

Appendix A
BOREHOLE LOGS



PITT & SHERRY
Laboratory and Field Testing Services

P&S F8

Borehole no:	PDH1
Sheet:	1 of 3

Engineering Log - Borehole

Project Name:	Gunns Landfill Site	Hole commenced:	9/03/2005
Project No:	L05215	Hole completed:	10/03/2005
Hole location:	E0494150 N5445439	Hole logged by:	G. Baker
		Log checked by:	K.McIntosh/ M. Pollington

Drill Model And Mounting:	MK600 Geomechanica	Slope:	deg	R.L. Surface:	
Hole Diameter:	mm	Bearing:	deg	Datum:	Operator: G. Baker

Drilling Information				Soil Description						Observations	
Method	Penetration	Support	Water	Depth metres	Graphic log	Classification symbol	Material Soil type: plasticity or particle characteristics, colour, secondary and minor component	Moisture condition	Consistency/density index	Hand penetrometer MPa	Structure and Additional Observations
						GW	GRAVEL (GW): loose, broken rock, (surface to 1m)	D	L		Piezometer construction: surface to 0.5m (cement seal) 0.5- 14.5m (sand/gravel pack) 14.5-15m (bentonite seal) 15-30m (slotted pvc screen)
				1.00			DOLERITE: weathered (from 1-2m)	D			
				2.00			DOLERITE: fresh, grey	D			
				3.00							
				4.00							
				5.00							
				6.00							
				7.00							
				8.00							
				9.00							
				10.00							

Method
AS - Auger Screwing
AD - Auger Drilling
H - Roller/Tricone
W - Washbore
CT - Cable Tool

B - Blank Bit
V - 'V' Bit
T - TC Bit

Support
C - Casing
M - Mud
Penetration
No Resistance
Ranging to Refusal
Graphic log
→ Inflow
← Outflow
Water
= Level and

Samples and Tests
U60 - Undisturbed Sample
U50 - 50mm Diameter
D - Disturbed Sample
N - Standard Penetration
N* - SPT + Sample
Nc - Cone Penetrometer

Classification Symbols and Soil Description - Based on Unified Soil Classification System

Moisture Condition
D - Dry
M - Moist
W - Wet

Plastic Limit
< PL
= PL
> PL

Consistency/Relative Density
VS - Very Soft
S - Soft
F - Firm
St - Stiff
VSt - Very Stiff
H - Hard
Fb - Friable
VL - Very Loose
L - Loose
MD - Moderately Dense
VD - Very Dense



PITT & SHERRY
Laboratory and Field Testing Services

P&S F9

Borehole no: **PDH1**
Sheet: **2** of **3**

Engineering Log - Borehole

Project Name:	Gunns Landfill Site	Hole commenced:	9/03/2005
Project No:	H05069	Hole completed:	10/03/2005
Hole location:		Hole logged by:	G. Baker
Drill Model And Mounting:	MK500 Geomechanics	Slope:	deg.
Hole Diameter:	mm	Bearing:	deg.
		R.L. Surface:	
		Datum:	
		Operator:	G. Baker

Drilling Information				Soil Description					Observations		
Method	Penetration	Support	Water	Depth, metres	Graphic log	Classification symbol	Material	Moisture condition	Consistency, density indices	Hardness, penetrometer	Structure and Additional Observations
1	2	3					Soil type; plasticity or particle characteristics, colour, secondary and minor component.			100 200 300 400 500 kPa	
							borehole continued from previous page				0.5- 14.5m (sand/gravel pack)
				11.00			DIRTYITE trash, grey	D			
				12.00							
				13.00							
				14.00							
				15.00							14.5-15m (bentonite soil)
				16.00							15-30m (slotted pvc screen)
				17.00							
				18.00							
				19.00							
				20.00							

