APPENDIX 5

Exploratory Hole Logs

GeoInvestigations
29 Greenlands Business Centre
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Borehole Logging Record :WS1

GeoInvestigations

DRILLING DETAILS

Drilling Company: PM Sampling

Drilling Method: WS

Drilling Date: 1st June 2017

Location: Welland Hosp : Spalding

Ground Elevation: (mAMSL)

Drilled Depth: (mBGL)

Bore Diameter: (mm)

TOC Elevation: (mAGL)

Sample Reference	Sample Range	Depth (mBGL)	Graphic Log	Soil or Rock Field Material Description	SPT (blows/300mm)	In Situ/ Lab Test	Piezometer Construction Details And Groundwater Levels
		0.00		MG Bituminous boiund surfacing.			
				MG Brown, silty, fine sand.			
69		0.50		MG Light grey, slightly clayey, fine to coarse sandy gravel. Gravel is fine to coarse, angular limestone and concrete.			
				Orangish brown mottled grey, clayey, silty, fine SAND. Between 2.8m and 3.5m bgl; becoming grey and damp.			
W2		1.00				3,2,2,3,2,2 (9)	
B70		1.50					
		2.00				2,4,4,4,4,5 (17)	
		2.50					
		3.00				1,1,2,2,3,3 (10)	
		3.50		Grey, silty, fine SAND. Wet.			
		4.00				2,2,3,4,4,5 (16)	
		4.50					
		5.00					

SPT (blows/300mm) scale: 0 10 20 30 40 50 60 90

Groundwater Observations:

Groundwater resting at 1.12m bgl after 4 hours.

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Borehole Logging Record :WS2

GeoInvestigations

DRILLING DETAILS

Drilling Company: PM Sampling

Drilling Method: WS

Drilling Date: 1st June 2017

Location: Welland Hosp : Spalding

Ground Elevation: (mAMSL)

Drilled Depth: (mBGL)

Bore Diameter: (mm)

TOC Elevation: (mAGL)

Sample Reference	Sample Range	Depth (mBGL)	Graphic Log	Soil or Rock Field Material Description	SPT (blows/300mm)	In Situ/ Lab Test	Piezometer Construction Details And Groundwater Levels
71		0.00		MG ~70% recovery. Brown, fine to coarse sandy gravel. Gravel is fine, angular limestone, quartzose clasts and concrete. Two angular concrete cobbles at 0.4m and 0.7m bgl.			
		0.50					
		1.00		Soft to firm, greyish brown, silty, fine sandy CLAY. Between 1.4m and 1.6m; becoming dark grey.			
W3						2,4,4,3,4,3 (14)	
		1.50					
72		2.00					
				Grey, silty, fine SAND. Wet.		2,2,1,2,3,3 (9)	
73		2.50					
		3.00				1,1,1,2,1,1 (5)	
		3.50					
		4.00					
		4.50					
		5.00					

Groundwater Observations:

Groundwater resting at 1.21m bgl after 3 hours.

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Borehole Logging Record :WS3

GeoInvestigations

DRILLING DETAILS

Drilling Company: PM Sampling

Drilling Method: WS

Drilling Date: 1st June 2017

Location: Welland Hosp : Spalding

Ground Elevation: (mAMSL)

Drilled Depth: (mBGL)

Bore Diameter: (mm)

TOC Elevation: (mAGL)

Sample Reference	Sample Range	Depth (mBGL)	Graphic Log	Soil or Rock Field Material Description	SPT (blows/300mm)	In Situ/ Lab Test	Piezometer Construction Details And Groundwater Levels
		0.00		Dark brown, silty, fine SAND with frequent rootlets. (TOPSOIL) NO RECOVERY			
		0.50		Brown, clayey, silty, fine SAND. Coarse limestone gravel at 0.7m bgl (SUB-SOIL).			
74		1.00		Brown mottled grey, slightly clayey, silty, fine SAND. Between 1.6m and 2.0m bgl; becoming clayey and damp.			
W4						2,4,4,5,5,5 (19)	
75		1.50					
		2.00				3,3,3,3,3,3 (12)	
		2.50		Grey, silty, fine SAND. Wet.			
		3.00				2,2,3,5,4,4 (16)	
		3.50					
		4.00					
		4.50					
		5.00					

SPT (blows/300mm) scale: 0 10 20 30 40 50 60 90

Groundwater Observations:

Groundwater resting at 1.21m bgl after 2 hours.

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Borehole Logging Record :WS4

GeoInvestigations

DRILLING DETAILS

Drilling Company: PM Sampling

Drilling Method: WS

Drilling Date: 1st June 2017

Location: Welland Hosp : Spalding

Ground Elevation: (mAMSL)

Drilled Depth: (mBGL)

Bore Diameter: (mm)

TOC Elevation: (mAGL)

Sample Reference	Sample Range	Depth (mBGL)	Graphic Log	Soil or Rock Field Material Description	SPT (blows/300mm)	In Situ/ Lab Test	Piezometer Construction Details And Groundwater Levels
76		0.00		Dark brown, silty, fine SAND. Frequent rootlets. (TOPSOIL)			
77		0.50		Brown, silty, fine SAND (SUB-SOIL)			
				Dark brown becoming brown, very clayey, silty, fine SAND.			
78		1.00					
W5						2,3,2,3,2,2 (9)	
79		1.50		Soft to firm, silty, fine sandy CLAY.			
		2.00		Brown, silty, fine SAND.		2,3,3,3,3,3 (12)	
		2.50		Grey, silty fine SAND. Wet.			
		3.00				2,3,4,3,4,3 (14)	
		3.50					
		4.00					
		4.50					
		5.00					

Groundwater Observations:

Groundwater resting at 1.22m bgl after 2 hours.

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Borehole Logging Record :WS5

GeoInvestigations

DRILLING DETAILS
Drilling Company: PM Sampling
Drilling Method: WS

Drilling Date: 1st June 2017
Location: Welland Hosp : Spalding
Ground Elevation: (mAMSL)

Drilled Depth: (mBGL)
Bore Diameter: (mm)
TOC Elevation: (mAGL)

Sample Reference	Sample Range	Depth (mBGL)	Graphic Log	Soil or Rock Field Material Description	SPT (blows/300mm)	In Situ/ Lab Test	Piezometer Construction Details And Groundwater Levels
		0.00		MG Dark brown, silty, fine sand. Frequent rootlets.			
				MG Coarse brick gravel.			
				Dark brown, clayey, silty, fine SAND. Occasional rootlets to a depth of 1.0m bgl.			
82		0.50					
		1.00				0,0,0,0,0,1 (1)	
		1.50		Soft, dark brown mottled black, silty, fine sandy CLAY. Between 2.0m and 2.7m bgl; becoming very soft and wet. No odours.			
83 W6		2.00				0,0,0,0,0,0 (0)	
		2.50					
84				Brown, clayey, silty, fine SAND. Wet.			
		3.00				4,3,3,3,2,2 (10)	
		3.50					
		4.00					
		4.50					
		5.00					

Groundwater Observations:

Groundwater resting at 1.74m bgl after 40 minutes.

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Borehole Logging Record :WS6

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DRILLING DETAILS

Drilling Company: PM Sampling

Drilling Method: WS

Drilling Date: 1st June 2017

Location: Welland Hosp : Spalding

Ground Elevation: (mAMSL)

Drilled Depth: (mBGL)

Bore Diameter: (mm)

TOC Elevation: (mAGL)

Sample Reference	Sample Range	Depth (mBGL)	Graphic Log	Soil or Rock Field Material Description	SPT (blows/300mm) 0 10 20 30 40 50 60 90	In Situ/ Lab Test	Piezometer Construction Details And Groundwater Levels
		0.00		MG Bituminous surfacing.			
				MG Brown, fine to coarse sandy gravel. Gravel is fine to coarse, angular brick and concrete.			
85		0.50		MG Greyish brown, gravelly sand. Gravel is fine to coarse, angular flint and concrete.			
		1.00		Greyish brown, silty, fine SAND. Between 1.8m and 2.3m bgl; becoming black. Between 2.3m and 2.8m; becoming greyish brown mottled black. Rare staining between 2.8m and 3.0m bgl. Slight odour of diesel below 1.8m bgl.			
86		1.50					
87		2.00					
W7							
88		2.50					
		3.00					
		3.50					
		4.00					
		4.50					
		5.00					

Groundwater Observations:

Groundwater resting at 2.14m bgl after 20 minutes.

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Borehole Logging Record :WS7

GeoInvestigations

DRILLING DETAILS

Drilling Company: PM Sampling

Drilling Method: WS

Drilling Date: 1st June 2017

Location: Welland Hosp : Spalding

Ground Elevation: (mAMSL)

Drilled Depth: (mBGL)

Bore Diameter: (mm)

TOC Elevation: (mAGL)

Sample Reference	Sample Range	Depth (mBGL)	Graphic Log	Soil or Rock Field Material Description	SPT (blows/300mm) 0 10 20 30 40 50 60 90	In Situ/ Lab Test	Piezometer Construction Details And Groundwater Levels
		0.00		MG Bituminous surfacing.			
				MG Brown, sandy gravel. Gravel is fine to coarse, angular brick.			
89		0.50		MG Black, silty, fine SAND. Moderate diesel odour.			
		1.00		Brownish grey, silty, fine SAND. Between 1.8m and 2.0m bgl; becoming black with a slight diesel odour.			
		1.50					
90		2.00		Soft, brownish grey mottled black, silty CLAY. Slight diesel odour. Damp.			
W8							
91		2.50					
		3.00					
		3.50					
		4.00					
		4.50					
		5.00					

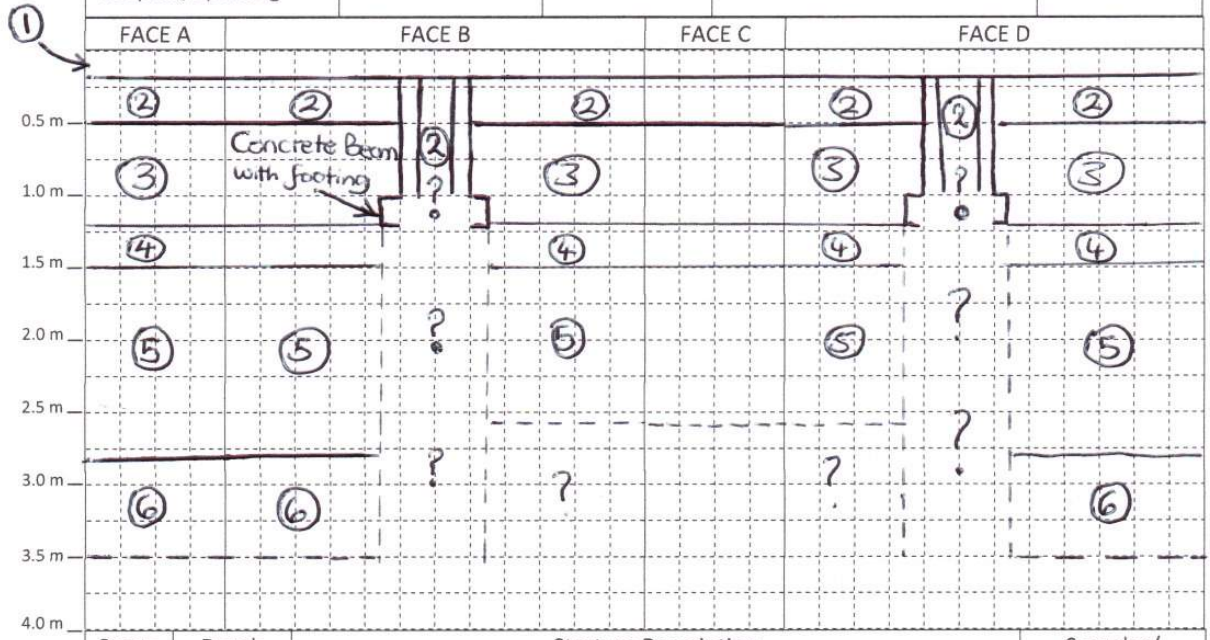
Groundwater Observations:

Groundwater resting at 2.18m bgl upon completion.

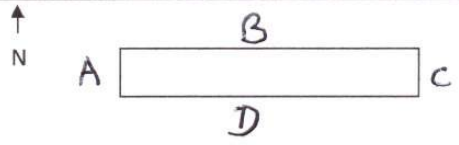
TRIAL PIT LOG

Trial Pit No.	Date:
TP1	*30/05/2017*

Project Name:	Project Number:	Client:	Logged By:
Former Welland Hospital, Spalding	*696*	*Lidl UK GmbH*	*DH*



Strata Ref.	Depth (m)	Stratum Description	Samples/ In Situ Tests
1	0-0.15	MG Concrete floor slab with a single layer of 4mm diameter reinforcement mesh.	
2	0.15-0.5	MG Greyish brown, sandy, gravelly cobbles of angular brick and concrete.	WAC1 – 0.25m.
3	0.5-1.2	MG Brown becoming greyish brown, clayey, very silty, fine sand. Occasional rootlets.	WAC2 – 0.7m.
4	1.2-1.5	Soft, brown mottled grey, silty CLAY.	B3 – 1.3m.
5	1.5-2.8	Brown mottled grey, clayey, silty, fine SAND. Damp.	B4 – 2.0m.
6	2.8-3.5	Dark grey mottled black, clayey, silty, fine occasionally medium SAND. Occasional 100mm to 300mm thick soft, brown clay lenses throughout. Damp.	B5 – 3.0m.

Remarks	Location Sketch (see trial pit location drawing)
i) Damp strata and very slow seepage of groundwater below 1.5m bgl. ii) Pit sides spalling below 1.5m bgl. Massive collapse at 3.5m bgl, pit abandoned. iii) No odours of petroleum hydrocarbons or solvents apparent.	

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Trial Pitting Record :TP2

GeoInvestigations

Logged By: DH
Hire Company: A&V Squires
Excavator: JCB 3CX

Date: 30th May 2017
Location: Welland Hosp : Spalding
Ground Elevation: (m AOD)

Depth: (m begl)
Bucket: 450 (mm)
Shoring: (Y/N?) N

Sample Reference	Sample Range	Depth (mBGL)	Graphic Log	Soil or Rock Field Material Description	In Situ/ Lab Test	Groundwater Levels
		0.00		MG Reinforced concrete floor slab with 2 layers of 4mm diameter steel mesh and 2 layers of 20mm diameter steel reinforcement bars. Unable to advance pit past lower layer of reinforcement bars at 0.3m bgl. Plastic membrane observed at 0.4m bgl where hydraulic breaker could be advanced between reinforcement bars (likely at base of slab).		
		0.50				
		1.00				
		1.50				
		2.00				
		2.50				
		3.00				
		3.50				
		4.00				

Groundwater Observations:

No groundwater observed.

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Trial Pitting Record :TP3

GeoInvestigations

Logged By: DH
Hire Company: A&V Squires
Excavator: JCB 3CX

Date: 30th May 2017
Location: Welland Hosp : Spalding
Ground Elevation: (m AOD)

Depth: (m begl)
Bucket: 450 (mm)
Shoring: (Y/N?) N

Sample Reference	Sample Range	Depth (mBGL)	Graphic Log	Soil or Rock Field Material Description	In Situ/ Lab Test	Groundwater Levels
		0.00		MG Reinforced concrete floor slab with 2 layers of 4mm diameter steel mesh and 2 layers of 20mm diameter steel reinforcement bars. Unable to advance pit past lower layer of reinforcement bars at 0.3m bgl. Plastic membrane observed at 0.4m bgl where hydraulic breaker could be advanced between reinforcement bars (likely indicating the base of the slab).		
		0.50				
		1.00				
		1.50				
		2.00				
		2.50				
		3.00				
		3.50				
		4.00				

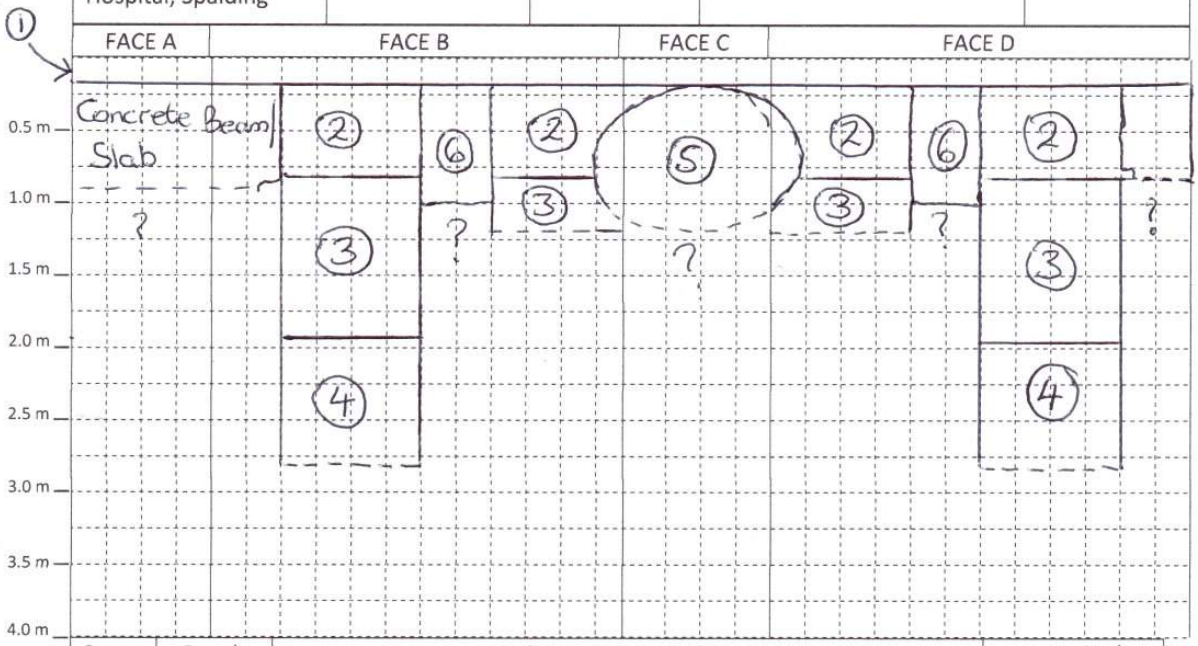
Groundwater Observations:

No groundwater observed.

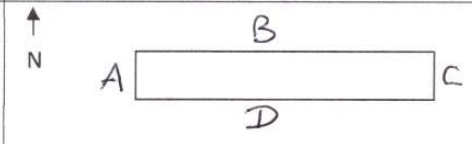
TRIAL PIT LOG

Trial Pit No.	Date:
TP4	*30/05/2017*

Project Name:	Project Number:	Client:	Logged By:
Former Welland Hospital, Spalding	*696*	*Lidl UK GmbH*	*DH*



Strata Ref.	Depth (m)	Stratum Description	Samples/ In Situ Tests
1	0-0.15	MG Brown, gravelly, fine to medium sand. Gravel is fine to medium, angular brick.	WAC6- 0.1m.
2	0.15-0.8	Brown, slightly clayey, very silty, fine SAND.	WAC7- 0.5m.
3	0.8-1.9	Firm, grey, very silty CLAY. Becoming slightly fine sandy between 1.5m and 1.9m bgl.	D8 – 1.0m. D9 – 1.5m.
4	1.9-2.8	Brown, slightly clayey, silty, fine SAND. No clay between 2.3m and 2.5m bgl.	D10 – 2.1m. ES11 – 2.0m.
5	0.15-0.5	MG Curved, concrete encased pipe. Circular hole leading into pipe, possibly related to a former downspout from roof of former hospital.	
6	0.15-0.75	MG Solid concrete beam.	

Remarks	Location Sketch (see trial pit location drawing)
i) Damp strata and very slow seepage of groundwater below 1.5m bgl. ii) Pit sides spalling below 1.5m bgl. Massive collapse at 3.5m bgl, pit abandoned. iii) No odours of petroleum hydrocarbons or solvents apparent.	

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Trial Pitting Record :TP5

GeoInvestigations

Logged By: DH	**Date:** 30th May 2017	**Depth:** (m begl)
Hire Company: A&V Squires	**Location:** Welland Hosp : Spalding	**Bucket:** 450 (mm)
Excavator: JCB 3CX	**Ground Elevation:** (m AOD)	**Shoring: (Y/N?)** N

Sample Reference	Sample Range	Depth (mBGL)	Graphic Log	Soil or Rock Field Material Description	In Situ/ Lab Test	Groundwater Levels
		0.00		MG Concrete floor slab with a single layer of 4mm diameter steel reinforcement mesh.		
12		0.50		MG Orangish brown, sandy, gravelly cobbles. Gravel and cobbles are angular concrete and brick.		
13				Soft to firm, brown, silty, fine sandy CLAY.		
14		1.00				
				Grey mottled brown, clayey, silty, fine SAND. Damp.		
15		1.50				
W1						
		2.00				
		2.50				
		3.00				
		3.50				
		4.00				

Groundwater Observations:

Very slow seepage of groundwater into base of pit. Pit sides remained stable to 1.8m bgl.

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Trial Pitting Record :TP6

GeoInvestigations

Logged By: DH	**Date:** 31st May 2017	**Depth:** (m begl)
Hire Company: A&V Squires	**Location:** Welland Hosp : Spalding	**Bucket:** 450 (mm)
Excavator: JCB 3CX	**Ground Elevation:** (m AOD)	**Shoring: (Y/N?)** N

Sample Reference	Sample Range	Depth (mBGL)	Graphic Log	Soil or Rock Field Material Description	In Situ/ Lab Test	Groundwater Levels
WAC16		0.00		MG Dark brown mottled light brown, fine to coarse sandy, cobbly gravel. Gravel is fine to coarse, angular pea gravel, concrete, brick and limestone.		
		0.50				
				Soft, silty, fine sandy CLAY.		
17		1.00				
		1.50				
		2.00				
		2.50		Greyish brown, clayey, silty, fine SAND. Damp.		
		3.00				
		3.50				
		4.00				

Groundwater Observations:

Very slow seepage of damp strata strata below 2.3m bgl. Pit sides remained stable to 2.8m bgl.

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Trial Pitting Record :TP7

GeoInvestigations

Logged By: DH
Hire Company: A&V Squires
Excavator: JCB 3CX

Date: 31st May 2017
Location: Welland Hosp : Spalding
Ground Elevation: (m AOD)

Depth: (m begl)
Bucket: 450 (mm)
Shoring: (Y/N?) N

Sample Reference	Sample Range	Depth (mBGL)	Graphic Log	Soil or Rock Field Material Description	In Situ/ Lab Test	Groundwater Levels
TS18		0.00		Dark brown, silty, fine SAND. Frequent rootlets (TOPSOIL)		
				Brown, clayey, silty, fine SAND. (SUB-SOIL)		
WAC19		0.50		Firm, brown, silty, fine sandy CLAY. Between 1.1m and 1.5m bgl; becoming mottled grey and damp. Between 1.9m and 2.1m; becoming soft consistency.		
20		1.00				
		1.50				
21		2.00		Greyish brown, silty, fine SAND. Damp.		
22		2.50				
		3.00				
		3.50				
		4.00				

Groundwater Observations:

Damp strata observed between 1.1m and 2.4m bgl. Pit sides periodically spalling below 2.0m bgl.

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Trial Pitting Record :TP8

GeoInvestigations

Logged By: DH	**Date:** 31st May 2017	**Depth:** (m begl)
Hire Company: A&V Squires	**Location:** Welland Hosp : Spalding	**Bucket:** 450 (mm)
Excavator: JCB 3CX	**Ground Elevation:** (m AOD)	**Shoring: (Y/N?)** N

Sample Reference	Sample Range	Depth (mBGL)	Graphic Log	Soil or Rock Field Material Description	In Situ/ Lab Test	Groundwater Levels
		0.00		MG Dark brown silty, fine sand. Frequent artifacts observed including a steel bar, polystyrene insulation sheets, a length of red electrical cable and plastic bags.		
WAC23						
		0.50		Grey mottled brown, slightly clayey, silty, fine SAND. Below 1.6m bgl; becoming clayey, locally very clayey and shelly. Damp.		
24						
		1.00				
		1.50				
B25						
26		2.00				
		2.50		Very soft to soft, grey mottled black, slightly organic, silty CLAY.		
27						
28		3.00				
B29		3.50		Grey, clayey, silty, fine to medium SAND. Wet.		
		4.00				

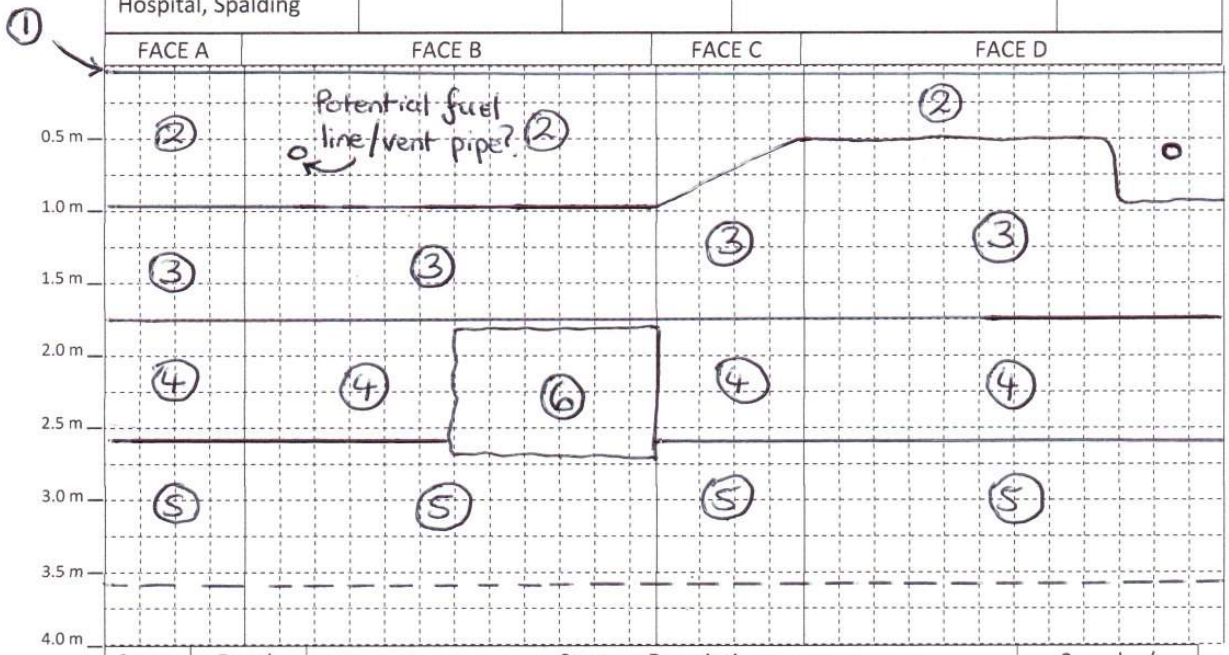
Groundwater Observations:

Damp strata observed between 1.6m and 2.5m bgl. Pit sides below 3.4m bgl spalling after 2 minutes.

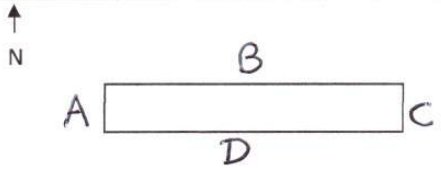
TRIAL PIT LOG

Trial Pit No.	Date:
TP9	*31/05/2017*

Project Name:	Project Number:	Client:	Logged By:
Former Welland Hospital, Spalding	*696*	*Lidl UK GmbH*	*DH*



Strata Ref.	Depth (m)	Stratum Description	Samples/ In Situ Tests
1	0-0.05	MG Bituminous bound surfacing.	
2	0.05-0.9	MG Brown, fine to coarse sand and fine to medium gravel. Gravel is brick, concrete, flint and limestone.	WAC29 – 0.15m.
3	0.9-1.75	Grey mottled brown, silty fine SAND.	ES30 – 1.0m.
4	1.75-2.6	Firm, black mottled grey, silty CLAY. Moderate odour of diesel associated with *black mottling. Intensity of staining and odour decreases gradually with depth.*	WAC31 – 1.8m.
5	2.6-3.6	Greyish brown, slightly clayey, silty, fine SAND. Rare black lenses with a slight odour of diesel. Below 3.0m bgl; no staining observed. Damp.	ES32 – 2.7m. ES33 – 3.1m. ES34 – 3.6m.
6	1.8-2.7	Spalling of northern face revealed a section of brickwork wall between 1.8m and 2.7m bgl. Associated with a brickwork tank cradle.	

Remarks	Location Sketch (see trial pit location drawing)
i) Damp strata observed below 2.6m bgl. Medium seepage of black liquid with strong odour of diesel originating from a point in the side of the brickwork cradle in the north face of the pit. ii) Pit sides spalling below 1.8m bgl. After reaching 3.6m bgl; pit collapsed back to 2.0m bgl. iii) Strong odour of diesel from liquid originating from cradle wall. Moderate odour of diesel in soil between 1.75m and 2.6m bgl. Slight odour of diesel noted between 2.6m and 3.0m bgl.	

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Trial Pitting Record :TP10

GeoInvestigations

Logged By: DH	**Date:** 31st May 2017	**Depth:** (m begl)
Hire Company: A&V Squires	**Location:** Welland Hosp : Spalding	**Bucket:** 450 (mm)
Excavator: JCB 3CX	**Ground Elevation:** (m AOD)	**Shoring: (Y/N?)** N

Sample Reference	Sample Range	Depth (mBGL)	Graphic Log	Soil or Rock Field Material Description	In Situ/ Lab Test	Groundwater Levels
35		0.00		Dark brown, silty, fine SAND. Frequent rootlets (TOPSOIL).		
36		0.50		Brown, silty, fine SAND. (SUB-SOIL)		
37		1.00		Orangish brown mottled grey, silty, fine SAND. Between 2.3m and 2.7m bgl; occasional black lenses with a slight diesel odour. Between 2.7m and 3.2m bgl; frequent black lenses with a moderate odour of diesel. Below 3.2m; no staining or odours.		
		1.50				
		2.00				
WAC38		2.50				
39		3.00				
40		3.50				
		4.00				

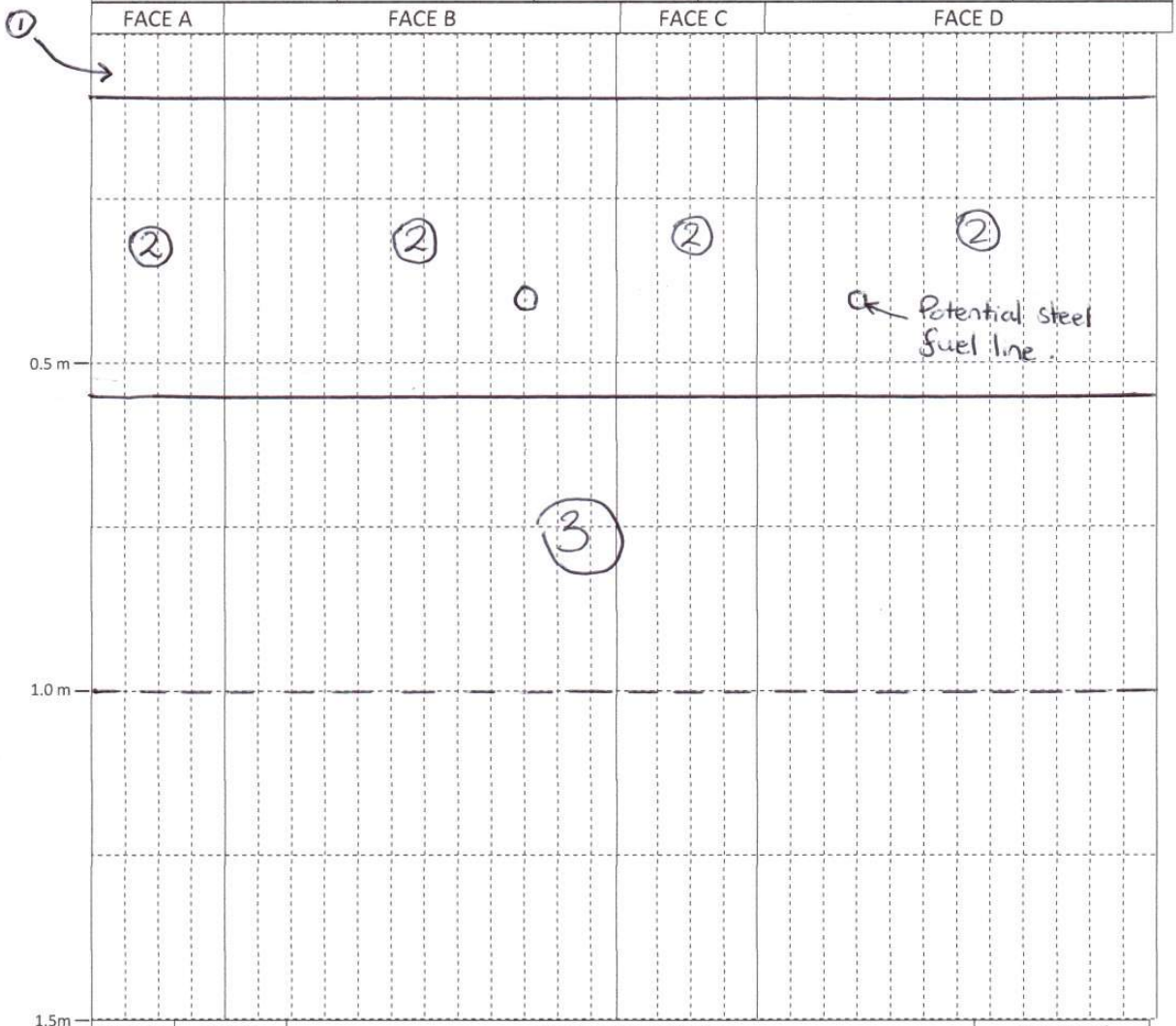
Groundwater Observations:

No groundwater observed. Pit collapsed at 3.6m bgl back to a depth of 2.0m bgl.

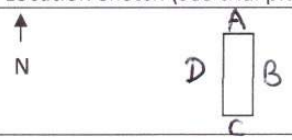
TRIAL PIT LOG

Trial Pit No.	Date:
TP11	*31/05/2017*

Project Name:	Project Number:	Client:	Logged By:
Former Welland Hospital, Spalding	*696*	*Lidl UK GmbH*	*DH*



Strata Ref.	Depth (m)	Stratum Description	Samples/ In Situ Tests
1	0-0.1	MG Dark brown, silty, fine sand.	
2	0.1-0.55	MG Brown, fine to coarse sand and gravel. Gravel is fine to coarse, angular flint.	ES41 – 0.4m (Fuel Line Surround)
3	0.55-1.0	Orangish brown mottled grey, silty, fine SAND.	

Remarks	Location Sketch (see trial pit location drawing)
i) No groundwater observed. ii) Pit sides remained stable at 1.0m bgl. iii) No visual or olfactory evidence of hydrocarbon contamination observed.	

GeoInvestigations
29 Greenlands Business Centre
Studley Road
Redditch
B98 7HD
paul@geoinvestigations.co.uk

Trial Pitting Record :TP12

GeoInvestigations

Logged By: DH	**Date:** 31st May 2017	**Depth:** (m begl)
Hire Company: A&V Squires	**Location:** Welland Hosp : Spalding	**Bucket:** 450 (mm)
Excavator: JCB 3CX	**Ground Elevation:** (m AOD)	**Shoring: (Y/N?)** N

Sample Reference	Sample Range	Depth (mBGL)	Graphic Log	Soil or Rock Field Material Description	In Situ/ Lab Test	Groundwater Levels
		0.00		MG Bituminous surfacing.		
				MG Brown, fine to coarse sandy, cobbly gravel. Gravel and cobbles are angular brick and concrete.		
WAC42				Blackish grey, silty, fine SAND. Slight odour of diesel.		
		0.50		Grey, silty, fine SAND. No odours or staining.		
43						
		1.00				
		1.50				
		2.00				
				Soft, grey mottled black, fine sandy, silty CLAY. Frequent black lenses with a moderate odour of diesel. Damp.		
44		2.50				
				Grey, silty, fine SAND. Damp. No staining or odours.		
		3.00				
45						
		3.50				
		4.00				

Groundwater Observations:

Damp strata observed below 2.3m bgl. Pit sides remained stable to 3.1m bgl.

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paul@geoinvestigations.co.uk

Trial Pitting Record :TP13

GeoInvestigations

Logged By: DH	**Date:** 31st May 2017	**Depth:** (m begl)
Hire Company: A&V Squires	**Location:** Welland Hosp : Spalding	**Bucket:** 450 (mm)
Excavator: JCB 3CX	**Ground Elevation:** (m AOD)	**Shoring: (Y/N?)** N

Sample Reference	Sample Range	Depth (mBGL)	Graphic Log	Soil or Rock Field Material Description	In Situ/ Lab Test	Groundwater Levels
		0.00		MG Concrete.		
46				MG Brown, fine to coarse sandy, gravelly cobbles. Gravel and cobbles are angular brick and concrete.#		
		0.50		Dark brown, clayey, fine sandy SILT.		
47						
48		1.00				
				Greyish brown clayey, silty, fine SAND. Occasional soft clay lenses. Below 3.0m bgl; becoming wet.		
49		1.50				
		2.00				
		2.50				
50		3.00				
		3.50				
		4.00				

Groundwater Observations:

Wet strata observed beneath 3.0m bgl. Pit sides remained stable to 3.1m bgl.

GeoInvestigations
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B98 7HD
paul@geoinvestigations.co.uk

Trial Pitting Record :TP14

GeoInvestigations

Logged By: DH	**Date:** 31st May 2017	**Depth:** (m begl)
Hire Company: A&V Squires	**Location:** Welland Hosp : Spalding	**Bucket:** 450 (mm)
Excavator: JCB 3CX	**Ground Elevation:** (m AOD)	**Shoring: (Y/N?)** N

Sample Reference	Sample Range	Depth (mBGL)	Graphic Log	Soil or Rock Field Material Description	In Situ/ Lab Test	Groundwater Levels
		0.00		MG Concrete.		
51				MG Brown, fine to coarse sandy, gravelly cobbles. Gravel and cobbles are angular brick and concrete.		
		0.50				
				Brown mottled grey, silty, fine SAND. No odours.		
		1.00				
		1.50				
		2.00		Firm, brown, silty CLAY. Wet. No odours.		
52		2.50				
		3.00				
		3.50				
		4.00				

Groundwater Observations:

Wet strata observed between 2.0m and 2.6m bgl. Pit sides periodically spalling below 2.0m bgl.

GeoInvestigations
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Trial Pitting Record :TP15

GeoInvestigations

Logged By: DH	**Date:** 1st June 2017	**Depth:** (m begl)
Hire Company: A&V Squires	**Location:** Welland Hosp : Spalding	**Bucket:** 450 (mm)
Excavator: JCB 3CX	**Ground Elevation:** (m AOD)	**Shoring: (Y/N?)** N

Sample Reference	Sample Range	Depth (mBGL)	Graphic Log	Soil or Rock Field Material Description	In Situ/ Lab Test	Groundwater Levels
		0.00		MG Concrete.		
				MG Brown, fine to coarse sandy, cobbly gravel. Gravel and cobbles are angular brick and concrete.		
		0.50		MG Dark brown, silty, fine sand. Two westward trending metal pipes originating from tank farm to the east (vent pipes?)		
		1.00		Greyish brown, clayey, silty, fine SAND. Below 2.0m bgl; becoming black with a moderate odour of diesel. Wet at base.		
		1.50				
53		2.00				
54		2.50		Soft, brown mottled grey and black, silty, fine sandy CLAY. Moderate odour of diesel.		
		3.00		Grey, slightly clayey, silty, fine SAND. Damp. No staining or odours.		
55		3.50				
		4.00				

Groundwater Observations:

Wet at base of strata at 2.3m bgl. Damp strata observed between 2.9m and 3.4m bgl. Pit sides spalling below 2.3m bgl after 2 minutes.

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B98 7HD
paul@geoinvestigations.co.uk

Trial Pitting Record :TP16

GeoInvestigations

Logged By: DH
Hire Company: A&V Squires
Excavator: JCB 3CX

Date: 1st June 2017
Location: Welland Hosp : Spalding
Ground Elevation: (m AOD)

Depth: (m begl)
Bucket: 450 (mm)
Shoring: (Y/N?) N

Sample Reference	Sample Range	Depth (mBGL)	Graphic Log	Soil or Rock Field Material Description	In Situ/ Lab Test	Groundwater Levels
		0.00		MG Broken concrete.		
WAC56				MG Brown, fine to coarse sand and gravel. Gravel is fine to coarse, angular flint and concrete.		
WAC57				MG Black, fine to coarse sandy cobbly gravel. Gravel and cobbles are angular bituminous surfacing chunks.		
		0.50		MG Grey mottled black, silty, slightly gravelly fine sand. Gravel is fine to coarse, angular brick, tile and concrete. Occasional fibrous organic lenses.		
58						
WAC59		1.00				
		1.50		Grey, clayey, silty, fine SAND. Damp.		
60						
61						
		2.00				
		2.50		Soft, grey, silty CLAY. Damp.		
		3.00				
		3.50				
		4.00				

Groundwater Observations:

Damp strata observed below 1.5m bgl. Pit sides continually spalling below 0.5m bgl.

GeoInvestigations
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Trial Pitting Record :TP17

GeoInvestigations

Logged By: DH	**Date:** 1st June 2017	**Depth:** (m begl)
Hire Company: A&V Squires	**Location:** Welland Hosp : Spalding	**Bucket:** 450 (mm)
Excavator: JCB 3CX	**Ground Elevation:** (m AOD)	**Shoring: (Y/N?)** N

Sample Reference	Sample Range	Depth (mBGL)	Graphic Log	Soil or Rock Field Material Description	In Situ/ Lab Test	Groundwater Levels
62		0.00		MG Grey, fine to coarse sandy, gravelly cobbles. Gravel and cobbles are angular brick and concrete.		
		0.50		MG Dark brown, clayey, silty, fine sand. Occasional fine to medium, angular brick and flint gravel.		
63		1.00		Brown, very clayey, silty, fine SAND.		
64		1.50				
		2.00		Soft, brown, silty CLAY. Damp.		
		2.50				
		3.00				
		3.50				
		4.00				

Groundwater Observations:

Damp strata observed below 1.9m bgl. Pit sides largely stable to 2.7m bgl.

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Trial Pitting Record :TP18

GeoInvestigations

Logged By: DH	**Date:** 1st June 2017	**Depth:** (m begl)
Hire Company: A&V Squires	**Location:** Welland Hosp : Spalding	**Bucket:** 450 (mm)
Excavator: JCB 3CX	**Ground Elevation:** (m AOD)	**Shoring: (Y/N?)** N

Sample Reference	Sample Range	Depth (mBGL)	Graphic Log	Soil or Rock Field Material Description	In Situ/ Lab Test	Groundwater Levels
		0.00		MG Broken bituminous surfacing.		
				MG brown, fine to medium sandy, gravelly cobbles. Gravel and cobbles are angular brick and concrete.		
		0.50		Brown, silty, fine SAND.		
		1.00				
65				Grey mottled black, clayey, silty, fine SAND. Occasional black lenses with a slight odour of diesel. Between 2.4m and 3.0m bgl; becoming grey mottled brown with rare black lenses. Lenses have a moderate odour of diesel. Damp. Between 3.0m and 3.4m bgl; no black lenses, faint diesel odour. Below 3.4m bgl; no odours or staining.		
		1.50				
		2.00				
66						
		2.50				
		3.00				
67						
		3.50				
		4.00				

Groundwater Observations:

Damp strata observed below 2.4m bgl. Pit sides periodically spalling below 3.0m bgl.

GeoInvestigations
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Trial Pitting Record :TP19

GeoInvestigations

Logged By: DH
Hire Company: A&V Squires
Excavator: JCB 3CX

Date: 1st June 2017
Location: Welland Hosp : Spalding
Ground Elevation: (m AOD)

Depth: (m begl)
Bucket: 450 (mm)
Shoring: (Y/N?) N

Sample Reference	Sample Range	Depth (mBGL)	Graphic Log	Soil or Rock Field Material Description	In Situ/ Lab Test	Groundwater Levels
68		0.00		MG Brown, fine to coarse sandy, gravelly cobbles. Gravel and cobbles are angular brick and concrete.		
		0.50		Brown, slightly clayey, silty, fine SAND.		
		1.00				
		1.50				
		2.00		Soft to firm, brown, silty CLAY. Damp. No odours or staining.		
		2.50				
		3.00				
		3.50				
		4.00				

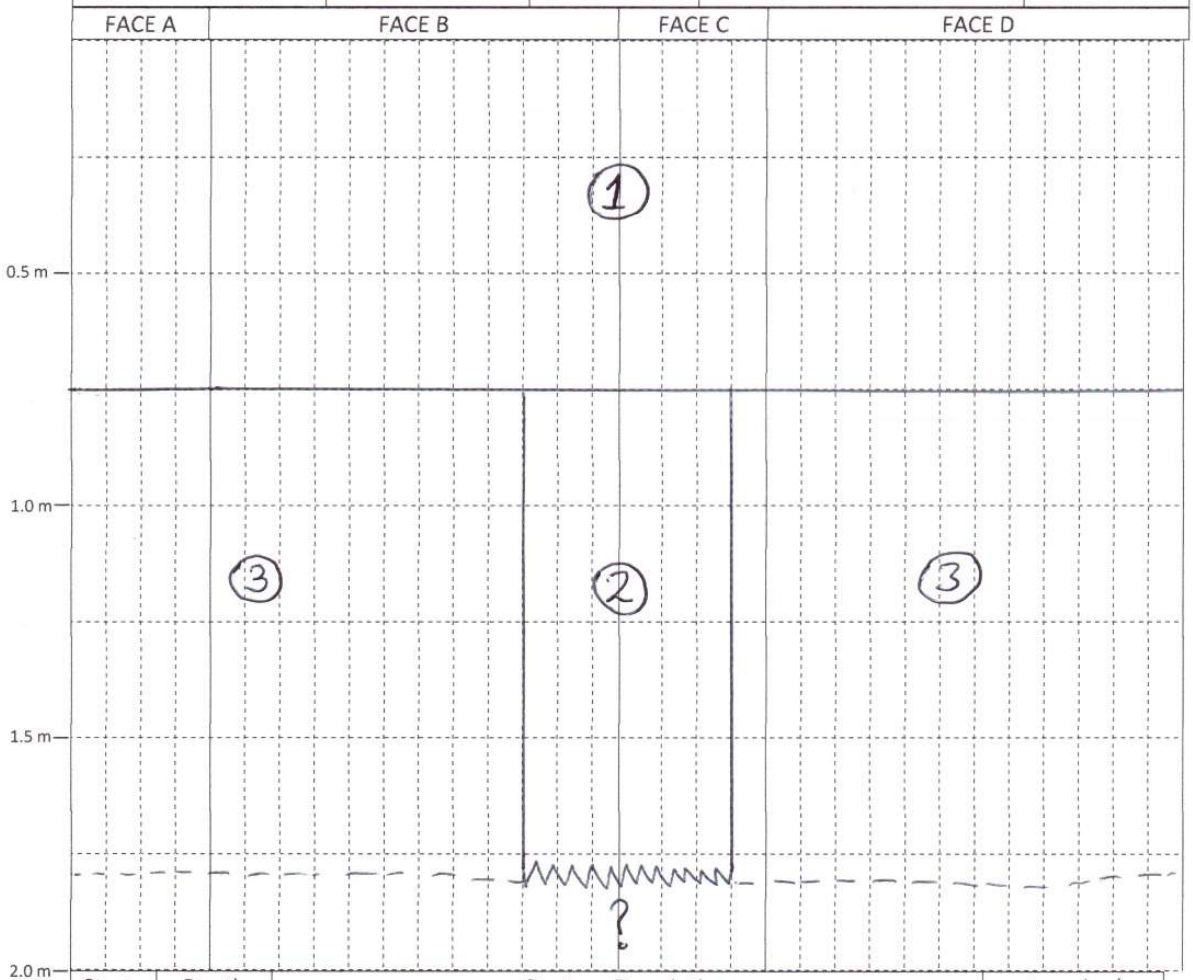
Groundwater Observations:

Damp strata observed beneath 1.7m bgl. Pit sides remained largely stable.

TRIAL PIT LOG

Trial Pit No.	Date:
TP20	*01/06/2017*

Project Name:	Project Number:	Client:	Logged By:
Former Welland Hospital, Spalding	*696*	*Lidl UK GmbH*	*DH*



Strata Ref.	Depth (m)	Stratum Description	Samples/ In Situ Tests
1	0-0.75	MG Reinforced concrete ground beam.	
2	0.75-1.8	MG Circular concrete pile.	
3	0.75-1.8	Firm, greyish brown, slightly fine sandy, silty CLAY.	ES80 – 0.8m.

Remarks	Location Sketch (see trial pit location drawing)
i) No groundwater observed. ii) Pit sides stable at 1.8m bgl. iii) No visual or olfactory evidence of hydrocarbon contamination observed.	N B A C D

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Trial Pitting Record :TP21

GeoInvestigations

Logged By: DH
Hire Company: A&V Squires
Excavator: JCB 3CX

Date: 1st June 2017
Location: Welland Hosp : Spalding
Ground Elevation: (m AOD)

Depth: (m begl)
Bucket: 450 (mm)
Shoring: (Y/N?) N

Sample Reference	Sample Range	Depth (mBGL)	Graphic Log	Soil or Rock Field Material Description	In Situ/ Lab Test	Groundwater Levels
81		0.00		MG Reinforced concrete beam with 4mm reinforcement mesh and 20mm reinforcement bars. 20mm thick layer of pea gravel at base of concrete beam.		
		0.50				
		1.00		Grey, slightly clayey, silty, fine SAND.		
		1.50				
		2.00				
		2.50				
		3.00				
		3.50				
		4.00				

Groundwater Observations:

No groundwater observed. Pit sides remained stable to 1.5m bgl.

GeoInvestigations
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B98 7HD
paul@geoinvestigations.co.uk

Trial Pitting Record :TP22

GeoInvestigations

Logged By: DH
Hire Company: A&V Squires
Excavator: JCB 3CX

Date: 1st June 2017
Location: Welland Hosp : Spalding
Ground Elevation: (m AOD)

Depth: (m begl)
Bucket: 450 (mm)
Shoring: (Y/N?) N

Sample Reference	Sample Range	Depth (mBGL)	Graphic Log	Soil or Rock Field Material Description	In Situ/ Lab Test	Groundwater Levels
		0.00		MG Reinforced concrete beam with 4mm reinforcement mesh and 20mm reinforcement bars.		
		0.50				
		1.00		Brown, silty, fine SAND.		
		1.50				
		2.00				
		2.50				
		3.00				
		3.50				
		4.00				

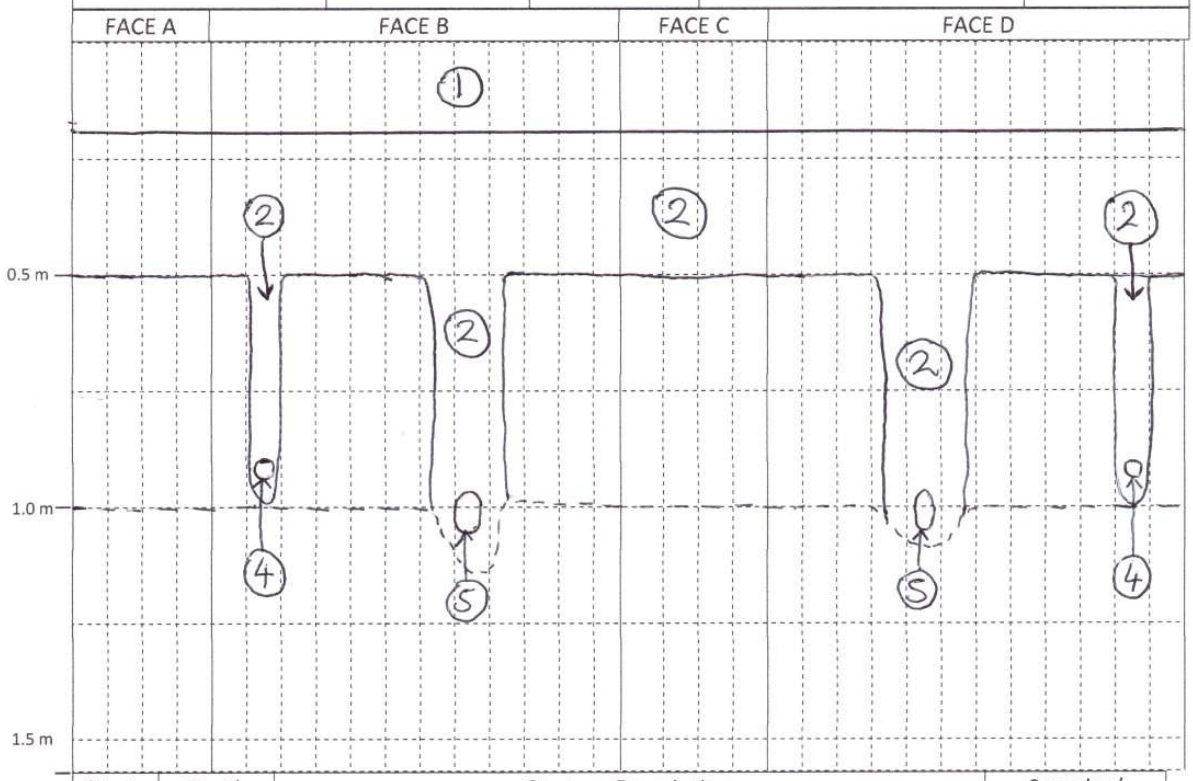
Groundwater Observations:

No groundwater observed. Pit sides remained stable to 1.6m bgl.

TRIAL PIT LOG

Trial Pit No.	Date:
TP23	*01/06/2017*

Project Name:	Project Number:	Client:	Logged By:
Former Welland Hospital, Spalding	*696*	*Lidl UK GmbH*	*DH*



Strata Ref.	Depth (m)	Stratum Description	Samples/ In Situ Tests
1	0-0.2	MG Brown, silty, fine sand. Frequent rootlets and roots.	
2	0.2-0.5/1.0	*MG Brown, clayey, silty, gravelly fine sand. Gravel is fine to coarse, angular flint,* concrete, brick and limestone.	
3	0.5-1.0m	Soft to firm, grey mottled brown, silty, slightly fine sandy CLAY.	
4	0.9-1.0	MG Blue ribbed drainage pipe.	
5	1.0-1.2	*MG Smooth brown drainage pipe.*	

Remarks	Location Sketch (see trial pit location drawing)
i) No groundwater observed. ii) Pit sides stable at 1.0m bgl. iii) No visual or olfactory evidence of hydrocarbon contamination observed.	

APPENDIX 6

Chemical Laboratory Test Certificates

Paul Palgrave
CSG Consulting Engineers Ltd
29 Greenlands Business Centre
Studley Road
Redditch
B98 7HD

QTS Environmental Ltd
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410
russell.jarvis@qtsenvironmental.com

QTS Environmental Report No: 17-59817

Site Reference:	Holbeach Road, Spalding
Project / Job Ref:	696
Order No:	1860
Sample Receipt Date:	06/06/2017
Sample Scheduled Date:	06/06/2017
Report Issue Number:	1
Reporting Date:	12/06/2017

Authorised by:

Kevin Old
Associate Director of Laboratory

Authorised by:

Russell Jarvis
Associate Director of Client Services

QTSE is the trading name of DETS Ltd, company registration number 03705645

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

4480

Soil Analysis Certificate						
QTS Environmental Report No: 17-59817	**Date Sampled**	01/06/17	01/06/17	01/06/17	01/06/17	01/06/17
CSG Consulting Engineers Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Holbeach Road, Spalding	**TP / BH No**	DH/696/LS/WS1	DH/696/LS/WS2	DH/696/LS/WS4	DH/696/LS/WS4	DH/696/LS/TP1
Project / Job Ref: 696	**Additional Refs**	69	71	76	77	WAC 1
Order No: 1860	**Depth (m)**	0.40	0.30	0.05	0.30	0.25
Reporting Date: 12/06/2017	**QTSE Sample No**	272254	272255	272256	272257	272258

Determinand	Unit	RL	Accreditation					
Asbestos Screen [S]	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Sample Matrix [S]	Material Type	N/a	NONE					
Asbestos Type [S]	PLM Result	N/a	ISO17025					
pH	pH Units	N/a	MCERTS					
Total Cyanide	mg/kg	< 2	NONE					
Free Cyanide	mg/kg	< 2	NONE					
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	90				
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	0.09				
Sulphide	mg/kg	< 5	NONE					
Organic Matter	%	< 0.1	MCERTS					
Arsenic (As)	mg/kg	< 2	MCERTS					
Barium (Ba)	mg/kg	< 5	NONE					
Beryllium (Be)	mg/kg	< 0.5	NONE					
W/S Boron	mg/kg	< 1	NONE					
Cadmium (Cd)	mg/kg	< 0.2	MCERTS					
Chromium (Cr)	mg/kg	< 2	MCERTS					
Copper (Cu)	mg/kg	< 4	MCERTS					
Lead (Pb)	mg/kg	< 3	MCERTS					
Mercury (Hg)	mg/kg	< 1	NONE					
Nickel (Ni)	mg/kg	< 3	MCERTS					
Selenium (Se)	mg/kg	< 3	NONE					
Vanadium (V)	mg/kg	< 2	NONE					
Zinc (Zn)	mg/kg	< 3	MCERTS					
Total Phenols (monohydric)	mg/kg	< 2	NONE					

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C

Analysis carried out on the dried sample is corrected for the stone content

The samples have been examined to identify the presence of asbestiform minerals by polarising light microscopy and dispersion staining technique to In-House Procedures QTSE600 Determination of Asbestos in Bulk Materials; Asbestos in Soils/Sediments (fibre screening and identification)

This report refers to samples as received, and QTS Environmental Ltd, takes no responsibility for the accuracy or competence of sampling by others.

The material description shall be regarded as tentative and is not included in our scope of UKAS Accreditation.

Opinions and interpretations expressed herein are outside the scope of UKAS Accreditation.

Asbestos Analyst: Javeed Malik

RL: Reporting Limit

Pinch Test: Where pinch test is positive it is reported "Loose Fibres - PT" with type(s).

Subcontracted analysis [S]

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate						
QTS Environmental Report No: 17-59817	**Date Sampled**	01/06/17	01/06/17	01/06/17	01/06/17	01/06/17
CSG Consulting Engineers Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Holbeach Road, Spalding	**TP / BH No**	DH/696/LS/TP4	DH/696/LS/TP5	DH/696/LS/TP6	DH/696/LS/TP21	DH/696/LS/TP8
Project / Job Ref: 696	**Additional Refs**	WAC 6	12	WAC 16	81	WAC 23
Order No: 1860	**Depth (m)**	0.10	0.30	0.20	0.85	0.20
Reporting Date: 12/06/2017	**QTSE Sample No**	272259	272260	272261	272262	272263

Determinand	Unit	RL	Accreditation					
Asbestos Screen (S)	N/a	N/a	ISO17025	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Sample Matrix (S)	Material Type	N/a	NONE					
Asbestos Type (S)	PLM Result	N/a	ISO17025					
pH	pH Units	N/a	MCERTS	8.1	10.9	8.3	7.7	7.8
Total Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2		< 2
Free Cyanide	mg/kg	< 2	NONE					
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	MCERTS	64	85	17	79	11
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	MCERTS	0.06	0.09	0.02	0.08	0.01
Sulphide	mg/kg	< 5	NONE	< 5	< 5	< 5		< 5
Organic Matter	%	< 0.1	MCERTS	1.5	0.2	0.1		1.9
Arsenic (As)	mg/kg	< 2	MCERTS	15	4	9		10
Barium (Ba)	mg/kg	< 5	NONE					
Beryllium (Be)	mg/kg	< 0.5	NONE					
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	< 1		< 1
Cadmium (Cd)	mg/kg	< 0.2	MCERTS	0.4	< 0.2	0.3		0.3
Chromium (Cr)	mg/kg	< 2	MCERTS	16	4	13		15
Copper (Cu)	mg/kg	< 4	MCERTS	14	6	9		13
Lead (Pb)	mg/kg	< 3	MCERTS	33	< 3	14		33
Mercury (Hg)	mg/kg	< 1	NONE	< 1	< 1	< 1		< 1
Nickel (Ni)	mg/kg	< 3	MCERTS	13	< 3	11		11
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3	< 3		< 3
Vanadium (V)	mg/kg	< 2	NONE					
Zinc (Zn)	mg/kg	< 3	MCERTS	64	24	41		53
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2	< 2		< 2

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C

Analysis carried out on the dried sample is corrected for the stone content

The samples have been examined to identify the presence of asbestiform minerals by polarising light microscopy and dispersion staining technique to In-House Procedures QTSE600 Determination of Asbestos in Bulk Materials; Asbestos in Soils/Sediments (fibre screening and identification)

This report refers to samples as received, and QTS Environmental Ltd, takes no responsibility for the accuracy or competence of sampling by others.

The material description shall be regarded as tentative and is not included in our scope of UKAS Accreditation.

Opinions and interpretations expressed herein are outside the scope of UKAS Accreditation.

Asbestos Analyst: Javeed Malik

RL: Reporting Limit

Pinch Test: Where pinch test is positive it is reported "Loose Fibres - PT" with type(s).

Subcontracted analysis (S)

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate						
QTS Environmental Report No: 17-59817	**Date Sampled**	01/06/17	01/06/17	01/06/17	01/06/17	
CSG Consulting Engineers Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Holbeach Road, Spalding	**TP / BH No**	DH/696/LS/T16	DH/696/LS/T7	DH/696/LS/T13	DH/696/LS/T17	
Project / Job Ref: 696	**Additional Refs**	57	TS18	47	62	
Order No: 1860	**Depth (m)**	0.40	0.10	0.60	0.20	
Reporting Date: 12/06/2017	**QTSE Sample No**	272264	272265	272266	272267	

Determinand	Unit	RL	Accreditation					
Asbestos Screen [S]	N/a	N/a	**ISO17025**		Not Detected		Detected	
Sample Matrix [S]	Material Type	N/a	NONE				Small bundles present	
Asbestos Type [S]	PLM Result	N/a	**ISO17025**				Chrysotile	
pH	pH Units	N/a	**MCERTS**	8.2	7.9	7.7	7.9	
Total Cyanide	mg/kg	< 2	NONE	< 2	< 2	< 2		
Free Cyanide	mg/kg	< 2	NONE				< 2	
W/S Sulphate as SO_4 (2:1)	mg/l	< 10	**MCERTS**	117	18	112		
W/S Sulphate as SO_4 (2:1)	g/l	< 0.01	**MCERTS**	0.12	0.02	0.11		
Sulphide	mg/kg	< 5	NONE	< 5	< 5	< 5		
Organic Matter	%	< 0.1	**MCERTS**		3.2		3.5	
Arsenic (As)	mg/kg	< 2	**MCERTS**	8	10	10	19	
Barium (Ba)	mg/kg	< 5	NONE				191	
Beryllium (Be)	mg/kg	< 0.5	NONE				1.6	
W/S Boron	mg/kg	< 1	NONE	< 1	< 1	2.8	1	
Cadmium (Cd)	mg/kg	< 0.2	**MCERTS**	< 0.2	0.3	0.3	0.8	
Chromium (Cr)	mg/kg	< 2	**MCERTS**	42	15	17	22	
Copper (Cu)	mg/kg	< 4	**MCERTS**	6	16	27	52	
Lead (Pb)	mg/kg	< 3	**MCERTS**	11	42	68	335	
Mercury (Hg)	mg/kg	< 1	NONE	< 1	< 1	< 1	< 1	
Nickel (Ni)	mg/kg	< 3	**MCERTS**	5	12	14	20	
Selenium (Se)	mg/kg	< 3	NONE	< 3	< 3	< 3	< 3	
Vanadium (V)	mg/kg	< 2	NONE				44	
Zinc (Zn)	mg/kg	< 3	**MCERTS**	25	63	89	225	
Total Phenols (monohydric)	mg/kg	< 2	NONE	< 2	< 2	< 2		

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C

Analysis carried out on the dried sample is corrected for the stone content

The samples have been examined to identify the presence of asbestiform minerals by polarising light microscopy and dispersion staining technique to In-House Procedures QTSE600 Determination of Asbestos in Bulk Materials; Asbestos in Soils/Sediments (fibre screening and identification)

This report refers to samples as received, and QTS Environmental Ltd, takes no responsibility for the accuracy or competence of sampling by others.

The material description shall be regarded as tentative and is not included in our scope of UKAS Accreditation.

Opinions and interpretations expressed herein are outside the scope of UKAS Accreditation.

Asbestos Analyst: Javeed Malik

RL: Reporting Limit

Pinch Test: Where pinch test is positive it is reported "Loose Fibres - PT" with type(s).

Subcontracted analysis [S]

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Soil Analysis Certificate - Speciated PAHs						
QTS Environmental Report No: 17-59817	Date Sampled	01/06/17	01/06/17	01/06/17	01/06/17	01/06/17
CSG Consulting Engineers Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Holbeach Road, Spalding	TP / BH No	DH/696/LS/TP4	DH/696/LS/TP5	DH/696/LS/TP6	DH/696/LS/TP8	DH/696/LS/T16
Project / Job Ref: 696	Additional Refs	WAC 6	12	WAC 16	WAC 23	57
Order No: 1860	Depth (m)	0.10	0.30	0.20	0.20	0.40
Reporting Date: 12/06/2017	QTSE Sample No	272259	272260	272261	272263	272264

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	0.45
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	0.35
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	7.58
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	2.70
Fluoranthene	mg/kg	< 0.1	MCERTS	0.16	< 0.1	< 0.1	0.26	28.50
Pyrene	mg/kg	< 0.1	MCERTS	0.15	< 0.1	< 0.1	0.23	23.50
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.12	6.92
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.14	6.30
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	0.16	< 0.1	< 0.1	0.23	6.99
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	2.56
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.14	5.33
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.13	2.78
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	0.45
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1	0.15	2.62
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6	< 1.6	< 1.6	97.1

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C

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Soil Analysis Certificate - Speciated PAHs						
QTS Environmental Report No: 17-59817	**Date Sampled**	01/06/17	01/06/17	01/06/17		
CSG Consulting Engineers Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied		
Site Reference: Holbeach Road, Spalding	**TP / BH No**	DH/696/LS/T7	DH/696/LS/T13	DH/696/LS/T17		
Project / Job Ref: 696	**Additional Refs**	TS18	47	62		
Order No: 1860	**Depth (m)**	0.10	0.60	0.20		
Reporting Date: 12/06/2017	**QTSE Sample No**	272265	272266	272267		

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	0.18	0.14		
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Fluoranthene	mg/kg	< 0.1	MCERTS	0.25	0.55	0.42		
Pyrene	mg/kg	< 0.1	MCERTS	0.22	0.47	0.36		
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	0.14	0.20	0.14		
Chrysene	mg/kg	< 0.1	MCERTS	0.15	0.30	0.26		
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	0.24	0.37	0.26		
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	0.18	0.15		
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	0.16	0.23	0.18		
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	0.13	0.20	0.13		
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	0.14	0.19	0.14		
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	2.9	2.2		

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{o}C

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Waste Acceptance Criteria Analytical Certificate - BS EN 12457/2

QTS Environmental Report No: 17-59817		**Date Sampled**	01/06/17				**Landfill Waste Acceptance Criteria Limits**	
CSG Consulting Engineers Ltd		**Time Sampled**	None Supplied				**Inert Waste Landfill**	**Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Site Reference: Holbeach Road, Spalding		**TP / BH No**	DH/696/LS/TP1						
Project / Job Ref: 696		**Additional Refs**	WAC 1						
Order No: 1860		**Depth (m)**	0.25						
Reporting Date: 12/06/2017		**QTSE Sample No**	272258						
Determinand	**Unit**	**MDL**							
TOC[MU]	%	< 0.1	0.3				3%	5%	6%
Loss on Ignition	%	< 0.01	3.30				--	--	10%
BTEX[MU]	mg/kg	< 0.05	< 0.05				6	--	--
Sum of PCBs	mg/kg	< 0.1	< 0.1				1	--	--
Mineral Oil[MU]	mg/kg	< 10	< 10				500	--	--
Total PAH[MU]	mg/kg	< 1.7	5.2				100	--	--
pH[MU]	pH Units	N/a	9.6				--	>6	--
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	1.8				--	To be evaluated	To be evaluated
Eluate Analysis			**10:1 mg/l**			**Cumulative 10:1 mg/kg**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**		
Arsenic[U]			0.01			0.1	0.5	2	25
Barium[U]			0.02			0.2	20	100	300
Cadmium[U]			< 0.0005			< 0.005	0.04	1	5
Chromium[U]			0.016			0.16	0.5	10	70
Copper[U]			< 0.01			< 0.1	2	50	100
Mercury[U]			< 0.0005			< 0.01	0.01	0.2	2
Molybdenum[U]			0.010			0.10	0.5	10	30
Nickel[U]			< 0.007			< 0.07	0.4	10	40
Lead[U]			< 0.005			< 0.05	0.5	10	50
Antimony[U]			< 0.005			< 0.05	0.06	0.7	5
Selenium[U]			< 0.005			< 0.05	0.1	0.5	7
Zinc[U]			< 0.005			< 0.05	4	50	200
Chloride[U]			2			23	800	15000	25000
Fluoride[U]			< 0.5			< 5	10	150	500
Sulphate[U]			31			310	1000	20000	50000
TDS			141			1410	4000	60000	100000
Phenol Index			< 0.01			< 0.1	1	-	-
DOC			2.8			27.9	500	800	1000
Leach Test Information									
Sample Mass (kg)			0.10						
Dry Matter (%)			94.6						
Moisture (%)			5.8						
Stage 1									
Volume Eluate L10 (litres)			0.90						

Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and QTS Environmental cannot be held responsible for any discrepencies with current legislation
M Denotes MCERTS accredited test
U Denotes ISO17025 accredited test

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Soil Analysis Certificate - Sample Descriptions	
QTS Environmental Report No: 17-59817	
CSG Consulting Engineers Ltd	
Site Reference: Holbeach Road, Spalding	
Project / Job Ref: 696	
Order No: 1860	
Reporting Date: 12/06/2017	

QTSE Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
272254	DH/696/LS/WS1	69	0.40	5.2	Brown sandy clay with stones
272258	DH/696/LS/TP1	WAC 1	0.25	13.6	Brown sandy clay with brick and concrete
272259	DH/696/LS/TP4	WAC 6	0.10	14	Brown sandy clay with stones and vegetation
272260	DH/696/LS/TP5	12	0.30	9.7	Brown sandy clay with stones
272261	DH/696/LS/TP6	WAC 16	0.20	11.6	Brown sandy gravel with stones
272262	DH/696/LS/TP21	81	0.85	10.7	Brown sandy gravel with stones and concrete
& 272263	DH/696/LS/TP8	WAC 23	0.20	15.7	Brown sandy clay with vegetation
272264	DH/696/LS/T16	57	0.40	13.2	Black sandy clay with stones
& 272265	DH/696/LS/T7	TS18	0.10	13	Brown sandy clay with vegetation
272266	DH/696/LS/T13	47	0.60	21.3	Brown sandy clay
272267	DH/696/LS/T17	62	0.20	15.7	Brown sandy clay with stones

Moisture content is part of procedure E003 & is not an accredited test
Insufficient Sample $^{I/S}$
& samples received in inappropriate containers for hydrocarbon analysis

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Soil Analysis Certificate - Methodology & Miscellaneous Information
QTS Environmental Report No: 17-59817
CSG Consulting Engineers Ltd
Site Reference: Holbeach Road, Spalding
Project / Job Ref: 696
Order No: 1860
Reporting Date: 12/06/2017

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received

Paul Palgrave
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QTS Environmental Report No: 17-59818

Site Reference:	Holbeach Road, Spalding
Project / Job Ref:	969
Order No:	1859
Sample Receipt Date:	06/06/2017
Sample Scheduled Date:	06/06/2017
Report Issue Number:	1
Reporting Date:	12/06/2017

Authorised by:

Kevin Old
Associate Director of Laboratory

Authorised by:

Russell Jarvis
Associate Director of Client Services

QTSE is the trading name of DETS Ltd, company registration number 03705645

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Soil Analysis Certificate							
QTS Environmental Report No: 17-59818	Date Sampled	01/06/17	01/06/17	01/06/17	01/06/17	
CSG Consulting Engineers Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
Site Reference: Holbeach Road, Spalding	TP / BH No	DH/696/LS/TP09	DH/696/LS/TP10	DH/696/LS/TP12	DH/696/LS/TP15	
Project / Job Ref: 969	Additional Refs	31	WAC 38	44	53	
Order No: 1859	Depth (m)	1.80	2.40	2.50	2.00	
Reporting Date: 12/06/2017	QTSE Sample No	272275	272277	272280	272281	

Determinand	Unit	RL	Accreditation					
pH	pH Units	N/a	MCERTS	7.6	7.7	7.8	7.9	

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C
Analysis carried out on the dried sample is corrected for the stone content
Subcontracted analysis $^{(S)}$

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Soil Analysis Certificate - Speciated PAHs							
QTS Environmental Report No: 17-59818	**Date Sampled**	01/06/17	01/06/17	01/06/17		
CSG Consulting Engineers Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied		
Site Reference: Holbeach Road, Spalding	**TP / BH No**	DH/696/LS/TP09	DH/696/LS/TP10	DH/696/LS/TP15		
Project / Job Ref: 969	**Additional Refs**	31	WAC 38	53		
Order No: 1859	**Depth (m)**	1.80	2.40	2.00		
Reporting Date: 12/06/2017	**QTSE Sample No**	272275	272277	272281		

Determinand	Unit	RL	Accreditation					
Naphthalene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Acenaphthylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Acenaphthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Fluorene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Phenanthrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Benzo(a)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Chrysene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Benzo(b)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Benzo(k)fluoranthene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Benzo(a)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Indeno(1,2,3-cd)pyrene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Dibenz(a,h)anthracene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Benzo(ghi)perylene	mg/kg	< 0.1	MCERTS	< 0.1	< 0.1	< 0.1		
Total EPA-16 PAHs	mg/kg	< 1.6	MCERTS	< 1.6	< 1.6	< 1.6		

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C

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Soil Analysis Certificate - EPH Texas Banded							
QTS Environmental Report No: 17-59818	Date Sampled	01/06/17					
CSG Consulting Engineers Ltd	Time Sampled	None Supplied					
Site Reference: Holbeach Road, Spalding	TP / BH No	DH/696/LS/TP10					
Project / Job Ref: 969	Additional Refs	37					
Order No: 1859	Depth (m)	1.00					
Reporting Date: 12/06/2017	QTSE Sample No	272278					

Determinand	Unit	RL	Accreditation					
EPH Texas (C6 - C8)	mg/kg	< 0.05	NONE	< 0.05				
EPH Texas (>C8 - C10)	mg/kg	< 1	MCERTS	< 1				
EPH Texas (>C10 - C12)	mg/kg	< 1	MCERTS	< 1				
EPH Texas (>C12 - C16)	mg/kg	< 1	MCERTS	< 1				
EPH Texas (>C16 - C21)	mg/kg	< 1	MCERTS	< 1				
EPH Texas (>C21 - C40)	mg/kg	< 6	MCERTS	< 6				
EPH Texas (C6 - C40)	mg/kg	< 6	NONE	< 6				

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C

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Soil Analysis Certificate - EPH Banded (Type F)							
QTS Environmental Report No: 17-59818	**Date Sampled**	01/06/17	01/06/17	01/06/17	01/06/17	01/06/17
CSG Consulting Engineers Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Holbeach Road, Spalding	**TP / BH No**	DH/696/LS/TP09	DH/696/LS/TP09	DH/696/LS/TP10	DH/696/LS/TP15	DH/696/LS/TP15
Project / Job Ref: 969	**Additional Refs**	31	32	39	53	55
Order No: 1859	**Depth (m)**	1.80	2.70	2.80	2.00	3.10
Reporting Date: 12/06/2017	**QTSE Sample No**	272275	272276	272279	272281	272282

Determinand	Unit	RL	Accreditation					
EPH (>C8 - C10)	mg/kg	< 1	MCERTS	25	13	< 1	2	9
EPH (>C10 - C12)	mg/kg	< 1	MCERTS	33	7	< 1	5	5
EPH (>C12 - C16)	mg/kg	< 1	MCERTS	9	< 1	< 1	2	< 1
EPH (>C16 - C21)	mg/kg	< 1	MCERTS	< 1	< 1	< 1	< 1	< 1
EPH (>C21 - C40)	mg/kg	< 6	MCERTS	< 6	< 6	< 6	< 6	< 6
EPH (C8 - C40)	mg/kg	< 6	MCERTS	66	20	< 6	8	14

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C

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Soil Analysis Certificate - TPH CWG Banded							
QTS Environmental Report No: 17-59818	Date Sampled	01/06/17	01/06/17	01/06/17	01/06/17	01/06/17
CSG Consulting Engineers Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Holbeach Road, Spalding	TP / BH No	DH/696/LS/TP09	DH/696/LS/TP10	DH/696/LS/TP12	DH/696/LS/TP15	DH/696/LS/TP18
Project / Job Ref: 969	Additional Refs	31	WAC 38	44	53	65
Order No: 1859	Depth (m)	1.80	2.40	2.50	2.00	1.30
Reporting Date: 12/06/2017	QTSE Sample No	272275	272277	272280	272281	272283

Determinand	Unit	RL	Accreditation					
Aliphatic >C5 - C6	mg/kg	< 0.01	NONE	0.23	0.15	2.91	< 0.01	< 0.01
Aliphatic >C6 - C8	mg/kg	< 0.05	NONE	10	1.13	131	< 0.05	< 0.05
Aliphatic >C8 - C10	mg/kg	< 2	MCERTS	26	< 2	6	< 2	< 2
Aliphatic >C10 - C12	mg/kg	< 2	MCERTS	7	< 2	< 2	< 2	< 2
Aliphatic >C12 - C16	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	< 3
Aliphatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	< 3
Aliphatic >C21 - C34	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Aliphatic (C5 - C34)	mg/kg	< 21	NONE	43	< 21	140	< 21	< 21
Aromatic >C5 - C7	mg/kg	< 0.01	NONE	< 0.01	< 0.01	0.19	< 0.01	< 0.01
Aromatic >C7 - C8	mg/kg	< 0.05	NONE	< 0.05	< 0.05	1.14	< 0.05	< 0.05
Aromatic >C8 - C10	mg/kg	< 2	MCERTS	< 2	< 2	77	< 2	< 2
Aromatic >C10 - C12	mg/kg	< 2	MCERTS	24	< 2	29	< 2	3
Aromatic >C12 - C16	mg/kg	< 2	MCERTS	5	< 2	3	< 2	< 2
Aromatic >C16 - C21	mg/kg	< 3	MCERTS	< 3	< 3	< 3	< 3	< 3
Aromatic >C21 - C35	mg/kg	< 10	MCERTS	< 10	< 10	< 10	< 10	< 10
Aromatic (C5 - C35)	mg/kg	< 21	NONE	29	< 21	110	< 21	< 21
Total >C5 - C35	mg/kg	< 42	NONE	72	< 42	250	< 42	< 42

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C

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Soil Analysis Certificate - BTEX / MTBE							
QTS Environmental Report No: 17-59818	Date Sampled	01/06/17	01/06/17	01/06/17	01/06/17	01/06/17
CSG Consulting Engineers Ltd	Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Holbeach Road, Spalding	TP / BH No	DH/696/LS/TP09	DH/696/LS/TP10	DH/696/LS/TP12	DH/696/LS/TP15	DH/696/LS/TP18
Project / Job Ref: 969	Additional Refs	31	WAC 38	44	53	65
Order No: 1859	Depth (m)	1.80	2.40	2.50	2.00	1.30
Reporting Date: 12/06/2017	QTSE Sample No	272275	272277	272280	272281	272283

Determinand	Unit	RL	Accreditation					
Benzene	ug/kg	< 2	MCERTS	< 2	< 2	194	< 2	< 2
Toluene	ug/kg	< 5	MCERTS	< 5	< 5	1137	< 5	< 5
Ethylbenzene	ug/kg	< 2	MCERTS	< 2	< 2	11826	< 2	< 2
p & m-xylene	ug/kg	< 2	MCERTS	< 2	< 2	21692	24	< 2
o-xylene	ug/kg	< 2	MCERTS	< 2	< 2	18538	< 2	< 2
MTBE	ug/kg	< 5	MCERTS	< 5	< 5	< 5	< 5	< 5

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30^{O}C

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Water Analysis Certificate								
QTS Environmental Report No: 17-59818	**Date Sampled**	01/06/17	01/06/17	01/06/17	01/06/17	01/06/17
CSG Consulting Engineers Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Site Reference: Holbeach Road, Spalding	**TP / BH No**	DH/696/LS/WS1	DH/696/LS/WS2	DH/696/LS/WS3	DH/696/LS/WS4	DH/696/LS/WS5
Project / Job Ref: 969	**Additional Refs**	W2	W3	W4	W5	W6
Order No: 1859	**Depth (m)**	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Reporting Date: 12/06/2017	**QTSE Sample No**	272268	272269	272270	272271	272272

Determinand	**Unit**	**RL**	**Accreditation**					
pH	pH Units	N/a	**ISO17025**	7.9	7.2	7.7	7.1	7.7
Sulphate as SO_4	mg/l	< 1	**ISO17025**	15	25	16	53	
Total Organic Carbon (TOC)	mg/l	< 0.1	NONE			8.4		135
Arsenic (dissolved)	ug/l	< 5	**ISO17025**			< 5		63
Barium (dissolved)	ug/l	< 5	**ISO17025**			203		196
Beryllium (dissolved)	ug/l	< 3	**ISO17025**			< 3		< 3
Boron (dissolved)	ug/l	< 5	**ISO17025**			223		244
Cadmium (dissolved)	ug/l	< 0.4	**ISO17025**			< 0.4		< 0.4
Chromium (dissolved)	ug/l	< 5	**ISO17025**			< 5		< 5
Copper (dissolved)	ug/l	< 5	**ISO17025**			< 5		< 5
Lead (dissolved)	ug/l	< 5	**ISO17025**			< 5		20
Mercury (dissolved)	ug/l	< 0.05	**ISO17025**			0.72		0.68
Nickel (dissolved)	ug/l	< 5	**ISO17025**			< 5		< 5
Selenium (dissolved)	ug/l	< 5	**ISO17025**			< 5		< 5
Vanadium (dissolved)	ug/l	< 5	**ISO17025**			5		< 5
Zinc (dissolved)	ug/l	< 2	**ISO17025**			< 2		8

Subcontracted analysis (S)
Insufficient sample I/S
Unsuitable Sample U/S

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Water Analysis Certificate								
QTS Environmental Report No: 17-59818	**Date Sampled**	01/06/17	01/06/17					
CSG Consulting Engineers Ltd	**Time Sampled**	None Supplied	None Supplied					
Site Reference: Holbeach Road, Spalding	**TP / BH No**	DH/696/LS/WS6	DH/696/LS/WS7					
Project / Job Ref: 969	**Additional Refs**	W7	W8					
Order No: 1859	**Depth (m)**	None Supplied	None Supplied					
Reporting Date: 12/06/2017	**QTSE Sample No**	272273	272274					

Determinand	Unit	RL	Accreditation					
pH	pH Units	N/a	**ISO17025**	8.0	7.6			
Sulphate as SO_4	mg/l	< 1	**ISO17025**					
Total Organic Carbon (TOC)	mg/l	< 0.1	NONE		15.1			
Arsenic (dissolved)	ug/l	< 5	**ISO17025**		< 5			
Barium (dissolved)	ug/l	< 5	**ISO17025**		78			
Beryllium (dissolved)	ug/l	< 3	**ISO17025**		< 3			
Boron (dissolved)	ug/l	< 5	**ISO17025**		309			
Cadmium (dissolved)	ug/l	< 0.4	**ISO17025**		< 0.4			
Chromium (dissolved)	ug/l	< 5	**ISO17025**		< 5			
Copper (dissolved)	ug/l	< 5	**ISO17025**		< 5			
Lead (dissolved)	ug/l	< 5	**ISO17025**		< 5			
Mercury (dissolved)	ug/l	< 0.05	**ISO17025**		1.27			
Nickel (dissolved)	ug/l	< 5	**ISO17025**		< 5			
Selenium (dissolved)	ug/l	< 5	**ISO17025**		< 5			
Vanadium (dissolved)	ug/l	< 5	**ISO17025**		< 5			
Zinc (dissolved)	ug/l	< 2	**ISO17025**		< 2			

Subcontracted analysis (S)
Insufficient sample I/S
Unsuitable Sample U/S

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Water Analysis Certificate - Speciated PAH							
QTS Environmental Report No: 17-59818	**Date Sampled**	01/06/17	01/06/17	01/06/17		
CSG Consulting Engineers Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied		
Site Reference: Holbeach Road, Spalding	**TP / BH No**	DH/696/LS/WS3	DH/696/LS/WS5	DH/696/LS/WS7		
Project / Job Ref: 969	**Additional Refs**	W4	W6	W8		
Order No: 1859	**Depth (m)**	None Supplied	None Supplied	None Supplied		
Reporting Date: 12/06/2017	**QTSE Sample No**	272270	272272	272274		

Determinand	**Unit**	**RL**	**Accreditation**					
Naphthalene	ug/l	< 0.01	NONE	< 0.01	6.06	< 0.01		
Acenaphthylene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01		
Acenaphthene	ug/l	< 0.01	NONE	< 0.01	0.01	< 0.01		
Fluorene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01		
Phenanthrene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01		
Anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01		
Fluoranthene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01		
Pyrene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01		
Benzo(a)anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01		
Chrysene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01		
Benzo(b)fluoranthene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01		
Benzo(k)fluoranthene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01		
Benzo(a)pyrene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01		
Indeno(1,2,3-cd)pyrene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01		
Dibenz(a,h)anthracene	ug/l	< 0.01	NONE	< 0.01	< 0.01	< 0.01		
Benzo(ghi)perylene	ug/l	< 0.008	NONE	< 0.008	< 0.008	< 0.008		
Total EPA-16 PAHs	ug/l	< 0.01	NONE	< 0.01	6.07	< 0.01		

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Water Analysis Certificate - EPH Banded							
QTS Environmental Report No: 17-59818	**Date Sampled**	01/06/17					
CSG Consulting Engineers Ltd	**Time Sampled**	None Supplied					
Site Reference: Holbeach Road, Spalding	**TP / BH No**	DH/696/LS/WS3					
Project / Job Ref: 969	**Additional Refs**	W4					
Order No: 1859	**Depth (m)**	None Supplied					
Reporting Date: 12/06/2017	**QTSE Sample No**	272270					

Determinand	**Unit**	**RL**	**Accreditation**					
EPH (>C8 - C10)	ug/l	< 10	NONE	< 10				
EPH (>C10 - C12)	ug/l	< 10	NONE	< 10				
EPH (>C12 - C16)	ug/l	< 10	NONE	< 10				
EPH (>C16 - C21)	ug/l	< 10	NONE	< 10				
EPH (>C21 - C40)	ug/l	< 10	NONE	< 10				
EPH (C8 - C40)	ug/l	< 10	NONE	< 10				

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Water Analysis Certificate - TPH CWG Banded							
QTS Environmental Report No: 17-59818	**Date Sampled**	01/06/17	01/06/17	01/06/17		
CSG Consulting Engineers Ltd	**Time Sampled**	None Supplied	None Supplied	None Supplied		
Site Reference: Holbeach Road, Spalding	**TP / BH No**	DH/696/LS/WS5	DH/696/LS/WS6	DH/696/LS/WS7		
Project / Job Ref: 969	**Additional Refs**	W6	W7	W8		
Order No: 1859	**Depth (m)**	None Supplied	None Supplied	None Supplied		
Reporting Date: 12/06/2017	**QTSE Sample No**	272272	272273	272274		

Determinand	**Unit**	**RL**	**Accreditation**					
Aliphatic >C5 - C6	ug/l	< 10	NONE	138102	18156	< 10		
Aliphatic >C6 - C8	ug/l	< 10	NONE	3361841	494045	< 10		
Aliphatic >C8 - C10	ug/l	< 10	NONE	2300	572	< 10		
Aliphatic >C10 - C12	ug/l	< 10	NONE	< 10	< 10	< 10		
Aliphatic >C12 - C16	ug/l	< 10	NONE	< 10	< 10	< 10		
Aliphatic >C16 - C21	ug/l	< 10	NONE	< 10	< 10	< 10		
Aliphatic >C21 - C34	ug/l	< 10	NONE	< 10	< 10	< 10		
Aliphatic (C5 - C34)	ug/l	< 70	NONE	3502243	512773	< 70		
Aromatic >C5 - C7	ug/l	< 10	NONE	< 10	716	< 10		
Aromatic >C7 - C8	ug/l	< 10	NONE	< 10	1341	< 10		
Aromatic >C8 - C10	ug/l	< 10	NONE	140000	114400	< 10		
Aromatic >C10 - C12	ug/l	< 10	NONE	91000	35984	< 10		
Aromatic >C12 - C16	ug/l	< 10	NONE	13000	2912	< 10		
Aromatic >C16 - C21	ug/l	< 10	NONE	700	41	< 10		
Aromatic >C21 - C35	ug/l	< 10	NONE	600	< 10	< 10		
Aromatic (C5 - C35)	ug/l	< 70	NONE	245300	155394	< 70		
Total >C5 - C35	ug/l	< 140	NONE	3747543	668167	< 140		

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Water Analysis Certificate - BTEX / MTBE							
QTS Environmental Report No: 17-59818	Date Sampled	01/06/17	01/06/17	01/06/17		
CSG Consulting Engineers Ltd	Time Sampled	None Supplied	None Supplied	None Supplied		
Site Reference: Holbeach Road, Spalding	TP / BH No	DH/696/LS/WS5	DH/696/LS/WS6	DH/696/LS/WS7		
Project / Job Ref: 969	Additional Refs	W6	W7	W8		
Order No: 1859	Depth (m)	None Supplied	None Supplied	None Supplied		
Reporting Date: 12/06/2017	QTSE Sample No	272272	272273	272274		

Determinand	Unit	RL	Accreditation					
Benzene	ug/l	< 1	ISO17025	< 1	716	< 1		
Toluene	ug/l	< 5	ISO17025	< 5	1340	< 5		
Ethylbenzene	ug/l	< 5	ISO17025	36700	20700	< 5		
p & m-xylene	ug/l	< 10	ISO17025	98300	69700	< 10		
o-xylene	ug/l	< 5	ISO17025	2510	20400	< 5		
MTBE	ug/l	< 10	ISO17025	< 10	< 10	< 10		

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Waste Acceptance Criteria Analytical Certificate - BS EN 12457/2

QTS Environmental Report No: 17-59818		**Date Sampled**	01/06/17				**Landfill Waste Acceptance Criteria Limits**			
CSG Consulting Engineers Ltd		**Time Sampled**	None Supplied				**Inert Waste Landfill**	**Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill**	**Hazardous Waste Landfill**	
Site Reference: Holbeach Road, Spalding		**TP / BH No**	DH/696/LS/TP10							
Project / Job Ref: 969		**Additional Refs**	WAC 38							
Order No: 1859		**Depth (m)**	2.40							
Reporting Date: 12/06/2017		**QTSE Sample No**	272277							
Determinand	**Unit**	**MDL**								
TOC[MU]	%	< 0.1	< 0.1				3%	5%	6%	
Loss on Ignition	%	< 0.01	0.90				--	--	10%	
BTEX[MU]	mg/kg	< 0.05	< 0.05				6	--	--	
Sum of PCBs	mg/kg	< 0.1	< 0.1				1	--	--	
Mineral Oil[MU]	mg/kg	< 10	< 10				500	--	--	
Total PAH[MU]	mg/kg	< 1.7	< 1.7				100	--	--	
pH[MU]	pH Units	N/a	7.7				--	>6	--	
Acid Neutralisation Capacity	mol/kg (+/-)	< 1	1				--	To be evaluated	To be evaluated	
Eluate Analysis			**10:1 mg/l**			**Cumulative 10:1 mg/kg**	**Limit values for compliance leaching test using BS EN 12457-3 at L/S 10 l/kg (mg/kg)**			
Arsenic[U]			< 0.01			< 0.1	0.5	2	25	
Barium[U]			0.07			0.7	20	100	300	
Cadmium[U]			< 0.0005			< 0.005	0.04	1	5	
Chromium[U]			< 0.005			< 0.05	0.5	10	70	
Copper[U]			< 0.01			< 0.1	2	50	100	
Mercury[U]			< 0.0005			< 0.01	0.01	0.2	2	
Molybdenum[U]			0.012			0.12	0.5	10	30	
Nickel[U]			< 0.007			< 0.07	0.4	10	40	
Lead[U]			< 0.005			< 0.05	0.5	10	50	
Antimony[U]			< 0.005			< 0.05	0.06	0.7	5	
Selenium[U]			< 0.005			< 0.05	0.1	0.5	7	
Zinc[U]			< 0.005			< 0.05	4	50	200	
Chloride[U]			< 1			< 10	800	15000	25000	
Fluoride[U]			< 0.5			< 5	10	150	500	
Sulphate[U]			10			99	1000	20000	50000	
TDS			69			690	4000	60000	100000	
Phenol Index			< 0.01			< 0.1	1	-	-	
DOC			2			19.9	500	800	1000	
Leach Test Information										
Sample Mass (kg)			0.12							
Dry Matter (%)			75.2							
Moisture (%)			33							
Stage 1										
Volume Eluate L10 (litres)			0.87							

Results are expressed on a dry weight basis, after correction for moisture content where applicable
Stated limits are for guidance only and QTS Environmental cannot be held responsible for any discrepencies with current legislation
M Denotes MCERTS accredited test
U Denotes ISO17025 accredited test

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Soil Analysis Certificate - Sample Descriptions	
QTS Environmental Report No: 17-59818	
CSG Consulting Engineers Ltd	
Site Reference: Holbeach Road, Spalding	
Project / Job Ref: 969	
Order No: 1859	
Reporting Date: 12/06/2017	

QTSE Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
272275	DH/696/LS/TP09	31	1.80	22	Black sandy clay
272276	DH/696/LS/TP09	32	2.70	21.8	Brown sandy clay
272277	DH/696/LS/TP10	WAC 38	2.40	24.8	Brown sandy clay
272278	DH/696/LS/TP10	37	1.00	22.4	Light brown sandy clay
272279	DH/696/LS/TP10	39	2.80	27.1	Black sandy clay
272280	DH/696/LS/TP12	44	2.50	21.9	Brown clayey sand
272281	DH/696/LS/TP15	53	2.00	20.9	Brown sandy clay
272282	DH/696/LS/TP15	55	3.10	21.6	Brown sandy clay
272283	DH/696/LS/TP18	65	1.30	19.4	Brown sandy clay

Moisture content is part of procedure E003 & is not an accredited test

Insufficient Sample $^{I/S}$

& samples received in inappropriate containers for hydrocarbon analysis

QTS Environmental Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

4480

Soil Analysis Certificate - Methodology & Miscellaneous Information
QTS Environmental Report No: 17-59818
CSG Consulting Engineers Ltd
Site Reference: Holbeach Road, Spalding
Project / Job Ref: 969
Order No: 1859
Reporting Date: 12/06/2017

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 – C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received

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UKAS TESTING
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Soil Analysis Certificate - Methodology & Miscellaneous Information
QTS Environmental Report No: 17-59818
CSG Consulting Engineers Ltd
Site Reference: Holbeach Road, Spalding
Project / Job Ref: 969
Order No: 1859
Reporting Date: 12/06/2017

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Water	UF	Alkalinity	Determination of alkalinity by titration against hydrochloric acid using bromocresol green as the end point	E103
Water	UF	BTEX	Determination of BTEX by headspace GC-MS	E101
Water	F	Cations	Determination of cations by filtration followed by ICP-MS	E102
Water	UF	Chemical Oxygen Demand (COD)	Determination using a COD reactor followed by colorimetry	E112
Water	F	Chloride	Determination of chloride by filtration & analysed by ion chromatography	E109
Water	F	Chromium - Hexavalent	Determination of hexavalent chromium by acidification, addition of 1,5 diphenylcarbazide followed by co	E116
Water	UF	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E115
Water	UF	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E115
Water	UF	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through liquid:liquid extraction with cyclohexane	E111
Water	F	Diesel Range Organics (C10 - C24)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	Dissolved Organic Content (DOC)	Determination of DOC by filtration followed by low heat with persulphate addition followed by IR detect	E110
Water	UF	Electrical Conductivity	Determination of electrical conductivity by electrometric measurement	E123
Water	F	EPH (C10 – C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID	E104
Water	F	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of liquid:liquid extraction with hexane followed by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E104
Water	F	Fluoride	Determination of Fluoride by filtration & analysed by ion chromatography	E109
Water	F	Hardness	Determination of Ca and Mg by ICP-MS followed by calculation	E102
Leachate	F	Leachate Preparation - NRA	Based on National Rivers Authority leaching test 1994	E301
Leachate	F	Leachate Preparation - WAC	Based on BS EN 12457 Pt1, 2, 3	E302
Water	F	Metals	Determination of metals by filtration followed by ICP-MS	E102
Water	F	Mineral Oil (C10 - C40)	Determination of liquid:liquid extraction with hexane followed by GI-FID	E104
Water	F	Nitrate	Determination of nitrate by filtration & analysed by ion chromatography	E109
Water	UF	Monohydric Phenol	Determination of phenols by distillation followed by colorimetry	E121
Water	F	PAH - Speciated (EPA 16)	Determination of PAH compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E105
Water	F	PCB - 7 Congeners	Determination of PCB compounds by concentration through SPE cartridge, collection in dichloromethane	E108
Water	UF	Petroleum Ether Extract (PEE)	Gravimetrically determined through liquid:liquid extraction with petroleum ether	E111
Water	UF	pH	Determination of pH by electrometric measurement	E107
Water	F	Phosphate	Determination of phosphate by filtration & analysed by ion chromatography	E109
Water	UF	Redox Potential	Determination of redox potential by electrometric measurement	E113
Water	F	Sulphate (as SO4)	Determination of sulphate by filtration & analysed by ion chromatography	E109
Water	UF	Sulphide	Determination of sulphide by distillation followed by colorimetry	E118
Water	F	SVOC	Determination of semi-volatile organic compounds by concentration through SPE cartridge, collection in dichloromethane followed by GC-MS	E106
Water	UF	Toluene Extractable Matter (TEM)	Gravimetrically determined through liquid:liquid extraction with toluene	E111
Water	UF	Total Organic Carbon (TOC)	Low heat with persulphate addition followed by IR detection	E110
Water	F	TPH CWG (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C35. C5 to C8 by headspace GC-MS	E104
Water	F	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of liquid:liquid extraction with hexane, fractionating with SPE followed by GC-FID for C8 to C44. C5 to C8 by headspace GC-MS	E104
Water	UF	VOCs	Determination of volatile organic compounds by headspace GC-MS	E101
Water	UF	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E101

Key

F Filtered
UF Unfiltered

Paul Palgrave
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QTS Environmental Report No: 17-59844

Site Reference:	Holbeach Road, Spalding
Project / Job Ref:	696
Order No:	1860
Sample Receipt Date:	06/06/2017
Sample Scheduled Date:	07/06/2017
Report Issue Number:	1
Reporting Date:	12/06/2017

Authorised by:

Kevin Old
Associate Director of Laboratory

Authorised by:

Russell Jarvis
Associate Director of Client Services

QTSE is the trading name of DETS Ltd, company registration number 03705645

QTS Environmental Ltd
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Soil Analysis Certificate - Volatile Organic Compounds (VOC)						
QTS Environmental Report No: 17-59844	**Date Sampled**	None Supplied	None Supplied			
CSG Consulting Engineers Ltd	**Time Sampled**	None Supplied	None Supplied			
Site Reference: Holbeach Road, Spalding	**TP / BH No**	DH/696/LS/TP13	DH/696/LS/TP13			
Project / Job Ref: 696	**Additional Refs**	46	50			
Order No: 1860	**Depth (m)**	0.20	3.00			
Reporting Date: 12/06/2017	**QTSE Sample No**	272379	272380			

Determinand	Unit	RL	Accreditation					
Dichlorodifluoromethane	ug/kg	< 5	MCERTS	< 5	< 5			
Vinyl Chloride	ug/kg	< 5	MCERTS	< 5	< 5			
Chloromethane	ug/kg	< 10	MCERTS	< 10	< 10			
Chloroethane	ug/kg	< 5	MCERTS	< 5	< 5			
Bromomethane	ug/kg	< 10	MCERTS	< 10	< 10			
Trichlorofluoromethane	ug/kg	< 5	MCERTS	< 5	< 5			
1,1-Dichloroethene	ug/kg	< 5	MCERTS	< 5	< 5			
MTBE	ug/kg	< 5	MCERTS	< 5	< 5			
trans-1,2-Dichloroethene	ug/kg	< 5	MCERTS	< 5	< 5			
1,1-Dichloroethane	ug/kg	< 5	MCERTS	< 5	< 5			
cis-1,2-Dichloroethene	ug/kg	< 5	MCERTS	< 5	< 5			
2,2-Dichloropropane	ug/kg	< 5	MCERTS	< 5	< 5			
Chloroform	ug/kg	< 5	MCERTS	< 5	< 5			
Bromochloromethane	ug/kg	< 5	MCERTS	< 5	< 5			
1,1,1-Trichloroethane	ug/kg	< 5	MCERTS	< 5	< 5			
1,1-Dichloropropene	ug/kg	< 10	MCERTS	< 10	< 10			
Carbon Tetrachloride	ug/kg	< 5	MCERTS	< 5	< 5			
1,2-Dichloroethane	ug/kg	< 5	MCERTS	< 5	< 5			
Benzene	ug/kg	< 2	MCERTS	< 2	< 2			
1,2-Dichloropropane	ug/kg	< 5	MCERTS	< 5	< 5			
Trichloroethene	ug/kg	< 5	MCERTS	< 5	< 5			
Bromodichloromethane	ug/kg	< 5	MCERTS	< 5	< 5			
Dibromomethane	ug/kg	< 5	MCERTS	< 5	< 5			
TAME	ug/kg	< 5	MCERTS	< 5	< 5			
cis-1,3-Dichloropropene	ug/kg	< 5	MCERTS	< 5	< 5			
Toluene	ug/kg	< 5	MCERTS	< 5	< 5			
trans-1,3-Dichloropropene	ug/kg	< 5	MCERTS	< 5	< 5			
1,1,2-Trichloroethane	ug/kg	< 10	MCERTS	< 10	< 10			
1,3-Dichloropropane	ug/kg	< 5	MCERTS	< 5	< 5			
Tetrachloroethene	ug/kg	< 5	MCERTS	< 5	< 5			
Dibromochloromethane	ug/kg	< 5	MCERTS	< 5	< 5			
1,2-Dibromoethane	ug/kg	< 5	MCERTS	< 5	< 5			
Chlorobenzene	ug/kg	< 5	MCERTS	< 5	< 5			
1,1,1,2-Tetrachloroethane	ug/kg	< 5	MCERTS	< 5	< 5			
Ethyl Benzene	ug/kg	< 2	MCERTS	< 2	< 2			
m,p-Xylene	ug/kg	< 2	MCERTS	< 2	< 2			
o-Xylene	ug/kg	< 2	MCERTS	< 2	< 2			
Styrene	ug/kg	< 5	MCERTS	< 5	< 5			
Bromoform	ug/kg	< 10	MCERTS	< 10	< 10			
Isopropylbenzene	ug/kg	< 5	MCERTS	< 5	< 5			
1,1,2,2-Tetrachloroethane	ug/kg	< 5	MCERTS	< 5	< 5			
1,2,3-Trichloropropane	ug/kg	< 5	MCERTS	< 5	< 5			
n-Propylbenzene	ug/kg	< 5	MCERTS	< 5	< 5			
Bromobenzene	ug/kg	< 5	MCERTS	< 5	< 5			
2-Chlorotoluene	ug/kg	< 5	MCERTS	< 5	< 5			
1,3,5-Trimethylbenzene	ug/kg	< 5	MCERTS	< 5	< 5			
4-Chlorotoluene	ug/kg	< 5	MCERTS	< 5	< 5			
tert-Butylbenzene	ug/kg	< 5	MCERTS	< 5	< 5			
1,2,4-Trimethylbenzene	ug/kg	< 5	MCERTS	< 5	< 5			
sec-Butylbenzene	ug/kg	< 5	MCERTS	< 5	< 5			
p-Isopropyltoluene	ug/kg	< 5	MCERTS	< 5	< 5			
1,3-Dichlorobenzene	ug/kg	< 5	MCERTS	< 5	< 5			
1,4-Dichlorobenzene	ug/kg	< 5	MCERTS	< 5	< 5			
n-Butylbenzene	ug/kg	< 5	MCERTS	< 5	< 5			
1,2-Dichlorobenzene	ug/kg	< 5	MCERTS	< 5	< 5			
,2-Dibromo-3-chloropropane	ug/kg	< 10	MCERTS	< 10	< 10			
Hexachlorobutadiene	ug/kg	< 5	MCERTS	< 5	< 5			

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C

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Soil Analysis Certificate - Sample Descriptions	
QTS Environmental Report No: 17-59844	
CSG Consulting Engineers Ltd	
Site Reference: Holbeach Road, Spalding	
Project / Job Ref: 696	
Order No: 1860	
Reporting Date: 12/06/2017	

QTSE Sample No	TP / BH No	Additional Refs	Depth (m)	Moisture Content (%)	Sample Matrix Description
^ 272379	DH/696/LS/TP13	46	0.20	9.7	Brown sandy clay with brick and concrete
^ 272380	DH/696/LS/TP13	50	3.00	19.6	Brown sandy clay

Moisture content is part of procedure E003 & is not an accredited test
Insufficient Sample I/S
Unsuitable Sample U/S
^ no sampling date provided; unable to confirm if samples are within acceptable holding times

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Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received

APPENDIX 7

Geotechnical LaboratoryTest Certificates

TERRA TEK
SITE INVESTIGATION & LABORATORY SERVICES

CSG Consulting Engineers Limited
31 Greenlands Business Centre
Studley Road
Redditch
B98 7HD

For the attention of Paul Palgrave

Report No: B20858
Issue No 01

LABORATORY TEST REPORT

Project Name	**HOLBEACH ROAD, SPALDING**		
Project Number	**B20858**	Date samples received	05/06/2017
Your Ref		Date written instructions received	05/06/2017
Purchase Order	696/1861	Date testing commenced	05/06/2017

Please find enclosed the results as summarised below

Figure / Table	Test Quantity	Description	ISO 17025 Accredited
1	~	Summary of Geotechnical Tests	See report
2	6	Sulphate (water soluble) - Soil	Yes
2	6	pH - Soil	Yes
3-8	6	Atterberg Limit	Yes
9-10	2	Particle Size Distribution	Yes
11	1	One Dimensional Consolidation	Yes
12	3	Hand Vane Test	No
App S1	~	Sample Descriptions - Soil	N/A
App S2	~	Deviating Samples - Soil	N/A
App S3	~	Summary of In-House Analytical Test Methods - Soil	N/A

Remarks :

Issued by : Stephen Langman Date of Issue : 24/06/2017

Approved Signatories : S. Langman 24/06/2017

G Wilson (JMD/Laboratories Director), S Langman (Laboratory Coordinator)

Key to symbols used in this report
S/C : Testing was sub-contracted

Unless we are notified to the contrary, samples will be disposed after a period of one month from this date.
The results reported relate to samples received in the laboratory only.
All results contained in this report are provisional unless signed by an approved signatory
This report should not be reproduced except in full without the written approval of the laboratory.
Under multisite accreditation the testing contained in this report may have been performed at another Terra Tek laboratory.
The enclosed results remain the property of Terra Tek Limited and we reserve the right to withdraw
our report if we have not received cleared funds in accordance with our standard terms and conditions
Only those results indicated in this report are UKAS accredited and any opinions or interpretations expressed are outside the scope of UKAS accreditation.
Feedback on the this report may be left via our website www.terratek.co.uk/contact-us

mCERTS UKAS TESTING 0126 25 YEARS 1990-2015

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TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES

Site: HOLBEACH ROAD, SPALDING

Client:

Engineer:

Contract No B20858

Sample Identification							Atterberg limits						Density		Total Stress			
Exploratory Hole	Depth m	Sample Ref	Sample Type	Lab Sample ID	Non Engineering Sample Description	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index	Percentage retained 425µm %	Atterberg Classification	Particle Density Mg/m³	Bulk Mg/m³	Dry Mg/m³	Shear Strength kPa	Apparent Cohesion C kPa	Angle of Shearing Resistance Phi	Other Tests
TP01	1.30		B	419466	Brown sandy CLAY.	30	32	19	13	0	CL		1.95	1.50				Oed,Shear Vane
TP01	2.00		B	419467	Brown slightly clayey very silty SAND.	28		non plastic	~	0								PSD
TP01	3.00		B	419468	Brown clayey SAND													Geochemical
TP04	1.00		ET	419445	Brown CLAY.	28	52	12	40	0	CH							
TP05	1.00		ET	419448	Brown sandy CLAY.	24	34	16	18	0	CL							
Notes	Opinions and interpretations are outside the scope of UKAS accreditation				UKAS Accredited Test Y/N	Test details are given on the 'Notes on Laboratory Procedures' sheet												See individual report sheets
						Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	

Originator	Approved
ME	S. Langman 24/06/2017

SUMMARY OF GEOTECHNICAL TESTS

Figure 1

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES

Site: HOLBEACH ROAD, SPALDING

Client:

Engineer:

Contract No B20858

Sample Identification							Atterberg limits						Density		Total Stress			
Exploratory Hole	Depth m	Sample Ref	Sample Type	Lab Sample ID	Non Engineering Sample Description	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index	Percentage retained 425µm %	Atterberg Classification	Particle Density Mg/m³	Bulk Mg/m³	Dry Mg/m³	Shear Strength kPa	Apparent Cohesion C kPa	Angle of Shearing Resistance Phi	Other Tests
TP06	1.00		ET	419450	Brown CLAY.	31	36	14	22	0	CI							
TP07	2.40		ET	419453	Brown SAND													Geochemical
TP08	1.60		B	419469	Brown very sandy clayey SILT with occasional gravel. Gravel is fine.													PSD
TP08	2.80		ET	419455	Brown CLAY.	32	37	21	16	0	CI							
WS02	1.70-2.00		ET	419459	Brown sandy CLAY													Geochemical
Notes	Opinions and interpretations are outside the scope of UKAS accreditation				UKAS Accredited Test Y/N	Test details are given on the 'Notes on Laboratory Procedures' sheet												See individual report sheets
						Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	

Originator	Approved
ME	S. Langman 24/06/2017

SUMMARY OF GEOTECHNICAL TESTS

Figure 1

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES

Site: HOLBEACH ROAD, SPALDING

Client:

Engineer:

Contract No B20858

Sample Identification							Atterberg limits						Density		Total Stress				
Exploratory Hole	Depth m	Sample Ref	Sample Type	Lab Sample ID	Non Engineering Sample Description	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index	Percentage retained 425µm %	Atterberg Classification	Particle Density Mg/m³	Bulk Mg/m³	Dry Mg/m³	Shear Strength kPa	Apparent Cohesion C kPa	Angle of Shearing Resistance Phi	Other Tests
WS02	2.50-3.00		ET	419460	Brown SAND													Geochemical
WS03	1.60-2.00		ET	419462	Brown clayey SAND													Geochemical
WS04	1.50		ET	419464	Brown clayey SAND													Geochemical
Notes	Opinions and interpretations are outside the scope of UKAS accreditation				UKAS Accredited Test Y/N	Test details are given on the 'Notes on Laboratory Procedures' sheet: Y	Y	Y	Y	Y	-	Y	Y	Y	Y	Y	Y	See individual report sheets

Originator	Approved
ME	S. Langman 24/06/2017

SUMMARY OF GEOTECHNICAL TESTS

Figure 1

Sheet 3 of 3

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES

Site HOLBEACH ROAD, SPALDING

Client

Engineer

Contract No B20858

Sample Identification				Lab Sample ID	Non Engineering Sample Description	Sample Passing 2.0 mm Test Sieve	Organic Matter		Mass Loss on Ignition	Sulphate Content as SO4			Carbonate as CO2	Chloride Content			pH Value	Total Dissolved Solids
Exploratory Hole	Depth m	Sample Ref	Sample Type				Organic Content	Sulphides or Chlorides Present		Total Acid Soluble Sulphate	Sulphate Content of 2:1 Water:Soil Extract	Sulphate Content of Groundwater		Water Soluble Chloride Content	Water : Soil Ratio	Acid Soluble Chloride Content		
						%	%		%	%	g/l	mg/l	%	%		%	pH Units	mg/l
TP01	3.00		B	419468	Brown clayey SAND	100	~	~	~	~	0.09	~	~	~	~	~	8.5	~
TP07	2.40		ET	419453	Brown SAND	100	~	~	~	~	0.03	~	~	~	~	~	8.9	~
WS02	1.70-2.00		ET	419459	Brown sandy CLAY	100	~	~	~	~	0.02	~	~	~	~	~	8.6	~
WS02	2.50-3.00		ET	419460	Brown SAND	100	~	~	~	~	0.09	~	~	~	~	~	8.8	~
WS03	1.60-2.00		ET	419462	Brown clayey SAND	100	~	~	~	~	0.01	~	~	~	~	~	8.2	~
WS04	1.50		ET	419464	Brown clayey SAND	100	~	~	~	~	0.02	~	~	~	~	~	8.3	~
Notes	Opinions and interpretations are outside the scope of UKAS accreditation				Terra Tek Analysis Method	GP001	TP041		TP042	TP029	TP043	TP065	TP114	TP134		TP098	TP019	TP035
					Accreditation M=Mcerts U=UKAS N=No accreditation	M	U		M	M	M	U	N	M		N	M	U

Originator	Checked & Approved
TGH	S. Langrish 24/06/2017

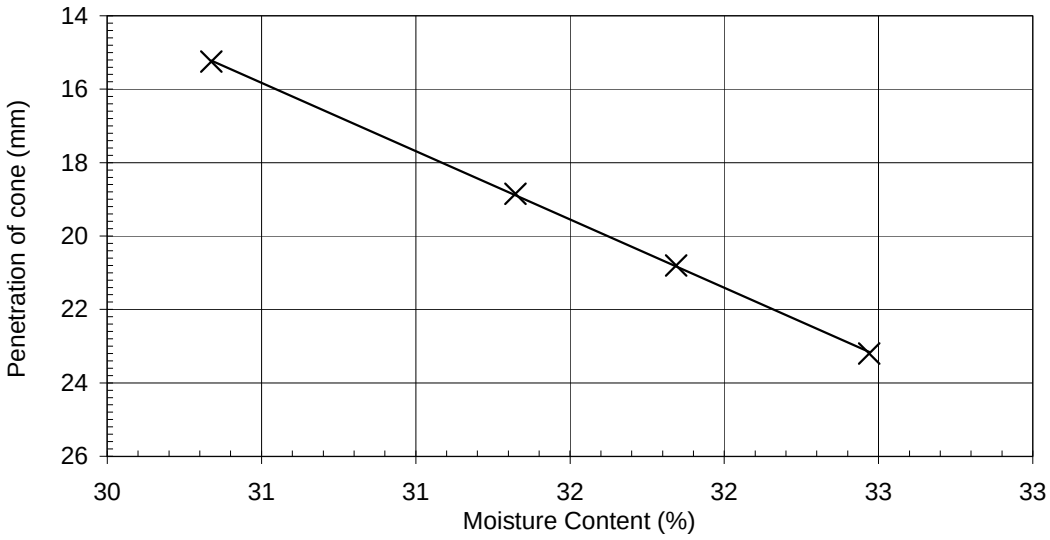
RESULTS OF CHEMICAL AND ELECTRO-CHEMICAL TESTS

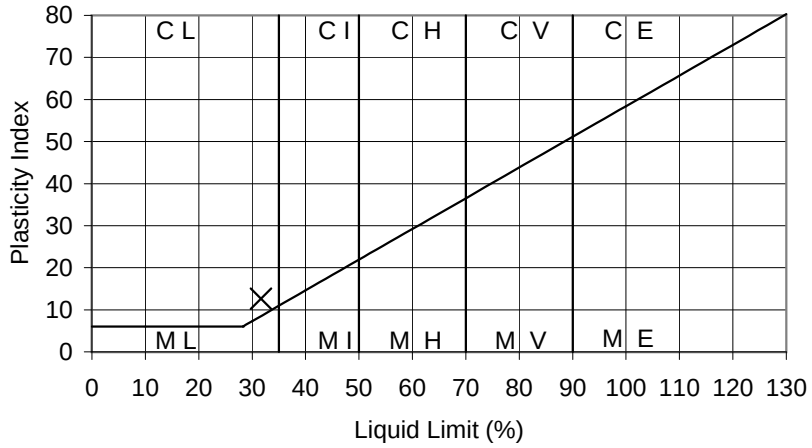
Figure 2

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES	Site HOLBEACH ROAD, SPALDING	**Contract No. B20858**
	Client	Hole ID TP01
	Engineer	Sample Ref Depth (m) 1.30 Sample Type B

Non Engineering Description : Brown sandy CLAY.

Preparation : Sample as received





Results :

As Received Moisture Content : (BS1377:Part 2:Clause 3:1990)	30	%
Percentage retained on 425µm sieve :	0	%
Liquid Limit :	32	%
Plastic Limit :	19	%
Plasticity Index :	13	
Equivalent moisture content of material passing 425µm sieve :	30	%
Liquidity Index :	0.85	

Originator	Checked & Approved	**Liquid Limit (Four Point Cone Penetrometer Method)** **Plastic Limit, Plasticity Index & Liquidity Index** BS 1377:Part 2:Clause 4.3:1990 BS 1377:Part 2:Clause 5:1990	**Figure 3**
KP	S. Langman 24/06/2017		Sheet 1 of 1

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES

Site HOLBEACH ROAD, SPALDING

Client

Engineer

Contract No. B20858

Hole ID TP01
Sample Ref
Depth (m) 2.00
Sample Type B

Non Engineering Description : Brown slightly clayey very silty SAND.

Preparation : Sample washed and air dried

Sample was determined to be Non-Plastic after preparation

Results :

As Received Moisture Content : (BS1377:Part 2:Clause 3:1990)	28 %
Percentage retained on 425µm sieve :	0 %
Equivalent moisture content of material passing 425µm sieve :	28 %

Originator	Checked & Approved
KP	24/06/2017

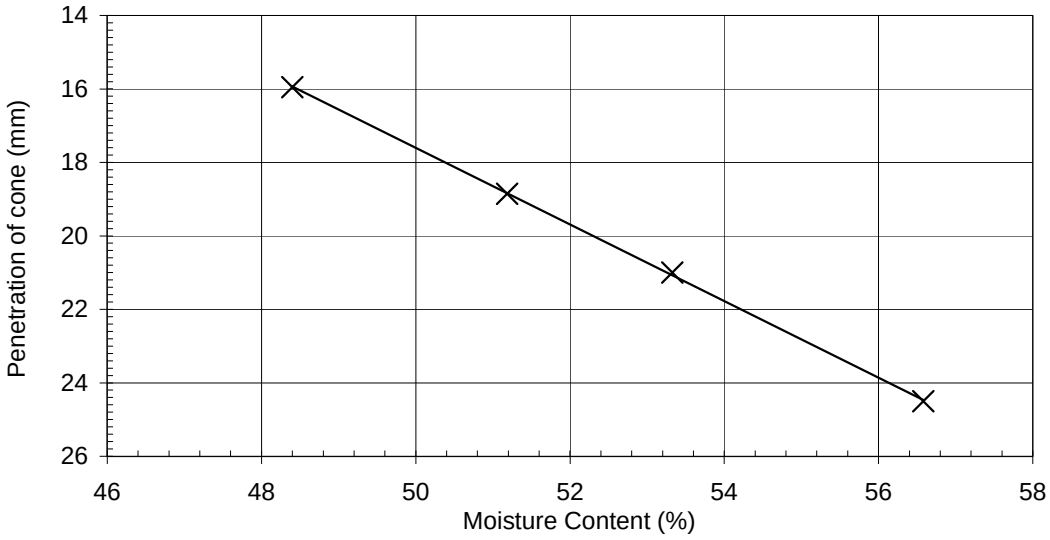
Plastic Limit
BS 1377:Part 2:Clause 5:1990

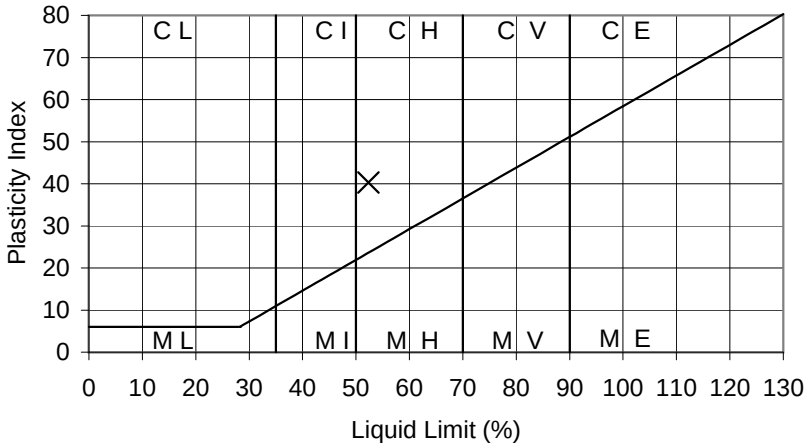
Figure 4

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES	Site HOLBEACH ROAD, SPALDING	**Contract No. B20858**
	Client	Hole ID TP04
	Engineer	Sample Ref Depth (m) 1.00 Sample Type ET

Non Engineering Description : Brown CLAY.

Preparation : Sample as received





Results :

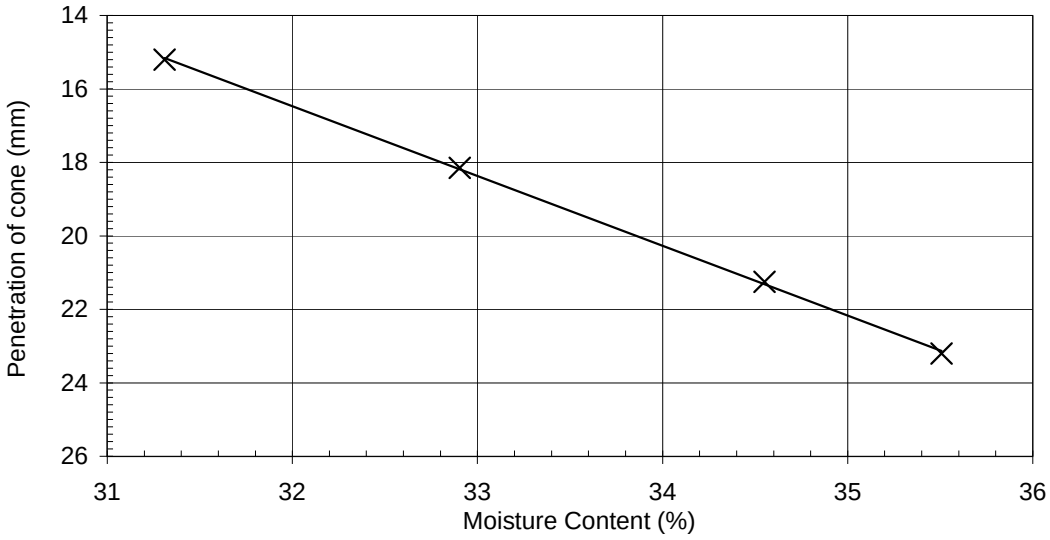
As Received Moisture Content : (BS1377:Part 2:Clause 3:1990)	28	%
Percentage retained on 425µm sieve :	0	%
Liquid Limit :	52	%
Plastic Limit :	12	%
Plasticity Index :	40	
Equivalent moisture content of material passing 425µm sieve :	28	%
Liquidity Index :	0.40	

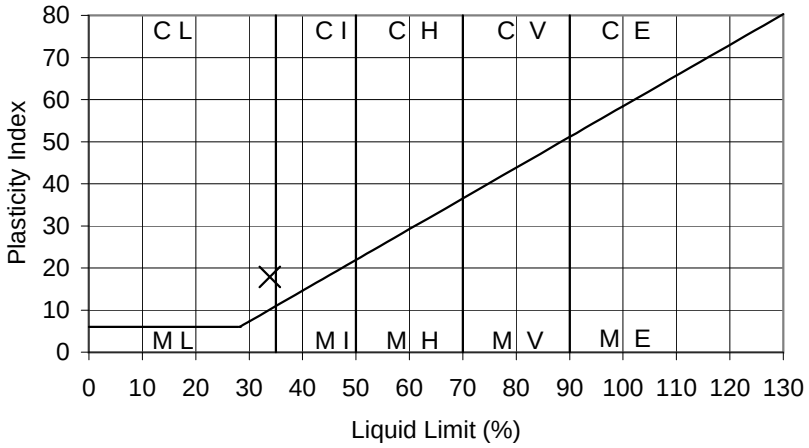
Originator	Checked & Approved	**Liquid Limit (Four Point Cone Penetrometer Method)** **Plastic Limit, Plasticity Index & Liquidity Index** BS 1377:Part 2:Clause 4.3:1990 BS 1377:Part 2:Clause 5:1990	**Figure 5**
KP	S. Langman 24/06/2017		Sheet 1 of 1

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES	Site HOLBEACH ROAD, SPALDING	**Contract No. B20858**
	Client	Hole ID TP05
	Engineer	Sample Ref Depth (m) 1.00 Sample Type ET

Non Engineering Description : Brown sandy CLAY.

Preparation : Sample as received





Results :

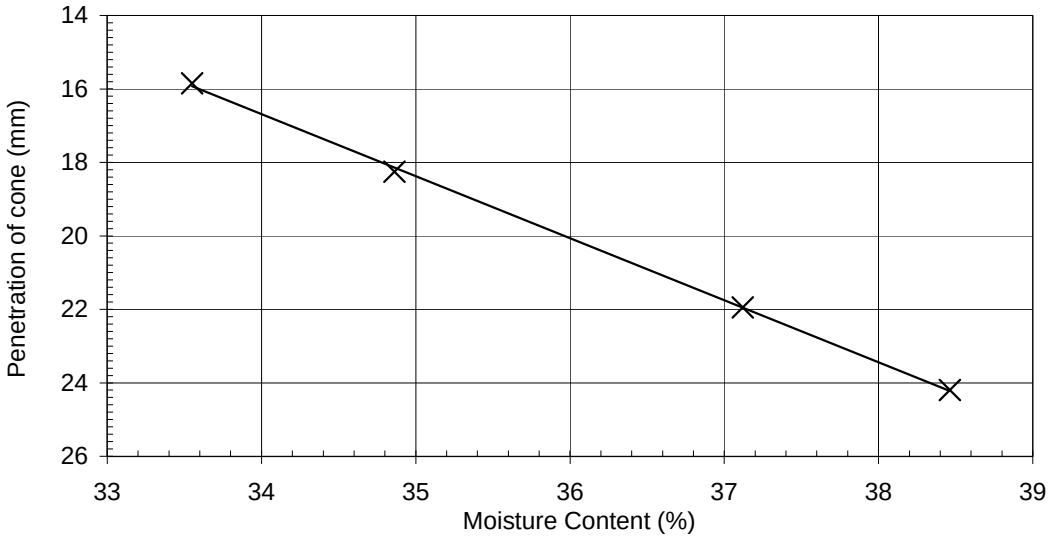
As Received Moisture Content : (BS1377:Part 2:Clause 3:1990)	24	%
Percentage retained on 425µm sieve :	0	%
Liquid Limit :	34	%
Plastic Limit :	16	%
Plasticity Index :	18	
Equivalent moisture content of material passing 425µm sieve :	24	%
Liquidity Index :	0.44	

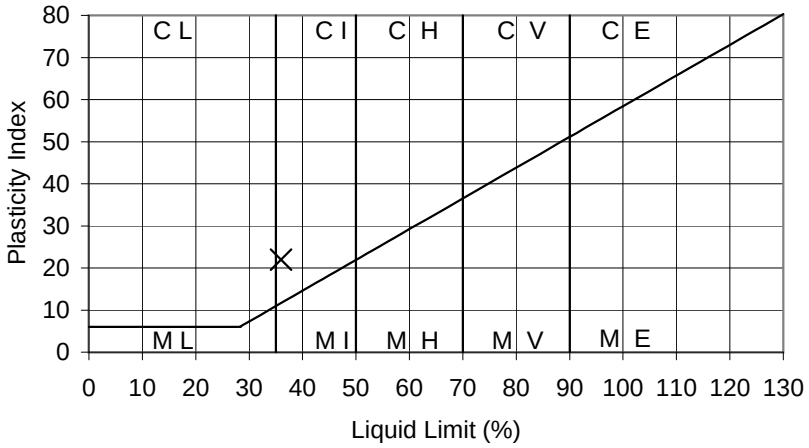
Originator	Checked & Approved	**Liquid Limit (Four Point Cone Penetrometer Method)** **Plastic Limit, Plasticity Index & Liquidity Index** BS 1377:Part 2:Clause 4.3:1990 BS 1377:Part 2:Clause 5:1990	**Figure 6**
KP	S. Langman 24/06/2017		Sheet 1 of 1

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES	Site HOLBEACH ROAD, SPALDING	**Contract No. B20858**
	Client	Hole ID TP06
	Engineer	Sample Ref Depth (m) 1.00 Sample Type ET

Non Engineering Description : Brown CLAY.

Preparation : Sample as received





Results :

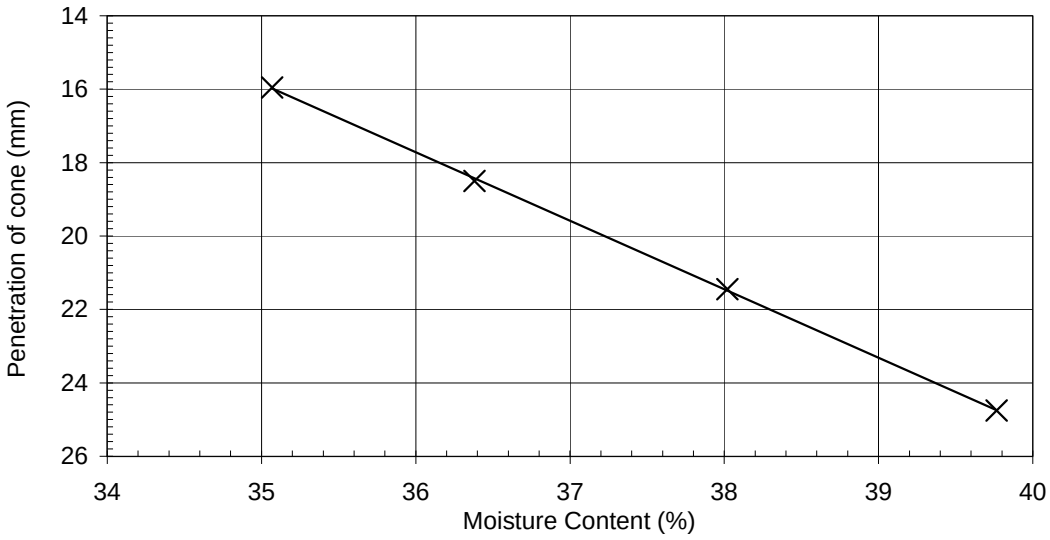
As Received Moisture Content : (BS1377:Part 2:Clause 3:1990)	31 %
Percentage retained on 425µm sieve :	0 %
Liquid Limit :	36 %
Plastic Limit :	14 %
Plasticity Index :	22
Equivalent moisture content of material passing 425µm sieve :	31 %
Liquidity Index :	0.77

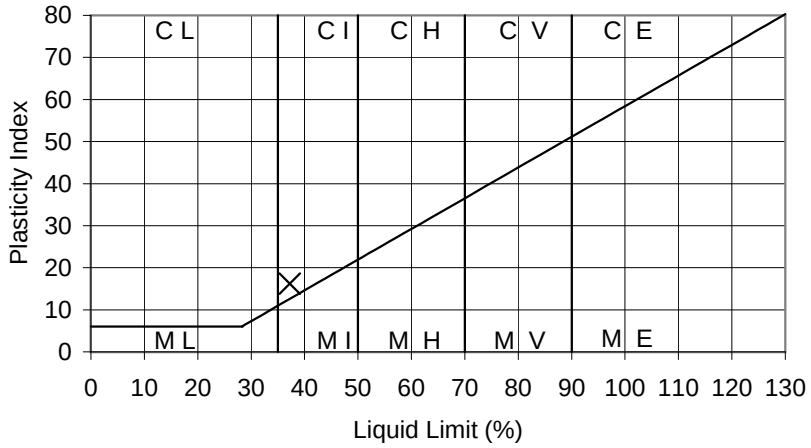
Originator	Checked & Approved	**Liquid Limit (Four Point Cone Penetrometer Method)** **Plastic Limit, Plasticity Index & Liquidity Index** BS 1377:Part 2:Clause 4.3:1990 BS 1377:Part 2:Clause 5:1990	**Figure 7**
KP	S. Langman 24/06/2017		Sheet 1 of 1

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES	Site HOLBEACH ROAD, SPALDING	**Contract No. B20858**
	Client	Hole ID TP08
	Engineer	Sample Ref Depth (m) 2.80 Sample Type ET

Non Engineering Description : Brown CLAY.

Preparation : Sample as received





Results :

As Received Moisture Content : (BS1377:Part 2:Clause 3:1990)	32	%
Percentage retained on 425µm sieve :	0	%
Liquid Limit :	37	%
Plastic Limit :	21	%
Plasticity Index :	16	
Equivalent moisture content of material passing 425µm sieve :	32	%
Liquidity Index :	0.69	

Originator	Checked & Approved	**Liquid Limit (Four Point Cone Penetrometer Method)** **Plastic Limit, Plasticity Index & Liquidity Index** BS 1377:Part 2:Clause 4.3:1990 BS 1377:Part 2:Clause 5:1990	**Figure 8**
KP	S. Langman 24/06/2017		Sheet 1 of 1

Version 059 - 24/06/2013
1260 - PSD TP01 02.00 B - B20858-419467.xls : Sample ID 419467

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES

Site HOLBEACH ROAD, SPALDING

Client

Engineer

Contract No B20858

Hole TP01
Sample Ref
Depth (m) 2.00
Sample Type B

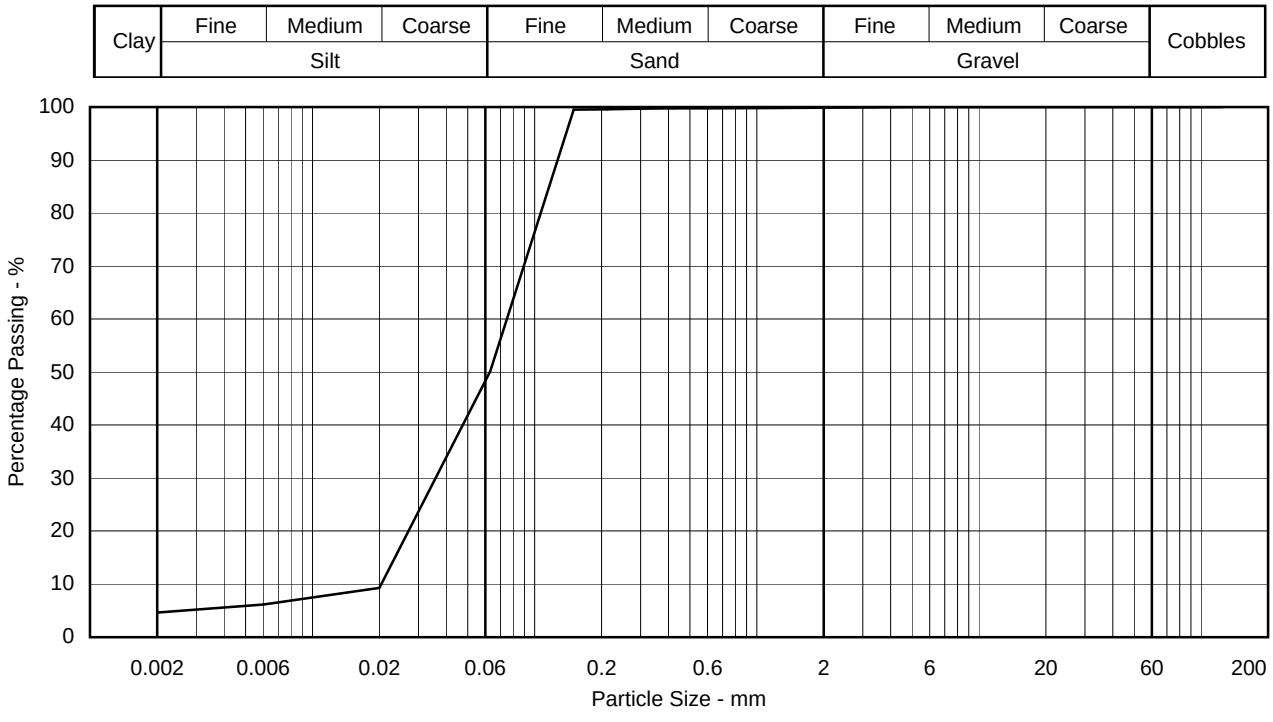
Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	100
2.00 mm	100
1.18 mm	100
600 µm	100
425 µm	100
300 µm	100
212 µm	100
150 µm	100
63 µm	50
20 µm	9
6 µm	6
2 µm	5

Non Engineering Description
Brown slightly clayey very silty SAND.

Sample Proportions - %	
Cobbles	0.0
Gravel	0.1
Sand	52.6
Silt	42.6
Clay	4.6

Particle Diameter - mm	
D100	5.0
D60	0.075
D10	0.020
Uniformity Coefficient	3.8

Notes
Sedimentation sample not pre-treated



Originator	Checked & Approved
JW/SG	S. Longman 24/06/2017

PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990 Clause 9.2 - Wet Sieving
BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

Figure 9

Moor Lane, Witton, Birmingham, B6 7HG
Lab Project No B20858 : 24/06/2017 09:55:59

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES

Site	HOLBEACH ROAD, SPALDING	**Contract No** **B20858**
Client		Hole TP08
Engineer		Sample Ref Depth (m) 1.60 Sample Type B

Particle Size	% Passing
125.0 mm	100
90.0 mm	100
75.0 mm	100
63.0 mm	100
50.0 mm	100
37.5 mm	100
28.0 mm	100
20.0 mm	100
14.0 mm	100
10.0 mm	100
6.30 mm	100
5.00 mm	100
3.35 mm	99
2.00 mm	99
1.18 mm	98
600 µm	97
425 µm	96
300 µm	95
212 µm	94
150 µm	92
63 µm	53
20 µm	12
6 µm	7
2 µm	5

Non Engineering Description

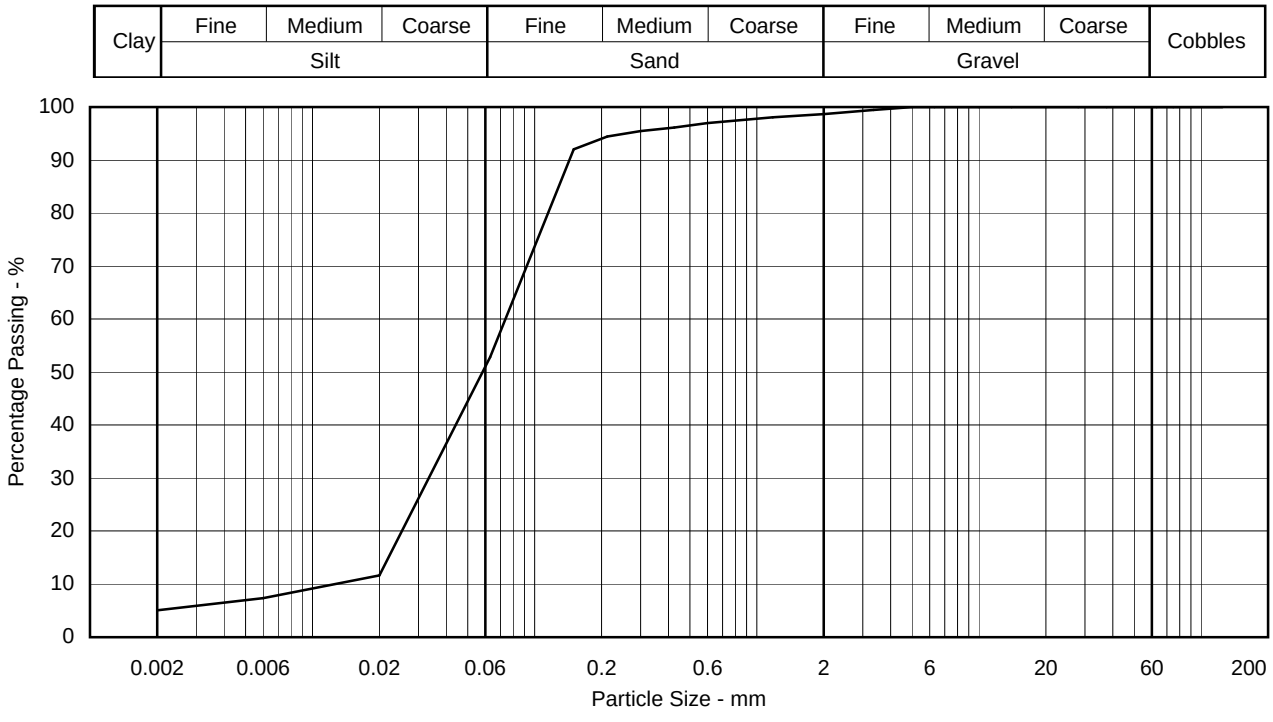
Brown very sandy clayey SILT with occasional gravel. Gravel is fine.

Sample Proportions - %	
Cobbles	0.0
Gravel	1.3
Sand	48.7
Silt	44.9
Clay	5.0

Particle Diameter - mm	
D100	5.0
D60	0.074
D10	0.013
Uniformity Coefficient	5.7

Notes

Sedimentation sample not pre-treated



Originator	Checked & Approved
JW/ME	24/06/2017

PARTICLE SIZE DISTRIBUTION

BS1377:Part 2:1990 Clause 9.2 - Wet Sieving
BS1377:Part 2:1990 Clause 9.4 - Sedimentation by Pipette

Figure 10

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES

Site HOLBEACH ROAD, SPALDING

Client

Engineer

Contract No B20858

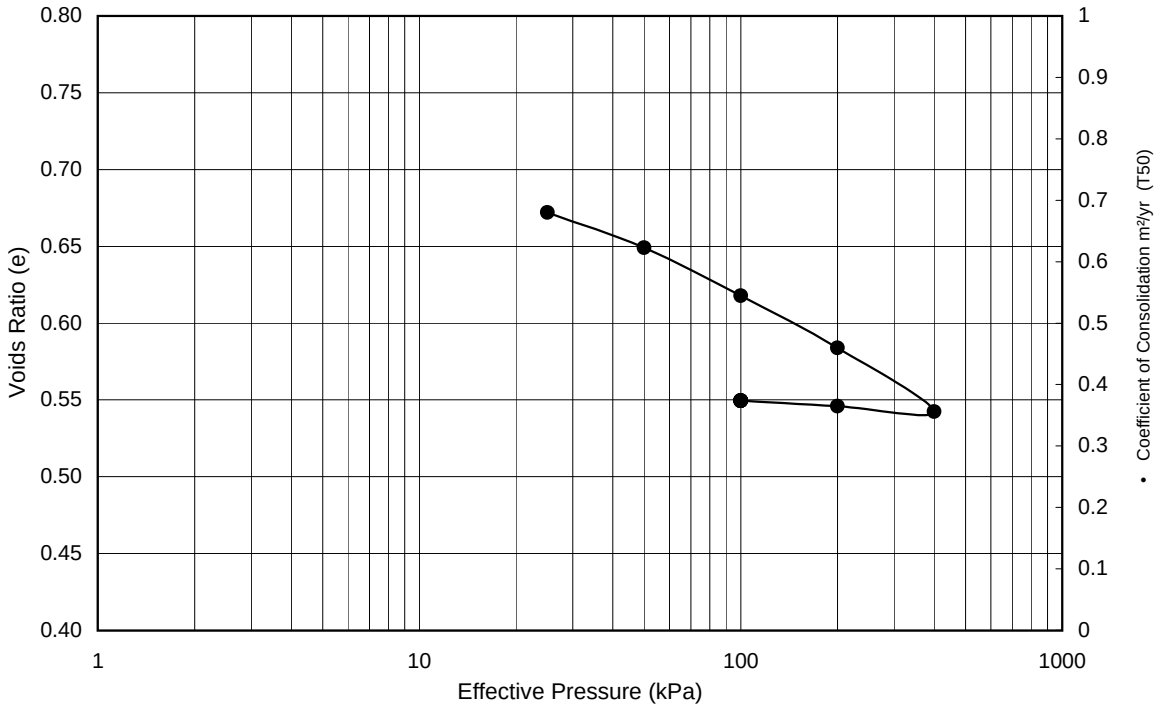
Hole ID TP01
Sample Ref
Depth (m) 1.30
Sample Type B

Non Engineering Description: Brown very sandy very silty CLAY.

Initial Moisture Content	29 %	Final Moisture Content	24 %	
Initial Voids Ratio	0.770	Final Voids Ratio	0.550	
Initial Bulk Density	1.95 Mg/m³	Particle Density	2.68 Mg/m³	Assumed
Initial Dry Density	1.51 Mg/m³	Degree of saturation	101 %	
Specimen Dimensions	19.91mm x 75.01mm dia			
Laboratory temperature	20±2°C			

Specimen taken 50mm below top of (U100) tube by vertical extrusion with horizontal orientation

Pressure Range kPa	M_v m²/MN	C_v (root time) m²/year	C_v (log time) m²/year	Voids ratio (e)	C_{sec}	Duration days
2 - 25	2.408	2.74	2.17	0.672		1
25 - 50	0.548	4.08	2.11	0.649		1
50 - 100	0.380	3.20	2.66	0.618		1
100 - 200	0.209	5.07	3.83	0.584		1
200 - 400	0.131	6.13	7.31	0.542		1
400 - 200	0.011	7.44	7.84	0.546		1
200 - 100	0.024	12.02	unable to assess	0.550		1



Originator	Checked & Approved
MUF	S. Langman 24/06/2017

ONE DIMENSIONAL CONSOLIDATION
BS1377:PART 5:1990

Figure 11

Moor Lane, Witton, Birmingham, B6 7HG

T:\Project\ 01.xls

TERRA TEK
Site Investigation & Laboratory Services

Site HOLBEACH ROAD, SPALDING

Client

Engineer

Contract No B20858

Sample Identification									
Exploratory Hole	Depth m	Sample Ref	Sample Type	Lab Sample ID	Reading 1 kPa	Reading 2 kPa	Reading 3 kPa	Mean kPa	Notes
TP01	2.80		B	419466	8	9	8	8	
TP06	1.00		ET	419450	9	9	9	9	
TP08	2.80		ET	419455	12	12	12	12	

Notes Opinions and interpretations are outside the scope of UKAS accreditation

UKAS Accredited Test No

Originator	Approved
ME	SPL

HAND VANE TEST

Figure 12

Sheet 1 of 1

Moor Lane, Witton, Birmingham, B6 7HG
Lab Project No B20858 : 24/06/2017 09:57:51

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES

Site HOLBEACH ROAD, SPALDING

Client

Engineer

Contract No B20858

Sample Identification				Lab Sample ID	Date Sampled	Temperature of cool box on receipt °C	Description
Exploratory Hole	Depth m	Sample Ref	Sample Type				
TP01	3.00		B	419468	Deviating	11.0	Brown clayey SAND
TP07	2.40		ET	419453	Deviating	11.0	Brown SAND
WS02	1.70-2.00		ET	419459	Deviating	11.0	Brown sandy CLAY
WS02	2.50-3.00		ET	419460	Deviating	11.0	Brown SAND
WS03	1.60-2.00		ET	419462	Deviating	11.0	Brown clayey SAND
WS04	1.50		ET	419464	Deviating	11.0	Brown clayey SAND

Notes

1. Where a date of sampling is not provided, the sample is classified as deviating.
2. Samples are considered deviating if the incorrect sample container type has been used. This is indicated within the report tables.
3. Results reported for samples classified as deviating may be compromised.

Originator	Checked & Approved	LABORATORY DESCRIPTIONS	Appendix S1
TGH	S. Langman 24/06/2017		Sheet 1 of 1

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES

Site HOLBEACH ROAD, SPALDING

Client

Engineer

Contract No B20858

Sample Identification				Lab Sample ID	Date Sampled	Deviating conditions						Preservatives used
Exploratory Hole	Depth m	Sample Ref	Sample Type			Sampling date has not been provided	Exceeded maximium holding time for selected test(s)	Presence of headspace in sample vial	Poorly fitting cap or lid	Damaged container		
TP01	3.00		B	419468	Deviating							
TP07	2.40		ET	419453	Deviating							
WS02	1.70-2.00		ET	419459	Deviating							
WS02	2.50-3.00		ET	419460	Deviating							
WS03	1.60-2.00		ET	419462	Deviating							
WS04	1.50		ET	419464	Deviating							

NOTES
1 Results reported for samples classified as deviating may be compromised. Deviation types are shown as "X" or "Yes" in the table above.
2 The absence of "X" or "Yes" in the table above indicates no reported deviations.
3 Deviations due to use of incorrect sample container are shown on result tables.
4 Deviating results are indicated within result tables.

Originator	Checked & Approved	DEVIATING SAMPLES - SOIL	Appendix S2
TGH	S. Langman 24/06/2017		Sheet 1 of 1

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES

Site HOLBEACH ROAD, SPALDING

Client

Engineer

Contract No B20858

Method Code	Reference	Description of Method	ISO17025 Accredited	MCERTS Accredited	Wet/Dry Sample Tested
GP001	BS1377, Part 3, 1990: Soils for Civil Engineering Purposes.	Preparation of soil samples for chemical analysis	Yes	Yes	N/A
GP012	BS EN 12457-3: Characterisation of Waste - Compliance test for leaching of granular waste materials and sludges (two-stage batch test)	Preparation of soil samples for two-stage leachate test			Dry
TP019	BS1377, Part 3, 1990: Soils for Civil Engineering Purposes.	Determination of pH in 2.5:1 water/soil extract using pH meter.	Yes	Yes	Dry
TP029	BS1377, Part 3, 1990: Soils for Civil Engineering Purposes.	Determination of acid soluble sulfate by gravimetry.	Yes	Yes	Dry
TP032	MAFF Book 427: The Analysis of Agricultural Materials: Method 8	Determination of water soluble boron by colorimetry	Yes		Dry
TP033	APHA/AWWA, 19th edition: Method 5520E	Determination of Toluene Extractable Matter by soxhlet extraction.	Yes		Dry
TP040	APHA/AWWA, 19th edition: Method 3500Cr-D	Determination of hexavalent chromium by colorimetry.	Yes		Dry
TP041	BS1377, Part 3, 1990: Soils for Civil Engineering Purposes.	Determination of organic matter by titrimetry.	Yes		Dry
TP042	BS1377, Part 3, 1990: Soils for Civil Engineering Purposes.	Determination of loss on ignition at 50-440°C by gravimetry	Yes	Yes	Dry
TP043	BS1377, Part 3, 1990: Soils for Civil Engineering Purposes.	Determination of water soluble sulfate in 2:1 water/soil extract	Yes	Yes	Dry
TP045	GACHAMJA A.M. Chromatography and Analysis: 1992 9-11 (modified)	Determination of polyaromatic hydrocarbons extractable in dichloromethane, by GC/MS	Yes	Yes	Dry
TP046	MEWAM method: Phenols in water and Effluents: 4-aminoantipyrine method	Determination of monohydric phenols by steam distillation/colorimetry	Yes	Yes	Dry
TP047	MEWAM method: Cyanide in Waters etc	Determination of Free Cyanide by steam distillation/colorimetry	Yes		Dry
TP048	MEWAM method: Cyanide in Waters etc	Determination of total cyanide by steam distillation/colorimetry.	Yes	Yes	Wet
TP049	MEWAM method: Cyanide in Waters etc	Determination of complex cyanide by calculation	Yes		Dry
TP050	MEWAM method: Determination of Thiocyanate ,1985	Determination of thiocyanate by colorimetry	Yes	Yes	Dry
TP051	USEPA Method 9030B	Determination of acid soluble sulfides by steam distillation/colorimetry.	Yes	Yes	Dry
TP052	BS1881: Part 324, 1988: Testing Concrete	Determination of elemental sulfur by soxhlet extraction and titrimetry.	Yes		Dry
TP067	TNRCC Method 1005: 2001 (modified)	Determination of pentane/acetone extractable petroleum hydrocarbons (C8 - C40) by GC/FID	Yes	Yes	Wet
TP072	In-house documented method	Determination of ammoniacal nitrogen by colorimetry.			Dry

Notes

1. Terra Tek (Birmingham) are MCERTS accredited for clay, sand & loam matrix types only, where they constitute the major component of the sample. Other coarse granular materials, ie gravel, are not accredited where they comprise the major component of the sample.
2. Results are expressed on a dry-weight basis (samples dried at 30°C ± 5°C) except where stated.
3. The laboratory removes any material >2mm prior to analysis. The quantity and nature of any material removed from samples is recorded and the information is available on request.
4. The laboratory records the date of analysis of each parameter. This information is available on request.
5. Where a parameter cannot be determined in house it is our policy to use a UKAS/MCERTS accredited laboratory wherever possible. Terra Tek will assume responsibility for the quality of subcontracted tests and the performance of the subcontractor chosen. Where there is no known UKAS/MCERTS laboratory for a particular parameter, a laboratory listed within the Terra Tek Approved Subcontractors list, which is subject to performance assessment, will be selected.

Originator	Checked & Approved	SUMMARY OF IN-HOUSE ANALYTICAL TEST METHODS (SOIL)	Appendix S3
N/A	N/A		Sheet 1 of 2

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES

Site HOLBEACH ROAD, SPALDING

Client

Engineer

Contract No B20858

Method Code	Reference	Description of Method	ISO17025 Accredited	MCERTS Accredited	Wet/Dry Sample Tested
TP073	In-house documented method	Determination of anionic detergent (MBAS) by colorimetry			Dry
TP074	In-house documented method	Determination of water soluble fluoride by ion selective electrode			Dry
TP098	BS1377, Part 3, 1990: Soils for Civil Engineering Purposes.	Determination of acid soluble chloride by titrimetry			Dry
TP099	BS1377, Part 3, 1990: Soils for Civil Engineering Purposes.	Determination of water soluble chloride by titrimetry	Yes	Yes	Dry
TP100	Wisconsin DNR Modified GRO method, Method for Determining Gasoline Range Organics	Determination of Volatile Petroleum Hydrocarbons/GRO.	Yes	Yes	Wet
TP110	USEPA Methods 8082A & 3665A	Determination of Total & Speciated 7 PCB Congeners by GC/MS SIM	Yes	Yes	Wet
TP114	BS1377, Part 3, 1990: Soils for Civil Engineering Purposes.	Determination of carbonate in soil (rapid titration method)			Dry
TP126	TNRCC Method 1006 (modified)	Extracted petroleum hydrocarbons from TP067 split into aromatic and aliphatic fractions. Analysed by GC/FID.	Yes		Wet
TP134	In-house documented method	Determination of water soluble chloride by titrimetry	Yes	Yes	Dry
TP135	USEPA Methods 8100 & 8270D. In-house method TP045	Determination of polyaromatic hydrocarbons extractable in dichloromethane, by GC/MS (with concentration stage)			Dry
TP137	BS7755: Section 3.9: 1995/ISO 11466:1995	Determination of acid extractable metals in soil by ICP-OES	Selected	Selected	Dry
TP145	USEPA Methods 3550C & 8270D	Determination of Semi-Volatile Organic Compounds by GC/MS	Yes	Yes	Wet
TP147	USEPA Methods 8082A & 3665A	Determination of total & speciated WHO 12 PCB Congeners by GC/MS SIM.			Wet
TP150	USEPA Methods 8081B & 8141B	Determination of pesticides and herbicides in soil by GC/MS SIM			Wet
TP152	USEPA Method 556	Determination of carbonyls by GC/MS.			Wet
TP154	USEPA Method 5021. Wisconsin DNR modified GRO method	Determination of volatiles in by GC/MS headspace	Yes	Selected	Wet
TP158	USEPA Method 1671	Determination of glycols by GC/FID DI			Wet

Notes

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2. Results are expressed on a dry-weight basis (samples dried at 30°C ± 5°C) except where stated.
3. The laboratory removes any material >2mm prior to analysis. The quantity and nature of any material removed from samples is recorded and the information is available on request.
4. The laboratory records the date of analysis of each parameter. This information is available on request.
5. Where a parameter cannot be determined in house it is our policy to use a UKAS/MCERTS accredited laboratory wherever possible. Terra Tek will assume responsibility for the quality of subcontracted tests and the performance of the subcontractor chosen. Where there is no known UKAS/MCERTS laboratory for a particular parameter, a laboratory listed within the Terra Tek Approved Subcontractors list, which is subject to performance assessment, will be selected.

Originator	Checked & Approved	SUMMARY OF IN-HOUSE ANALYTICAL TEST METHODS (SOIL)	Appendix S3
N/A	N/A		Sheet 2 of 2

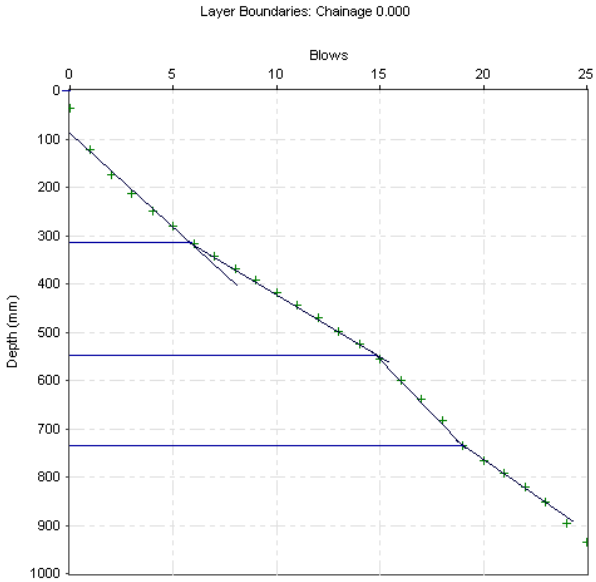
APPENDIX 8

Transport Research Laboratory
Dynamic Cone Penetration Test Data & Results

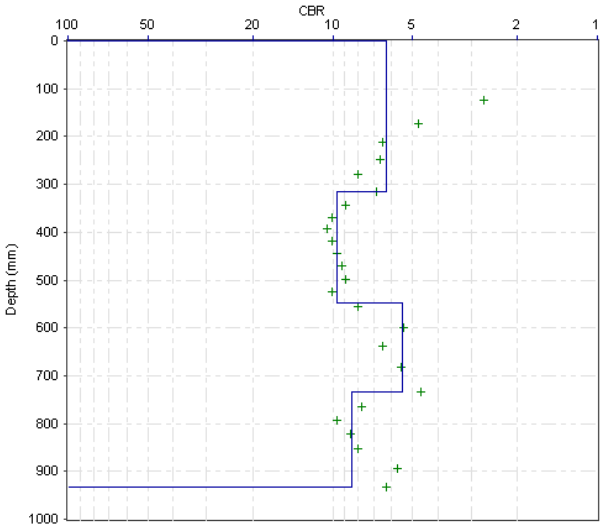
DCP Layer Strength Analysis Report

Project Name: Welland Hosp Spalding TRL1

Chainage (km):	0.000	Surface Type:	Unpaved
Direction:		Thickness (mm):	0
Location/Offset:	Lay-by / other	Base Type:	
Cone Angle:	60 degrees	Thickness (mm):	
Zero Error (mm):	4	Surface Moisture:	Moderate
Test Date:	30/05/2017	Moisture adjustment factor:	Not adjusted



Layer Boundaries Chart



CBR Chart

Layer Properties

No.	Penetration Rate (mm/blow)	CBR (%)	Thickness (mm)	Depth to layer bottom (mm)
1	39.02	6	314	314
2	26.01	10	235	549
3	44.72	5	186	735
4	29.49	8	199	934

CBR Relationship:

TRL equation: $\log_{10}(CBR) = 2.48 - 1.057 \times \log_{10}(Strength)$

Report produced by .....

Penetration Data Report

Project Name: Welland Hosp Spalding TRL1

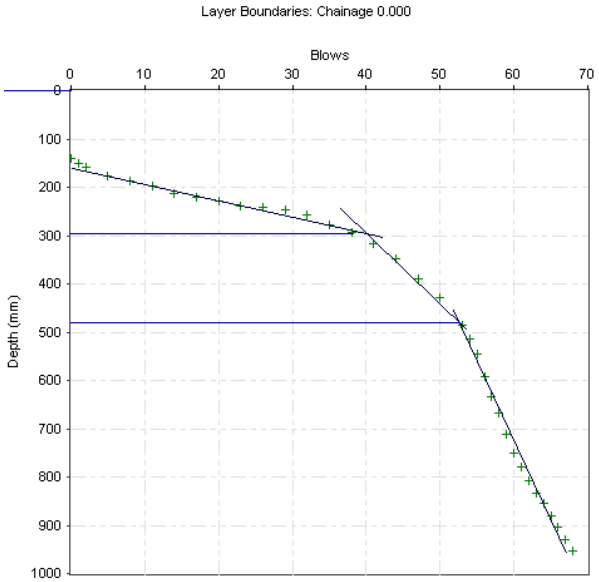
Chainage (km):	0.000	Surface Type:	Unpaved
Direction:		Thickness (mm):	0
Location/Offset:	Lay-by / other	Base Type:	
Cone Angle:	60 degrees	Thickness (mm):	
Zero Error (mm):	4	Surface Moisture:	Moderate
Test Date:	30/05/2017	Moisture adjustment factor:	Not adjusted

No.	Blows	Cumulative Blows	Penetration Depth (mm)	Penetration Rate (mm/blow)	No.	Blows	Cumulative Blows	Penetration Depth (mm)	Penetration Rate (mm/blow)
1	0	0	40	0.00	26	1	25	938	39.00
2	1	1	127	87.00					
3	1	2	178	51.00					
4	1	3	216	38.00					
5	1	4	253	37.00					
6	1	5	284	31.00					
7	1	6	320	36.00					
8	1	7	348	28.00					
9	1	8	373	25.00					
10	1	9	397	24.00					
11	1	10	422	25.00					
12	1	11	448	26.00					
13	1	12	475	27.00					
14	1	13	503	28.00					
15	1	14	528	25.00					
16	1	15	559	31.00					
17	1	16	604	45.00					
18	1	17	642	38.00					
19	1	18	686	44.00					
20	1	19	738	52.00					
21	1	20	770	32.00					
22	1	21	796	26.00					
23	1	22	825	29.00					
24	1	23	856	31.00					
25	1	24	899	43.00					

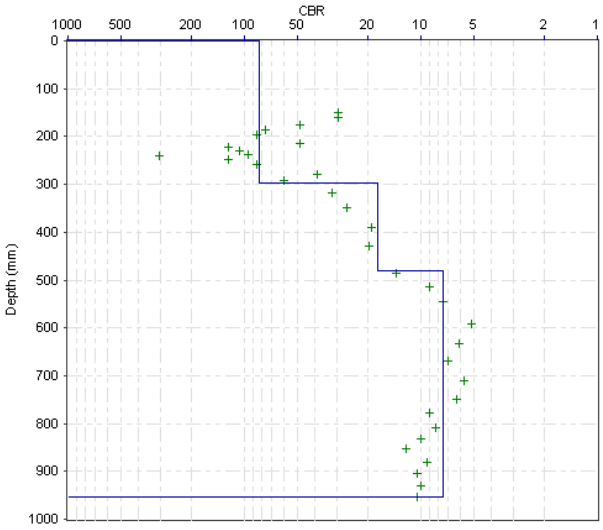
DCP Layer Strength Analysis Report

Project Name: Welland Hosp Spalding TRL2

Chainage (km):	0.000	Surface Type:	Unpaved
Direction:		Thickness (mm):	0
Location/Offset:	Lay-by / other	Base Type:	
Cone Angle:	60 degrees	Thickness (mm):	
Zero Error (mm):	4	Surface Moisture:	Moderate
Test Date:	30/05/2017	Moisture adjustment factor:	Not adjusted



Layer Boundaries Chart



CBR Chart

Layer Properties

No.	Penetration Rate (mm/blow)	CBR (%)	Thickness (mm)	Depth to layer bottom (mm)
1	3.40	83	297	297
2	14.75	18	184	481
3	33.17	7	473	954

CBR Relationship:

TRL equation: $\log_{10}(CBR) = 2.48 - 1.057 \times \log_{10}(Strength)$

Report produced by .....

Penetration Data Report

Project Name: Welland Hosp Spalding TRL2

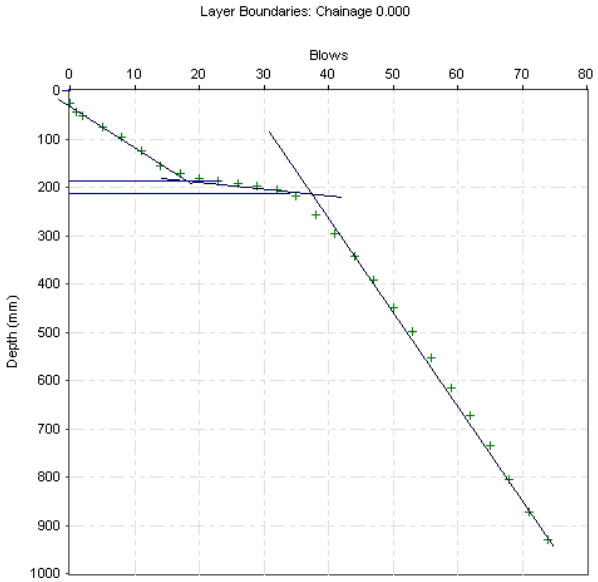
Chainage (km):	0.000	Surface Type:	Unpaved
Direction:		Thickness (mm):	0
Location/Offset:	Lay-by / other	Base Type:	
Cone Angle:	60 degrees	Thickness (mm):	
Zero Error (mm):	4	Surface Moisture:	Moderate
Test Date:	30/05/2017	Moisture adjustment factor:	Not adjusted

No.	Blows	Cumulative Blows	Penetration Depth (mm)	Penetration Rate (mm/blow)	No.	Blows	Cumulative Blows	Penetration Depth (mm)	Penetration Rate (mm/blow)
1	0	0	145	0.00	26	1	59	715	43.00
2	1	1	154	9.00	27	1	60	754	39.00
3	1	2	163	9.00	28	1	61	782	28.00
4	3	5	180	5.67	29	1	62	812	30.00
5	3	8	191	3.67	30	1	63	837	25.00
6	3	11	201	3.33	31	1	64	858	21.00
7	3	14	218	5.67	32	1	65	885	27.00
8	3	17	225	2.33	33	1	66	909	24.00
9	3	20	233	2.67	34	1	67	934	25.00
10	3	23	242	3.00	35	1	68	958	24.00
11	3	26	245	1.00					
12	3	29	252	2.33					
13	3	32	262	3.33					
14	3	35	283	7.00					
15	3	38	297	4.67					
16	3	41	322	8.33					
17	3	44	352	10.00					
18	3	47	393	13.67					
19	3	50	433	13.33					
20	3	53	489	18.67					
21	1	54	517	28.00					
22	1	55	550	33.00					
23	1	56	597	47.00					
24	1	57	637	40.00					
25	1	58	672	35.00					

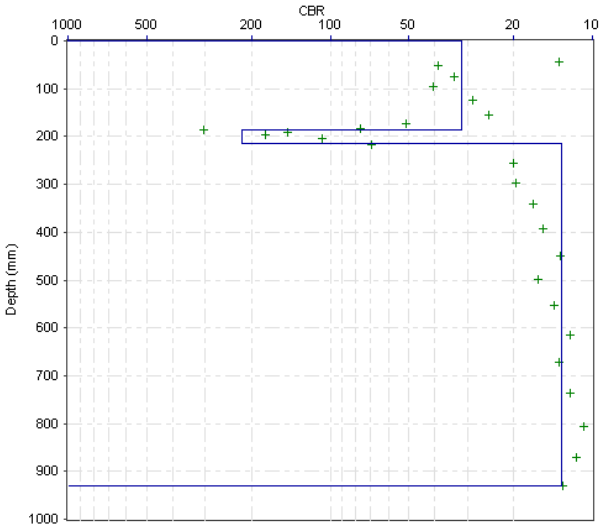
DCP Layer Strength Analysis Report

Project Name: Welland Hosp Spalding TRL3

Chainage (km):	0.000	Surface Type:	Unpaved
Direction:		Thickness (mm):	0
Location/Offset:	Lay-by / other	Base Type:	
Cone Angle:	60 degrees	Thickness (mm):	
Zero Error (mm):	4	Surface Moisture:	Moderate
Test Date:	01/06/2017	Moisture adjustment factor:	Not adjusted



Layer Boundaries Chart



CBR Chart

Layer Properties

No.	Penetration Rate (mm/blow)	CBR (%)	Thickness (mm)	Depth to layer bottom (mm)
1	8.50	31	187	187
2	1.37	216	27	214
3	19.55	13	717	931

CBR Relationship:

TRL equation: $\log_{10}(CBR) = 2.48 - 1.057 \times \log_{10}(Strength)$

Report produced by .....

Penetration Data Report

Project Name: Welland Hosp Spalding TRL3

Chainage (km):	0.000	Surface Type:	Unpaved
Direction:		Thickness (mm):	0
Location/Offset:	Lay-by / other	Base Type:	
Cone Angle:	60 degrees	Thickness (mm):	
Zero Error (mm):	4	Surface Moisture:	Moderate
Test Date:	01/06/2017	Moisture adjustment factor:	Not adjusted

No.	Blows	Cumulative Blows	Penetration Depth (mm)	Penetration Rate (mm/blow)	No.	Blows	Cumulative Blows	Penetration Depth (mm)	Penetration Rate (mm/blow)
1	0	0	30	0.00	26	3	71	876	22.00
2	1	1	49	19.00	27	3	74	935	19.67
3	1	2	56	7.00					
4	3	5	80	8.00					
5	3	8	100	6.67					
6	3	11	128	9.33					
7	3	14	160	10.67					
8	3	17	176	5.33					
9	3	20	187	3.67					
10	3	23	190	1.00					
11	3	26	196	2.00					
12	3	29	201	1.67					
13	3	32	209	2.67					
14	3	35	221	4.00					
15	3	38	260	13.00					
16	3	41	300	13.33					
17	3	44	346	15.33					
18	3	47	396	16.67					
19	3	50	454	19.33					
20	3	53	502	16.00					
21	3	56	557	18.33					
22	3	59	620	21.00					
23	3	62	677	19.00					
24	3	65	740	21.00					
25	3	68	810	23.33					