/2007 7:30:00 a.m. 16/08/2007 7:30:00 a.m. 4/08/2007 7.30,00 a,m. 13/08/2007 7:30:00 a.m. 70.61 98.87 13.30

Sheet 5 of 11

URS New Zealand PROJECT: CLIENT: Southern Landfill Consenting Wellington City Council

URS Wellington 160 Lambton Quay, Wellington Phone: 64.4.496.3750 Fax: 64.4.496.3755

LOG OF DRILLHOLE

FEATURE: Consent #:
WGN070197(25906)
CO-ORDINATES: mN, mE

HOLE

BH2A

LOCATION: Wind Turbine

	CLIENT: GRID: DATUM:	Wellington City Co	ouncil		HA	D-ORDIN AD GROU AD COLL	UND:	290	N, mE 0 m 0 m	Ē			ANGLE FROM HORIZONT DIRECTION:	ΓAL:	90° -		
INTERPRETATION	COLOUR, WI TYPE, DEFE (bedding, folia cement etc) S	PTION OF CORE "EATHERING, FABRIC, STRENGTH, ICT SPACING, LITHOLOGICAL FEA" altion, mineralogy, texture, STRATIGRAPHIC NAME	, ROCK .TURES	CORE BOXES	· sw · ww WEATHERING · HW	-5 CORE LOSS -10 / LIFT (%)	REDUCED LEVEL (RL)	DЕРТН (m)	GRAPHIC LOG	10 20 30 SPT N-VALUE 40	SPT INTERVAL	SAMPLES	DEFECT DESCRIPTION PROMINENT JOINTS, BEDDING, SEAMS, SHATTER, SHEAR AND CRUSH ZONES, FOLIATION, SCHISTOSITY (atititude, spacing, continuity, roughness, infilling, etc.) (OR SOIL DESCRIPTION) (consistency, relative density, water content, plasticity, grading, group symbol etc.)	METHOD & SHIFT	HEAD TEST	25 DRILL WATER 50 RETURN (%) 73 RETURN (%)	PIEZOMETER INSTALLATION
	GREYWA	y weathered brown-grey fracti CKE, weak, fractures 2-5cm s og 20°, 45° and 70°, fractures clay, quartz velning on much o t)	spacing, frequently filled	111111111111111111111111111111111111111			239—	51	× × × × × × × × × × × × × × × × × × ×								
	GREYWA	orred black-grey fractured mas CKE, strong, fractures 20cm; cosscutting, minor clay with fra ns, 1-5cm intervals, all angles	spacing, 20º and actures, 2-5mm,				238	52—	× × × × × × × × × × × × × × × × × × ×								
	70°, cross	red black-grey fractured GRE ly strong, fractures 5-10cm sp cutting, fractures contain mine	EYWACKE, ——— pacing, 10°, 45° and nor silty clay, 1cm	d			236—	54	× × × × × × × × × × × × × × × × × × ×								
AGS3_UK.GDT 19.	thick layer	r of clayey silt at 57.6m.		£			234—	56-	× × × × × × × × × × × × × × × × × × ×								man to the second of the secon
LANDFIL DRILLING.GPJ							233-	57	××××××××××××××××××××××××××××××××××××××								The state of the s
HOLE - SOIL- GEN DESC SOUTHERN	moderatel 70°, crossi	ored black-grey fractured GRE ly strong, fractures 5-10cm sp cutting, fractures contain min	pacing, 10°, 45° and nor silly clay.	ä			231	59~	× × × × × × × × × × × × × × × × × × ×				DRILLING WATER LEVELS:			HOLE	ENGTH:
DRICL	LOGGED: JGP 1/08/200	DRILLER: LR/HW/LG Websters	REMARKS: Well installation 104.5 m machi	n: 0 r ine s	m - 89. lotted	.5 m blanl uPVC50n	k screw t	ogether eter uP\	50mm (diameter u	ιPV(C, 8		/TIME 80:00 a	a.m.	1	.50 m

DRILLHOLE - SOIL- GEN DESC SOUTHERN LANDFIL DRILLING GPJ AGS3_UK.GDT 19.

LR/HW/LG Websters JGP 1/08/2007 RIG: CHECKED: Diamond Coring HQ TJM

EIWIAKNS:

Well installation: 0 m - 89.5 m blank screw together 50mm diameter uPVC, 89.5 m - 104.5 m machine slotted uPVC50mm diameter uPVC

Backfill: 1m-4m bentonite, 4m-16m backfill, 16m-18m bentonite, 18m - 36m backfill, 36m-38m bentinite, 36m-53.5m backfill, 53m-56m bentinite, 56m-74.5m backfill, 74.5m-80.5m bentonite, 80.5m-82.0m blinding sand, 82.0m-101.5m 7/14 Walton Park sand, 101.5m-104.5m hole collapse around piezo.

3.62 3.86 5.08 11.27 12.32 12.70 HOLE DEPTH 14.75 59.96 30.24 41.68 88.60 104.11 DATE/TIME 21/07/2007 7:30:00 a.m. 2/08/2007 7:30:00 a.m. 25/07/2007 7:30:00 a.m. 30/07/2007 7:30:00 a.m. 9/08/2007 7:30:00 a.m. 16/08/2007 7:30:00 a.m. 4708/2007 7:30:00 a.m. 13/08/2007 7:30:00 a.m. 98.87

Sheet 6 of 11

URS New Jacobs New Jac

LOG OF DRILLHOLE

HOLE No.

BH2A

CLIENT:

Southern Landfill Consenting Wellington City Council

LOCATION: Wind Turbine

FEATURE: Consent #:
WGN070197(25906)
CO-ORDINATES: mN, mE
HAD GROUND: 290 m

ANGLE FROM HORIZONTAL: 90°

	GRID: DATUM:		HA	D GRO	JND:	290) m) m				ANGLE FROM I DIRECTION:	HORIZONT	ΓAL:	90°		
INTERPRETATION	DESCRIPTION OF CORE COLOUR, WEATHERING, FABRIC, STRENGTH, ROCK TYPE, DEFECT SPACING, LITHOLOGICAL FEATURES (bedding, foliation, mineralogy, texture, cement etc) STRATIGRAPHIC NAME	CORE BOXES	SW WEATHERING HW WEATHERING	-5 CORE LOSS -10 / LIFT (%)	REDUCED LEVEL (RL)	DEPTH (m)	GRAPHIC LOG	10 20 30 SPT N-VALUE 40	SPT INTERVAL	SAMPLES	DEFECT DESCRIPTION PROMINENT JOINTS, BEDDING, SEAM SHEAR AND ORUSH ZOMES, FOLLATIC SCHISTOSITY (etitlude, spacing, continu roughness, infilling, etc.) (OR SOIL DESCRIPTION) (consistency, relative density, water conte grading, group symbol etc.)		METHOD & SHIFT	HEAD TEST	25 DRILL WATER 50 RETURN (%)	PIEZOMETER INSTALLATION
	Unweathered black-grey fractured GREYWACKE, moderately strong, fractures 5-10cm spacing, 10°, 45° and 70°, crosscutting, fractures contain minor silty clay. (continued)	12				-	× × × × × × × × × × × × × × × × × × ×									
	Unweathered black-grey fractured GREYWACKE, strong,				229— - - - - - - -	61	× × × × × × × × × × × × × × × × × × ×									
	fractures every 10-20cm, 45°, 50° & 70°, very minor clay present in fractures. Frequent quartz veining (1-5mm thick 1-3cm spacing).				228—	62	× × × × × × × × × × × × × × × × × × ×								6	
					227	63	× × × × × × × × × × × × × × × × × × ×									
		13			226	64	× × × × × × × × × × × × × × × × × × ×									
					225	65	× × × × × × × × × × × × × × × × × × ×									
ON GD 13					224-	66-	× × × × × × × × × × × × × × × × × × ×									
NILLING, GPO AGGS	Unweathered grey-black highly fractured GREYWACKE, weak, fractures every 1-3cm, 20° and 60°, 2cm thick sheared zone of sandy slit at 68.0-68.38m, 70°, apparentl along quartz vein.	у			223- -	67	× × × × × × × × × × × × × × × × × × ×	-								
רווויין וואפווי	Unweathered grey-black highly fractured and sheared GREYWACKE, poor core recovery, mixture of soft silty clay and very weathered rock zones (68.6-68.8m and	e			222-	68-	× × × × × × × × × × × × × × × × × × ×	-								
- SOIL- GEN DESC. SOUTHERN_LANDFIL_DRILLING.GFJ. AGS3_UK.GDT 18,	71.1-71.65m) and strong gravel sized fragments with finer removed, 5cm of angular gravel and fine clayey sand at 69.35m (argillite - very angular fractures).	8 4			221-	69-	× × × × × × × × × × × × × × × × × × ×									
, HOLF -	OCCED. DRILLED. DEMARKS						× × × ×	1::::			DRILLING WATER	LEVELS:		::::	HOLF	LENGTH;
Ϋ́ -	OGGED: DRILLER: REMARKS: JGP LR/HW/IG Well installation 1/08/2007 Websters 104.5 m mach DHECKED: RIG: 36m-38m bent TJM Diamond Coring 74.5m-80.5m HQ Park sand, 10°	ine n be	slotted u entonite	uPVC50m , 4m-16m 53 5m bai	nm diam backfill, •kfill 53	eter uP\ 16m-18 5m-56m	/C im benti i bentini	onite, 18m	- 36 l 5m	m t	9.5 m - LEVEL HOLE DEPTH 3.82 14.75 ckfill, 3.86 59.96 ckfill, 6.08 30.24 11.27 41.68 12.32 88.60 12.70 104.11	DATE 21/07/2007 7:3 2/08/2007 7:3 25/07/2007 7:3 30/07/2007 7:3 9/08/2007 7:30 16/08/2007 7:30	80:00 a 0:00 a.r 80:00 a 80:00 a 80:00 a.r 80:00 a	n. .m. .m. n. .m.	10-	7 of 11

GEOTECH DRILLHOLE - SOIL-GEN DESC SOUTHERN LANDFIL DRILLING GPJ AGS3 UK.GDT 19,

25/07/2007 7:30:00 a.m. 30/07/2007 7:30:00 a.m. 9/08/2007 7:30:00 a.m. 16/08/2007 7:30:00 a.m. 4/08/2007 7:30:00 a.m. 13/08/2007 7:30:00 a.m. 98.87

13.30

URS New URS Wellington 160 Lambton Quay, Wellington Phone: 64.4.496.3750
Fax: 64.4.496.3755

LOG OF DRILLHOLE

HOLE No.

BH2A

PROJECT: CLIENT:

Southern Landfill Consenting Wellington City Council

LOCATION: Wind Turbine

FEATURE: Consent #:
WGN070197(25906)
CO-ORDINATES: mN, mE

RID: ATUM:		HAD GROU!	ND: 29	00 m 00 m	•		ANGLE FROM HORIZON DIRECTION:	TAL:	90° -	•	
DESCRIPTION OF CORE COLOUR, WEATHERING, FABRIC, STRENGTH, ROCK YPE, DEFECT SPACING, LITHOLOGICAL FEATURES Sedding, foliation, mineralogy, texture, erment etc) STRATIGRAPHIC NAME	181	HWW WEATHERING S. CORE LOSS CORE LOSS CORE // LIFT (%)	REDUCED LEVEL (RL) DEPTH (m)	GRAPHIC LOG	10 20 30 SPT N-VALUE 40	SPT INTERVAL SAMPLES	EFECT DESCRIPTION OMINENT JOINTS, BEDDING, SEAMS, SHATTER, EAR AND CRIUSH ZONES, FOLIATION, HISTOSITY (attitude, spacing, continuity, ghness, infilling, etc.) R SOIL DESCRIPTION) Insistency, relative density, water content, plasticity, ding, group symbol etc.)	METHOD & SHIFT	HEAD TEST	.35 DRILL WATER .35 RETURN (%)	PIEZOMETER INSTALLATION
Jnweathered grey-black highly fractured and sheared SREYWACKE, poor core recovery, mixture of soft silty lay and very weathered rock zones (68.5-68,5m and '1.1-71.65m) and strong gravel sized fragments with fines emoved, 5cm of angular gravel and fine clayey sand at 19.35m (argillite - very angular fractures) (continued)		2	219 71-	× × × × × × × × × × × × × × × × × × ×							
Unweathered grey-black highly fractured and broken GREYWACKE, only 40cm whole core recovered over this nterval, the rest is either: - sandy silt bound angular gravel sized clasts 71.62-72m, 3.61m, and 20cm above 77.83m, silty clay 5cm thick at 3.61m, other fractured zonas only silty sand or sandy silt. - broken gravel to cobble sized strong angular greywackeragments, no fines, clasts, grey-black to black argylilte to			218- 72-	× × × × × × × × × × × × × × × × × × ×			·				
ragments, no lines, clasts, grey-black to black argyllite to ne gravel sandstone.			217— 73-	× × × × × × × × × × × × × × × × × × ×							And the second of the second o
			216—74—	× × × × × × × × × × × × × × × × × × ×							
	15		214—76—	× × × × × × × × × × × × × × × × × × ×							
		2	213— 77—	× × × × × × × × × × × × × × × × × × ×							
			212— 78—	× × × × × × × × × × × × × × × × × × ×							
Inweathered grey-black fractured and broken REYWACKE, weak to very weak, fractures 2-5cm pacing, 20° and 60°, frequent quartz veining, frequent hear zones, of more highly fractured rock, consisting of ery weak rock, clayey silt matrix, approximately every 0-40cm, one long run of core above 82.6m.		2	211 79	× × × × × × × × × × × × × × × × × × ×							
	}		4	× ×	: : : :				::::	}	

GEOTECH DRILLHOLE - SOIL- GEN DESC SOUTHERN_LANDFIL_DRILLING.GPJ AGS3_UK.GDT 19,

JGP 1/08/2007 LR/HW/LG Websters CHECKED: RIG:

TJM

Diamond Coring HQ

Well installation: 0 m - 89.5 m blank screw together 50mm diameter uPVC, 89.5 m - 104.5 m machine slotted uPVC50mm diameter uPVC
Backfill: 1m-4m bentonite, 4m-16m backfill, 16m-18m bentonite, 18m - 36m backfill, 36m-38m bentinite, 38m-53.5m backfill, 53.5m-56m bentinite, 56m-74.5m backfill, 74.5m-80.5m bentonite, 80.5m-82.0m blinding sand, 82.0m-101.5m 7/14 Walton Park sand, 101.5m-104.5m hole collapse around piezo.

