



University of Reading – Health & Life Science Building

Ground Gas Remediation Validation Report to discharge condition 16 of Reading Borough Council's Schedule of Conditions.

December 2018

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Validation Sheet

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STRIDE TREGLOWN

Specification:

1459939-STL-XX-ZZ-SP-A-4080-
30-70-90 Waterproofing Systems

Project:

1459939-University of Reading - Health and Life Sciences Building

Revision Code:

C3

Revision Date:

06/04/2018

Specification Status:

A - Construction

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STRIDE TREGLOWN

1459939-University of Reading - Health and Life Sciences Building

1459939-STL-XX-ZZ-SP-A-4080-

30-70-90/135 - Fully-bonded bitumen membrane external tanking system - type A

Revision: C3

Revision Date: 06/04/2018

This specification is to be read with the Outline Architectural specification.

The contractor is to note that a BREEAM assessment is being carried out.

The contractor is to read this specification with BREEAM Tracker report. Note requirements for sustainable sourcing of timber and selection of materials using the BRE Green guide as appropriate.

Since the previous issue of this document, the following clauses have been added or amended:

30-70-90/135 Fully-bonded bitumen membrane external tanking system - type A

System outline

30-70-90/135 Fully-bonded bitumen membrane external tanking system type A

- **Description:** Bitumen Protection boards
- **System manufacturer:** GCP Applied Technologies (formerly Grace Construction Products)
- **Substrates:**
 - **Preparation:** Required.
 - **Pointing and filling mortar:** 45-55-50/302 Cement gauged designed mix mortar type B.
 - **Primer:** 45-55-12/390 Bitumen primers.
- **Tanking membranes:**
 - **Waterproof sheets:** 45-65-50/304 Bitumen sheets type A.
 - **Reinforcement:** Site formed polymer modified mortar fillets. refer to manufacturers standard details
- **Protection:**
 - **Horizontal protection:** 45-45-95/395 Bitumen impregnated softboard and .
 - **Jointing tape:** manufacturers recommendations for this application
- **Pipe sleeves:** Required.
- **Execution:** ;
30-70-90/672 Applying primers for bonded or self adhesive tanking sheets;
30-70-90/682 Installing fully bonded bitumen sheets for tanking;
and 30-70-90/696 Installing protection boards.
- **System completion:** 30-70-90/810 Inspection of waterproof coatings and membranes.

Products

45-45-95/395 Bitumen impregnated softboard

- **Manufacturer:** GCP Applied Technologies (formerly Grace Construction Products)
- **Product reference:** Bituthene® Protection Board
- **Application:** Bonding: Apply with asphaltic paper facing the waterproofing. Patch apply Servicised® B2 primer to back of each board and allow to dry. Apply Bitustik™ 4000, 150 mm double sided bonding tape to the primed strips. Apply boards and roll 'patches' firmly.
Board joints: Overlap boards by 75 mm minimum, prime lap and allow to dry. Apply Bitustik™ 4000, 70 mm single sided sealant tape to joints and roll well to achieve full adhesion.
- **Execution:** 45-45-95/620 Installing wood-based panels type A;
45-45-95/625 Moisture content of supports;
and 45-45-95/630 Panel edge supports.

45-55-12/390 Bitumen primers

- **Manufacturer:** GCP Applied Technologies (formerly Grace Construction Products)
uksales@gcpat.com
T: +44 (0)1753 490000
F: +44 (0)1753 490001
580 Ipswich Road,
Slough,

Berkshire,
SL1 4EQ

- **Characteristics:**
 - **Test standard:** To BS EN 12846-2.
 - **Volatile solvent content (minimum):** 40% by mass.
 - **Viscosity (maximum):** 10s (STV at 25°C, 4 mm orifice).
- **Execution:** 45-55-12/620 Applying bitumen primers.

45-55-50/302 Cement gauged designed mix mortar type B

- **Standard:** To BS EN 998-2.
- **Mortar type:** Ready to use cement:sand.
- **Reaction to fire classification:** Class A1.

45-65-50/304 Bitumen sheets type A

- **Manufacturer:** GCP Applied Technologies (formerly Grace Construction Products)
- **Product reference:** Preprufe® 160R Plus
- **Sealant tape:** Preprufe® tape.

Execution

30-70-90/672 Applying primers for bonded or self adhesive tanking sheets

- **Coverage per coat (minimum):** As recommended for the purpose by membrane manufacturer.
- **Curing:** Allow to dry thoroughly before covering.

30-70-90/682 Installing fully bonded bitumen sheets for tanking

- **Installation standard:** In accordance with BS 8102.
- **Installation in accordance with third party certification:** As product Agrément certificate for proposed application.
- **Air and surface temperatures:** Do not apply sheets if below minimum ambient or surface temperature recommended by manufacturer.
- **Number of layers:** Three, laid to break joint.
- **Joints:**
 - **Laps (minimum):** Sides 100 mm; ends 150 mm.
 - **Jointing:** Fully bond.
- **Protection:** Apply as soon as possible.

30-70-90/696 Installing protection boards

- **Board joints:** Primed and taped. Roll fully to adhere.
- **Board contact with coating or membrane:** Secure and continuous.

45-45-95/620 Installing wood-based panels type A

- **Gap between adjacent boards:** 1–2 mm.
- **Fixing centres (maximum):**
 - **General:** A robust bitumen board comprising a hard bitumen compound coated one side with asphaltic paper and one side with printed polyethylene film. Recommended for use with Bituthene® and backfilled Preprufe® membranes. Suitable for use with graded backfill materials. The protection boards are not suitable for horizontal applications.

Boards and sheets to be fixed securely to each support without distortion and true to line and level. Fixings to be evenly spaced in straight lines and, unless otherwise recommended by board manufacturer, in pairs across joints

- **Bonding:** Bonding: Apply with asphaltic paper facing the waterproofing. Patch apply Servicised® B2 primer to back of each board and allow to dry. Apply Bitustik™ 4000, 150 mm double sided bonding tape to the primed strips. Apply boards and roll 'patches' firmly.
- **Joints:** Board joints: Overlap boards by 75 mm minimum, prime lap and allow to dry. Apply Bitustik™ 4000, 70 mm single sided sealant tape to joints and roll well to achieve full adhesion.

45-45-95/625 Moisture content of supports

- **Moisture content:**
 - **Final:** 12–14%
 - **At time of fixing boards:** 18% maximum
- **Test results:** Submit record of tests and results.

45-45-95/630 Panel edge supports

- **Provision:** In accordance with board manufacturer's recommendations.
- **Tongued and grooved jointed rigid board areas:** To unsupported perimeter edges.
- **Butt jointed rigid board areas:** To unsupported edges.
- **Size:** 50 mm wide and of adequate thickness.
- **Quality:** As for adjacent timber supports.
- **Treatment:** As for adjacent timber supports.

45-55-12/620 Applying bitumen primers

- **Surface coverage:** Even and full.
- **Coats:** Fully bond. Allow volatiles to dry off thoroughly between coats.

System completion

30-70-90/810 Inspection of waterproof coatings and membranes

- **Give notice:** Before covering any part of waterproof coatings or membranes with overlying construction.

Ω End of system

STRIDE TREGLOWN

1459939-University of Reading - Health and Life Sciences Building

1459939-STL-XX-ZZ-SP-A-4080-

30-70-90/135 - Fully-bonded bitumen membrane external tanking system - type B - RIW Gas Seal

Revision: C3

Revision Date: 06/04/2018

This specification is to be read with the Outline Architectural specification.

