

A.5.1.1.1

N6 Galway City Outer Bypass Contract 1 Menlough to Garraun North

September to November 2003

A.5.1.1.1

Samples				Classification				Strength			Other Tests	
Hole	Depth	Type	Description	<425 I _P	Prep w _L	w _P	Water %	γ _{b3} Mg/m	Test	σ ₃ kPa	C kPa	
BH235A	2.50 - 2.73	D	Clayey very sandy GRAVEL				9.1					
BH235A	2.50 - 3.00	B	Clayey very sandy GRAVEL									Particle Size analysis
BH265	0.00 - 0.50	B	Silty very sandy GRAVEL									CBR
BH265	0.50 - 1.00	B	Silty very sandy GRAVEL	57	425μ 29	Sieve NP	21					pH = 8.5 Particle Size analysis SO ₃ (2:1) = 0.08g/l Passing 2mm = 47%
TP149	0.10	D	MADE GROUND: Slightly sandy slightly gravelly CLAY				29					
TP149	0.50 - 0.75	B	Slightly sandy very gravelly SILT	61 16	425μ 52	Sieve 36	20					CBR Particle Size analysis
TP151	0.10	D	TOPSOIL: Slightly sandy CLAY				22					
TP151	0.10 - 0.40	B	Slightly sandy gravelly SILT	69 13	425μ 50	Sieve 37						w% / Dry Density CBR MCV Particle Size analysis
TP151	0.30	D	Slightly sandy gravelly CLAY				23					
TP161	0.40	D	TOPSOIL: Sandy gravelly CLAY				24					
TP161	0.60	B	Clayey sandy GRAVEL				10					w% / Dry Density pH = 8.2 Particle Size analysis SO ₃ (2:1) = 0.08g/l Passing 2mm = 34%
TP163	0.15	D	TOPSOIL: Clayey gravelly SAND				9.5					
TP163	0.60	B	Silty very sandy GRAVEL	26	425μ 25	Sieve NP	6.0					pH = 8.2 Particle Size analysis SO ₃ (2:1) = 0.14g/l Passing 2mm = 41%
TP164	0.10	D	TOPSOIL: Slightly sandy slightly gravelly CLAY				54					

Remarks

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Laboratory - Results Summary

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Samples				Classification				Strength			Other Tests	
Hole	Depth	Type	Description	<425 I _P	Prep w _L	w _p	Water %	γ _{b3} Mg/m	Test	σ ₃ kPa	C kPa	
TP213	0.70	B	Slightly sandy slightly gravelly CLAY	69 9	425μ 23	Sieve 14						CBR Particle Size analysis
TP213	1.70	D	Slightly sandy slightly gravelly CLAY				9.6					
TP215	1.00	D	PEAT				623					
TP215	2.00	D	PEAT				619					Org = 35.5% Passing 2mm = 90%
TP217	0.35	D	TOPSOIL: Clayey very sandy GRAVEL				68					
TP217	0.65	B	Slightly clayey sandy GRAVEL									w% / Dry Density CBR MCV pH = 8.3 Particle Size analysis SO ₃ (2:1) = 0.06g/l Passing 2mm = 37%
TP219	0.40	D	MADE GROUND: Clayey sandy GRAVEL				5.0					
TP219	0.40	B	MADE GROUND: Clayey sandy GRAVEL									pH = 8.2 Particle Size analysis SO ₃ (2:1) = 0.06g/l Passing 2mm = 35%
TP222	0.20	D	Slightly clayey slightly sandy matrix				89					
TP224	0.30	D	TOPSOIL: Very clayey gravelly SAND				55					
TP224	0.70	B	Slightly sandy slightly gravelly CLAY	63 8	425μ 22	Sieve 14						w% / Dry Density MCV Particle Size analysis
TP224	1.70	D	Slightly sandy slightly gravelly CLAY				8.0					
TP225	0.20	D	TOPSOIL: Sandy slightly gravelly CLAY				19					
TP225	0.70	B	Sandy slightly gravelly CLAY	75 11	425μ 33	Sieve 22						w% / Dry Density MCV Particle Size analysis
TP225	1.70	D	Sandy slightly gravelly CLAY				16					

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Laboratory - Results Summary

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Samples				Earthworks												
Hole	Depth	Type	Description	CBR Top	CBR Base	CBR Top w%	CBR Base w%	CBR Surch kg.	γ_b Mg/m ³	Comp Type	w% (Opt) <Nat>	γ_d (max) Mg/m ³	ρ_s Mg/m ³	% ret 20/37.5 mm	MCV	
BH192	0.00-1.20	B	Slightly sandy slightly gravelly to gravelly CLAY	0.6	0.9	14	15	13.6	2.21	2.5kg		1.94		12		
BH265	0.00-0.50	B	Silty very sandy GRAVEL	0.3	0.4	22	20	13.6	2.01	2.5kg		1.66		16		
TP149	0.50-0.75	B	Slightly sandy very gravelly SILT	7.2	10	26	25	13.6	1.77	2.5kg		1.42		59		
TP151	0.10-0.40	B	Slightly sandy gravelly SILT							2.5kg	(26)	(1.47)	2.65	12/		
									1.77	2.5kg	<40>	1.26		2.5		
									1.82	2.5kg	35	1.35				
									1.85	2.5kg	32	1.39				
									1.79	2.5kg	24	1.44				
									1.70	2.5kg	23	1.38				
									1.85	2.5kg	30	1.43				
				0.4	0.5	38	44	13.6	1.76	2.5kg		1.25			11	
									1.73	MCV	36	1.27			11	4.4
				TP161	0.60	B	Clayey sandy GRAVEL							2.5kg	(11)	(2.01)
15	14	11	11					13.6	2.23	2.5kg	<11>	2.00	20			
23	33	11	9.5					13.6	2.19	2.5kg	10	1.99				
25	36	7.5	6.6					13.6	2.03	2.5kg	7.1	1.90				
0.3	0.4	15	15					13.6	2.22	2.5kg	15	1.93				
26	25	9.7	4.8					13.6	2.07	2.5kg	7.2	1.93				
TP164	0.20-0.30	B	Sandy slightly gravelly CLAY/SILT							2.5kg	(22)	(1.63)	2.65	2.1/		
				0.7	0.9	28	27	13.6	1.90	2.5kg	<27>	1.49	0.5			
				1.5	2.0	25	25	13.6	1.95	2.5kg	25	1.56				
				2.7	2.3	23	23	13.6	1.97	2.5kg	23	1.60				
				8.8	6.8	19	21	13.6	1.93	2.5kg	20	1.61				
				18	12	16	16	13.6	1.80	2.5kg	16	1.55				
									1.87	MCV	26	1.49		3	7.3	
									1.89	MCV	25	1.52		3	8.2	
									1.95	MCV	12	1.74		3	7.2	
									1.92	MCV	24	1.54		3	6.3	
					2.05	MCV	16	1.78		3	17.9					
TP165	0.50-0.70	B	Sandy slightly gravelly CLAY	5.9	6.2	22	22	13.6	1.94	2.5kg		1.59		2		
TP167	0.50-0.70	B	Slightly sandy very gravelly CLAY	5.1	4.4	10	10	13.6	2.26	2.5kg		2.05		29		

Remarks

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Laboratory - Compaction, CBR & MCV Summary

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BH/TP	Depth	w%	Direct Shear Top (kpa)	Remoulded Shear Top (kpa)	Direct Shear Bottom (kpa)	Remoulded Shear Bottom (kpa)
TP151	0.10 - 0.40	40	16	4	22	8
TP164	0.20 - 0.30	27	27	6	25	9
TP164	0.20 - 0.30	25	42	14	63	18
TP164	0.20 - 0.30	23	59	30	62	20
TP164	0.20 - 0.30	20	124	18	106	46
TP164	0.20 - 0.30	16	84	16	104	16
TP169	0.50 - 0.80	39	20	22	21	14
TP169	0.50 - 0.80	33	54	18	54	20
TP169	0.50 - 0.80	27	np	np	np	np
TP169	0.50 - 0.80	21	92	22	108	18
TP169	0.50 - 0.80	18	130	22	128	24
TP209	0.50 - 0.80	11	31	12	28	11
TP209	0.50 - 0.80	12	26	11	24	11
TP209	0.50 - 0.80	14	22	10	30	16
TP209	0.50 - 0.80	16	20	4	24	4
TP209	0.50 - 0.80	17	9	5	8	6
TP217	0.65	10	>146	30	68	44
TP217	0.65	6.1	np	np	np	np
TP217	0.65	12	np	np	np	np
TP217	0.65	11	np	np	np	np
TP217	0.65	14	np	np	np	np
TP224	0.70	11	25	20	33	18
TP224	0.70	9.1	130	23	138	16
TP224	0.70	5.7	np	np	np	np
TP224	0.70	3.6	np	np	np	np
TP224	0.70	13	16	9	18	10
TP225	0.70	19	91	16	78	42
TP225	0.70	18	>146	24	>146	46
TP225	0.70	14	>146	24	>146	24
TP225	0.70	12	np	np	np	np
TP225	0.70	24	32	10	30	14
TP225A	0.20 - 0.40	27	32	12	39	12
TP225A	0.20 - 0.40	25	28	13	32	14
TP225A	0.20 - 0.40	21	98	30	96	27
TP225A	0.20 - 0.40	18	np	np	np	np
TP225A	0.20 - 0.40	13	86	40	77	25
TP228	1.80	11	5	4	5	4
TP228	1.80	8.7	30	24	32	20
TP228	1.80	4.6	np	np	np	np
TP228	1.80	7.9	10	8	13	7
TP228	1.80	9.5	12	12	14	10

Hand Vanes In CBR Moulds

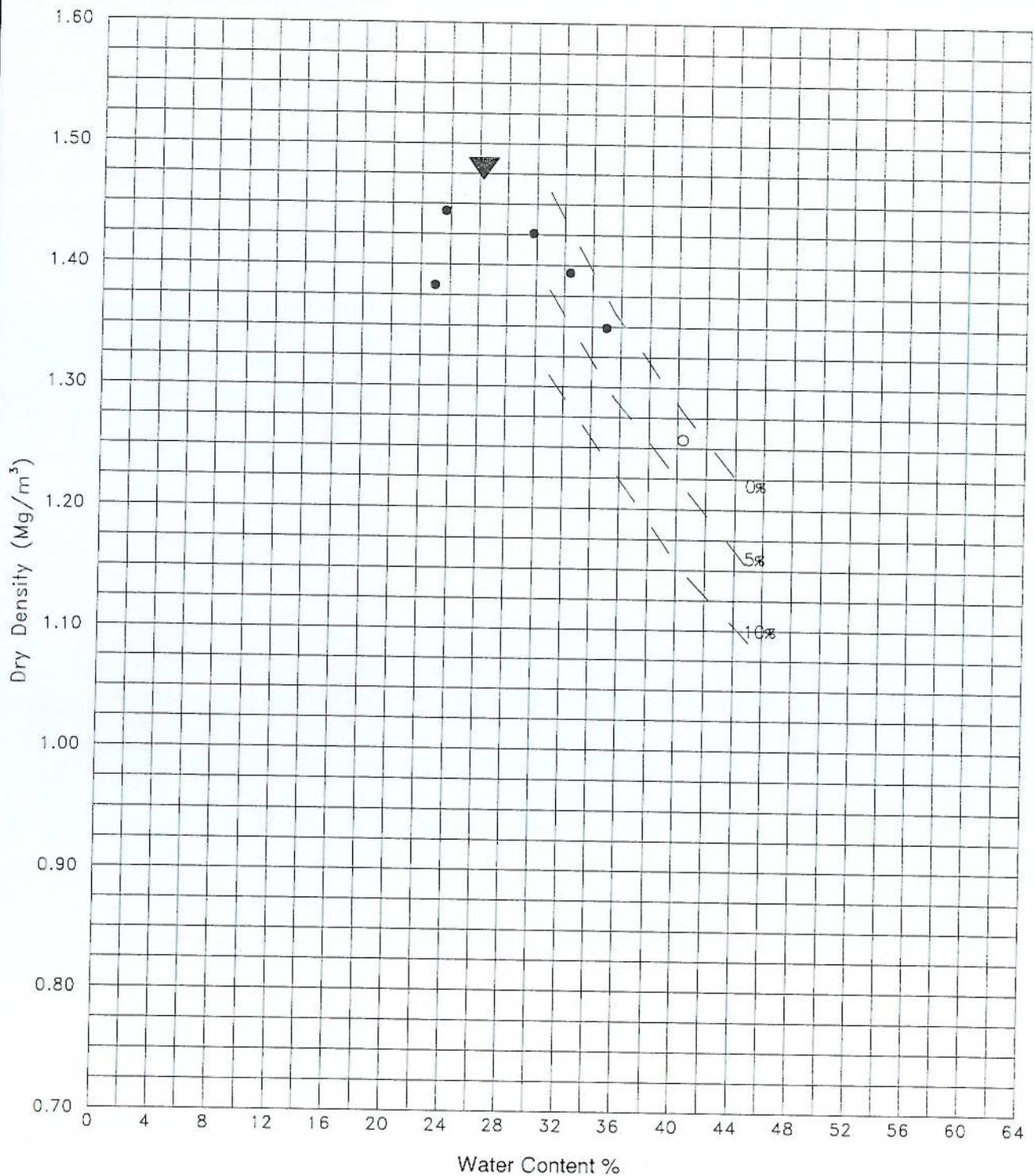
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- Moisture Content/Dry Density
- Compaction at Natural Water Content
- ▼ Maximum Dry Density/Optimum Water Content

Type of Test/Mould	2.5Kg/CBR	Description Slightly sandy gravelly CLAY	Hole	TP151
Particle Density	Assumed 2.65 Mg/m ³		Depth	0.10 -0.40
Maximum Dry Density	1.47 Mg/m ³		Type	B
Optimum Water Content	26 %		Form 54/0	
% retained 37.5mm sieve	2			
% retained 20mm sieve	12			

Remarks

Laboratory Moisture Content/
Dry Density Relationship

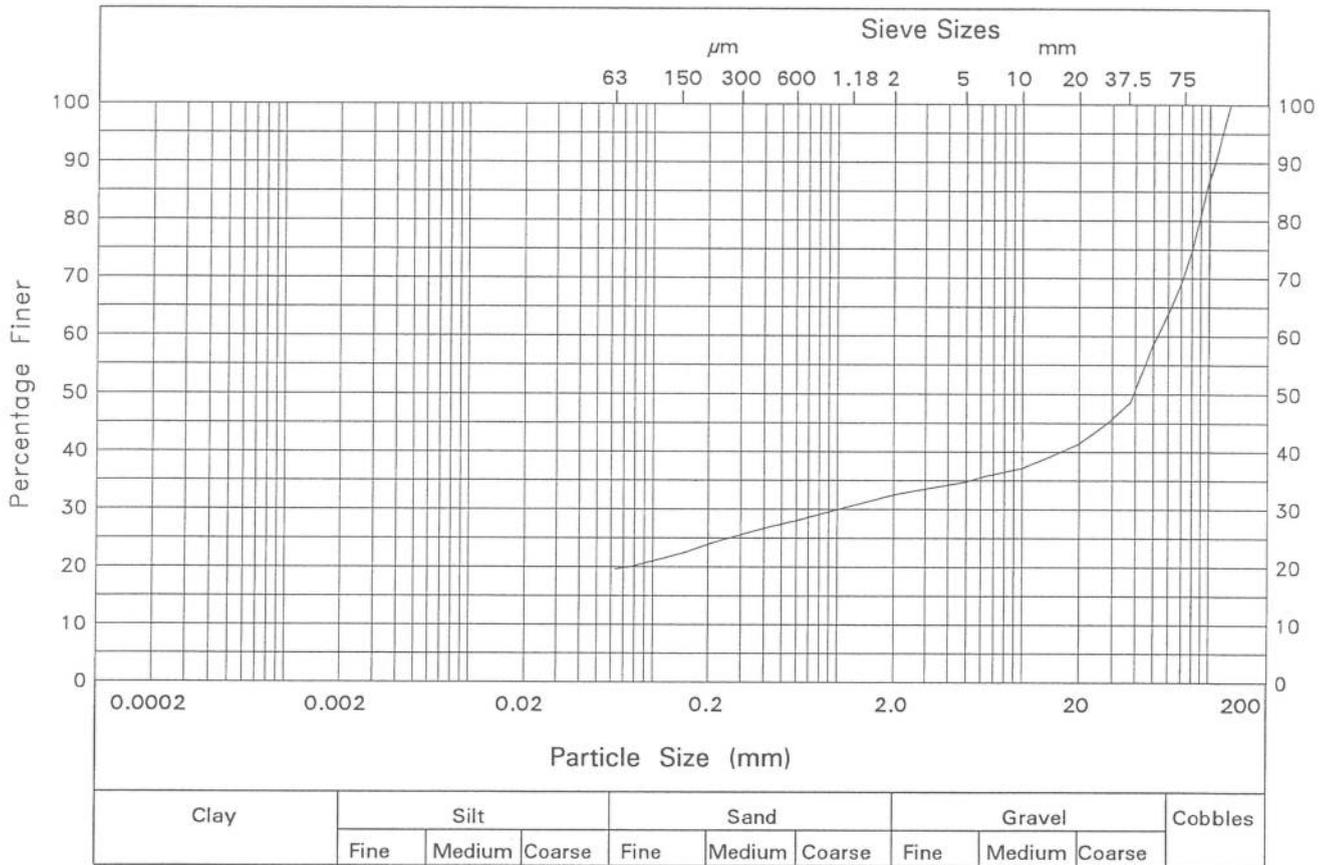
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Particle Size	% Passing	Particle Size	% Passing
90 mm	81	2 mm	33
75 mm	72	1.18 mm	31
63 mm	65	600 μm	28
50 mm	59	425 μm	27
37.5 mm	49	300 μm	26
28 mm	45	212 μm	24
20 mm	41	150 μm	23
14 mm	39	75 μm	20
10 mm	37	63 μm	20
6.3 mm	36		
5 mm	35		
3.35 mm	34		
Hole TP149	Description Slightly sandy very gravelly SILT		
Depth 0.50 -0.75			
Type B			
Test Performed Wet	Uniformity Coefficient not applicable.		

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Laboratory - Particle Size Plot

Project

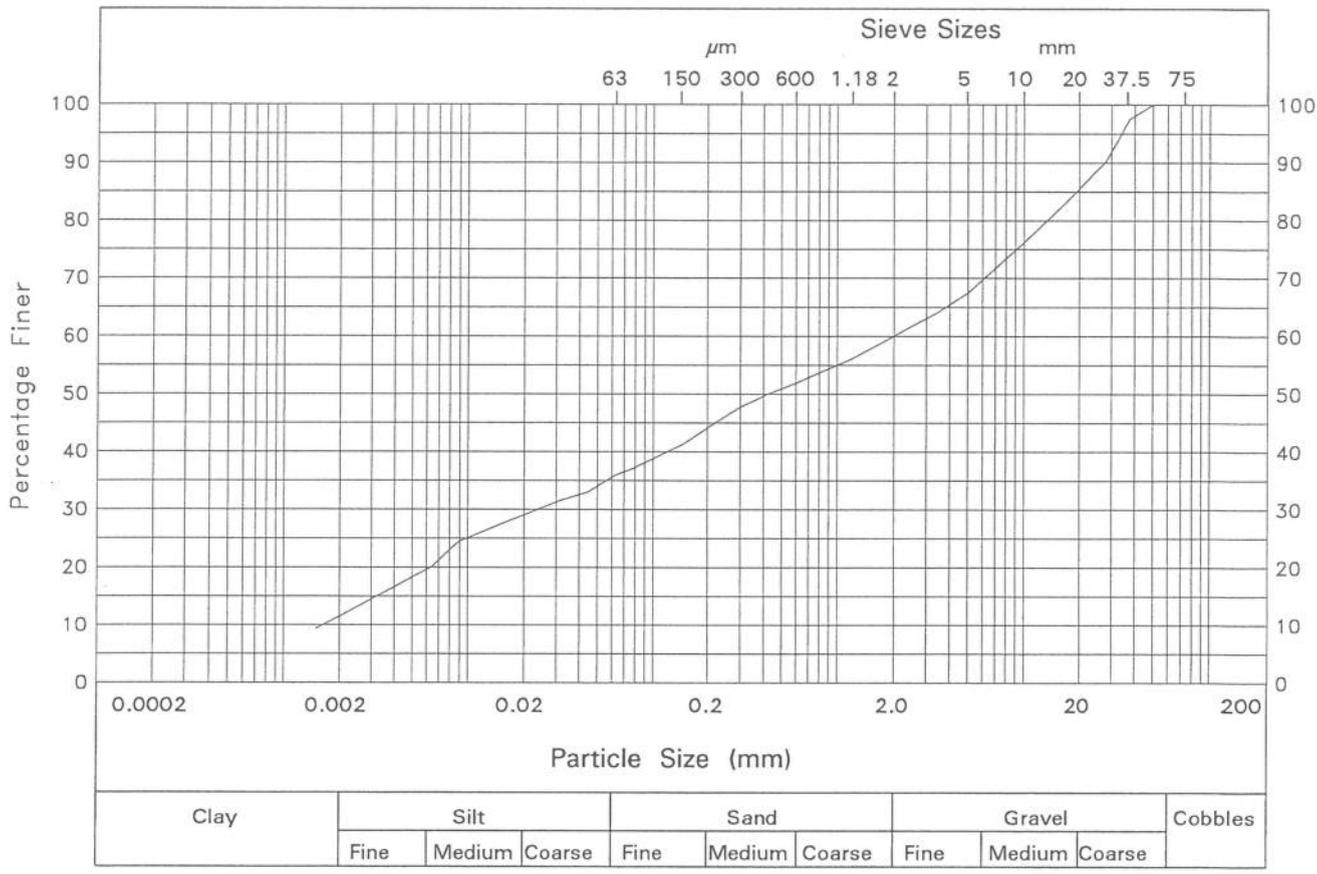
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Particle Size	% Passing	Particle Size	% Passing
50 mm	100	425 μm	50
37.5 mm	98	300 μm	48
28 mm	90	212 μm	45
20 mm	86	150 μm	41
14 mm	81	75 μm	37
10 mm	76	63 μm	36
6.3 mm	70	45 μm	33
5 mm	67	32 μm	32
3.35 mm	64	17 μm	28
2 mm	60		
1.18 mm	56		
600 μm	52		

Hole TP151	Description Slightly sandy gravelly SILT
Depth 0.10 -0.40	
Type B	
Test Performed Wet	Uniformity Coefficient not applicable.

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Laboratory - Particle Size Plot 	Project N6 Galway City Outer Bypass Contract 1 Ground Investigation Menlough to Garraun North Galway County Council	Contract KC3209
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Trial Pit Log

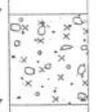


Logged by DJB Checked by ROR		Start 16/10/2003 End 16/10/2003	Equipment, Methods and Remarks Excavated using a JCB	Dimensions and Orientation Width 0.80 m Length 2.50 m		Ground Level Coordinates National Grid	+17.05 mOD E 129594.42 N 228308.23	
Samples and Tests			Strata					
Depth	Type & No.	Date Records	Description			Depth, Level/ (Thickness)	Legend	Backfill/ Instrument
0.10	D 1		1 MADE GROUND: Soft to firm brown slightly sandy slightly gravelly CLAY with rare granite and brick fragments. Gravel is subangular to subrounded fine to coarse.			0.20 +16.85		
0.50 0.50-0.75 0.50-0.75	D 2 B 3 B 4		2 Stiff brown grey slightly sandy very gravelly SILT with many cobbles. Gravel is subangular to angular fine to coarse. Cobbles are subangular of limestone.			(0.55)		
			EXPLORATORY HOLE ENDS AT 0.75 m			0.75 +16.30		
			0.75 m Gravel and cobbles are angular.					
Depth	Type & No.	Records Date						
Groundwater Entries No. Struck Post Strike Behaviour (m) None observed (see Key Sheet)			Depth Related Remarks From to (m) 0.75 Trial pit terminated due to obstruction - limestone bedrock.			Stability Good Shoring None Weather		
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.			Project N6 Galway City Outer Bypass Contract 1 Ground Investigation Menlough to Garraun North KC3209 Project No. KC3209 Carried out for Galway County Council			Trial Pit TP149 Sheet 1 of 1		
Scale 1:25			(c) MESH HBIII (298), 22/01/2004 12:19:12					