3.62 3.86 5.08 11.27 12.32 12.70 HOLE DEPTH 14.75 59.96 30.24 41.68 88.60 104.11 DATE/TIME
21/07/2007 7:30:00 a.m.
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16/08/2007 7:30:00 a.m. 4/08/2007 7:30:00 a.m. 13/08/2007 7:30:00 a.m.

70.61 98.87

13,18 13,30

Sheet 8 of 11

URS New Zealand

URS Wellington 160 Lambton Quay, Wellington Phone: 64,4,496,3750 Fax; 64,4,496,3755

LOG OF DRILLHOLE

HOLE No

BH2A

PROJECT: CLIENT:

Southern Landfill Consenting Wellington City Council

FEATURE: Consent #:

LOCATION: Wind Turbine

GRID:

WGN070197(25906) CO-ORDINATES: mN, mE 290 m

HAD GROUND: ANGLE FROM HORIZONTAL: 90° DATUM: HAD COLLAR: 290 m DIRECTION: DESCRIPTION OF CORE DEFECT DESCRIPTION WEATHERING DRILL WATER RETURN (%) SPT N-VALUE PROMINENT JOINTS, BEDDING, SEAMS, SHATTER, SHEAR AND CRUSH ZONES, FOLIATION, SCHISTOSITY (attitude, spacing, continuity, roughness, infilling, etc.) CORE LOSS / LIFT (%) EVE SPT INTERVAL METHOD & SHIF Ξ TEST COLOUR, WEATHERING, FABRIC, STRENGTH, ROCK TYPE, DEFECT SPACING, LITHOLOGICAL FEATURES (bedding, foliation, mineralogy, texture, ement etc) STRATIGRAPHIC NAME GRAPHIC JGED (JR) (OR SOIL DESCRIPTION) (consistency, relative density, water content, plasticity, grading, group symbol etc.) A A A 8 G K ^R 은 B 2222 Unweathered grey-black fractured and broken GREYWACKE, weak to very weak, fractures 2-5cm spacing, 20° and 60°, frequent quartz veining, frequent shear zones, of more highly fractured rock, consisting of very weak rock, clayey silt matrix, approximately every 20–40cm, one long run of core above 82.6m.(continued) 209 81 208 82-207 83-Unweathered grey shattered crushed GREYWACKE, silty sand and clayey silt matrix with angular greywacke gravel and cobble sized fragments. 206 84 Unweathered grey-black highly fractured GREYWACKE, weak, fractures 2-6cm spacing, argyllite texture, no continuous lengths of core. 85-204 86-DRILLING.GPJ AGS3_UK.GDT 203 87 Unweathered grey highly fractured GREYWACKE, moderately strong, fractures 5cm spacing, 20° and 45°, silly ciay in fracture planes, quartz velning abundant, 1mm spacing, 5cm thick, highly fractured intervals at 87.7, 88.1, 88.6 and 88.9m. 88-Unweathered grey highly fractured GREYWACKE and argillite, poor core recovery (very broken core), weak to very weak, fracture interval <1- 5cm in occasional intervals, no sheared clayey intervals observed. 201 89-

DRILLHOLE - SOIL- GEN DESC SOUTHERN LANDFIL

LOGGED: JGP 1/08/2007 CHECKED:

TJM

DRILLER: LR/HW/LG Websters

Diamond Coring

RIG:

Well installation: 0 m - 89.5 m blank screw together 50mm diameter uPVC, 89.5 m - 104.5 m machine slotted uPVC50mm diameter uPVC
Backfill: 1m-4m bentonite, 4m-16m backfill, 16m-18m bentonite, 18m - 36m backfill, 36m-38m bentinite, 38m-53.5m backfill, 53.5m-56m bentinite, 56m-74.5m backfill, 74.5m-80.5m bentonite, 80.5m-82.0m blinding sand, 82.0m-101.5m 7/14 Walton Park sand, 101.5m-104.5m hole collapse around piezo.

DRILLING WATER LEVELS: DATE/TIME 21/07/2007 7:30:00 a.m. 2/08/2007 7:30:00 a.m. 25/07/2007 7:30:00 a.m. 30/07/2007 7:30:00 a.m. 9/08/2007 7:30:00 a.m. 16/08/2007 7:30:00 a.m. LEVEL HOLE DEPTH 3.62 3.86 5.08 11.27 12.32 12.70

13/08/2007 7:30:00 a.m.

13.30

98.87

Sheet 9 of 11

HOLE LENGTH:

104.50 m

URS Wellington 160 Lambton Quay, Wellington Phone: 64.4.496.3750 Fax: 64.4.496.3755 HOLE URS New Zealand BH2A LOG OF DRILLHOLE No FEATURE: Consent #:
WGN070197(25906)
CO-ORDINATES: mN, mE LOCATION: Wind Turbine PROJECT: Southern Landfill Consenting CLIENT: Wellington City Council 290 m ANGLE FROM HORIZONTAL: 90° GRID: HAD GROUND: 290 m HAD COLLAR: DIRECTION: DATUM: DESCRIPTION OF CORE DEFECT DESCRIPTION WEATHERING PROMINENT JOINTS, BEODING, SEAMS, SHATTER, SHEAR AND CRUSH ZONES, FOLIATION, SCHISTOSITY (attitude, spacing, continuity, curphoses, infiling, att.) LEVEL DRILL WATER RETURN (%) N-VALUE METHOD & SHIFT PIEZOMETER INSTALLATION SSO:(%) Ê COLOUR, WEATHERING, FABRIC, STRENGTH, ROCK TYPE, DEFECT SPACING, LITHOLOGICAL FEATURES (bedding, foliation, mineralogy, texture, cement eto) STRATIGRAPHIC NAME SAMPLES TEST GRAPHIC CORE L REDUCED L (RL) roughness, infilling, etc.) HEAD SPT (OR SOIL DESCRIPTION) SPT (consistency, relative density, water content, plasticity, grading, group symbol etc.) WW AM **5884** អូ ម៉ ដ Unweathered grey highly fractured GREYWACKE and arglillite, poor core recovery (very broken core), weak to very weak, fracture interval <1-5cm in occasional intervals, no sheared clayey intervals observed. 91 198 92 Unweathered grey very highly fractured ARGILLITE, 30cm extremely weathered silty clay, soft, high plasticity, remainder highly fractured very weathered argillite. 93-No core recovered. Unweathered grey highly fractured GREYWACKE and argillite, weak to very weak, fracture spacing 3-10cm, 30° and 45°, argyllite zones 10-30cm thlock greywacke 20-40cm thick, 2cm thick silty clay interval, 45° at 96.0m (shear along 5mm quartz vein). 94 195 95 96 UKGDT Very poor core recovery (<20%), three 20-40cm thick intervals of unweathered highly fractured gouged GREYWACKE, extremely weathered silty sand, silty clay, soft, moderately plastic, remaining core grey moderately fractured GREYWACKE and argyllite, weak to moderately strong, regular 1-2mm thick quartz veins all orientations. AGS3_1 193 97 SOUTHERN LANDFIL DRILLING.GPJ 99-DRILLING WATER LEVELS: HOLE LENGTH: DRILLER: REMARKS: LOGGED: DATE/TIME
21/07/2007 7:30:00 a.m.
2/08/2007 7:30:00 a.m.
25/07/2007 7:30:00 a.m.
30/07/2007 7:30:00 a.m.
9/08/2007 7:30:00 a.m.
16/08/2007 7:30:00 a.m. Well installation: 0 m - 89.5 m blank screw together 50mm diameter uPVC, 89.5 m - 104.5 m machine slotted uPVC50mm diameter uPVC Backfill: 1m-4m bentonite, 4m-16m backfill, 16m-18m bentonite, 18m - 36m backfill, 36m-38m bentinite, 38m-53.5m backfill, 53.5m-56m bentinite, 56m-74.5m backfill, 74.5m-80.5m bentonite, 80.5m-82.0m blinding sand, 82.0m-101.5m 7/14 Walton Park sand, 101.5m-104.5m hole collapse around piezo. LR/HW/LG Websters JGP 1/08/2007 104.50 m CHECKED: RIG: Sheet 10 of 1 Diamond Coring HQ

13/08/2007 7:30:00 a.m.

URS New URS Wellington 160 Lambton Quay, Wellington Phone: 64.4.96.3755

Fax: 64.4.96.3755

LOG OF DRILLHOLE

HOLE No.

BH2A

PROJECT:

Southern Landfill Consenting Wellington City Council

FEATURE: Consent #:
WGN070197(25906)
CO-ORDINATES: mN, mE

LOCATION: Wind Turbine

	CLIENT: Wellington City Council GRID: DATUM:		HA)-ORDIN ,D GRO! ,D COLL	UND:	290 290	N, MI D m D m	=	ANGLE FROM HORIZONTAL: 90° DIRECTION: -								
NTERPRETATION	DESCRIPTION OF CORE COLOUR, WEATHERING, FABRIC, STRENGTH, ROCK TYPE, DEFECT SPACING, LITHOLOGICAL FEATURES (bedding, foliation, mineralogy, texture, cement eto) STRATIGRAPHIC NAME	CORE BOXES	w WEATHERING	CORELOSS /LIFT(%)	REDUCED LEVEL (RL)	DEPTH (m)	GRAPHIC LOG	SPT N-VALUE	SPT INTERVAL	PROMIN SHEAR SCHISTO roughnes	ENT JOINT AND CRUSH DSITY (attitu ss, infilling, e	SCRIPTIC	SEAMS, SHATTER, LIATION, continuity,	METHOD & SHIFT	HEAD TEST	25 DRILL WATER 50 RETURN (%)	PIEZOMETER INSTALLATION
	Very poor core recovery (<20%), three 20-40cm thick intervals of unweathered highly fractured gouged GREYWACKE, extremely weathered silty sand, silty clay, soft, moderately plastic, remaining core grey moderately fractured GREYWACKE and argylilte, weak to moderately strong, regular 1-2mm thick quartz veins all orientations. (continued)		MW MS	9 ° 8	189	101	× × × × × × × × × × × × × × × × × × ×	9889		graving,	טוועס קטווט					5.	
	103.0m - 104.5m This interval drilled using casing advancer with a tricone bit - no core recovery possible.	21			188	102	× × × × × × × × × × × × × × × × × × ×										
					186-	104											
					185—	105											
					183	107-											
	·				181—	109-											
L	OGGED: DRILLER: REMARKS: JGP LR/HW/LG Well installation 1/08/2007 Websters 104,5 m machin	n: 0	m - 89.5	m blank	screw to	ogether (50mm d	i : : : : : : : : : : : : : : : : : : :	∐ PVC,	89.5 m -		ING WAT	ER LEVELS: TH DATE/ 21/07/2007 7:30	TIME 0:00 a]::::: m.		LENGTH: 04.50 m

GEOTECH DRILLHOLE - SOIL- GEN DESC SOUTHERN LANDFIL DRILLING GPJ AGS3_UK.GDT 19

1/08/2007 CHECKED: RIG:

TJM

Well installation: 0 m - 89.5 m blank screw together 50mm diameter uPVC, 89.5 m - 104.5 m machine slotted uPVC50mm diameter uPVC
Backfill: 1m-4m bentonite, 4m-16m backfill, 16m-18m bentonite, 18m - 36m backfill, 36m-38m bentinite, 38m-53.5m backfill, 53.5m-56m bentinite, 56m-74.5m backfill, 74.5m-80.5m bentonite, 80.5m-82.0m blinding sand, 82.0m-101.5m 7/14 Walton Park sand, 101.5m-104.5m hole collapse around piezo.

DATE/IME
21/07/2007 7:30:00 a.m.
2/08/2007 7:30:00 a.m.
25/07/2007 7:30:00 a.m.
30/07/2007 7:30:00 a.m.
9/08/2007 7:30:00 a.m.
16/08/2007 7:30:00 a.m.
18/08/2007 7:30:00 a.m.

13.30

Sheet 11 of











































4.4

URS New Zealand

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LOG OF DRILLHOLE

HOLE No.

