

FINAL

27686G/S/101/RJM

**EARTHWORKS
SPECIFICATION FOR PROPOSED
GAS BARRIER,
AND
ENGINEERING PLACEMENT OF SITE-WON MATERIALS
AT
TOVIL QUARRY
NEAR MAIDSTONE
KENT**

**July 2017
Revision 0**

EARTHWORKS SPECIFICATION – TOVIL QUARRY, NEAR MAIDSTONE
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EARTHWORKS SPECIFICATION – TOVIL QUARRY, NEAR MAIDSTONE

1.0 INTRODUCTION

- 1.1 The site was previously used for the quarrying of ragstone and has been subjected to partial filling as a landfill since cessation of quarrying activities. Site investigations carried out have shown that the depth of historically imported material varies considerably. A Reclamation Method Statement was prepared by Liverpool Environmental Engineering Consultants (Reference 1), and the methodology has been approved by all parties with an interest in the site, i.e. Kent County Council, Maidstone Borough Council and the Environment Agency.
- 1.2 The site is bordered by roads (north), residential developments (north east), a capped landfill (south west) and development land owned by others (east). It is proposed that the existing site will be filled, using site-won soils, placed to an engineering specification and to an agreed profile in accordance with the agreed Reclamation Method Statement (RMS), which will be developed for residential use in due course. The surrounding land should be unaffected by the proposed earthworks, apart from localised works to regulate the ground level over a proportion of the capped landfill to the south west.
- 1.3 It is envisaged that the final depth of engineered material will average around 5m – 6m, and up to a maximum of 10m. Currently proposed finished levels are specified on the attached drawings and may be varied during the course of the works to accord with planning and other considerations associated with the proposed end use of the site which will be for housing.
- 1.4 Elements of the RMS works which have already been carried out include the following:
- i) Selective excavation of the landfill waste and screening and hand picking to remove plastic, stone, metal and other refuse materials
 - ii) Disposal of plastic etc to landfill (Refer separate Letter Reference 27686A-L-003ARev1-RJM (Transfer of Land) 21.04.15 for details of haulage certificates. (see Appendix C)
 - iii) Excavations and related movements of spoil around the site to confirm suitable formation and to enable selective stockpiling of soils for use as engineered fill.
- 1.5 The works addressed by this Specification will consist of the following main items:
- i) Preparation of the land currently owned by Maidstone Borough Council and adjoining areas of the overall quarry to receive the gas protection bund and associated membrane and gas venting structures (Refer to Drawing provided with Contract for the Sale of Freehold Land with Vacant Possession at Tovil, dated 8th November 2007).
 - ii) Construction of a berm of engineered site-won soil to support the face of the adjacent landfill and to provide a suitable base for the placement of a geomembrane gas barrier

- to prevent gas migration from the adjoining landfill along the south western boundary of the site.
- iv) Installation and construction quality assurance of the geomembrane by a specialist supplier in accordance with this specification and the manufacturers own guidance.
 - v) Placement and compaction of site won soils consisting of original quarry waste (hassock and ragstone), clay stored on site (approximately 4000m³), and processed landfill and cover materials to appropriate specifications.
 - vi) Independent validation of each stage and process of the engineered remedial works
 - vii) Validation Conformance testing of all engineered soils and features
 - viii) Production of a completion report.
- 1.5 In carrying out the placement of materials, the contractor shall employ only plant and working methods which are suited to the work and to the materials being handled and traversed.
- 1.6 Attention is drawn to the fact that there may be localised occurrences of substances which are harmful to health. It is considered that these will not represent a hazard to potential long term receptors such as groundwater and future residents of housing. However, appropriate precautions must be taken to protect site operatives and others who are likely to come into contact with such materials during placement. These issues are discussed in a separate Interim Report on Remediation document which will be issued in due course.
- 1.7 This specification provides for the placement and compaction of clean site won soils as described in Sections 3.0, 4.0, 5.0 of this Specification, and associated Tables and Sections contained within this specification.

2.0 PREPARATION OF EXISTING SITE

- 2.1 Drawings are provided showing the boundaries of the site and the extent of the proposed works, including a survey showing present contours and sections showing the ground level at different periods since 2006 and up to 2017. Discrepancies occurring as a result of temporary works shall be reported to the Engineer in writing as the works proceed.
- 2.2 Bushes, undergrowth and small trees shall be uprooted and disposed of. Trees shall be uprooted or cut down as near to ground level as possible and all felled timber and other vegetation shall be disposed of by the Contractor.
- 2.3 Any areas of ponded water shall be pumped out or otherwise dealt with by the Contractor before filling works begin, and this shall be repeated as necessary during the course of the works.
- 2.4 If unsuitable materials are exposed by the remedial operations, eg sludge, flytippings, or refuse materials (eg plastic, paper, soft soil) these shall be selectively removed and stockpiled for off-site disposal and shall not be re-used in the engineered remediation works.

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- 2.5 The Contractor shall arrange the works such that all surfaces which are prepared ready to receive engineered fill or geomembrane are protected from deterioration. Before placement of engineered material, all prepared surfaces shall be inspected by a suitably qualified Engineer. Proof rolling shall be carried out and the Engineer will sign off prepared surfaces accordingly.
- 2.6 Earthworks shall be kept free of water by:
- i) Arranging for the rapid removal of water which has either shed onto the earthworks or entered the earthworks from any other source.
 - ii) Covering and maintaining by appropriate measures the water levels in excavations sufficiently to enable the permanent works to be constructed.
- 2.7 Where engineered materials are to be placed up against existing steep slopes, benching shall be carried out as appropriate, prior to any fill being placed.
- 2.8 Deep fill settlement monitoring stations shall be constructed as shown in Appendix E, upon completion of bulk filling operations. A provisional total of 16no. such monitoring stations shall be constructed on a regular 50m grid across the site.
- 2.9 The Contractor shall take all necessary precautions to ensure that these monitoring stations are clearly visible and properly protected at all times from impact by construction plant.
- 2.10 The Contractor must maintain on site wheel cleansing facilities to prevent the transfer of soil onto the public highway, and employ suitable dust prevention methods.
- 3.0 CONSTRUCTION OF IMPORTED MATERIALS**
- 3.1 It is envisaged that Tovil Quarry will be infilled using site-won materials, placed in accordance with this specification and all related documents, drawings etc.
- 3.2 Only materials which comply with this specification shall be used in the works. Such materials shall be principally granular or cohesive in character and free from contamination, organic debris or other material which may be subject to degradation.
- 3.3 Other materials such as clay and chalk may, at a later date, be considered for bulk importation and placement. However, it is anticipated at this stage that if such materials are incorporated into the works, they will be restricted to specified levels and zones which will be determined by the Engineer.
- 3.4 Physical and compaction requirements for any imported materials will be specified by the Engineer should it be considered that imported materials are to be permitted.

- 3.5 There may be a requirement to source and place smaller volumes of other materials eg for gas protection measures, drainage or landscaping. Details of this will be advised as necessary but it is essential that a full custody record is maintained for any such works.
- 3.6 During operations the Contractor shall keep all earthworks protected and free of water as described in section 2.3 and 2.6. Any areas of completed works which deteriorate due to the Contractor's failure to take adequate precautions in this respect shall be dug out and replaced with suitable material at the Contractor's own expense.
- 3.7 This Specification covers all site-won materials to be used in the bulk filling exercise but it is anticipated that, following completion of the bulk filling works, a provisional 500mm capping of validated inert subsoil and topsoil will be provided in domestic gardens, and 300mm in landscaped areas. Validation requirements to be agreed in due course with the relevant Local Authority Contaminated Land Officer.

4.0 SITE WON FILL MATERIAL – PROPERTIES & CLASSIFICATION

- 4.1 The physical properties of the main site-won bulk fill materials to be incorporated in the works are given in Appendix C and are based on the Department of Transport Specification for Highway Works, Series 600, Earthworks (2001). Three classes of material have been identified and based on their gradings and other properties, classify as follows:
- Class 2A (Wet cohesive fill) – clay fill stored on site
 - Class 2B (Dry cohesive fill) – a small proportion of the quarry waste / hassock type material available in the north east portion of the site
 - Class 2C – most of the stockpile materials (Stockpiles SP1 to SP8) based on samples taken in June/July 2017, and most of the quarry waste based on samples taken in March 2017.
- 4.2 A fourth material is also present, consisting primarily of ash. This is NOT considered to be a suitable engineering fill in its own right, and it's use is to some degree restricted because of irregular inclusions of asbestos containing materials (ACM's). It's suitability for re-use as fill or as a surfacing for temporary haul roads is subject to the ACM's being satisfactorily hand-picked for disposal as hazardous waste, and regular quantitative analysis on representative samples. Preliminary analysis has indicated that it is present at sufficiently low levels (less than 0.001%) to ensure that it does not classify as hazardous waste. Following the quantitative testing, a visual survey of the stockpiles and overall site surface was carried out by an asbestos surveyor and their report is provided as Appendix H.
- 4.3 Any other material will be considered appropriate providing that it can be proven to be compactable to the requirements of this Specification by means of compaction trials and not subject to any undesirable post compaction settlement. Such materials must be chemically inert, non-leachable and fully meet the contamination criteria laid down in this Specification.

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- 4.4 Chemical test results including asbestos screens and quantitative analysis are provided in Appendix C. Further analysis of this data will be presented in a separate Report on Remedial Works.
- 4.5 For imported soils, independent test certificates shall be provided for each source to demonstrate compliance with the requirements. Test certificates shall be provided at least five working days before commencement of delivery to site to allow the Engineer time for consideration and approval.
- 4.6 From time to time the Engineer may request additional test certificates to demonstrate on going compliance as the source becomes worked. These shall also be provided in a timely manner.

5.0 COMPACTION REQUIREMENTS

- 5.1 Compaction of materials will be by means of a vibrating roller and will be in accordance with Table 6/4 of the DoT specification for Highway Works (1991). A Specification for the proposed compaction plant/rollers is provided in Appendix B. Method compaction shall be undertaken using plant and methods appropriate to the requirements as listed in Tables 6/1-6/4 for the class of material being compacted. However, the compacted material will also be required to meet certain end product criteria and these are given in Section 6.3.
- 5.2 Plant and methods not included in Table 6/4 shall only be used if it is demonstrated at site trials that a state of compaction is achieved by the alternative method equivalent or superior to that obtained using the specified method. The procedure to be adopted for these site trials shall first be submitted to the Engineer for approval.
- 5.3 Earthmoving plant shall not be accepted as compaction equipment nor shall the use of a lighter category of plant to provide any preliminary compaction to assist the use of heavier plant be taken into account when assessing the amount of compaction required for any layer.
- 5.4 If more than one Class of material is being used in such a way that it is not practicable to define the areas in which each Class occurs, the Contractor shall compact with plant operating as if only the material which requires the greater compaction is being compacted.
- 5.5 The Engineer shall at any time carry out field dry density tests on material compacted to method requirements. If the results of field tests show densities which indicate the state of compaction to be inadequate in the opinion of the Engineer, then providing this is due to failure to comply with the requirements of the Specification, then further works as is required to comply with the Specification shall be carried out.
- 5.6 For the purposes of Table 4 the following shall apply:

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- i) The minimum number of passes, N, is the minimum number of times that each point on the surface of the layer being compacted shall be traversed by the item of compaction plant in its operating mode. D is the maximum depth of the compacted layer.
- ii) **NOTE:** In column N # the number of passes shown is to be doubled for all material Classes when such materials occur within 600mm of sub-formation or formation.
- iii) The compaction plant in Table 6/4 is categorised in terms of static mass. The mass per metre width of roll is the total mass on the roll divided by the total roll width. Where a smooth wheeled roller has more than one axle the category of the machine shall be determined on the basis of the axle giving the highest value of mass per metre width.

5.7 Vibratory rollers are self-propelled or towed smooth-wheeled rollers having means of applying mechanical vibration to one or more rolls. The requirements for vibratory rollers are based on the use of the lowest gear on a self-propelled machine with mechanical transmission and a speed of 1.5 to 2.5 km/h for a towed machine, or a self-propelled machine with hydrostatic transmission. If higher gears or speeds are used an increased number of passes shall be provided in proportion to the increase in speed of travel. Where the mechanical vibration is applied to two rolls in tandem, the minimum number of passes shall be half the number given in Table 4 for the appropriate mass per metre of one vibrating roll but if one roll differs in mass per metre width from the other the number of passes shall be calculated as for the roll with the smallest value. Alternatively the minimum number of passes may be determined by treating the machine as having a single vibrating roll with a mass per metre width equal to that of the roll with the higher value. Vibrating rollers operating without vibration will be classified as smooth-wheeled rollers and shall not be used. Vibratory rollers shall be operated with their vibratory mechanism operating only at the frequency of vibration recommended. The machine shall be operated at the maximum amplitude setting and at the maximum recommended frequency for that setting. Vibratory rollers shall be equipped or provided with devices indicating the frequency at which the mechanism is operating and the speed of travel.

5.8 For items marked * in the Method 3 columns of Table 4 the roller shall be towed by track-laying tractors. Self propelled rollers are unsuitable. Where combinations of different types or categories of plant are used, the following shall apply:

- a) the depth of layer shall be that for the type of plant requiring the least depth of layer; and
- b) the number of passes shall be that for the type of plant requiring the greatest number of passes.

6.0 CONSTRUCTION OF LANDFILL GAS CONTROL MEASURES

- 6.1 The landfill gas control measures shall be installed in accordance with the attached Drawings (Appendix A) and the manufacturer/installer's own specifications and details (Appendix F).
- 6.2 The Reclamation Method Statement stipulated a 6m deep and 1m wide trench, infilled with gas permeable stone, backed by an HDPE gas proof liner on the Tovil Quarry side, to be installed along the full 240m length of the south western boundary as a safeguard against future gas inflows into the Tovil Quarry land. It was also advised that where the trench needed to be greater than 6m depth, that an option to install gas relief boreholes at 20m centres would be considered. This is superceded by the following clauses:
- 6.3 Based on the recent survey drawings, it is known that the depth of filling will exceed 6m for a proportion of the length of the southwestern boundary. Therefore, 2m x 1m gabions filled with permeable stone, and with a central slotted gas pipe will be installed at 20m centres along the face of the neighbouring landfill and these will be held in place by an engineered bund. The gabion column with internal gas pipe will be extended vertically, one box at a time, as the bund becomes higher.
- Each gabion column will be founded into the underlying strata on a bed of compacted ragstone. The underlying strata is expected to be insitu Atherfield Clay at the lowest points and either clean quarry waste (ragstone and hassock only) or insitu Hythe Beds.
- The top of each gabion column will be terminated at 6m below finished ground level where they will connect to the proposed venting ditch which shall be installed as per the original Reclamation Method Statement.
- 6.4 The bund will be installed using engineered fill as indicated in the drawings in **Appendix A: Gas Protection Bund, Vent and Membrane Details; Appendix F: Butek Landline Details & Specifications for Provision and Installation of Ground Gas Membrane;** and as specified elsewhere in this document.
- 6.5 An HDPE membrane will be installed on the Tovil Quarry side of the bund to provide a continuous gas barrier to the full height of the south western boundary. Connections and methods of connection between adjoining sheets will be Construction Quality Assured by the installer, and these records will be validated by the scheme engineer who shall be in attendance for the duration of the membrane installation works.
- 6.6 When filling has been completed, a 6m deep venting trench will be installed along the southwestern boundary, and this shall be separated from the rest of the Tovil Quarry site by the HDPE membrane.

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- 6.7 All of the above stages of construction shall be the subject of a Final Report on Validation which should include clear documentary evidence, including photographs, testing records and a site diary covering each stage of the construction.

GENERAL REQUIREMENTS

7.0 TESTING

- 7.1 Test results are provided in Appendix C for all site-won materials.

- 7.2 For each new source of material proposed to be imported to site, PJ Burke will be required to provide the Engineer with the results of independent testing which show compliance with the specification. The Engineer will issue written confirmation that a particular source of material is suitable for use and therefore such test results shall be made available at least 48 hours before any materials to which they relate are brought to site. From time to time additional testing may be required by the Engineer to ensure continuing compliance with the specification. On these occasions selection of samples for testing shall be at the point of delivery. Requirements for physical and chemical properties of the various classes of material that may be used at the site are given in Tables 1 - 3.

- 7.3 Testing will be required to demonstrate that the method of compaction being used is adequate in terms of dry density being achieved and that the development site is providing adequate bearing characteristics. To demonstrate this, in-situ dry density tests will be carried out at all levels together with Plate Bearing tests.

- 7.4 The target for dry density will be 95% of the maximum achieved under laboratory conditions (BS 1377 1990 Part 4 Vibrating hammer method). The Contractor will make adjustments to the number of passes and layer thickness in order to meet this criterion and the necessary bearing performances, the requirements for which are:

Minimum size of Plate	-	600mm
Working load	-	100 kN/m ²
Maximum settlement at working load	-	5mm
Maximum settlement at twice working load	-	10mm
Maximum settlement at three times working load	-	15mm

- 7.5 The Engineer will decide on the number, frequency, spacing and position of all in-situ tests but, as a guide, the following general rates may be assumed:

In-situ density tests	-	1 per 1,000m ³
Plate Bearing tests	-	1 per 5,000m ³

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- 7.6 The Contractor will provide the Engineer with copies of results of all laboratory and field density tests and all Plate Bearing tests as soon as practical but no later than 24 hours after the completion of the tests.
- 7.7 On completion of the filling exercise, it is recommended that the Contractor undertaking the works at that time shall establish, protect and maintain additional concrete block levelling stations located on a regular grid pattern across the site at the finished level of the imported material, for subsequent level monitoring by the engineer. Positions of these monitoring stations are to be confirmed at a later date.
- 7.8 Deep monitoring stations will also be installed in boreholes on completion of the works and locations will be selected carefully to avoid proposed building footprints. The purpose of these monitoring points is to establish what proportion of any settlement is associated with the deeper original quarry fill.
- 7.9 PJ Burke, and any subsequent contractor undertaking filling works shall undertake site noise, dust or vibration monitoring as required.

8.0 OTHER LANDSCAPING REQUIREMENTS

- 8.1 Dentition and other tying-in works may be required to the site boundaries. These will be detailed in due course, if identified as a requirement by the engineer or others during the course of the filling operations.
- 8.2 Specific care should be taken to prevent disturbance of asbestos containing materials in the made ground along the north west boundary. This appears to be made up ground associated with the lay-by located alongside the site boundary (Refer to Appendix H).

9.0 REPORTING

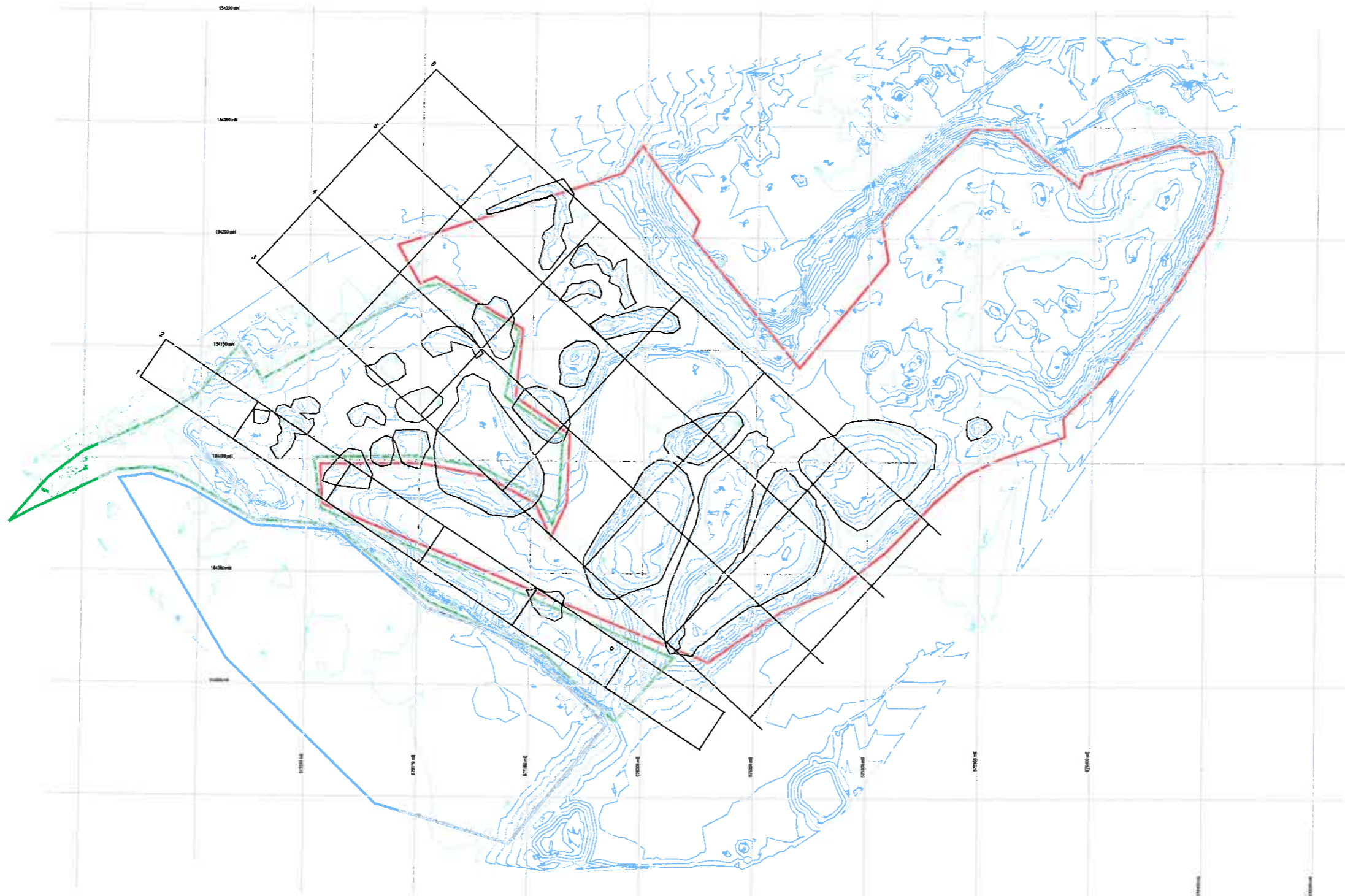
On completion of the work and not later than one month after completion the Contractor shall provide the Engineer with five copies of a report which shall fully describe the work undertaken. As well as a brief written statement the report shall include plans showing details of the as-built works, the plant used, dates and such other information as may be reasonably requested by the Engineer. The report shall contain, in appendix form if necessary, copies of all tests results, test locations etc. Photographs showing the various stages of the work shall also be included.