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30-70-90/135 Fully-bonded bitumen membrane external tanking system - type B - RIW Gas Seal

System outline

30-70-90/135 Fully-bonded bitumen membrane external tanking system type B - RIW Gas Seal

- **Substrates:**
 - **Preparation:** Required.
- **Liquid applid coating:** 45-55-70/335 Floor coating resin
- **Protection:**
 - **Horizontal protection:** 45-45-95/395 Bitumen impregnated softboard.
 - **Vertical protection:** 45-65-50/325 Plastics sheets type D
- **Pipe sleeves:** Required.
- **System completion:** 30-70-90/810 Inspection of waterproof coatings and membranes.

Products

45-45-95/395 Bitumen impregnated softboard

See: 20-75-30/135 Fully-bonded bitumen membrane underslab damp-proofing system.

45-55-70/335 Floor coating resin

- **Manufacturer:** RIW
- **Product reference:** RIW Toughseal
- **Application:** 2 coats, brush, roller or spray applied.
- **Coverage per coat (minimum):** 4 m²/litre.
- **Execution:** 45-55-70/605 Resin application.

45-65-50/325 Plastics sheets type D

- **Manufacturer:** RIW
- **Product reference:** RIW Gas Seal Black

Execution

45-45-95/620 Installing wood-based panels type A

See: 45-45-95/395 Bitumen impregnated softboard.

45-45-95/625 Moisture content of supports

See: 45-45-95/395 Bitumen impregnated softboard.

45-45-95/630 Panel edge supports

See: 45-45-95/395 Bitumen impregnated softboard.

45-55-70/605 Resin application

- **Number of coats:** Three.

System completion

30-70-90/810 Inspection of waterproof coatings and membranes

See: 30-70-90/135 Fully-bonded bitumen membrane external tanking system - type A.

Ω End of system

STRIDE TREGLOWN

1459939-University of Reading - Health and Life Sciences Building

1459939-STL-XX-ZZ-SP-A-4080-

30-70-90/135 - Fully-bonded bitumen membrane external tanking system - type C - RIW Sheet Seal GR

Revision: C3

Revision Date: 06/04/2018

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System outline

30-70-90/135 Fully-bonded bitumen membrane external tanking system type C - RIW Sheet Seal GR

- **Substrates:**
 - **Preparation:** Required.
- **Tanking membranes:**
 - **Waterproof sheets:** 45-65-50/304 Bitumen sheets type B
- **Liquid applied coating:** 45-55-70/335 Floor coating resin
- **Pipe sleeves:** Required.
- **System completion:** 30-70-90/810 Inspection of waterproof coatings and membranes.

Products

45-55-70/335 Floor coating resin

See: 20-55-77/170 Resin flooring system.

45-65-50/304 Bitumen sheets type B

- **Manufacturer:** RIW
- **Product reference:** RIW Sheetseal GR
- **Primer:** RIW Sheetseal Primer.

Execution

45-55-70/605 Resin application

See: 45-55-70/335 Floor coating resin.

System completion

30-70-90/810 Inspection of waterproof coatings and membranes

See: 30-70-90/135 Fully-bonded bitumen membrane external tanking system - type A.

Ω End of system

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1459939-University of Reading - Health and Life Sciences Building

1459939-STL-XX-ZZ-SP-A-4080-

30-70-90/135 - Fully-bonded bitumen membrane external tanking system - type D - RIW Tough Seal

Revision: C3

Revision Date: 06/04/2018

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Since the previous issue of this document, the following clauses have been added or amended:

30-70-90/135 Fully-bonded bitumen membrane external tanking system - type D - RIW Tough Seal

System outline

30-70-90/135 Fully-bonded bitumen membrane external tanking system type D - RIW Tough Seal

- **Substrates:**
 - **Preparation:** Required.
- **Liquid applied Coating:** 45-55-70/335 Floor coating resin
- **Pipe sleeves:** Required.

Products

45-55-70/335 Floor coating resin

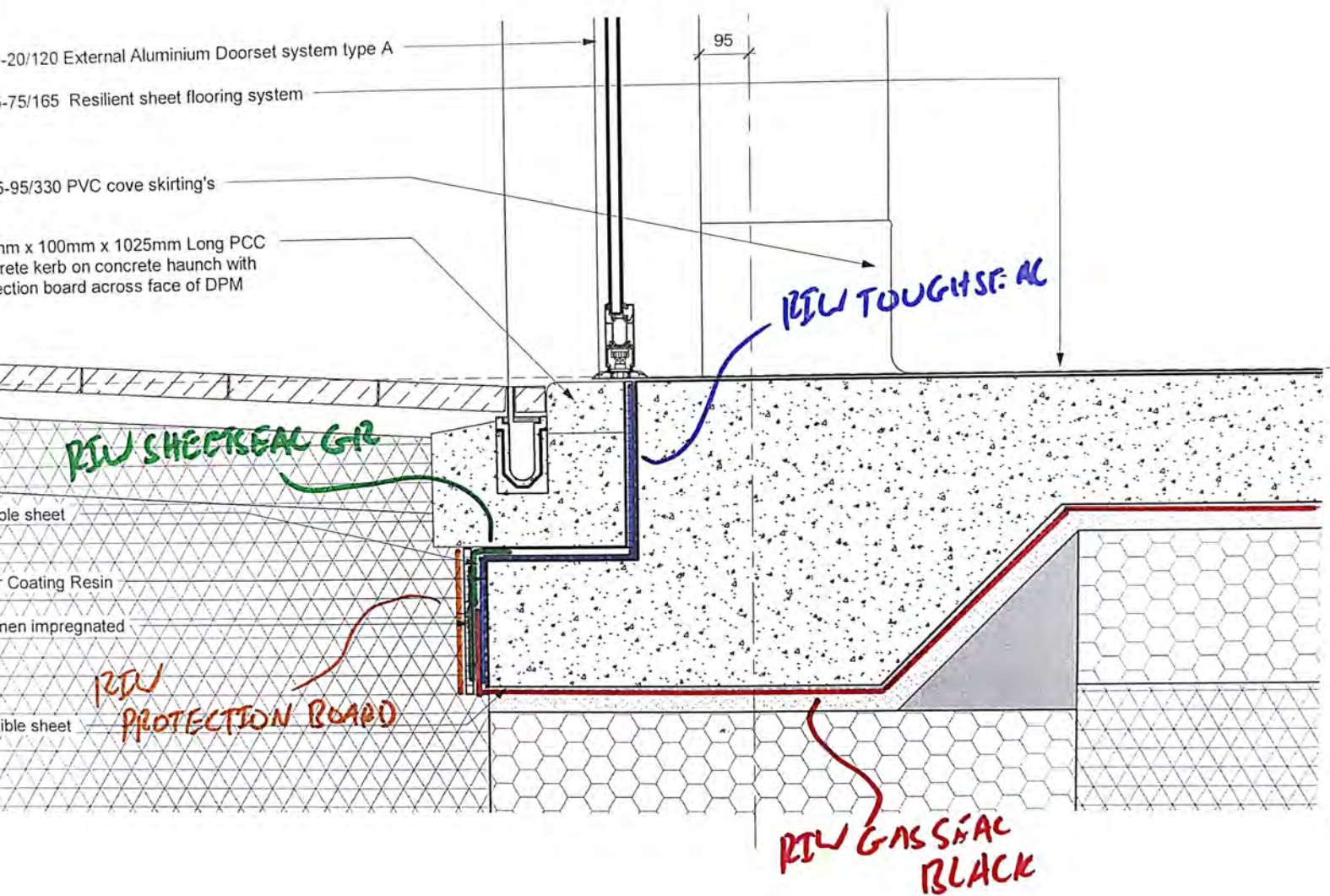
See: 20-55-77/170 Resin flooring system.