BH2B

CLIENT: GRID:

GEOTECH DRILLHOLE - SOIL- GEN DESC SOUTHERN_LANDFIL_DRILLING.GPJ AGS3_UK.GDT 19

Southern Landfill Consenting Wellington City Council

FEATURE: Consent #:
WGN070197(25906)
CO-ORDINATES: mN, mE
HAD GROUND: 290 m

LOCATION: WindTurbine

ANGLE FROM HORIZONTAL: 90°

١	GRID: DATUM:	HAD GRO		290	m					ECTION:	MONIZON		-		1
	DESCRIPTION OF CORE COLOUR, WEATHERING, FABRIC, STRENGTH, ROCK TYPE, DEFECT SPACING, LITHOLOGICAL FEATURES (bedding, foliation, mineralogy, texture, cement etc) STRATIGRAPHIC NAME	sw www WEATHERING HW 5 CORE LOSS 1-10 / LIFT (%)		DЕРТН (m)	GRAPHIC LOG	10 20 30 SPT N-VALUE 40	SPT INTERVAL	PROMINEI SHEAR AN SCHISTOS roughness	DIL DESC	RIPTION BEDDING, SEA ONES, FOLIAT , spacing, contin) CRIPTION) ensity, water contol.	MS, SHATTER, ION, nuity,	METHOD & SHIFT	HEAD TEST	25 DRILL WATER 50 RETURN (%)	PIEZOMETER INSTALLATION
ארבווטרב- סטוב סרט וובוא באות באות היא מינה של האינה אל האינה האינה אל האינה האינה אל האינה האינה אל האינה אל ה	LOGGED: DRILLER: REMARKS: JGP LG/HW Well installation: 0.	Om-30.0 m blai	289— 288— 288— 288— 288— 288— 288— 288— 288— 288— 288— 288—	1 1 1 1 1 1 1 1 1 1		diameter ul	CC	30,0 m -	LEVEL I	NG WATER	DATE/	TIME			Control of the contro
JEO I LOI .	Websters 45.0 m machine slo	hine slotted uPVC50mm diameter uPVC 13.207 slotted uPVC50mm diameter uPVC 13.60 36.00 30/08/2007 10:00:00 a.m. 30/08/2007 3										47.50 m Sheet 1 of 5			

URS New URS Wellington 160 Lambton Quay, Wellington Phone: 64.496.3755

Eagliesing and Environmental Management Face 64.496.3755

LOG OF DRILLHOLE

HOLE No.

BH2B

PROJECT: Southern Landfill Consenting
CLIENT: Wellington City Council
GRID:

LOCATION: WindTurbine

FEATURE: Consent #:
WGN070197(25906)
CO-ORDINATES: mN, mE
HAD GROUND: 290 m

ANGLE FROM HORIZONTAL: 90°

INTERPRETATION		CORE BOXES	sw www.WEATHERING	CORE LOSS O	REDUCED LEVEL (RL)	290 (m) PLEATH (m)	GRAPHIC LOG	10 20 30 SPT N-VALUE 40	SPT INTERVAL	SAMPLES	DIRECTION: DEFECT DESCRIPTION PROMINENT JOINTS, BEDDING, SEAMS, SHATTER, SHEAR AND CRUSH ZONES, FOLLATION, SCHISTOSITY (attitude, spacing, continuity, roughness, infilling, etc.) (OR SOIL DESCRIPTION) (consistency, relative density, water content, plasticity, grading, group symbol etc.)	METHOD & SHIFT	HEAD TEST	. 25 DRILL WATER . 50 RETURN (%)	PIEZOMETER INSTALLATION
	Hole drilled using air rotary - no core recovery. For geological details, see BH2A log (continued)		AH. USU AG	95	279————————————————————————————————————	11					grading, group symbol etc./			2	
	OGGED: JGP LG/HW Websters HECKED: TJM REMARKS: Well installation 45.0 m machin Backfill: Om-0.8 24.0m-25.0m b hole collapse.	n: 0 e sl	m - 30.0 otted uP\ concrete, ling sand	m blank √C50mn	screw to diamete .0m pea .45.0m 7.	ogether 5 er uPVC gravel, 1 /14 Walto	50mm (18.0-24 on Pari	diameter u 4.0m bento k sand, 45	PVC nite .0m	c, 30	DRILLING WATER LEVELS: 0.0 m - LEVEL HOLE DEPTH DATE/ 13.20 32.00 29/08/2007 9:0 13.60 36.00 30/08/2007 10:	TIME 0:00 a.	.m. a.m.		LENGT 7.50 m

URS New URS Wellington 160 Lambton Quay, Wellington Phone: 64 4.496.3750
Fig. 164.496.3755

LOG OF DRILLHOLE

HOLE

BH2B

PROJECT: Southern Landfill Consenting CLIENT: Wellington City Council

FEATURE: Consent #: WGN070197(25906) CO-ORDINATES: mN, mE

LOCATION: WindTurbine

GRID: DATUM: HAD GROUND:

ANGLE FROM HORIZONTAL: 90°

HAD COLLAR:

290 m 290 m

DIRECTION:

DESCRIPTION OF CORE **DEFECT DESCRIPTION** 500 单 트 PROMINENT JOINTS, BEDDING, SEAMS, SHATTER,

Citation	COLOUR, WEATHERING, FABRIC, STRENGTH, ROCK TYPE, DEFECT SPACING, LITHOLOGICAL FEATURES (bedding, folialion, mineralogy, texture, cement etc) STRATIGRAPHIC NAME	SW WEATHERIN	-5 CORE LOSS -10 / LIFT (%)	REDUCED LEVE (RL)	DEPTH (m)	GRAPHIC LO	10 20 30 SPT N-VALU	SPT INTERVA SAMPLES	PROMINENT JOINTS, BEDDINGS, SEAMS, SHATTEN, SHEAR RAND CRUSH ZONES, FOLLATION, SCHISTOSITY (attitude, spacing, continuity, roughness, Infilling, etc.) (OR SOIL DESCRIPTION) (consistency, relative density, water content, plasticity, grading, group symbol etc.)	METHOD & SHIF	HEAD TEST	. 30 DRILL WATER . 30 RETURN (%)	PIEZOMETER
	Hole drilled using air rotary - no core recovery. For geological details, see BH2A log.(continued)			-									
				269	21—								
				-	-								
				268	22—								
				-	_ _ 								
				267-	23-								
				-	-								
				266	24—								
				265—	25—								
				-	-								
2				264	26-								
100.00				-	_								
2000 010.0				263	27								
ור חוווררוווא				-	-								
				262-	28-								
2000				261	29-								
מוב מרוג מר				-	-								
				-	-								

LOGGED: JGP DRILLER: LG/HW Websters CHECKED:

TJM

RIG:

Air Rotary PQ

DRILLHOLE - SOIL- GEN DESC SOUTHERN LANDFIL

REMARKS:

Well installation: 0 m - 30.0 m blank screw together 50mm diameter uPVC, 30.0 m - 45.0 m machine slotted uPVC50mm diameter uPVC
Backfill: 0m-0.5m concrete, 0.5 - 18.0m pea gravel, 18.0-24.0m bentonite, 24.0m-25.0m blinding sand, 25.0m-45.0m 7/14 Walton Park sand, 45.0m - 47.5m hole collapse.

DRILLING WATER LEVELS: LEVEL HOLE DEPTH 13.20 32.00 13.60 36.00 DATE/TIME 29/08/2007 9:00:00 a.m. 30/08/2007 10:00:00 a.m.

HOLE LENGTH: 47.50 m

Sheet 3 of 5

URS Wellington
160 Lambton Quay, Wellington
Phone: 64.4.496.3750
Fax: 64,4.496.3755

LOG OF DRILLHOLE

HOLE No.

BH2B

PROJECT:

Southern Landfill Consenting Wellington City Council

FEATURE: Consent #:
WGN070197(25906)
CO-ORDINATES: mN, mE
HAD GROUND: 290 m

LOCATION: WindTurbine

CLIENT: GRID:

HAD COLLAR:

290 m

ANGLE FROM HORIZONTAL: 90°

DATUM:					GROU COLL		290 290	m					RECTION	OM HORIZON ⁻ N:	AL.	-		
DESCRIPTION COLOUR, WEATHE TYPE, DEFECT SP/ (bedding, foliation, m cement ele) STRATI	N OF CORE IRING, FABRIC, STRENGTH ACING, LITHOLOGICAL FEA ineralogy, texture, GRAPHIC NAME	I, ROCK LTURES	CORE BOXES	SW MW WEATHERING HW	5 CORE LOSS 50 / LIFT (%)	REDUCED LEVEL (RL)	DЕРТН (m)	GRAPHIC LOG	10 20 30 SPT N-VALUE 40	SPT INTERVAL	PROMIN SHEAR A SCHISTO roughnes	ENT JOIN' AND CRUS DSITY (attit as, Infilling, OIL DE	SCRIPTIO	SEAMS, SHATTER, LIATION, ontinuity,	METHOD & SHIFT	HEAD TEST	25 DRILL WATER 26 RETURN (%)	PIEZOMETER INSTALLATION
geological detail	g air rotary - no core res, see BH2A log (contin					258— 	31 33 33 33 33 35 35 37 37 38 37 39 39 39 39 39						INC MAT					
LOGGED: JGP CHECKED: TJM	DRILLER: LG/HW Websters RIG: Air Rotary PQ	REMARKS: Well installation 45.0 m machine Backfill: 0m-0,5 24.0m-25.0m bl hole collapse.	n; 0 r e slo im co lindir	n - 30.0 r tted uPV oncrete, (ng sand,	n blank s C50mm - 0.5 - 18.0 25.0m-4	screw tog diamete Om pea g 5.0m 7/1	gether 5 r uPVC gravel, 1 l4 Walto	0mm di 8,0-24, n Park	iameter uP 0m benton sand, 45.0	VC, 3 ite,)m - 4	7.5m	13.20 13.60	HOLE DEPT 32.00 36.00	ER LEVELS: H DATE/1 29/08/2007 9:00 30/08/2007 10:0	IME :00 a. 0:00 a	m. i.m.	47	LENGTH: '.50 m 4 of 5

URS New URS Wellington 160 Lambton Query, Wellington Phone: 64.4.496.3750 Fax: 64.4.496.3755

LOG OF DRILLHOLE

HOLE No.

BH2B

PROJECT: CLIENT: GRID:

Southern Landfill Consenting Wellington City Council

FEATURE: Consent #:
WGN070197(25906)
CO-ORDINATES: mN, mE
HAD GROUND: 290 m

LOCATION: WindTurbine

GEOTECH DRILLHOLE - SOIL- GEN DESC SOUTHERN_LANDFIL_DRILLING.GPJ AGS3_UK.GDT 19,

ANGLE FROM HORIZONTAL: 90°

DESCRIPTION OF CORE DESCRIPTION CONTROL DESCRIPTION CONTRO		GRID: DATUM:			D GRO D COLL		290 290					NGLE FROM RECTION:	M HORIZONT	AL:	90°		
249	INTERPRETATION	DESCRIPTION OF CORE COLOUR, WEATHERING, FABRIC, STRENGTH, ROCK TYPE, DEFECT SPACING, LITHOLOGICAL FEATURES (bedding, foliation, mineralogy, texture, cement etc) STRATIGRAPHIC NAME	CORE BOXES			REDUCED LEVEL (RL)	DEРТН (m)	GRAPHIC LOG	SPT INTERVAL SAMPLES	PROMINE SHEAR AI SCHISTO roughness (OR SC	NT JOINTS ND CRUSH SITY (attitu , infilling, et OIL DES cy, relative	s, BEDDING, SE IZONES, FOLIA de, spacing, cont tc.) CRIPTION density, water co)	METHOD & SHIFT	HEAD TEST		PIEZOMETER INSTALLATION
LOGGED:		Hole drilled using air rotary - no core recovery. For geological details, see BH2A log (continued)				248—	43 44 45 46 46 46 46 46 46 46 46 46 46 46 46 46										
JGP																	
	L	JGP LG/HW Websters Well installatio 45,0 m machin Backfill: 0m-0. CHECKED: RIG: 24.0m-25.0m k	ne sl	lotted uF	VC50mn	n diamet	er uPVC				13.20	HOLE DEPTH 32.00	DATE/ 29/08/2007 9:00	0:00 a	.m. a.m.	4	7.50 m

DRILL HOLE NO. BH3A

LIRS New Zealand Limited 13-15 College Hill, Auckland

Phone: (09) 355 1300 Fax: (09) 355 1333

Project No.:

Permit No:

Project Reference:

Client

Southern Landfill - Stage 4

Drill Type:

coring

Drilling Contractor:

HQ triple tube, wire line

Webster Drilling & Exploration

Date Finished:

Logged By: E. Ross / N O'Rourke Checked By: P Salter Date Started: 16-12-10

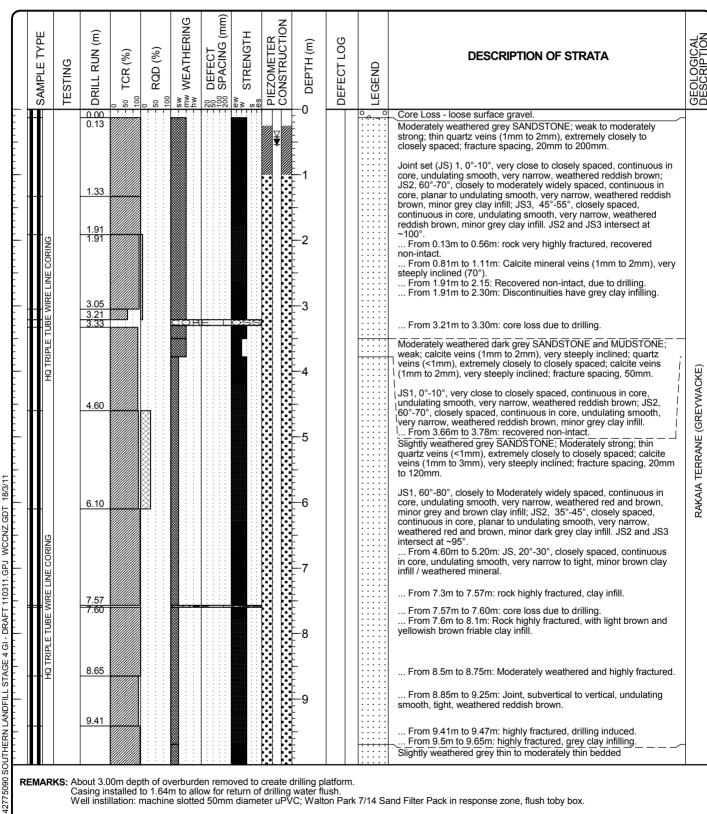
21-12-10

Relative Level: 205.87 mRL Coordinates: 5986379 00 mN

42775090

2656113 00 mF

Wellington City Council



REMARKS: About 3.00m depth of overburden removed to create drilling platform.