Method AS - Auger Screwing AD - Auger Drilling R - Roller/Tricone W - Washbore CT - Cable Tool B - Blank Bit V - "V" Bit T - TC Drt	Support C - Casing M - Mud Penetration No Resistance Flanging to Refusal Graphic log 	Samples and Tests U50 - Undisturbed Sample U50 - 50mm Diameter D - Disturbed Sample N - Standard Penetration N' - SPT - Sample No - Cone Penetrometer Classification Symbols and Soil Description - Based on Unified Soil Classification System	Moisture Condition D - Dry M - Moist W - Wet Plastic Limit < - PL - PL > - PL	Consistency/Relative Density VS - Very Soft S - Soft F - Firm St - Stiff VSr - Very Stiff H - Hard Fb - Friable VL - Very Loose L - Loose MD - Moderately Dense VD - Very Dense
--	--	--	---	---



PITT & SHERRY
Laboratory and Field Testing Services

P&S F8

Borehole no:	PDH1	
Sheet:	3	of 3

Engineering Log - Borehole

Project Name: Gunns Landfill Site		Hole commenced:	9/03/2005
Project No: L05215		Hole completed:	10/03/2005
Hole location: E0494150 N5445439		Hole logged by:	G. Baker
Drill Model And Mounting: MK600 Geomechanica		Log checked by:	K. McIntosh/ M. Pollington
Hole Diameter:	mm	Bearing:	deg.
		Slope:	deg.
		R.L. Surface:	
		Datum:	
		Operator:	G. Baker

Drilling Information				Soil Description						Observations		
Method	Penetration	Support	Water	Piezometer	Depth metres	Graphic log	Classification symbol	Material Soil type: plasticity or particle characteristics, colour, secondary and minor component.	Moisture condition	Consistency, density index	Hand penetrometer	Structure and Additional Observations
1	2	3										
								borehole continued from previous page				
					21.00			DOLERITE: fresh, grey	D			
					22.00							
					23.00							
					24.00							15-30m (slotted pvc screen)
					25.00							
					26.00							
					27.00							
					28.00							
					29.00							
					30.00			End of borehole at 30m				

Method AS - Auger Screwing AD - Auger Drilling R - Roller/Ticone W - Washbore CT - Cable Tool B - Blank Bit V - "V" Bit T - TC Bit	Support C - Casing M - Mud Penetration No Resistance Ranging to Refusal Graphic log 	Samples and Tests U60 - Undisturbed Sample U50 - 50mm Diameter D - Disturbed Sample N - Standard Penetration N* - SPT + Sample Nc - Cone Penetrometer Classification Symbols and Soil Description - Based on Unified Soil Classification System	Moisture Condition D - Dry M - Moist W - Wet Plastic Limit < - PL = - PL > - PL	Consistency/ Relative Density VS - Very Soft S - Soft F - Firm St - Stiff VSt - Very Stiff H - Hard Fb - Friable VL - Very Loose L - Loose MD - Moderately Dense VD - Very Dense
---	--	--	--	--



PITT & SHERRY
Laboratory and Field Testing Services

P&S F8

Borehole no:	PDH2	
Sheet	1	of 3

Engineering Log - Borehole

Project Name:	Gunns Landfill Site	Hole commenced:	22/03/2005
Project No:	LO5215	Hole completed:	24/03/2005
Hole location:	E0494478 N5445032	Hole logged by:	M. Pollington
		Log checked by:	K.McIntosh

Drill Model And Mounting:	MK600 Geomechanics	Step:	dog	R.L. Surface:	
Hole Diameter:	mm	Bearing:	dog.	Datum:	Operator: G. Baker