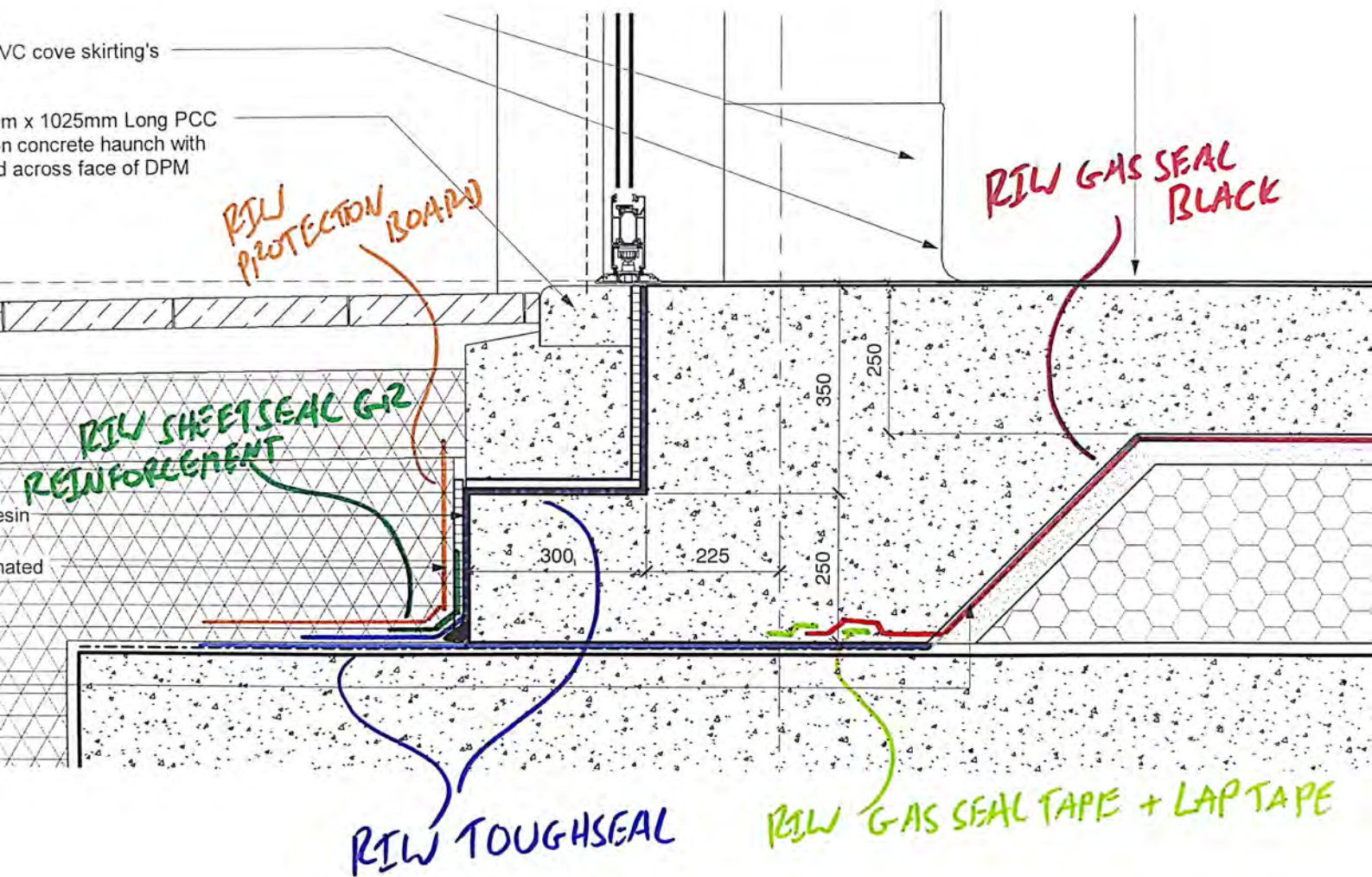
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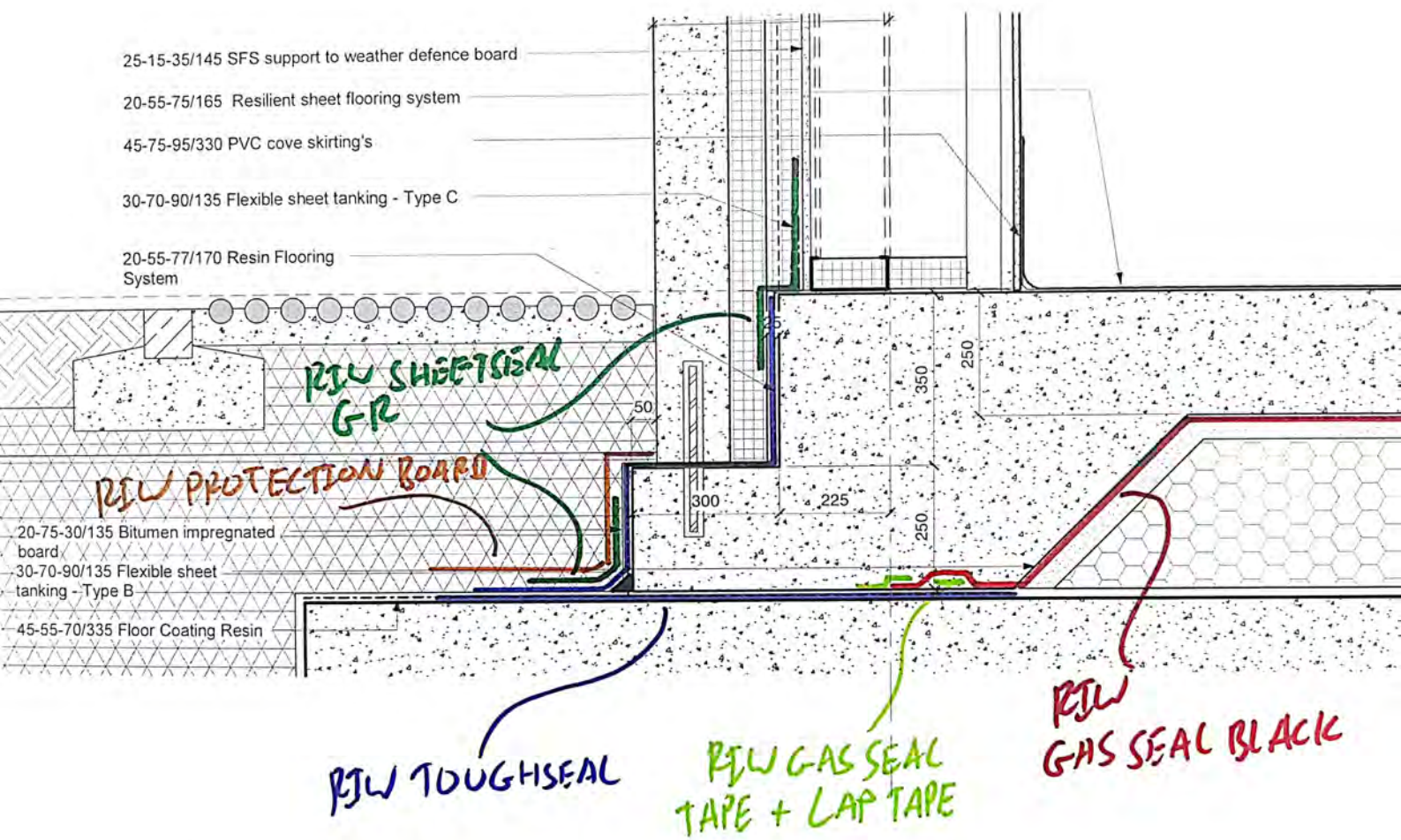
45-55-70/605 Resin application

See: 45-55-70/335 Floor coating resin.

