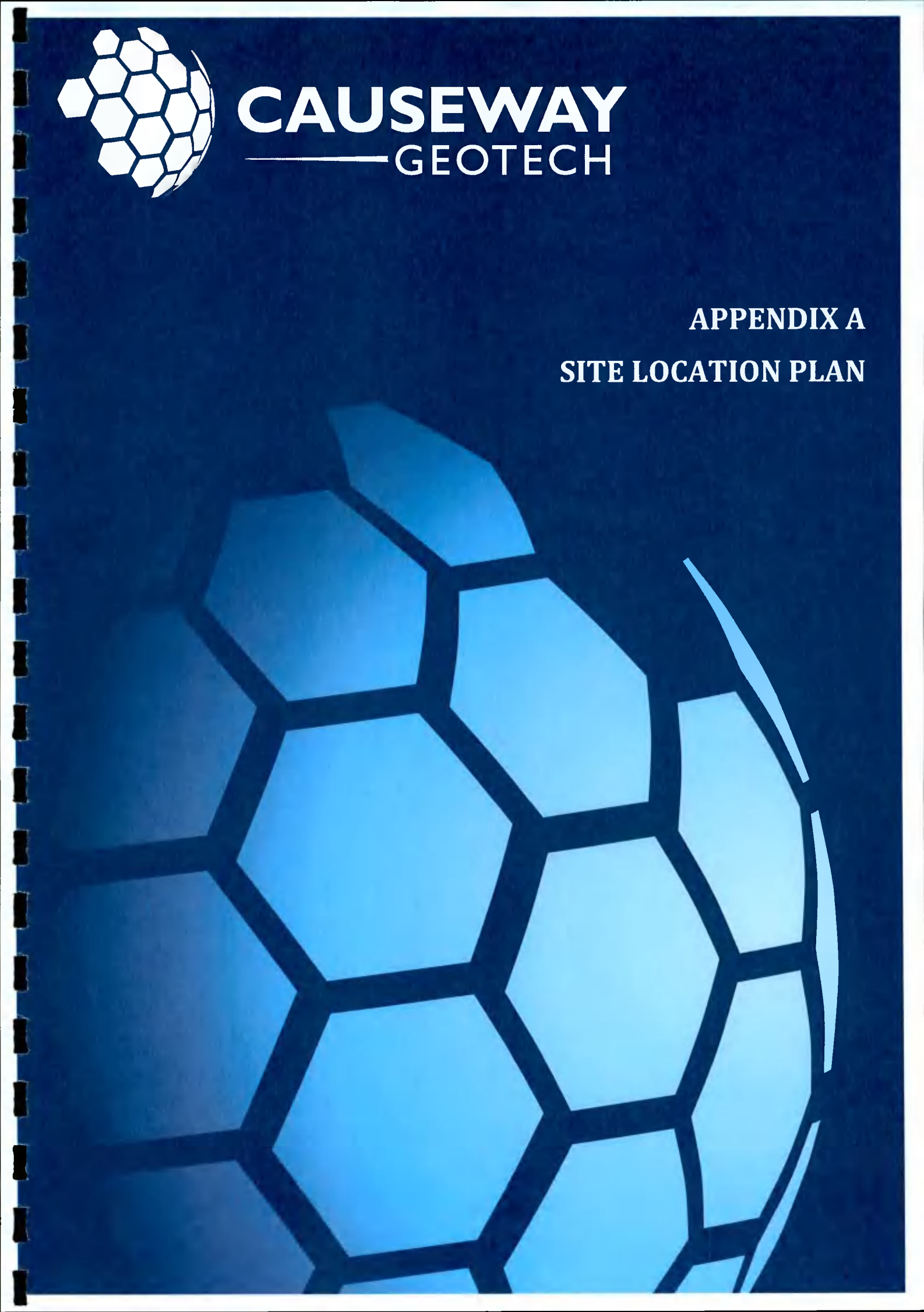




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APPENDIX A
SITE LOCATION PLAN

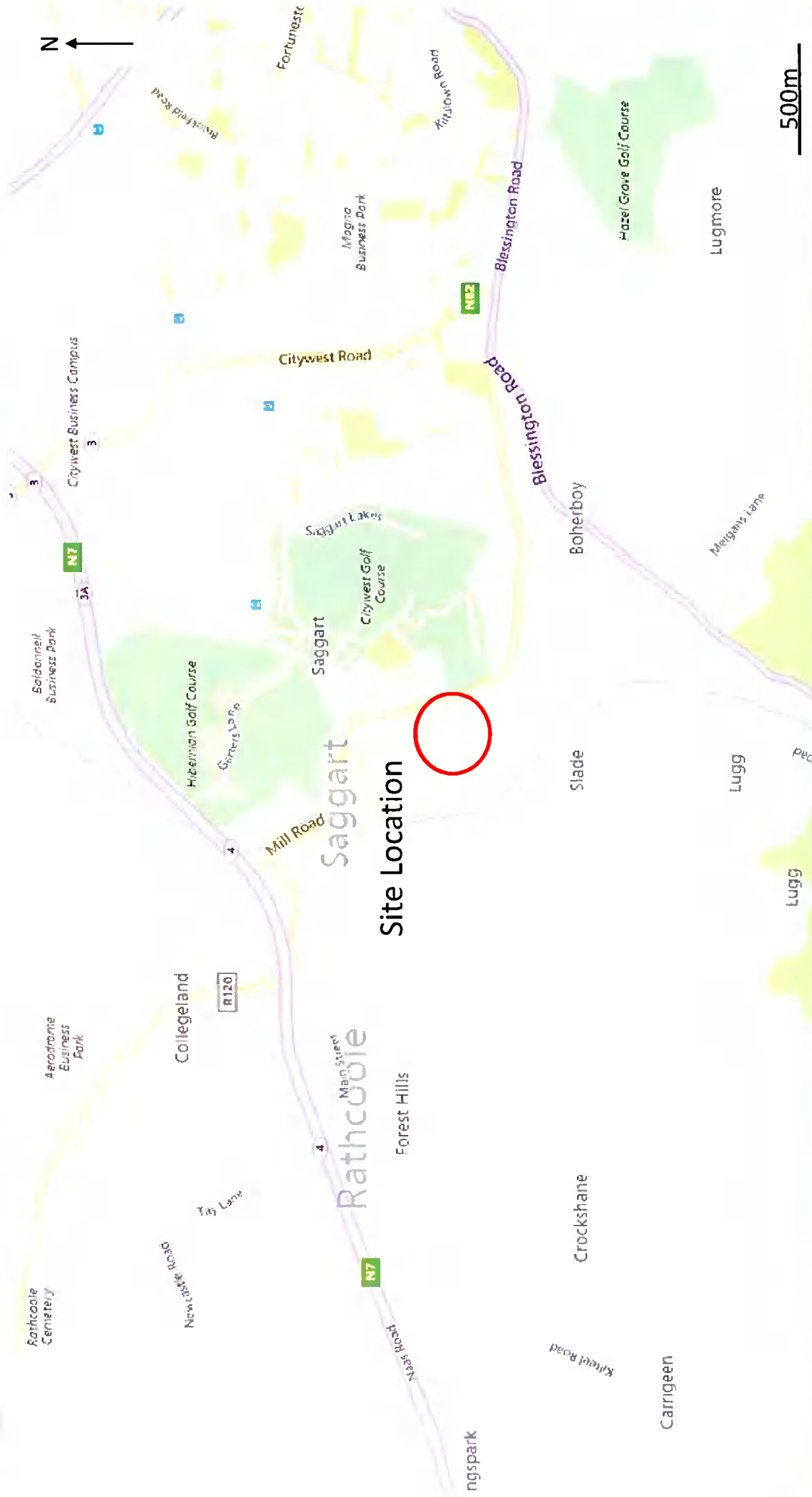




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Saggart Reservoir
Report No. 17-1375





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Legend Key

- Locations By Type - CP
- Locations By Type - CP+RC
- Locations By Type - TP

Project No.: 17-1375

Project Name: Saggart Reservoir Site Investigation

Client: Irish Water

Client's Representative: RPS Consulting Engineers



Title: Exploratory Hole Location Plan

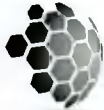
Last Revised:	15/06/2018
Scale:	1:2500



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APPENDIX B
BOREHOLE LOGS





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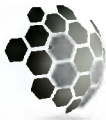
Project No.: 17-1375	Project Name: Saggart Reservoir Site Investigation	Borehole No.: BH01
Coordinates: 303507.38 E	Client: Irish Water	Sheet 1 of 1
Method Cable Percussion	Plant Used Dando 2500	Top 0.00
Base 1.90	Client's Representative: RPS Consulting Engineers	Scale: 1:50
Ground Level: 139.27 mOD	Dates: 21/02/2018 - 20/03/2018	Driller: DMcA
		Logger: MFG

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
0.00 - 1.00	B1							Stiff brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.		
0.50	ES4									
1.00	ES5					(1.90)				
1.00 - 1.90	B2			N=15 (2,3/3,3,4,5)						
1.20 - 1.65	SPT (S) N=15									
1.60	D3				137.3 7	1.90		End of Borehole at 1.90m		

Remarks
Hand dug inspection pit excavated from 0-1.20m.

Terminated on refusal at 1.90m. Moved to rebore position BH01A

Water Strikes				Chiselling Details		
Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)
				1.90	1.90	01:00
Water Added		Casing Details				
From (m)	To (m)	To (m)	Diam (mm)			
		1.90	200			

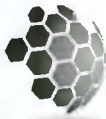


CAUSEWAY GEOTECH

Project No.: 17-1375	Project Name: Saggart Reservoir Site Investigation	Borehole No.: BH01A
Coordinates: 303507.38 E	Client: Irish Water	Sheet 1 of 2
226194.37 N	Client's Representative: RPS Consulting Engineers	Scale: 1:50
Ground Level: 139.27 mOD	Dates: 22/02/2018	Driller: DMCA
		Logger: MFG

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
1.90 - 2.90 2.00 - 2.45 2.40	B1 SPT (S) N=32 D7	2.00		N=32 (3,5,7,7,9,9)		(3.00)		Very stiff brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles and boulders are subangular.		
2.90 - 3.70 3.00 - 3.45 3.40	B2 SPT (S) N=21 D8	3.00	2.10	N=21 (4,4/5,5,5,6)	136.2 7	3.00 (0.90)		Stiff brown slightly sandy gravelly CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles and boulders are subangular.		
3.70 - 3.90 3.90 - 4.90 4.00 - 4.29 4.30	B3 B4 SPT (S) D9	4.00	3.60	50 (12,13/50 for 140mm)	135.3 7	3.90		Very dense grey sandy clayey angular fine to coarse GRAVEL with and occasional bands of stiff brown sandy gravelly clay.		
4.90 - 5.90 5.00 - 5.20 5.30	B5 SPT (S) D10	5.00	4.10	50 (25 for 110mm/50 for 95mm)		(2.00)				
5.90 - 6.60 6.00 - 6.21 6.30	B6 SPT (S) D11	6.00	4.80	50 (25 for 105mm/50 for 105mm)	133.3 7	5.90 (0.70)		Very dense grey subangular medium GRAVEL with bands of stiff black sandy gravelly clay with low cobble and boulder content.		
					132.6 7	6.60 (0.30)		BOULDER		
					132.3 7	6.90		Very stiff dark brown slightly sandy slightly gravelly CLAY. (Driller's Description)		
8.50 - 8.95	SPT (S) N=48	8.50		N=48 (6,9/9,11,14,14)		(2.80)				
					129.5 7	9.70 (1.30)		Weathered ROCK (Driller's description)		

Remarks Hand dug inspection pit excavated from 0-1.20m.	Core Barrel T2-101	Water Strikes				Chiselling Details		
		Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)
	Flush Type	Water Added		Casing Details				
		From (m)	To (m)	To (m)	Diam (mm)			
	3.90	6.60	6.60	200				



CAUSEWAY GEOTECH

Project No.: 17-1375	Project Name: Saggart Reservoir Site Investigation	Borehole No.: BH01A
Coordinates: 303507.38 E	Client: Irish Water	Sheet 2 of 2
226194.37 N	Client's Representative: RPS Consulting Engineers	Scale: 1:50
Ground Level: 139.27 mOD	Dates: 22/02/2018	Driller: DMcA
		Logger: MFG

Method	Plant Used	Top	Base
Cable Percussion	Dando 2500	0.00	6.60
Roatry Drilling	Hanjin 8D	6.60	11.00
Rotary Coring	Hanjin 8D	11.00	14.00

Depth (m)	Sample / Tests		Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
11.00						128.2 7	11.00	[Pattern]	Weathered ROCK (Driller's description)		
12.00	100	39	39	20+				[Pattern]	Weak to medium strong interbedded SANDSTONE and thin laminated MUDSTONE. Distinctly weathered: slightly reduced strength, much closer fracture spacing. Rust oxidation staining on fracture surfaces. Discontinuities: 1. 5 to 10 degree joints, closely spaced (60/80/250), stepped, rough. 2. 45 degree joints, closely spaced (80/100/350), planar, rough. 3. 75 to 90 degree bedding fractures, very closely spaced, stepped, smooth.		
				6				[Pattern]			
13.00	100	0	0	20+			(3.00)	[Pattern]			
14.00	100	10	10			125.2 7	14.00	[Pattern]	End of Borehole at 14.00m		

Remarks Hand dug inspection pit excavated from 0-1.20m	Core Barrel T2-101	Water Strikes				Chiselling Details		
		Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)
	Flush Type		Water Added		Casing Details			
	From (m)	To (m)	To (m)	Diam (mm)				

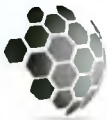


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Project No.: 17-1375	Project Name: Saggart Reservoir Site Investigation	Borehole No.: BH02
Coordinates: 303806.00 E	Client: Irish Water	Sheet 1 of 3
226123.94 N	Client's Representative: RPS Consulting Engineers	Scale: 1:50
Ground Level: 147.57 mOD	Dates: 29/04/2018	Driller: DMC+JG
		Logger: CH+TH