APPENDICES	
A	DRAWINGS <ul style="list-style-type: none">• Existing Survey• Stockpile Locations and 2017 Trial Pits• Sections of existing strata• Proposed Levels• Isopachyte Drawing (Existing vs Proposed Levels)• Gas Protection Bund, Vent and Membrane Details

NOTES:

1) **GENERAL**

A) ---
 B) ---



Rev	Date	Revision	By	Chk
A	25.07.17			
Client		P J Burke		
Project		Tovil Quarry Maidstone		
Drawing Title		2017 Survey Existing Ground Levels		
SCALE		1:1000		DRAWN CIH
DATE		04.07.17		
DRAWING STATUS				A1
27686/ G /SK1				

Client: **P J Burke**

Project: **Tovil Quarry
Maidstone**

Drawing Title: **2017 Survey Existing
Ground Levels**

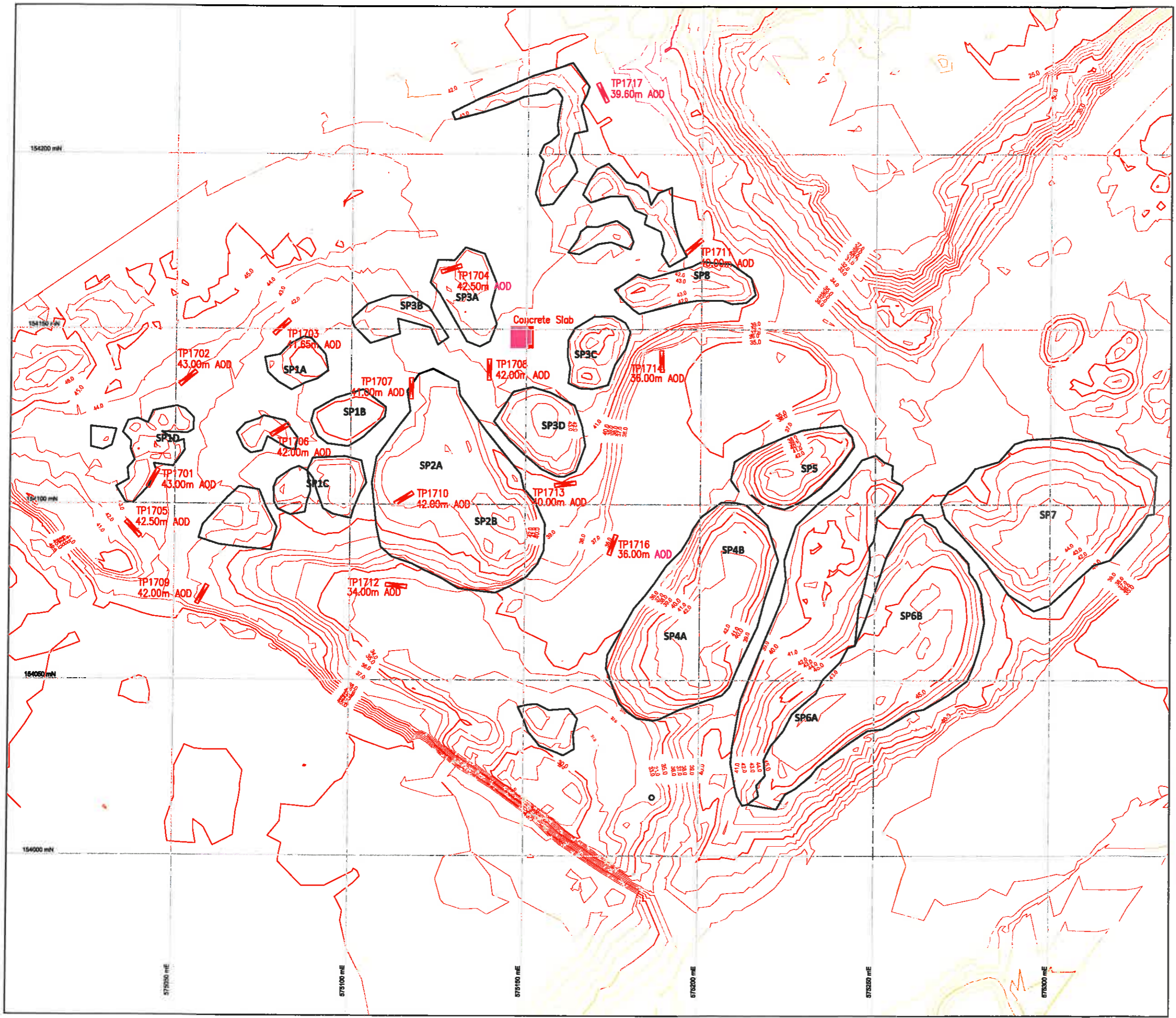


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DRAWING STATUS

27686/ G /SK1 **A**



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 This drawing is to be read in conjunction with all relevant documents
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NOTES.
 1) **GENERAL**

- TP1703 41.65m AOD 2017 TRIAL PIT LOCATIONS
- SP5 STOCKPILE LOCATIONS

CONSTRUCTION (DESIGN & MANAGEMENT) REGULATIONS 2015

- DESIGNERS HAZARD INFORMATION FOR CONSTRUCTION**
1. SERVICES TO BE LOCATED
 2. MANUAL LIFTING
 3. HOT MATERIAL WORKING
 4. CUTTING/DUST
 5. CONCRETE, HANDING, LIFTING, PLACEMENT
 6. DEEP EXCAVATIONS, COLLAPSE/FALLING
 7. SERVICE VOIDS/RISERS, FALLING

A	25.07.17	Draft	CH	RM
Rev	Date	Revision	By	Chk

Client **P J Burke**

Project **Tovil**

Drawing Title
Stockpile Locations & 2017 Trial Pit Locations

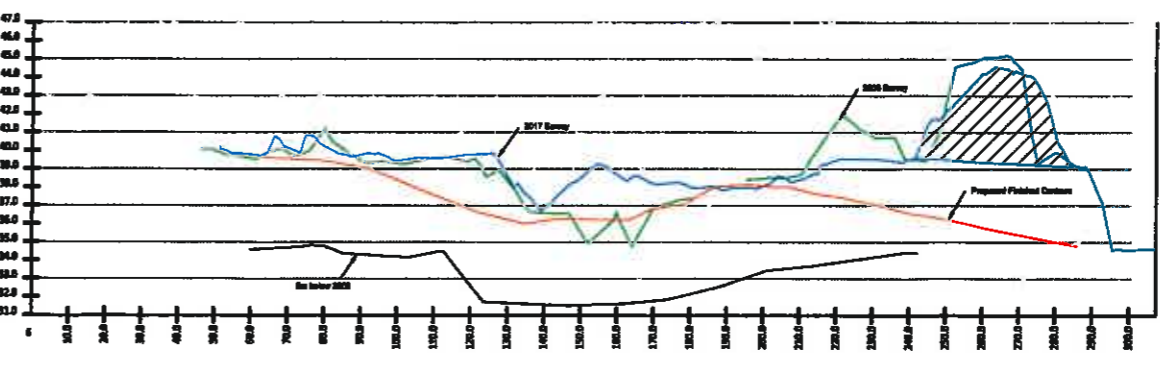
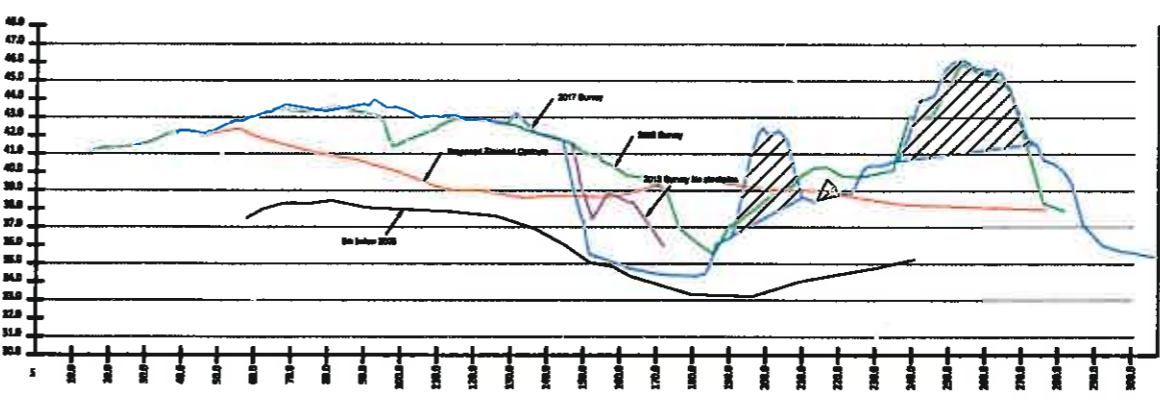
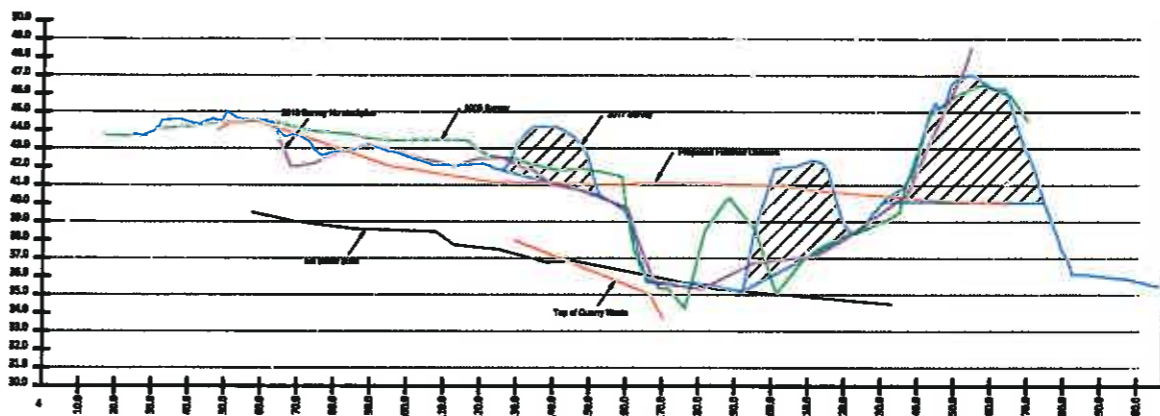
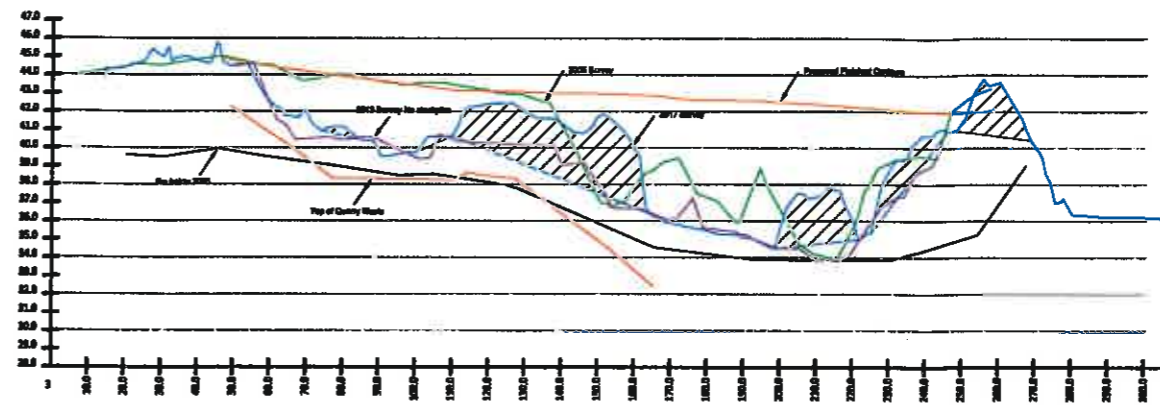
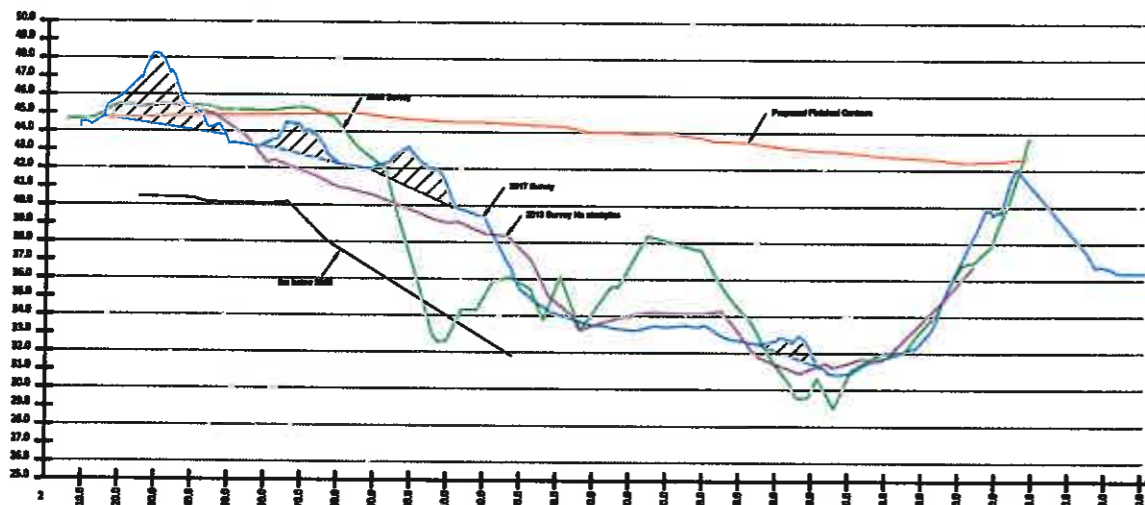
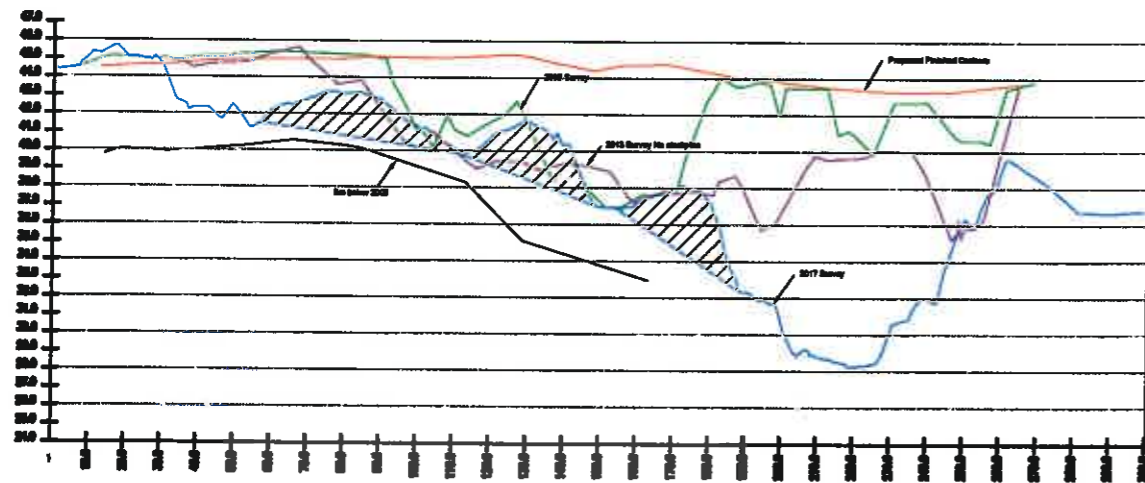
Knapp Hicks
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DATE	25.07.17	CHECK	RJM	

DRAWING STATUS

27686/ G /SK3 A

NOTES:
 1) GENERAL
 A) For Section locations see drawing 27686/005.



Rev	Date	Revision	By	CHK
A	25.07.17	Issue	CM	RM

Client: P J Burke

Project: Tovil Quarry Maidstone

Drawing Title: Sections of Existing Strata & Previous Site Surveys

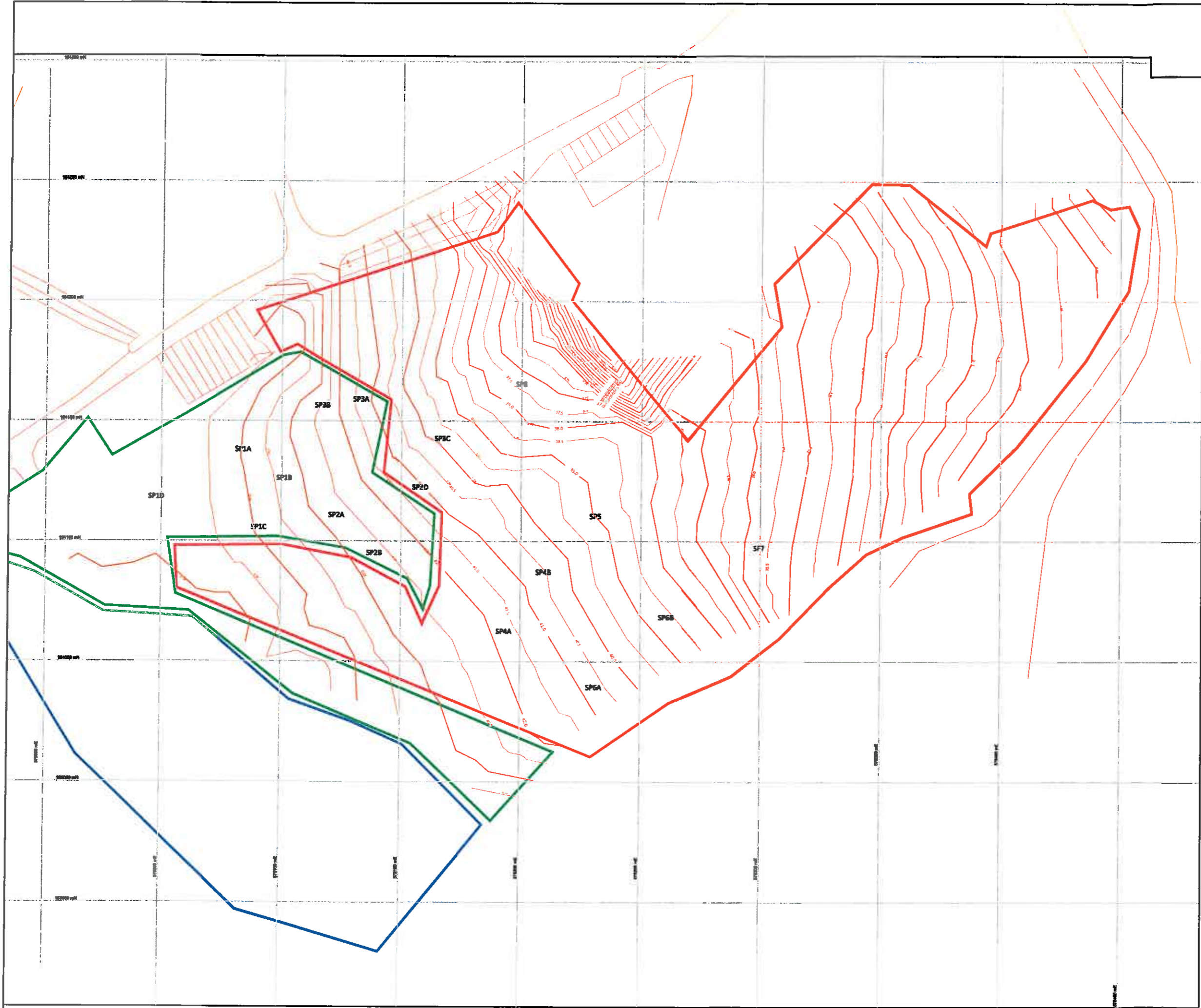
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DATE	25.07.17	CHECK	RM	

DRAWING STATUS

27686/ G /SK2 A

Use figured dimensions only: Do not scale from drawing.
 All levels and dimensions are to be checked on site.
 This drawing is to be read in conjunction with all relevant documents

KNAPP HICKS & PARTNERS LTD. (DATE AS TITLE)



NOTES.
 1) **GENERAL**
 A)
 B)

CONSTRUCTION (DESIGN & MANAGEMENT) REGULATIONS 2015

DESIGNERS HAZARD INFORMATION FOR CONSTRUCTION

1. SERVICES TO BE LOCATED
2. MANUAL LIFTING
3. HOT MATERIAL WORKING
4. CUTTING/DUST
5. CONCRETE, HANDING, LIFTING, PLACEMENT
6. DEEP EXCAVATIONS, COLLAPSE/FALLING
7. SERVICE VOIDS/RISERS, FALLING

A	25.07.17	Draft	CH	RM
Rev	Date	Revision	By	Chk

Client **P J Burke**

Project **Tovil**

Drawing Title **Proposed Levels**

Knapp Hicks
 Consulting Structural, Civil
 & Geotechnical Engineers

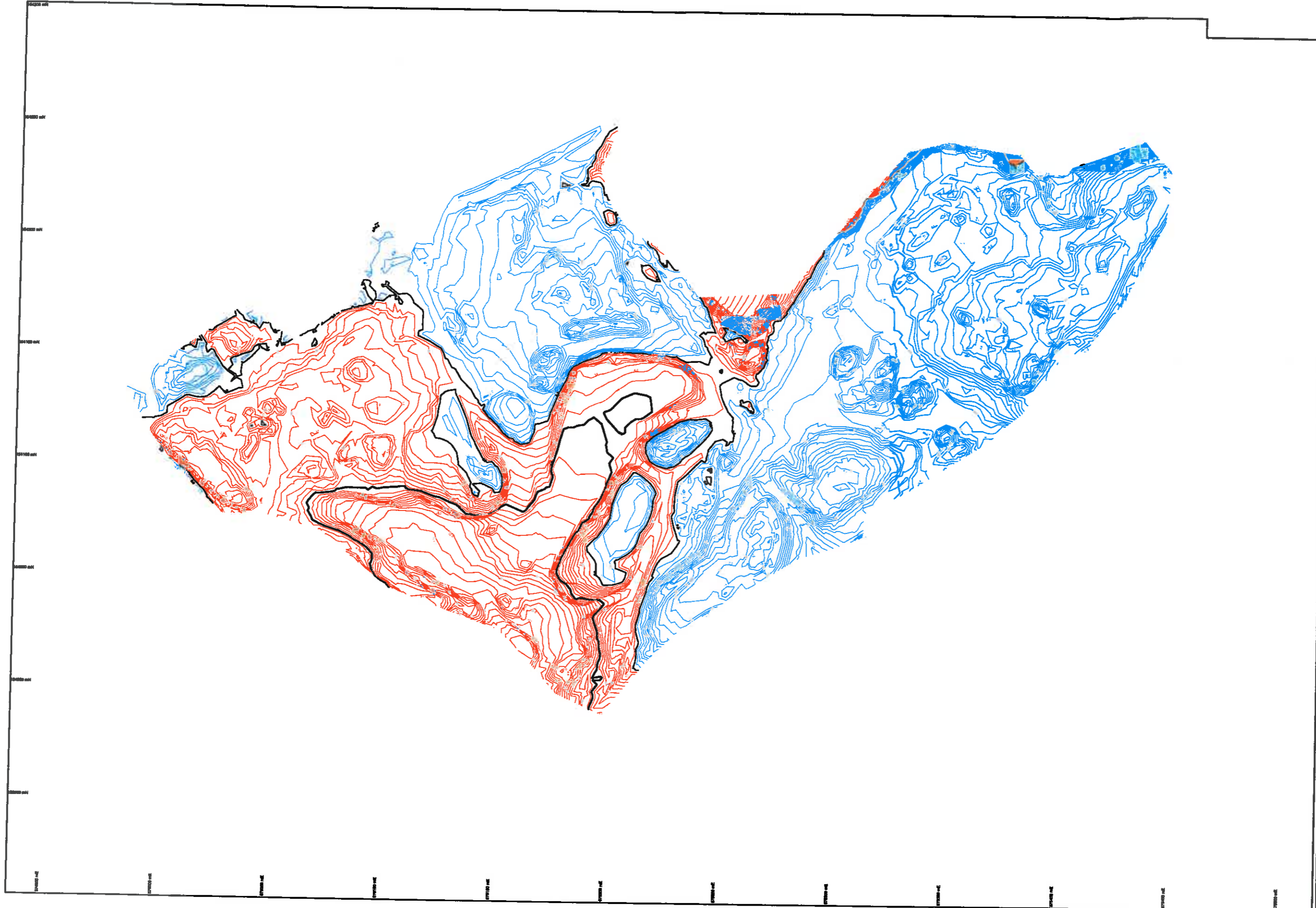
Prospect House, 1 Highpoint Business Village
 Henwood, Ashford, Kent TN24 8DH

tel: 01233 502255 website: www.knapphicks.co.uk

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DRAWING STATUS

27686/ G /SK4 A



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NOTES:
 1. SEE SHEET 27686/G/SK5 FOR CONTIGUOUS AREAS.
 2. SEE SHEET 27686/G/SK5 FOR CONTIGUOUS AREAS.

- 1. EXISTING TOPOGRAPHY
- 2. PROPOSED TOPOGRAPHY
- 3. EXISTING UTILITIES
- 4. PROPOSED UTILITIES
- 5. EXISTING ROADWAY
- 6. PROPOSED ROADWAY
- 7. EXISTING BUILDINGS
- 8. PROPOSED BUILDINGS

NO.	DATE	BY	CHKD
1			
2			

Drawn: **P J Burke**

Project: **Tovli Quarry**

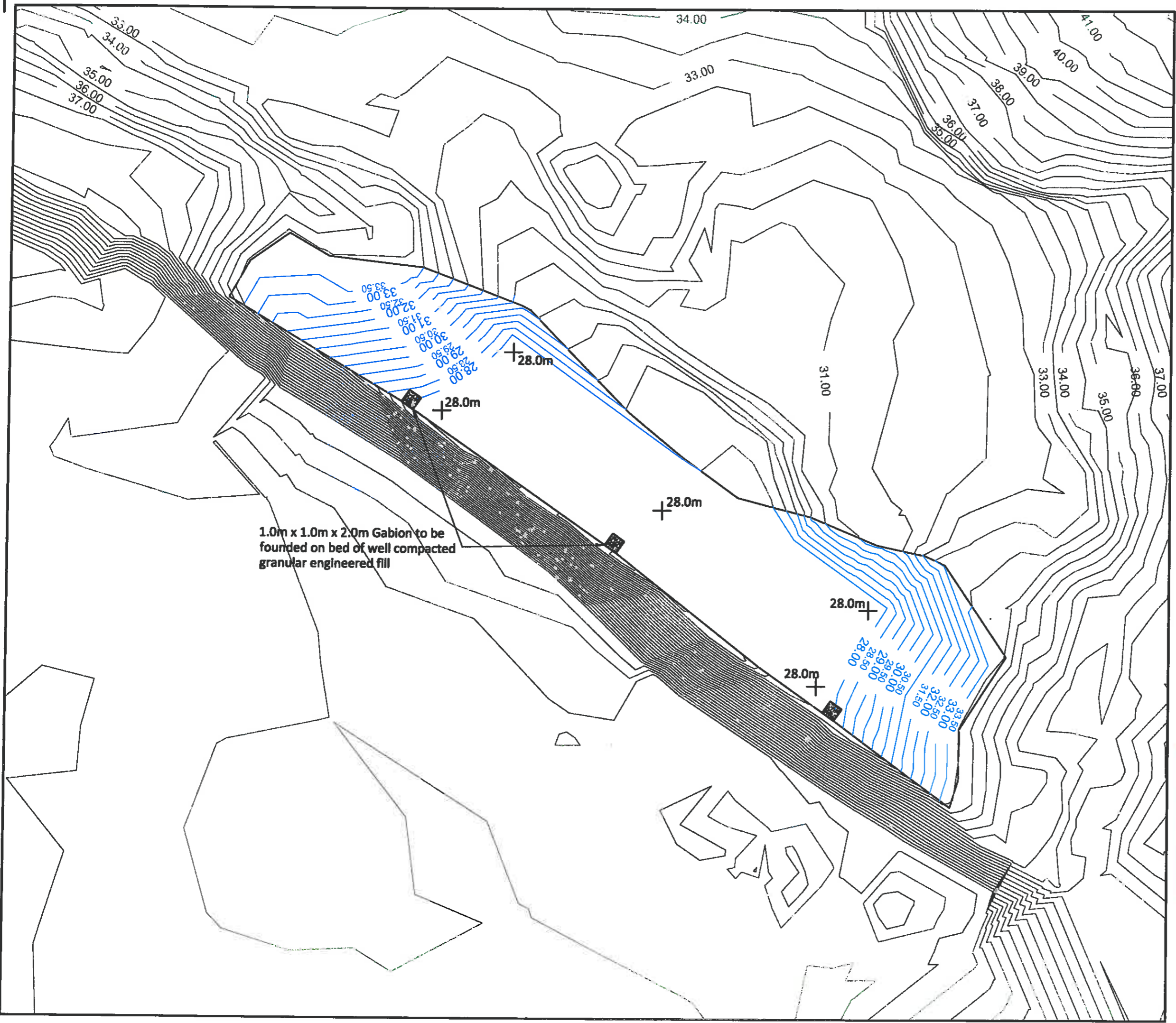
Drawing Title: **Cut and Fill
 2017 Survey
 and Proposed**



SCALE: 1:500
 DATE: 28.07.17
 SHEET: 27686/G/SK5
 DRAWN: PJB
 CHECKED: SK5
 A0

DRAWING STATUS

27686/G/SK5 A



Use figured dimensions only: Do not scale from drawing.
 All levels and dimensions are to be checked on site.
 This drawing is to be read in conjunction with all relevant documents

KNAPP HICKS & PARTNERS LTD. (DATE AS TITLE)

NOTES.
 1) **GENERAL**
 A) Soft material is to be removed and the area de-watered prior to fill placement. Formation level to be firm natural ground.
 B) Formation level to be compacted prior to engineered fill placement.