Ω End of system







25-15-35/160 Pre Cast Concrete Wall System

Connection detail to be confirmed with specialist concrete cladding contractor

45-45-65/430 Insulation board

30-70-90/135 Flexible sheet tanking - Type C

45-75-95/330 PVC cove skirting's

00 Ground Floor

+69.200

45-55-70/335 Floor Coating Resin

30-70-90/135 Flexible sheet tanking - Type C

20-75-30/135 Bitumen Impregnated Board

30-70-90/135 Flexible sheet tanking - Type B

45-55-70/335 Floor Coating Resin

Top of pile cap

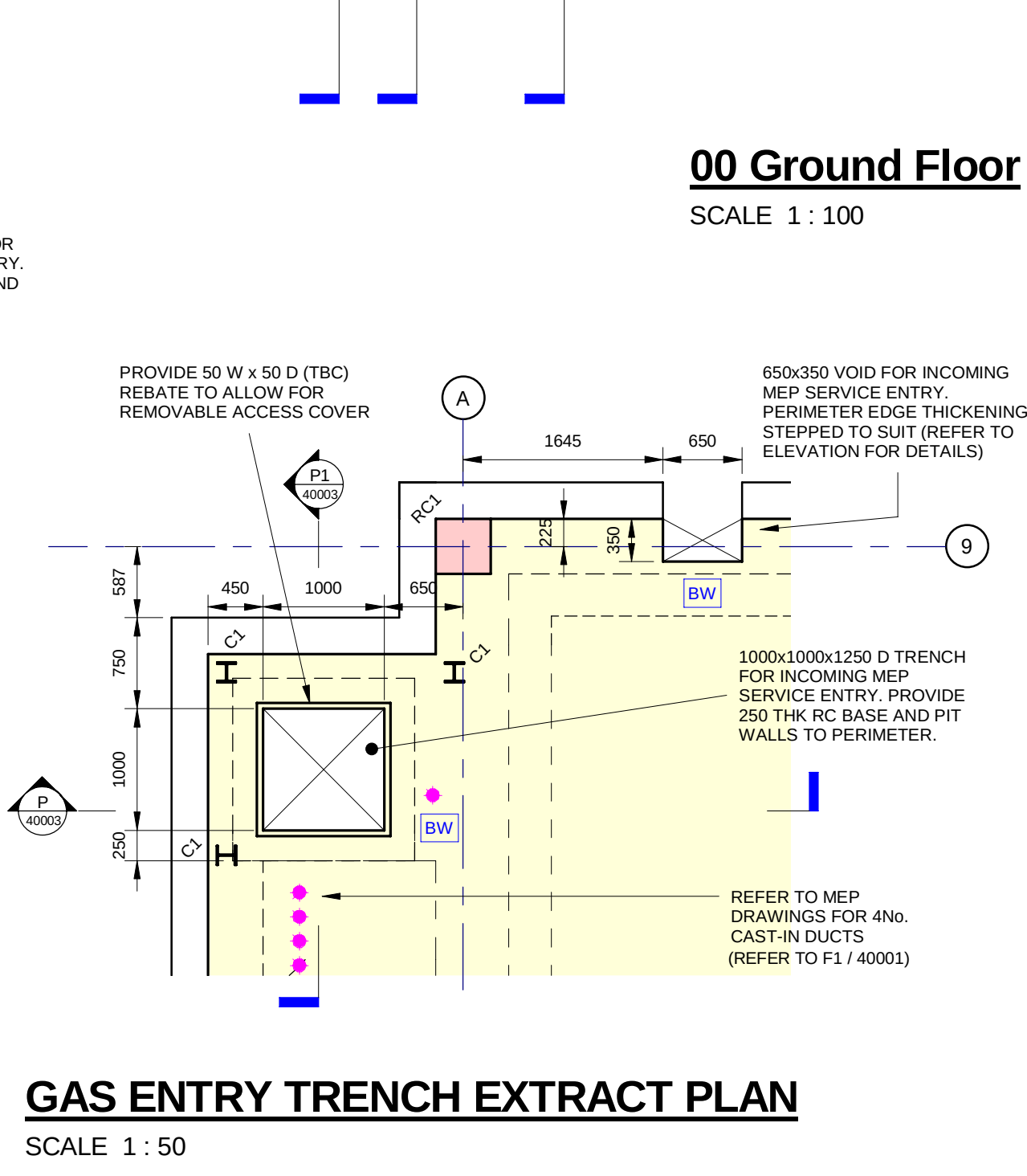
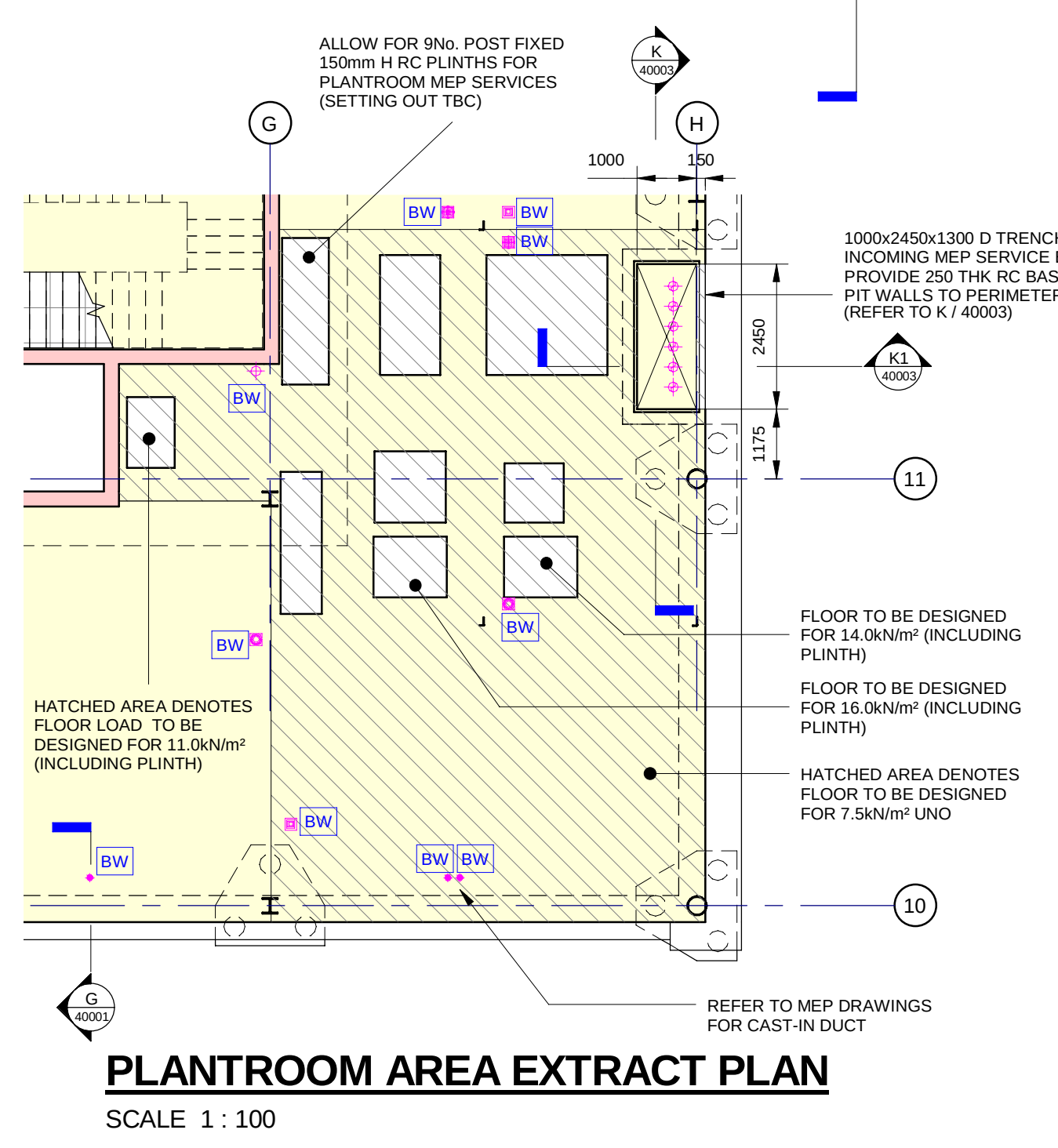
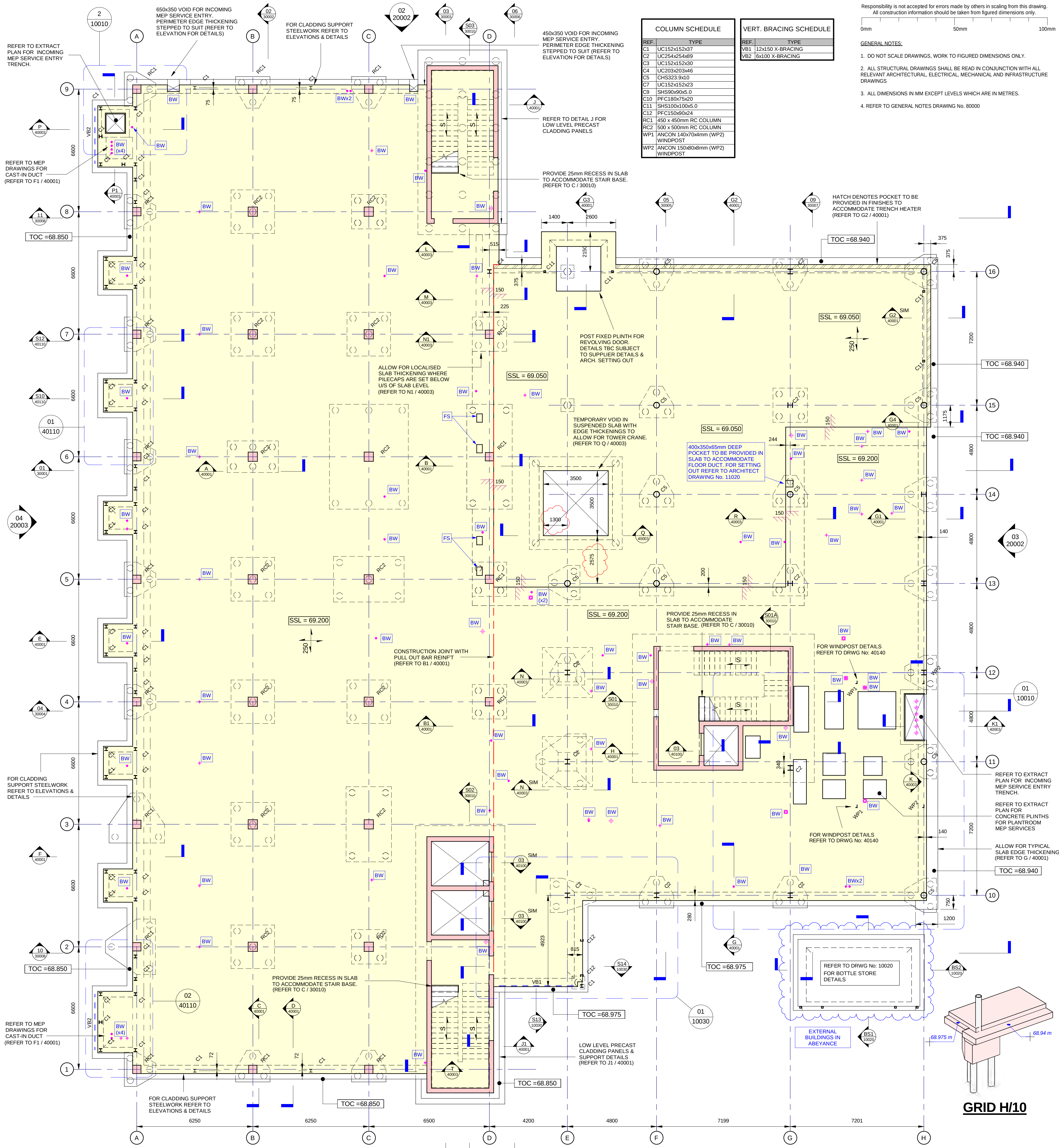
Depth of foundations to S.E design

RTU SHEETSEAL G12

RTU PROTECTION BOARD

RTU TOUGHSEAL WITH GRADE 1 AGGREGATE TO SECOND COAT FOR KEY

45-55-70/335 Floor Coating Resin loading by 70mm screed



FLOOR SPAN KEY:				
TWO-WAY SPANNING 250mm THK RC40 SUSPENDED FLAT SLAB SPANNING BETWEEN PILECAPS (NUMBER DENOTES THICKNESS)				
STAIRCASE:				