Depth (m)	Sample Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
0.00 - 0.40	B1					(0.40)	[Pattern]	TOPSOIL		
0.40 - 1.40	B2				147.1	0.40	[Pattern]	Stiff brown sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse.		
0.50	ES38				7					
1.00	ES39			N=25 (3,4/5,6,6,8)		(1.30)	[Pattern]			
1.20 - 1.65	SPT (S) N=25							Dense greyish brown very sandy slightly clayey rounded fine to coarse GRAVEL. Sand is fine to coarse.		
1.40 - 1.70	B3									
1.60	D21				145.8	1.70	[Pattern]			
1.70 - 2.70	B4				7					
2.00 - 2.45	SPT (S) N=38	2.00	1.30	N=38 (3,6/7,8,10,13)						
2.40	D22									
2.70 - 3.70	B5									
3.00 - 3.45	SPT (S) N=43	3.00	2.10	N=43 (1,5/10,11,11,11)						
3.40	D23									
3.70 - 4.70	B7							(5.00)		
4.00 - 4.45	SPT (S) N=39	4.00	2.70	N=39 (3,4/7,8,11,13)						
4.40	D24									
4.70 - 5.70	B8									
5.00 - 5.45	SPT (S) N=38	5.00	3.60	N=38 (3,4/6,9,10,13)						
5.40	D25									
5.70 - 6.70	B9									
6.00 - 6.45	SPT (S) N=46	6.00	4.20	N=46 (2,5/8,10,12,16) Water strike at 6.00m				Dense greyish very gravelly slightly clayey brown fine to coarse SAND.		
6.40	D26				140.8	6.70	[Pattern]			
6.70 - 7.30	B10				7			(0.60)		
7.00 - 7.45	SPT (S) N=46	7.00	4.70	N=46 (3,5/9,10,13,14)						
7.30 - 8.10	B11				140.2	7.30	[Pattern]		Very stiff grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.	
7.40	D27				7					
8.00 - 8.45	SPT (S) N=31	8.00	4.90	N=31 (3,4/6,8,8,9)				(4.20)		
8.10 - 9.10	B12									
8.40	D28									
9.00 - 9.36	SPT (S)	9.00	5.10	50 (4,9/50 for 215mm)						
9.10 - 9.60	B13									
9.30	D29									
10.00 - 10.50	B14									
10.00 - 10.45	SPT (S) N=47	10.0	4.70	N=47 (10,10/10,12,12,13)						

Remarks Hand dug inspection pit excavated from 0-1.20m.	Core Barrel SK6LT2-101	Water Strikes				Chiselling Details		
		Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (h:mm)
	6.00	6.00	20	6.00	1.90	2.60	01:00	
	26.00	26.00	20	26.00	5.70	6.20	01:00	
	Flush Type	Water Added		Casing Details				
From (m)		To (m)	To (m)	Diam (mm)				
		1.70	15.50					



CAUSEWAY
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Project No.: 17-1375		Project Name: Saggart Reservoir Site Investigation		Borehole No.: BH02	
Coordinates: 303806.00 E		Client: Irish Water		Sheet 2 of 3	
Method		Plant Used		Scale: 1:50	
Cable Percussion Geobor S Rotary Coring		Dando 2500 Hanjin 8D Hanjin 8D		Driller: DMC+JG	
Top		Base		Logger: CH+TH	
0.00 15.50 18.50		15.50 18.50 26.50			
Ground Level: 147.57 mOD		Dates: 29/04/2018			

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
10.40	D30 D32							Very stiff grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.		
11.00 - 11.50 11.00 - 11.45	B15 SPT (S) N=51	11.0	3.60	N=51 (10,10/11,12,13,15)						
11.40	D31 D33				136.0 7	11.50		Very stiff brown slightly sandy gravelly CLAY with thin lenses of sandy gravel. Sand is fine to coarse. Gravel is subrounded fine to coarse.		
12.00 - 12.50 12.00 - 12.34	B16 SPT (S)	12.0	4.20	50 (6,10/50 for 190mm)		(1.00)				
12.30 12.50 - 13.00	D34 B17				135.0 7	12.50		Very stiff dark grey slightly sandy slightly gravelly CLAY. Gravel is subangular fine to coarse of limestone. Sand is fine to coarse.		
13.00 - 13.50 13.00 - 13.44	B18 SPT (S)	13.0	5.70	50 (6,7/50 for 285mm)		(0.50)				
13.30	D35				134.5 7	13.00		Very stiff brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse.		
14.00 - 14.50 14.00 - 14.44	B19 SPT (S)	14.0	7.10	N=52 (7,8/52 for 285mm)		(0.50)				
14.50	D36				134.0 7	13.50		Very dense brown sandy slightly clayey subrounded fine to coarse GRAVEL of mixed lithologies. Sand is fine to coarse.		
15.00 - 15.50 15.00 - 15.42	B20 SPT (S)	15.0	7.90	N=50 (3,5/50 for 265mm)		(2.00)				
15.50	D37				132.0 7	15.50		Medium dense sandy subangular to subrounded fine to coarse GRAVEL with occasional cobbles and boulders. Sand is fine to coarse. Cobbles and boulders are subrounded.		
						(1.50)				
					130.5 7	17.00		Very stiff brownish grey sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of mixed lithologies. Cobbles are subangular		
						(7.00)				
20.00										

Remarks Hand dug inspection pit excavated from 0-1.20m.	Core Barrel SK6LT2-101	Water Strikes				Chiselling Details		
		Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)
						1.90	2.60	01:00
						5.70	6.20	01:00
Flush Type		Water Added		Casing Details				
		From (m)	To (m)	To (m)	Diam (mm)			
				18.50	200			

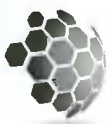


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Project No.: 17-1375	Project Name: Saggart Reservoir Site Investigation	Borehole No.: BH02
Coordinates: 303806.00 E	Client: Irish Water	Sheet 3 of 3
Method Cable Percussion Geobor S Rotary Coring	Plant Used Dando 2500 Hanjin 8D Hanjin 8D	Top 0.00 15.50 18.50
Base 15.50 18.50 26.50	Client's Representative: RPS Consulting Engineers	Scale: 1:50
Ground Level: 147.57 mOD	Dates: 29/04/2018	Driller: DMC +JG
		Logger: CH+TH

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
21.50	100										
23.00	100										
24.50	100					123.5 7	24.00		Stiff light brown sandy very gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of mixed lithologies. Cobbles are subangular <i>24.00m - 26.00m clay is dry and compacted with low moisture content</i>		
26.00	60				Water strike at 26.00m		(2.50)				
26.50						121.0 7	26.50		End of Borehole at 26.50m		

Remarks Hand dug inspection pit excavated from 0-1.20m.	Core Barrel SK6LT2-101	Water Strikes				Chiselling Details		
		Struck at (m) 6.00 26.00	Casing to (m) 6.00 26.00	Time (min) 20 20	Rose to (m) 6.00 26.00	From (m) 1.90 5.70 11.60	To (m) 2.60 6.20 12.00	Time (hh:mm) 01:00 01:00 01:00
	Flush Type	Water Added		Casing Details				
		From (m)	To (m)	To (m)	Diam (mm)			
			26.50	152				



Project No.:
17-1375

Coordinates:
303529.39 E
226088.91 N

Ground Level:
139.30 mOD

Project Name:
Saggart Reservoir Site Investigation

Client:
Irish Water

Client's Representative:
RPS Consulting Engineers

Dates:
07/03/2018

Borehole No.:
BH03

Sheet 1 of 2

Scale: 1:50

Driller: DMC+JG

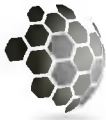
Logger: CH+ST

Method	Plant Used	Top	Base
Cable Percussion	Dando 25000	0.00	2.30
Rotary Drilling	Hanjin 8D	2.30	5.50
Rotary Coring	Hanjin 8D	5.60	6.00
Open Hole Drilling	Hanjin 8D	6.00	11.70

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
0.00 - 0.30	B7					(0.30)	[Pattern]	TOSPOIL.		
0.30 - 1.30	B6				139.0	0.30	[Pattern]	Firm brown slightly sandy slightly gravelly SILT. Sand is fine to coarse. Gravel is fine to medium.		0.5
0.50	ES2				0		[Pattern]			1.0
1.00	ES1						[Pattern]			1.5
1.20 - 1.65	SPT (S) N=11			N=11 (2,3/2,3,3,3)		(2.30)	[Pattern]			2.0
1.30 - 2.30	B5 D4						[Pattern]			2.5
1.60				Water strike at 1.60m			[Pattern]			3.0
2.00 - 2.26	SPT (S)			50 (4,8/50 for 115mm)	136.7	2.60	[Pattern]			3.5
2.30	D3				0	(0.30)	[Pattern]	Large BOULDER		4.0
2.60 - 2.82	SPT (S)			50 (25 for 145mm/50 for 70mm)	136.4	2.90	[Pattern]	Stiff slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Sand is fine to coarse.		4.5
							[Pattern]			5.0
4.00 - 4.45	SPT (S)			23 (6,7/7,8,8,)		(2.60)	[Pattern]			5.5
							[Pattern]			6.0
6.00	100				133.8	5.50	[Pattern]	Very stiff dark grey slightly sandy very gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of mixed lithologies predominately		6.5
					133.3	6.00	[Pattern]	Limestone.		7.0
						(1.00)	[Pattern]	Very stiff slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subrounded.		7.5
7.00 - 7.45	SPT (S)			50 (5,12/18,18,14,)	132.3	7.00	[Pattern]	Very stiff black slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subrounded.		8.0
							[Pattern]			8.5
8.50 - 8.88	SPT (S)			49 (6,13/49 for 225mm)		(4.70)	[Pattern]			9.0
							[Pattern]			9.5
10.00 - 10.38	SPT (S)			49 (6,13/49 for 225mm)			[Pattern]			10.0

Remarks
Hand dug inspection pit excavated from 0-1.20m

Core Barrel	Water Strikes				Chiselling Details		
	Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)
T2-101	1.60	1.60	20	1.40	2.30	2.60	01.00
Flush Type	Water Added		Casing Details				
	From (m)	To (m)	To (m)	Diam (mm)			



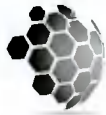
CAUSEWAY GEOTECH

Project No.: 17-1375	Project Name: Saggart Reservoir Site Investigation	Borehole No.: BH03
Coordinates: 303529.39 E	Client: Irish Water	Sheet 2 of 2
Method	Plant Used	Scale: 1:50
Cable Percussion	Dando 25000	Driller: DMC+JG
Rotary Drilling	Hanjin 8D	
Rotary Coring	Hanjin 8D	
Open Hole Drilling	Hanjin 8D	Logger: CH+ST
Top	Base	
0.00	2.30	
2.30	5.50	
5.60	6.00	
6.00	11.70	
Ground Level: 139.30 mOD	Dates: 07/03/2018	

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
11.70 - 12.08	SPT (S)			50 (2,10/50 for 225mm)	127.60	11.70		Very stiff black slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subrounded.		
								End of Borehole at 11.70m		

Remarks
Hand dug inspection pit excavated from 0-1.20m.

Core Barrel T2-101	Water Strikes				Chiselling Details		
	Struck at (m) 1 60	Casing to (m) 1 60	Time (min) 20	Rose to (m) 1 40	From (m) 2 30	To (m) 2 60	Time (hh:mm) 01:00
Flush Type	Water Added		Casing Details				
	From (m)	To (m)	To (m)	Diam (mm)			

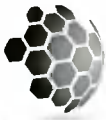


CAUSEWAY GEOTECH

Project No.: 17-1375	Project Name: Saggart Reservoir Site Investigation	Borehole No.: BH04
Coordinates: 303495.47 E	Client: Irish Water	Sheet 1 of 1
Method Cable Percussion	Plant Used Dando 2500	Top 0.00
Base 1.80	Client's Representative: RPS Consulting Engineers	Scale: 1:50
Ground Level: 138.58 mOD	Dates: 23/04/2018	Driller: DM
		Logger: CH

Depth (m)	Sample Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
0.00 - 0.30	B4					(0.30)	[Pattern]	TOPSOIL.		
0.30 - 1.30	B5				138.2	0.30	[Pattern]	Firm brown sandy slightly gravelly SILT. Sand is fine to coarse. Gravel is subangular fine to medium.		
0.50	ES2				8					0.5
1.00	ES1					(1.50)	[Pattern]			1.0
1.20 - 1.65	SPT (S) N=15	1.20		N=15 (2,3/4,3,4,4)						1.5
1.30 - 1.80	B6									2.0
1.60	D3				136.7	1.80		End of Borehole at 1.80m		2.5
					8					3.0
										3.5
										4.0
										4.5
										5.0
										5.5
										6.0
										6.5
										7.0
										7.5
										8.0
										8.5
										9.0
										9.5

Remarks Hand dug inspection pit excavated from 0-1.20m. Terminated on refusal at 1.80m. Moved to rebore position BH04A	Water Strikes				Chiselling Details		
	Struck at (m)	Casing to (m)	Time (min)	Rise to (m)	From (m)	To (m)	Time (hh:mm)
					1.80	1.90	01.00
	Water Added		Casing Details				
From (m)	To (m)	To (m)	Diam (mm)				
		1.80	200				



CAUSEWAY GEOTECH

Project No.: 17-1375	Project Name: Saggart Reservoir Site Investigation	Borehole No.: BH04A
Coordinates: 303495.47 E	Client: Irish Water	Sheet 1 of 2
Method	Plant Used	Scale: 1:50
Cable Percussion	Dando 2500	Driller: DMC+JG
Rotary Drilling	Hanjin 8D	
Rotary Coring	Hanjin 8D	Logger: CH+SG
Top 0.00	Base 4.20	
Ground Level: 138.58 mOD	Dates: 22/02/2018	
226147.58 N	Client's Representative: RPS Consulting Engineers	