CONSTRUCTION (DESIGN & MANAGEMENT) REGULATIONS 2015

- DESIGNERS HAZARD INFORMATION FOR CONSTRUCTION**
1. SERVICES TO BE LOCATED
 2. MANUAL LIFTING
 3. HOT MATERIAL WORKING
 4. CUTTING/DUST
 5. CONCRETE, HANDING, LIFTING, PLACEMENT
 6. DEEP EXCAVATIONS, COLLAPSE/FALLING
 7. SERVICE VOIDS/RISERS, FALLING

Rev	Date	Revision	By	Chk
B	26.07.17	Construction	CH	RM
A	25.07.17	Draft	CH	RM

Client
P J Burke

Project
**Farleigh Hill
 Tovil, Maidstone**

Drawing Title
**South West Boundary
 Waste Face:
 Formation Levels for
 Engineered Bund**

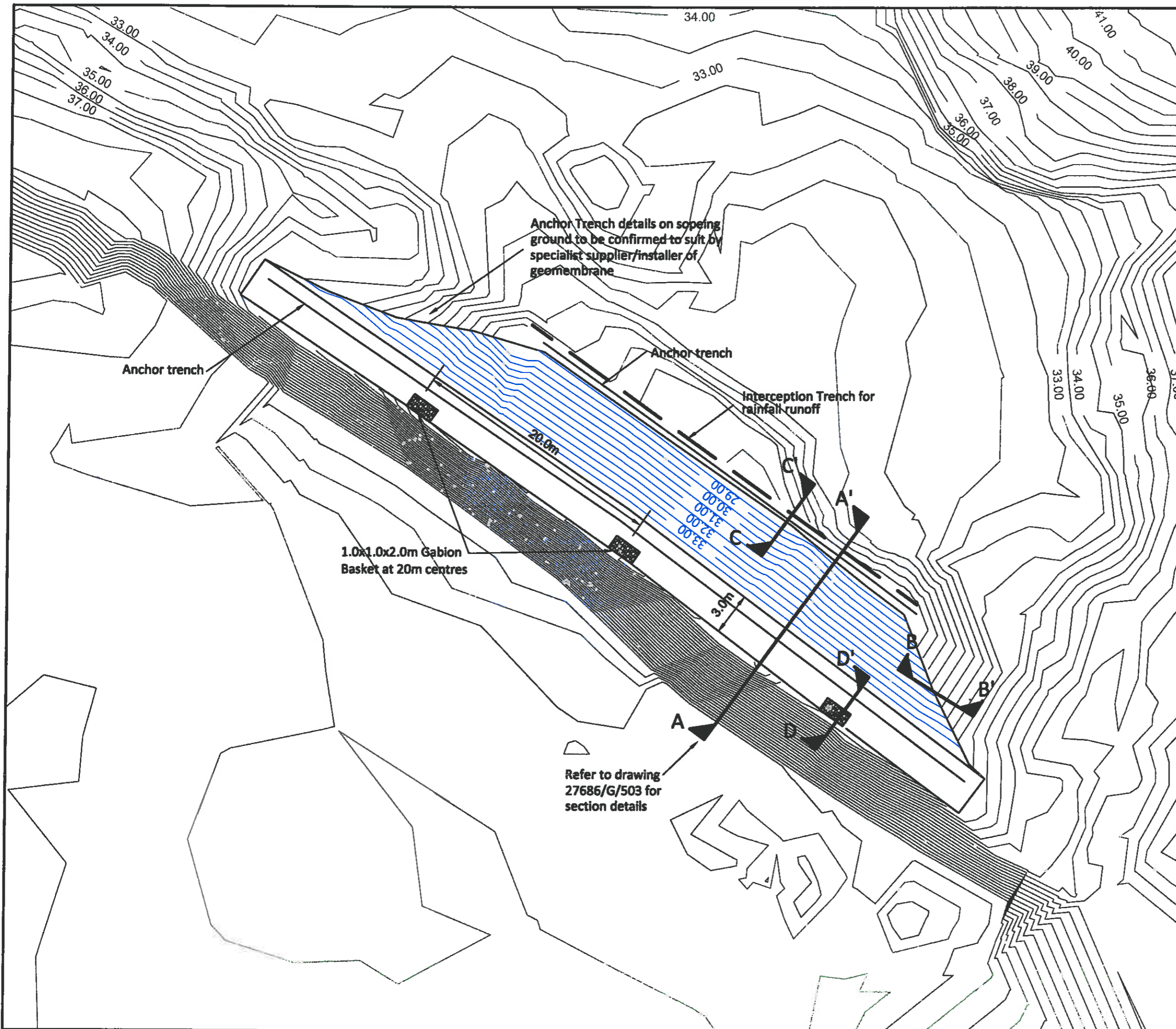


Knapp Hicks
 Consulting Structural, Civil
 & Geotechnical Engineers
 Prospect House, 1 Highpoint Business Village
 Henwood, Ashford, Kent TN24 8DH
 tel: 01233 502255 website: www.knapphicks.co.uk

SCALE **1:250** DRAWN **CJH** **A3**
 DATE **25.07.17** CHECK **RJM**

DRAWING STATUS

27686 / C / 501 **B**



Use figured dimensions only: Do not scale from drawing.
 All levels and dimensions are to be checked on site.
 This drawing is to be read in conjunction with all relevant documents
 KNAPP HICKS & PARTNERS LTD. (DATE AS TITLE)

NOTES.
 1) **GENERAL**
 A) Anchor trenches to be 0.5m x 0.5m at toe and crest of batter as shown on drawing 27686-503.
 B) Interception trench to be excavated to collect rainfall run-off to protect toe of slope. To be pumped to a suitable location away from engineered bund.
 C) Gabion baskets to be filled in conjunction with engineered clay placement. Gas pipes to be placed concurrently with gabion infill.

CONSTRUCTION (DESIGN & MANAGEMENT) REGULATIONS 2015

DESIGNERS HAZARD INFORMATION FOR CONSTRUCTION

1. SERVICES TO BE LOCATED
2. MANUAL LIFTING
3. HOT MATERIAL WORKING
4. CUTTING/DUST
5. CONCRETE, HANDING, LIFTING, PLACEMENT
6. DEEP EXCAVATIONS, COLLAPSE/FALLING
7. SERVICE VOIDS/RISERS, FALLING

Rev	Date	Revision	By	Chk
B	26.07.17	Construction	CH	RM
A	20.07.17	Draft	CH	RM

Client
P J Burke

Project
**Farleigh Hill
 Tovil, Maidstone**

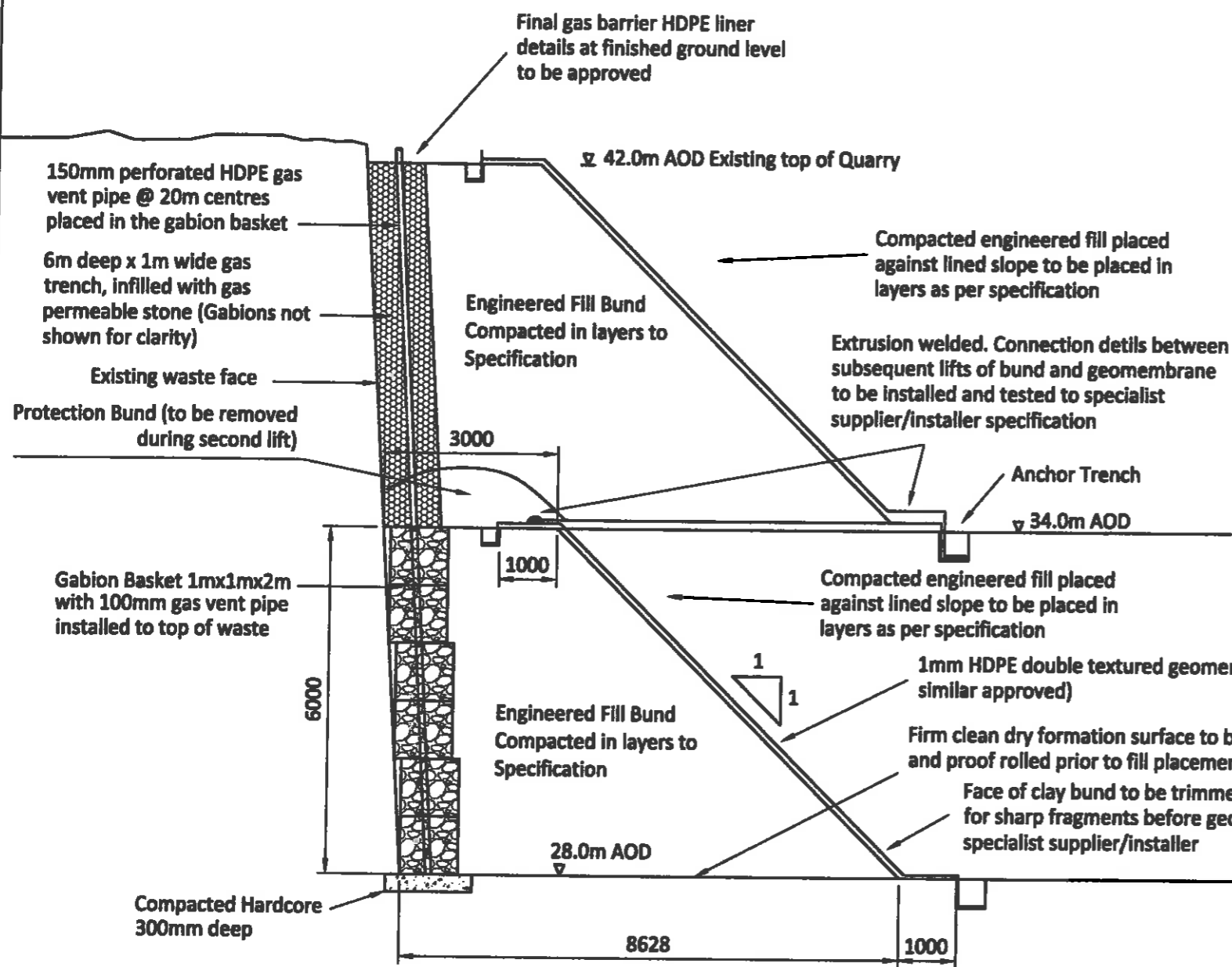
Drawing Title
**South West Boundary
 Waste Face:
 Engineered Clay Bund
 Lift 1**

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 & Geotechnical Engineers
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 Hemwood, Ashford, Kent, TN24 8DH
 tel: 01233 502255 website: www.knapphicks.co.uk

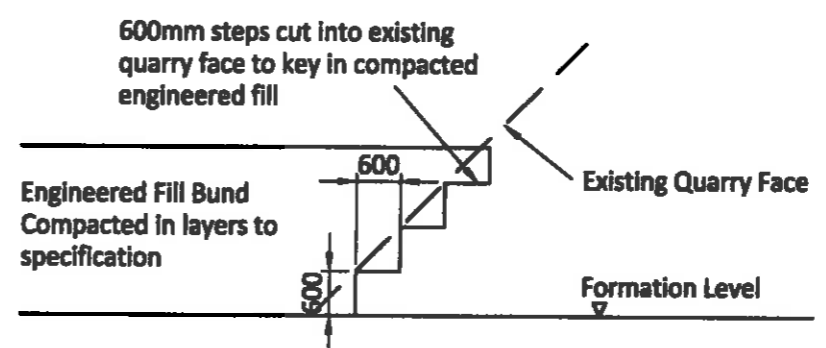
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DATE	20.07.17	CHECK	RJM	

DRAWING STATUS

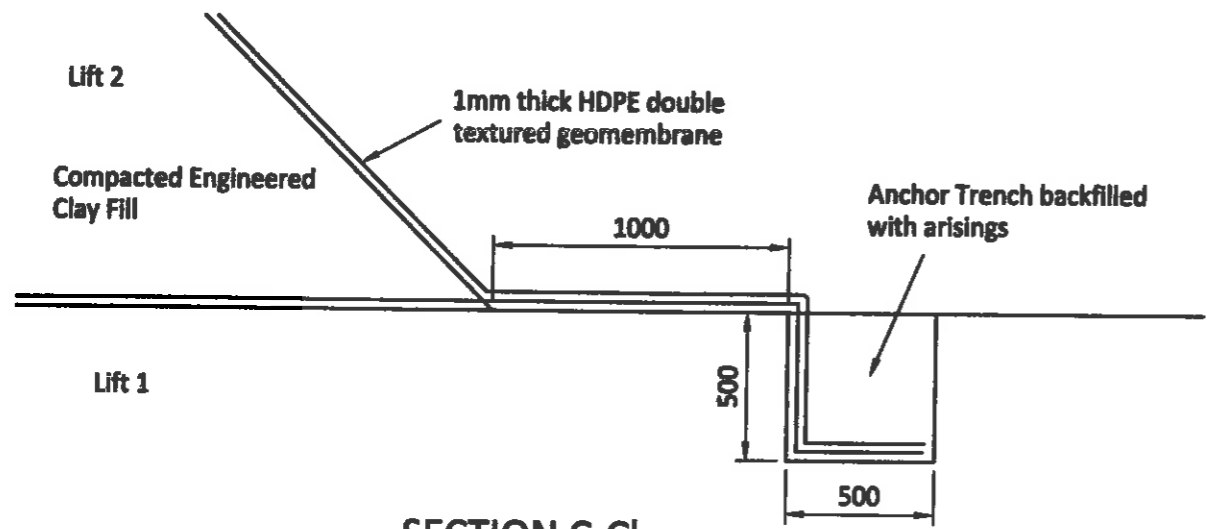
27686 / C / 502 **B**



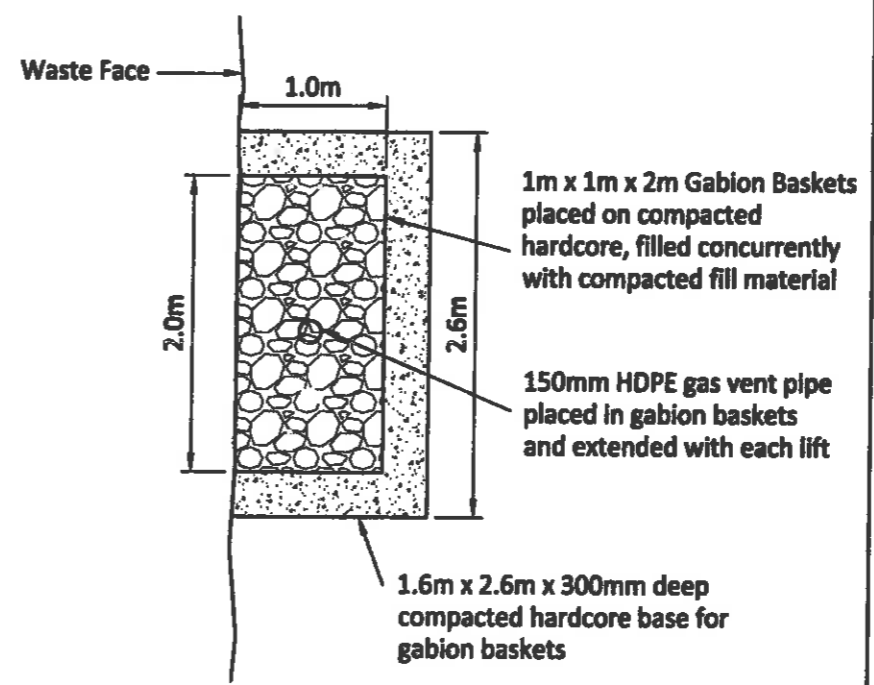
SECTION A-A' THROUGH GAS BARRIER AND BUND CONSTRUCTION
 (1:100)



SECTION B-B' KEY IN DETAIL BETWEEN EXISTING QUARRY AND ENGINEERED BUND FILL
 (1:100)



SECTION C-C' ANCHOR TRENCH DETAIL
 (1:25)



SECTION D-D' THROUGH GABION BASKET AND GAS VENT PIPE
 (1:50)

NOTES.
 1) GENERAL

CONSTRUCTION (DESIGN & MANAGEMENT) REGULATIONS 2015

- DESIGNERS HAZARD INFORMATION FOR CONSTRUCTION
- SERVICES TO BE LOCATED
 - MANUAL LIFTING
 - HOT MATERIAL WORKING
 - CUTTING/DUST
 - CONCRETE, HANDING, LIFTING, PLACEMENT
 - DEEP EXCAVATIONS, COLLAPSE/FALLING
 - SERVICE VOIDS/RISERS, FALLING

Rev	Date	Revision	By	Chk
B	26.07.17	Construction	CH	RM
A	20.07.17	Draft	CH	RM

Client
P J Burke

Project
**Farleigh Hill
 Tovil, Maidstone**

Drawing Title
**South West Boundary
 Waste Face:
 Earthworks Construction
 Details**

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 Consulting Structural, Civil & Geotechnical Engineers
 Prospect House, 1 Highpoint Business Village
 Hamwood, Ashford, Kent TN24 8DH
 Tel: 01233 502255 website: www.knapphicks.co.uk

SCALE	As shown	DRAWN	CJH	A3
DATE	20.07.17	CHECK	RM	

DRAWING STATUS

27686 / C / 503 **B**

Use figured dimensions only: Do not scale from drawing.
 All levels and dimensions are to be checked on site.
 This drawing is to be read in conjunction with all relevant documents
 © KNAPP HICKS & PARTNERS LTD. (DATE AS TITLE)

NOTES
 1) GENERAL

CONSTRUCTION (DESIGN & MANAGEMENT) REGULATIONS 2015

DESIGNERS HAZARD INFORMATION FOR CONSTRUCTION

- 1. SERVICES TO BE LOCATED
- 2. MANUAL LIFTING
- 3. HOT MATERIAL WORKING
- 4. CUTTING/DUST
- 5. CONCRETE, HANDING, LIFTING, PLACEMENT
- 6. DEEP EXCAVATIONS, COLLAPSE/FALLING
- 7. SERVICE VOIDS/RISERS, FALLING

Rev	Date	Revision	By	Chk
B	26.07.17	Construction	CH	RM
A	25.07.17	Draft	CH	RM

Client
P J Burke

Project
**Farleigh Hill
 Tovil, Maidstone**

Drawing Title
**South West Boundary
 Waste Face:
 Geomembrane Lining
 Construction Details**

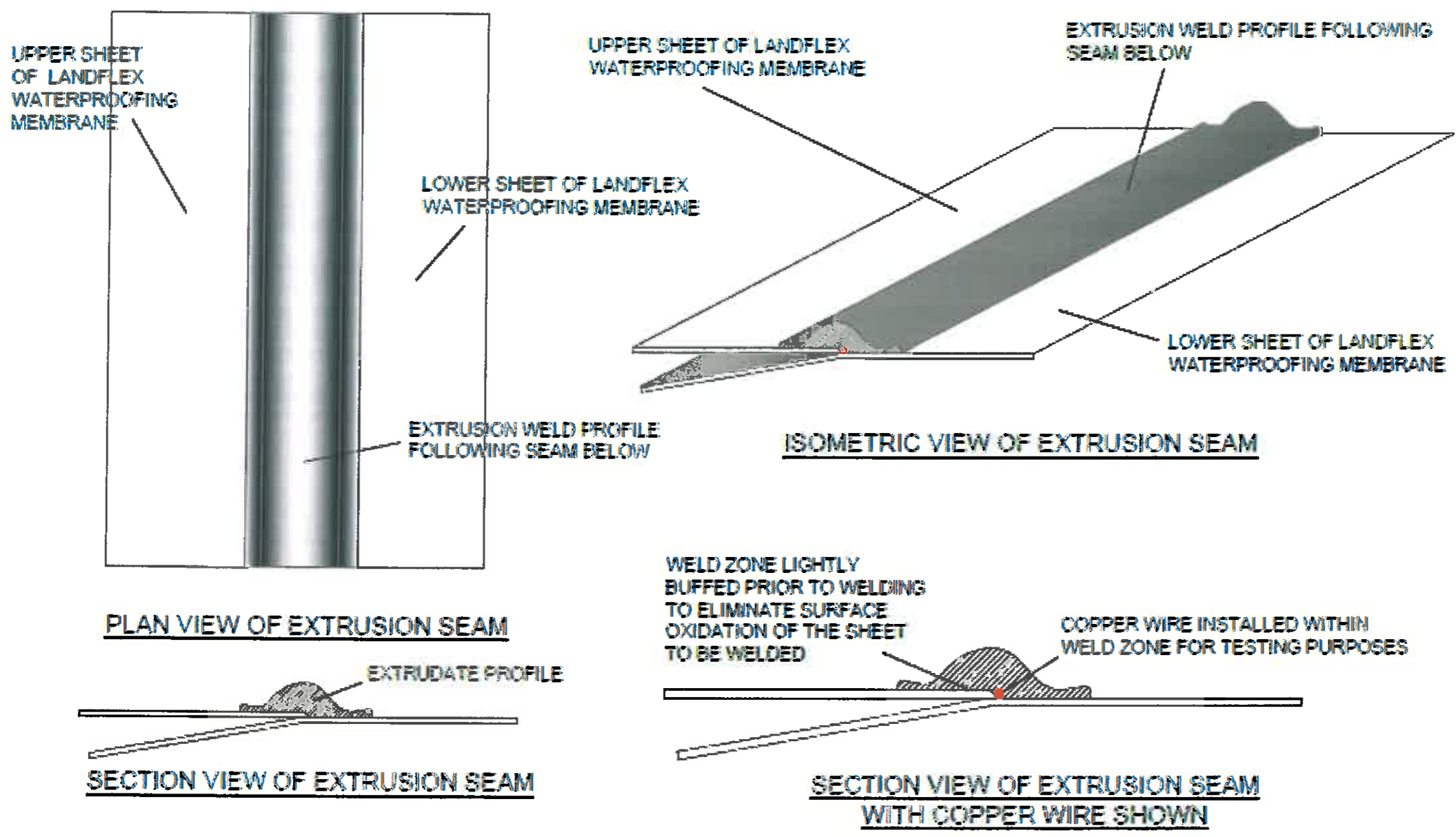


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SCALE	N.T.S.	DRAWN	CJH	A3
DATE	20.07.17	CHECK	RJM	

DRAWING STATUS

27686 / C / 504 B



PLAN VIEW OF EXTRUSION SEAM

SECTION VIEW OF EXTRUSION SEAM

ISOMETRIC VIEW OF EXTRUSION SEAM

SECTION VIEW OF EXTRUSION SEAM WITH COPPER WIRE SHOWN

APPENDICES	
B	Highways Specification - Tables 1 to 4 <ul style="list-style-type: none">• Summary of Classification results and recommendations for Method Compaction• Summary of Method Compaction Criteria for Proposed Compaction Plant (July 2017)• Quarry Waste (Hassock & Ragstone)• Clay stored on site• Processed Hassock-based landfill materials• Specification for Proposed Vibratory Roller

For Bomag BW6
(3411kg/m width of
roll)

Tovil Classification Tests

Soil Type	Trial Pit	Date	Depth (mbgl) or Location in Stockpile (see attached plan)	Specification for Highway Works Class based on Grading (Table 6/1)	NMC	Optimum MC	Maximum Dry Density	Plasticity Index (%)	Plastic Limit (%)	Plastic Limit -4% (see Note 1)	Liquid Limit	Revised Class (Table 6/1)	Method compaction (Table 6/4)	Layer Thickness (mm)	Number of Passes
Quarry Fill	TP1	16/02/2017	0.0-1.8	2C	19	18	1.76	19	19	15			Method 2	200	4
	TP2		0.0-2.0	2C	23	17	1.76	20	20	16			Method 2	200	4
	TP3		0.8-2.0	2C	22	15	1.84	19	19	15			Method 2	200	4
	TP4		0.0-0.8	2A/2B	21	17	1.76	24	24	20		2B	Method 2	200	4
Clay	TP205	05/07/2017	0.25 & 0.4-0.6	2A/2B	28.6	20	1.63	48	15	11	48	2A	Method 1	200	4
	TP206		0.25 & 1.0-1.5	2A/2B	34.2	23	1.56	36	20	16	56	2A	Method 1	200	4
Stockpiles	SP1	07/07/2017	A-D	2C	26	20	1.61	11	19	15			Method 2	200	4
	SP2		A-B	2C	28	21	1.52	14	22	18			Method 2	200	4
	SP3		A-D	2C	21	20	1.6	10	18	14			Method 2	200	4
	SP4		A-B	2C	27	22	1.52	4	31	27			Method 2	200	4
	SP5		A	2C	24	19	1.58	12	19	15			Method 2	200	4
	SP6		A-B	2C	20	18	1.68	8	19	15			Method 2	200	4
	SP7		A	2C	28	18	1.65	13	18	14			Method 2	200	4
	SP8		A	2C	23	18	1.7	15	16	12			Method 2	200	4
Notes															

1. For Class 2A where Liquid Limit is greater than 50%, the soils should be compacted using a vibratory tamping or grid roller

SUMMARY OF METHOD COMPACTION CRITERIA FOR PROPOSED COMPACTION PLANT (JULY 2017)

Equipment	Operating Weight	Per m width	Type	Method 1*		Method 2**	
				Layer Thickness	Number of passes	Layer Thickness	Number of passes
BW6	5,840	3,435	Vibrating Roller	200	4	200	4
BW10 (Without Vibration)	10,500	5,250	Deadweight Tamping Roller (No Vibration)	225	4	150	12
BW10 (With Vibration)	10,500	5,250	Vibrating Tamping Roller	275	9	275	9

*Method 1 – Applies to wet cohesive fill (Clay stockpiled on site)

**Method 2 – Applies to stockpiles of processed waste from landfill & Quarry Waste

FINAL

TABLES 1 - 4

TABLE 3

CHEMICAL REQUIREMENTS FOR ACCEPTABLE EARTHWORK MATERIALS

Contaminant

Acceptance Value

Refer to Report on Remediation

TABLE 1

**ACCEPTABLE EARTHWORKS MATERIALS:
CLASSIFICATION AND COMPACTION REQUIREMENTS**

Class	General Description	Material Properties Required for Acceptability		Acceptable Limits		Compaction Requirements Table 6/4	Notes
		Property	Defined and Tested in Accordance with	Lower	Upper		
2A	Wet Cohesive (Site Clay Stockpile)	Grading NMC Index Properties Undrained shear strength		50KN/m ²		Method 1 See Table 4	Refer to text
2B	Dry Cohesive (Site Clay Stockpile and Quarry Waste)	Grading NMC Index Properties Undrained shear strength		50KN/m ²		Method 2 See Table 4	
2C	Stoney Cohesive (Quarry Waste & Stockpiles of Remaining Soils following Remediation, i.e. removal of waste)	Grading NMC Index Properties Undrained shear strength		50KN/m ²		See Method 2	

TABLE 4

**METHOD COMPACTION FOR EARTHWORKS MATERIALS;
PLANTS AND METHODS 2 AND 3**

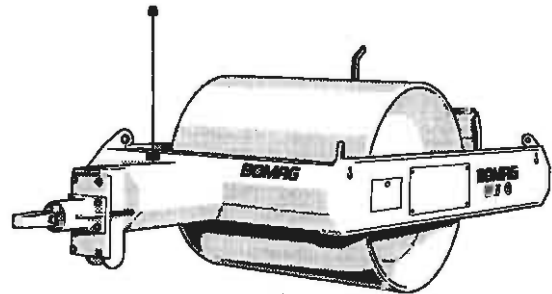
Type of Compaction Plant	Ref N°	Category	Method 1		Method 2	
			D	N #	D	N #
Vibrating roller		Mass per metre width of a vibratory roll:		Passes		
	1	over 270kg up to 1500kg	Unsuitable		75	16
	2	over 450kg up to 700kg	Unsuitable		75	12
	3	over 700kg up to 1300kg	100	12	125	10
	4	over 1300kg up to 1800kg	125	8	150	8
	5	over 1800kg up to 2300kg	150	4	150	4
	6	over 2300kg up to 2900kg	175	4	175	4
BOMAG BW6 (Proposed)	7	over 2900kg up to 3600kg	200	4	200	4
	8	over 3600kg up to 4300 kg	225	4	225	4
	9	over 4300kg up to 5000kg	250	4	250	4
	10	over 5000kg	275	4	275	4

* Towed by track laying tractor . Self propelled roller unsuitable

In column N # the number of passes shown is to be doubled for material Classes 1A and 1B when such materials occur within 600mm of sub-formation or formation. Such extra compaction shall be carried out for the full width of the areas of fill which are to receive a pavement.