Drilling Information				Soil Description						Observations		
Method	1 Penetration	2 Support	Water	Piezometer	Depth metres	Graphic log	Classification symbol	Material Soil type: plasticity or particle characteristics, colour, secondary and minor component.	Moisture condition	Consistency, density index	Hand penetrometer (kPa)	Structure and Additional Observations
					1.00			TOPSOIL: Clayey GRAVEL: brown	D	L		Piezometer construction: surface to 0.5m (cement seal) 0.5- 8.0m (sand/gravel pack) 8.0-8.5m (bentonite seal) 8.5-29.8m (slotted pvc screen)
								Started coring at 1.0m CORE LOSS (1-1.5m)	D			
					2.00			Dolerite cobbles, pebbles & gravel (50-80mm)	D			Drilling method: Washed from surface to 1.0m Cored from 1.0 to 29.8m
					3.00		GC	Clayey GRAVEL (GC): mottled grey-red brown, low plasticity, gravelly patches, occasional cobbles, psalitic CORE LOSS (2.4-2.7m)				
							GC	Clayey GRAVEL (GC) mottled grey-red brown CORE LOSS (3.22-3.4m)				
					4.00		GC	Clayey GRAVEL, some psalitic layers CORE LOSS (4-4.27m)				(Colluvium)
					5.00			CLAY (CH): mottled red-brown-grey, EW dolerite CORE LOSS (4.7-4.88m)				
					6.00			CLAY (Cl): med-high plasticity, angular cobbles & some gravel, mottled red-brown-grey. CORE LOSS (5.8-6.1m)				
					7.00			CLAY (Cl): medium plasticity clay, with trace of sand (EW dolerite/fabric intact) CORE LOSS (6.8-7.4m)				
					8.00			DOLERITE: highly to extremely weathered, Fe staining on joint faces				HW to EW dolerite Water level during drilling 8m Predominate joint orientation 45deg JT, 45deg, PL, IR, spacing 100-300mm Fe staining, JT vertical, open JT, vertical, tight Cl. infill JT 45 deg, irregular, rough some Fe staining
					9.00							
					10.00							

Method

- AS - Auger Screwing
- AD - Auger Drilling
- R - Roller/Tricone
- W - Washbore
- CT - Cable Tool

B - Blank Bit
V - "V" Bit
T - TC Bit

Support

- C - Casing
- M - Mud

Penetration

- No Resistance
- Ranging to Refusal

Graphic log

- Inflow
- Outflow
- Water
- Level and

Samples and Tests

- U60 Undisturbed Sample
- U50 50mm Diameter
- D Disturbed Sample
- N Standard Penetration
- N' SPT - Sample
- Nc Cone Penetrometer

Classification Symbols and Soil Description - Based on Unified Soil Classification System

Moisture Condition

- D Dry
- M Moist
- W Wet

Plastic Limit

- < PL
- = PL
- > PL

Consistency/Relative Density

- VS - Very Soft
- S - Soft
- F - Firm
- St - Stiff
- VSt - Very Stiff
- H - Hard
- Fb - Friable
- VL - Very Loose
- L - Loose
- MD - Moderately Dense
- VD - Very Dense



PITT & SHERRY
Laboratory and Field Testing Services

P&S FB

Borehole no:
PDH2
Sheet: 2 of 3

Engineering Log - Borehole

Project Name: Gunns Landfill Site		Hole commenced: 9/03/2005	
Project No: LO5215		Hole completed: 10/03/2005	
Hole location: E0494478 N5445032		Hole logged by: M. Pollington	
		Log checked by: K. McIntosh	
Drill Model And Mounting: MK600 Geomechanics		Slope: deg.	
Hole Diameter: mm		Bearing: deg.	
		R.L. Surface:	
		Datum:	
		Operator: G. Baker	

Drilling Information				Soil Description					Observations							
Method	Penetration	Support	Water	Piezometer	Depth metres	Graphic log	Classification symbol	Material Soil type; plasticity or particle characteristics, colour, secondary and minor component.	Moisture condition	Consistency, density index	Moist. 100	Moist. 200	Moist. 300	Moist. 400	Moist. 500	Structure and Additional Observations
								borehole continued from previous page								JT 45 deg, spacing 100-300mm some Fe staining
					11.00			DOLERITE: EW-HW, grey-green								JT 45 deg, slickensided, tight spacings
					12.00											
					13.00			DOLERITE: HW - EW to clay, grey to cream, Fe staining on joints, remnant bedrock fabric								JT 45 deg, Fe staining
					14.00											JT 45 deg, Fe staining, slickensided shear planes, tight spacings
					15.00											
					16.00			DOLERITE: HW - EW to clay, grey-green to cream, Fe staining,								JTs 45 deg, spacing at 500mm JTs subvertical, 20-30mm apart Fe staining & clay infill
					17.00											JTs 45 deg, some annealed (resealed) clay infill, some Fe staining, JT spacings at 100-300mm
					18.00											JT subhorizontal, 300-1000mm spacing
					19.00											JT subvert. Travertine infill
					20.00											