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
					138.28	(0.30) 0.30	TOPSOIL			
1.80 - 2.80	B3									
2.00 - 2.44	SPT (S)	2.00		N=49 (2,3/49 for 290mm)		(3.60)		Stiff brown slightly sandy slightly gravelly CLAY with low to medium cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are angular.		
2.40	D6									
2.80 - 3.90	B2									
3.00 - 3.45	SPT (S) N=29	3.00		N=29 (3,5/8,7,6,8)						
3.40	D5									
3.90 - 4.20	B1				134.68	3.90 (0.30)		Stiff black slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel		
4.20 - 4.65	SPT (S) N=50	4.00		N=50 (4,5/6,14,17,13)	134.38	4.20		is subangular to subrounded fine to coarse.		
4.60	D4							Very stiff slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.		
5.50 - 5.89	SPT (C)			N=50 (6,8/50 for 240mm)						
7.00 - 7.39	SPT (C)			N=50 (5,6/50 for 240mm)		(7.30)				
8.50 - 8.78	SPT (C)			N=43 (6,9/43 for 125mm)						

Remarks Hand dug inspection pit excavated from 0-1.20m.	Core Barrel T2-101	Water Strikes				Chiselling Details		
		Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (h:mm)
					2.40	2.70	00:30	
					3.90	4.20	01:00	
	Flush Type	Water Added		Casing Details				
		From (m)	To (m)	To (m)	Diam (mm)			



CAUSEWAY GEOTECH

Project No.: 17-1375	Project Name: Saggart Reservoir Site Investigation	Borehole No.: BH04A
Coordinates: 303495.47 E	Client: Irish Water	Sheet 2 of 2
226147.58 N	Client's Representative: RPS Consulting Engineers	Scale: 1:50
Ground Level: 138.58 mOD	Dates: 22/02/2018	Driller: DMC+JG
		Logger: CH+SG

Method	Plant Used	Top	Base
Cable Percussion	Dando 2500	0.00	4.20
Rotary Drilling	Hanjin 8D	4.20	11.50
Rotary Coring	Hanjin 8D	11.50	12.00

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
12.00	100				127.0	11.50	[Symbol]	Very stiff slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.		
					8	(0.50)	[Symbol]	Very stiff grey slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of mixed lithologies predominately sandstone and slaty mudstone. Cobbles are subangular.		
					126.5	12.00		End of Borehole at 12.00m		

TCR SCR RQD FI

Remarks
Hand dug inspection pit excavated from 0-1.20m.

Core Barrel T2-101	Water Strikes				Chiselling Details		
	Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh mm)
Flush Type					2.40	2.70	00:30
					3.90	4.20	01:00
	Water Added		Casing Details				
	From (m)	To (m)	To (m)	Diam (mm)			

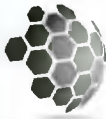


CAUSEWAY GEOTECH

Project No.: 17-1375		Project Name: Saggart Reservoir Site Investigation		Borehole No.: BH05	
Coordinates: 303489.30 E		Client: Irish Water		Sheet 1 of 2	
Method Cable Percussion Rotary Drilling		Plant Used Dando 2500 Hanjin 8D		Top 0.00 2.30	
Base 13.00		Client's Representative: RPS Consulting Engineers		Scale: 1:50	
Ground Level: 137.01 mOD		Dates: 06/03/2018		Driller: DMC+JG	
				Logger: CH	

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
0.00 - 1.20	B7					(0.20)		TOPSOIL.		
0.20 - 1.20	B6				136.8	0.20		Stiff brown CLAY with cobbles and boulders. Cobbles and boulders are subrounded.		
0.50	ES2				1					
1.00	ES1									
1.20 - 1.65	SPT (S) N=19			N=19 (2,3/5,4,5,5)		(2.10)				
1.60	D4									
2.00 - 2.43	SPT (S)			N=50 (4,4/50 for 280mm)						
2.20 - 2.30	B5				134.7	2.30		Very stiff slightly silty slightly gravelly sandy CLAY. (Driller's description)		
2.30	D3				1					
2.60 - 2.96	SPT (C)			N=50 (6,9/50 for 210mm)						
4.00 - 7.00	B8									
4.00 - 4.34	SPT (S)			N=51 (7,9/51 for 190mm)						
5.50 - 5.92	SPT (S)			N=50 (9,10/50 for 265mm)						
7.00 - 10.00	B9									
7.00 - 7.28	SPT (S)			N=41 (9,11/41 for 135mm)						
8.50 - 8.76	SPT (S)			N=44 (10,13/44 for 110mm)						
10.00 - 10.33	SPT (S)			N=50 (8,11/50 for 180mm)						

Remarks Hand dug inspection pit excavated from 0-1.20m.	Core Barrel	Water Strikes				Chiselling Details		
		Struck at (m)	Casing to (m)	Time (min)	Rise to (m)	From (m)	To (m)	Time (hh:mm)
	11:00	11:00			2:30	2:60	01:00	
	Flush Type	Water Added		Casing Details				
From (m)		To (m)	To (m)	Diam (mm)				



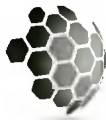
CAUSEWAY GEOTECH

Project No.: 17-1375	Project Name: Saggart Reservoir Site Investigation	Borehole No.: BH05
Coordinates: 303489.30 E	Client: Irish Water	Sheet 2 of 2
226104.44 N	Client's Representative: RPS Consulting Engineers	Scale: 1:50
Ground Level: 137.01 mOD	Dates: 06/03/2018	Driller: DMC+JG
		Logger: CH

Method	Plant Used	Top	Base
Cable Percussion Rotary Drilling	Dando 2500 Hanjin 8D	0.00 2.30	2.30 13.00

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
11.50 - 11.88	SPT (S)			Water strike at 11.0m N=50 (9,13/50 for 225mm)	124.0 1	13.00		Very stiff slightly silty slightly gravelly sandy CLAY. (Driller's description)	▼	
								End of Borehole at 13.00m		

Rernarks Hand dug inspection pit excavated from 0-1.20m.	Core Barrel	Water Strikes				Chiselling Details		
		Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)
	11.00	11.00			2.30	2.60	01.00	
	Flush Type	Water Added		Casing Details				
From (m)		To (m)	To (m)	Diam (mm)				



CAUSEWAY
GEOTECH

Project No.:

17-1375

Project Name:

Saggart Reservoir Site Investigation

Borehole No.:

BH06

Coordinates:

303589.07 E

Client:

Irish Water

Sheet 1 of 2

Client's Representative:

RPS Consulting Engineers

Scale: 1:50

Driller: DMCA+G

Dates:

20/02/2018

Logger: MFG+SG

226243.29 N

Ground Level:

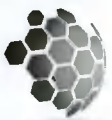
143.12 mOD

Depth (m)	Sample / Tests	Casing Depth (m)	Wear Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
0.00 - 1.00	B1							Firm brown slightly sandy slightly gravelly CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles and boulders are subrounded.		
0.50	ES8					(1.60)				
1.00	ES9									
1.00 - 2.60	B2			N=13 (3,3/3,4,3,3)						
1.20 - 1.65	SPT (S)									
1.60	D5				141.5	1.60				
1.60 - 2.60	B3				2			Very stiff brownish grey sandy gravelly CLAY with high boulder content and low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles and boulders are subangular to subrounded.		
2.00 - 2.40	SPT (S)	2.00		N=50 (5,7/50 for 255mm)						
2.40	D6									
2.60 - 3.00	B4					(1.40)				
3.00 - 3.30	SPT (S)	3.00		N=50 (11,13/50 for 145mm)	140.1	3.00		Very stiff blackish grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subangular.		
3.30	D7				2	(0.80)				
					139.3	3.80		Very stiff brownish black slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are of various lithologies predominately limestone and sandstone.		
	100				2					
5.30										
	100					(4.30)				
6.80										
	100									
8.30					135.0	8.10		Firm to stiff brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.		
					2					
	93					(1.90)				
9.80					133.1	10.00		Medium strong greenish grey thin laminated coarse grained cemented SANDSTONE. Partially weathered: slightly reduced strength, black reddish		
					2					

Remarks

Hand dug inspection pit excavated from 0-1.20m.
Cored from 3.80m to 12.80m using Geobore S

Core Barrel	Water Strikes				Chiselling Details		
	Struck at (m)	Casing to (m)	Fame (mm)	Rose to (m)	From (m)	To (m)	Time (hh:mm)
SK6L					3 00	3 30	01:00
Flush Type	Water Added		Casing Details				
	From (m)	To (m)	To (m)	Diam (mm)			
			3 00	200			



CAUSEWAY
GEOTECH

Project No.: 17-1375	Project Name: Saggart Reservoir Site Investigation	Borehole No.: BH06
Coordinates: 303589.07 E	Client: Irish Water	Sheet 2 of 2
Method	Plant Used	Scale: 1:50
Cable Percussion	Dando 2500	Driller: DMCA
Rotary Drilling	Beretta T44	+GT
Geobor S	Beretta T44	Logger: MFG+SG
Top	Base	
0.00	3.00	
3.00	3.80	
3.80	12.80	
Ground Level: 143.12 mOD	Dates: 20/02/2018	

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
11.30	100	25	20	6		132.1	(1.00)	Medium strong greenish grey thinly laminated coarse grained cemented SANDSTONE. Partially weathered: slightly reduced strength, black reddish discolouration on fracture surface with clay. Fine sediment in fractures and joints.		
				10		2	11.00	-----	Discontinuities: 1. 45 degree joints closely spaced (100/100/160), stepping, rough. Oxidation staining on joint surface.		
	100	20	20	7			(1.80)	-----	Weak thinly laminated grey slaty MUDSTONE. Partially weathered: slightly reduced strength, slightly closer fracture spacing. Black and orange staining on fracture and joint surfaces with clay sediment in joints.		
							12.80	-----	Discontinuities: 1. 5 to 10 degree joints closely spaced (60/100/120), stepped, smooth, orange staining. 2. 75 to 80 degree bedding fractures, very closely spaced (20/40/60), planar, smooth, black and orange staining.		
12.80						130.3	12.80		End of Borehole at 12.80m		
						2					

Remarks Hand dug inspection pit excavated from 0-1.20m. Cored from 3.80m to 12.80m using Geobore S	Core Barrel SK6L	Water Strikes				Chiselling Details		
		Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)
					3.00	3.30	03.00	
	Flush Type	Water Added		Casing Details				
From (m)		To (m)	To (m)	Diam (mm)				

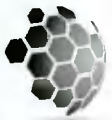


CAUSEWAY GEOTECH

Project No.: 17-1375	Project Name: Saggart Reservoir Site Investigation	Borehole No.: BH07
Coordinates: 303569.28 E	Client: Irish Water	Sheet 1 of 2
226115.31 N	Client's Representative: RPS Consulting Engineers	Scale: 1:50
Ground Level: 141.58 mOD	Dates: 27/02/2018 - 27/03/2018	Driller: DMC+JG
		Logger: CH+ST

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
0.00 - 0.30	B6					(0.30)		TOPSOIL		
0.30 - 1.30	B7				141.28	0.30		Firm to stiff brown slightly sandy slightly gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of mixed lithologies. Cobbles are subangular.		
0.50	ES2									
1.00	ES1									
1.20 - 1.51 1.30 - 2.30	SPT (S) B8			7 (2,2/7 for 160mm)						
1.60	D5					(3.40)				
2.20 - 2.65	SPT (S) N=26	2.00		N=26 (2,2/5,9,6,6)						
2.30 - 3.30 2.60	B9 D4									
3.00 - 3.45	SPT (S) N=50	3.00		N=50 (5,5/7,9,12,22)						
3.30 - 3.70 3.40	B10 D3									
4.00 - 7.00 4.00 - 4.15				B11 25 (8,25/25 for 0mm)	137.88 137.58	3.70 (0.30) 4.00	BOULDER	Stiff dark grey silty gravelly CLAY with cobbles and boulders. (Driller's description)		
5.50 - 5.78				50 (9,20/50 for 125mm)						
7.00 - 10.00				B12		(7.50)				
8.50 - 8.85				50 (8,11/50 for 200mm)						
10.00 - 12.50 10.00 - 10.18				B13 25 (12,27/25 for 35mm)						

Remarks Hand dug inspection pit excavated from 0-1.20m.	Core Barrel T2-101	Water Strikes				Chiselling Details		
		Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)
					3.70	4.00	01:00	
	Flush Type	Water Added		Casing Details				
From (m)		To (m)	To (m)	Diam (mm)				
			3.70	200				



CAUSEWAY
GEOTECH

Project No.: 17-1375	Project Name: Saggart Reservoir Site Investigation	Borehole No.: BH07
Coordinates: 303569.28 E	Client: Irish Water	Sheet 2 of 2
Method Cable Percussion Rotary Coring	Plant Used Dando 2500 Hanjin 8D	Scale: 1:50
Top 0.00	Base 3.70 16.00	Driller: DMC +JG
Ground Level: 141.58 mOD	Client's Representative: RPS Consulting Engineers	Logger: CH+ST
Dates: 27/02/2018 - 27/03/2018		

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
									Stiff dark grey silty gravelly CLAY with cobbles and boulders. (Driller's description)		
						130.0 8	11.50 (0.50)		Sandy GRAVEL with pieces of rock. (Driller's description)		
						129.5 8	12.00 (0.50)		Boulder (Driller's description)		
						129.0 8	12.50 (3.00)		Stiff brown slightly sandy very gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of mixed lithologies predominately shale.		
13.50	42										
	0	0	0								
15.50						126.0 8	15.50 (0.50)		Weak brownish red SHALE/MUDSTONE. Partially weathered; reduced strength, highly fractured staining on fracture surface.		
16.00	0	60	60			125.5 8	16.00		Discontinuities: 1. 30 to 40 degree bedding fractures very closely spaced (05/08/12 planar, smooth, stained. 2. Subvertical fractures planar, smooth, stained. End of Borehole at 16.00m		

Remarks Hand dug inspection pit excavated from 0-1.20m	Core Barrel T2-101	Water Strikes				Chiselling Details		
		Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)
					3.70	4.00	01.00	
	Flush Type	Water Added		Casing Details				
From (m)		To (m)	To (m)	Diarn (mm)				