Trial Pit Log



Logged by DB Checked by ROR	Start 10/11/2003 End 10/11/2003	Equipment, Methods and Remarks Excavated using a JCB	Dimensions and Orientation Width 0.90 m Length 3.00 m  98 (Deg)	Ground Level +24.87 mOD Coordinates E 129788.90 National Grid N 228546.61
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Samples and Tests			Strata	Depth, Level (Thickness)	Legend	Backfill/Instrument
Depth	Type & No.	Date Records	Description			
0.10	D 1		1 TOPSOIL: Firm brown slightly sandy CLAY with many roots. Gravel is subangular.	0.10 +24.77		
0.10-0.40	B 3		2 Firm to stiff brown slightly sandy gravelly SILT with occasional cobbles. Gravel is subangular fine to coarse. Cobbles are subangular of limestone.	(0.30)		
0.10-0.40	B 4					
0.30	D 2		EXPLORATORY HOLE ENDS AT 0.40 m	0.40 +24.47		

Depth	Type & No.	Records Date	Groundwater Entries No. Struck Post Strike Behaviour (m) None observed (see Key Sheet)	Depth Related Remarks From to (m) 0.40 Trial pit terminated due to obstruction - possible limestone bedrock.	Stability Good Shoring None Weather
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Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.	Project N6 Galway City Outer Bypass Contract 1 Ground Investigation Menlough to Garraun North Project No. KC3209 Carried out for Galway County Council	Trial Pit TP151 Sheet 1 of 1
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Trial Pit Log



Logged by DJB Checked by ROR		Start 17/10/2003 End 17/10/2003	Equipment, Methods and Remarks Excavated using a track machine	Dimensions and Orientation Width 0.80 m Length 3.50 m		Ground Level Coordinates National Grid	+9.63 mOD E 131193.46 N 228785.96	
Samples and Tests			Strata					
Depth	Type & No.	Date Records	Description			Depth, Level/ (Thickness)	Legend	Backfill/ Instrument
0.50	HV	p 65 kPa, r 0 kPa	1 Spongy dark brown black slightly sandy pseudofibrous PEAT with occasional tree remains.			(3.00)		
1.00 1.00-1.50 1.00-1.50	D 1 B 2 B 3		0.50 m Hand vane 65, 60, 70kPa, average 65kPa					
2.00 2.00-2.50 2.00-2.50	D 4 B 5 B 6							
			2 Firm grey slightly sandy gravelly CLAY. Gravel is subangular fine to coarse.			3.00 +6.63		
			EXPLORATORY HOLE ENDS AT 3.10 m			3.10 +6.53		
Depth	Type & No.	Records Date	Depth Related Remarks			Stability Poor below 2.00m		
Groundwater Entries No. Struck Post Strike Behaviour (m) 1 2.00 Fast inflow			From to (m) 3.10 - Trial pit terminated at maximum depth.			Shoring None Weather		
Notes: For explanation of symbols and abbreviations see key sheet. All depths and reduced levels in metres. Stratum thickness given in brackets in depth column.			Project N6 Galway City Outer Bypass Contract 1 Ground Investigation Menlough to Garraun North Project No. KC3209 Carried out for Galway County Council			Trial Pit TP215 Sheet 1 of 1		