Method AS - Auger Screwing AD - Auger Drilling R - Roller/Tricone W - Washbore CT - Cable Tool B - Blank Bit V - "V" Bit T - TC Bit	Support C - Casing M - Mud Penetration No Resistance Ranging to Refusal Graphic log 	Samples and Tests U60 - Undisturbed Sample U50 - 50mm Diameter D - Disturbed Sample N - Standard Penetration N* - SPT + Sample No - Cone Penetrometer Classification Symbols and Soil Description - Based on Unified Soil Classification System	Moisture Condition D - Dry M - Moist W - Wet Plastic Limit > II < PL > II < PL > II < PL	Consistency/Relative Density VS - Very Soft S - Soft F - Firm St - Stiff VSt - Very Stiff H - Hard Fb - Frangible VL - Very Loose L - Loose MD - Moderately Dense VD - Very Dense
--	--	--	---	---



PITT & SHERRY
Laboratory and Field Testing Services

P&S Fa

Borehole no: **PDH2**
Sheet: **3** of **3**

Engineering Log - Borehole

Project Name: Gunns Landfill Site
Project No: LO5215
Hole location: E0494478 N5445032
Hole commenced: 9/03/2005
Hole completed: 10/03/2005
Hole logged by: M. Pollington
Log checked by: K.McIntosh

Drill Model And Mounting: MK600 Geomechanica **Slope:** deg.
Hole Diameter: mm **Bearing:** deg. **R.L. Surface:**
Datum: **Operator:** G. Baker

Drilling Information				Soil Description					Observations			
Method	Penetration	Support	Water	Piezometer	Depth metres	Graphic log	Classification symbol	Material Soil type: plasticity or particle characteristics, colour, secondary and minor component.	Moisture condition	Consistency, density index	Hand penetrometer kPa	Structure and Additional Observations
1	2	3									100 200 300 400 500	
								borehole continued from previous page				JT, 45 deg. Fe staining & clay infill
					21.00			DOLERITE: HW-EW, grey-green to cream				
					22.00			DOLERITE: HW, travertine infill in joints				JT subvertical, travertine infill
					23.00			DOLERITE: moderately to HW, grey cream				JT 45 deg. Pl, IR, slickensided JT subvert. Travertine infill
					24.00							JTs subvertical, 100-300mm spacings
					25.00							highly fractured zone, potential for groundwater passage way (leakage of leachate to groundwater)
					26.00							JT 45 deg, highly fractured zone travertine infill, chlorite alteration & Fe staining
					27.00							JTs subhorizontal, annealed, spacings 300-1000mm, infilled with chlorite & calcite material, some Fe staining
					28.00							JTs spacing 300-1000mm, Fe staining
					29.00			DOLERITE: fresh to slightly weathered, blue-grey.				
					30.00			End of borehole at 29.8m				



PITT & SHERRY
Laboratory and Field Testing Services

P&S FB

Borehole no:
PDH3
Sheet: 1 of 1

Engineering Log - Borehole

Project Name: Gunns Landfill Site		Hole commenced: 22/03/2005	
Project No: L05215		Hole completed: 24/03/2005	
Hole location: E0494478 N5445032		Hole logged by: M. Pollington	
		Log checked by: K. McIntosh	
Drill Model And Mounting: MK600 Geomechanica		Slope: deg.	
Hole Diameter: mm		Bearing: deg.	
		R.L. Surface:	
		Datum:	
Operator: G. Baker			