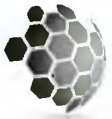


CAUSEWAY GEOTECH

Project No.: 17-1375		Project Name: Saggart Reservoir Site Investigation		Borehole No.: BH08	
Coordinates: 303589.06 E		Client: Irish Water		Sheet 1 of 1	
Method Cable Percussion Rotary Drilling		Plant Used Dando 2500 Hanjin 8D		Top 0.00	
Base 3.40 10.00		Client's Representative: RPS Consulting Engineers		Scale: 1:50	
Ground Level: 141.45 mOD		Dates: 08/03/2018 - 30/03/2018		Driller: DMC+JG	
				Logger: CH	

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
0.00 - 0.20	B6					(0.20)		TOPSOIL.		
0.20 - 1.20	B7				141.2	0.20		Firm becoming stiff light brown slightly sandy gravelly CLAY with occasional cobbles and boulders. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies.		
0.50	ES2				5					
1.00	ES1									
1.20 - 2.20	B8									
1.20 - 1.65	SPT (S) N=12	1.00		N=12 (2,3/3,2,3,4) Water strike at 1.50m						
1.60	D5					(3.20)				
2.00 - 2.45	SPT (S) N=22	2.00	0.90	N=22 (3,4/6,5,5,6)						
2.20 - 3.10	B9									
2.40	D4									
3.00 - 3.45	SPT (S) N=37	3.00	1.10	N=37 (4,7/6,7,10,14)						
3.10 - 3.40	B10									
3.40	D3				138.0	3.40		Very stiff dark slightly sandy slightly gravelly boulder CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of mixed lithologies.		
4.00 - 7.00	B11				5					
5.50 - 5.92	SPT (S)			N=50 (11,13/50 for 265mm)						
7.00 - 10.00	B12									
7.00 - 7.32	SPT (S)			N=50 (12,15/50 for 170mm)		(6.60)				
8.50 - 8.78	SPT (S)			25 (13,18/25 for 125mm)						
10.00 - 10.28	SPT (S)			25 (12,18/25 for 135mm)	131.4	10.00		End of Borehole at 10.00m		

Remarks Hand dug inspection pit excavated from 0-1.20m.	Core Barrel	Water Strikes				Chiselling Details		
		Struck at (m) 1.50	Casing to (m) 1.50	Time (min) 20	Rose to (m) 0.60	From (m) 3.40	To (m) 3.50	Time (hh:mm) 01:00
	Flush Type	Water Added		Casing Details				
From (m)		To (m)	To (m)	Diam (mm)				
			10.00	200				

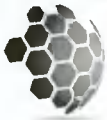


CAUSEWAY
GEOTECH

Project No.: 17-1375	Project Name: Saggart Reservoir Site Investigation	Borehole No.: BH09
Coordinates: 303567.28 E	Client: Irish Water	Sheet 1 of 2
Method Cable Percussion Rotary Drilling	Plant Used Dando 25000 Hanjin 8D	Top 0.00
Base 2.70 12.00	Client's Representative: RPS Consulting Engineers	Scale: 1:50
Ground Level: 139.14 mOD	Dates: 11/04/2018 - 16/04/2018	Driller: DMCHG
		Logger: CH

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
0.00 - 0.30	B5					(0.30)	[Pattern]	TOPSOIL		
0.30 - 1.30	B6				138.8	0.30	[Pattern]	Firm brown slightly sandy slightly gravelly CLAY with high cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular.		
0.50	ES2				4					
1.00	ES1					(1.50)	[Pattern]			
1.20 - 1.65	SPT (S) N=15			N=15 (2,3/4,3,4,4)						
1.30 - 1.80	B7									
1.60	D4									
1.80 - 2.70	B8				137.3	1.80	[Pattern]	Stiff grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to medium.		
2.00 - 2.45	SPT (S) N=28			N=28 (3,5/6,7,7,8)	4					
2.40	D3					(0.90)				
2.70 - 2.90	B9				136.4	2.70	[Pattern]	BOULDER		
					4	(0.30)				
					136.1	3.00	[Pattern]	Very stiff dark greyish brown sandy gravelly CLAY with cobbles and boulder. (Driller's description)		
					4					
4.00 - 7.00	B10					(9.00)	[Pattern]			
7.00 - 10.00	B11									
8.50 - 8.93	SPT (S)			N=50 (8,8/50 for 275mm)						
10.00 - 12.00	B12									
10.00 - 10.30	SPT (S)			36 (11,11/36 for 145mm)						

Remarks Hand dug inspection pit excavated from 0-1.20m.	Core Barrel	Water Strikes				Chiselling Details		
		Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)
	Flush Type	Water Added		Casing Details				
		From (m)	To (m)	To (m)	Diam (mm)			
			2.70	200				



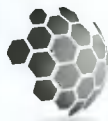
CAUSEWAY
GEOTECH

Project No.: 17-1375	Project Name: Saggart Reservoir Site Investigation	Borehole No.: BH09
Coordinates: 303567.28 E	Client: Irish Water	Sheet 2 of 2
Method Cable Percussion Rotary Drilling	Plant Used Dando 25000 Hanjin 8D	Top 0.00
Base 2.70 12.00	Client's Representative: RPS Consulting Engineers	Scale: 1:50
Ground Level: 139.14 mOD	Dates: 11/04/2018 - 16/04/2018	Driller: DMC+JG
		Logger: CH

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
11.50 - 11.69	SPT (S)			25 (14,25/25 for 40mm)	127.1 4	12.00		Very stiff dark greyish brown sandy gravelly CLAY with cobbles and boulder. (Driller's description)		
								End of Borehole at 12.00m		

Remarks
Hand dug inspection pit excavated from 0-1.20m.

Core Barrel	Water Strikes				Chiselling Details		
	Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)
Flush Type	Water Added		Casing Details				
	From (m)	To (m)	To (m)	Diam (mm)			
			12.00	152			



CAUSEWAY
GEOTECH

Project No.: 17-1375	Project Name: Saggart Reservoir Site Investigation	Borehole No.: BH10
Coordinates: 303637.24 E	Client: Irish Water	Sheet 1 of 2
Method Cable Percussion Rotary Drilling	Plant Used Dando 2500 Hanjin 8D	Top 0.00 Base 4.50 18.00
226042.46 N	Client's Representative: RPS Consulting Engineers	Scale: 1:50
Ground Level: 142.31 mOD	Dates: 10/04/2018	Driller: DMC+JG
		Logger: CH

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
0.00 - 0.60	B6					(0.60)		MADE GROUND: Soft brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.		
0.50	ES2				141.7	0.60		Firm brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse.		
0.60 - 1.60	B7			N=10 (1,2/2,3,2,3)	1	(2.00)				
1.00	ES1									
1.20 - 1.65	SPT (S) N=10									
1.60	D5									
1.60 - 2.60	B8									
2.00 - 2.45	SPT (S) N=14	2.00		N=14 (2,3/4,3,3,4)						
2.40	D4									
2.60 - 3.80	B9				139.7	2.60		Stiff brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse.		
3.00 - 3.45	SPT (S) N=19	3.00		N=19 (2,2/4,4,4,7)	1	(1.20)				
3.40	D3									
3.80 - 4.50	B10			Water strike at 3.80m	138.5	3.80		Very stiff dark grey slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse.		
4.00 - 4.34	SPT (S)	4.00	3.90	N=50 (9,11/50 for 185mm)	1	(2.00)				
5.50 - 8.50	B11				136.5	5.80		Very stiff dark greyish brown sandy gravelly silty CLAY with cobbles and boulder. (Driller's description)		
7.00 - 7.45	SPT (S) N=30			N=30 (5,5/6,8,8,8)						
8.50 - 11.50	B12									

Remarks Hand dug inspection pit excavated from 0-1.20m.	Core Barrel	Water Strikes				Chiselling Details		
		Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)
	3.80	3.80	20	3.70	4.00	4.50	02:00	
	16.00							
Flush Type	Water Added		Casing Details					
	From (m)	To (m)	To (m)	Diam (mm)				
			4.50	200				



CAUSEWAY GEOTECH

Project No.: 17-1375	Project Name: Saggart Reservoir Site Investigation	Borehole No.: BH10
Coordinates: 303637.24 E	Client: Irish Water	Sheet 2 of 2
Method Cable Percussion Rotary Drilling	Plant Used Dando 2500 Hanjin 8D	Top 0.00 4.50
Base 4.50 18.00	Client's Representative: RPS Consulting Engineers	Scale: 1:50
Ground Level: 142.31 mOD	Dates: 10/04/2018	Driller: DMCHG
		Logger: CH

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
11.50 - 14.50	B13							Very stiff dark greyish brown sandy gravelly silty CLAY with cobbles and boulder. (Driller's description)		
						(9.20)		Clay clamp at 12.00 to 14.00m		
14.50 - 18.00 14.50 - 14.83	B14 SPT (S)			N=50 (8,11/50 for 180mm)	127.3 1	15.00		Dark grey sandy clayey GRAVEL (Driller's description).		
				Water Strike at 16.00m		(3.00)				
					124.3 1	18.00		End of Borehole at 18.00m		

Remarks Hand dug inspection pit excavated from 0-1.20m.	Core Barrel	Water Strikes				Chiselling Details		
		Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)
	3.80	3.80	20	3.70	4.00	4.50	02:00	
	16.00							
Flush Type	Water Added		Casing Details					
	From (m)	To (m)	To (m)	Diam (mm)				



CAUSEWAY
GEOTECH

Project No.: 17-1375	Project Name: Saggart Reservoir Site Investigation	Borehole No.: BH11
Coordinates: 303648.96 E	Client: Irish Water	Sheet 1 of 2
226092.19 N	Client's Representative: RPS Consulting Engineers	Scale: 1:50
Ground Level: 144.40 mOD	Dates: 09/03/2018 - 01/04/2018	Driller: DMC+HG
		Logger: CH+TH

Depth (m)	Sample / Tests	Casing Depth (m)	Wear Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
0.00 - 0.30	B5					(0.30)	[Pattern]	TOPSOIL.		
0.30 - 1.30	B6			Water strike at 0.30m	144.10	0.30	[Pattern]	Firm light brown slightly sandy slightly gravelly CLAY with cobbles and boulders. Sand is fine to coarse. Gravel is subangular fine to coarse of mixed lithologies. Cobbles and boulders are subangular.		
0.50	ES2									
1.00	ES1									
1.20 - 1.65	SPT (S) N=14	1.00		N=14 (2,2/3,4,3,4)		(1.70)	[Pattern]			
1.30 - 2.30	B7									
1.60	D4									
2.00 - 2.45	SPT (S) N=27	2.00		N=27 (2,3/5,9,6,7)	142.40	2.00	[Pattern]	Very stiff brown sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of mixed lithologies. Cobbles are angular.		
2.30 - 2.90	B8					(0.75)	[Pattern]			
2.40	D3									
2.90 - 3.12	SPT (C) 100			23 (24,27/23 for 25mm)	141.65	2.75	[Pattern]	Stiff brownish grey sandy gravelly CLAY with medium cobble content and low boulder content. Sand is fine to coarse. Gravel is subangular fine to coarse of mixed lithologies. Cobbles and boulders are angular to subangular.		
3.50										
	86					(2.75)	[Pattern]			
5.00										
	86				138.90	5.50	[Pattern]	Grey sandy clayey subangular fine to coarse GRAVEL of mixed lithologies with medium cobble content. Sand is fine to coarse. Cobbles are subangular.		
6.50										
	70					(2.50)	[Pattern]			
8.00										
	70				136.40	8.00	[Pattern]	Grey slightly sandy slightly clayey subangular fine to coarse GRAVEL of mixed lithologies with low cobble and boulder content. Sand is fine to coarse. Cobbles and boulders are subangular.		
	70					(1.50)	[Pattern]			
9.50										
					134.90	9.50	[Pattern]	Grey slightly sandy slightly clayey subangular fine to coarse GRAVEL with medium cobble content. Sand is fine to coarse. Cobbles and boulders are subangular.		
					134.30	10.10	[Pattern]	Grey sandy clayey subangular fine to coarse GRAVEL with medium cobble		

Remarks Hand dug inspection pit excavated from 0-1.20m.	Core Barrel SK6L	Water Strikes				Chiselling Details		
		Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)
		0.30	0.30			2.50	2.90	01.00
	Flush Type	Water Added		Casing Details				
From (m)		To (m)	To (m)	Diam (mm)				
			2.50	200				

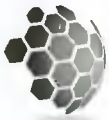


CAUSEWAY GEOTECH

Project No.: 17-1375	Project Name: Saggart Reservoir Site Investigation	Borehole No.: BH11
Coordinates: 303648.96 E	Client: Irish Water	Sheet 2 of 2
Method	Plant Used	Scale: 1:50
Cable Percussion	Dando 25000	Driller: DMC
Symmetrix	Hanjin 8D	+JG
Geobor S	Hanjin 8D	Logger: CH+TH
Top	Base	
0.00	2.50	
2.50	2.90	
2.90	12.00	
Ground Level: 144.40 mOD		Dates: 09/03/2018 - 01/04/2018

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
12.00						132.40	12.00		Grey sandy clayey subangular fine to coarse GRAVEL with medium cobble content. Sand is fine to coarse. Cobbles are subangular.		
	83					0			End of Borehole at 12.00m		

Remarks Hand dug inspection pit excavated from 0-1.20m.	Core Barrel SK6L	Water Strikes				Chiselling Details		
		Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)
	0.30	0.30			2.50	2.90	01.00	
	Flush Type	Water Added		Casing Details				
From (m)		To (m)	To (m)	Diam (mm)				
			12.00	152				



CAUSEWAY
GEOTECH

Project No.: 17-1375	Project Name: Saggart Reservoir Site Investigation	Borehole No.: BH12
Coordinates: 303595.52 E	Client: Irish Water	Sheet 1 of 2
226150.43 N	Client's Representative: RPS Consulting Engineers	Scale: 1:50
Ground Level: 142.69 mOD	Dates: 26/02/2018 - 28/03/2018	Driller: DMC+JG
		Logger: CH

Method	Plant Used	Top	Base
Cable Percussion Rotary Drilling	Dando 25000 Hanjin 8D	0.00 3.60	3.60 12.00

Depth (m)	Sample / Tests	Casing Depth (m)	Wear Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
0.00 - 0.20	B6				142.4	(0.20)		TOPSOIL.		
0.20 - 1.20	B8				9			Firm brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse.		
0.50	ES2					(1.00)				
1.00	ES1				141.4	1.20		Stiff becoming very stiff brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subrounded to subangular fine to coarse of mixed lithologies. Cobbles are subangular.		
1.20 - 2.20	B9			N=18 (2,2/4,5,5,4)	9					
1.20 - 1.65	SPT (S) N=18									
1.60	D5									
2.00 - 2.45	SPT (S)	2.00		N=34 (2,4/9,8,8,9)		(2.40)				
2.20 - 3.20	B10									
2.40	D4									
3.00 - 3.42	SPT (S)	3.00		N=50 (2,3/50 for 265mm)						
3.20 - 3.60	B11									
3.40	D3				139.0	3.60		Very stiff dark brown sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is fine to medium.		
4.00 - 7.00	B11			50 (8,18/50 for 115mm)	9					
4.00 - 4.26	SPT (S)									
5.50 - 5.71	SPT (S)			50 (22,3/50 for 60mm)						
7.00 - 10.00	B12			50 (14,20/50 for 35mm)		(8.40)				
7.00 - 7.18	SPT (S)									
8.50 - 8.78	SPT (S)			50 (8,20/50 for 125mm)						
10.00 - 12.00	B13			N=50 (9,10/50 for 245mm)						
10.00 - 10.40	SPT (S)									

Remarks
Hand dug inspection pit excavated from 0-1.20m.