TOWED VIBRATORY ROLLERS BW 6, BW 6 S

PERFORMANCE DATA



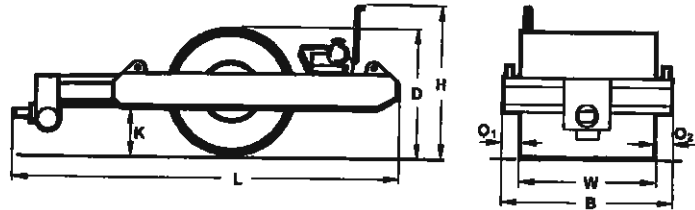
Machine type	Compaction output (m ³ /h)			
	Rock fill	Gravel, sand	Mixed soil	Silt, clay
BW 6	470-940	360-720	270-540	180-360
BW 6 S	470-940	360-720	270-540	210-420

Machine type	Compacted layer thickness (m)			
	Rock fill	Gravel, sand	Mixed soil	Silt, clay
BW 6	0,80	0,60	0,45	0,25
BW 6 S	0,80	0,60	0,45	0,30

Technical Data

Shipping dimensions in m3

BW 6	19,048
BW 6 S	18,430



Standard

- Electric starter
- Fuel level indicator
- Electric remote control for vibration
- Acoustic engine monitoring
 - V-belt
 - Generator
 - oil pressure
- Scrapers
- Hour meter
- Dry air filter
- Wheel chock

Dimensions in mm

	B	D	H	K	L	O1	O2	W
BW 6	2080	1500	1850	510	4950	190	190	1700
BW 6 S	2080	1380	1790	450	4950	190	190	1700

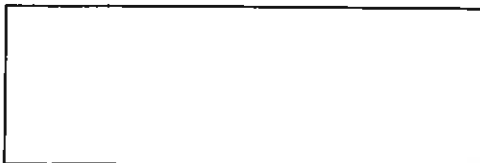
Options

- Special painting
- Towing hitch (NATO)
- Drum (BW6)
(38 mm/+1000 kg)
- Tool kit

Technical Data

	BOMAG BW 6	BOMAG BW 6 S
Weights		
Grossweight	kg 6.050	6.950
Operating weight CECE	kg 5.876	6.776
Basic weight	kg 5.800	6.700
Static linear load CECE	kg/cm 34,6	
Dimensions		
Projection angle, front	grad 9	9
Projection angle, rear	grad 16	16
Permitted inclination, front	grad 45	45
Permitted inclination, rear	grad 40	40
Tipping angle, left-right	grad 30	30
Drive		
Engine manufacturer	Deutz	Deutz
Type	D 914 L03i	D 914 L03i
Cooling	air	air
Number of cylinders	3	3
Performance ISO 3046	kW 43	43
Performance SAE J 1995	hp 58	58
Speed	min-1 2.300	2.300
Fuel	diesel	diesel
Air cleaner		
Drums		
Height of pad feet	mm 100	100
Area of one pad foot	cm2 136	136
Number of pad feet	96	96
Exciter system		
Drive system	mech.	mech.
Frequency (1)	Hz 28	28
Amplitude (1)	mm 1,53	1,19
Centrifugal force 1	kN 118	118
Centrifugal force 1	t 12	12
Electric equipment		
Electric equipment	V 12	12
Generator	V AC	AC
Battery - Voltage/capacity	V/Ah 12/143	12/143
Towing hitch		
Bore diameter	mm 45,5	45,5
Thickness of hitch	mm 60	60
Capacities		
Fuel	l 90	90

Technical modifications reserved. Machines may be shown with options.



BOMAG
Hellerwald
D-56154 Boppard
P.O. Box 5162
Tel. (0)6742 - 1000
Fax (0)6742 - 3090
Fax (0)6742 - 3090

BOMAG
FAYAT GROUP

APPENDICES	
C	Laboratory Test Results <ul style="list-style-type: none">• Quarry Waste (Hassock & Ragstone)• Clay stored on site• Processed Hassock-based landfill materials

FINAL

APPENDIX C

- **Quarry Waste (Hassock & Ragstone)**

Subject: Re: Testing of Tovil samples
From: richardm <rmoore@knapphicks.co.uk>
Date: 31/03/2017 16:51
To: P J Burke <pjburke@lineone.net>

On 31/03/2017 16:48, richardm wrote:

Rob,

I will be on site 9am Wednesday as I had forgotten about a couple of existing appointments.

Copies of the chemical lab test results and the geotechnical testing are attached along with a rough sketch of the test locations.

Main points to note are as follows:

Trial Pits 1-3 (excavated in the main source area for backfilling)

- No significant contamination noted
- The geotechnical samples had moisture contents a few percent above optimum for compaction, but it seems this may not be critical except in the more clayey finer grained soils which were found in the top 800mm of the third pit.
- With the exception of the layer of cohesive material in TP3, the gradings were quite consistent, and subject to a bit more analysis should be suitable for use as general fill and compacted to Highways Spec method compaction i.e. agreed layer thickness and plant.

Samples from 'Topsoil' Stockpiles

- All registered lead at levels (217-302mg/kg) which is above what would be acceptable for allotments or typical residential end uses but below what might be acceptable for public open spaces.
- All other contaminants are below acceptable levels and no asbestos was noted in the samples which were all screened for asbestos.
- No other geotechnical tests carried out on these samples.
- Therefore, it seems that it may be feasible to reuse these soils in the open space area although this would be subject to further risk assessment and regulator approval etc.

Let me know if Wednesday is okay for you.

Kind Regards,

Richard

On 28/03/2017 21:32, P J Burke wrote:

either day is fine

TP3

TP4

For each of these, we propose to merge the bulk samples and carry out coarse (£50/sample) and fine (£50/sample) gradings, plasticity index (£42.50/sample), moisture content (£5/sample) and a compaction test (£105/sample) i.e. £252.50+VAT per pit

Total Cost of Lab Testing ... £1770+VAT

Please confirm this is acceptable and I will get it all under way.

Our site visit and reporting costs will be an additional fee.

Regards,

Richard

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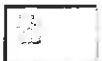
Richard Moore
Geotechnical Engineer
Knapp Hicks & Partners Ltd
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TN24 8DH
Tel. 01233 502255
Mob. 07870 561092
rmoore@knapphicks.co.uk

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Richard Moore
Geotechnical Engineer



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Client: Knapp Hicks and Partners
Address: Prospect House
 1 Highpoint Business Village
 Herwood, Ashford
 Kent TN24 8DH

Report No: 0020/02/01
Your Ref: N/A
Report Date: 13/03/2017

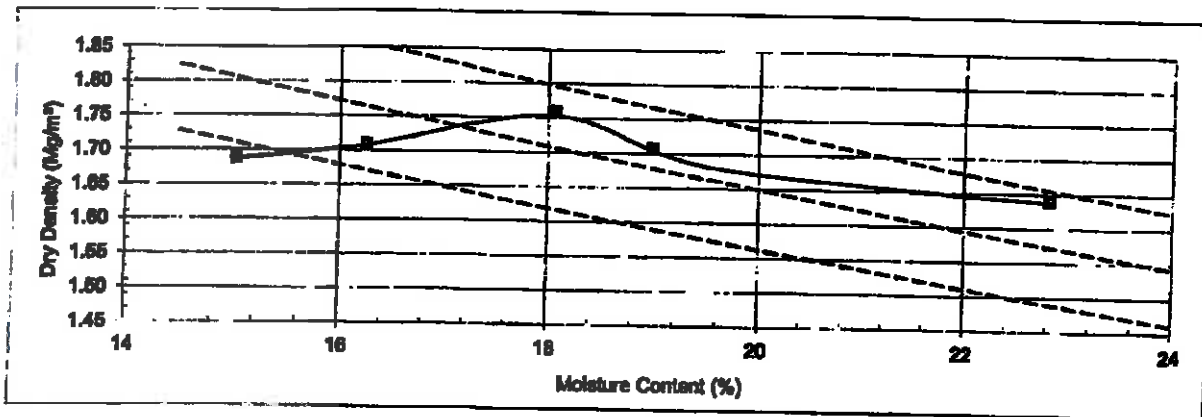
Client Contact: Mr Richard Moore
Site: Tevill Quarry

Test Requested: Determination of Dry Density/Moisture Content Relationship
Test Method: B.S. 1377 - 4 : 1990, Clause 3.3

Sample Details:	Sampled and Supplied By:	Client	Date Tested:
	Sample Location:	TP1 @ 0.00-1.80m	01-06/03/2017
	Laboratory Ref:	0020/02/01	Type of Sample: Bulk
	Date Sampled:	18/02/2017	
	Date Received:	18/02/2017	
	Type of Specimen:	Multiple	
	Percentage retained on 20mm sieve:	53%	
	Percentage retained on 37.5mm sieve:	49%	
	Assumed Particle Density:	2.66 Mg/m ³	

Visual Description: Brown clayey gravelly SAND with many cobbles. Gravel & cobbles are of limestone

As received Moisture Content (%):	19	Size of Test Mould:	1 litre
Optimum Moisture Content (%):	18	Mass of Rammer:	2.6 kg (Light)
Maximum Dry Density (Mg/m³):	1.76		



Comments:
 Air Voids lines plotted at 10%, 5% and 0% values.

Sample Preparation: In accordance with BS 1377: Parts 1 & 4:1990
 Certified that the test was carried out in accordance with B.S. 1377 - 4 : 1990, Clause 3.3

Signed: [Signature] Kwaku Bash - Laboratory Manager

For and on behalf of PBA Laboratories



Peter Baxter Associates Laboratories
 A subsidiary of Peter Baxter Associates
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 Gillingham
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 E: info@peterbaxterassociates.co.uk
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Client: Knapp Hicks and Partners
Address: Prospect House
 1 Highpoint Business Village
 Henwood, Ashford
 Kent TN24 8DH

Report No: 0828/02/02
Your Ref: N/A
Report Date: 13/03/2017

Client Contact: Mr Richard Moore
Site: Tovil Quarry

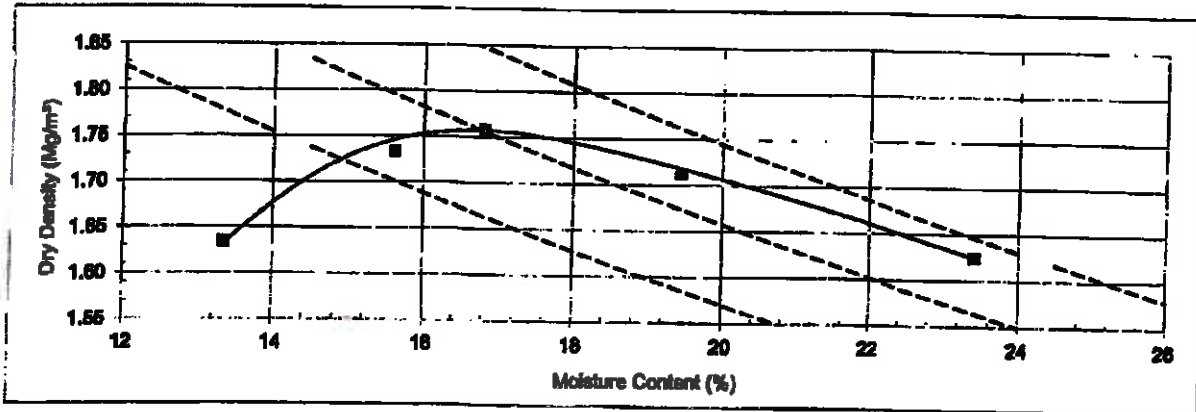
Test Requested: Determination of Dry Density/Moisture Content Relationship
Test Method: B.S. 1377 - 4 : 1990, Clause 3.3

Sample Details:

Sampled and Supplied By:	Client	Date Tested:	01-08/03/2017
Sample Location:	TP2 @ 0.00-2.00m	Type of Sample:	Bulk
Laboratory Ref:	0828/02/02		
Date Sampled:	16/02/2017		
Date Received:	16/02/2017		
Type of Specimen:	Multiple		
Percentage retained on 20mm sieve:	40%		
Percentage retained on 37.5mm sieve:	32%		
Assumed Particle Density:	2.68 Mg/m ³		

Visual Description: Brown gravelly sandy CLAY with many cobbles. Gravel & cobbles are of limestone

As received Moisture Content (%):	23	Size of Test Mould:	1 litre
Optimum Moisture Content (%):	17	Mass of Rammer:	2.5 kg (Light)
Maximum Dry Density (Mg/m ³):	1.76		



Comments:
 Air Voids lines plotted at 10%, 5% and 0% values.

Sample Preparation: In accordance with BS 1377:Parts 1 & 4:1990
 Certified that the test was carried out in accordance with B.S. 1377 - 4 : 1990, Clause 3.3

Signed: [Signature] Kwaku Beah - Laboratory Manager

For and on behalf of PBA Laboratories



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 Kestrel Works
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 ME13 6PL

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Client: Knapp Hicks and Partners
Address: Prospect House
 1 Highpoint Business Village
 Henwood, Ashford
 Kent TN24 8DH

Report No: 0929/02/03
Your Ref: N/A
Report Date: 18/09/2017

Client Contact: Mr Richard Moore
Site: Torrill Quarry

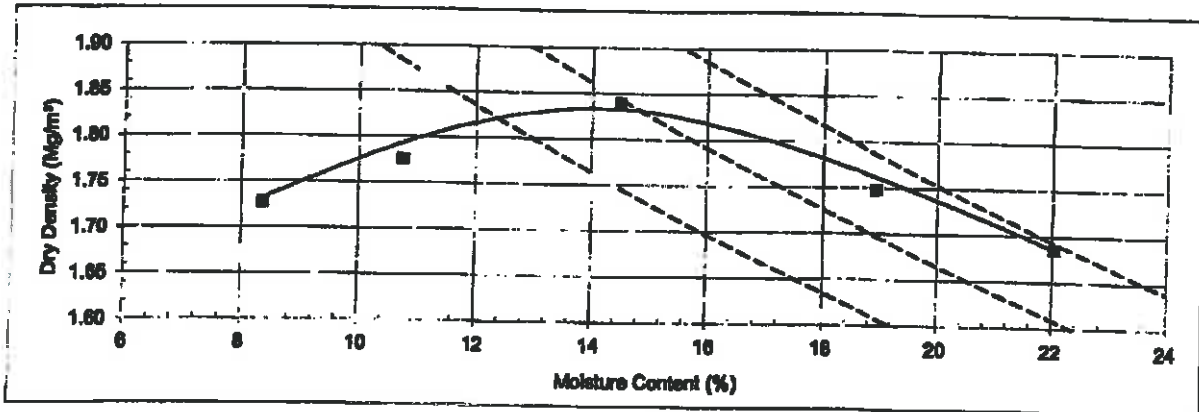
Test Requested: Determination of Dry Density/Moisture Content Relationship
Test Method: B.S. 1377 - 4 : 1990, Clause 3.3

Sample Details:

Sampled and Supplied By:	Client	Date Tested:	01-08/03/2017
Sample Location:	TP3 @ 0.00-0.80m	Type of Sample:	Bulk
Laboratory Ref:	0929/02/03		
Date Sampled:	16/02/2017		
Date Received:	16/02/2017		
Type of Specimen:	Multiple		
Percentage retained on 20mm sieve:	0%		
Percentage retained on 37.5mm sieve:	0%		
Assumed Particle Density:	2.7 Mg/m ³		

Visual Description: Brown slightly sandy CLAY

As received Moisture Content (%):	22	Size of Test Mould:	1 litre
Optimum Moisture Content (%):	15	Mass of Rammer:	2.5 kg (Light)
Maximum Dry Density (Mg/m³):	1.84		



Comments:
 Air Voids lines plotted at 10%, 5% and 0% values.

Sample Preparation: In accordance with BS 1377:Parts 1 & 4:1990
 Certified that the test was carried out in accordance with B.S. 1377 - 4 : 1990, Clause 3.3

Signed: [Signature] Kwaku Baah - Laboratory Manager

For and on behalf of PBA Laboratories



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Client: Knapp Hicks and Partners
Address: Prospect House
 1 Highpoint Business Village
 Herwood, Ashford
 Kent TN24 8DH

Report No: 0828/02/04
Your Ref: N/A
Report Date: 13/03/2017

Client Contact: Mr Richard Moore
Site: Tovil Quarry

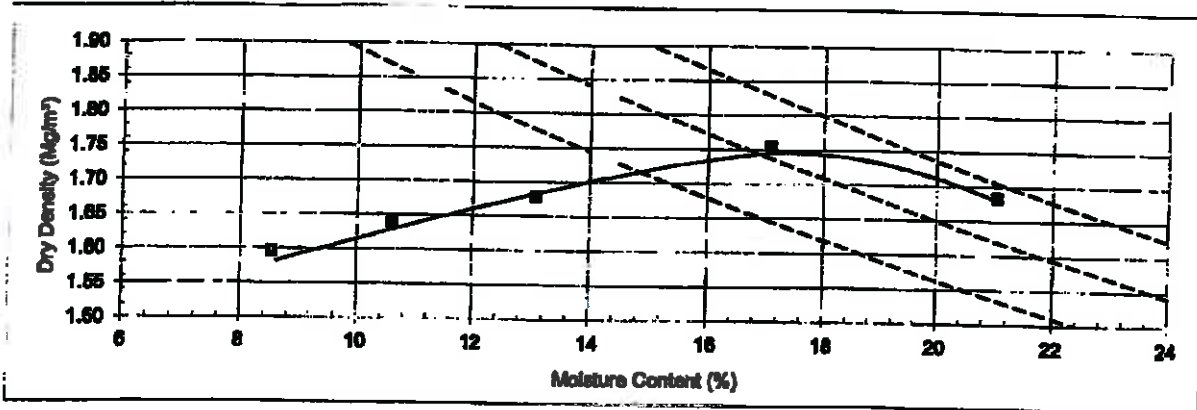
Test Requested: Determination of Dry Density/Moisture Content Relationship
Test Method: B.S. 1377 - 4 : 1990, Clause 3.3

Sample Details:

Sampled and Supplied By:	Client	Date Tested:	01-06/03/2017
Sample Location:	TP3 @ 0.80-2.00mm	Type of Sample:	Bulk
Laboratory Ref:	0828/02/04		
Date Sampled:	16/02/2017		
Date Received:	16/02/2017		
Type of Specimen:	Multiple		
Percentage retained on 20mm sieve:	51%		
Percentage retained on 37.5mm sieve:	43%		
Assumed Particle Density:	2.66 Mg/m ³		

Visual Description: Brown clayey gravelly SAND with many cobbles. Gravel & cobbles are of limestone

As received Moisture Content (%):	21	Size of Test Mould:	1 litre
Optimum Moisture Content (%):	17	Mass of Rammer:	2.5 kg (Light)
Maximum Dry Density (Mg/m ³):	1.76		



Comments:
 Air Voids lines plotted at 10%, 5% and 0% values.

Sample Preparation: In accordance with BS 1377: Parts 1 & 4: 1990
 Certified that the test was carried out in accordance with B.S. 1377 - 4 : 1990, Clause 3.3

Signed:  Kwaku Baah - Laboratory Manager

For and on behalf of PBA Laboratories



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Client: Knapp Hicks and Partners **Report No:** 0828/02/MC1
Address: Prospect House
 1 Highpoint Business Village
 Hornwood, Ashford
 Kent
 TN24 8DH **Your Ref:** 27686
Report Date: 13/03/2017
Client Contact: Mr Richard Moore
Site: Tovil Quarry
Test Requested: Determination of Moisture Content, Liquid, Plastic Limits & Plasticity Index
Test Method: BS 1377-2: 1990, Test Nos. 3.2; 4.4 (1 point LL); 5.3; & 5.4
Sample Details: Sampled and submitted by: Client
 Date Sampled: 16/02/2017
 Date Received: 16/02/2017
 Date Tested: 02/03/2017

TEST RESULTS:

Laboratory Reference	Client Reference		MC (%)	LL (%)	P.L (%)	P.J (%)	% Retained on 425µm sieve	Condition of Test	Sample Type
	BH/WB/TP	Ref.							
0828/02/01	TP1 @ 0.00-1.80m	B	18	35	19	16	37	Washed	Bulk
0828/02/02	TP2 @ 0.00-2.00m	B	18	34	20	14	38	Washed	Bulk
0828/02/03	TP3 @ 0.00-0.80m	B	22	35	19	18	2	Natural	Bulk
0828/02/04	TP3 @ 0.80-2.00m	B	17	32	24	8	63	Washed	Bulk

Visual Descriptions:

Laboratory Reference	Client Reference	Description
0828/02/01	TP1 @ 0.00-1.80m	Brown clayey gravelly SAND with many cobbles. Gravel and cobbles are of limestone
0828/02/02	TP2 @ 0.00-2.00m	Brown gravelly sandy CLAY with many cobbles. Gravel and cobbles are of limestone
0828/02/03	TP3 @ 0.00-0.80m	Brown slightly sandy CLAY
0828/02/04	TP3 @ 0.80-2.00m	Brown clayey gravelly SAND with many cobbles. Gravel and cobbles are of limestone

Note: All samples received for this job shall be disposed of after 28 days of this report.

.....END OF TEST REPORT.....