Casing installed to 1.64m to allow for return of drilling water flush.

Well instillation: machine slotted 50mm diameter uPVC; Walton Park 7/14 Sand Filter Pack in response zone, flush toby box.

Wellington City Council

SANDSTONE, were weak, thin quality especially strong, interbedded with Moderately weathered dark grey to black think jaminated to laminated and MUDSTONE; very weak, thin quality espaced, colinium, calcite veins (mm to 2mm), very steeply inclined; facture spacing, 30mm to 90mm. 10.94 11.0.94 11.1.1.1.5. confluencis core, planar smooth, closely spaced, light, weathered grey and brown, JS2, 80°-80°, closely to Moderately widely spaced, continuous in core, undulating smooth, light, weathered proving JS3, 35°-45°, closely spaced, continuous in core, planar to muddling smooth, light, weathered or planar to muddling smooth, light, weathered proving JS3, 30°-35°, closely spaced, continuous in core, planar to muddling smooth, light, weathered and brown, milror dark grey day intill. JS2 and JS3 intersect at -95°. 12.44 12.44 13.87 13.87 13.87 13.87 13.87 13.87 13.87 13.87 13.87 13.87 15.10 closely spaced, continuous in core, planar smooth, light, surface staining, spaced, spaced, continuous in core, planar smooth, light, surface staining, JS2, 00°-70°, closely to Moderately widely infill / weathered mineral, JS3, 30°-35°, very close to closely spaced, continuous in core, planar smooth, light, surface staining, JS2, 00°-70°, closely to Moderately widely infill / weathered mineral, JS3, 30°-35°, very close to closely spaced, continuous in core, planar smooth, light, surface staining, JS2, 00°-70°, closely to Moderately widely infill / weathered mineral, JS3, 30°-35°, very close to closely spaced, continuous in core, planar smooth, light, surface staining, JS2, 00°-70°, closely to Moderately widely infill / weathered mineral, JS3, 30°-35°, very close to closely spaced, continuous in core, planar smooth, light, surface staining, JS2, 00°-70°, closely to Moderately widely infill / weathered mineral, JS3, steeply inclined (-10°), extensive quart veins; (-10°), planar		SAMPLE TYPE	TESTING	DRILL RUN (m)	0 50 TCR (%) 100	0 50 RQD (%) 100	56 DEFECT 200 SPACING (mm)	STRENGTH	PIEZOMETER CONSTRUCTION	DEPTH (m)	DEFECT LOG	LEGEND	DESCRIPTION OF STRATA	GEOLOGICAL DESCRIPTION
ӣ [FIELDLOG 42775090 SOUTHERN LANDFILL STAGE 4 GI - DRAFT 110311.GPJ WCCNZ.GDT 18/3/11	TRIPLE TUBE WIRE LINE CORING HO TRIPLE TUBE WIRE LINE		10.94 12.44 13.67 13.82 15.12 16.04						-11 -12 -13 -14 -15 -17 -18			weathered dark grey to black thinly laminated to laminated MUDSTONE; very weak; thin quartz veins (<1mm); calcite veins (1mm to 2mm), very steeply inclined; fracture spacing, 30mm to 90mm. JS1, 15°, continuous in core, planar smooth, closely spaced, tight, weathered grey and brown; JS2, 60°-80°, closely to Moderately widely spaced, continuous in core, undulating smooth, tight, weathered brown; JS3, 35°-45°, closely spaced, continuous in core, planar to undulating smooth, tight, weathered red and brown, minor dark grey clay infill. JS2 and JS3 intersect at ~95°. From 9.70m to 10.30m: healed shear zone. Extremely close to very closely spaced parallel defects, mineral staining. From 11.75m to 11.90m: very weak. Slightly weathered grey SANDSTONE; Moderately strong; thin quartz veins, subhorizontal to vertical (<1mm), extremely closely to closely spaced; calcite veins (1mm to 2mm), very steeply inclined to vertical; fracture spacing, 20mm to 85mm. JS1, 15°, closely spaced, continuous in core, planar smooth, tight, surface staining; JS2, 60°-70°, closely to Moderately widely spaced, continuous in core, undulating smooth, tight, grey clay infill / weathered mineral; JS3, 30°-35°, very close to closely spaced, continuous in core, undulating smooth, tight, grey clay infill / weathered mineral; JS3, and JS3 intersect at ~90°. From 12.41m to 12.44m: core loss due to drilling. From 12.41m to 12.44m: core loss due to drilling. From 13.37m to 13.67m: highly fractured. Unweathered grey to dark grey SANDSTONE; strong; extensive quartz veins (<1mm), predominantly slightly inclined (<1mm), extremely closely to closely spaced, continuous in core, undulating smooth, tight, grey clay infill / weathered mineral; JS3, steeply inclined 30°-35°, very close to closely spaced, continuous in core, undulating smooth, tight, grey clay infill / weathered mineral; JS3, steeply inclined 30°-35°, very close to closely spaced, continuous in core, undulating smooth, tight, grey clay infill / weathered mineral; JS3, st	RAKAIA TERRANE (GREYWACKE)

URS

Logged By:

Checked By:

Date Started:

Date Finished:

Webster Drilling & Exploration

Phone: (09) 355 1300 Project No.:

Coordinates:

Permit No:

2656113.00 mE

Fax: (09) 355 1333

P. Salter

16-12-10 21-12-10

URS New Zealand Limited

Drilling Contractor:

Drill Type:

coring

13-15 College Hill, Auckland

HQ triple tube, wire line

Wellington City Council

Comparison of the continuous in core, undulating smooth, fight, grey day infill, yery day infill weathered mineral. \$33, 30" -40", very close to closely spaced, continuous in core, undulating smooth, fight, grey day infill weathered infine. \$33, 30" -40", very close to closely spaced, continuous in core, undulating smooth, fight, grey day infill weathered infill. \$32 and \$33 intersect at 100 closely spaced, continuous in core, undulating smooth, fight, grey day infill weathered infill. \$32 and \$33 intersect at 100 closely spaced, continuous in core, undulating smooth, fight, grey day infill weathered infill. \$32 and \$33 intersect at 100 closely spaced, continuous in core, undulating smooth, minor light grey day infill. \$45 and \$45 closely spaced, continuous in core, undulating smooth, minor light grey day infill. \$45 closely spaced, continuous in core, undulating smooth, minor light grey day infill. \$45 closely spaced, continuous in core, undulating smooth, minor light grey day infill. \$45 closely spaced, continuous in core, undulating smooth, light grey clay infill. \$45 closely spaced, continuous in core, undulating smooth, light grey clay infill. \$45 closely spaced, continuous in core, undulating smooth, minor light grey clay infill. \$45 closely spaced, continuous in core, undulating smooth, minor light grey clay infill. \$45 closely spaced, continuous in core, undulating smooth, minor light grey clay infill. \$45 closely spaced, continuous in core, undulating smooth, minor light grey clay infill. \$45 closely spaced, continuous in core, undulating smooth, minor light grey clay infill. \$45 closely spaced, continuous in core, undulating smooth, minor light grey clay infill. \$45 closely spaced, continuous in core, undulating smooth, minor light grey clay infill. \$45 closely spaced, continuous in core, undulating smooth, minor light grey clay infill. \$45 closely spaced, continuous in core, undulating smooth, minor white-grey clay infill. \$45 closely spaced, continuous in core, undulating smooth, minor white-grey		SAMPLE TYPE	TESTING	DRILL RUN (m)	0 50 TCR (%) 100	0 50 RQD (%) 100	sw mw WEATHERING hw	20 100 200 SPACING (mm)	s STRENGTH	PIEZOMETER CONSTRUCTION	DEPTH (m)	DEFECT LOG	LEGEND	DESCRIPTION OF STRATA	GEOLOGICAL DESCRIPTION
	SOUTHERN LANDFILL STAGE 4 GI - DRAFT 110:	HQ TRIPLE TUBE WIRE LINE CORING HQ TRIPLE TUBE WIRE LINE		21.34 22.58 23.67 25.72 24.97 25.88 27.30 27.30							-21 -22 -23 -24 -25 -26 -27		0,00	tight, grey clay infill / weathered mineral; JS3, 30°-40°, very close to closely spaced, continuous in core, undulating smooth, tight, grey clay infill / weathered infill. JS2 and JS3 intersect at 100°-110°. I From 17.79m to 17.85m: highly fractured. I From 19.83m to 19.88m: core loss due to drilling. CLAY with some fine to coarse gravel; banded light grey and dark lgrey. Soft, wet; gravel, subangular, SANDSTONE (SHEAR ZONE). Unweathered grey SANDSTONE; Strong; quartz veins (<1mm); fracture spacing 20mm to 200mm. JS1, 70°-80°, closely spaced, continuous in core, very narrow, undulating smooth, minor light grey clay infill; JS2, 60°-70°, very closely to closely spaced, continuous in core, very narrow, undulating smooth, minor light grey clay infill. JS1 and JS2 intersect at -80°. I From 21.76m to 22.65m: highly fractured. Loose to medium dense sandy fine to coarse GRAVEL, with some clay; light grey. Subangular to angular, SANDSTONE; sand is fine to coarse. At lease two phases of shearing with extensive calcite / infilling, 2mm. (SHEAR ZONE) Unweathered grey SANDSTONE; Strong; quartz veins (<1mm); fracture spacing 20mm to 200mm. JS1, 60°-70°, very closely to closely spaced, continuous in core, very narrow, planar to undulating smooth, light grey clay infill; JS2, 0°-10°, closely spaced, continuous in core, very narrow, planar to undulating smooth, minor light grey clay infill. I From 23.67m to 23.72m: core loss due to drilling. Unweathered grey SANDSTONE; Strong to very strong; quartz veins (<1mm); fractures extremely close to closely spaced, 20mm to 100mm. JS1, 50°-60°, very closely spaced, continuous in core, very narrow, planar to undulating smooth, minor light grey clay infill; JS2, 0°-10°, very closely spaced, continuous in core, very narrow, planar to undulating smooth, minor light grey clay infill; JS2, 0°-10°, very closely spaced, continuous in core, very narrow, undulating smooth, minor white-grey clay infill.	RAKAIA TERRANE (GREYWACKE)

Phone: (09) 355 1300 | Project No.:

Coordinates:

Permit No:

2656113.00 mE

Fax: (09) 355 1333

P. Salter

16-12-10

21-12-10

Webster Drilling & Exploration

Logged By:

Checked By:

Date Started: Date Finished:

URS New Zealand Limited

Drilling Contractor:

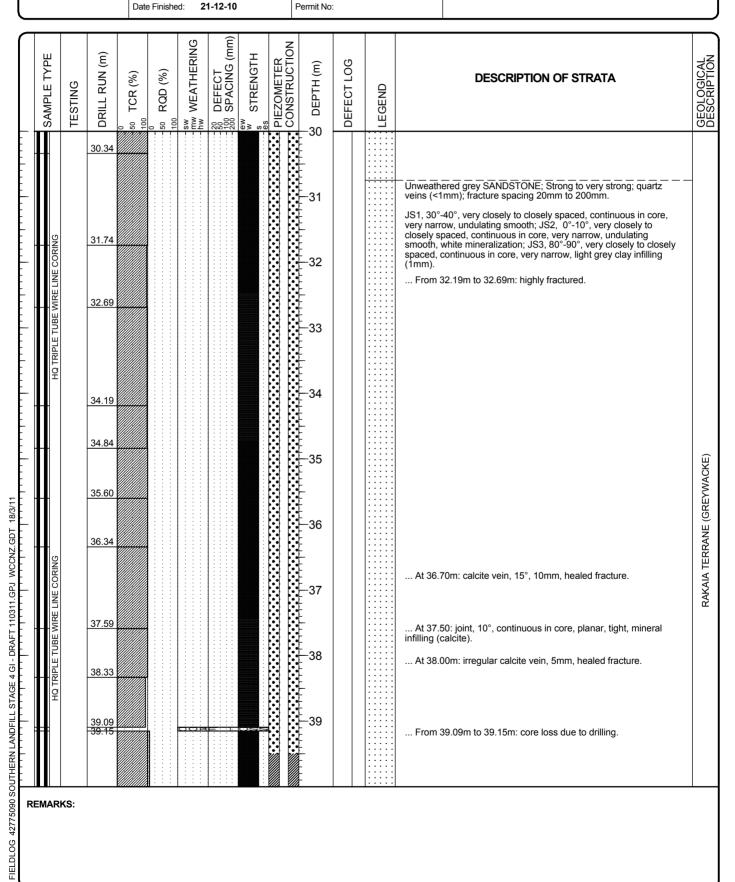
Drill Type:

coring

13-15 College Hill, Auckland

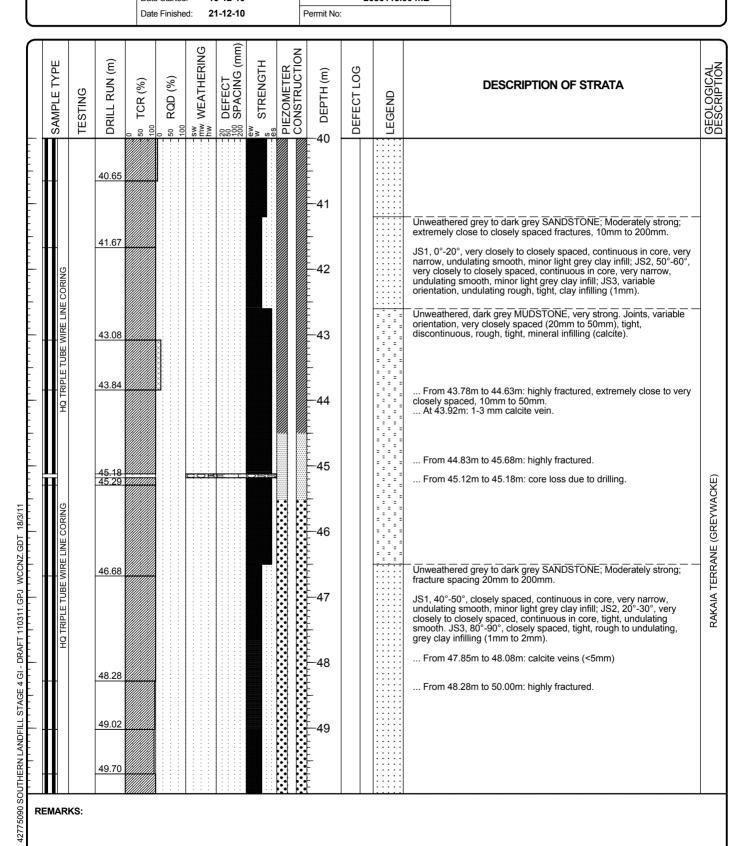
HQ triple tube, wire line

U	R	5		DRIL	Sheet 4 of 6
URS New Zealand Limited 13-15 College Hill, Auckland Drilling Contractor: We	bster Drilling	Phone: (09) 355 1300 Fax: (09) 355 1333 & Exploration	,	2775090	Project Reference: Southern Landfill - Stage 4
Drill Type: HQ triple tube, wire line coring	Logged By: Checked By: Date Started:	E. Ross / N O'Rourke P. Salter 16-12-10	Relative Level: Coordinates:	205.87 mRL 5986379.00 mN 2656113.00 mE	Client: Wellington City Council



U	R	5		DRIL	L HOLE NO. BH3A	heet 5 of 6
URS New Zealand Limited 13-15 College Hill, Auckland		Phone: (09) 355 1300 Fax: (09) 355 1333			Project Reference:	
Drilling Contractor: We	bster Drilling	& Exploration	42	2775090	Southern Landfill - Stage 4	
Drill Type:	Logged By:	E. Ross / N O'Rourke	Relative Level:	205.87 mRL	Client:	
HQ triple tube, wire line	Checked By:	P. Salter	Coordinates:	5986379.00 mN	Mallimenton City Coversil	
coring	Date Started:	16-12-10		2656113.00 mE	Wellington City Council	

FIELDLOG



	DRIL	Sheet 6 of 6 L HOLE NO. BH3A
Phone: (09) 355 1300 Fax: (09) 355 1333	Project No.:	Project Reference:
Exploration	42775090	Southern Landfill - Stage 4
E. Ross / N O'Rourke	Relative Level: 205.87 mRL	Client:
P. Salter	Coordinates: 5986379.00 mN	

Wellington City Council

SAMPLE TYPE	TESTING	DRILL RUN (m)	0 50 TCR (%)	0 50 RQD (%) 100	sw mw hw WEATHERING	20 DEFECT 200 SPACING (mm)	ew S STRENGTH	es PIEZOMETER CONSTRUCTION	3 DEPTH (m)	DEFECT LOG	LEGEND	DESCRIPTION OF STRATA	GEOLOGICAL DESCRIPTION
HOTRID ETTIRE WIRE I NE CORNG	ווא זינו בר וספר אוואר בוער	51.00 51.17 52.10 52.84 53.40 54.57			COP				50 51 52 53 55		0 - 0	Unweathered grey to dark grey SANDSTONE; Moderately strong; interbedded thin (10-30mm) dark grey to black MUDSTONE, weak, very steeply inclined (70°-80°); fracture spacing 20mm to 60mm. Clayey fine to coarse GRAVEL, minor fine to medium sand and silt, light grey and white. Moist; subangular to angular; sandstone and mudstone. (SHEAR ZONE) Unweathered grey SANDSTONE; Strong; quartz veins (1-3mm), fracture spacing 60mm to 200mm. From 50.68m to 51.06m: subvertical (80°-90°) calcite vein (<5mm) JS1, 20°-30°, closely spaced, continuous in core, tight, undulating smooth; JS2, 70°-80°, closely spaced, continuous in core, very narrow, undulating smooth, white mineralization. From 51.00m to 51.17m: core loss due to drilling. Unweathered grey to dark grey SANDSTONE; Moderately strong; interbedded thin (20-30mm) dark grey to black MUDSTONE, weak, very steeply inclined (60°-70°); fracture spacing 20-200mm, dark grey clay infill on fractures between mudstone and sandstone. JS1, 60°-70°, closely spaced, continuous in core, tight, undulating smooth. From 53.87m to 55.46m: highly fractured. From 54.00m to 55.46m: becomes slightly weathered due to high level of fracturing. Unweathered grey to dark grey SANDSTONE; Strong; quartz veins (<1mm); fracture spacing 60mm to 200mm. JS1, 60°-70°, closely spaced, continuous in core, very narrow, undulating smooth. From 56.26m to 57.05m: highly fractured. From 56.26m to 57.05m: highly fractured. From 56.26m to 58.55m: calcite veins (1-3mm).	RAKAIA TERRANE (GREYWACKE)
HO TRIPI E TI IRE WIRE		58.67							59			CLAY with some fine to coarse gravel and fine to medium sand, grey. Soft; moist to wet; gravel, subangular to angular, sandstone. / (SHEAR ZONE) Unweathered grey to dark grey SANDSTONE; Moderately strong; extremely close to closely spaced fractures, quartz veins (<1mm). From 59.90m to 59.95m: discontinuities extremely closely spaced (5mm to 10mm), variable orientation, clay infilling (1mm to 2mm).	

Coordinates:

Permit No:

2656113.00 mE

Webster Drilling & Exploration

16-12-10 21-12-10

Logged By:

Checked By:

Date Started:

Date Finished:

URS New Zealand Limited 13-15 College Hill, Auckland

HQ triple tube, wire line

Drilling Contractor:

Drill Type:

coring



BH3A: 0.0m to 2.75m



BH3A: 2.75m to 5.15m





BH3A: 5.15m to 8.16m

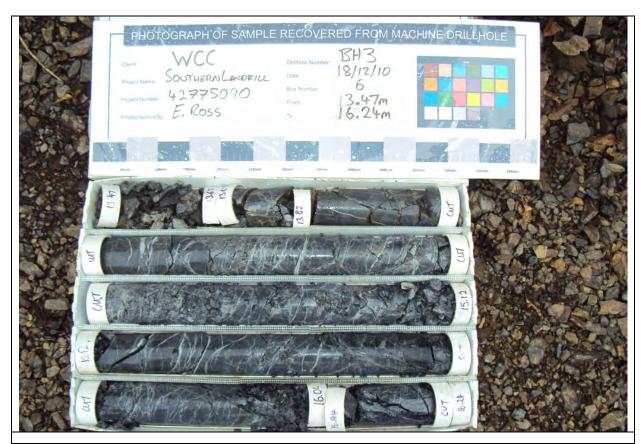


BH3A: 8.16m to 10.82m





BH3A: 10.82m to 13.47m



BH3A: 13.47m to 16.24m





BH3A: 16.24m to 19.03m



BH3A: 19.03m to 21.76m





BH3A: 21.76m to 24.54m



BH3A: 24.54m to 27.30m





BH3A: 27.30m to 30.06m



BH3A: 30.06m to 32.86m





BH3A: 32.86m to 35.60m



BH3A: 35.60m to 38.33m





BH3A: 38.33m to 41.09m



BH3A: 41.09m to 43.78m





BH3A: 43.78m to 46.58m



BH3A: 46.58m to 49.30m





BH3A: 49.30m to 54.80m



BH3A: 54.80m to 57.51m

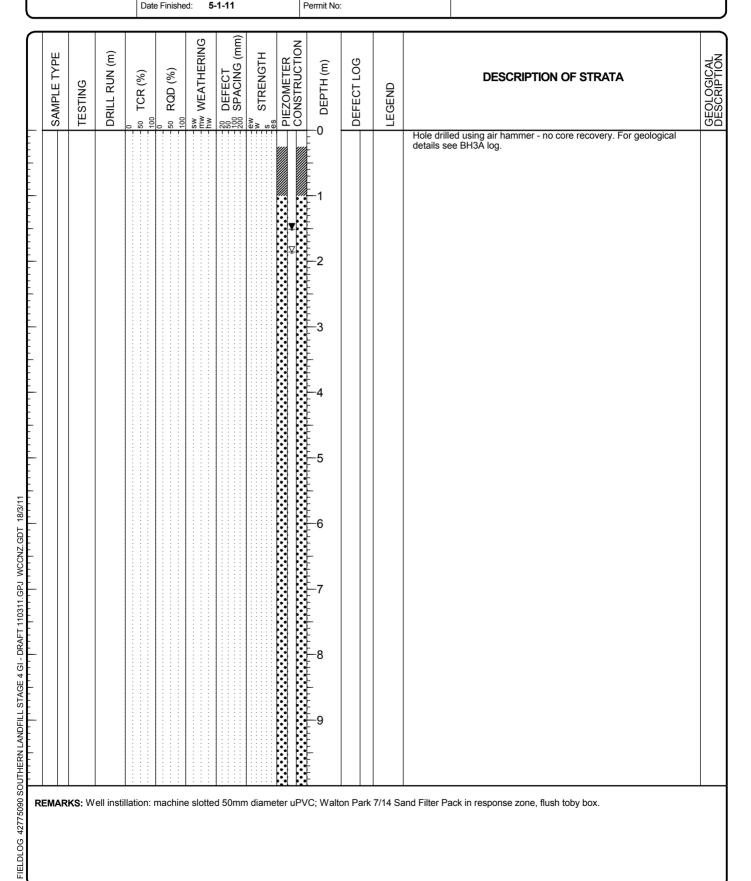




BH3A: 57.51m to 60.00m



U	R	5		DRIL	L HOLE NO. BH3B	Sheet 1 of 3
URS New Zealand Limited 13-15 College Hill, Auckland Drilling Contractor: We	bster Drilling	Phone: (09) 355 1300 Fax: (09) 355 1333 & Exploration	,	2775090	Project Reference: Southern Landfill - Stage 4	
Drill Type: Air hammer	Logged By: Checked By: Date Started:	G. Haldane P. Salter 22-12-10	Relative Level: Coordinates:	206.07 mRL 5986381.00 mN 2656112.00 mE	Client: Wellington City Council	