Core Barrel	Water Strikes				Chiselling Details		
	Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)
Flush Type	Water Added		Casing Details				
	From (m)	To (m)	To (m)	Diam (mm)			
			3.60	200			



CAUSEWAY GEOTECH

Project No.: 17-1375	Project Name: Saggart Reservoir Site Investigation	Borehole No.: BH12
Coordinates: 303595.52 E	Client: Irish Water	Sheet 2 of 2
Method Cable Percussion Rotary Drilling	Plant Used Dando 25000 Hanjin 8D	Top 0.00
Base 3.60	Client's Representative: RPS Consulting Engineers	Scale: 1:50
Ground Level: 142.69 mOD	Dates: 26/02/2018 - 28/03/2018	Driller: DMC-JG
		Logger: CH

Depth (m)	Sample Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
11.50 - 11.80	SPT (S)			50 (25 for 115mm/50 for 190mm)	130.6 9	12.00		Very stiff dark brown sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is fine to medium.		
								End of Borehole at 12.00m		

Remarks
Hand dug inspection pit excavated from 0-1.20m.

Core Barrel	Water Strikes				Chiselling Details		
	Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)
					3.60	3.90	01.00
Flush Type	Water Added		Casing Details				
	From (m)	To (m)	To (m)	Diam (mm)			



CAUSEWAY
GEOTECH

Project No.:
17-1375

Project Name:
Saggart Reservoir Site Investigation

Borehole No.:
BH13

Coordinates:
303614.55 E

Client:
Irish Water

Sheet 1 of 2

Method	Plant Used	Top	Base
Cable Percussion Rotary Drilling	Dando 2500 Hanjin 8D	0.00 3.00	3.00 15.00

226192.26 N

Client's Representative:
RPS Consulting Engineers

Scale: 1:50

Ground Level:
143.72 mOD

Dates:
19/02/2018

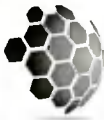
Driller: DMCA+JG

Logger: MFG

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
0.00 - 1.00	B3							Firm brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.		
0.50	ES1									
1.00 - 2.00	ES2 B4 SPT (S) N=10			N=10 (3,2/2,3,2,3)		(2.00)				
1.20 - 1.65	D6									
1.60										
2.00 - 3.00	B5 SPT (S) N=17	2.00		N=17 (3,4/4,5,4,4)	141.7 2	2.00		Stiff light brown slightly sandy slightly gravelly CLAY with high cobble and boulder content. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles and boulders are angular.		
2.00 - 2.45	D7					(1.00)				
2.40										
3.00 - 3.30	SPT (S)	3.00		50 (22,3/50 for 150mm) Water Strike at 3.10m	140.7 2	3.00		Very stiff dark brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular is fine to coarse of mixed lithologies.		
3.40	D8									
4.00 - 7.00	B9 SPT (S)			N=50 (20,25/50 for 255mm)						
4.00 - 4.40										
5.50 - 5.92	SPT (S)			N=50 (13,22/50 for 275mm)						
3.40										
7.00 - 9.70	B10 SPT (S)			N=50 (12,18/50 for 275mm)		(6.70)				
7.00 - 7.42										
8.50 - 8.93	SPT (S)			N=50 (14,20/50 for 275mm)						
8.50										
10.00 - 12.00	B11 SPT (S)			N=50 (15,25/50 for 260mm)	134.0 2	9.70		Dark brown sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies.		
10.00 - 10.41										

Remarks
Hand dug inspection pit excavated from 0-1.20m.

Core Barrel	Water Strikes				Chiselling Details		
	Struck at (m)	Casing to (m)	Time (min)	Rise to (m)	From (m)	To (m)	Time (hh:mm)
	3.10		5	3.00	3.10	3.20	00:30
Flush Type	Water Added		Casing Details				
	From (m)	To (m)	To (m)	Diam (mm)			
			3.00	200			



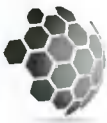
CAUSEWAY
GEOTECH

Project No.: 17-1375	Project Name: Saggart Reservoir Site Investigation	Borehole No.: BH13
Coordinates: 303614.55 E	Client: Irish Water	Sheet 2 of 2
Method Cable Percussion Rotary Drilling	Plant Used Dando 2500 Hanjin 8D	Top 0.00
Base 3.00	Client's Representative: RPS Consulting Engineers	Scale: 1:50
Ground Level: 143.72 mOD	Dates: 19/02/2018	Driller: DMCA+JG
		Logger: MFG

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
						(2.30)		Dark brown sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies.		
					131.7 2	12.00		Weathered SANDSTONE (Driller's description)		
						(1.00)				
					130.7 2	13.00		SANDSTONE (Driller's description)		
						(2.00)				
					128.7 2	15.00		End of Borehole at 15.00m		

Remarks
Hand dug inspection pit excavated from 0-1.20m.

Core Barrel	Water Strikes				Chiselling Details		
	Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)
	3.10		5	3.00	3.10	3.20	00:30
Flush Type	Water Added		Casing Details				
	From (m)	To (m)	To (m)	Diam (mm)			
			13.00	150			



CAUSEWAY
GEOTECH

Project No.: 17-1375	Project Name: Saggart Reservoir Site Investigation	Borehole No.: BH14
Coordinates: 303674.70 E	Client: Irish Water	Sheet 1 of 2
226195.89 N	Client's Representative: RPS Consulting Engineers	Scale: 1:50
Ground Level: 145.65 mOD	Dates: 18/04/2018	Driller: SS+JG
		Logger: CH+TH

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
0.50	D3 ES1				145.4 5	(0.20) 0.20	TOPSOIL	Very stiff greyish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse.		
0.80 - 1.20	B9									
1.00	ES2									
1.20 - 1.65	SPT (S) N=46			N=46 (13,10/11,12,13,10)						
1.50	D4									
1.80 - 2.20	B10									
2.00 - 2.45	SPT (S) N=30			N=30 (8,8/7,8,7,8)		(3.90)				
2.50	D5									
2.80 - 3.20	B11									
3.00 - 3.45	SPT (S) N=34			N=34 (5,9/9,8,7,10)						
3.50	D6									
3.80 - 4.20	B12									
4.50	D7				141.5 5	4.10	BOULDER recovered through chiseling as dark grey angular gravel.			
4.80 - 5.20	B13					(1.10)				
5.50	D8				140.4 5	5.20	Stiff to very stiff brown sandy gravelly CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is subrounded fine to coarse.			
5.80 - 6.20	B14					(0.60)				
6.00 - 6.10	SPT (S)			50 (50 for 80mm/50 for 15mm)	139.8 5	5.80	Very stiff brownish grey sandy gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to medium.			
					139.4 5	6.20	Stiff brownish grey sandy very gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of mixed lithologies. Cobbles are subangular.			
						(0.90)				
8.00	100				138.5 5	7.10	Stiff yellowish brown sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of mixed lithologies			
						(3.40)				
9.50	100	26	12							
	TCR	SCR	RQD	FI						

Remarks
Hand dug inspection pit excavated from 0-1.20m.

Core Barrel SK6L	Water Strikes				Chiselling Details		
	Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)
Flush Type	Water Added		Casing Details		4.10	5.30	01:00
	From (m)	To (m)	To (m)	Diam (mm)			
	1.30	6.20					

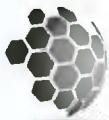


CAUSEWAY
GEOTECH

Project No.: 17-1375		Project Name: Saggart Reservoir Site Investigation		Borehole No.: BH14	
Coordinates: 303674.70 E		Client: Irish Water		Sheet 2 of 2	
Method Cable Percussion Geobor S		Plant Used Dando 2000 Hanjin 8D		Scale: 1:50	
Top 0.00		Base 6.20		Driller: SS+JG	
Ground Level: 145.65 mOD		Dates: 18/04/2018		Logger: CH+TH	

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
11.00				18		135.15	10.50	[Symbol]	Stiff yellowish brown sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse of mixed lithologies Very weak yellowish brown SANDSTONE. Distinctly weathered: pervasive yellowish brown discolouration, reduced strength, closer fracture spacing.		
							(0.50)				
12.50	100	82	60	3		134.65	11.00	[Symbol]	Discontinuities: 1. 50 to 70 degree fractures, very closely spaced (30/45/50) undulating, smooth, patchy brown staining on fracture surfaces. Weak yellowish brown SANDSTONE. Distinctly weathered: pervasive yellowish brown discolouration, reduced strength.		
14.00	100	68	62	4				[Symbol]	Discontinuities: 1. 0 to 20 degree joints, medium spaced (300/420/860) planar, smooth patchy yellowish brown staining on joint surfaces with clay. 2. 80 to 90 degree joints at 12.20m to 12.50m and 13.00m to 13.50m undulating, smooth, patchy yellowish brown staining on joint surface with clay.		
						131.65	14.00		End of Borehole at 14.00m		

Remarks Hand dug inspection pit excavated from 0-1.20m.	Core Barrel SK6L	Water Strikes				Chiselling Details		
		Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)
					4 10	5 30	01:00	
	Flush Type	Water Added		Casing Details				
From (m)		To (m)	To (m)	Diam (mm)				

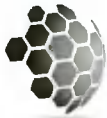


CAUSEWAY
GEOTECH

Project No.: 17-1375	Project Name: Saggart Reservoir Site Investigation	Borehole No.: BH15
Coordinates: 303710.39 E	Client: Irish Water	Sheet 1 of 2
226135.62 N	Client's Representative: RPS Consulting Engineers	Scale: 1:50
Ground Level: 145.76 mOD	Dates: 30/03/2018 - 17/04/2018	Driller: SS+JG
		Logger: CH+JG

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
0.50	D8				145.5	(0.20)		TOPSOIL.		
0.80 - 1.20	ES15 B1				145.1	(0.40)		Firm brown slightly sandy gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse with occasional boulders.		
1.00	ES16				145.1	(0.60)		Stiff brown slightly gravelly sandy CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse.		
1.20 - 1.65	SPT (S) N=16			N=16 (3,4/4,3,4,5)	144.5	1.20		Stiff to very stiff greyish brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to medium.		
1.50	D9				143.1	(1.40)				
1.80 - 2.20	B2				143.1	2.60		Very stiff brown slightly sandy slightly gravelly CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is subangular fine to coarse.		
2.00 - 2.37	SPT (S)			50 (13,11/50 for 220mm)	140.1	(3.00)				
2.50	D10				140.1	5.60		Very stiff dark grey slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse.		
2.80 - 3.20	B3				138.7	7.00		Very stiff dark grey sandy gravelly CLAY with cobbles (Driller's description)		
3.00 - 3.20	SPT (S)			50 (19,6/50 for 50mm)	138.7	(2.00)				
3.50	D11				136.7	9.00		Very stiff light brown sandy gravelly CLAY (Driller's description)		
3.80 - 4.20	B4				136.7	(1.00)				
4.50	D12				135.7	10.00		Dense dark grey sandy GRAVEL (Driller's description)		
4.80 - 5.20	B5				135.7	(1.00)				
5.50	D13				135.7	6				
5.80 - 6.20	B6				135.7	6				
6.00 - 6.30	SPT (S)			50 (11,13/50 for 150mm)	135.7	6				
6.50	D14				135.7	6				
6.80 - 7.00	B7				135.7	6				
7.00 - 10.00	B17				135.7	6				
7.00 - 7.43	SPT (S)			N=50 (13,11/50 for 279mm)	135.7	6				
8.50 - 8.95	SPT (S) N=45			N=45 (7,8/9,10,11,15)	135.7	6				
10.00 - 13.00	B18				135.7	6				
10.00 - 10.30	SPT (S)			50 (10,11/50 for 145mm)	135.7	6				

Remarks Hand dug inspection pit excavated from 0-1.20m.	Core Barrel	Water Strikes				Chiselling Details		
		Struck at (m)	Casing To (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)
	10.00	10.00	10	10.00	0.00	1.20	00:45	
					4.60	5.30	00:30	
	Flush Type	Water Added		Casing Details				
From (m)		To (m)	To (m)	Diam (mm)				
		2.60	7.00					



CAUSEWAY
GEOTECH

Project No.: 17-1375		Project Name: Saggart Reservoir Site Investigation		Borehole No.: BH15	
Coordinates: 303710.39 E		Client: Irish Water		Sheet 2 of 2	
Method Cable Percussion Rotary Drilling		Plant Used Dando 2000 Hanjin 8D		Scale: 1:50	
Top 0.00		Base 7.00		Driller: SS+JG	
Ground Level: 145.76 mOD		Client's Representative: RPS Consulting Engineers		Logger: CH+JG	
Dates: 30/03/2018 - 17/04/2018					

Depth (m)	Sample / Tests	Casing Depth (m)	Wear Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
13.00 - 14.00	B19				132.76	(3.00)		Dense dark grey sandy GRAVEL (Driller's description)		
					131.76	(1.00)		CONGLOMERATE (Driller's description)		
								End of Borehole at 14.00m		

Remarks
Hand dug inspection pit excavated from 0-1.20m.