Drilling Information			Soil Description					Observations				
Method	Penetration	Support	Water	Piezometer	Depth metres	Graphic log	Classification symbol	Material Soil type: plasticity or particle characteristics, colour, secondary and minor component.	Moisture condition	Consistency density index	Hand penetrometer kPa	Structure and Additional Observations
1	2	3							D	L	100 200 300 400 500	
								Washbored from surface to 1.0m				Piezometer construction: surface to 0.5m (cement seal) 0.5- 4.5m (sand/gravel pack) 4.5-5.0m (bentonite seal) 5.0-8.0m (slotted pvc screen)
					1.00	No core		Started coring at ??m				(Colluvium) Drilling method: Washbored from surface to ?? Cored from ?? to ??m
					2.00	CL		CLAY (CL): brown, low-medium plasticity, gravelly in patches				
					3.00	CL						
					4.00	CL						
					5.00	CL						
					6.00	CL						
					7.00	CL						Water level during drilling 5m 4.5-5.0m (bentonite seal) 5.0-8.0m (slotted pvc screen)
					8.00	CL						

Method AS - Auger Screwing AD - Auger Drilling R - Roller/Tricone W - Washbore CT - Cable Tool B - Blank Bit V - "V" Bit T - TC Bit	Support C - Casing M - Mud Penetration No Resistance Ranging to Refusal Graphic log Inflow Outflow Water Level and	Samples and Tests U60 - Undisturbed Sample U50 - 50mm Diameter D - Disturbed Sample N - Standard Penetration N' - SPT + Sample Nc - Cone Penetrometer Classification Symbols and Soil Description - Based on Unified Soil Classification System	Moisture Condition D - Dry M - Moist W - Wet Plastic Limit < - PL = - PL > - PL	Consistency/Relative Density VS - Very Soft S - Soft F - Firm St - Stiff VSt - Very Stiff H - Hard Fb - Friable VL - Very Loose L - Loose MD - Moderately Dense VD - Very Dense
--	---	--	--	---



Engineering Log - Borehole

Project No.: L05215

Client: Gunns Limited	Commenced: 15/02/2006		
Project Name: Gunns Pulp Mill Geotechnical Investigation	Completed: 15/02/2006		
Hole Location: Refuse Site Water Monitoring	Logged By: Brett Chandler		
Hole Position: 494978.0 m E 5444775.0 m N MGA94	Checked By: Michael Pollington		
Drill Model and Mounting: CMV MK 1750, Tracked	Inclination: -90°	RL Surface: 0.00 m	
Hole Diameter:	Bearing: 0°	Datum: AHD	Operator: G. Baker (Stacpoolle)

Drilling Information				Soil Description				Observations					
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	Depth (m)	Graphic Log	Classification Symbol	Material Description soil type, plasticity or particle characteristics, secondary and minor components, colour	Moisture Condition	Consistency/Density Index	Hand Penetrometer (kPa)	Structure and Additional Observations
												100 200 300 400 500	
						0.0							Bentonite seal from 0 m to 0.8 m
						1.0		CH	CLAY, high plasticity, with boulder, medium, tolente, and fine sub-rounded dolerite and ironstone gravel. MC < PL brown.				
						2.0							
						3.0			DOLERITE: fine to medium, massive. Boulder grey green yellow brown.				
						4.0							
						5.0							
						6.0							
						7.0			DOLERITE: fine to medium, massive yellow brown.				
													Slotted PVC (0.5 mm) screen from 0.8 m to 14.5 m

P.L.L. 01/2005 G.B. Log #1 L05 0006-001E 030603 P.V.P.H.S.L.C.P. / 090221010.0704 08000506 11.00 Produced by gPITF Produced/Developed by Digital Pty Ltd