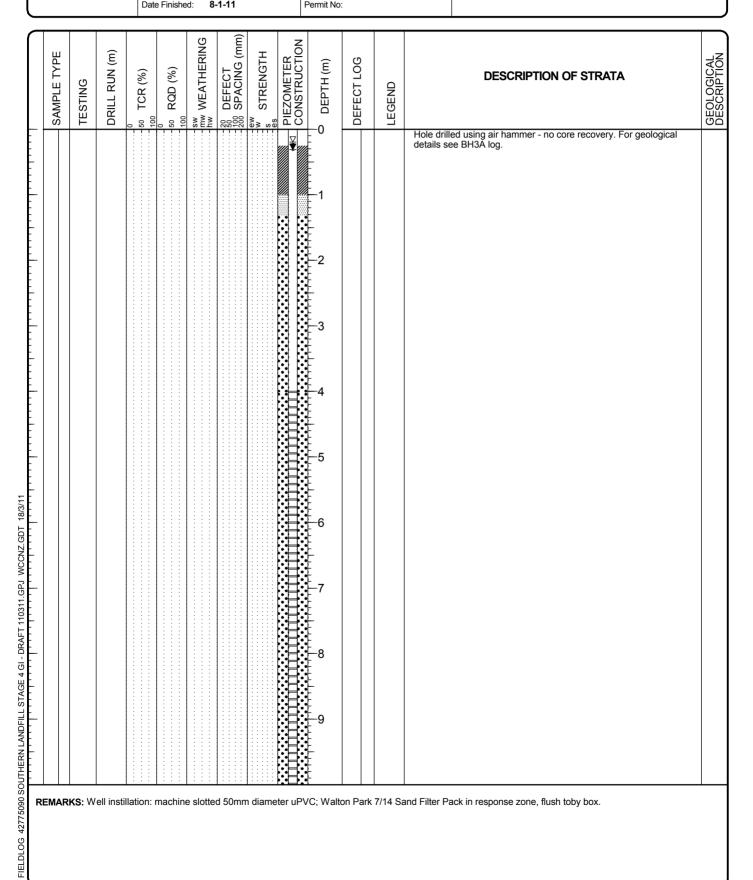
U	R	5		DRIL	L HOLE NO. BH3B	Sheet 2 of 3				
URS New Zealand Limited 13-15 College Hill, Auckland Drilling Contractor: We	bster Drilling a	Phone: (09) 355 1300 Fax: (09) 355 1333 & Exploration		2775090	Project Reference: Southern Landfill - Stage 4					
Drill Type: Air hammer	Logged By: Checked By: Date Started:	G. Haldane P. Salter 22-12-10	Relative Level: Coordinates:	206.07 mRL 5986381.00 mN 2656112.00 mE	Client: Wellington City Council					

SAMPLE TYPE	TESTING	DRILL RUN (m)	0 50 TCR (%) 100	0 50 RQD (%) 100	sw mw WEATHERING hw	50 DEFECT 200 SPACING (m	-ew STRENGTH	PIEZOMETER CONSTRUCTION	DEPTH (m)	DEFECT LOG	LEGEND		DESCRIPTION OF STRATA	GEOLOGICAL
			υ <u>μ</u> 195 – 0	υ <u>μ</u> 09- 0	1. L.	2			-17		7	Hole drille details se	ed using air hammer - no core recovery. For geological ee BH3A log.	

ľ	RS	5		DRIL	L HOLE NO. BH3B	Sheet 3 of 3
URS New Zealand Limited 13-15 College Hill, Auckland		Phone: (09) 355 1300 Fax: (09) 355 1333	,,	2775090	Project Reference: Southern Landfill - Stage 4	
Drilling Contractor: We	bster Drilling &	& Exploration				
Drill Type:	Logged By:	G. Haldane	Relative Level:	206.07 mRL	Client:	
Air hammer	Checked By:	P. Salter	Coordinates:	5986381.00 mN	NA ()	
	Date Started:	22-12-10		2656112.00 mE	Wellington City Council	
	Date Finished:	5-1-11	Permit No:			

SAMPLE TYPE	TESTING	DRILL RUN (m)	50 TCR (%)	50 RQD (%)	sw mw hw WEATHERING	20 DEFECT 100 SPACING (mm)	ew W S S STRENGTH	PIEZOMETER CONSTRUCTION		DEFECT LOG	LEGEND		GEOLOGICAL DESCRIPTION
									-21 -22 -23			Hole drilled using air hammer - no core recovery. For geological details see BH3A log.	
REMAR	RKS: Bo	orehole	complet	ed at ta	arget de	epth of 2	26.50m	h.	-27 28 29				

U	RS	5		Sheet 1 of 2			
URS New Zealand Limited 13-15 College Hill, Auckland Drilling Contractor: We	bster Drilling	Phone: (09) 355 1300 Fax: (09) 355 1333 & Exploration	,	2775090	Project Reference: Southern Landfill - Stage 4		
Drill Type: Air hammer	Logged By: Checked By: Date Started:	G. Haldane P. Salter 6-1-11	Relative Level: Coordinates:	205.72 mRL 5986377.00 mN 2656114.00 mE	Client: Wellington City Council		



ľ	R	5		Sheet 2 of 2			
URS New Zealand Limited 13-15 College Hill, Auckland Drilling Contractor: We	bster Drilling 8	Phone: (09) 355 1300 Fax: (09) 355 1333 & Exploration	,	2775090	Project Reference: Southern Landfill - Stage 4		
Drill Type: Air hammer	Logged By: Checked By: Date Started: Date Finished:	G. Haldane P. Salter 6-1-11 8-1-11	Relative Level: Coordinates: Permit No:	205.72 mRL 5986377.00 mN 2656114.00 mE	Client: Wellington City Council		

		STRENGTH S S S S S CONSTRUCTION	_10 -		GEOLOGICAL DESCRIPTION
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			- 10 		
			17		
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<u>-</u>			18 18 		
			- - - - - - - -19		
REMARKS: B			- - -		
	ted at target depth of		-		

DRILL HOLE NO. BH4A

LIRS New Zealand Limited 13-15 College Hill, Auckland Phone: (09) 355 1300 Fax: (09) 355 1333

Project No.:

Permit No:

Project Reference:

Client

Southern Landfill - Stage 4

Drilling Contractor:

Webster Drilling & Exploration

42775090

Drill Type:

HQ triple tube, wire line coring

Logged By: E. Ross / N O'Rourke Relative Level: 189.79 mRL Checked By:

28-1-11

Date Started:

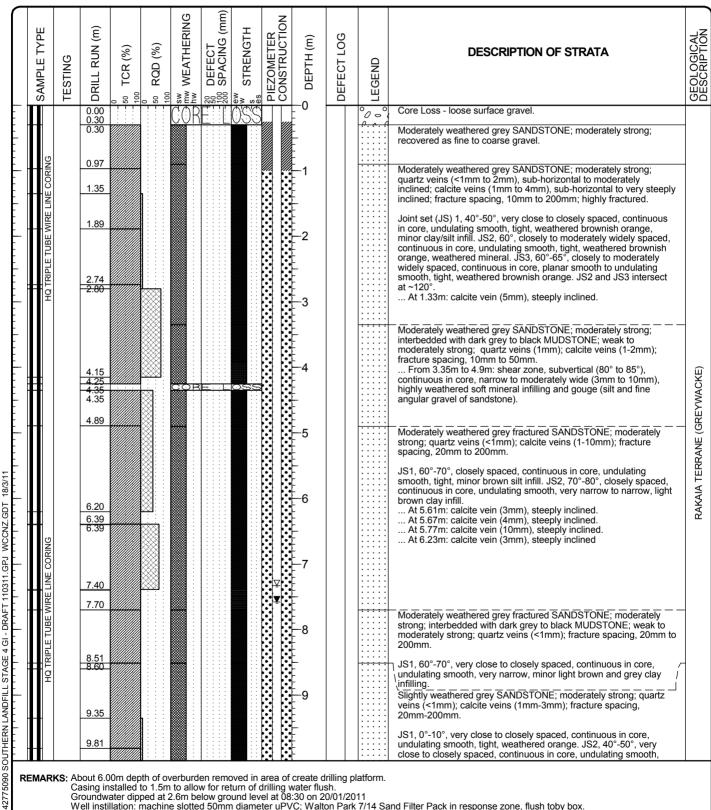
Date Finished:

P Salter Coordinates: 18-1-11

5986046 00 mN

2656311 00 mF

Wellington City Council

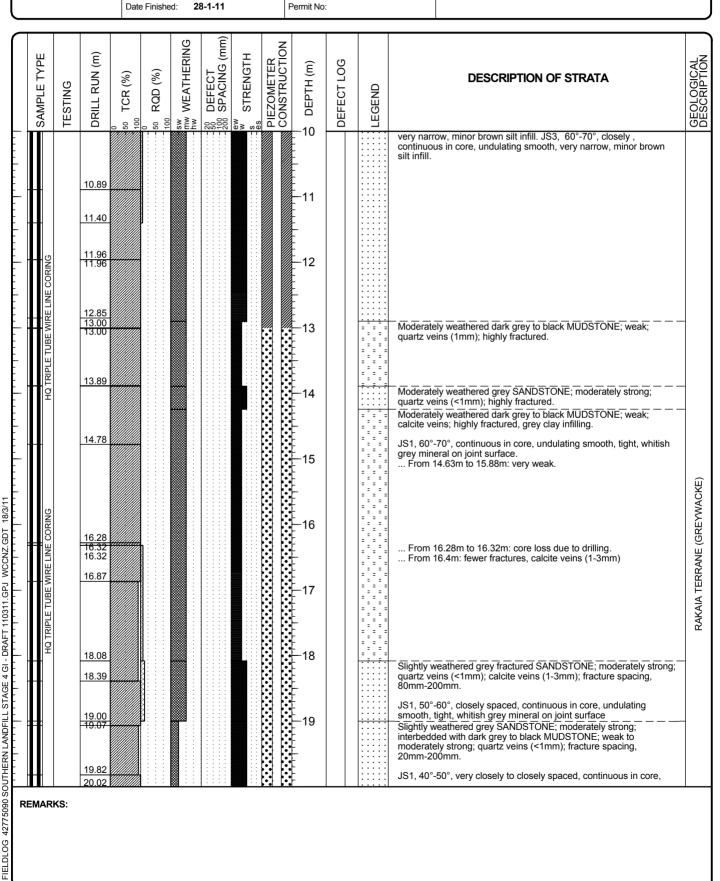


REMARKS: About 6.00m depth of overburden removed in area of create drilling platform. Casing installed to 1.5m to allow for return of drilling water flush.

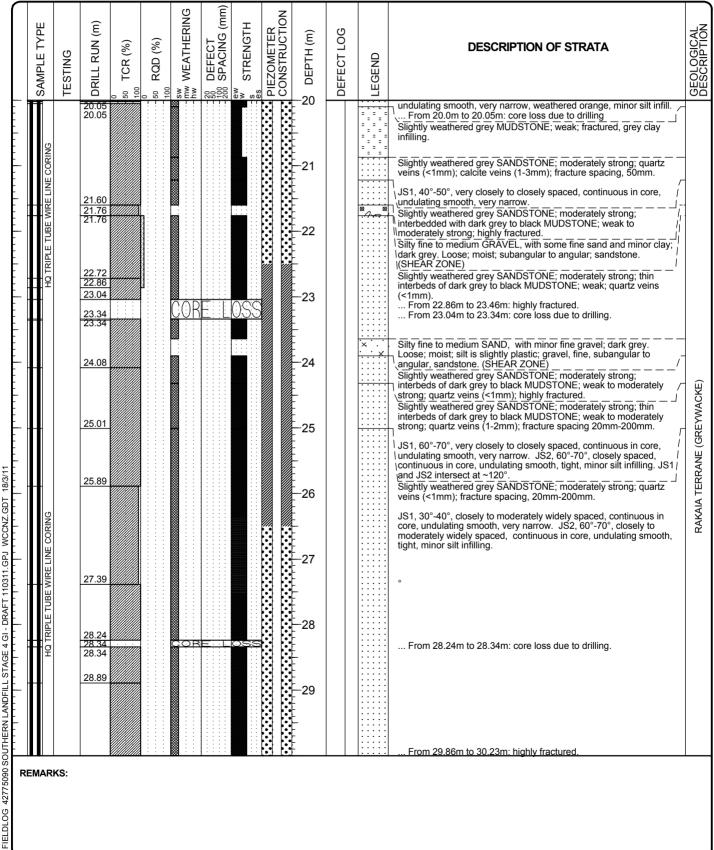
Groundwater dipped at 2.6m below ground level at 08:30 on 20/01/2011

Well instillation: machine slotted 50mm diameter uPVC; Walton Park 7/14 Sand Filter Pack in response zone, flush toby box.