Core Barrel	Water Strikes				Chiselling Details		
	Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)
	10.00	10.00	10	10.00	0.00	1.20	00:45
					4.60	5.30	00:30
Flush Type	Water Added		Casing Details				
	From (m)	To (m)	To (m)	Diam (mm)			
			14.00	200			

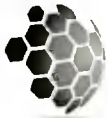


CAUSEWAY
GEOTECH

Project No.: 17-1375		Project Name: Saggart Reservoir Site Investigation		Borehole No.: BH16	
Coordinates: 303813.97 E		Client: Irish Water		Sheet 1 of 3	
226143.19 N		Client's Representative: RPS Consulting Engineers		Scale: 1:50	
Ground Level: 146.37 mOD		Dates: 28/03/2018 - 19/04/2018		Driller: DMC+JG	
				Logger: AOK	

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
0.00 - 1.20	B10							Stiff brown sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse. Cobbles are subangular.		
0.50	ES2					(1.20)				
1.00	ES1									
1.20 - 2.20	B11			N=33 (3,5,7,8,9,9)	145.1	1.20		Dense brown gravelly very silty fine to coarse SAND.		
1.20 - 1.65	SPT (S)				7					
1.60	D3									
2.00 - 2.45	SPT (S)			N=32 (2,3/6,8,8,10)						
2.20 - 2.50	B12					(1.30)				
2.40	D4									
2.50 - 3.50	B13				143.8	2.50		Very stiff greyish brown sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.		
3.00 - 3.45	SPT (S)			N=46 (3,4/7,11,12,16)						
3.40	D5									
3.50 - 4.50	B14									
4.00 - 4.45	SPT (S)			N=46 (3,4/7,11,12,16)						
4.40	D6									
4.50 - 5.50	B15					(4.40)				
5.00 - 5.45	SPT (S)			N=50 (4,5/9,10,13,18)						
5.40	D7									
5.50 - 5.90	B									
6.00 - 6.32	SPT (S)			50 (7,12/50 for 170mm)						
6.30	D8									
6.90 - 7.50	B17				139.4	6.90		Very stiff grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine.		
7.00 - 7.45	SPT (S)			N=44 (4,6/9,11,12,12)	7	(0.60)				
7.40	D9				138.8	7.50		Dark grey sandy GRAVEL with cobbles (Driller's description)		

Remarks Hand dug inspection pit excavated from 0-1.20m	Core Barrel	Water Strikes				Chiselling Details		
		Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)
	7.50	24.50	10	7.50	7.50	7.60	01:00	
	24.50	24.50	10	24.50				
Flush Type	Water Added		Casing Details					
	From (m)	To (m)	To (m)	Diam (mm)				
	1.20	7.50						

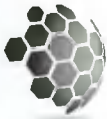


CAUSEWAY
GEOTECH

Project No.: 17-1375	Project Name: Saggart Reservoir Site Investigation	Borehole No.: BH16
Coordinates: 303813.97 E	Client: Irish Water	Sheet 2 of 3
Method Cable Percussion Rotary Drilling	Plant Used Dando 2500 Hanjin 8D	Top 0.00
Base 7.50 25.00	Client's Representative: RPS Consulting Engineers	Scale: 1:50
Ground Level: 146.37 mOD	Dates: 28/03/2018 - 19/04/2018	Driller: DMC+JG
		Logger: AOK

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
								Dark grey sandy GRAVEL with cobbles (Driller's description)		
						(11.00)				
					127.8 7	18.50		Very stiff dark brownish grey sandy gravelly CLAY with cobbles (Driller's description)		

Remarks Hand dug inspection pit excavated from 0-1.20m.	Core Barrel	Water Strikes				Chiselling Details	
		Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)
	7.50	24.50	10	7.50	7.50	7.60	01:00
	24.50	24.50	10	24.50			
Flush Type	Water Added		Casing Details				
	From (m)	To (m)	To (m)	Diam (mm)			
			18.50	200			
		25.00	152				



CAUSEWAY
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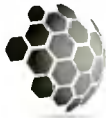
Project No.: 17-1375	Project Name: Saggart Reservoir Site Investigation	Borehole No.: BH16
Coordinates: 303813.97 E	Client: Irish Water	Sheet 3 of 3
226143.19 N	Client's Representative: RPS Consulting Engineers	Scale: 1:50
Ground Level: 146.37 mOD	Dates: 28/03/2018 - 19/04/2018	Driller: DMC+HG
		Logger: AOK

Method	Plant Used	Top	Base
Cable Percussion Rotary Drilling	Dando 2500 Hanjin 8D	0.00 7.50	7.50 25.00

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
						(6.00)		Very stiff dark brownish grey sandy gravelly CLAY with cobbles (Driller's description)		
					121.8 7	24.50 (0.50)		Weathered SANDSTONE (Driller's description)		
					121.3 7	25.00		End of Borehole at 25.00m		

Remarks
Hand dug inspection pit excavated from 0-1.20m.

Core Barrel	Water Strikes				Chiselling Details		
	Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)
Flush Type	Water Added		Casing Details				
	From (m)	To (m)	To (m)	Diam (mm)			



CAUSEWAY GEOTECH

Project No.: 17-1375	Project Name: Saggart Reservoir Site Investigation	Borehole No.: BH17
Coordinates: 303717.11 E	Client: Irish Water	Sheet 1 of 2
Method Cable Percussion Symmetrix	Plant Used Dando 2500 Hanjin 8D	Top 0.00 Base 5.40 20.50
Ground Level: 148.12 mOD	Client's Representative: RPS Consulting Engineers	Scale: 1:50
	Dates: 09/04/2018 - 23/04/2018	Driller: DMCHG
		Logger: CH+JG

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
0.00 - 0.20	B7					(0.20)		TOPSOIL		
0.20 - 1.20	B8				147.9	0.20		Stiff to very stiff brown sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse.		
0.50	ES2				2					
1.00	ES1									
1.20 - 2.20	B9			N=35 (3,5/7,8,9,11)		(2.60)				
1.20 - 1.65	SPT (S) N=35									
1.60	D6									
2.00 - 2.45	SPT (S) N=33	2.00	1.10	N=33 (3,4/6,8,9,10)						
2.20 - 2.80	B10									
2.40	D5									
2.80 - 3.50	B11				145.3	2.80		Stiff grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse.		
3.00 - 3.45	SPT (S) N=25	3.00	1.70	N=25 (2,6/3,4,8,10)	2	(0.70)				
3.40	D4									
3.50 - 4.50	B12				144.6	3.50		Very stiff brown slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse.		
4.00 - 4.45	SPT (S) N=31	4.00	1.30	N=31 (3,5/6,7,9,9)	2	(2.40)				
4.40	D3									
4.50 - 5.40	B13									
5.00 - 5.16	SPT (C)	5.00	1.90	50 (25 for 85mm/50 for 80mm)						
					142.2	5.90		Stiff dark slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subrounded.		
					2	(4.10)				
7.00 - 10.00				B14						
10.00 - 13.00				B15 Water strike at 10.00m	138.1	10.00		Sandy subangular to subrounded fine to coarse GRAVEL. Sand is fine to		
					2	(0.50)				

Remarks Hand dug inspection pit excavated from 0-1.20m.	Core Barrel	Water Strikes				Chiselling Details		
		Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)
	10.00	10.00	20	10.00	5.40	5.40	01:00	
	15.00	15.00						
Flush Type	Water Added		Casing Details					
	From (m)	To (m)	To (m)	Diam (mm)				
	1.60	5.40						

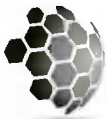


CAUSEWAY
GEOTECH

Project No.: 17-1375	Project Name: Saggart Reservoir Site Investigation	Borehole No.: BH17
Coordinates: 303717.11 E	Client: Irish Water	Sheet 2 of 2
Method Cable Percussion Symmetrix	Plant Used Dando 2500 Hanjin 8D	Scale: 1:50
Top 0.00	Base 5.40 20.50	Driller: DMC +JG
Ground Level: 148.12 mOD	Client's Representative: RPS Consulting Engineers	Logger: CH+JG
	Dates: 09/04/2018 - 23/04/2018	

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
13.00 - 16.00					B16	137.6 2	10.50		Sandy subangular to subrounded fine to coarse GRAVEL. Sand is fine to coarse		
							(4.50)		Stiff dark brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subrounded.		
16.00 - 19.00					Seepage at 15.00m B17	133.1 2	15.00		Stiff dark brown silty slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subrounded.		
19.00 - 20.50					B18		(5.50)				
						127.6 2	20.50		End of Borehole at 20.50m		

Remarks Hand dug inspection pit excavated from 0-1.20m.	Core Barrel	Water Strikes				Chiselling Details		
		Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh mm)
	10 00	10 00	20	10 00	5.40	5.40	01.00	
	15.00	15.00						
Flush Type	Water Added		Casing Details					
	From (m)	To (m)	To (m)	Diam (mm)				
			20.50	200				



CAUSEWAY GEOTECH

Project No.: 17-1375	Project Name: Saggart Reservoir Site Investigation	Borehole No.: BH18
Coordinates: 303772.31 E	Client: Irish Water	Sheet 1 of 2
Method Cable Percussion Rotary Drilling	Plant Used Dando 2500 Hanjin 8D	Top 0.00
Base 3.00 15.00	Client's Representative: RPS Consulting Engineers	Scale: 1:50
Ground Level: 148.74 mOD	Dates: 09/04/2018	Driller: DMC+J
		Logger: CH

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
0.00 - 0.40	B4					(0.40)	[Pattern]	TOPSOIL		
0.40 - 1.40	B5 ES2				148.3 4	0.40	[Pattern]	Stiff brown slightly gravelly sandy CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse.		0.5
1.00	ES1					(1.00)	[Pattern]			1.0
1.20 - 1.65	SPT (S) N=30			N=30 (2,3/5,7,9,9)						
1.40 - 2.40	B6 D3 D8				147.3 4	1.40	[Pattern]	Very dense brownish grey very sandy clayey angular fine to coarse GRAVEL Sand is fine to coarse.		1.5
2.00 - 2.14	SPT (C)	2.00	1.10	N=50 (25 for 85mm/50 for 60mm)		(1.60)	[Pattern]			2.0
2.40 - 3.00	B7									2.5
3.00 - 3.14	SPT (C)	3.00	1.70	N=50 (25 for 75mm/50 for 60mm)	145.7 4	3.00	[Pattern]	MADE GROUND: Worked CLAY (Driller's description)		3.0
						(2.50)	[Pattern]			3.5
5.50 - 8.50	B9				143.2 4	5.50	[Pattern]	Very stiff brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse		5.5
						(1.00)	[Pattern]			6.0
7.00 - 7.08	SPT (S)	7.00		N=50 (25 for 75mm/50 for 0mm)	142.2 4	6.50	[Pattern]	Very stiff dark grey slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subrounded		6.5
						(7.50)	[Pattern]			7.0
8.50 - 11.50	B10									7.5
8.50 - 8.80	SPT (S)	8.50		N=50 (14,19/50 for 150mm)						8.0
										8.5
10.00 - 10.26	SPT (S)	10.00		N=46 (10,16/46 for 115mm)						9.0
										9.5
										10.0

Remarks
Hand dug inspection pit excavated

Core Barrel	Water Strikes				Chiselling Details		
	Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)
					1.80	3.00	02:30
Flush Type	Water Added		Casing Details				
	From (m)	To (m)	To (m)	Diam (mm)			
	1.40	3.00	3.00	200			



CAUSEWAY
GEOTECH

Project No.: 17-1375	Project Name: Saggart Reservoir Site Investigation	Borehole No.: BH18
Coordinates: 303772.31 E	Client: Irish Water	Sheet 2 of 2
226037.74 N	Client's Representative: RPS Consulting Engineers	Scale: 1:50
Ground Level: 148.74 mOD	Dates: 09/04/2018	Driller: DMC+JG
		Logger: CH

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
11.50 - 15.00 11.50 - 11.72	B11 SPT (S)	11.50	0	N=50 (25 for 75mm/50 for 145mm)				Very stiff dark grey slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subrounded		
13.00 - 13.00	SPT (S)	13.00	0	N=50 (25 for 0mm/50 for 0mm)	134.74	14.00				
14.50 - 14.69	SPT (S)	14.50	0	N=25 (17,8/25 for 40mm)	133.74	15.00		Stiff dark grey slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subrounded		
End of Borehole at 15.00m										

Remarks Hand dug inspection pit excavated	Core Barrel	Water Strikes				Chiselling Details		
		Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)
					1.80	3.00	02:30	
	Flush Type	Water Added		Casing Details				
From (m)		To (m)	To (m)	Diam (mm)				

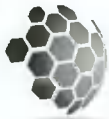


CAUSEWAY
GEOTECH

Project No.: 17-1375	Project Name: Saggart Reservoir Site Investigation	Borehole No.: BH19
Coordinates: 303769.40 E	Client: Irish Water	Sheet 1 of 2
226097.06 N	Client's Representative: RPS Consulting Engineers	Scale: 1:50
Ground Level: 147.95 mOD	Dates: 04/04/2018 - 25/04/2018	Driller: DMC+JG
		Logger: CH+TH