<p>Method</p> <ul style="list-style-type: none"> AS - Auger Screwing AH - Auger Hollow Flight R - Roller/Tricone W - Washbore 	<p>Penetration</p> <p>No resistance ranging to refusal</p>	<p>Water</p> <ul style="list-style-type: none"> Levins (Date) Inflow Partial Loss Complete Loss 	<p>Samples and Tests</p> <ul style="list-style-type: none"> U50 - Undisturbed Sample 50 mm dia U52 - Undisturbed Sample 50 mm dia D - Disturbed Sample N - Standard Penetration Test N* - SPT + Sample Nc - Cone Penetrometer 	<p>Moisture Condition</p> <ul style="list-style-type: none"> D - Dry M - Moist W - Wet 	<p>Consistency/Relative Density</p> <ul style="list-style-type: none"> VS - Very Soft S - Soft F - Firm VSI - Very Stiff H - Hard Fb - Friable VL - Very Loose L - Loose MD - Medium Dense D - Dense VD - Very Dense
<p>Support</p> <ul style="list-style-type: none"> C - Casing M - Mud 	<p>Graphic Log/ Core Loss</p> <p>Core recovered (hatching indicates material)</p> <p>Core loss</p>	<p>Classification Symbols and Soil Descriptions</p> <p>Based on Unified Soil Classification System</p> <p>Plastic Limit</p> <ul style="list-style-type: none"> < PL = PL > PL 			



Engineering Log - Borehole

Project No.: L05215

Client: Gunns Limited	Commenced: 15/02/2006		
Project Name: Gunns Pulp Mill Geotechnical Investigation	Completed: 15/02/2006		
Hole Location: Refuse Site Water Monitoring	Logged By: Brett Chandler		
Hole Position: 494978.0 m E 5444775.0 m N MGA94	Checked By: Michael Pollington		
Drill Model and Mounting: CMV MK 1750, Tracked	Inclination: -90°	RL Surface: 0.00 m	
Hole Diameter:	Bearing: 0°	Datum: AHD	Operator: G. Baker (Stacpoolc)

Drilling Information				Soil Description				Observations
Method	Support	Sampling Tests	Recovery	Depth (m)	Graphic Log	Classification Symbol	Material Description	Structure and Additional Observations
AS	C		100%	9.0			DOLERITE: fine to medium, massive grey green.	Slotted PVC (0.5 mm) screen from 0.8 m to 14.5 m
				10.0				
				11.0			DOLERITE: fine to medium, massive yellow brown.	
				12.0				
				13.0				
				14.0				
				14.45			Hole Terminated at 14.45 m	
				15.0				

<p>Method</p> <p>AS - Auger Screwing AH - Auger Hollow Flight R - Roller/Talcone W - Washbore</p>	<p>Penetration</p> <p>No resistance ranging to refusal</p>	<p>Water</p> <p>Level (Date) Inflow Partial Loss Complete Loss</p>	<p>Samples and Tests</p> <p>U60 - Undisturbed Sample 60 mm dia U50 - Undisturbed Sample 50 mm dia D - Disturbed Sample N - Standard Penetration Test N* - SPT + Sample Nc - Cone Penetrometer</p>	<p>Moisture Condition</p> <p>D - Dry M - Moist W - Wet</p>	<p>Consistency/Relative Density</p> <p>VS - Very Soft S - Soft F - Firm VSF - Very Stiff H - Hard Fb - Friable VL - Very Loose L - Loose MD - Medium Dense D - Dense VD - Very Dense</p>
<p>Support</p> <p>C - Casing M - Mud</p>	<p>Graphic Log Core Loss</p> <p>Core recovered (hatching indicates material) Core loss</p>	<p>Classification Symbols and Soil Description</p> <p>Based on Unified Soil Classification System</p>	<p>Plastic Limit</p> <p>< PL = PL > PL</p>		

PL 1.0 - 4/2005 (6.8) Use of LOS Borehole Gunns Pulp Mill, G.P. DWG 212 1/8 (6.8) 15/02/2006 11:25 Produced by GPT Production. Drawn by Engel P/L