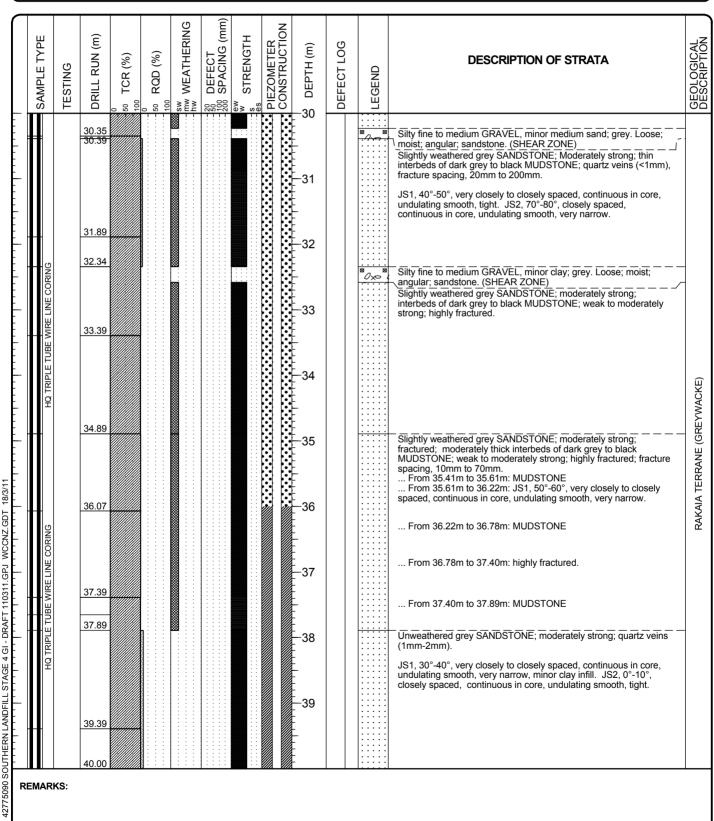
U	R	5		DRIL	L HOLE NO. BH4A		
URS New Zealand Limited 13-15 College Hill, Auckland Drilling Contractor: Wet	oster Drilling	Phone: (09) 355 1300 Fax: (09) 355 1333 & Exploration	,	2775090	Project Reference: Southern Landfill - Stage 4		
coring	Logged By: Checked By: Date Started:	E. Ross / N O'Rourke P. Salter 18-1-11	Relative Level: Coordinates:	189.79 mRL 5986046.00 mN 2656311.00 mE	Client: Wellington City Council		



			Į	R	S							DRIL	L HOLE NO. BH4A	Sheet 3	of 6
URS New Zealand Limited Phone: (0 13-15 College Hill, Auckland Fax: (0 Prilling Contractor: Webster Drilling & Exploration				(09) 355		Project No		75090		Project Reference: Southern Landfill - Stage 4 Client: Wellington City Council					
l "	Drill Type: Logged By: E. HQ triple tube, wire line coring Checked By: P. Date Started: 18				. Ross / . Salter 8-1-11 8-1-11		ourke	Relative Level: 189.79 mRL Coordinates: 5986046.00 mN 2656311.00 mE Permit No:					00 mN		
SAMPLE TYPE	TESTING	DRILL RUN (m)	550 TCR (%)	50 RQD (%)	sw mw WEATHERING hw	20 DEFECT 100 SPACING (mm)	ew S S S S	PIEZOMETER	DEPTH (m)	DEFECT LOG	LEGEND		DESCRIPTION OF STRATA		GEOLOGICAL DESCRIPTION

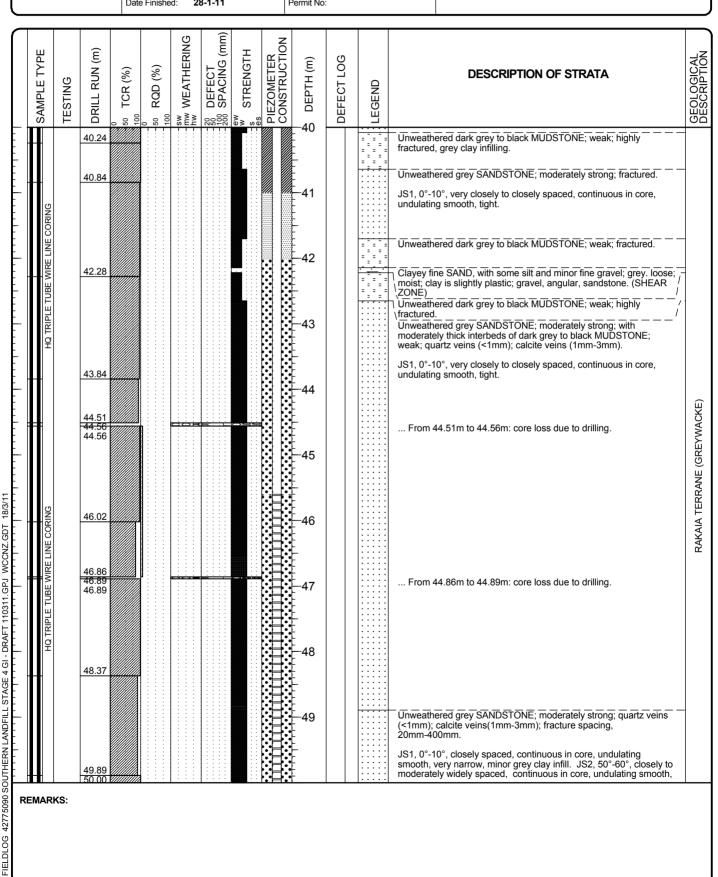


ľ	RS	5		DRILL HOLE NO. BH4A						
URS New Zealand Limited 13-15 College Hill, Auckland		Phone: (09) 355 1300 Fax: (09) 355 1333	,		Project Reference:					
Drilling Contractor: We	bster Drilling &	& Exploration	4:	2775090	Southern Landfill - Stage 4					
Drill Type:	Logged By:	E. Ross / N O'Rourke	Relative Level:	189.79 mRL	Client:					
HQ triple tube, wire line	Checked By:	P. Salter	Coordinates:	5986046.00 mN	NA III 4 01 0 II					
coring	Date Started:	18-1-11		2656311.00 mE	Wellington City Council					
	Date Finished:	28-1-11	Permit No:							
			ı							



FIELDLOG

		•				Sheet 5 of 6
U	13-15 College Hill, Auckland Fax: (09) 358			DRIL	L HOLE NO. BH4A	
URS New Zealand Limited 13-15 College Hill, Auckland		Phone: (09) 355 1300 Fax: (09) 355 1333	,		Project Reference:	
Drilling Contractor: We	bster Drilling &	& Exploration	42	2775090	Southern Landfill - Stage 4	
Drill Type: HQ triple tube, wire line coring	Logged By: Checked By: Date Started:	E. Ross / N O'Rourke P. Salter 18-1-11	Relative Level: Coordinates:	189.79 mRL 5986046.00 mN 2656311.00 mE	Client: Wellington City Council	
	Data Finished:	20.4.44	Dormit No:			



	DRIL	Sheet 6 of 6
Phone: (09) 355 1300 Fax: (09) 355 1333	Project No.:	Project Reference:
Exploration	42775090	Southern Landfill - Stage 4
E. Ross / N O'Rourke	Relative Level: 189.79 mRL	Client:

Wellington City Council

	SAMPLE TYPE	TESTING	DRILL RUN (m)	0 50 TCR (%) 100	0 50 RQD (%)		200 DEFECT 200 SPACING (mm)	ew W STRENGTH S S	PIEZOMETER CONSTRUCTION	— О DEPTH (m)	DEFECT LOG	LEGEND	DESCRIPTION OF STRATA	GEOLOGICAL DESCRIPTION
	HQ TRIPLE TUBE WIRE LINE CORING		50.55 50.55 52.12 52.89			CORE LOS		52 -53				tight From 49.59m to 49.66m: thin steeply inclined interbed of dark grey to black MUDSTONE. Clay infilling of fractures From 50.00m to 50.55m: core loss due to drilling. Unweathered grey SANDSTONE; moderately strong; with thin interbeds of dark grey to black MUDSTONE; weak; quartz veins		
			53.87 54.99 55.09							54			interbeds of dark grey to black MUDS I ONE; weak; quartz veins (<1mm); calcite veins (1mm-3mm); fracture spacing, 10mm to 200mm; grey clay infilling in bedding fractures between mudstone and sandstone. JS1, 60°-70°, very closely to closely spaced, continuous in core, undulating smooth, tight. Unweathered grey SANDSTONE; moderately strong; quartz veins (1mm); calcite veins (1mm-3mm); fracture spacing 20mm-400mm.	(3
FIELDLOG 42775090 SOUTHERN LANDFILL STAGE 4 GI - DRAFT 110311.GPJ WCCNZ.GDT 18/3/11	HQ TRIPLE TUBE WIRE LINE CORING		57.39							56 57 58			JS1, 50°-60°, closely to moderately widely spaced, continuous in core, undulating smooth, very narrow, minor grey clay infill.	RAKAIA TERRANE (GREYWACKE)
SOUTHERN			59.70							- - - -				
FIELDLOG 42775090	EMAR	KS: B	orehole	comple	ted at t	arget de	pth of 6	60.00m	ı					

Coordinates:

Permit No:

2656311.00 mE

Webster Drilling & Exploration

P. Salter

18-1-11 28-1-11

Logged By:

Checked By:

Date Started:

Date Finished:

URS New Zealand Limited 13-15 College Hill, Auckland

HQ triple tube, wire line

Drilling Contractor:

Drill Type:

coring



BH4A: 0.0m to 2.74m



BH4A: 2.74m to 5.44m





BH4A: 5.44m to 8.20m

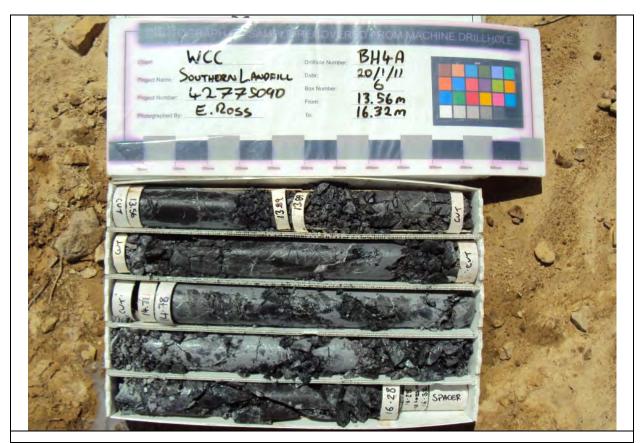


BH4A: 8.20m to 10.89m





BH4A: 10.89m to 13.56m



BH4A: 13.56m to 16.32m





BH4A: 16.32m to 19.07m



BH4A: 19.07m to 21.76m





BH4A: 21.76m to 24.34m



BH4A: 24.34m to 27.09m





BH4A: 27.09m to 29.80m



BH4A: 29.80m to 32.58m





BH4A: 32.58m to 35.31m



BH4A: 35.31m to 37.89m





BH4A: 37.89m to 40.64m



BH4A: 40.64m to 43.28m





BH4A: 43.28m to 46.02m



BH4A: 46.02m to 48.77m





BH4A: 48.77m to 51.55m



BH4A: 51.55m to 54.29m





BH4A: 54.29m to 56.99m



BH4A: 56.99m to 59.70m

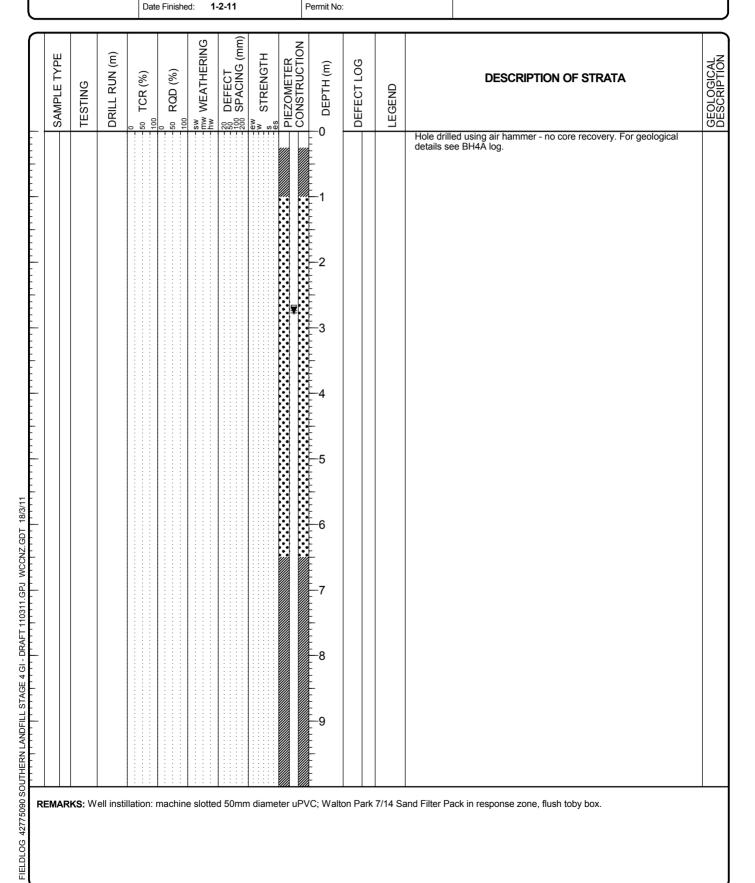




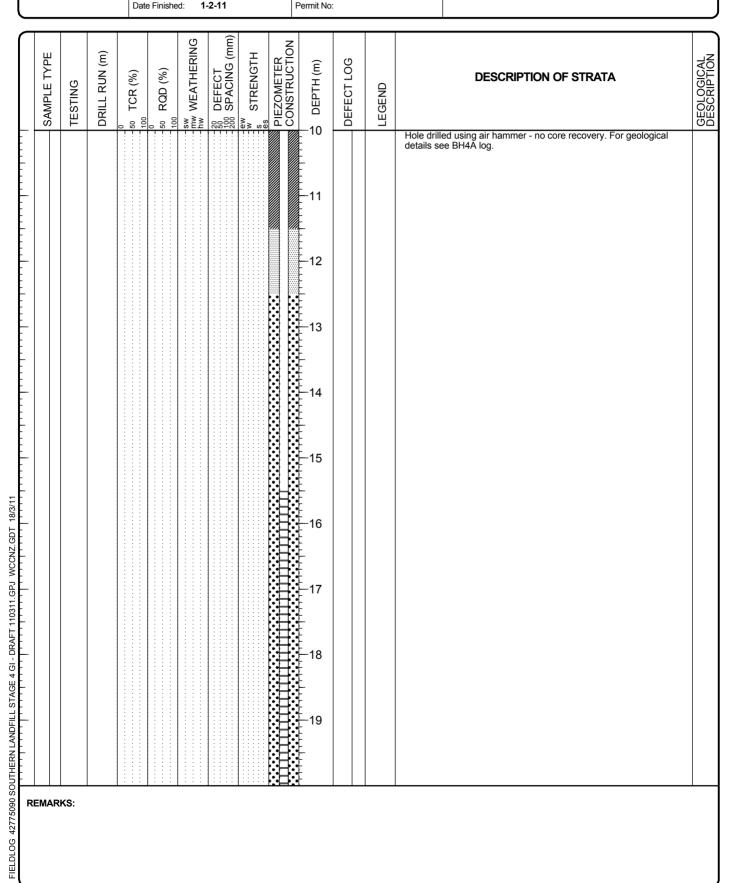
BH4A: 59.70m to 60.00m



T	5		DRIL	Sheet 1 of 3 ILL HOLE NO. BH4B					
URS New Zealand Limited 13-15 College Hill, Auckland Drilling Contractor: We	Phone: (09) 355 1300 Fax: (09) 355 1333 & Exploration	,	Project Reference: Southern Landfill - Stage 4						
Drill Type: Air hammer	Logged By: Checked By: Date Started:	G. Haldane P. Salter 29-1-11	Relative Level: Coordinates:	189.70 mRL 5986043.00 mN 2656312.00 mE	Client: Wellington City Council				