SPAN OF PRECAST CONCRETE STAIRCASE & LANDING (250 THK WAIST) DETAILS TO BE DEVELOPED				
CORE & SHEAR WALLS				
WALLS TO BE 250mm THK GRADE RC40 CONCRETE U.N.O				
FIRE STRATEGY:				
ALL STEELWORK EXCEPT FROM STEELWORK SUPPORTING THE ROOF TO BE INTUMESCENTLY PAINTED TO ACHIEVE 60 MINUTE RATING. (REFER TO ARCHITECTS 45000 SERIES DRWGS FOR FURTHER INFORMATION)				
VERTICAL BRACING KEY:				
VB INDICATES VERTICALLY BRACED BAY				
BUILDERSWORK:				
BW DENOTES BUILDERSWORK HOLES THROUGH SLAB. FOR SIZE & SETTING OUT REFER TO ARCHITECT DRAWING No. 11020. NOTE THAT ALL HOLES LESS THAN 300mm DIA OR SQUARE CAN BE FORMED ON SITE WITHOUT ADDITIONAL REINFORCEMENT.				
FS DENOTES 450x300x100mm DEEP POCKET TO BE PROVIDED IN SLAB TO ACCOMMODATE FLOOR SPRINGS				
REFER TO MEP/ARCHITECTS INFORMATION FOR OTHER SLAB BW REQUIREMENTS				

Responsibility is not accepted for errors made by others in scaling from this drawing.
All construction information should be taken from figured dimensions only.