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
0.00 - 0.40	B5					(0.40)	[Pattern]	TOPSOIL		
0.40 - 1.40	B6				147.5	0.40	[Pattern]	Stiff brown slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is angular fine to coarse.		
0.50	ES2				5					
1.00	ES1			N=21 (2,3/5,5,6,5)			[Pattern]			
1.20 - 1.65	SPT (S) N=21									
1.40 - 2.40	B7					(2.60)	[Pattern]			
1.60	D4									
2.00 - 2.45	SPT (S) N=25	2.00	1.20	N=25 (3,4/5,7,6,7)			[Pattern]	Grey slightly sandy slightly clayey angular to subangular fine to coarse GRAVEL with medium cobble content. Sand is fine to coarse. Cobbles are angular of mixed lithologies		
2.40	D3									
					144.9	3.00	[Pattern]			
					5	(1.00)				
	86				143.9	4.00	[Pattern]	Very stiff brownish grey sandy gravelly CLAY with low cobble and boulder content. Sand is fine to coarse. Gravel is angular to subangular fine to coarse of mixed lithologies. Cobbles and boulders are angular of mixed lithologies		
					5					
5.00							[Pattern]			
	100					(3.60)				
6.50							[Pattern]			
	80									
8.00					140.3	7.60	[Pattern]	Greyish brown sandy clayey angular to subangular fine to coarse GRAVEL of mixed lithologies. Sand is fine to coarse		
					5	(0.40)				
					139.9	8.00	[Pattern]	Greyish brown slightly sandy slightly clayey angular to subangular fine to coarse GRAVEL of mixed lithologies with low boulder content. Sand is fine to coarse. Boulders are angular of sandstone		
					5					
				Waterstrike at 8.0m			[Pattern]			
	20					(3.00)				

Remarks Hand dug inspection pit excavated from 0-1.20m.	Core Barrel SK6L	Water Strikes				Chiselling Details		
		Struck at (m)	Casing to (m)	Time (min)	Rise to (m)	From (m)	To (m)	Time (hh:mm)
	8.00	8.00	20	8.00	2.40	3.00	01:30	
	Flush Type	Water Added		Casing Details				
From (m)		To (m)	To (m)	Diam (mm)				
	1.70	3.00						

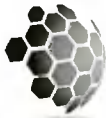


CAUSEWAY
GEOTECH

Project No.: 17-1375	Project Name: Saggart Reservoir Site Investigation	Borehole No.: BH19
Coordinates: 303769.40 E	Client: Irish Water	Sheet 2 of 2
226097.06 N	Client's Representative: RPS Consulting Engineers	Scale: 1:50
Ground Level: 147.95 mOD	Dates: 04/04/2018 - 25/04/2018	Driller: DMC +JG
		Logger: CH+TH

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
11.00 - 12.00 11.80					B8	136.95	11.00		Greyish brown slightly sandy slightly clayey angular to subangular fine to coarse GRAVEL of mixed lithologies with low boulder content. Sand is fine to coarse. Boulders are angular of sandstone		
14.00 - 17.00					B9		(9.00)		Dense GRAVEL with COBBLES and BOULDERS. (Driller's description)		
17.00 - 20.00					B10	127.95	20.00				
End of Borehole at 20.00m											

Remarks Hand dug inspection pit excavated from 0-1.20m.	Core Barrel SK6L	Water Strikes				Chiselling Details		
		Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)
	8.00	8.00	20	8.00	2.40	3.00	01:30	
	Flush Type	Water Added		Casing Details				
From (m)		To (m)	To (m)	Diam (mm)				
			20.00	200				

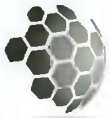


CAUSEWAY
GEOTECH

Project No.: 17-1375	Project Name: Saggart Reservoir Site Investigation	Borehole No.: BH20
Coordinates: 303765.59 E	Client: Irish Water	Sheet 1 of 2
Method Cable Percussion Symmetrix Geobor S	Plant Used Dando 2500 Hanjin 8D Hanjin 8D	Top 0.00 9.30 9.50
Base 9.30 9.50 17.00	Client's Representative: RPS Consulting Engineers	Scale: 1:50
Ground Level: 146.75 mOD	Dates: 26/04/2018	Driller: DMC+HG
		Logger: CH+TH

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
0.00 - 0.20	B1					(0.20)		TOPSOIL.		
0.20 - 1.20	B2				146.5	0.20		Possible MADE GROUND: Stiff brown sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse.		
0.50	ES21				5					
1.00	ES22					(2.00)				
1.20 - 2.20	B3			N=29 (3,4/6,7,7,9)						
1.20 - 1.65	SPT (S)									
1.60	N=29 D12									
2.00 - 2.38	SPT (C)	2.00	1.30	N=50 (4,5/50 for 235mm)	144.5	2.20		Dense brown very sandy clayey GRAVEL. Gravel is subangular fine to coarse. Cobbles are subangular.		
2.20 - 3.20	B4				5					
2.40	D13					(1.00)				
3.00 - 3.45	SPT (S)	3.00	1.90	N=41 (3,6/7,9,11,14)	143.5	3.20		Dense brownish grey very sandy clayey angular fine to coarse GRAVEL. Sand is fine to coarse.		
3.20 - 4.20	N=41 B5				5					
3.40	D14									
4.00 - 4.38	SPT (S)	4.00	2.60	50 (5,6/50 for 225mm)						
4.20 - 5.20	B6									
4.30	D15					(5.20)				
5.00 - 5.32	SPT (S)	5.00	1.80	49 (6,9/49 for 170mm)						
5.20 - 6.20	B7									
5.30	D16									
6.00 - 6.30	SPT (S)	6.00	2.20	50 (6,11/50 for 150mm)						
6.20 - 7.20	B8									
6.30	D17									
7.00 - 7.26	SPT (S)	7.00	2.90	50 (7,13/50 for 105mm)						
7.20 - 8.20	B9									
7.30	D18									
8.00 - 8.30	SPT (S)	8.00	3.70	50 (6,15/50 for 150mm)						
8.20 - 8.40	B10				138.3	8.40		Very stiff dark grey slightly sandy gravelly CLAY with medium cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse.		
8.40	D19				5					
8.40 - 8.90	B11									
8.90 - 9.22	SPT (S)	8.50	5.60	50 (7,12/50 for 175mm)		(0.90)				
9.40	D20									
					137.4	9.30 (0.20)		Stiff dark grey slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse. Cobbles are subrounded.		
					5	(0.50)				
					137.2	9.65		Soft grey sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of mixed lithologies		
					5	(1.05)				
					137.1			Stiff grey sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular		
					0					

Remarks Hand dug inspection pit excavated from 0-1.20m.	Core Barrel SK6L	Water Strikes				Chiselling Details		
		Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)
					1.90	2.20	01:00	
					8.90	8.90	01:00	
	Flush Type	Water Added		Casing Details				
From (m)		To (m)	To (m)	Diam (mm)				
		2.20	8.40	9.50	200			



CAUSEWAY
GEOTECH

Project No.: 17-1375	Project Name: Saggart Reservoir Site Investigation	Borehole No.: BH20
Coordinates: 303765.59 E	Client: Irish Water	Sheet 2 of 2
Method Cable Percussion Symmetrix Geobor S	Plant Used Dando 2500 Hanjin 8D Hanjin 8D	Scale: 1:50
Top 0.00 9.30 9.50	Base 9.30 9.50 17.00	Driller: DMCA +JG
Ground Level: 146.75 mOD	Client's Representative: RPS Consulting Engineers	Logger: CH+TH
Dates: 26/04/2018		

Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill	
11.00	100					136.0 5	10.70 (0.30)		Stiff grey sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of mixed lithologies			
						135.7 5	11.00		Firm grey gravelly very sandy CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of mixed lithologies			
12.50	100	0	0			134.5 5	12.20 (0.30)		Grey slightly sandy clayey subangular fine to coarse GRAVEL with low cobble content. Sand is fine to coarse. Cobbles are subangular			
						134.2 5	12.50 (0.30)		Stiff grey sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse			
						133.9 5	12.80 (0.50)		Stiff light brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of mixed lithologies			
						133.4 5	13.30		Weak narrowly foliated yellowish brown SHALE. Distinctly weathered: closer fracture spacing, reduced strength, yellowish orange discolouration			
14.00	100	0	0	20		133.4 5	2.60		Discontinuity Set 1: 0-30 degree joints, closely spaced (90/180/290), planar, smooth, yellowish brown staining on joint surfaces with clay infill			
										Discontinuity Set 2: 60-80 degree foliation fractures, very closely spaced, (20/50/70), planar, smooth, strong orangish brown staining on fracture surfaces		
15.50	100	18	13	20		130.8 5	1.10		Weak yellowish brown SANDSTONE. Distinctly weathered: reduced strength, pervasive yellowish brown discolouration			
17.00						129.7 5	17.00		Discontinuity Set 1: 0-30 degree joints, closely spaced, (130/190/240), planar, smooth, patchy brown staining on joint surfaces with clay infill			
									End of Borehole at 17.00m			

Remarks
Hand dug inspection pit excavated from 0-1.20m.

Core Barrel SK6L	Water Strikes				Chiselling Details		
	Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm:ss)
Flush Type	Water Added		Casing Details				
	From (m)	To (m)	To (m)	Diam (mm)			
			17.00	152	1.90	2.20	01:00
					8.90	8.90	01:00

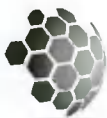


CAUSEWAY GEOTECH

Project No.: 17-1375	Project Name: Saggart Reservoir Site Investigation	Borehole No.: BH21
Coordinates: 303761.50 E	Client: Irish Water	Sheet 1 of 2
226216.78 N	Client's Representative: RPS Consulting Engineers	Scale: 1:50
Ground Level: 145.85 mOD	Dates: 10/04/2018	Driller: SS+JG
		Logger: CH+ST

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
0.50	D1 ES18				145.7 5	(0.10)		TOPSOIL Firm becoming stiff brown sandy gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse.		
0.80 - 1.20	B10									
1.00	ES19									
1.20 - 1.65	SPT (S) N=13			N=13 (2,3/6,3,2,2)						
1.50	D2									
1.80 - 2.20	B11									
2.00 - 2.45	SPT (S) N=22			N=22 (5,5/4,5,6,7)		(3.70)				
2.50	D3									
2.80 - 3.20	B12									
3.00 - 3.45	SPT (S) N=30			N=30 (8,6/6,7,8,9)						
3.50	D4									
3.80 - 4.20	B13				142.0 5	3.80		Dense brown very sandy clayey subrounded fine to coarse GRAVEL. Sand is fine to coarse.		
4.00 - 4.45	SPT (C) N=45			N=45 (9,9/10,14,11,10)						
4.50	D5									
4.80 - 5.20	B14									
5.00 - 5.45	SPT (C) N=65			N=65 (10,13/17,17,16,15)		(3.10)				
5.50	D6									
5.80 - 6.20	B15									
6.00 - 6.14	SPT (C)			50 (25 for 85mm/50 for 50mm)						
6.50	D7									
6.80 - 7.20	B16				138.9 5	6.90		Very stiff brown slightly sandy slightly gravelly CLAY. Gravel is subrounded fine to coarse.		
7.00 - 7.11	SPT (S)			50 (50 for 90mm/50 for 20mm)						
7.50	D8									
7.80 - 8.50	B17					(1.60)				
8.00 - 8.09	SPT (S)			50 (50 for 80mm/50 for 10mm)						
8.50	D9				137.3 5	8.50		Stiff light brown sandy gravelly CLAY with cobbles. (Driller's description)		
						(3.00)				

Remarks Hand dug inspection pit excavated from 0-1.20m.	Core Barrel T2-101	Water Strikes				Chiselling Details		
		Struck at (m)	Casing to (m)	Time (min)	Rise to (m)	From (m)	To (m)	Time (hh:mm)
	Flush Type	Water Added From (m) To (m)	Casing Details To (m) Diam (mm)					
	1.20	8.50	8.50	200				

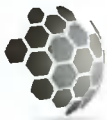


CAUSEWAY
GEOTECH

Project No.: 17-1375	Project Name: Saggart Reservoir Site Investigation	Borehole No.: BH21
Coordinates: 303761.50 E	Client: Irish Water	Sheet 2 of 2
Method	Plant Used	Top
Cable Percussion	Dando 2000	0.00
Rotary Drilling	Hanjin 8D	8.50
Rotary Coring	Hanjin 8D	11.50
	Base	13.85
Ground Level: 145.85 mOD	Client's Representative: RPS Consulting Engineers	Scale: 1:50
	Dates: 10/04/2018	Driller: SS+JG
		Logger: CH+ST

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
								Stiff light brown sandy gravelly CLAY with cobbles. (Driller's description)		
	100				134.3 5	11.50 (1.00)		Stiff brown slightly sandy very gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of mixed lithologies predominately limestone.		
12.50	100	10	0		133.3 5	12.50 (1.35)		Weak brownish grey SHALE/MUDSTONE. Partially weathered: reduced strength, highly fractured red staining on fracture surface. Discontinues: 1. 30 to 40 degree bedding fractures extremely closely spaced (05/08/12) planar, smooth, stained. 2. Subvertical fractures, planar, smooth, stained.		
13.50	100	0	0							
13.85					132.0 0	13.85		End of Borehole at 13.85m		

Remarks Hand dug inspection pit excavated from 0-1.20m.	Core Barrel T2-101	Water Strikes				Chiselling Details		
		Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)
	Flush Type	Water Added		Casing Details				
		From (m)	To (m)	To (m)	Diam (mm)			



CAUSEWAY
GEOTECH

Project No.: 17-1375	Project Name: Saggart Reservoir Site Investigation	Borehole No.: BH22
Coordinates: 303808.04 E	Client: Irish Water	Sheet 1 of 2
Method	Plant Used	Scale: 1:50
Cable Percussion	Dando 2000	Driller: SS+JG
Rotary Drilling	Hanjin 8D	Logger: CH+ST
Rotary Coring	Hanjin 8D	
Ground Level: 144.76 mOD	Client's Representative: RPS Consulting Engineers	
Dates: 10/04/2018		