T	5		DRILL HOLE NO. BH4B				
URS New Zealand Limited Phone: (09) 355 1300 13-15 College Hill, Auckland Fax: (09) 355 1333 Drilling Contractor: Webster Drilling & Exploration			,	2775090	Project Reference: Southern Landfill - Stage 4		
Drill Type: Air hammer	Logged By: Checked By: Date Started:	G. Haldane P. Salter 29-1-11	Relative Level: Coordinates:	189.70 mRL 5986043.00 mN 2656312.00 mE	Client: Wellington City Council		



U	5		DRIL	L HOLE NO. BH4B					
URS New Zealand Limited Phone: (09) 355 1300 13-15 College Hill, Auckland Fax: (09) 355 1333 Drilling Contractor: Webster Drilling & Exploration			,	2775090	Project Reference: Southern Landfill - Stage 4				
Drill Type: Air hammer	Logged By: Checked By: Date Started: Date Finished:	G. Haldane P. Salter 29-1-11 1-2-11	Relative Level: Coordinates: Permit No:	189.70 mRL 5986043.00 mN 2656312.00 mE	Client: Wellington City Council				

	SAMPLE TYPE	TESTING	DRILL RUN (m)	0 50 TCR (%) 100	0 50 RQD (%)	sw mw WEATHERING hw	200 DEFECT 200 SPACING (mm)	ew W STRENGTH	PIEZOMETER CONSTRUCTION	0 DEPTH (m)	DEFECT LOG	LEGEND	DESCRIPTION OF STRATA	GEOLOGICAL DESCRIPTION
- - - - - - - - - - -										-21			Hole drilled using air hammer - no core recovery. For geological details see BH4A log.	
										22				
										23				
-										<u>-</u> 24				
										25 25				
										26 26				
-										27 				
										-28 - - - - - - - - - - - - -				
										-				
RE	 EMAR	KS : Bo	prehole	comple	ted at t	arget de	epth of 2	24.50m	l.	Γ				

TEST PIT LOG TP1									
Project No.:	Project Reference:								
42775090	Southern Landfill - Stage 4								
Relative Level: 190.00 mRL	Client:								

Wellington City Council

	DESCRIPTION OF STRATA	GRAPHIC LOG	0.0 DEPTH (m)	GEOLOGICAL DESCRIPTION	FIELD SHEAR STRENGTH (kPa)	PENETROMETER BLOWS (N)	SAMPLING AND OTHER TESTING	GROUND WATER DATA AND COMMENTS
	TOPSOILwith roots; brown. sandy gravelly SILT, with some clay; brownish orange. Firm; moist; low plasticity; sand, fine to coarse; gravel, fine to coarse, subangular of sandstone. (COLLUVIUM) At 0.6m becomes stiff to very stiff.	× × × × × × × × × × × × × × × × × × ×	0.2	COLLUVIUM	168/13		S1 Bulk Disturbed	
	Trial pit completed at 0.7m depth due to cobble obstruction.		0.8					
	Scala penetrometer test undertaken 1.5m away from hole in undisturbed ground.							
	Depth Blows/100mm penetration		1.0					
	0.0m - 0.1m 0 0.1m - 0.2m 2 0.2m - 0.3m 2		- 1.2					
	0.3m - 0.4m 2 0.4m - 0.5m 2		<u> </u>					
	0.5m - 0.6m 2 0.6m - 0.7m 6							
	0.7m - 0.8m		- 1.6 -					
	0.9m - 1.0m 5 1.0m - 1.1m 20 / refusal		_ 1.8					
			2.0					
			⊢ − 2.2					
			— 2.4 —					
/11			2.6					
1311.GPJ WCCNZ.GDT 14/3/11			2.8					
Z.GD.			3.0					
VCCN								
GPJ \			- 3.2 -					
0311.			3.4					
4FT 1			— — 3.6					
I - DR,			_ _ 3.8					
ЭЕ 4 G			- 3.0					
42775090 SOUTHERN LANDFILL STAGE 4 GI - DRAFT 110	TEST PIT SECTION	DN OC	1	1	1		TEST PIT TERM	INATED AT:
NDFIL1							Target Depth	
în LA				+			Refusal	X
ЛНЕR							Flooding Caving/collapse	
nos o				+				· 🗀
77509				+			SAMPLE TYPE:	
		++		+		-	Bulk Sample	BS
TEST PIT							Tube Sample Disturbed Samp	TS ole DS
F								

697983.00 mN

297465.00 mE

URS

URS NZ Ltd.

Logged By:

Checked By:

Date Started:

Date Finished:

Coordinates:

Permit No:

E. Ross

P. Salter

19-1-11

19-1-11

URS New Zealand Limited 13-15 College Hill, Auckland

Drilling Contractor:

Excavation Method:

Hand Dug

	TE	ST PIT LOG TP2	Sheet 1 of 1
Project No.: 427	75090	Project Reference: Southern Landfill - Stage 4	
Relative Level: 2 Coordinates: 6	54.00 mRL 97640.00 mN	Client:	

Wellington City Council

DESCRIPTION OF STRATA	GRAPHIC LOG	О DЕРТН (m)	GEOLOGICAL DESCRIPTION	FIELD SHEAR STRENGTH (KPa)	PENETROMETER BLOWS (N)	SAMPLING AND OTHER TESTING	GROUND WATER DATA AND COMMENTS
TOPSOIL with some gravel and silt; brown. SILT with some fine to coarse gravel, minor cobbles; brownish orange. Stiff to very stiff; moist; non-plastic; gravel and cobbles, subangular to angular of sandstone. (COLLUVIUM) GRAVEL, with some fine to coarse sand and cobbles, minor silt, trace clay; brownish orange. Tightly packed; moist; subangular; sandstone; cobbles, subangualr to angular of sandstone. (COLLUVIUM)		- 0.2 - 0.4 - 0.6 - 0.8	COLLUVIUM	due to gra	avel	S2 Bulk Disturbed	
Trial pit completed at 1.2m depth due to rock obstruction. Scala penetrometer test undertaken 1.5m away from hole in undisturbed ground. Depth Blows/100mm penetration 0.0m - 0.1m 0 0.1m - 0.2m 2 0.2m - 0.3m 5 0.3m - 0.4m 5 0.4m - 0.5m 6 0.5m - 0.6m 4 0.6m - 0.7m 6		- 1.2 - 1.4 - 1.6 - 1.8 - 2.0					
0.7m - 0.8m 8 0.8m - 0.9m 8 0.9m - 1.0m 13 1.0m - 1.1m 8 1.1m - 1.2m 8 1.2m - 1.3m 9 1.3m - 1.4m 15 / bouncing		2.2 2.4 2.6 2.8					
TEST PIT SECTI	ION	3.8				TEST PIT TERM	
						Refusal Flooding Caving/collaps SAMPLE TYPE: Bulk Sample	BS
						Tube Sample Disturbed Sam	TS ple DS

TEST PIT 42775090 SOUTHERN LANDFILL STAGE 4 GI - DRAFT 110311.GPJ WCCNZ. GDT 14/3/11

URS

URS NZ Ltd.

Logged By:

Checked By:

Date Started:

Date Finished:

Permit No:

296910.00 mE

E. Ross

P. Salter

19-1-11

19-1-11

URS New Zealand Limited 13-15 College Hill, Auckland

Drilling Contractor: Excavation Method:

Hand Dug

		TE	Sheet 1 of 1						
Phone: (09) 355 1300	,		Project Reference:						
Fax: (09) 355 1333		0775000	Courthous Londfill Chara A						
42775090			Southern Landfill - Stage 4						
. Ross	Relative Level:	219.00 mRL	Client:						
. Salter	Coordinates:	697610.00 mN	MA III						
9-1-11		297265.00 mE	Wellington City Council						

DESCRIPTION OF STRATA	GRAPHIC LOG	GEOLOGICAL DESCRIPTION	FIELD SHEAR STRENGTH (kPa)	PENETROMETER BLOWS (N)	SAMPLING AND OTHER TESTING	GROUND WATER DATA AND COMMENTS
Sandy fine to coarse GRAVEL, with trace silt; brownish orange. Tightly packed; moist; clast supported / cemented; subangular to angular; sandstone; sand is fine to coarse. (COLLUVIUM)	0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0	COLLUVIUM			S3 Bulk Disturbed S4 Bulk Disturbed	
Trial pit completed at 1.8m depth due to rock obstruction. Scala penetrometer test undertaken 2.0m away from hole in undisturbed ground. Depth Blows/100mm penetration 0.0m - 0.1m 0 0.1m - 0.2m 2 0.2m - 0.3m 2 0.3m - 0.4m 2 0.4m - 0.5m 6 0.5m - 0.6m 6 0.6m - 0.7m 4 0.7m - 0.8m 4 0.8m - 0.9m 8 0.9m - 1.0m 12 1.0m - 1.1m 22 1.1m - 1.2m 16 1.2m - 1.3m 25 1.3m - 1.4m 22 / bouncing	- 2.6 - 2.8 - 3.0 - 3.2 - 3.6					
TEST PIT 42775090 SOUTHERN LANDFILL STAGE 4 GI - DE TEST PIT 42775090 SOUTHERN LANDFILL STAGE 4 GI - DE TEST PIT 42775090 SOUTHERN LANDFILL STAGE 4 GI - DE	3.8 DN				TEST PIT TERM Target Depth Refusal Flooding Caving/collapse SAMPLE TYPE: Bulk Sample Tube Sample Disturbed Sam	BS TS

297265.00 mE

Permit No:

URS

E. Ross

P. Salter

19-1-11

19-1-11

URS NZ Ltd.

Logged By:

Checked By:

Date Started:

Date Finished:

URS New Zealand Limited 13-15 College Hill, Auckland

Drilling Contractor: Excavation Method:

Hand Dug

TE	Sheet 1 of 1
Project No.:	Project Reference:
42775090	Southern Landfill - Stage 4
Relative Level: 134.00 mRL Coordinates: 697800.00 mN	Client:

Wellington City Council

DESCRIPTION OF STRATA	GRAPHIC LOG	O DEPTH (m)	GEOLOGICAL DESCRIPTION	FIELD SHEAR STRENGTH (kPa)	PENETROMETER BLOWS (N)	SAMPLING AND OTHER TESTING	GROUND WATER DATA AND COMMENTS	
TOPSOIL, with roots; dark brown.								
Fine to coarse GRAVEL, with some fine to coarse sa	nd, minor silt	0.00	0.2					
and cobbles, trace clay and rootlets; orangish brown packed; moist; subangular to angular; sandstone; cot subangular of sandstone. (COLLUVIUM)	0000							
Suzarigana or carrectorio. (CC220 11511)	0000							
		0000	_					
		0000	⊢					
		0000	_	_			S5 Bulk Disturbed	
		0000	1.2	VIUN				
		looon e	11	COLLUVIUM				
		0000	<u> </u>	O				
Fine to coarse GRAVEL, with some cobbles, boulder coarse sand, minor silt, trace clay; brownish orange. moist; subangular to angular; sandstone; cobbles and	Tightly packed:	0000	}					
subangular of sandstone. (COLLUVIUM)	0	0000						
		0000	2.0				S6 Bulk Disturbed	
		lon son s	<u> </u> 2.2					
Trial pit completed at 2.4m depth due to rock obstruct	tion.	0000						
			 2.6					
			_					
			- 2.8 -					
			3.0					
			- 3.2					
			_ _ 3.4					
			 3.6					
TES			_					
			- 3.8 -					
TES	ST PIT SECTION	ON.	I				TEST PIT TERM	IINATED AT:
							Target Depth	
							Refusal	X
						Flooding Caving/collaps		
	+							
						SAMPLE TYPE:		
							Bulk Sample Tube Sample	BS TS
							Disturbed Sam	

TEST PIT 42775090 SOUTHERN LANDFILL STAGE 4 GI - DRAFT 110311.GPJ WCCNZ. GDT 14/3/11

URS

URS NZ Ltd.

Logged By:

Checked By:

Date Started:

Date Finished:

Phone: (09) 355 1300 Fax: (09) 355 1333

E. Ross

P. Salter

19-1-11

19-1-11

Permit No:

297390.00 mE

URS New Zealand Limited 13-15 College Hill, Auckland

Drilling Contractor:

Excavator

Excavation Method: