

Notes:
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RISK ASSESSMENT	
RESIDUAL RISKS IDENTIFIED	1. None identified, 16/04/18.

CONTRACTOR'S GENERAL RISK ITEMS (List is not exhaustive but includes commonly raised issues)	
1. Location of all buried services.	
2. Existing drainage:	
i) Gases, confined spaces, diseases.	
ii) Maintain flow in drains during works.	
3. Manual lifting of heavy objects:	
Manhole covers, drainage pipes, concrete rings, kerbs, etc.	
4. Excavation for drainage trenches and manholes.	
5. Security:	
Keep site secure from members of the public.	
Maintain public safety when accessing site.	

KEY TO SYMBOLS:	
SHALLOW SWALE NETWORK	
FLOOD RETENTION DITCH & BUND	
POLYTUNNEL AREA	

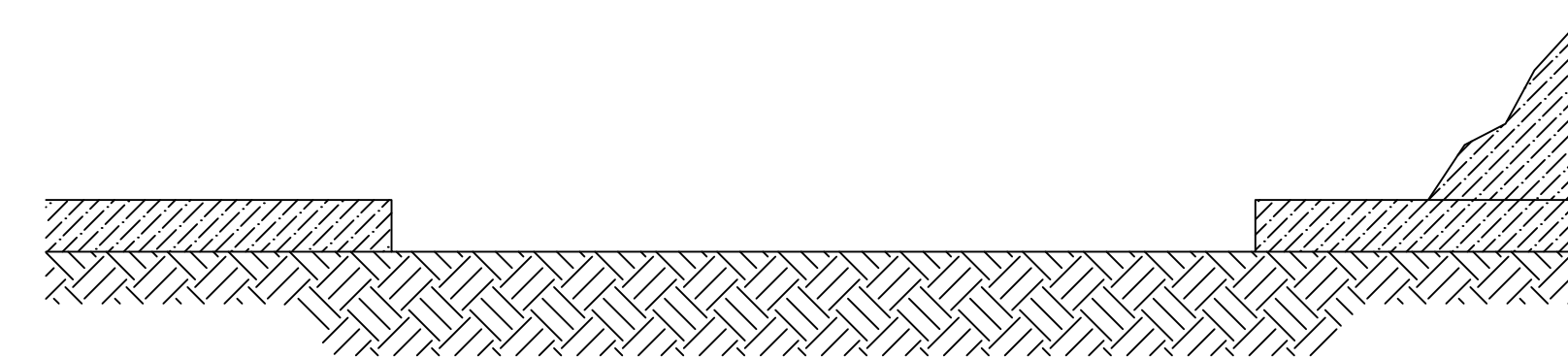
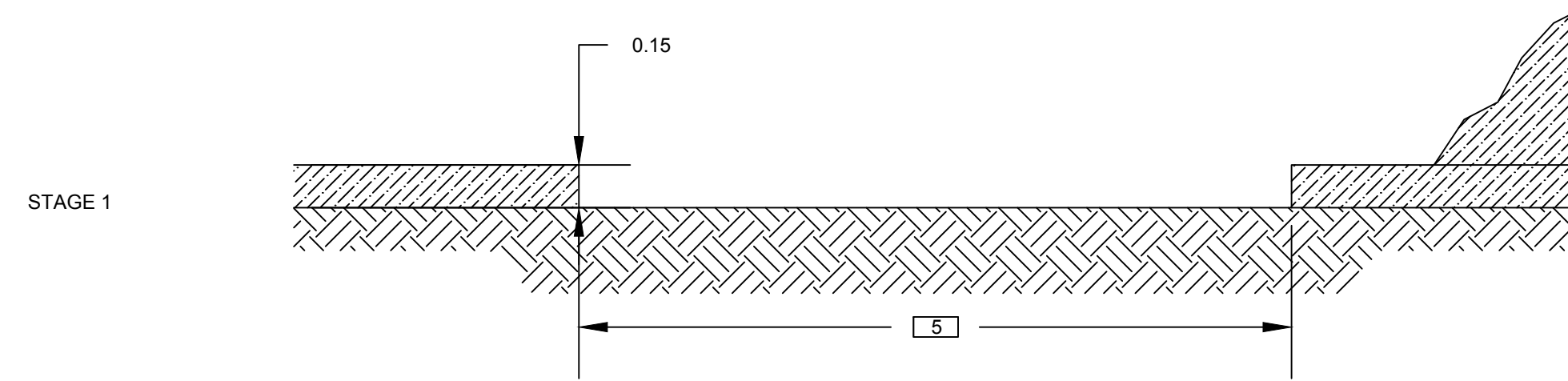
MONSON
 Broadway Chambers, High Street, Crowborough, East Sussex TN6 1DF
 Tel: (01892) 601370. Fax: (01892) 601379
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Project:	Nickle Farm Chartham
Origin:	Crowborough
Current Issue:	Approved LGL Date 16/04/18
Prepared:	JF
Approved:	LGL
Size:	A1
Date:	16/04/18
Drawing Status:	PRELIMINARY

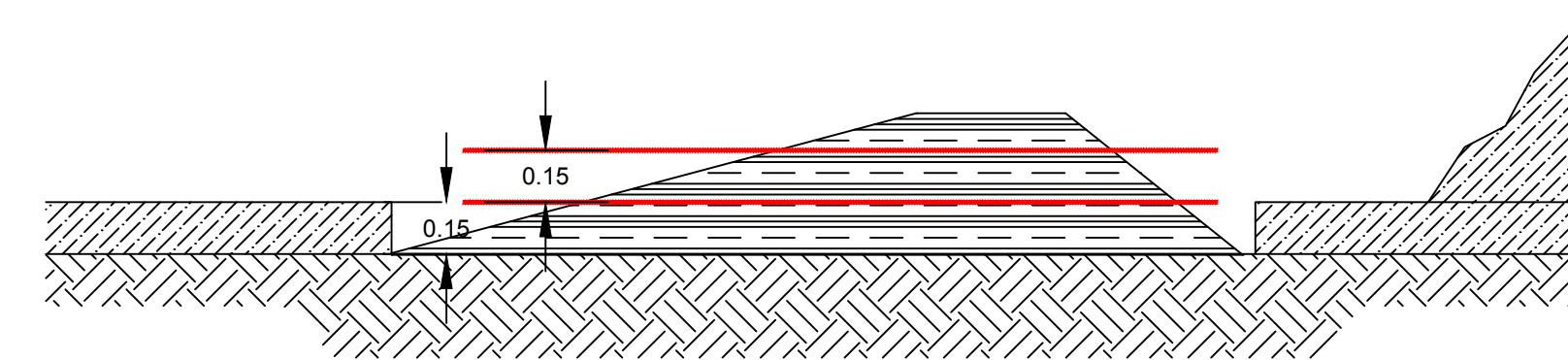
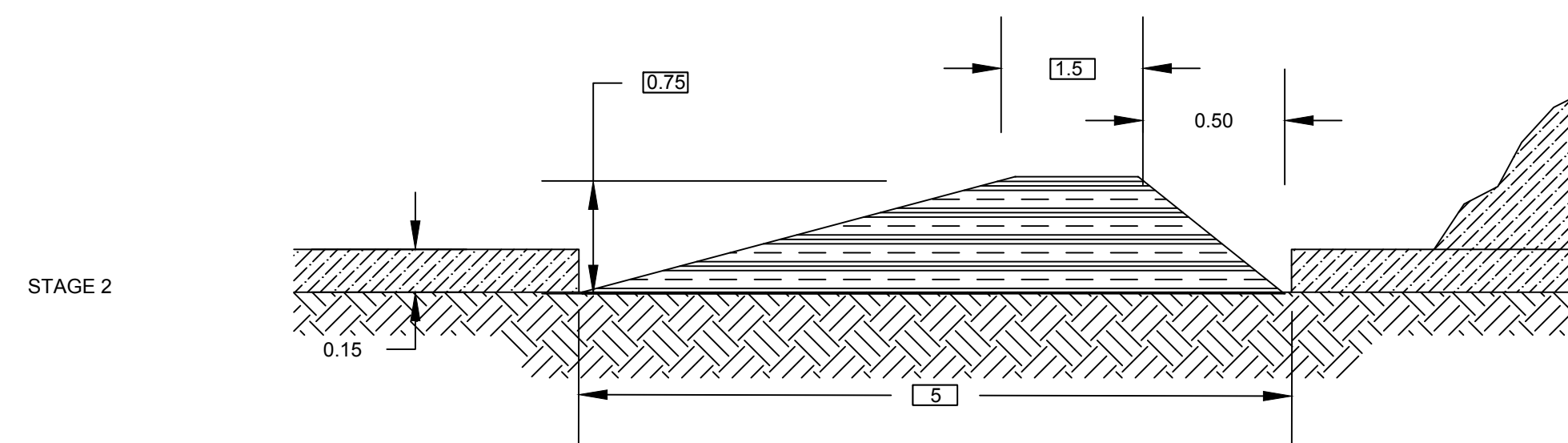
Description:	Drainage Strategy Drawing Jocks & Morrello
Scale:	1:1000
Dwg No:	0000/01
Issue:	A

STANDARD DETAILS

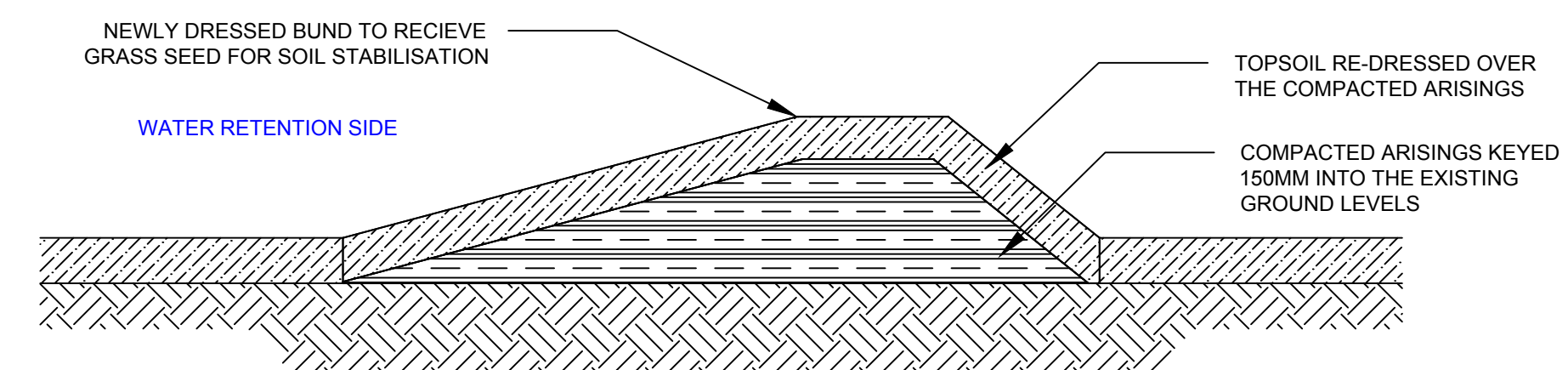
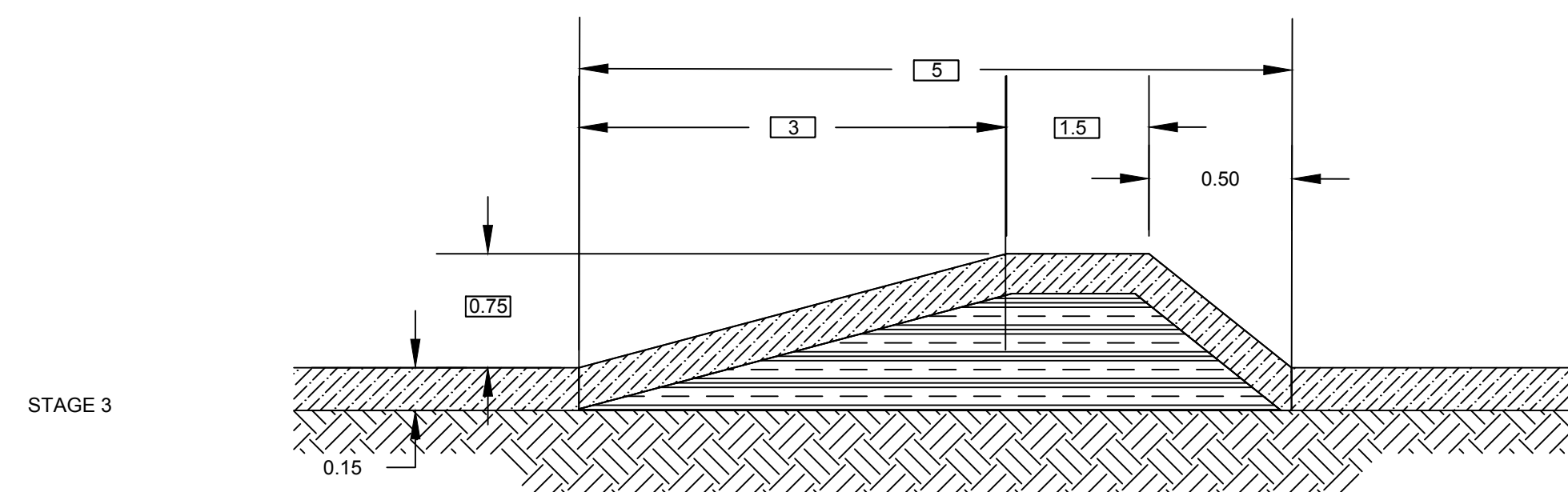
FLOOD RETENTION BUND DETAILS



TOPSOIL TO BE STRIPPED TO A DEPTH OF 150MM AND SET ASIDE FOR REUSE



THE BUND SHALL BE CONSTRUCTED USING THE AVAILABLE ARISINGS FROM THE SOAKAWAY TRENCHES AND COMPACTED IN LAYERS NOT GREATER THAN 150MM EACH LIFT. IT IS ANTICIPATED THAT THE BUND WILL BE OVER CONSTRUCTED FOR THE PURPOSES OF COMPACTION AND THEN SHAPED TO SIZE



NEWLY DRESSED BUND TO RECEIVE GRASS SEED FOR SOIL STABILISATION

WATER RETENTION SIDE

TOPSOIL RE-DRESSED OVER THE COMPACTED ARISINGS

COMPACTED ARISINGS KEYED 150MM INTO THE EXISTING GROUND LEVELS

THE COMPACTED ARISINGS WILL BE RE-DRESSED WITH THE TOPSOIL PREVIOUSLY REMOVED TO ALLOW VEGETATION GROWTH AND QUICK STABILISATION OF THE BUND SOIL.

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RISK ASSESSMENT	
RESIDUAL RISKS IDENTIFIED	
1. None identified, 16/04/18.	

- CONTRACTOR'S GENERAL RISK ITEMS**
(List is not exhaustive but includes commonly raised issues)
1. Location of all buried services.
 2. Existing drainage:
 - i) Gases, confined spaces, diseases.
 - ii) Maintain flow in drains during works.
 3. Manual lifting of heavy objects:
 - i) Manhole covers, drainage pipes, concrete rings, kerbs, etc.
 4. Excavation for drainage trenches and manholes.
 5. Security:
 - i) Keep site secure from members of the public.
 - ii) Maintain public safety when accessing site.

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A JF 16/04/18 Original Issue
Issue By Date Amendments

MONSON

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Project:
**Nickle Farm
Chartham
Jocks & Morrello**

Description:
Standard Details

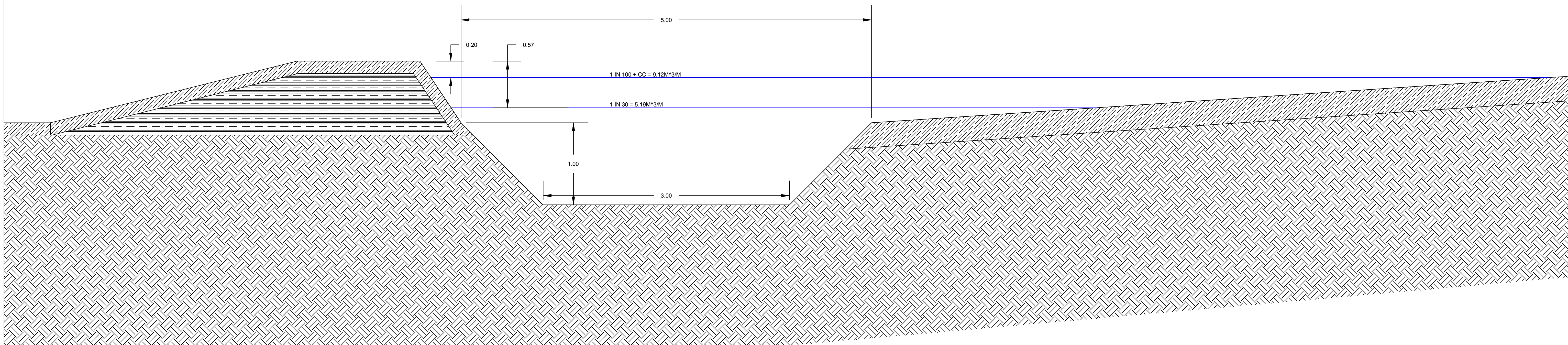
Original Drawing: Prepared JF Approved LGL
Origin: Crowborough Size A1
Current Issue: Approved LGL Date 16/04/18
Drawing Status: **PRELIMINARY**

Scale: Dwg No: Issue:
NTS 0000/02 A

ISSUE SHEET MEL-14-APPROVED DEC 2012 ISSUE NO 4

CROSS SECTION

FLOOD RETENTION DITCH & BUND DETAILS



Notes:
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RISK ASSESSMENT	
RESIDUAL RISKS IDENTIFIED	
1.	None identified, 16/04/18.

CONTRACTOR'S GENERAL RISK ITEMS
 (List is not exhaustive but includes commonly raised issues)

- Location of all buried services.
- Existing drainage:
 - i) Gases, confined spaces, diseases.
 - ii) Maintain flow in drains during works.
- Manual lifting of heavy objects:
 - Manhole covers, drainage pipes, concrete rings, kerbs, etc.
- Excavation for drainage trenches and manholes.
- Security:
 - Keep site secure from members of the public.
 - Maintain public safety when accessing site.

Issue	By	Date	Amendments
A	JF	16/04/18	Original issue

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Project: Nickle Farm Chartham Jocks & Morrello			
Original Drawing:	Prepared JF	Approved LGL	Size A1
Origin:	Crowborough	Date 16/04/18	
Current Issue:	Approved LGL	Date 16/04/18	
Drawing Status: PRELIMINARY			

Description: Standard Details		
Scale:	Dwg No:	Issue:
NTS	0000/03	A

Appendix G - Calculations

Polytunnel Areas Nickle Farm, Jocks & Morrello

Total Impermeable Area: **106253.4**

Covering No. Jocks 1
Total Section Area **25282.4** m2

Covering No. Jocks 2
Total Section Area **38727.7** m2

Covering No. Morrello
Total Section Area **42243.3** m2

Row	Width	Length	Tunnel Area
1	8.5	41.8	355.3
2	8.5	48.4	411.4
3	8.5	55	467.5
4	8.5	63.8	542.3
5	8.5	72.6	617.1
6	8.5	79.2	673.2
7	8.5	85.8	729.3
8	8.5	92.4	785.4
9	8.5	99	841.5
10	8.5	103.4	878.9
11	8.5	107.8	916.3
12	8.5	112.2	953.7
13	8.5	114.4	972.4
14	8.5	118.8	1009.8
15	8.5	121	1028.5
16	8.5	125.4	1065.9
17	8.5	127.6	1084.6
18	8.5	132	1122
19	8.5	134.2	1140.7
20	8.5	136.4	1159.4
21	8.5	140.8	1196.8
22	8.5	140.8	1196.8
23	8.5	143	1215.5
24	8.5	143	1215.5
25	8.5	145.2	1234.2
26	8.5	145.2	1234.2
27	8.5	145.2	1234.2
28	8.5		0
29	8.5		0
30	8.5		0
31	8.5		0
32	8.5		0
33	8.5		0
34	8.5		0
35	8.5		0
36	8.5		0
37	8.5		0
38	8.5		0
39	8.5		0
40	8.5		0
41	8.5		0
42	8.5		0
43	8.5		0
44	8.5		0
45	8.5		0
46	8.5		0
47	8.5		0
48	8.5		0
49	8.5		0
50	8.5		0

Row	Width	Length	Tunnel Area
1	8.5	30.8	261.8
2	8.5	39.6	336.6
3	8.5	79.2	673.2
4	8.5	187	1589.5
5	8.5	184.8	1570.8
6	8.5	180.4	1533.4
7	8.5	178.2	1514.7
8	8.5	176	1496
9	8.5	173.8	1477.3
10	8.5	169.4	1439.9
11	8.5	167.2	1421.2
12	8.5	165	1402.5
13	8.5	162.8	1383.8
14	8.5	158.4	1346.4
15	8.5	156.2	1327.7
16	8.5	154	1309
17	8.5	151.8	1290.3
18	8.5	147.4	1252.9
19	8.5	143	1215.5
20	8.5	138.6	1178.1
21	8.5	134.2	1140.7
22	8.5	132	1122
23	8.5	127.6	1084.6
24	8.5	123.2	1047.2
25	8.5	121	1028.5
26	8.5	116.6	991.1
27	8.5	112.2	953.7
28	8.5	110	935
29	8.5	107.8	916.3
30	8.5	105.6	897.6
31	8.5	105.6	897.6
32	8.5	105.6	897.6
33	8.5	105.6	897.6
34	8.5	105.6	897.6
35	8.5		0
36	8.5		0
37	8.5		0
38	8.5		0
39	8.5		0
40	8.5		0
41	8.5		0
42	8.5		0
43	8.5		0
44	8.5		0
45	8.5		0
46	8.5		0
47	8.5		0
48	8.5		0
49	8.5		0
50	8.5		0

Row	Width	Length	Tunnel Area
1	8.5	118.8	1009.8
2	8.5	220	1870
3	8.5	220	1870
4	8.5	220	1870
5	8.5	220	1870
6	8.5	220	1870
7	8.5	220	1870
8	8.5	220	1870
9	8.5	220	1870
10	8.5	220	1870
11	8.5	220	1870
12	8.5	220	1870
13	8.5	217.8	1851.3
14	8.5	217.8	1851.3
15	8.5	215.6	1832.6
16	8.5	213.4	1813.9
17	8.5	213.4	1813.9
18	8.5	211.2	1795.2
19	8.5	209	1776.5
20	8.5	209	1776.5
21	8.5	204.6	1739.1
22	8.5	200.2	1701.7
23	8.5	173.8	1477.3
24	8.5	145.2	1234.2
25	8.5		0
26	8.5		0
27	8.5		0
28	8.5		0
29	8.5		0
30	8.5		0
31	8.5		0
32	8.5		0
33	8.5		0
34	8.5		0
35	8.5		0
36	8.5		0
37	8.5		0
38	8.5		0
39	8.5		0
40	8.5		0
41	8.5		0
42	8.5		0
43	8.5		0
44	8.5		0
45	8.5		0
46	8.5		0
47	8.5		0
48	8.5		0
49	8.5		0
50	8.5		0

Controlled Discharge/Soakage Rate	42.34	l/s
Total Impermeable Area	106253.4	m ²
Runoff Coefficient	0.5	

Storage Calculations for 1 in 100 year return period					
Storm Duration	Rainfall Intensity mm/h	Area m ²	Peak Flow l/s	Adjusted Peak Flow	Storage Required m ³
15	133.73	106253.4	1975.088	1932.748	1739.473
30	86.33	106253.4	1275.027	1232.687	2218.837
60	52.5	106253.4	775.3842	733.0442	2638.959
120	30.87	106253.4	455.9259	413.5859	2977.818
240	17.89	106253.4	264.2214	221.8814	3195.092
360	12.98	106253.4	191.7045	149.3645	3226.273
600	8.45	106253.4	124.7999	82.45993	2968.558
1440	4.26	106253.4	62.91689	20.57689	1777.843

Controlled Discharge/Soakage Rate	42.34	l/s
Total Impermeable Area	106253.4	m ²
Runoff Coefficient	0.5	

Storage Calculations for 1 in 100 year return period + 20% CC					
Storm Duration	Rainfall Intensity mm/h	Area m ²	Peak Flow l/s	Adjusted Peak Flow	Storage Required m ³
15	160.48	106253.4	2370.106	2327.766	2094.989
30	103.60	106253.4	1530.032	1487.692	2677.846
60	63.00	106253.4	930.461	888.121	3197.236
120	37.04	106253.4	547.1111	504.7711	3634.352
240	21.47	106253.4	317.0657	274.7257	3956.05
360	15.58	106253.4	230.0454	187.7054	4054.437
600	10.14	106253.4	149.7599	107.4199	3867.117
1440	5.11	106253.4	75.50027	33.16027	2865.047

Controlled Discharge/Soakage Rate	42.34	l/s
Total Impermeable Area	106253.4	m ²
Runoff Coefficient	0.5	

Storage Calculations for 1 in 100 year return period + 40% CC					
Storm Duration	Rainfall Intensity mm/h	Area m ²	Peak Flow l/s	Adjusted Peak Flow	Storage Required m ³
15	187.22	106253.4	2765.123	2722.783	2450.505
30	120.86	106253.4	1785.038	1742.698	3136.856
60	73.50	106253.4	1085.538	1043.198	3755.512
120	43.22	106253.4	638.2963	595.9563	4290.885
240	25.05	106253.4	369.9099	327.5699	4717.007
360	18.17	106253.4	268.3863	226.0463	4882.6
600	11.83	106253.4	174.7199	132.3799	4765.677
1440	5.96	106253.4	88.08364	45.74364	3952.251

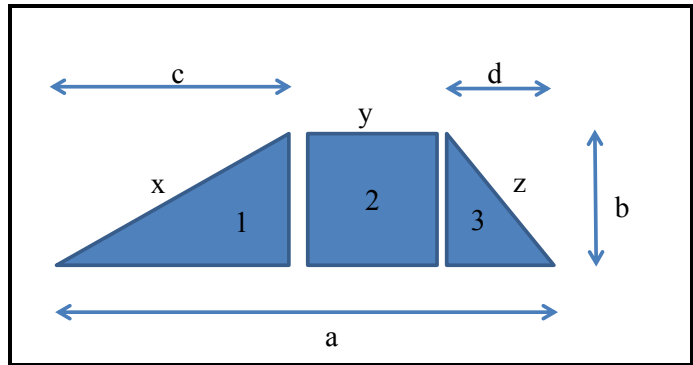
Controlled Discharge/Soakage Rate	42.34	l/s
Total Impermeable Area	106253.4	m ²
Runoff Coefficient	0.5	

Storage Calculations for 1 in 30 year return period					
Storm Duration	Rainfall Intensity mm/h	Area m ²	Peak Flow l/s	Adjusted Peak Flow	Storage Required m ³
15	99.71	106253.4	1472.639	1430.299	1287.269
30	63.52	106253.4	938.141	895.801	1612.442
60	39.88	106253.4	588.9966	546.6566	1967.964
120	23.82	106253.4	351.8029	309.4629	2228.133
240	13.96	106253.4	206.1783	163.8383	2359.272
360	10.27	106253.4	151.6799	109.3399	2361.742
600	6.71	106253.4	99.10148	56.76148	2043.413
1440	2.98	106253.4	44.01228	1.672283	144.4853

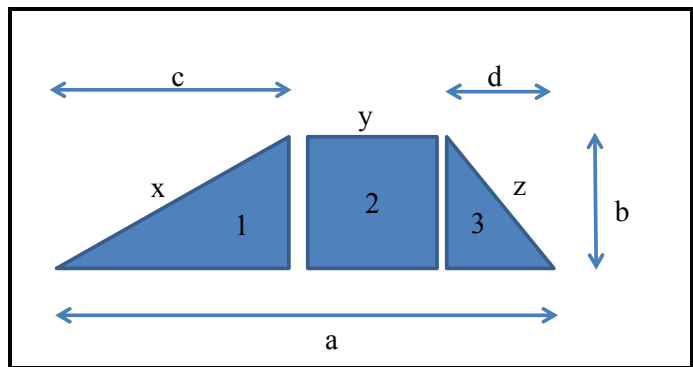
Cut and Fill Calculations

Project Name:	Jocks & Morrello	Sheet Title:	Bund Cross-Section and Volumes
Date:	April 2018	Drawing No. :	0
		Drawing Reference:	0

Start of Cross Section	
Length (a)	5 m
Height (b)	0.75 m
Length (c)	3 m
Length (d)	0.5 m
Length (x)	3.092329219 m
Length (y)	1.5 m
Length (z)	0.901387819 m
Angle (Slope x)	14.03624347 °
Angle (Slope z)	56.30993247 °
Cross Section (1)	1.125 m ²
Cross Section (2)	1.125 m ²
Cross Section (3)	0.1875 m ²
Total Cross Section	2.4375 m ²



End of Cross Section	
Length (a)	5 m
Height (b)	0.75 m
Length (c)	3 m
Length (d)	0.5 m
Length (x)	3.092329219 m
Length (y)	1.5 m
Length (z)	0.901387819 m
Angle (Slope x)	14.03624347 °
Angle (Slope z)	56.30993247 °
Cross Section (1)	1.125 m ²
Cross Section (2)	1.125 m ²
Cross Section (3)	0.1875 m ²
Total Cross Section	2.4375 m ²



Average Cross Section	2.4375 m ²
Total Length of Embankment	460 m
Bulk Factor for Re-Compacted Soil	1.05
Volume of Material Calculated	1177.313 m ³

Notes:
 Arisings to be re-used, well compacted and shaped for perimeter bunding, providing flood exceedance protection.

Appendix H - Soakage Test Report

FW Mansfield and Son
C/O Nicholas Rooke
Finn's Canterbury
82 Castle Street,
Canterbury,
Kent,
CT1 2QD



16th February 2018

Our ref. TH/I7/LP001527/Ph2

**Re: Peaches, Jocks Morello and Swallow Fields, Nickle Farm, Kent
Soakage Testing**

Dear Jamie,

1 Introduction

Leap Environmental Ltd (hereafter referred to as **LEAP**) has been appointed by Jamie Finch of Roads & Sewers for Planning & Design to undertake trial pit soakage testing on land owned by FW Mansfield and Son, Nickle Farm, Kent. The instruction to carry out the works from the client was received via Jamie Finch in an email dated 26th January 2018.

The site comprised of three fields separately located around Canterbury, Kent named as Peaches Field, Jocks Morello Field, and Swallow Field. The approximate National Grid References of the three fields are: Peaches Field is TR 1669 5444, Jocks Morello Field is TR 1604 6140, and Swallow Field is TR 0883 5613. It is proposed to construct a series of poly tunnels across each of the three site areas

2 Site Setting

At the time of the investigation, each of the site areas comprised agricultural fields, bounded by hedgerows comprising mature trees and hedges.

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Site 1 (Peaches Field) is irregular in shape and covers an area of approximately 23.47Ha. The field is slightly undulating with a gentle slope, falling approximately 12m to the north. It is bounded to the north, east, and west by agricultural land and the south is bounded by Bridge Road. There is an overhead powerline running through the field, parallel to Bridge Road, which can be observed from the entrance off Bridge Road.

Site 2 (Jocks Morello) is a rectangular shaped parcel of land and covers an area of approximately 11.77Ha. The field is highly undulated, and has a gentle slope falling approximately 5m towards the north. At the time of the intrusive investigation, the field had been recently ploughed. It is bounded to the west by Barton Wood, and Little Hall Wood. The north of the site is bounded by Little Hall Wood, and Heel Lane. The east and south of the field is bounded by agricultural land.

Site 3 (Swallow) is formed of an irregular shaped parcel of land and covers an area of approximately 4.66Ha, sloping towards the south, with an approximate fall of 10m. The ground undulates, with a slight valley in the middle of the field with a north-south strike. It is bounded to the north by a farmer's track and agricultural land. The south is bounded by a railway track. The east is bounded by a residential area comprising of one house, and the east is bounded by more agricultural land. On the day of the visit, parts of the site, particularly over the southern, waterlogged area, were soft and boggy.

3 Geology

The geology of the site has been determined by reference to the 1:50,000 British Geological Survey sheet 289 (Canterbury), solid and drift edition and the BGS website (www.bgs.ac.uk).

Site 1 has been mapped as being underlain by Head overlying the White Chalk Subgroup while Site 2 is shown to be underlain by the London Clay Formation. Site 3 has been mapped to be underlain by Head deposits, overlying the Thanet Formation across the western part of the site and the White Chalk Subgroup over the remaining part of the site.

Head deposits accumulated largely by solifluction (the slow downslope movement of soil in response to the seasonal freezing and thawing of ground) and hillwash, mainly under periglacial conditions during the Quaternary glaciations. In general, it occurs beneath concave slopes on the flanks and floors of valleys. It is locally derived and its content reflects the base geology, in this instance it comprises of variable deposits of impure clays, silts and sands, locally gravelly.

At outcrop the London Clay Formation is weathered to brown and may contain secondary carbonate nodules. This weathered or oxidized zone varies from about 3-6m in depth and may be less than 1m thick where the clay is overlain by superficial deposits. Below this it is generally blue grey in colour and fissured. In this area, these deposits can be sandy.

The Thanet Sand Formation consists of fine grained pale yellow and grey mottled silty sands. Across east Kent they are generally more clayey. The boundary with the underlying chalk is

very irregular and often marked by a bed of green coated flints and glauconitic sand and clay (the Bullhead Beds).

The White Chalk Subgroup is a very fine grained white limestone consisting predominantly of the disaggregated skeletal remains of tiny planktonic algae, and is composed of almost pure calcium carbonate. Layers of flint are common within the Upper Chalk Subgroup. Flint is composed of silica derived from the dissolved skeletons of siliceous sponges and microfossils.

The White Chalk Member are a Principal Aquifer in SE England.

4 Fieldwork

The trial pit soakage testing was carried out between the 6th to the 9th of February 2018 with the weather being predominantly sunny and dry on all days except for Friday the 9th, when the weather was wet and overcast.

The intrusive works comprised the excavation of a total of 11 trial pits (designated TP 201 to 205 in Peaches Field, TP 301 to TP303 at Jocks Morello, and TP 401 to TP403 at Swallow Field) by means of a mechanical excavator to depths of between 1.5m and 3.1m below ground level. Falling head soakage testing was carried out within each of the pits in general accordance with BRE DG365. The location of the tests were specified by the client at the time of instruction and are shown on Figures 1, 2, and 3.

Due to soft ground/ waterlogged soils, the location of trial pits TP402 and TP403 had to be moved to allow the plant to traffic to the test positions. TP401 was also moved approximately 10m to the west due to the presence of a local water service.

The trial pits were logged by LEAP in general accordance with the requirements of BS 5930: 1999+A2:2010 and BS EN ISO 14688 Pt 1&2.

5 Ground Conditions

The ground conditions are described in detail in the logs attached in Appendix A. In summary the soil conditions at the three different fields were as follows:

Table 1: Summary of the Trial Pit Log at Peaches Field (TP201 – TP205)

Depth From (m)	Depth To (m)	Soil Type	Description
GL	0.20-0.40	TOPSOIL	TOPSOIL: Dark brown gravelly silty clay. Gravel is fine to coarse flint.
0.20-0.40	0.45->2.75	CLAY (HEAD)	Orange brown silty gravelly CLAY with subordinate horizons of gravel.
0.45->1.60	>1.65->2.60	STRUCTURELESS CHALK (WHITE CHALK SUBGROUP)	Off white structureless CHALK with orange staining and black speckling. 60 – 65% matrix. (Grade Dm becoming Grade Dc with depth).

Table 2: Summary of the Trial Pit Log at Jocks Morello Field (TP301 – TP303)

Depth From (m)	Depth To (m)	Soil Type	Description
GL	0.25-0.40	TOPSOIL	TOPSOIL: Dark grey brown slightly gravelly, sandy, silty clay with rootlets <10mm diameter. Gravel is fine to coarse brick, flint, and charcoal.
0.25	1.00	MADE GROUND	Orange brown and grey mottled silty clay with occasional cobbles of brick. (TP301 only)
0.40	>1.80->2.25	Sandy CLAY/ clayey SAND (LONDON CLAY FORMATION)	Orange brown gravelly clayey fine to medium SAND and silty very sandy CLAY. Gravel is fine to coarse gravel ironstone/ mudstone and flint.

Table 3: Summary of the Trial Pit Log at Swallow Field (TP401 – TP 403)

Depth From (m)	Depth To (m)	Soil Type	Description
GL	0.30-0.40	TOPSOIL	Dark brown silty slightly gravelly clay. Gravel is fine to coarse flint and chalk.
0.30-0.40	1.20->3.10	CLAY (HEAD)	Dark orange brown silty slightly gravelly CLAY. Gravel is fine to medium flint and chalk.
1.20->3.10	>1.80	STRUCTURELESS CHALK (WHITE CHALK SUBGROUP)	Off-white structureless CHALK, with orange staining. 70% matrix. (Grade Dm).

The soils encountered within the trial pits are in broad agreement within the deposits indicated on the published geology map.

With the exception of trial pit TP301 (located in Jocks Morello Field), where a groundwater seepage was recorded at a depth of 2.20m, all of the trial pits remained dry during excavation.

Collapse of the pit sides was observed in TP301 at a depth of 2.20m at the level of the water ingress. The remaining pits were recorded to be stable.

6 Trial Pit Soakage Results

Soakage testing was undertaken within each of the trial pits in general accordance with BRE365¹. The results from trial pit soakage testing are appended to this report and are summarised below:

¹ Building Research Establishment Digest 365: 2007. Soakaway Design

Table 4: Summary of trial pit falling head soakage tests at Peaches Field

Test Location	Test Number	Soil Infiltration Rate (m/s)
TP201	1	4.09×10^{-4}
	2	2.38×10^{-4}
TP202	1	4.33×10^{-5}
	2	7.74×10^{-5}
TP203	1	5.69×10^{-4}
	2	3.48×10^{-4}
TP204	1	1.80×10^{-4}
	2	4.17×10^{-3}
TP205	1	No significant soakage

Table 5: Summary of trial pit falling head soakage tests at Jocks Morello Field

Test Location	Test Number	Soil Infiltration Rate (m/s)
TP301	1	No significant soakage.
TP302	1	6.08×10^{-6}
TP303	1	6.04×10^{-7}

Table 6: Summary of trial pit falling head soakage tests at Swallow Field

Test Location	Test Number	Soil Infiltration Rate (m/s)
TP401	1	No significant soakage.
TP402	1	No significant soakage.
TP403	1	2.96×10^{-4}

The soil infiltration rate has been generally calculated in accordance with BRE DG365 by dividing the volume of water lost between 75% and 25% of the initial test depth by the average surface area of the sides of the trial pit in contact with the water during the test period, together with the area of the base. This figure was then divided by the duration of the test to provide the soil infiltration rate.

However, it is noted that the water level within trial pits TP302 and TP303 did not fall below 25% of the initial test depth. As such, calculation of the soil infiltration rates was not possible in accordance with the BRE digest. Therefore, for these tests, the soil infiltration rate has been calculated by dividing the volume of water lost during the test by the average surface area of the trial pit in contact with water during the test period and the test duration in seconds.

In addition, the tests carried out in trial pits TP205, TP301, TP401 and TP402 did not recorded any significant fall in water level over the course of the testing period. As such it can be considered that only negligible soakage potential is present at these positions.

Table 7: Summary of trial pit falling head soakage rates within the different fields

Site Name	Lowest Recorded Permeability Rates	Highest Recorded Permeability Rates	Trial Pits with Recorded Negligible Permeability
Peaches	7.74 x10 ⁻⁵ m/s Negligible soakage was also recorded	4.17 x10 ⁻³ m/s	TP205
Jocks Morello	6.04 x10 ⁻⁷ m/s Negligible soakage was also recorded	6.08 x10 ⁻⁶ m/s	TP301
Swallow	Negligible soakage	2.96 x 10 ⁻⁴ m/s	TP401 and TP402

7 Recommendations

The infiltration rates achieved from the trial pit soakage testing indicates that the use of conventional (e.g. ring) soakaways will be feasible where discharging into the White Chalk Subgroup deposits at Peaches and Swallow (i.e. trial pit TP201-TP204, and TP403).

However, based on the test results, it is considered that surface water discharge into the Head deposits (TP205 and TP401 - TP402) is unlikely to be feasible at these sites. It is therefore recommended that soakaways are extended to discharge solely within the

underlying White Chalk Subgroup deposits anticipated to present at variable depth below ground level.

For the Jocks Morello site, (TP301 - TP303) the low infiltration rates achieved indicate that surface water discharge into the underlying London Clay Formation is unlikely to be feasible with a conventional soakaways. Consideration could be given to the construction of trench soakaways, which has the advantage of a large surface area through which the water can infiltrate into the soils together with increased storage capacity. It is noted that the backfill used to fill a trench soakaway will affect the storage capacity. In addition, there is the potential for the soakaway to silt up over time.

Caution should be exercised when discharging into the near surface soils at Peaches and Swallow as washout of fines around the soakaway can occur, creating voids. To minimise the risk of subsidence, soakaways are normally constructed a minimum of 10.0m away from proposed or existing buildings, although given the proposed development of polytunnels this could be relaxed to say 5m. Alternatively, deep borehole soakaways could be constructed extending into the underlying White Chalk Subgroup.

The design of soakaways should be carefully considered to ensure that they are capable of half emptying within a 24 hour period, as recommended by the BRE 365 Guide.

In the event that soakaways are adopted, designers should refer to the Environment Agency Pollution Prevention Guidance Notes (PPG) (now withdrawn) which sets out the legal requirements and good practice for minimising risk of pollution to groundwater. In addition, the local authority and water company will need to be consulted.

Please do not hesitate to contact me if you require any further information.

Yours sincerely,



Tim Howard BEng CGeol FGS

Enc.

Limitations

LIMITATIONS

This report is confidential to the Client, and Leap Environmental Ltd accepts no responsibility whatsoever to third parties to whom this report, or any part thereof, is made known, unless formally agreed by Leap Environmental Ltd beforehand. Any such party relies upon the report at their own risk. Unless explicitly agreed otherwise in writing, this report has been prepared under LEAP's standard terms and conditions, as included in the quotation for this works.

This report has been prepared by Leap Environmental Ltd on the basis of information received from a variety of sources which Leap Environmental Ltd believes to be accurate. Nevertheless, Leap Environmental Ltd cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.

Leap Environmental Ltd has used all reasonable skill, care and diligence in the design and execution of this report, taking into account the manpower and resources devoted to it in agreement with the Client. Although every reasonable effort has been made to obtain all relevant information, all potential contamination, environmental constraints or liabilities associated with the site may not necessarily have been revealed. LEAP cannot be held responsible for any disclosures or changes in regulation that are provided post production of this report, and will not automatically update the report.

The conclusions reached in this report are necessarily restricted to those which can be determined from the information consulted, and may be subject to amendment in the light of additional information becoming available. These conclusions may not be appropriate for alternative schemes.

The extent of the exploratory holes, laboratory testing and monitoring undertaken may have been restricted due to a number of factors including accessibility, the presence of buried or overhead services, current development and site usage, timescales or clients specification. The exploratory holes only assess a small proportion of the site area with respect to the site as a whole, and as such may only provide an overall assessment of ground conditions on site. The presence of hotspots of undisclosed contamination or exceptional and unforeseen ground conditions cannot be discounted.

Eurocode 7 gives guidance on the type of sampling, sample quality, number and spacing of intrusive investigations, and number of laboratory tests required. It is intended that the Geotechnical Information section of this report will fulfil the general requirements of the Ground Investigation Report as set out in section 6 of Eurocode², although this is subject to

² BS EN 1997 Eurocode 7- Geotechnical Design - Part 1: General Rules (2004) and Part 2: Ground Investigation and Testing (2007)

the restrictions imposed on the investigation as listed above. For geotechnical design, Eurocode 7 requires the Geotechnical Design Report to address both the geotechnical and structural aspects of the geotechnical design for both the limit and serviceability states. The Geotechnical Appraisal section of this report will not meet the requirements of a Geotechnical Design Report (GDR), and should therefore be used for preliminary guidance only.

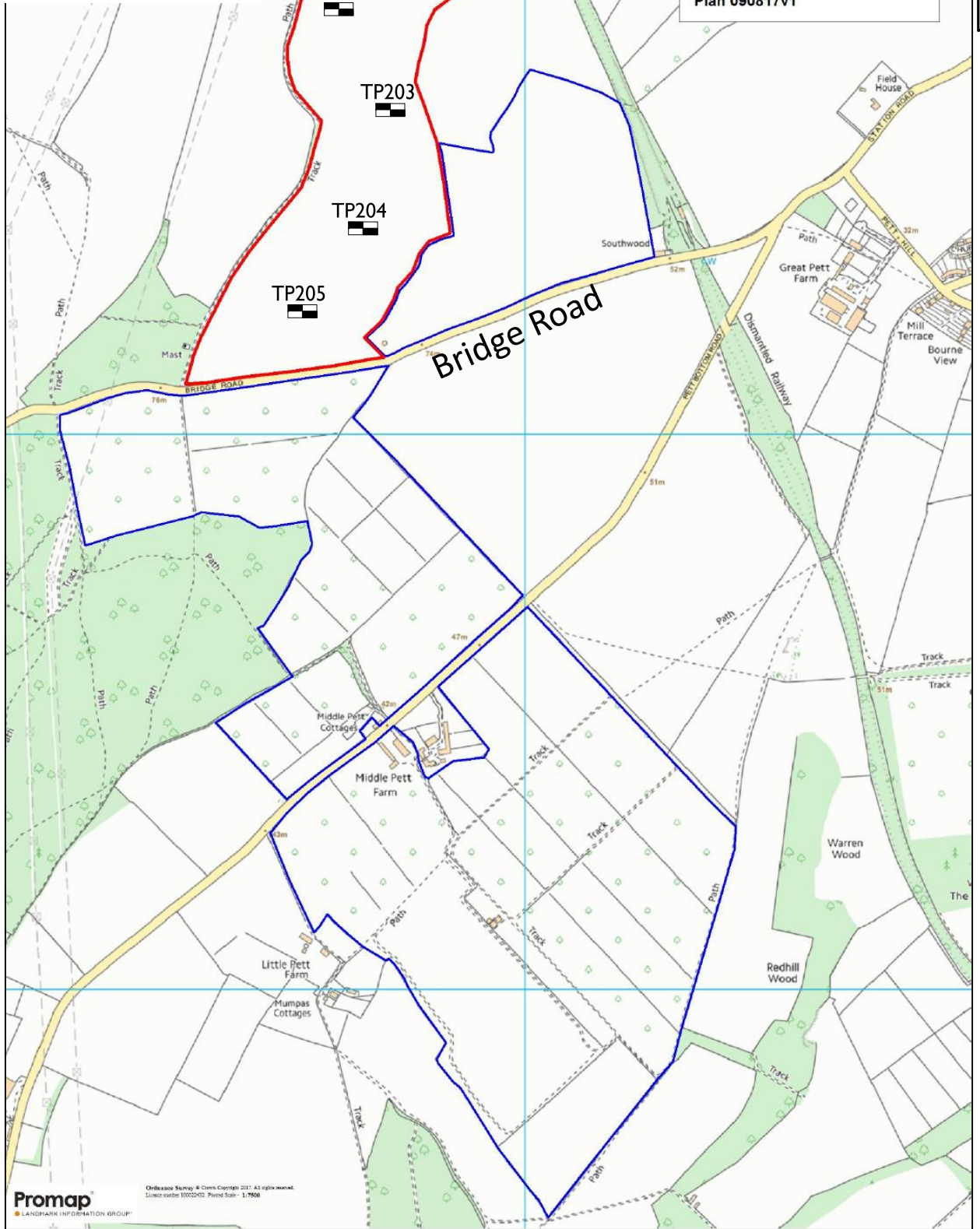
The presence of asbestos may be noted during the site walkover survey, intrusive investigations and/or from the results of contamination testing. However, this report does not constitute an asbestos survey. On this basis, the presence of asbestos on site cannot be discounted and a full asbestos survey should be undertaken

Figures

Location Plan

Proposed Polytunnels
Bridge Road, Bridge
Canterbury. CT4 5AL

1:7,500 at A3
Plan 090817v1



Site: Nickle Farm –
Peaches Field Location

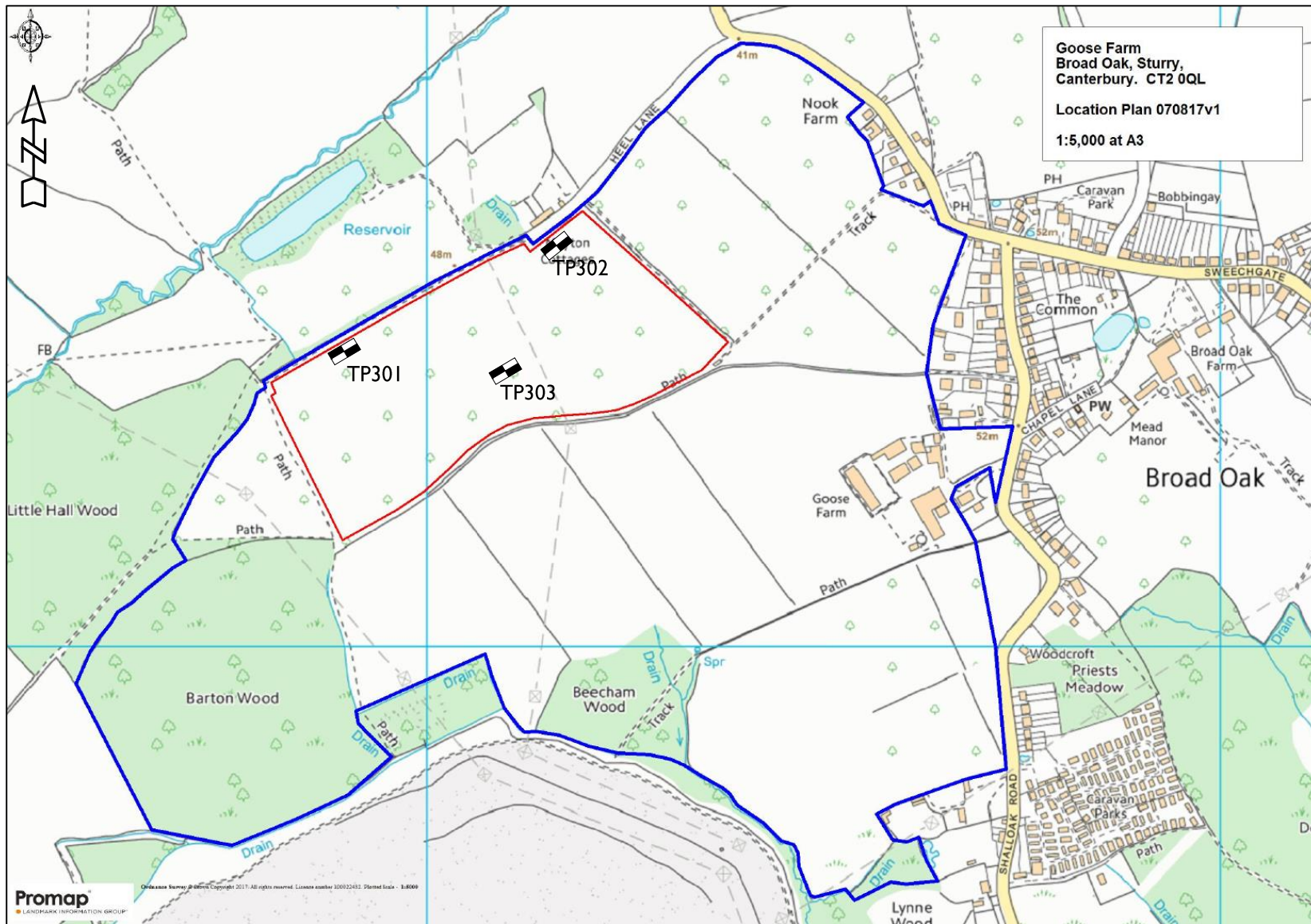
Date: 16/02/2018

Project ID: LPI527

Client: F M Mansfields

Title: Trial Pit Location Plan

Figure No.: 1



Client: F M Mansfields

Date: 16/02/2018

Project ID: LPI527

Site: Nickle Farm – Jocks_Morello Field
Location

Title: Trial Pit Location Plan

Figure No.: 2



Client:	F M Mansfields	Date:	16/02/2018	Project ID:	LP1527
Site:	Nickle Farm – Swallow Field Location	Title:	Trial Pit Location Plan	Figure No.:	3

APPENDIX C – TRIAL PIT LOGS

Trial Pit Logs



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Trial Pit Log

Trialpit No
TP201
Sheet 1 of 1

Project Name: Nickle Farm Project No. LP1527 Co-ords: - Date 06/02/2018
Level: Level:

Location: Hatch Lane, Chartham Dimensions (m): 3.3 Scale 1:25

Client: F M Mansfield Depth 1.70 Logged SL

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.40			TOPSOIL: Dark brown silty gravelly clay. Gravel is fine to coarse flint. With rootlets <5mm diameter.
				0.90			Orange-brown silty gravelly CLAY. Gravel is fine to coarse flint.
				1.70			Off-white structureless CHALK. 60% matrix with orange staining and black speckling. Grade Dm. <i>Becoming 30% matrix below 1.3m depth. Grade Dc.</i>
							End of pit at 1.70 m

Remarks: Trial pit dry and stable.

Stability: Stable





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Trial Pit Log

Trialpit No
TP202
Sheet 1 of 1

Project Name: Nickle Farm Project No. LP1527 Co-ords: - Date 06/02/2018
Level: Level:

Location: Hatch Lane, Chartham Dimensions (m): 2.8
Client: F M Mansfield Depth 2.60 Scale 1:25
Logged SL

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.40			TOPSOIL: Dark brown gravelly silty clay. Gravel is fine to coarse flint. With rootlets <5mm diameter.
				1.60			Orange brown silty gravelly CLAY with localised iron staining. Gravel is fine to coarse flint.
				2.60			Off-white structureless CHALK, with orange staining and black speckling. 60% matrix (Grade Dm). <i>CLAY and CHALK boundary varies between 1.6m depth in the eastern side of the pit, to 2.0m depth in the western side of the pit.</i> Becoming 25% matrix below 2.4m depth. Grade Dc. End of pit at 2.60 m

Remarks: Trial pit dry and stable.

Stability: Stable





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Trial Pit Log

Trialpit No
TP203
Sheet 1 of 1

Project Name: Nickle Farm Project No. LP1527 Co-ords: - Date 06/02/2018
Level: Level:

Location: Hatch Lane, Chartham Dimensions (m): 2.9 Scale 1:25

Client: F M Mansfield Depth 2.20 Logged SL

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.40			TOPSOIL: Dark brown gravelly silty clay. Gravel is fine to coarse flint. With rootlets <5mm diameter.
				1.40			Orange brown gravelly silty CLAY. Gravel is fine to coarse flint.
				1.50			Dark brown clayey GRAVEL. Gravel is fine to coarse flint, and chalk. (Head). Off-white structureless CHALK, with orange staining and black speckling. Matrix 60% (Grade Dm).
				2.20			Becoming 20% matrix below 1.95m depth. Grade Dc. End of pit at 2.20 m

Remarks: Trial pit dry and stable.

Stability: Stable





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Trial Pit Log

Trialpit No
TP204
Sheet 1 of 1

Project Name: Nickle Farm Project No. LP1527 Co-ords: - Date 07/02/2018
Level: Level:

Location: Hatch Lane, Chartham Dimensions (m): 2.8
Client: F M Mansfield Depth 1.65 Scale 1:25
Logged SL

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.20			TOPSOIL: Dark brown gravelly silty clay. Gravel is fine to coarse flint. With rootlets <5mm diameter.
				0.45			Orange brown slightly gravelly silty CLAY. Gravel is fine to coarse flint and rare chalk. With rootlets <5mm diameter.
				1.65			Off-white structureless CHALK, with much orange staining and black speckling. 65% matrix (Grade Dm). <i>Becoming 30% matrix below 1.0m depth. Grade Dc.</i>
							End of pit at 1.65 m

Remarks: Trial pit dry and stable.

Stability: Stable





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Trial Pit Log

Trialpit No
TP205
Sheet 1 of 1

Project Name: Nickle Farm

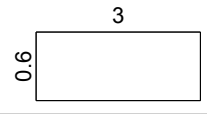
Project No. LP1527

Co-ords: -
Level:

Date
07/02/2018

Location: Hatch Lane, Chartham

Dimensions (m):



Scale
1:25
Logged
SL

Client: F M Mansfield

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
				0.30			TOPSOIL: Dark orange brown slightly gravelly clay. Gravel is fine to medium flint. With rootlets <5mm diameter.	
							Orange brown slightly silty CLAY, with iron staining.	
							Orange brown very sandy (fine to coarse), very gravelly CLAY. Gravel is fine to coarse flint.	
				2.75			Orange brown very sandy GRAVEL of fine to coarse flint.	
				2.90			Orange brown very sandy GRAVEL of fine to coarse flint.	
				3.10			End of pit at 3.10 m	

With much gravel of fine to coarse flint below 2.0m depth.

Remarks: Trial pit dry and stable.

Stability: Stable





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Trial Pit Log

Trialpit No
TP301
 Sheet 1 of 1

Project Name: Nickle Farm Project No. LP1527 Co-ords: - Date 08/02/2018
 Level: Level:

Location: Hatch Lane, Chartham Dimensions (m): 2.8
 Client: F M Mansfield Depth 2.25 Scale 1:25
 Logged OK

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.25			TOPSOIL: Dark grey brown slightly sandy silty clay with rootlets <10mm diameter.
				1.00			MADE GROUND: Orange brown grey mottled silty clay with occasional cobbles of brick.
				1.70			Orange brown and grey mottled slightly gravelly silty CLAY. Gravel is fine to coarse ironstone/mudstone.
				2.25			Orange brown and grey gravelly very sandy (fine to coarse) CLAY. Gravel is fine to coarse flint.
							Ground water seepage at 2.2m depth. End of pit at 2.25 m

Remarks: Some collapse around water table at 2.2m depth.

Stability: Stable





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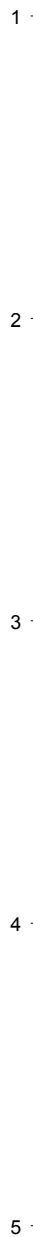
Trial Pit Log

Trialpit No
TP302
Sheet 1 of 1

Project Name: Nickle Farm Project No. LP1527 Co-ords: - Date 08/02/2018
Level: Level:

Location: Hatch Lane, Chartham Dimensions (m): 3.1
Client: F M Mansfield Depth 1.80 Scale 1:25
Logged OK

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.40			TOPSOIL: Dark grey brown slightly sandy (fine) silty clay with occasional rootlets <10mm diameter.
				1.80			Orange brown clayey fine to medium SAND with occasional fine to coarse gravel and cobble of flint.
							End of pit at 1.80 m



Remarks: Trial pit remained dry and stable. Some inconsistency in sands in side walls.

Stability: Stable





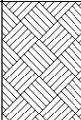
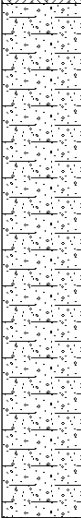
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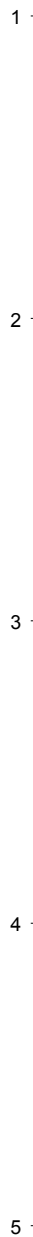
Trial Pit Log

Trialpit No
TP303
Sheet 1 of 1

Project Name: Nickle Farm Project No. LP1527 Co-ords: - Date 08/02/2018
Level: Level:

Location: Hatch Lane, Chartham Dimensions (m): 2.8
Client: F M Mansfield Depth 2.10 Scale 1:25
Logged OK

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.40			TOPSOIL: Dark grey brown slightly gravelly slightly sandy silty clay with many rootlets <10mm diameter. Gravel is fine to coarse brick, flint, and charcoal.
				2.10			Orange brown and grey brown gravelly clayey fine to medium SAND. Gravel is fine to coarse angular flint. <i>With no gravel of flint and with occasional pockets of grey clay below 1.3m depth.</i>
							End of pit at 2.10 m



Remarks: Trial pit remained dry and stable.

Stability: Stable





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Trial Pit Log

Trialpit No
TP401
Sheet 1 of 1

Project Name: Nickle Farm Project No. LP1527 Co-ords: - Date 09/02/2018
Level: Level:

Location: Hatch Lane, Chartham Dimensions (m): 3.2

Client: F M Mansfield Depth 3.10 0.6 Logged SL

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.35			TOPSOIL: Dark brown silty slightly gravelly clay. Gravel is fine to medium flint and chalk. With rootlets <5mm diameter.
							Dark orange brown slightly gravelly silty CLAY. Gravel is fine to medium flint and chalk.
							<i>With much fine to coarse gravel of chalk at 1.0m depth.</i>
				2.60			Orange brown silty CLAY.
				3.10			End of pit at 3.10 m

Remarks: Trial pit remained dry.

Stability: Stable





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Trial Pit Log

Trialpit No
TP402
 Sheet 1 of 1

Project Name: Nickle Farm Project No. LP1527 Co-ords: - Date 09/02/2018
 Level: Level:

Location: Hatch Lane, Chartham Dimensions (m): 3.2
 Depth 1.70 0.6

Client: F M Mansfield Scale 1:25
 Logged SL

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.40			TOPSOIL: Dark brown silty slightly gravelly clay. Gravel is fine to medium chalk. With rootlets <5mm diameter.
				1.10			Dark orange brown gravelly silty CLAY. Gravel is fine to medium chalk.
				1.70			Orange brown silty CLAY, with some iron staining. <i>Becoming yellow orange brown mottled slightly sandy (fine) CLAY, below 1.4m depth.</i>
							End of pit at 1.70 m

Remarks: Trial pit remained dry.

Stability: Stable





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Trial Pit Log

Trialpit No
TP403
 Sheet 1 of 1

Project Name: Nickle Farm Project No. LP1527 Co-ords: - Date 09/02/2018
 Level: Level:

Location: Hatch Lane, Chartham Dimensions (m): 3.2
 Client: F M Mansfield Depth 1.80 Scale 1:25
 Logged SL

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.30			TOPSOIL: Dark brown silty sandy (fine) gravelly clay. Gravel is fine to coarse chalk. With rootles <5mm diameter.
				0.80			Dark orange brown slightly gravelly silty CLAY. Gravel is fine to medium chalk.
				1.20			Orange brown grey silty sandy (fine to medium) CLAY.
				1.80			Off-white structureless CHALK, with orange staining. 70% matrix (Grade Dm). <i>Boundary between CLAY and CHALK is at 1.4m depth on northern end of pit.</i>
							End of pit at 1.80 m

Remarks: Trial pit remained dry.


Stability: Stable




APPENDIX D – SOAKAGE TEST RESULTS

Soakage Test Results


BRE 365 Soakage Test Results

Project No: LPI527	Date: 06/02/2018	Trial Hole No: TP20 I Test I	
Site: Nickle Farm (Peaches Field)			
Client: R M Mansfield			
Trial Hole Dimensions Pit Length: 2.4m Pit Width: 0.9m Pit Depth: 1.7m	Test Conditions Hole gravel filled (Y/N): N Depth to top of granular fill: NA Depth to top of permeable soils: NA Assumed Void Ratio in granular backfill: NA Depth to Ground Water: NA		
Time	Elapsed Time Minutes	Water Level mbgl	
	0.01	1.64	
	1	1.68	
	2	1.69	
	3	1.70	
Notes	BRE Soil Infiltration Rate:		
	4.094 x 10⁻⁴ m/s		

BRE 365 Soakage Test Results

Project No: LPI527	Date: 06/02/2018	Trial Hole No: TP201 Test 2		
Site: Nickle Farm (Peaches Field)				
Client: R M Mansfield				
Trial Hole Dimensions Pit Length: 2.4m Pit Width: 0.9m Pit Depth: 1.7m		Test Conditions Hole gravel filled (Y/N): N Depth to top of granular fill: NA Depth to top of permeable soils: NA Assumed Void Ratio in granular backfill: NA Depth to Ground Water: NA		
Time	Elapsed Time Minutes	Water Level mbgl		
	0.01	1.54		
	1	1.58		
	2	1.60		
	3	1.63		
	4	1.65		
	5	1.67		
	6	1.68		
	7	1.69		
	8	1.70		
Notes		BRE Soil Infiltration Rate:		
		$2.381 \times 10^{-4} \text{ m/s}$		

BRE 365 Soakage Test Results

Project No: LPI527	Date: 06/02/2018	Trial Hole No: TP202 Test I	
Site: Nickle Farm (Peaches Field)			
Client: R M Mansfield			
Trial Hole Dimensions Pit Length: 2.4m Pit Width: 0.6m Pit Depth: 2.4m		Test Conditions Hole gravel filled (Y/N): N Depth to top of granular fill: NA Depth to top of permeable soils: NA Assumed Void Ratio in granular backfill: NA Depth to Ground Water: NA	
Time	Elapsed Time Minutes	Water Level mbgl	
	0.01	2.19	
	1	2.21	
	2	2.22	
	4	2.24	
	9	2.25	
	14	2.26	
	19	2.27	
	24	2.3	
	29	2.33	
	39	2.37	
Notes	BRE Soil Infiltration Rate:		
	4.329 x 10⁻⁵ m/s		