0mm 50mm 100mm

GENERAL NOTES:

- DO NOT SCALE DRAWINGS, WORK TO FIGURED DIMENSIONS ONLY.
- ALL STRUCTURAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTURAL, ELECTRICAL, MECHANICAL AND INFRASTRUCTURE DRAWINGS
- ALL DIMENSIONS IN MM EXCEPT LEVELS WHICH ARE IN METRES.
- REFER TO GENERAL NOTES DRAWING No. 80000

REF.	TYPE
C1	UC152x152x37
C2	UC254x254x89
C3	UC152x152x30
C4	UC203x203x46
C5	CHS323.9x10
C7	UC152x152x23
C9	SHS90x90x5.0
C10	PF180x75x20
C11	SHS100x100x5.0
C12	PF150x90x24
RC1	450 x 450mm RC COLUMN
RC2	500 x 500mm RC COLUMN
WP1	ANCON 140x70x4mm (WP2)
WP2	ANCON 150x80x8mm (WP2)

REF.	TYPE
VB1	12x150 X-BRACING
VB2	6x100 X-BRACING

01 10010

02 20002

03 30003

04 40004

05 50005

06 60006

07 70007

08 80008

09 90009

10 10010

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12 12012

13 13013

14 14014

15 15015

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Oliver Connell & Son Ltd. Inspection and Test Plan															
University of Reading															
ITP Revision Number: 3.0		ITP Prepared by: Eoin McNamara		Signed: 								ITP Approved By		ITP issued By:	
Date: 19/08/18		ITP Reviewed by: Romeo Fagurel		Signed: 								Eoin McNamara		Romeo Fagurel	
		ITP Reviewed by:		Signed:											
		ITP Reviewed by:		Signed:											
Inspection Level Codes															
H=Hold Point (cease work until inspected and approved) ; A=Approval; W=Witness Opportunity / Notice Given; D=Daily Inspection; R10=10% Inspection; R20=20% Inspection; R100=100% Inspection; C= Certified															
Item Nr	Activity	Acceptance criteria.	Frequency of Process and review	Roles Responsible	Specification Ref	Checklist or other verifying document	Inspection Level								
							OCS (Sub-contractor)	Balfour Beatty (PC)				Indep. Inspection (Pudlo, RIW etc)			
1.0 Pre-Construction Activities															
1.1	ITP Approval	Pre-start review meeting with Balfour Beatty	Before start of work	Project Manager/Quality Manager			H	A	A						
1.2	Issue of Construction Drawing	Ensuring "For Construction" issue drawings are available	Check business Collaborator before starting each work.	Principle Contractor	Documentation Review	Business Collaborator Online Document Storage	D/H	A	A						
1.3	Issue of the relevant and site specific Method Statements and Risk Assessments	RAMS review	Prior to any work activities	Project Manager			H	A	A						
1.4	Issue of all relevant inspection check sheets for all work activities.	Approved Document	Prior to any work activities	Project Manager/Quality Manager		Approval document of ITP/ Inspection sheet as per submission	H	A	A						
1.5	Permit to dig and service clearance	Approved and up to date permit to dig in place and service clearance	Prior to any breaking of the ground.	Project Manager/Principle Contractor	Permit to dig procedures outlined	Permit procedures follow as outlined	H/D	H							
1.6	Quality documentation to be completed	- Quality plan - Templates for Work Sections	Prior to any work activities	Project Manager/Quality Manager	Employers Requirements	As per any documents issued by Balfour Beatty	H/A	A	A						
1.7	Compliance to H&S, Fire Safety standards and emergency plans/procedures	Standard Balfour Beatty Documentation and Procedures & Oliver Connell Procedures	Prior to any work activities	Principle Contractor/Project Manager/Construction Manager/H&S Advisor	RAMS & Site Inductions	Balfour Beatty Requirements	H	A							
1.8	Plant Certificates	As Per LOLER and PUWER withing the specified time a full inspection should be conducted additionally a plant register must be available	Prior to Plant Delivery and ensuring plant register is kept up to date	Project Manager/Construction Manager/Foreman			H/A	A							
Site Work Activities -2.0 Excavating/Backfilling & Reinstatment															
2.1	Setting Out	As per Structural Engineers drawings. Structural specification 14599-ACM-XX-XX-SP-S-4080-SP001	As work progresses. Check excavation for line and/or level	Site Engineer/Construction Manager/Foreman	Structural Engineers drawings and specification 14599-ACM-XX-XX-SP-S-4080-SP001	Instrument Calibration Certificate. recorded on the Work inspection sheet sheet OC-F027-QA-PPIC	H/A	R20							
2.2	Permit to Dig Check and Exclusion Zone set up	Permit to Dig issued when all known services are marked on the ground.	Daily	Site Engineer/Construction Manager/Foreman	Refer to topo/services drawing	MS - Groundworks & Excavations Balfour Beatty Permit to dig	H	A - by balfour beatty							
2.3	Service check	Visual inspection that no services are visible. Existing Service provider drawings. Use of service scanning equipment	As work progresses	Site Engineer/Construction Manager/Foreman	Permit to dig procedures outlined	MS - Groundworks & Excavations	R100	W							
2.4	Excavation Inspection	Visual inspection. Structural specification 14599-ACM-XX-XX-SP-S-4080-SP001	Daily inspection,	Site Engineer/Construction Manager/Foreman	Excavation inspection sheet	Recorded in Excavation Register Weekly. OC-F027-QA-PPIC	D	W							
	Excavation filling systems	As per Structural specification 14599-ACM-XX-XX-SP-S-4080-SP001 Part 10-35-35-127-D-000-001	Inspection on completion of layers. Compaction testing to take place. Survey for level completed by site engineer	Site Engineer/Construction Manager/Foreman	As constructed survey & Compaction testing results		R100	R20							
2.5	Access to the work space	Review of the RAMS and check daily for any deterioration of work environment. Structural specification 14599-ACM-XX-XX-SP-S-4080-SP001	Daily check of site and change of site due to adverse weather.	Site Engineer/Construction Manager/Foreman	Project Information Method Statement	Inspection check sheet OC Excavation inspection	D	W							
2.6	Compaction Checks	Confirm Compliant Materials arrive with Certification. As per Structural specification 14599-ACM-XX-XX-SP-S-4080-SP001	When backfilling/ reinstating	Site Engineer/Construction Manager/Foreman	As per the structural engineers drawings	ESG to test when required.Test results issued by laboratory. Filed on site folder 15.11.1	A	W							
2.7	Compaction Testing	Test for compaction as per Structural specification 14599-ACM-XX-XX-SP-S-4080-SP001	When backfilling/ reinstating	Site Engineer/Construction Manager/Foreman	As per the structural engineers spec	ESG to test when required.Test results issued by laboratory Filed on site folder 15.11.1	H	A							
Site Work Activities - 3.0 Concrete Placement															
3.1	Setting Out	As per structural engineers drawings. Refer to Structural specification 14599-ACM-XX-XX-SP-S-4080-SP001. for tolerance	As work progresses	Site Engineer/Construction Manager/Foreman	As per Structural Engineers drawings and specification 14599-ACM-XX-XX-SP-S-4080-SP001	Instrument Calibration Certificate. recorded on the Work inspection sheet sheet OC-F027-QA-PPIC	H/A	R20							
3.2	Pre-pour Inspection	Visual inspection ensuring pour and cast in items conform to the spec and structural engineers drawings	Prior to each pour. Where possible 24 hours notice given to PC	Site Engineer/Construction Manager/Foreman	As per Structural Engineers drawings and specification 14599-ACM-XX-XX-SP-S-4080-SP001	Concreting RAMS OC-F027-QA-PPIC	H	W							
3.3	Materials Check for Deliveries	checking of concrete tickets upon arrival	On delivery and before use	Site Engineer/Construction Manager/Foreman	As per Structural Engineers drawings and specification 14599-ACM-XX-XX-SP-S-4080-SP001	Concreting RAMS additionally copies of delivery tickets will be kept for inspection	H	W							
3.4	Water Bar	Waterbar to be installed at all construction joints and applied strictly in accordance with the manufactures requirements.	Prior to each pour	Site Engineer/Construction Manager/Foreman	As per Structural Engineers drawings and specification 14599-ACM-XX-XX-SP-S-4080-SP001	recorded on the Work inspection sheet sheet OC-F027-QA-PPIC	H	W							
3.5	Pudlo Admixture	Installed to manufacturers specification	Where applicable	Site Engineer/Foreman/Pudlo Representative.	As per Structural Engineers drawings and specification 14599-ACM-XX-XX-SP-S-4080-SP001 & Pudlo Specification	Were applicable OC-F027-QA-PPIC	H	W						W	
3.6	Cast-in items / reinforcement	As per structural Engineers drawings. As per Structural specification 14599-ACM-XX-XX-SP-S-4080-SP001	As work progresses. Prior to pouring concrete	Site Engineer/Construction Manager/Foreman	As per Structural Engineers drawings and specification 14599-ACM-XX-XX-SP-S-4080-SP001	recorded on the Work inspection sheet sheet OC-F027-QA-PPIC	R100	R20							
3.7	Check of Level & Tolerances Check	As per structural engineers drawings to ensure correct positioning. As per Structural specification 14599-ACM-XX-XX-SP-S-4080-SP001	As Work progresses	Site Engineer/Construction Manager/Foreman	As per Structural Engineers drawings and specification 14599-ACM-XX-XX-SP-S-4080-SP001	recorded on the Work inspection sheet sheet OC-F027-QA-PPIC	R100	R20							
3.8	Vibration of Concrete and Transport of Concrete	2hours or less from batching to discharge completion. Vibration of concrete within 500mm centers of each dip. As per Structural specification 14599-ACM-XX-XX-SP-S-4080-SP001	Check prior to pouring as part of the material delivery check. Every load of concrete, invoice check on arrival to site.	Site Engineer/Construction Manager/Foreman	As per Structural Engineers drawings and specification 14599-ACM-XX-XX-SP-S-4080-SP001	Tickets will be made available for inspection. Ticket copies filled in site file 15.1.5	R100	R20							
3.9	Strength Testing (Cube Sample)	A set of 4 cubes to be taken at the frequency advised by British Standards. Results to be issued to balfour beatty on a regular basis and in accordance with BS EN 12390-3	A set of 4 cubes to be made every 24m3 poured or 4 loads, which ever come first, but never less than 1 set per pour.	Site Engineer/Construction Manager/Foreman	As per Structural Engineers drawings and specification 14599-ACM-XX-XX-SP-S-4080-SP001	Results of crushed cubes after 1 @7days, 2 @28days, 1 Spare. Results filed to site folder 15.1.4	A/C	W							
3.1	Protection of Concrete	Concrete must be protected that no Plant movement or weathering can influence the integrity of the concrete	Every Concrete Item	Site Engineer/Construction Manager/Foreman	As per Structural Engineers drawings and specification 14599-ACM-XX-XX-SP-S-4080-SP001	recorded on the Work inspection sheet sheet OC-F027-QA-PPIC	A	W							
3.11	Cast concrete	Correct mix, check levels and depths. As per Structural specification 14599-ACM-XX-XX-SP-S-4080-SP001 & British Standards	As work progresses	Site Engineer/Construction Manager/Foreman	As per Structural Engineers drawings and specification 14599-ACM-XX-XX-SP-S-4080-SP001	Delivery Tickets	R100	R20							
3.12	Check of levels	As per Structural Engineers drawings	As soon of completion of concreting	Site Engineer/Construction Manager/Foreman	As per Structural Engineers drawings and specification 14599-ACM-XX-XX-SP-S-4080-SP001	Recorded on an as-built drawing Asbuilts filed on site folder 15.5	H	W							
3.13	Making good of concrete after striking	To gain a smooth surface	As soon as possible after striking	Site Engineer/Construction Manager/Foreman	As per Structural Engineers drawings and specification 14599-ACM-XX-XX-SP-S-4080-SP001	Signed off on Finished work inspection sheet	R100	W							
3.14	Curing the reinforced concrete elements	As per OCS Procedure "Concreting in Hot Weather", British Standards BS 1881, BS 7542, BS EN 13670 and product specifications	As soon as possible after the concrete formwork is struck or the surface finish is done	Site Engineer/Construction Manager/Foreman	As per Structural Engineers drawings and specification 14599-ACM-XX-XX-SP-S-4080-SP001	Signed off on Finished work inspection sheet	R100	W							
Site Work Activities - 4.0 Reinforcement/Formwork															
4.1	Setting Out	As per structural engineers drawings & As per Structural specification 14599-ACM-XX-XX-SP-S-4080-SP001	As work progresses. Final checks prior to placement of concrete	Site Engineer/Construction Manager/Foreman	As per Structural Engineers drawings and specification 14599-ACM-XX-XX-SP-S-4080-SP001	Instrument Calibration Certificate.	H/A	R20							
4.2	Materials check	Visual check to confirm correct materials and check for CARES Certification and Check for correct dimensions. All reinforcement bar will be in accordance with the BS 8666 & structures specification 14599-ACM-XX-XX-SP-S-4080-SP001	For each delivery.	Site Engineer/Construction Manager/Foreman	As per Structural Engineers drawings and specification 14599-ACM-XX-XX-SP-S-4080-SP001	Delivery Ticket/Schedule, CARES Certificate	A/C	W							
4.3	Rebar clearance to formwork	prior to external shutter in place, visual check	As work progresses & prior to each pour	Site Engineer/Construction Manager/Foreman	As per Structural Engineers drawings and specification 14599-ACM-XX-XX-SP-S-4080-SP001. OC-F027-QA-PPIC	recorded on the Work inspection sheet sheet OC-F027-QA-PPIC	R100	W							
4.4	Rebar spacing and lapping check	Check against the structures specification 14599-ACM-XX-XX-SP-S-4080-SP001 and drawings	As work progresses & prior to each pour	Site Engineer/Construction Manager/Foreman	As per Structural Engineers drawings and spec OC-F027-QA-PPIC	recorded on the Work inspection sheet sheet OC-F027-QA-PPIC	R100	W							