Signed:  Kwaku Bash - Laboratory Manager

For and on behalf of PBA Laboratories



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Client: Knepp Hicks and Partners
Address: Prospect House
 1 Highpoint Business Village
 Herwood, Ashford
 Kent TN24 8DH

Report No: 0929/02/01
Your Ref: 27686
Report Date: 13/03/2017

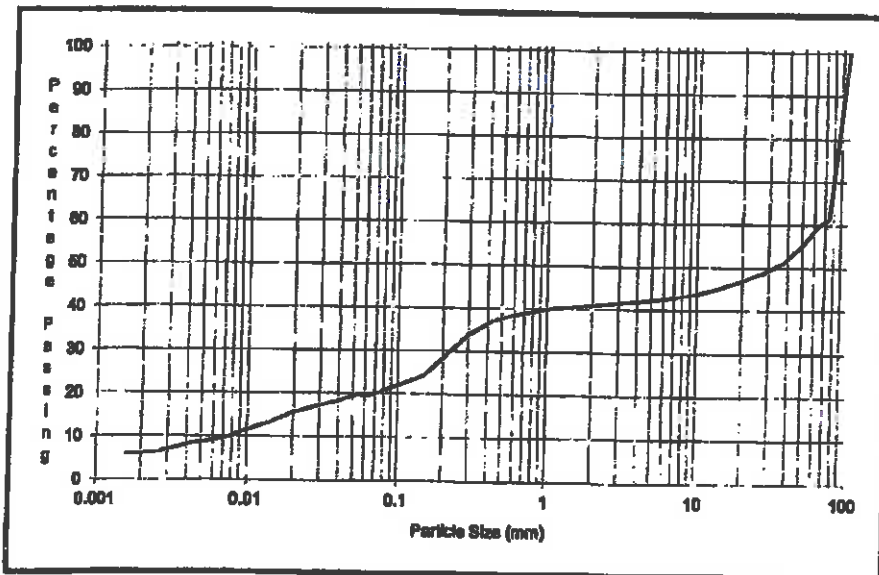
Client Contact: Richard Moore
Site: Tovil Quarry

Test Requested: Particle Size Distribution
Test Method: BS 1377-2 : 1990 : Clauses 9.2 & 9.5

Sample Details: Sampled and submitted by: Client
 Client Ref: TP1 @ 0.00-1.80m
 Laboratory Ref: 0929/02/01
 Date Received: 16/02/2017
 Date Tested: 06-07/03/2017
 Date Sampled: 16/02/2017
 Type of Sample: Bulk

Visual Description: Brown clayey gravelly SAND with many cobbles. Gravel and cobbles are of limestone

Preparation Method : In accordance with BS 1377-1:1990
 Assumed Particle Density: 2.66 Mg/m³



Material Type	Percentage Passing
Cobbles	40
Gravel	19
Sand	21
Silt	13
Clay	6

Comments :

Signed :  Kwaku Baah - Laboratory Manager

For and on behalf of PBA Laboratories



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Client: Knapp Hicks and Partners
Address: Prospect House
 1 Highpoint Business Village
 Herwood, Ashford
 Kent TN24 8DH

Report No: 0929/02/02
Your Ref: 27686
Report Date: 13/03/2017

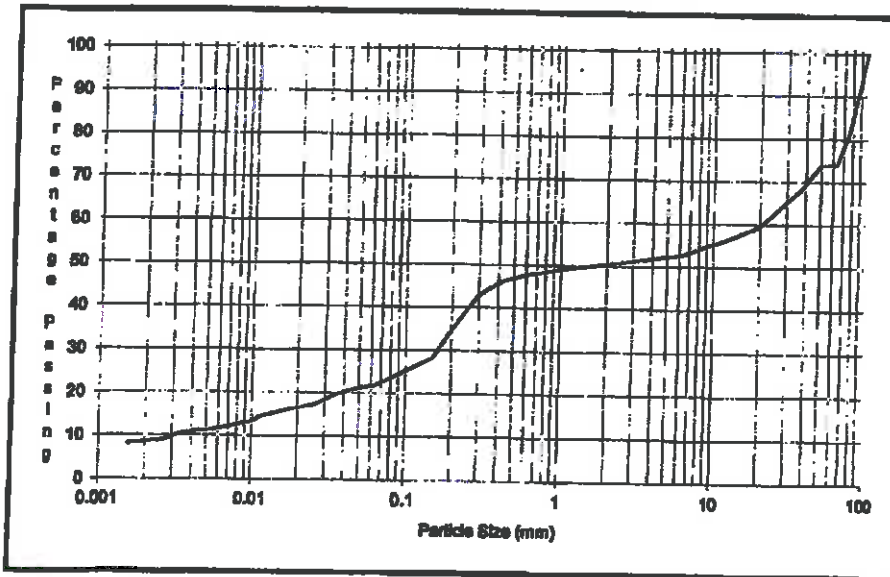
Client Contact: Richard Moore
Site: Tovil Quarry

Test Requested: Particle Size Distribution
Test Method: BS 1377-2 : 1990 : Clauses 9.2 & 9.5

Sample Details: Sampled and submitted by: Client
 Client Ref: TP2 @ 0.00-2.00m
 Laboratory Ref: 0929/02/02
 Date Received: 16/02/2017
 Date Tested: 06-07/03/2017
 Date Sampled: 16/02/2017
 Type of Sample: Bulk

Visual Description: Brown sandy gravelly CLAY with many cobbles. Gravel and cobbles are of limestone

Preparation Method : In accordance with BS 1377-1:1990
 Assumed Particle Density: 2.68 Mg/m³



Material Type	Percentage Passing
Cobbles	26
Gravel	24
Sand	28
Silt	13
Clay	9

Comments :

Signed :  Kwaku Baah - Laboratory Manager

For and on behalf of PBA Laboratories



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Client: Knapp Hicks and Partners
Address: Prospect House
 1 Highpoint Business Village
 Herwood, Ashford
 Kent TN24 8DH

Report No: 0929/02/04
Your Ref: 27686
Report Date: 13/03/2017

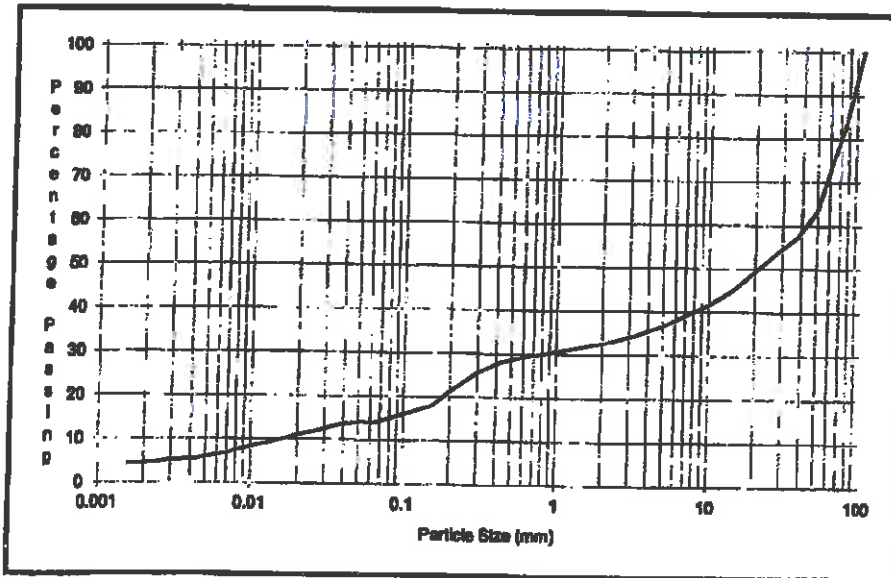
Client Contact: Richard Moore
Site: Tevl Quarry

Test Requested: Particle Size Distribution
Test Method: BS 1377-2 : 1990 : Clauses 9.2 & 9.5

Sample Details: Sampled and submitted by: Client
 Client Ref: TP3 @ 0.80-2.00m
 Laboratory Ref: 0929/02/04
 Date Received: 16/02/2017
 Date Tested: 06-07/03/2017
 Date Sampled: 16/02/2017
 Type of Sample: Bulk

Visual Description: Brown clayey gravelly SAND with many cobbles. Gravel and cobbles are of limestone

Preparation Method : In accordance with BS 1377-1:1990
 Assumed Particle Density: 2.68 Mg/m³



Material Type	Percentage Passing
Cobbles	25
Gravel	42
Sand	19
Silt	9
Clay	5

Comments :

Signed :  Kwaku Baah - Laboratory Manager

For and on behalf of PBA Laboratories



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Client: Knapp Hicks and Partners
Address: Prospect House
 1 Highpoint Business Village
 Henwood, Ashford
 Kent TN24 8DH

Report No: 0929/02/03
Your Ref: 27688
Report Date: 13/03/2017

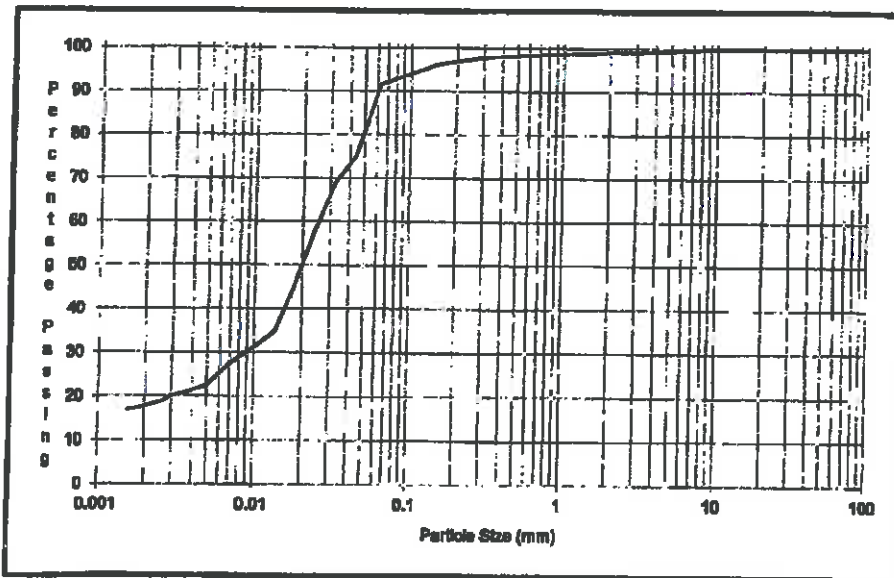
Client Contact: Richard Moore
Site: Tevil Quarry

Test Requested: Particle Size Distribution
Test Method: BS 1377-2 : 1990 : Clauses 9.2 & 9.5

Sample Details: Sampled & submitted by: Client
 Client Ref: TP3 @ 0.00-0.80m
 Laboratory Ref: 0929/02/03
 Date Received: 16/02/2017
 Date Tested: 06-07/03/2017
 Date Sampled: 16/02/2017
 Type of Sample: Bulk

Visual Description: Brown slightly sandy CLAY

Preparation Method : In accordance with BS 1377-1:1990
 Assumed Particle Density: 2.70 Mg/m³



Material Type	Percentage Passing
Cobbles	
Gravel	1
Sand	7
Silt	74
Clay	18

Comments :

Signed :  Kwaku Baah - Laboratory Manager

For and on behalf of PBA Laboratories

FINAL

APPENDIX C

- Clay stored on site



Soiltec Laboratories Limited
Soiltec House, Langley Park
Sutton Road, Langley,
Maidstone, Kent ME17 3NQ

Telephone: (01622) 862138
Fax: (01622) 862904
E-mail: info@soiltec.net
Web: www.soiltec.net

LABORATORY REPORT

Date : 5th July 2017

Report No : 07638/23

Client : Knapp Hicks & Partners
Prospect House
1 Highpoint Business Village
Henwood
Ashford
TN24 8DH

Client Ref : 27686G

CLAY
RESERVE ON
SITE.

Site : Tovil Quarry
Maidstone

This report details of laboratory tests carried out on soil samples recovered from the above site and submitted for test on 14th June 2017

- 2 Nr. Atterberg Limits Tests
- 12 Nr. Natural Moisture Content determinations.
- 2 Nr. Compaction Tests (2.5kg rammer) in Proctor
- 2 Nr. Soluble Sulphate & pH Analysis

All tests have been carried out in accordance with BS1377 : 1990

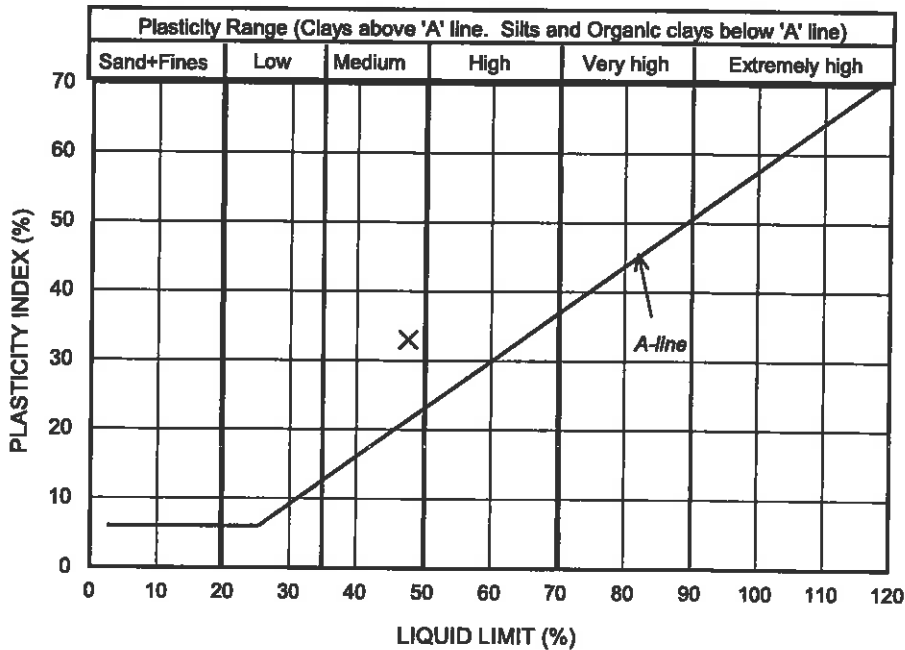
For and on behalf of
Soiltec Laboratories Limited

Client :	Knapp Hicks & Partners Ltd	Rep No:	07538/23
Site:	Tovil Quarry, Maidstone	Borehole/Trial Pit :	TP205
		Sample No:	1
		Sample Depth (m)	0.40-0.60
		Date:	26/06/17

Sample description : Mix of dark orange and dark brown slightly sandy silty CLAY with scattered limestone fragments
Test Method : BS1377:Part2:1990:4.3 Multiple point method
Sample preparation : washed on 425 micron sieve
Material passing 425µm : 77.04 %
Natural Water Content : 28.6 %
Liquid Limit : 48 %
Plastic Limit : 15 %
Plasticity Index : 33 %

Modified Plasticity Index 25.4 % ref : NHBC 4.2

CASAGRANDE PLASTICITY CHART



Operator	AH
Checked	MK
Approved	MK



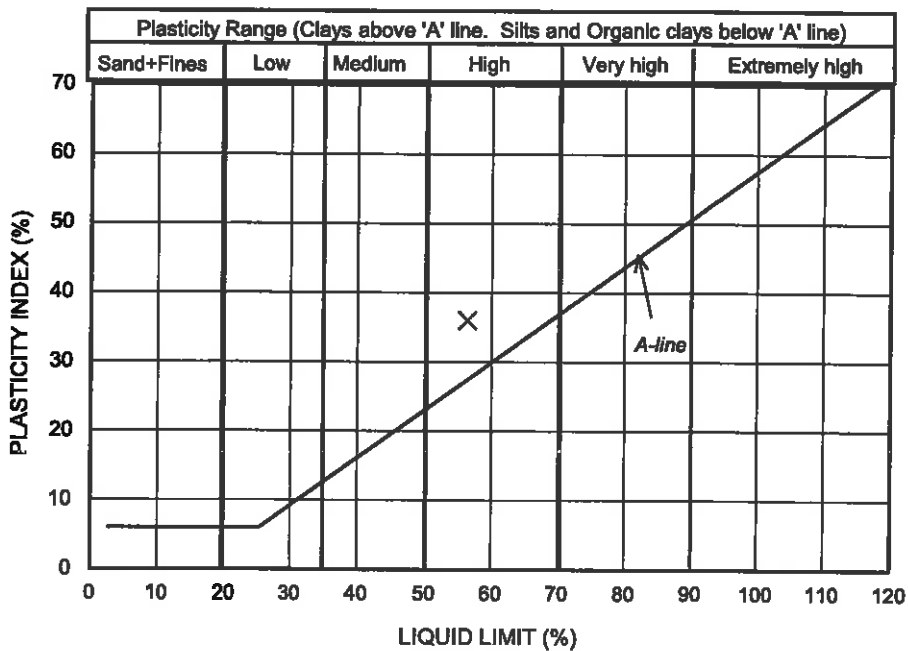
PLASTICITY INDEX

Client :	Knapp Hicks & Partners Ltd	Rep No:	07538/23
Site:	Tovil Quarry, Maidstone	Borehole/Trial Pit :	TP206
		Sample No:	1
		Sample Depth (m)	1.00-1.50
		Date:	26/06/17

Sample description : Dark orange slightly sandy silty CLAY with scattered limestone fragments
Test Method : BS1377:Part2:1990:4.3 Multiple point method
Sample preparation : washed on 425 micron sieve
Material passing 425µm : 90.36 %
Natural Water Content : 34.2 %
Liquid Limit : 56 %
Plastic Limit : 20 %
Plasticity Index : 36 %

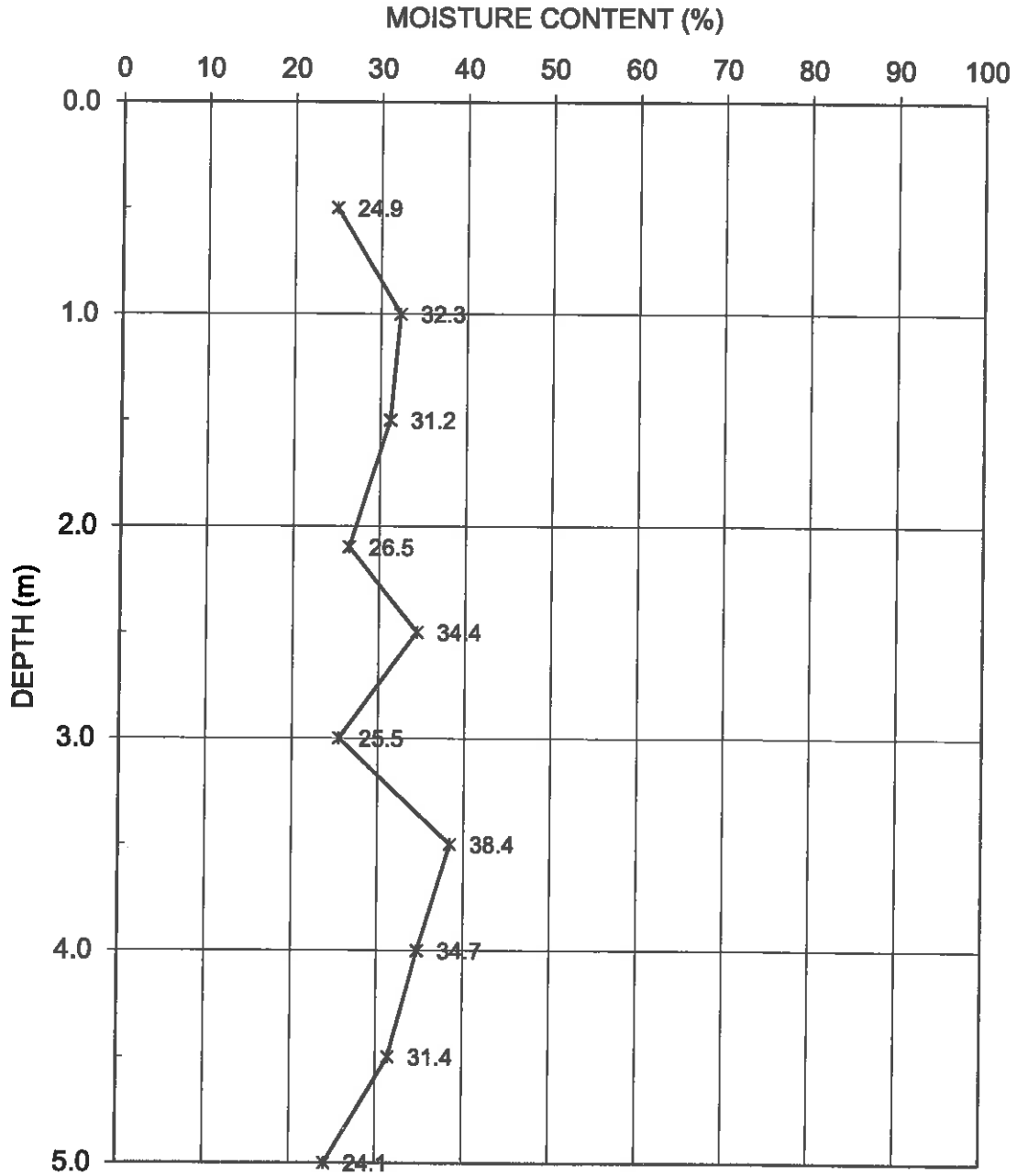
Modified Plasticity Index 32.5 % ref : NHBC 4.2

CASAGRANDE PLASTICITY CHART



Operator	AH
Checked	MK
Approved	MK

NATURAL MOISTURE CONTENT



○ - □ indicates PL and LL results

◆ - indicates 0.4 LL and should only be applied to London Clay

Location :	0	Job ref:	07638/23
		BH/TP no:	WS101
Checked	AH		
Approved	MK	Date	26-Jun-17



**COMPACTION TEST RESULTS
(BS 1377 : Part 4)**

Date : July 2017

Report No: 07638/23

Client : Knapp Hicks

Location : Tovil Quarry, Maidstone (27686G)

Sample No.	Sample Moisture Content (%)	Compaction method	Material retained on 37.5mm sieve (%)	Material retained on 20mm sieve (%)	Max dry density (Mg/m ³)	Optimum Moisture Content (%)	Sample Description
TP205	28.6	2.5kg	0	10	1.63	20	Grey and orange brown slightly fine sandy silty clay with scattered small limestone fragments
TP206	34.2	2.5kg	0	8	1.56	23	Orange and brown silty CLAY with scattered small limestone fragments

SOILTEC LABORATORIES LTD

CHEMICAL ANALYSIS REPORT

CLIENT: Knapp Hicks
SITE: Tovil Quarry, Maidstone
DATE SAMPLED: Not Known
SAMPLE REF: 07638/23
DATE SAMPLES RECEIVED: 14/06/17
SAMPLED BY: Client
TESTED BY: Soiltec (AH/RJ)

REPORT No: 07638/23
REPORT DATE: 21/06/17
SPEC: BS1377 Part3:1990

RESULTS

Sample Location	Depth (m)	pH	Water Soluble Sulphate (g/l) as SO_4^{2-}	Stone Content >2mm (% w/w)
TP205	0.4-0.6	7.3	0.37	<0.1
TP206	1.0-1.5	7.0	0.23	<0.1

COMMENTS The analysis was carried out in accordance with BS1377 Part3:1990 i.e. the sulphate determination was carried out on the material passing a 2mm sieve.



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Client: Knapp Hicks and Partners

Report No: 0929/13/09

Address: Prospect House
 1 Highpoint Business Village
 Henwood, Ashford
 Kent TN24 8DH

Your Ref: 27686G

Report Date: 21/07/2017

Client Contact: Cathy Hoskins

Site: Tovil

Test Requested: Particle Size Distribution

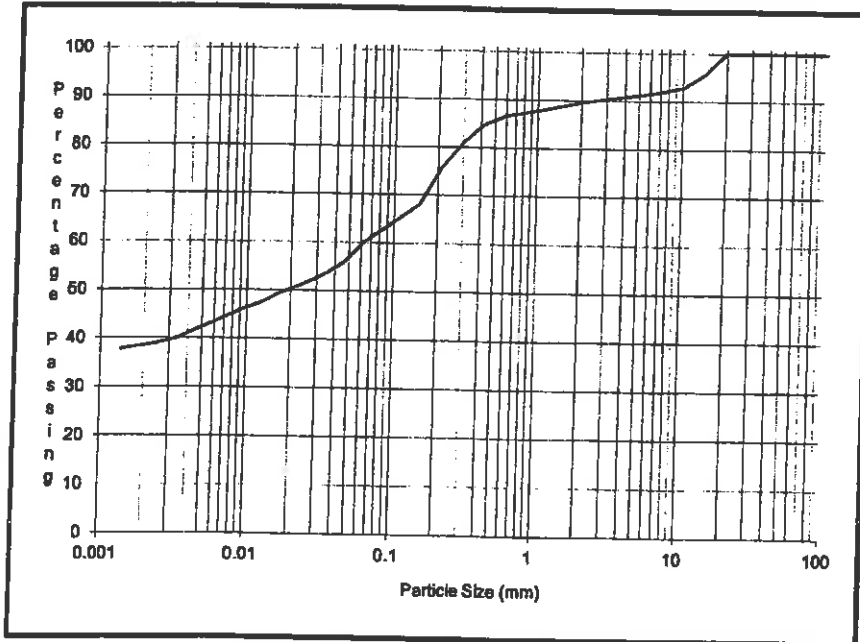
Test Method: BS 1377-2 : 1990 : Clauses 9.2 & 9.5

Sample Details: Sampled and submitted by: Client
 Client Ref: TP205 @ 0.25m
 Laboratory Ref: 0929/13/09
 Date Received: 17/07/2017

Date Tested: 20-21/07/2017
 Date Sampled: 17/07/2017
 Type of Sample Bulk

Visual Description: Brown slightly gravelly sandy CLAY (petroleum odour)

Preparation Method : In accordance with BS 1377-1:1990
 Assumed Particle Density: 2.70 Mg/m³



Material Type	Percentage Passing
Cobbles	
Gravel	10
Sand	30
Silt	22
Clay	38

Comments :

Signed :  Kwaku Baah - Laboratory Manager

For and on behalf of PBA Laboratories



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Client: Knapp Hicks and Partners
Address: Prospect House
 1 Highpoint Business Village
 Herwood, Ashford
 Kent TN24 8DH

Report No: 0929/13/10
Your Ref: 27686G
Report Date: 21/07/2017

Client Contact: Cathy Hoskins
Site: Tovl

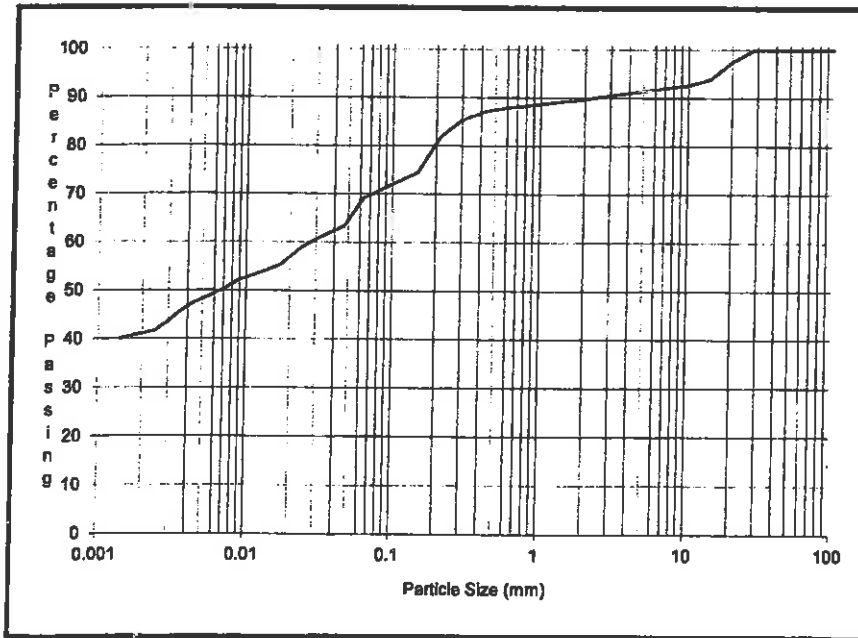
Test Requested: Particle Size Distribution
Test Method: BS 1377-2 : 1990 : Clauses 9.2 & 9.5

Sample Details: Sampled and submitted by: Client
 Client Ref: TP206 @ 0.25m
 Laboratory Ref: 0929/13/10
 Date Received: 17/07/2017

Date Tested: 20-21/07/2017
 Date Sampled: 17/07/2017
 Type of Sample Bulk

Visual Description: Brown slightly gravelly sandy CLAY

Preparation Method : In accordance with BS 1377-1:1990
 Assumed Particle Density: 2.70 Mg/m³



Material Type	Percentage Passing
Cobbles	
Gravel	10
Sand	21
Silt	28
Clay	41

Comments :

Signed :  Kwaku Baah - Laboratory Manager

For and on behalf of PBA Laboratories

FINAL

APPENDIX C

- **Processed Hassock-based landfill materials**

Peter Baxter Associates Limited
Laboratory Request for Test Form v1.6

Client: Knapp Hicks and Partners
 Site: Tovil
 Date Sampled: 07/07/2017
 Date Submitted: 07/07/2017
 Submitted To: PBA

Job No. _____
 Ref: 27686G

Lab Ref.	SP1	SP2	SP3	SP4	SP5	SP6	SP7	SP8
Client Ref	A-D	A-B	A-D	A-B	A	A-B	A	A
BH No								
Sample type	Bulk	Bulk	Bulk	Bulk	Bulk	Bulk	Bulk	Bulk
Depth								
Soil Samples								
Moisture Content	1	1	1	1	1	1	1	1
Core Bulk Density (inc Moi content)								
Liquid Limit (1 point) & plastic limit	1	1	1	1	1	1	1	1
Liquid Limit (4 point) & plastic limit								
Dry sieve								
PSD (Wet Sieve) BS 1377.2	1	1	1	1	1	1	1	1
Sedimentation Hydrometer	1	1	1	1	1	1	1	1
Particle Density (small p method)								
Bulk Density								
Compaction Study (2.5kg)	1	1	1	1	1	1	1	1
Compaction Study (4.5kg)								
MCV (1 Point)								
One dimensional consolidation test								
CBR								
10% Fines Value								
pH	1	1	1	1	1	1	1	1
Sulphate	1	1	1	1	1	1	1	1
Permeability (BS)								
Permeability (Acc)								
WAC								

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 Medway City Estate, Rochester
 Kent ME2 4FB
 Tel: 01634 717974



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Client: Knapp Hicks and Partners
Address: Prospect House
 1 Highpoint Business Village
 Henwood, Ashford
 Kent
 TN24 8DH

Report No: 0929/13/MC1
Your Ref: 27686G
Report Date: 21/07/2017

Client Contact: Ms Cathy Hoskins
Site: Tovil

Test Requested: Determination of Moisture Content, Liquid, Plastic Limits & Plasticity Index
Test Method: BS 1377-2: 1990, Test Nos. 3.2; 4.4 (1 point LL); 5.3; & 5.4

Sample Details: Sampled and submitted by: Client
 Date Sampled: 07/07/2017
 Date Received: 07/07/2017
 Date Tested: 17/07/2017

TEST RESULTS:

Laboratory Reference	Client Reference		MC (%)	L.L (%)	P.L (%)	P.I (%)	% Retained on 425µm sieve	Condition of Test	Sample Type
	BH/WS/TP	Ref.							
0929/13/01	SP1 @ A-D	N/A	26	30	19	11	51	Washed	Bulk
0929/13/02	SP2 @ A-B	N/A	28	36	22	14	43	Washed	Bulk
0929/13/03	SP3 @ A-D	N/A	21	28	18	10	39	Washed	Bulk
0929/13/04	SP4 @ A-B	N/A	27	35	31	4	32	Washed	Bulk
0929/13/05	SP5 @ A	N/A	24	31	19	12	44	Washed	Bulk
0929/13/06	SP6 @ A-B	N/A	20	27	19	8	46	Washed	Bulk
0929/13/07	SP7 @ A	N/A	28	31	18	13	32	Washed	Bulk
0929/13/08	SP8 @ A	N/A	23	31	16	15	28	Washed	Bulk

Visual Descriptions:

Laboratory Reference	Client Reference	Description
0929/13/01	SP1 @ A-D	Brown gravelly sandy CLAY with brick fragments
0929/13/02	SP2 @ A-B	Brown gravelly sandy CLAY with brick & ceramic fragments
0929/13/03	SP3 @ A-D	Brown gravelly sandy CLAY with brick fragments
0929/13/04	SP4 @ A-B	Brown gravelly sandy CLAY with brick & ceramic fragments
0929/13/05	SP5 @ A	Brown gravelly sandy CLAY with brick & ceramic fragments
0929/13/06	SP6 @ A-B	Brown gravelly sandy CLAY with brick & metal fragments
0929/13/07	SP7 @ A	Brown gravelly sandy CLAY with brick fragments
0929/13/08	SP8 @ A	Brown gravelly sandy CLAY with brick fragments & plastic

Note: All samples received for this job shall be disposed of after 28 days of this report.

.....END OF TEST REPORT.....

Signed:  Kwaku Baah - Laboratory Manager

For and on behalf of PBA Laboratories



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Client: Knapp Hicks and Partners
Address: Prospect House
 1 Highpoint Business Village
 Henwood, Ashford
 Kent
 TN24 8DH

Report No: 0929/13/CH1
Your Ref: 27886G
Report Date: 21/07/2017

Client Contact: Ms Cathy Hoskins
Site: Tovil

Test Requested: Determination of pH Value and Sulphate Content
Test Method: BS 1377-3: 1990, Clauses 5.5 & 9.5

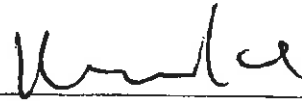
Sample Details: Sampled and submitted by: Client
 Date Sampled: 07/07/2017
 Date Received: 07/07/2017
 Date Tested: 19/07/2017

TEST RESULTS:

Laboratory Reference	Client Reference		Soil Sulphates as SO ₄		Water Sulphates as SO ₄	pH	CLASS*	Dry Mass Passing 2mm test sieve (%)	Description
	BH/WS	Sample Ref	Total (%)	Water Soluble (g/L)	(g/L)				
0929/13/01	SP1 @ A-D	N/A	-	0.5	-	5.9	DS-1	68	Brown gravelly sandy CLAY with brick fragments
0929/13/02	SP2 @ A-B	N/A	-	1.3	-	6.1	DS-2	64	Brown gravelly sandy CLAY with brick & ceramic fragments
0929/13/03	SP3 @ A-D	N/A	-	0.4	-	6.4	DS-1	74	Brown gravelly sandy CLAY with brick fragments
0929/13/04	SP4 @ A-B	N/A	-	0.7	-	6.4	DS-2	56	Brown gravelly sandy CLAY with brick & ceramic fragments
0929/13/05	SP5 @ A	N/A	-	0.4	-	6.6	DS-1	55	Brown gravelly sandy CLAY with brick & ceramic fragments
0929/13/06	SP6 @ A-B	N/A	-	0.5	-	6.8	DS-1	59	Brown gravelly sandy CLAY with brick & metal fragments
0929/13/07	SP7 @ A	N/A	-	0.2	-	7.2	DS-1	51	Brown gravelly sandy CLAY with brick fragments
0929/13/08	SP8 @ A	N/A	-	0.4	-	7.2	DS-1	56	Brown gravelly sandy CLAY with brick fragments & plastic

* Classification based on Tables C1 & C2: BRE Special Digest 1:2005

.....END OF TEST REPORT.....

Signed:  Kwaku Baah - Laboratory Manager

For and on behalf of PBA Laboratories



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Client: Knapp Hicks and Partners
Address: Prospect House
 1 Highpoint Business Village
 Henwood, Ashford
 Kent TN24 8DH

Report No: 0929/13/01
Your Ref: 27686G
Report Date: 21/07/2017

Client Contact: Cathy Hoskins
Site: Tovil

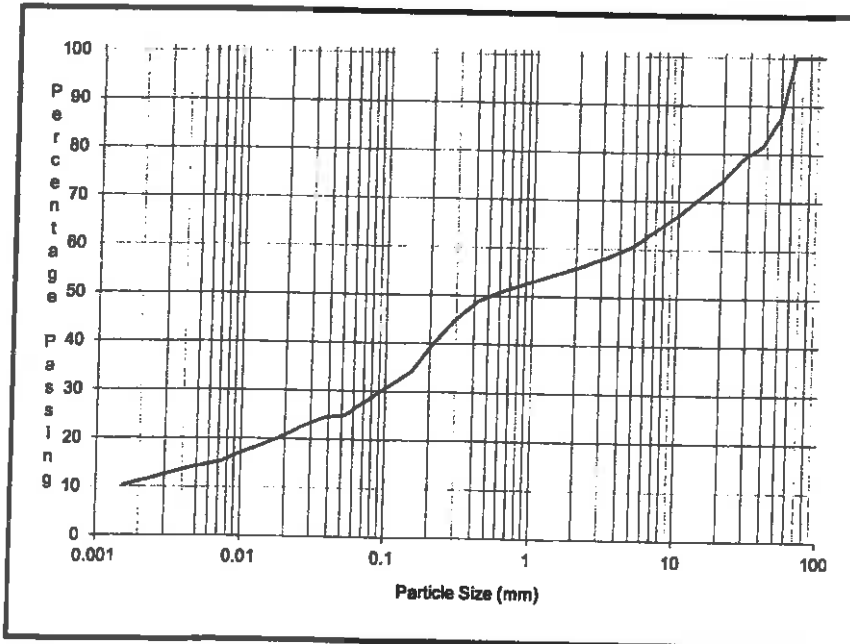
Test Requested: Particle Size Distribution
Test Method: BS 1377-2 : 1990 : Clauses 9.2 & 9.5

Sample Details: Sampled and submitted by: Client
 Client Ref: SP1 @ A-D
 Laboratory Ref: 0929/13/01
 Date Received: 07/07/2017

Date Tested: 19-20/07/2017
 Date Sampled: 07/07/2017
 Type of Sample Bulk


Visual Description: Brown gravelly sandy CLAY with brick fragments

Preparation Method : In accordance with BS 1377-1:1990
 Assumed Particle Density: 2.70 Mg/m³



Material Type	Percentage Passing
Cobbles	
Gravel	44
Sand	29
Silt	15
Clay	12

Comments :

Signed :  Kwaku Baah - Laboratory Manager

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Client: Knapp Hicks and Partners
Address: Prospect House
 1 Highpoint Business Village
 Herwood, Ashford
 Kent TN24 8DH

Report No: 0929/13/02
Your Ref: 27686G
Report Date: 21/07/2017

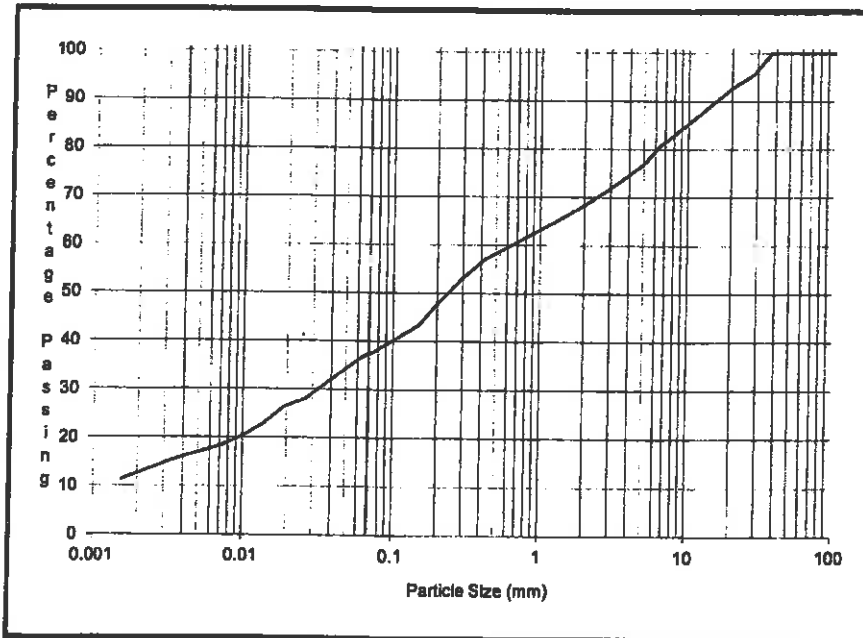
Client Contact: Cathy Hoskins
Site: Tovil

Test Requested: Particle Size Distribution
Test Method: BS 1377-2 : 1990 : Clauses 9.2 & 9.5

Sample Details: Sampled and submitted by: Client
 Client Ref: SP2 @ A-B
 Laboratory Ref: 0929/13/02
 Date Received: 07/07/2017
 Date Tested: 19-20/07/2017
 Date Sampled: 07/07/2017
 Type of Sample Bulk

Visual Description: Brown gravelly sandy CLAY with brick and ceramic fragments

Preparation Method : In accordance with BS 1377-1:1990
 Assumed Particle Density: 2.70 Mg/m³



Material Type	Percentage Passing
Cobbles	
Gravel	32
Sand	32
Silt	23
Clay	13

Comments :

Signed :  Kwaku Baah - Laboratory Manager

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Client: Knapp Hicks and Partners
Address: Prospect House
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 Kent TN24 8DH

Report No: 0929/13/03
Your Ref: 27686G
Report Date: 21/07/2017

Client Contact: Cathy Hoskins
Site: Tovil

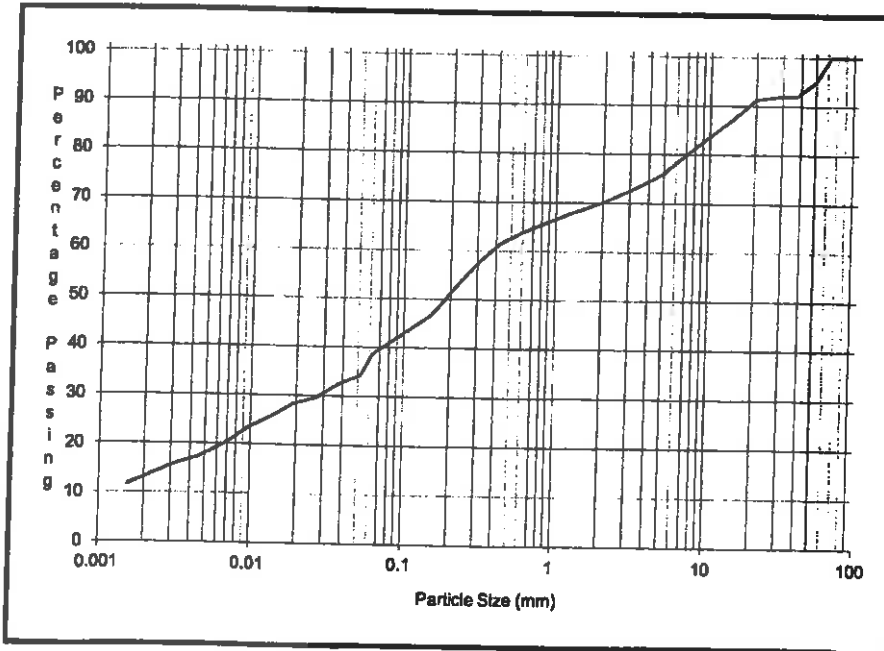
Test Requested: Particle Size Distribution
Test Method: BS 1377-2 : 1990 : Clauses 9.2 & 9.5

Sample Details:
 Sampled & submitted by: Client
 Client Ref: SP3 @ A-D
 Laboratory Ref: 0929/13/03
 Date Received: 07/07/2017

Date Tested: 19-20/07/2017
 Date Sampled: 07/07/2017
 Type of Sample Bulk

Visual Description: Brown gravelly sandy CLAY with brick fragments

Preparation Method : In accordance with BS 1377-1:1990
 Assumed Particle Density: 2.70 Mg/m³



Material Type	Percentage Passing
Cobbles	
Gravel	30
Sand	31
Silt	25
Clay	14

Comments :

Signed : [Signature] Kwaku Baah - Laboratory Manager

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Client: Knapp Hicks and Partners
Address: Prospect House
 1 Highpoint Business Village
 Henwood, Ashford
 Kent TN24 8DH

Report No: 0928/13/04
Your Ref: 27686G
Report Date: 21/07/2017

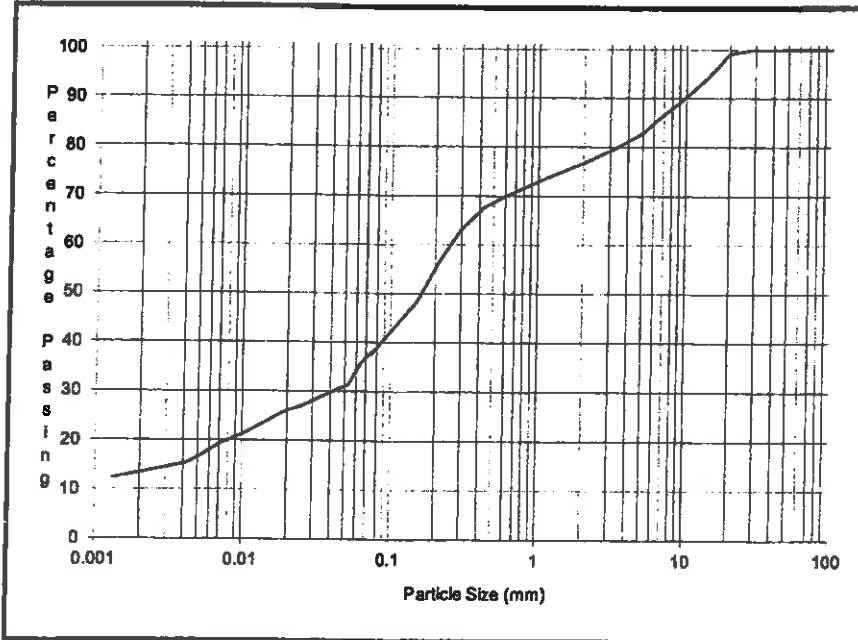
Client Contact: Cathy Hoskins
Site: Tovil

Test Requested: Particle Size Distribution
Test Method: BS 1377-2 : 1990 : Clauses 9.2 & 9.5

Sample Details: Sampled and submitted by: Client
 Client Ref: SP4 @ A-B
 Laboratory Ref: 0928/13/04
 Date Received: 07/07/2017
 Date Tested: 19-20/07/2017
 Date Sampled: 07/07/2017
 Type of Sample Bulk

Visual Description: Brown gravelly sandy CLAY with brick and ceramic fragments

Preparation Method : In accordance with BS 1377-1:1990
 Assumed Particle Density: 2.70 Mg/m³



Material Type	Percentage Passing
Cobbles	
Gravel	23
Sand	41
Silt	22
Clay	14

Comments :

Signed : Kwaku Baah - Laboratory Manager

For and on behalf of PBA Laboratories



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Client: Knapp Hicks and Partners
Address: Prospect House
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 Kent TN24 8DH

Report No: 0928/13/05
Your Ref: 27686G
Report Date: 21/07/2017

Client Contact: Cathy Hoskins
Site: Tovil

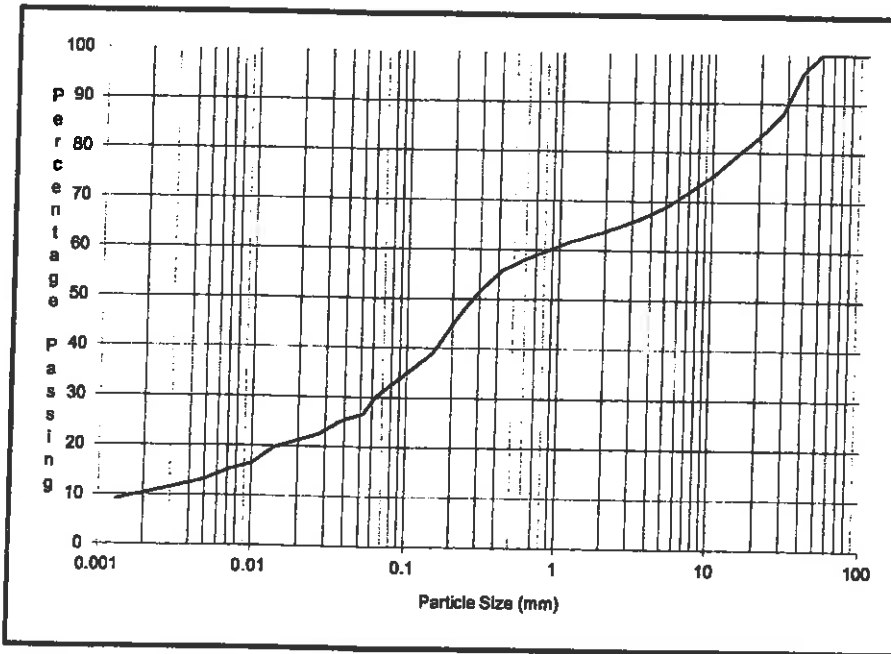
Test Requested: Particle Size Distribution
Test Method: BS 1377-2 : 1990 : Clauses 9.2 & 9.5

Sample Details:
 Sampled and submitted by: Client
 Client Ref: SP5 @ A
 Laboratory Ref: 0928/13/05
 Date Received: 07/07/2017

Date Tested: 19-20/07/2017
 Date Sampled: 07/07/2017
 Type of Sample Bulk

Visual Description: Brown gravelly sandy CLAY with brick and ceramic fragments

Preparation Method : In accordance with BS 1377-1:1990
 Assumed Particle Density: 2.70 Mg/m³



Material Type	Percentage Passing
Cobbles	
Gravel	36
Sand	34
Silt	19
Clay	11

Comments :

Signed :  Kwaku Baah - Laboratory Manager

For and on behalf of PBA Laboratories



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Client: Knapp Hicks and Partners
Address: Prospect House
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 Kent TN24 8DH

Report No: 0929/13/06
Your Ref: 27686G
Report Date: 21/07/2017

Client Contact: Cathy Hoskins
Site: Tovil

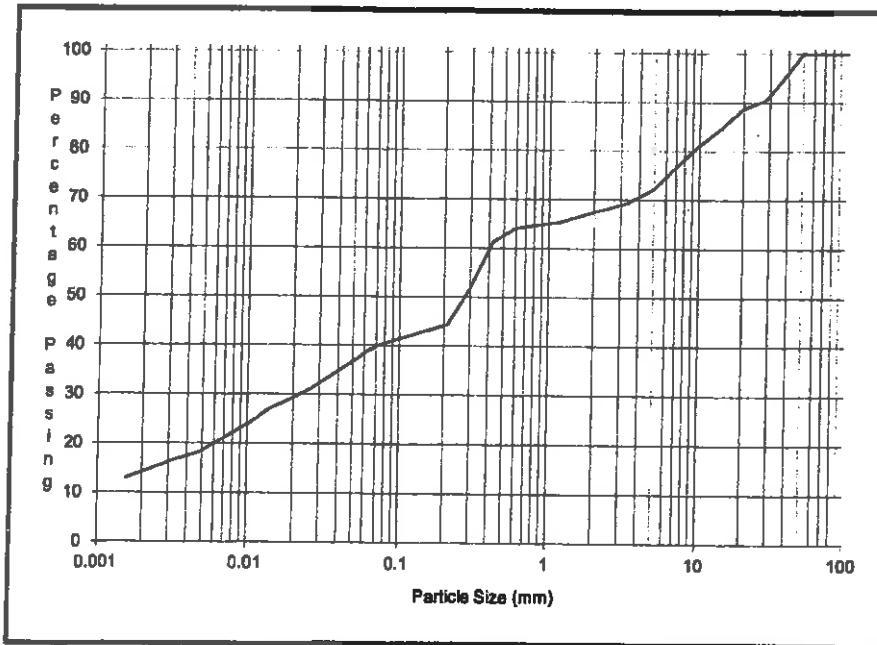
Test Requested: Particle Size Distribution
Test Method: BS 1377-2 : 1990 : Clauses 9.2 & 9.5

Sample Details: Sampled and submitted by: Client
 Client Ref: SP6 @ A-B
 Laboratory Ref: 0929/13/06
 Date Received: 07/07/2017

Date Tested: 19-20/07/2017
 Date Sampled: 07/07/2017
 Type of Sample Bulk

Visual Description: Brown gravelly sandy CLAY with brick and metal fragments

Preparation Method : In accordance with BS 1377-1:1990
 Assumed Particle Density: 2.70 Mg/m³



Material Type	Percentage Passing
Cobbles	
Gravel	31
Sand	29
Silt	25
Clay	15

Comments :

Signed : Kwaku Baah - Laboratory Manager

For and on behalf of PBA Laboratories



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Client: Knapp Hicks and Partners
Address: Prospect House
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Report No: 0929/13/07
Your Ref: 27686G
Report Date: 21/07/2017

Client Contact: Cathy Hoskins
Site: Tovil

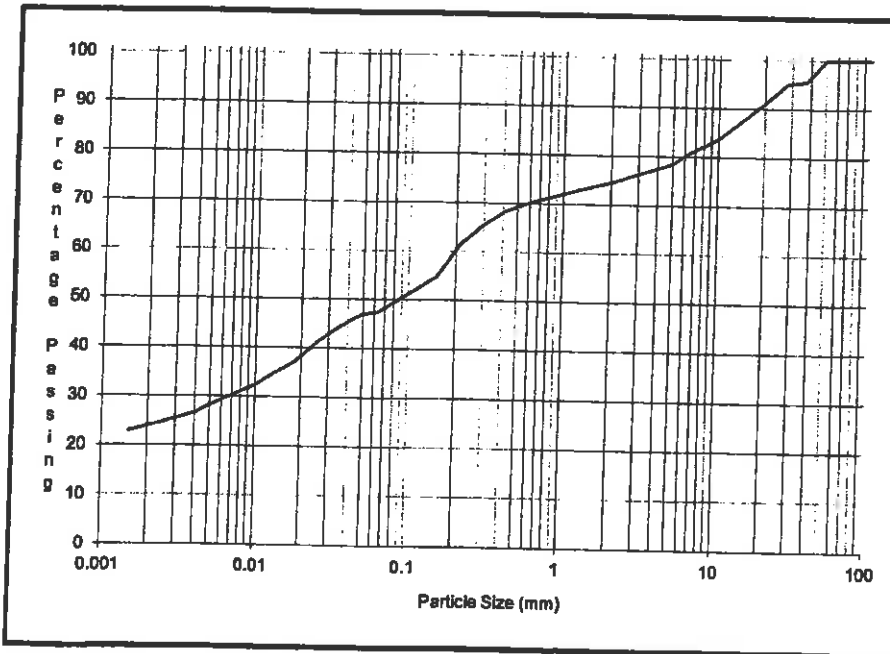
Test Requested: Particle Size Distribution
Test Method: BS 1377-2 : 1990 : Clauses 9.2 & 9.5

Sample Details: Sampled and submitted by: Client
 Client Ref: SP7 @ A
 Laboratory Ref: 0929/13/07
 Date Received: 07/07/2017

Date Tested: 19-20/07/2017
 Date Sampled: 07/07/2017
 Type of Sample Bulk


Visual Description: Brown gravelly sandy CLAY with brick fragments

Preparation Method : In accordance with BS 1377-1:1990
 Assumed Particle Density: 2.70 Mg/m³



Material Type	Percentage Passing
Cobbles	
Gravel	25
Sand	27
Silt	23
Clay	25

Comments :

Signed :  Kwaku Baah - Laboratory Manager

For and on behalf of PBA Laboratories



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Client: Knapp Hicks and Partners
Address: Prospect House
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 Kent TN24 8DH

Report No: 0929/13/08
Your Ref: 27686G
Report Date: 21/07/2017

Client Contact: Cathy Hoskins
Site: Tovil

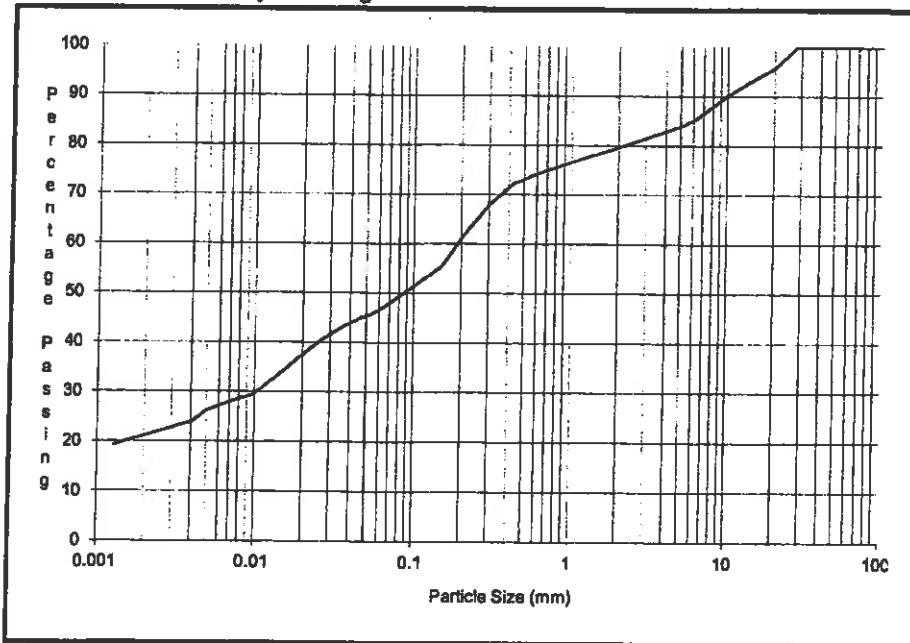
Test Requested: Particle Size Distribution
Test Method: BS 1377-2 : 1990 : Clauses 9.2 & 9.5

Sample Details: Sampled and submitted by: Client
 Client Ref: SP8 @ A
 Laboratory Ref: 0929/13/08
 Date Received: 07/07/2017

Date Tested: 19-20/07/2017
 Date Sampled: 07/07/2017
 Type of Sample


Visual Description: Brown gravelly sandy CLAY with brick fragments and plastic

Preparation Method : In accordance with BS 1377-1:1990
 Assumed Particle Density: 2.70 Mg/m³



Material Type	Percentage Passing
Cobbles	
Gravel	20
Sand	33
Silt	25
Clay	22

Comments :

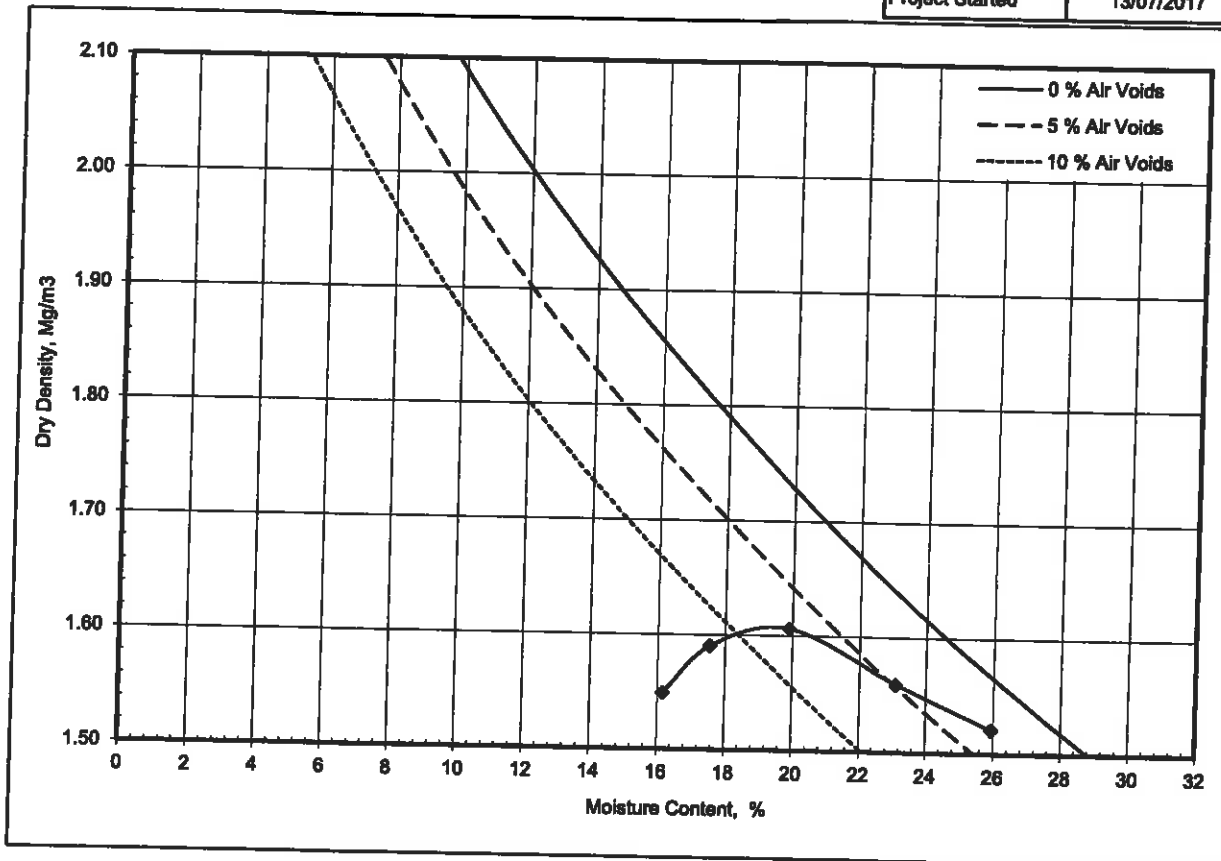
Signed :  Kwaku Baah - Laboratory Manager

For and on behalf of PBA Laboratories



**Dry Density / Moisture Content Relationship
Light Compaction**

Job Ref		23088	
Borehole / Pit No		SP1	
Site Name		Tovll	
Sample No		A-D	
Project No.	0928/13	Client	Peter Baxter Ass
Depth Top		- m	
Soil Description		Brown slightly sandy slightly gravelly CLAY with numerous fmc brick, plastic and glass fragments (gravel is fmc and angular to sub-angular)	
Depth Base		- m	
Sample Type		B	
Test Method		BS1377:Part 4:1990, clause 3.4, 2.5kg rammer	
Samples received		12/07/2017	
Schedule received		13/07/2017	
Project Started		13/07/2017	



Test Started	14/07/2017
Preparation	Material used was natural
Mould Type	CBR
Samples Used	Single sample tested
Material Retained on 37.5 mm Sieve	% 10
Material Retained on 20.0 mm Sieve	% 16
Particle Density - Assumed	Mg/m³ 2.64

Maximum Dry Density	Mg/m³	1.61
---------------------	-------	------

Optimum Moisture Content	%	20
--------------------------	---	----

Remarks	
---------	--



Test Report by K4 SOILS LABORATORY
Unit 8 Olds Close Olds Approach
Watford Herts WD18 9RU
Tel: 01923 711 288
Email: James@k4soils.com

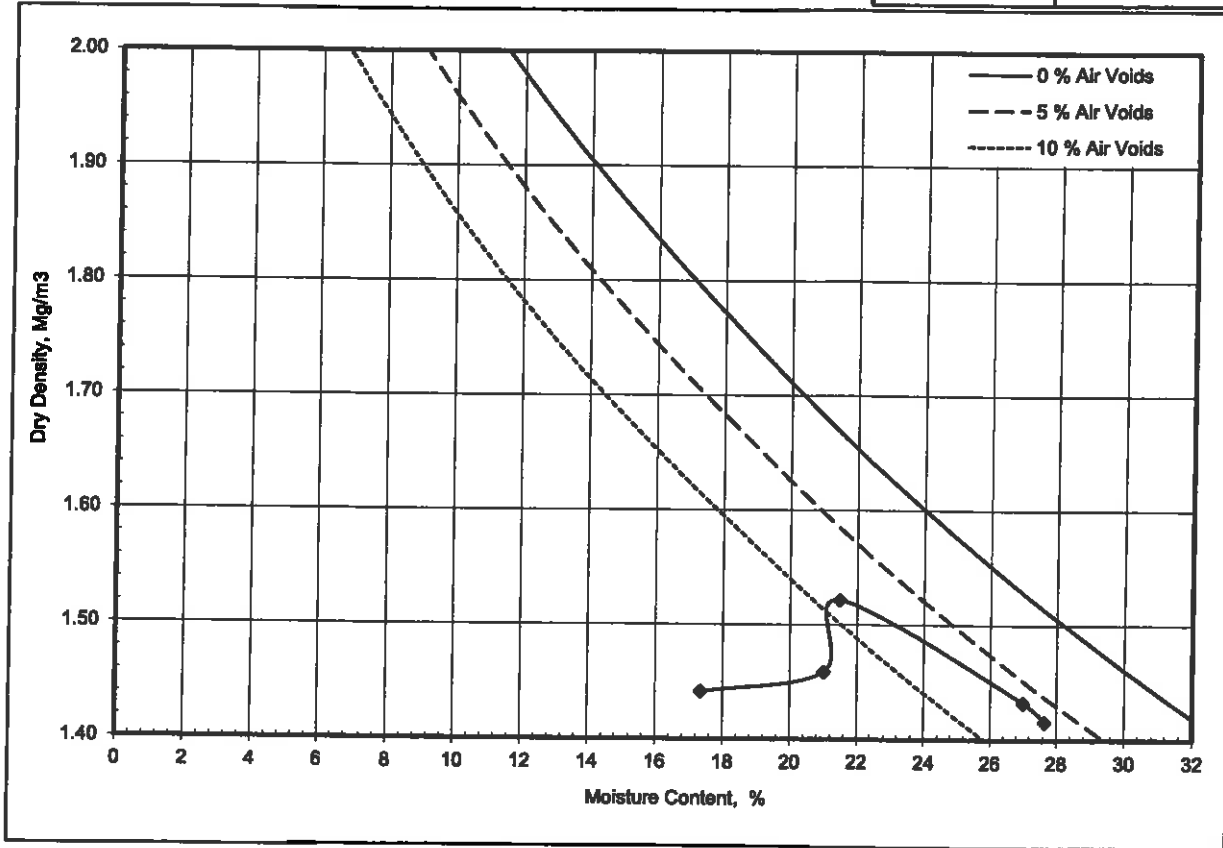
Checked and Approved
Initials: K.P
Date: 21/07/2017
MSF-5-R5(a)



**Dry Density / Moisture Content Relationship
Light Compaction**

Job Ref	23088
Borehole / Pit No	SP2
Sample No	A-B
Depth Top	- m
Depth Base	- m
Sample Type	B
Samples received	12/07/2017
Schedule received	13/07/2017
Project Started	13/07/2017

Site Name	Tovil	
Project No.	0928/13	Client Peter Baxter Ass
Soil Description	Brown slightly sandy slightly gravelly CLAY with frequent brick, tile, plastic fragments and abundant glass fragments (gravel is fmc and angular to sub-angular)	
Test Method	BS1377:Part 4:1990, clause 3.4, 2.5kg rammer	



Test Started	14/07/2017	
Preparation	Material used was natural	
Mould Type	CBR	
Samples Used	Single sample tested	
Material Retained on 37.5 mm Sieve	%	2
Material Retained on 20.0 mm Sieve	%	8
Particle Density - Assumed	Mg/m³	2.60

Maximum Dry Density	Mg/m³	1.52
Optimum Moisture Content	%	21

Remarks	
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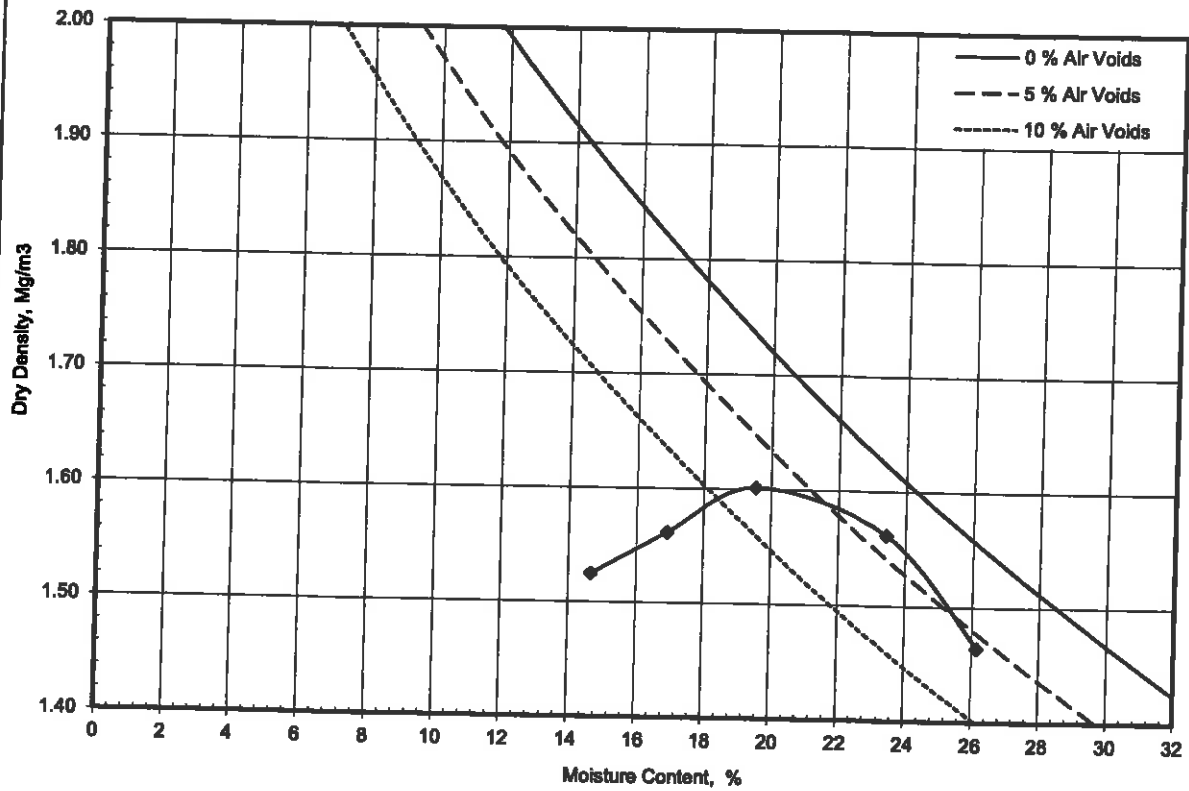
Test Report by **K4 SOILS LABORATORY**
 Unit 8 Olds Close Olds Approach
 Watford Herts WD18 9RU
 Tel: 01923 711 288
 Email: James@k4soils.com

Checked and Approved
 Initials: K.P
 Date: 21/07/2017



**Dry Density / Moisture Content Relationship
Light Compaction**

		Job Ref	23088		
		Borehole / Pit No	SP3		
Site Name	Tovil		Sample No	A-D	
Project No.	0928/13	Client	Peter Baxter Ass	Depth Top	- m
Soil Description	Brown slightly sandy slightly gravelly CLAY with numerous brick, plastic and waste fragments (gravel is fmc and angular to sub-angular)			Depth Base	- m
				Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.4, 2.5kg rammer			Samples received	12/07/2017
				Schedule received	13/07/2017
				Project Started	13/07/2017



Test Started	14/07/2017	
Preparation	Material used was natural	
Mould Type	CBR	
Samples Used	Single sample tested	
Material Retained on 37.5 mm Sieve	%	1
Material Retained on 20.0 mm Sieve	%	10
Particle Density - Assumed	Mg/m ³	2.62
Maximum Dry Density	Mg/m ³	1.60
Optimum Moisture Content	%	20
Remarks		



Test Report by **K4 SOILS LABORATORY**
 Unit 8 Olds Close Olds Approach
 Watford Herts WD18 9RU
 Tel: 01923 711 288
 Email: James@k4soils.com

Checked and Approved
 Initials: **K.P**
 Date: **21/07/2017**



**Dry Density / Moisture Content Relationship
Light Compaction**

Job Ref 23088

Borehole / Pit No SP4

Site Name Tovil

Sample No A-B

Project No. 0928/13

Client

Peter Baxter Ass

Depth Top - m

Soil Description

Brown slightly sandy slightly gravelly CLAY with abundant waste plastic, glass fragments and occasional fmc brick fragments (gravel is fmc and angular to sub-angular)

Depth Base - m

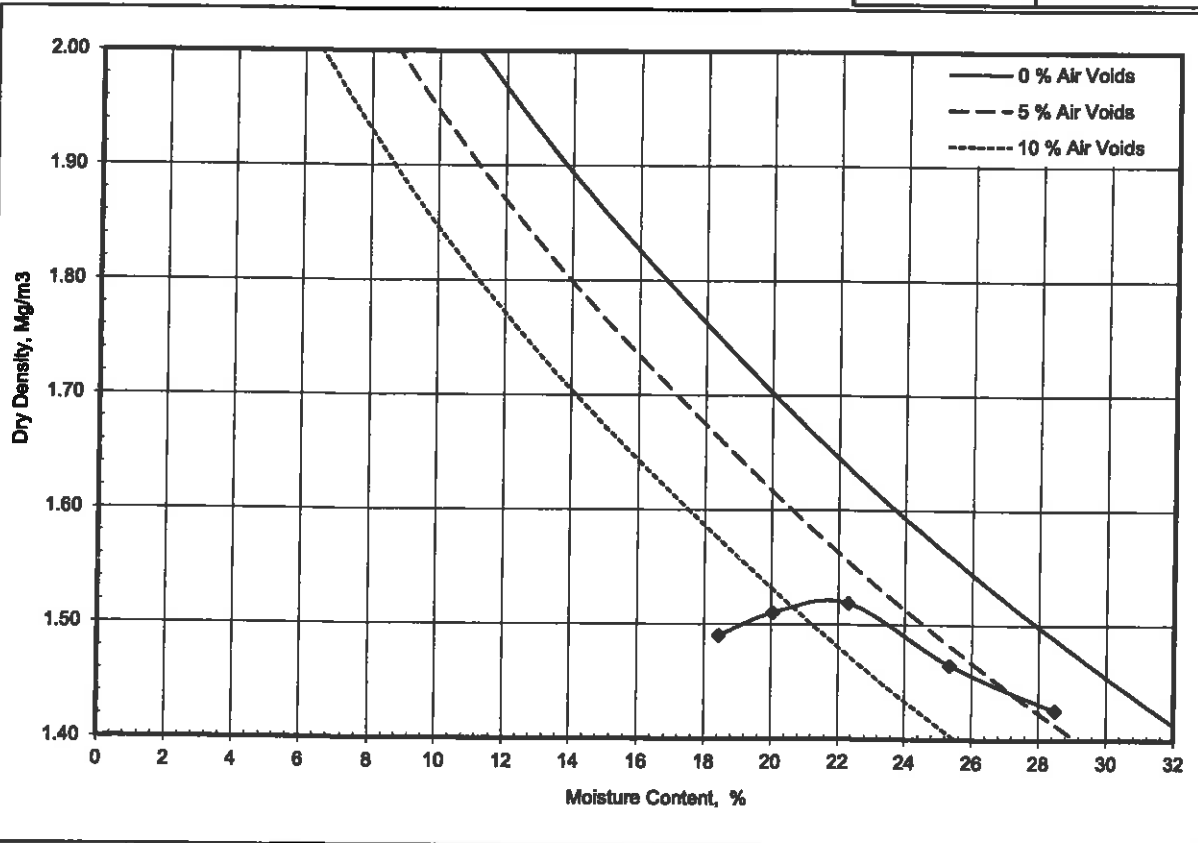
Sample Type B

Test Method BS1377:Part 4:1990, clause 3.4, 2.5kg rammer

Samples received 12/07/2017

Schedule received 13/07/2017

Project Started 13/07/2017



Test Started	14/07/2017
Preparation	Material used was natural
Mould Type	CBR
Samples Used	Single sample tested
Material Retained on 37.5 mm Sieve	%
Material Retained on 20.0 mm Sieve	%
Particle Density - Assumed	Mg/m³

Maximum Dry Density	Mg/m³	1.52
---------------------	-------	------

Optimum Moisture Content	%	22
--------------------------	---	----

Remarks	
---------	--



Test Report by K4 SOILS LABORATORY

Unit 8 Olds Close Olds Approach

Watford Herts WD18 9RU

Tel: 01923 711 288

Email: James@k4soils.com

Checked and Approved

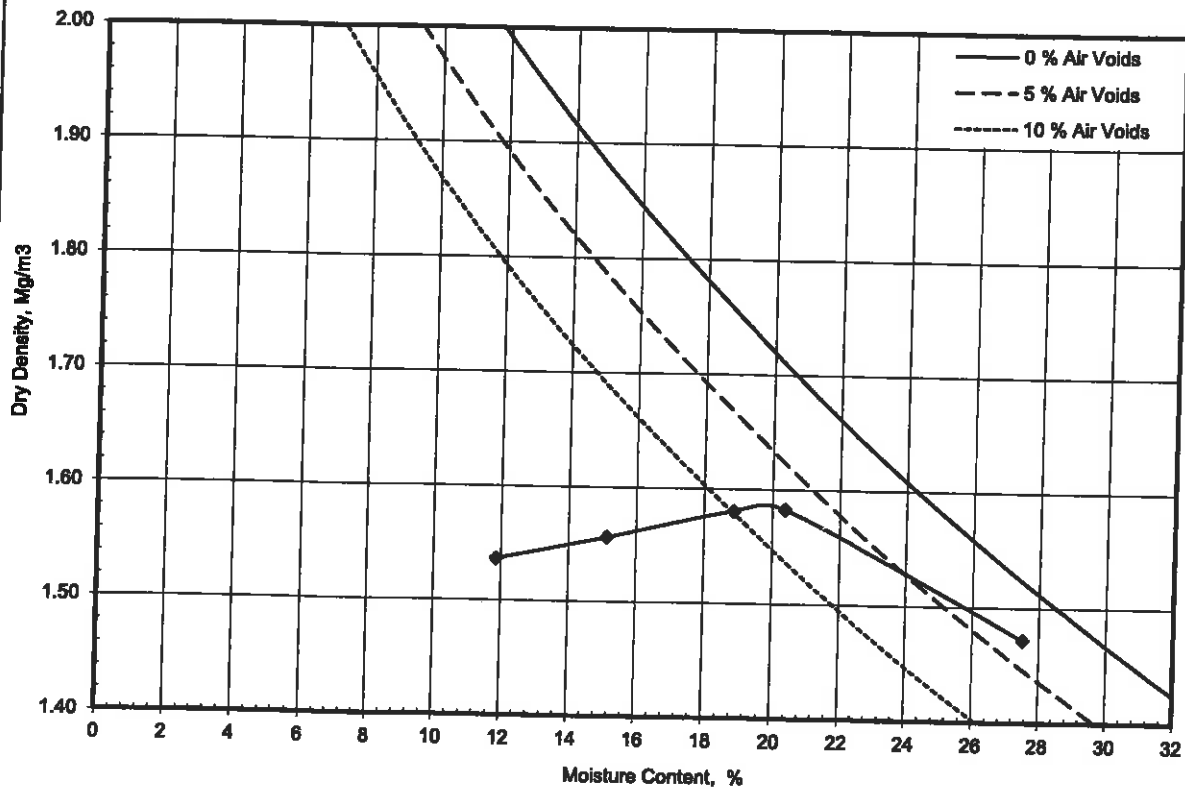
Initials: K.P

Date: 21/07/2017



**Dry Density / Moisture Content Relationship
Light Compaction**

Job Ref	23088	
	Borehole / Pit No	SP5
Site Name	Tovil	
Project No.	0928/13	Client
		Peter Baxter Ass
Soil Description	Brown slightly sandy slightly gravelly CLAY with numerous fmc brick, plastic and waste fragments (gravel is fmc and angular to sub-angular)	Depth Top
		- m
Test Method	BS1377:Part 4:1990, clause 3.4, 2.5kg rammer	Depth Base
		- m
Sample No	A	
Sample Type	B	
Samples received	12/07/2017	
Schedule received	13/07/2017	
Project Started	13/07/2017	



Test Started	14/07/2017
Preparation	Material used was natural
Mould Type	CBR
Samples Used	Single sample tested
Material Retained on 37.5 mm Sieve	%
Material Retained on 20.0 mm Sieve	%
Particle Density - Assumed	Mg/m³

Maximum Dry Density	Mg/m³	1.58
Optimum Moisture Content	%	19

Remarks



Test Report by **K4 SOILS LABORATORY**
 Unit 8 Olds Close Olds Approach
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 Email: James@k4soils.com

Checked and Approved
 Initials: K.P
 Date: 21/07/2017



**Dry Density / Moisture Content Relationship
Light Compaction**

Job Ref 23088

Borehole / Pit No SP6

Site Name Tovil

Sample No A-B

Project No. 0928/13

Client

Peter Baxter Ass

Depth Top - m

Soil Description

Brown slightly sandy slightly gravelly CLAY with numerous brick, plastic and glass fragments (gravel is fine and angular to sub-angular)

Depth Base - m

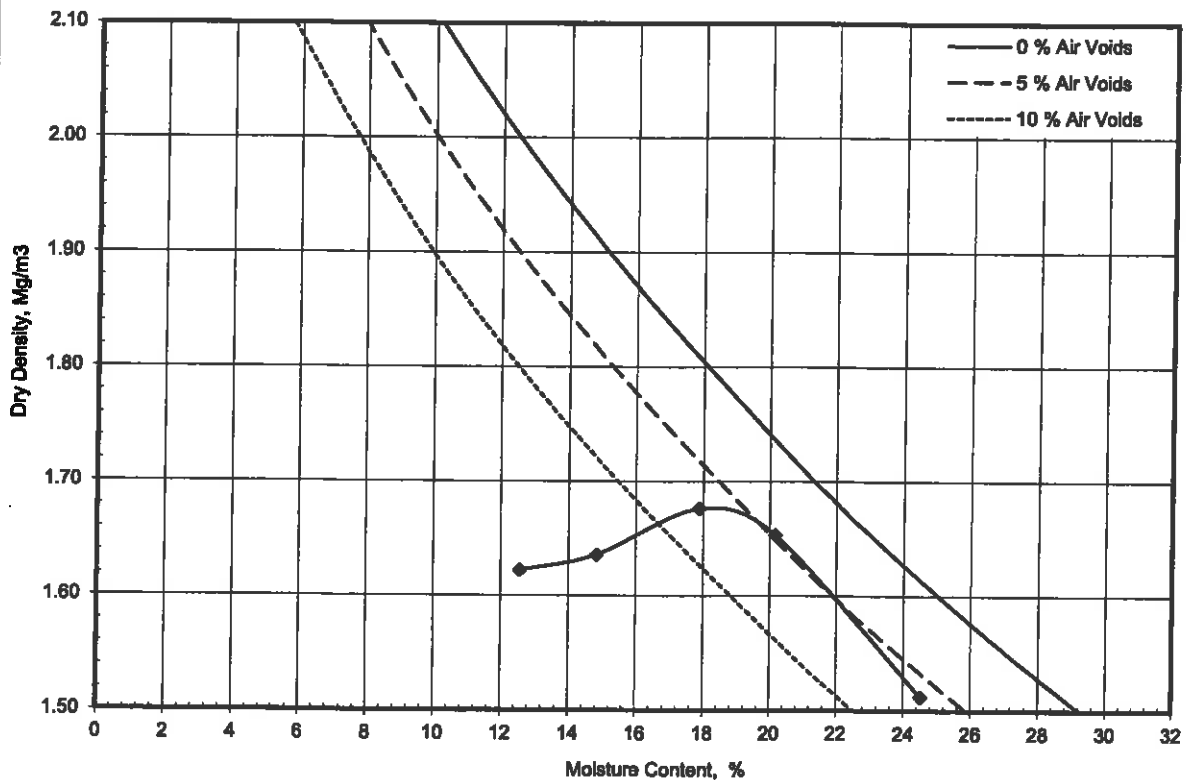
Sample Type B

Test Method BS1377:Part 4:1990, clause 3.4, 2.5kg rammer

Samples received 12/07/2017

Schedule received 13/07/2017

Project Started 13/07/2017



Test Started	14/07/2017
Preparation	Material used was natural
Mould Type	CBR
Samples Used	Single sample tested
Material Retained on 37.5 mm Sieve	% 4
Material Retained on 20.0 mm Sieve	% 9
Particle Density - Assumed	Mg/m³ 2.67

Maximum Dry Density	Mg/m³	1.68
---------------------	-------	------

Optimum Moisture Content	%	18
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Remarks	
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Test Report by K4 SOILS LABORATORY

Unit 8 Olds Close Olds Approach

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Tel: 01923 711 288

Email: James@k4soils.com

Checked and Approved

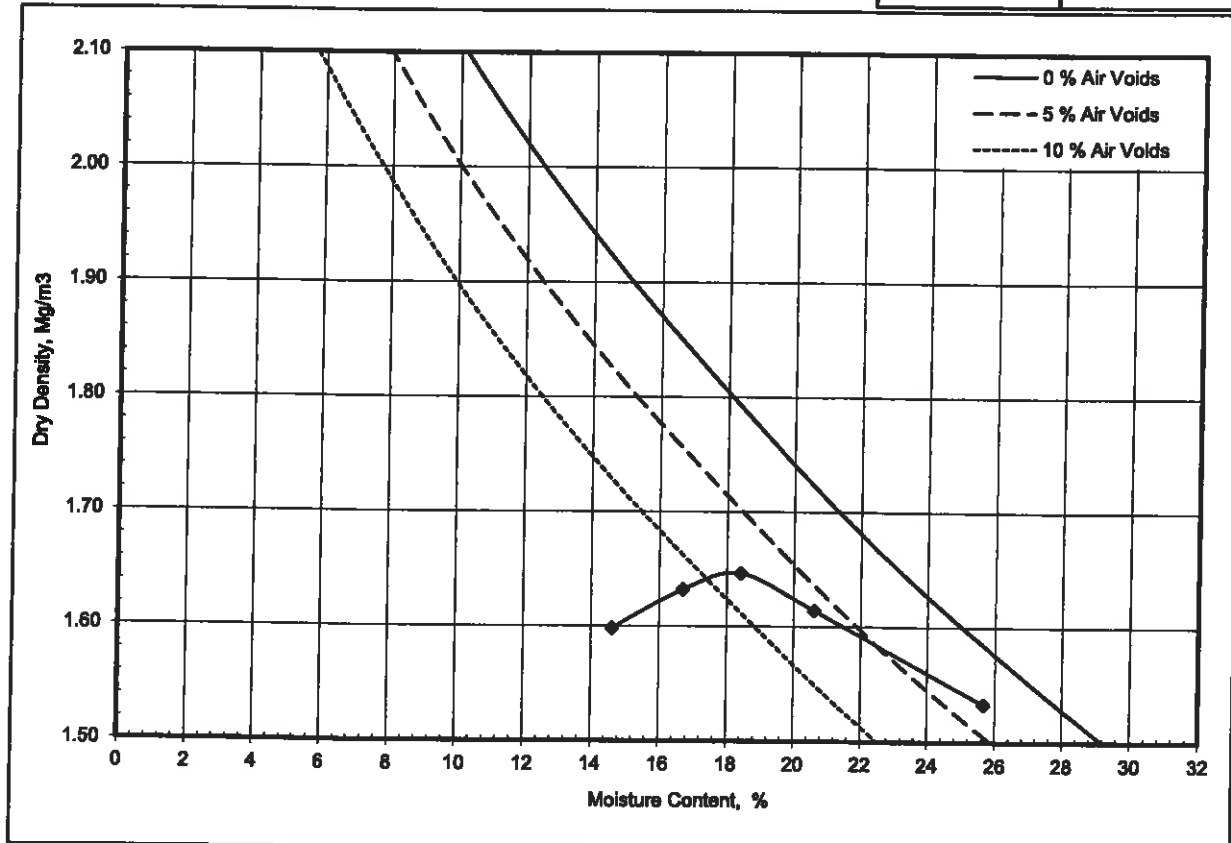
Initials: K.P

Date: 21/07/2017



**Dry Density / Moisture Content Relationship
Light Compaction**

		Job Ref	23088		
		Borehole / Pit No	SP7		
Site Name	Tovil		Sample No	A	
Project No.	0928/13	Client	Peter Baxter Ass	Depth Top	- m
Soil Description	Brown slightly sandy slightly gravelly CLAY with fmc brick fragments and numerous plastic waste material (gravel is fmc and angular to sub-angular)		Depth Base	- m	
			Sample Type	B	
Test Method	BS1377:Part 4:1990, clause 3.4, 2.5kg rammer		Samples received	12/07/2017	
			Schedule received	13/07/2017	
			Project Started	13/07/2017	



Test Started	14/07/2017	
Preparation	Material used was natural	
Mould Type	CBR	
Samples Used	Single sample tested	
Material Retained on 37.5 mm Sieve	%	4
Material Retained on 20.0 mm Sieve	%	7
Particle Density - Assumed	Mg/m ³	2.67
Maximum Dry Density	Mg/m ³	1.65
Optimum Moisture Content	%	18
Remarks		



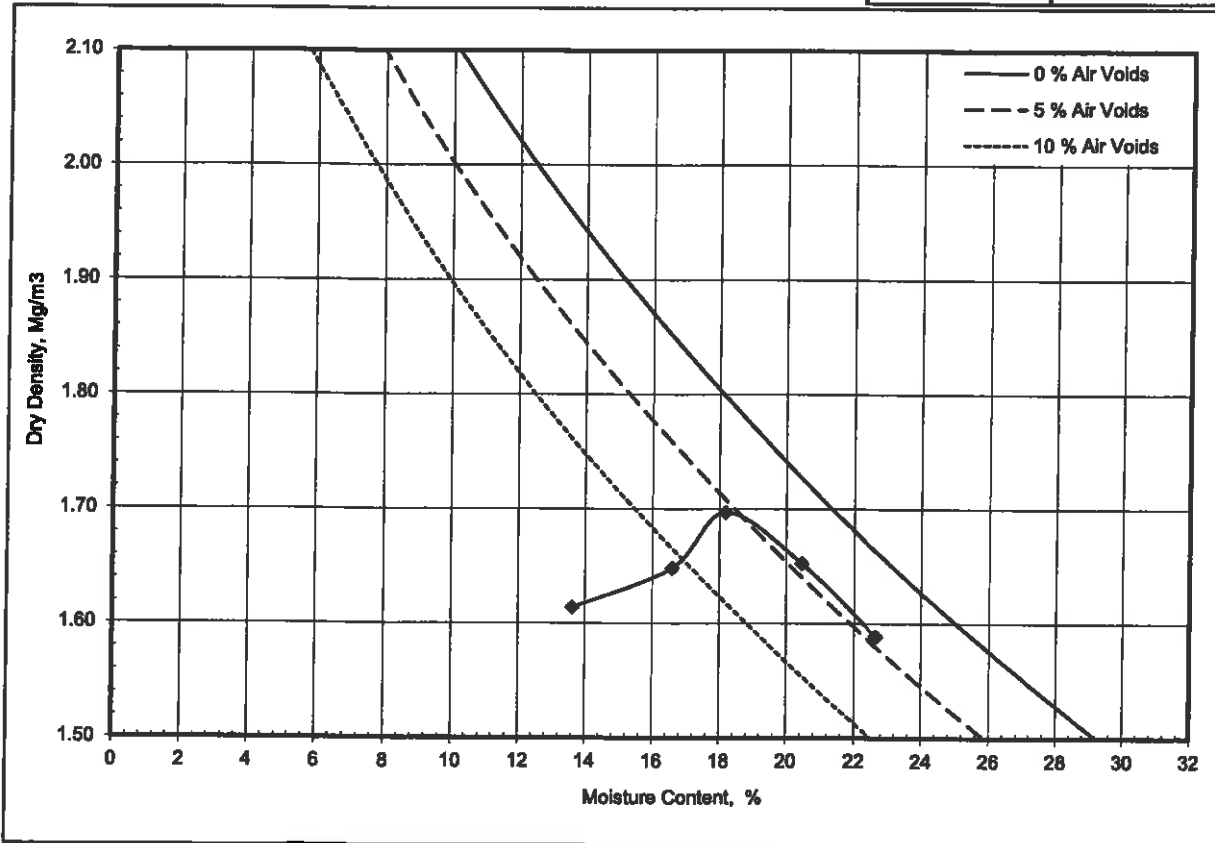
Test Report by K4 SOILS LABORATORY
Unit 8 Olds Close Olds Approach
Watford Herts WD18 9RU
Tel: 01923 711 288
Email: James@k4soils.com

Checked and Approved
Initials: K.P
Date: 21/07/2017
MSF-5-R5(a)



**Dry Density / Moisture Content Relationship
Light Compaction**

		Job Ref	23088		
		Borehole / Pit No	SP8		
Site Name	Tovil		Sample No	A	
Project No.	0928/13	Client	Peter Baxter Ass	Depth Top	- m
Soil Description	Brown slightly sandy slightly gravelly CLAY with numerous brick and plastic fragments (gravel is fine and angular to sub-angular)			Depth Base	- m
				Sample Type	B
Test Method	BS1377:Part 4:1990, clause 3.4, 2.5kg rammer			Samples received	12/07/2017
				Schedule received	13/07/2017
				Project Started	13/07/2017



Test Started	14/07/2017	
Preparation	Material used was natural	
Mould Type	CBR	
Samples Used	Single sample tested	
Material Retained on 37.5 mm Sieve	%	9
Material Retained on 20.0 mm Sieve	%	16
Particle Density - Assumed	Mg/m³	2.67

Maximum Dry Density	Mg/m³	1.70
---------------------	-------	------

Optimum Moisture Content	%	18
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Remarks	
---------	--



Test Report by K4 SOILS LABORATORY
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Tel: 01923 711 288
Email: James@k4soils.com

Checked and Approved
Initials: K.P
Date: 21/07/2017

APPENDICES	
D	Correspondence & Previous Reports (Available on Request) <ul style="list-style-type: none">• Liverpool Environmental Engineering Consultants Limited: Tovil Quarry, Near Maidstone, Site sub-surface conditions and reclamation method statement, May 2006• Knapp Hicks & Partners Report Reference 27686/R/001/MKR, September 2013 (includes EA Letter Reference KT/2006/023262-2/1, dated 04 July 2006)• Letter Reference 27686A-L-003ARev1-RJM (Transfer of Land) 21.04.15

APPENDICES	
E	Proposals for Settlement Monitoring Stations

Details to be confirmed

- **Approx 16 No deep monitoring stations to be installed retrospectively**
- **Approx 16No surface monitoring stations to be installed upon completion of filling**

FINAL

APPENDICES	
F	Butek Landline Details & Specifications for Provision and Installation of Ground Gas Membrane.

Landflex PE100LLT

1.00mm Textured LLDPE

Available Types: Single side textured, both sides textured

Product Specification



EN 13361, EN 13362, EN 13491
EN 13492, EN 13493, EN 15382



Material Properties	Unit	Test Method	Values
Density	g/cm ³	DIN EN ISO 1183-1	<0.940
Melt Flow Range 190/2,16	g/10min	DIN EN ISO 1133	0.20 – 0.70
Carbon Black Content (TGA)	%		2.0 – 3.0
Carbon Black Dispersion	-		Category 1-2
Durability			
Oxidation Resistance	-	DIN EN 14575	Fulfilled
Oxidative Induction Time (OIT)	Min	ASTM D 3895	>100
Stress Crack Resistance	H	DIN EN 14576	>200
Weathering Resistance	H	DIN EN 12224	>3000
Root Resistance	-	DINE EN 14416	Fulfilled
Resistance to Leaching	-	DIN EN 14415	Fulfilled
Chemical Resistance	-	DIN EN 14414	Fulfilled
Microbiological Resistance	-	DIN EN 12225	Fulfilled
Functional Properties			
Foldability at Low Temperatures	C	DIN EN 495-5	<-40
Dimensional Stability	%	DIN EN 1107-2	<2.0
Mechanical Properties			
Thickness	Mm	ASTM D 5994	1.00
Tolerance	%	DIN EN ISO 9863-1	±5
Asperity Height	Mm	ASTM D 7466	0.25
Tolerance		GRI/GM13	-0.00
Tensile Strength at Yield	Mpa	DIN EN ISO 527 Type 5/100mm/min	14
Tolerance			-3
Elongation at Yield	%		12
Tolerance			-2
Tensile Strength at Break	Mpa		36
Tolerance			-3
Elongation at Break	%	900	
Tolerance		-100	
Tear Resistance	N/mm	ISO 34, Method B Procedure (a) 500mm/min	130
Tolerance			-20
Static Puncture	KN	DIN EN ISO 12236	4.0
Tolerance			-1.0
Bursting Pressure	%	DIN 61551	>9
Resistance to Static Loading	-	DIN EN 12730	Fulfilled

The information herein is based upon data obtained by the manufacturer and is considered accurate. However, no warranty is expressed or implied regarding the accuracy of this data. This information is furnished upon the condition that the person receiving it shall evaluate its suitability for the specific application.

Butek Landline

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Spec. 23.2 Rev.A

Landflex G8000

Puncture resistant Geotextile

Product Specification

- Provides top level protection at high strain
- Landflex G8000 combines filtration properties & high water permeability
- Offers high resistance to puncture & abrasion



	Test method	Value
Mechanical Properties		
Tensile strength Longitudinal	EN ISO 10319	44.9 kN/m
Tensile strength Transverse		48.9 kN/m
Elongation Longitudinal	EN ISO 10319	65 %
Elongation Transverse		65%
Static puncture resistance (CBR)	EN ISO 12236	8.0 kN
Dynamic perforation resistance – Cone drop	EN ISO 13433	5.0mm
Hydraulic Properties		
Water permeability normal to the plane	EN ISO 11058	40 l/m ² /s
Characteristic opening size (AOS)	EN ISO 12956	0.070mm
Physical Properties		
Thickness at 2 kPa	EN ISO 9863	4.90mm
Weight	EN ISO 9864	670g/m ²
Roll Dimensions	5.25m wide x 50m linear (263m ³)	
Composition	100% Polypropylene non-woven geotextile	
Colour	White	
Durability	Predicted to be durable for a minimum of 25 years in natural soil with 4<pH<9 and soil temperatures < 25C	
The Information herein is based upon data obtained by the manufacturer and is considered accurate. However, no warranty is expressed or implied regarding the accuracy of this data. This information is furnished upon the condition that the person receiving it shall evaluate its suitability for the specific application.		

Butek Landline

Containment Solutions

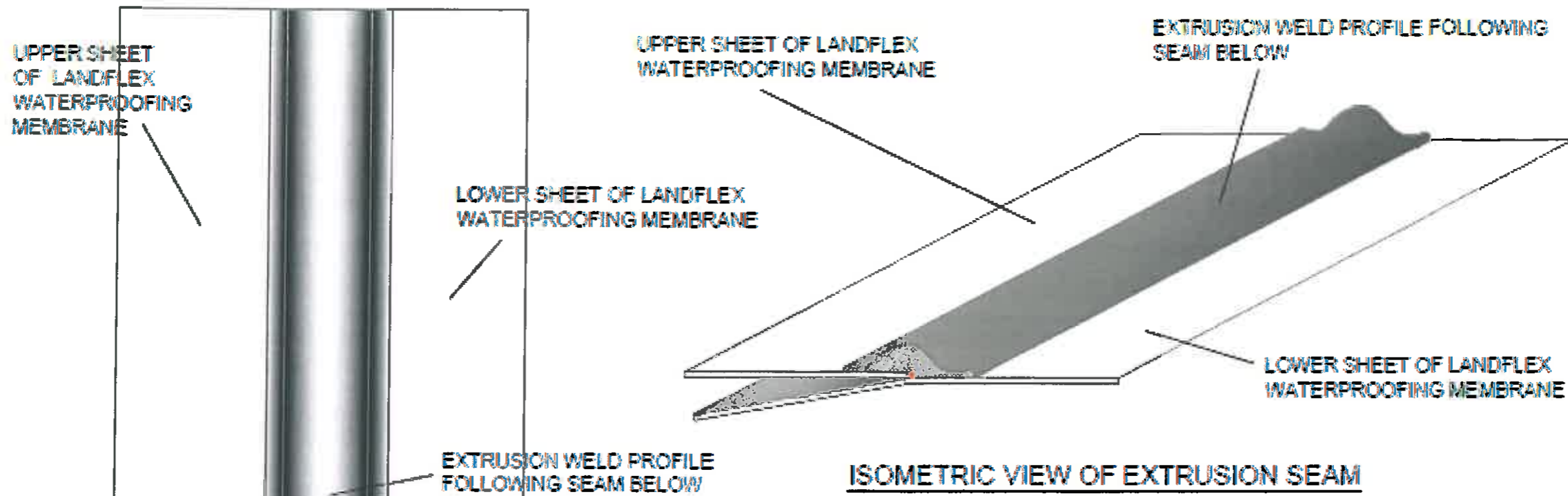
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Spec. 12.2 Rev.A



PLAN VIEW OF EXTRUSION SEAM



SECTION VIEW OF EXTRUSION SEAM



SECTION VIEW OF EXTRUSION SEAM WITH COPPER WIRE SHOWN

Butek Landline

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**Typical Welding Detail
 Extrusion Weld**

Drawn: BA	Checked: RGB	Approved: CB	Date: 05/05/2015	Scale: NTS
Drawing No. BL031				Rev. A

FINAL

APPENDICES	
G	Daily Diary Sheet

DAILY DIARY

Date:

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Weather Conditions:

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Personnel on Site:

Name	Company	Job Title

Visitors:

Name	Company	Job Title

Plant on Site:

Plant	No.	Operator

Diary:

Work Element & Description	Time	Personnel & Plant used

Continue overleaf if necessary:

Construction Issues:

Description	Resolved Y/N	Action Completed

FINAL

APPENDICES	
H	Report on Asbestos Ground Contamination at Tovil Quarry, 26th June 2017



KH ASBESTOS INVESTIGATIONS LTD

Independent Surveys, Investigations, Consultancy Advice & Training



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ACMA, MAAT, MCM

Asbestos Consultant:
Kevin Winder

34935Q/L/001A/KRW
26th June 2017

P J Burke (Kent) Limited
Moatlands Farm
Howland Road
Marden
Tonbridge
Kent
TN12 9LB

For the attention of Pat Burke

By e-mail prior to posting (piburke831@gmail.com)

Dear Pat,

Re: Asbestos Ground Contamination at Tovil Quarry

Following our site visit this morning we give below a summary of our findings and recommendations:

- Small fragments of asbestos cement were evident in most stock piles. This material was in the form of flat sheet, corrugated sheet and imitation slate tile debris.
- Due to the small amounts noted in the stockpiles, if the fragments are diligently removed by adequately trained and experienced persons and stored safely and securely on-site prior to disposal as hazardous waste, then the resulting spoil heaps would be extremely unlikely to contain sufficient amounts of asbestos to be classified as hazardous waste.
- The operatives conducting the hand picking are to be trained in Category "A" Asbestos Awareness and we are aware that UKATA approved training has already been scheduled for 2nd August 2017.
- The area along the boundary fence line by the layby contains considerable quantities of asbestos cement debris. If this material is likely to be disturbed during future excavations then the posed asbestos risk will be elevated and more stringent controls will be required.
- Should these controls become necessary, then the appointment of an independent UKAS Accredited laboratory to conduct reassurance and personal air testing would be strongly advised.

Should you have any questions about any of the above points, please do not hesitate to contact us.

Yours faithfully,
For and on behalf of KH Asbestos Investigations Ltd

KH Asbestos Investigations Ltd
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No. 6928904

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