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
0.50	D8							Stiff brown slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subrounded fine to coarse.		
0.80 - 1.20	ES15 B1									
1.00	ES16									
1.20 - 1.65	SPT (S) N=23			N=23 (6,6/6,7,6,4)		(2.40)				
1.50	D9									
1.80 - 2.20	B2									
2.00 - 2.45	SPT (S) N=20			N=20 (6,5/5,6,4,5)						
2.50	D10				142.3 6	2.40		Brownish grey very sandy clayey subrounded fine to coarse GRAVEL. Sand is fine to coarse.		
2.80 - 3.20	B3					(0.60)				
3.00 - 3.08	SPT (S)			50 (250 for 75mm/50 for 0mm)	141.7 6	3.00		Very dense grey very sandy clayey subrounded fine to coarse GRAVEL. Sand is fine to coarse.		
3.50	D11									
3.80 - 4.20	B4									
4.00 - 4.19	SPT (C)			50 (17,8/50 for 40mm)						
4.50	D12									
4.80 - 5.20	B5					(3.30)				
5.00 - 5.40	SPT (C)			N=50 (10,11/50 for 245mm)						
5.50	D13									
5.80 - 6.20	B6									
6.50	D14				138.4 6	6.30		Very stiff dark grey sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to medium.		
6.80 - 7.20	B7					(1.20)				
7.00 - 10.00	B17 B19									
7.00 - 7.11	SPT (S)			50 (50 for 85mm/50 for 25mm) Water strike at 7.00m	137.2 6	7.50		Very stiff dark grey sandy gravelly CLAY with cobbles (Driller's description)		
8.50 - 8.65	SPT (S)			50 (25 for 125mm/50 for 30mm)		(3.00)				
10.00 - 12.00	B18 B20									

Remarks Hand dug inspection pit excavated from 0-1.20m.	Core Barrel T2-101	Water Strikes				Chiselling Details		
		Struck at (m) 7.00 10.50	Casing to (m) 7.00 1.50	Time (min)	Rise to (m)	From (m)	To (m)	Time (hh:mm)
	Flush Type	Water Added		Casing Details				
		From (m) 1.20	To (m) 7.50	To (m) 7.50	Diam (mm) 200			



CAUSEWAY
GEOTECH

Project No.: 17-1375	Project Name: Saggart Reservoir Site Investigation	Borehole No.: BH22
Coordinates: 303808.04 E	Client: Irish Water	Sheet 2 of 2
226219.41 N	Client's Representative: RPS Consulting Engineers	Scale: 1:50
Ground Level: 144.76 mOD	Dates: 10/04/2018	Driller: SS+JG
		Logger: CH+ST

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
				Water strike at 10.50m	134.2 6	10.50		Very stiff dark grey sandy gravelly CLAY with cobbles (Driller's description)		
						(1.50)		Highly fractured SHALE (Driller's description)		
					132.7 6	12.00		Sandy CONGLOMERATE (Driller's description)		
					132.0 6	12.70 (0.20)		Stiff brown slightly sandy very gravelly CLAY. Sand is fine to coarse. Gravel is subangular fine to coarse of mixed lithologies predominately shale.		
13.70	100 0 0				131.8 6	12.90		Weak brownish grey SHALE/MUDSTONE. Partially weathered reduced strength highly fractured, red staining, on fracture surface. Discontinuities: 1. 30 to 40 degree bedding fractures extremely closely spaced (05/08/12) planar, smooth, stained. 2. Subvertical fractures, planar, smooth, stained.		
			20			(1.80)				
14.70	100 8 0				130.0 6	14.70		End of Borehole at 14.70m		

Remarks Hand dug inspection pit excavated from 0-1.20m.	Core Barrel T2-101	Water Strikes				Chiselling Details		
		Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh mm)
	7 00	7 00						
	10 50	1 50						
Flush Type	Water Added		Casing Details					
	From (m)	To (m)	To (m)	Diam (mm)				



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GEOTECH

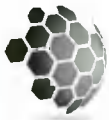
Project No.: 17-1375	Project Name: Saggart Reservoir Site Investigation	Borehole No.: BH23
Coordinates: 303708.89 E	Client: Irish Water	Sheet 1 of 1
Method Cable Percussion	Plant Used Dando 2500	Top 0.00
Base 1.20	Client's Representative: RPS Consulting Engineers	Scale: 1:50
Ground Level: 148.00 mOD	Dates: 13/03/2018	Driller: DMC
		Logger: CH

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
0.00 - 0.20	B5					(0.20)	[Pattern]	TOPSOIL.		
0.20 - 1.20	B4				147.8	0.20	[Pattern]	Stiff brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies. Cobbles are subangular.		
0.50	ES2				0	(1.00)	[Pattern]			
1.00	ES1									
1.20 - 1.65	SPT (S) N=19			N=19 (3,4/5,5,4,5)	146.8	1.20		End of Borehole at 1.20m		
1.60	D3				0					

Remarks

Hand dug inspection pit excavated from 0-1.20m.

Water Strikes				Chiselling Details		
Struck at (m)	Casing to (m)	Time (min)	Rise to (m)	From (m)	To (m)	Time (hh:mm)
				1.20	1.20	01:00
Water Added		Casing Details				
From (m)	To (m)	To (m)	Diam (mm)			

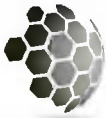


CAUSEWAY
GEOTECH

Project No.: 17-1375	Project Name: Saggart Reservoir Site Investigation	Borehole No.: BH23A
Coordinates: 303708.89 E	Client: Irish Water	Sheet 1 of 2
Method Cable Percussion Rotary Drilling	Plant Used Dando 2500 Hanjin 8D	Top 0.00 Base 5.50 20.00
Ground Level: 148.00 mOD	Client's Representative: RPS Consulting Engineers	Scale: 1:50
Dates: 22/03/2018 - 05/04/2018		Driller: DMC+JG
		Logger: CH

Depth (m)	Sample / Tests	Casing Depth (m)	Wear Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
					147.8 0	(0.20) 0.20		TOPSOIL.		
						(1.00)		Stiff brown slightly sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular to subrounded fine to coarse of mixed lithologies. Cobbles are subangular.		
1.20 - 1.50	B1				146.8 0	1.20 (0.30)		Stiff brown slightly sandy gravelly CLAY. Gravel is angular fine. Sand is fine to coarse.		
1.50 - 1.70	B2				146.5 0	1.50		Loose brown slightly sandy subrounded fine to coarse GRAVEL with occasional cobbles and boulders. Sand is fine to coarse. Cobbles and boulders are rounded.		
1.70 - 2.60	B3					(1.10)				
1.70 - 2.15	SPT (S) N=9	1.50	1.10	N=9 (4,5/2,1,1)						
2.10	D7									
2.60 - 3.60	B4				145.4 0	2.60		Very stiff dark brown gravelly slightly sandy CLAY with occasional cobbles and boulders. Sand is fine to coarse. Gravel is subangular fine to coarse of mixed lithologies. Cobbles and boulders are angular.		
3.00 - 3.45	SPT (S) N=33	3.00	1.90	N=33 (3,5/6,6,8,13)						
3.40	D8									
3.60 - 4.60	B5									
4.00 - 4.45	SPT (C) N=33	4.00	2.70	N=33 (4,6/8,9,4,12)		(2.90)				
4.40	D9									
4.60 - 5.20	B6									
5.00 - 5.30	SPT (C)	5.00	3.60	50 (6,9/50 for 155mm)						
5.40	D10				142.5 0	5.50		Very stiff dark greyish brown sandy gravelly CLAY with cobbles and boulder (Driller's description)		
7.00 - 7.30	SPT (S)			50 (9,16/50 for 150mm)						
8.50 - 8.64	SPT (S)			50 (25 for 105mm/50 for 30mm)						
10.00 - 10.24	SPT (S)			50 (25 for 125mm/50 for 115mm)						

Remarks Hand dug inspection pit excavated from 0-1.20m.	Core Barrel	Water Strikes				Chiselling Details		
		Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)
					1.70	1.90	00:30	
					5.20	5.50	01:00	
Attempted to core 15.50 to 18.00m but only recovered some gravel and cobbles.	Flush Type	Water Added		Casing Details				
		From (m)	To (m)	To (m)	Diam (mm)			
			5.50	200				

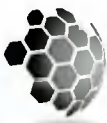


CAUSEWAY
GEOTECH

Project No.: 17-1375	Project Name: Saggart Reservoir Site Investigation	Borehole No.: BH23A
Coordinates: 303708.89 E	Client: Irish Water	Sheet 2 of 2
Method Cable Percussion Rotary Drilling	Plant Used Dando 2500 Hanjin 8D	Top 0.00
Base 5.50 20.00	Client's Representative: RPS Consulting Engineers	Scale: 1:50
Ground Level: 148.00 mOD	Dates: 22/03/2018 - 05/04/2018	Driller: DMC-JG
		Logger: CH

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
11.50 - 11.80	SPT (S)			59 (12,16/59 for 150mm)				Very stiff dark greyish brown sandy gravelly CLAY with cobbles and boulder (Driller's description)		
13.00 - 13.22	SPT (S)			50 (13,17/50 for 75mm)						
14.50 - 14.71	SPT (S)			25 (15,19/25 for 60mm)						
					128.00	(14.50)				
					0	20.00		End of Borehole at 20.00m		

Remarks Hand dug inspection pit excavated from 0-1.20m. Attempted to core 15.50 to 18.00m but only recovered some gravel and cobbles.	Core Barrel	Water Strikes				Chiselling Details		
		Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)
					1.70	1.90	00:30	
					5.20	5.50	01:00	
	Flush Type	Water Added		Casing Details				
		From (m)	To (m)	To (m)	Diam (mm)			



CAUSEWAY
GEOTECH

Project No.: 17-1375	Project Name: Saggart Reservoir Site Investigation	Borehole No.: BH24
Coordinates: 303828.93 E	Client: Irish Water	Sheet 1 of 2
226100.83 N	Client's Representative: RPS Consulting Engineers	Scale: 1:50
Ground Level: 148.72 mOD	Dates: 05/04/2018 - 11/04/2018	Driller: DMC+JG
		Logger: CH

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
0.00 - 0.40	B5					(0.40)		TOPSOIL		
0.40 - 1.40	B6				148.3 2	0.40		Firm to stiff light brown sandy slightly gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subrounded fine to coarse.		
1.20 - 1.65	SPT (S) N=19			N=19 (2,3/4,4,5,6)		(1.30)				
1.40 - 1.70	B7									
1.60	D1				147.0 2	1.70		Stiff brown slightly sandy gravelly CLAY with high cobble content and occasional boulders. Sand is fine to coarse. Gravel is subangular fine to coarse. Cobbles are subangular.		
1.70 - 2.60	B8									
2.00 - 2.45	SPT (S) N=38	2.00	1.30	N=38 (3,4/6,7,9,16)		(0.90)				
2.40	D2									
2.60 - 3.00	B9				146.1 2	2.60		Very stiff dark grey slightly sandy gravelly CLAY with low cobble content. Sand is fine to coarse. Gravel is subangular fine to coarse.		
3.00 - 4.00	B10									
3.00 - 3.45	SPT (S) N=44	3.00	2.60	N=44 (4,6/7,11,12,14)		(1.90)				
3.40	D3									
4.00 - 4.50	D11									
4.00 - 4.32	SPT (C)	4.00	3.80	50 (7,11/50 for 170mm)						
4.20	D4				144.2 2	4.50		Very stiff dark grey sandy gravelly CLAY with cobbles. (Driller's description)		
4.50 - 7.50	B12 B13									
5.50 - 5.68	SPT (S)			50 (10,15/50 for 35mm)						
7.00 - 7.42	SPT (S)			N=50 (10,15/50 for 265mm)						
7.50 - 10.50	B14					(7.00)				
8.50 - 8.76	SPT (S)			50 (11,17/50 for 110mm)						
10.00 - 10.16	SPT (S)			50 (25 for 120mm/50 for 40mm)						

Remarks Hand dug inspection pit excavated from 0-1.20m.	Core Barrel	Water Strikes				Chiselling Details		
		Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh mm)
	11 50	11 50	10	11 50	1 90	2 00	00:30	
	14 00	18 50	10	14 00	4 50	4 50	01:00	
Flush Type	Water Added		Casing Details					
	From (m)	To (m)	To (m)	Diam (mm)				



CAUSEWAY GEOTECH

Project No.: 17-1375		Project Name: Saggart Reservoir Site Investigation		Borehole No.: BH24	
Coordinates: 303828.93 E		Client: Irish Water		Sheet 2 of 2	
Method Cable Percussion Rotary Drilling		Plant Used Dando 2500 Hanjin 8D		Scale: 1:50	
Top 0.00		Base 4.50 18.50		Driller: DMCHG	
Ground Level: 148.72 mOD		Dates: 05/04/2018 - 11/04/2018		Logger: CH	
Client's Representative: RPS Consulting Engineers					

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Legend	Description	Water	Backfill
10.50 - 13.50	B15 B16							Very stiff dark grey sandy gravelly CLAY with cobbles. (Driller's description)		
					137.2 2	11.50 (0.75)		Dark grey gravelly SAND (Driller's description)		
					136.4 7	12.25		Very stiff dark grey sandy gravelly CLAY (Driller's description)		
13.00 - 13.14	SPT (S)			50 (25 for 100mm/50 for 40mm)		(1.75)				
14.00 - 18.50	B17				134.7 2	14.00		Dark grey sandy slightly clayey subangular fine to coarse GRAVEL		
						(4.50)				
					130.2 2	18.50		End of Borehole at 18.50m		

Remarks Hand dug inspection pit excavated from 0-1.20m.	Core Barrel	Water Strikes				Chiselling Details		
		Struck at (m)	Casing to (m)	Time (min)	Rose to (m)	From (m)	To (m)	Time (hh:mm)
	11 50	11 50	10	11 50	1 90	2 00	00:30	
	14 00	18 50	10	14 00	4 50	4 50	01:00	
	Flush Type	Water Added		Casing Details				
		From (m)	To (m)	To (m)	Diam (mm)			
				16.00	152			
				18.50	100			



Appendix 5 – Ground Investigation Report (Source Site)

COFFEY CONSTRUCTION LTD
ENVIRONMENTAL & PLANING REPORT