4.5	Formwork line and level check	Check against the specification and drawing prior to concrete placement	As work progresses & prior to each pour	Site Engineer/Construction Manager/Foreman	As per Structural Engineers drawings and spec. OC-F027-QA-PPIC	recorded on the Work inspection sheet sheet OC-F027-QA-PPIC	R100	W							
4.6	Pre-Formwork/Pour inspection	Visual inspection ensuring pour and reinforcement conform to the spec and structural engineers drawings	Prior to closing up reinforcement with formwork or each pour	Site Engineer/Construction Manager/Foreman	As per Structural Engineers drawings and spec. OC-F027-QA-PPIC	recorded on the Work inspection sheet sheet OC-F027-QA-PPIC	H	A							
Site Work Activities - 5.0 Drainage															
5.1	Setting Out	As per the structural engineers drawings. Structural specification 1459939-ACM-XX-XX-SP-C-XXXX-00002		Site Engineer	As per Structural Engineers drawings and Structural specification 1459939-ACM-XX-XX-SP-C-XXXX-00002	Instrument Calibration Certificate.	H/A	R20							
5.2	Materials Check	Visual check to confirm correct materials without defects and correct Factory Acceptance Test Certificate. Structural specification 1459939-ACM-XX-XX-SP-C-XXXX-00002	On delivery and before use of each pipe	Construction Manager/Foreman	As per Structural Engineers drawings and Structural specification 1459939-ACM-XX-XX-SP-C-XXXX-00002	Material register.	H	R20							
5.3	ST4 Bed Level check/shingle bed level check	Level Survey to ensure correct levels Tolerance. Structural specification 14599-ACM-XX-XX-SP-S-4080-SP001 .	Prior to installation of the drainage pipes	Site Engineer/Construction Manager/Foreman	As per Structural Engineers drawings and Structural specification 1459939-ACM-XX-XX-SP-C-XXXX-00002	recorded on an As-Built Work inspection sheet OC-F011-QA-DIC	H/C	W							
5.4	Check of Joints	Every drainage joint should be checked prior to preliminary testing. Structural specification 1459939-ACM-XX-XX-SP-C-XXXX-00002	Prior to Preliminary testing. All saddles and junction pipes shall have a flexible joint type socket.	Site Engineer/Construction Manager/Foreman	As per Structural Engineers drawings and Structural specification 1459939-ACM-XX-XX-SP-C-XXXX-00002	As-Built Work inspection sheet OC-F011-QA-DIC	R100	W							
5.5	Testing	Air Test. Structural specification 1459939-ACM-XX-XX-SP-C-XXXX-00002. For pipes up to and including 825mm diameter pipes an air test shall be applied prior to backfilling. After backfilling is complete a wAir test will be applied again. In the event of a failure of an air test a Water tests will be deemed acceptable. Manholes will be tested using a water test. On completion of all drainage a CCTV test will be complete. 2 DVD copies of the CCTV will be issued to balfour beatty .	During the installation of drainage runs and on completion of each run. Manholes to be tested by water test on completion of walls but prior to placement of cover . CCTV on completion of works.	Site Engineer/Construction Manager/Foreman	As per Structural Engineers drawings and Structural specification 1459939-ACM-XX-XX-SP-C-XXXX-00002	photos to be taken and results to be recorded on the Work inspection sheet OC-F011-QA-DIC Air test recorded on OC-Airtest-001	A	W							
5.6	Invert levels check	Invert Levels should be checked (within tolerances). Structural specification 1459939-ACM-XX-XX-SP-C-XXXX-00002	Prior to encasing pipe to concrete/shingle surround to all Pipes	Site Engineer/Construction Manager/Foreman	As per Structural Engineers drawings and Structural specification 1459939-ACM-XX-XX-SP-C-XXXX-00002	As-Built showing the invert level of each pipe No backfall exists in any length of the pipe	H	W							
5.7	Visual Inspection before Concrete/Specified Surround to Pipe work	Visual inspection ensuring pour conforms to the spec and drawings. Structural specification 1459939-ACM-XX-XX-SP-C-XXXX-00002	Before surrounding drainage runs with specified material	Site Engineer/Construction Manager/Foreman	As per Structural Engineers drawings and Structural specification 1459939-ACM-XX-XX-SP-C-XXXX-00002	Work inspection sheet OC-F011-QA-DIC	H	W							
5.8	Check to ST4 Concrete Surround/shingle surround	Visual Inspection of the Concrete surround. Structural specification 14599-ACM-XX-XX-SP-S-4080-SP001	Before Air test and Backfilling	Site Engineer/Construction Manager/Foreman	As per Structural Engineers drawings and Structural specification 1459939-ACM-XX-XX-SP-C-XXXX-00002	Work inspection sheet OC-F011-QA-DIC	R100/C	W							
5.9	Final Testing After Backfilling (Air test, Water Test, CCTV)	Air Test for Drainage pipes Values should be in accordance to BS1610:2015. Structural specification 1459939-ACM-XX-XX-SP-C-XXXX-00002	When the drainage runs and manholes are complete and prior to handover	Site Engineer/Construction Manager/Foreman	As per Structural Engineers drawings and Structural specification 1459939-ACM-XX-XX-SP-C-XXXX-00002	photos to be taken and results to be recorded on the inspection sheet	H	A							
Site Work Activities - 6.0 Temporary Works															
6.1	Temporary Works Install- Backpropping	Temporary Works Design; Equipment compliance;	For every new design or when the design changes. Daily inspection by OC engineer	Temporary Works Co-ordinator/Temporary Works Supervisor	Contract Spec 855975 2008	Temporary Works Design OC-F002-TW-PIOS	H	H	W						
6.2	Inspection	Inspection OC - Temporary Works Supervisor will complete initial check and offer area for final inspection to Balfour Beatty TWC	Hold Point; Permit Requirement before use; Weekly/ Recorded inspection; Daily inspection and following adverse weather	Temporary Works Co-ordinator/Temporary Works Supervisor	Temporary Works Procedures.	Temporary Works Inspection sheet Permit to Load/Strike OC-F002-TW-PIOS	H, R100	H	W						



CE n55Plus

CI/SfB

Tn6

L14143

February 2017

RIW GAS SEAL BLACK

Gas Seal Black is a four-layer, low density polyethylene membrane reinforcing grid with an integral aluminium foil.

BENEFITS

- └ Compliant with BS 8485: 2015
- └ Manufactured from virgin material, not recycled waste
- └ Separate damp proof membrane not required
- └ Robust jointing and sealing system
- └ Welded joints possible
- └ Single wound membrane with zero creases
- └ Two colour membrane for on-site quality control
- └ Suitable for use where radon, carbon dioxide, methane and hydrocarbon vapours are present
- └ Complies with latest codes of practice as published by CIRIA and BRE

APPLICATIONS

- └ Combined ground floor damp proof membrane and gas barrier

APPLIED TO

- └ Sand blinding
- └ Suspended floors
- └ Ground bearing slabs

REMEMBER IT'S

waterproof RIW

RIW GAS SEAL BLACK

TYPICAL USES

Gas Seal Black is typically used as a low density, polyethylene gas barrier and damp proof membrane in concrete floors above and below the slab.

The installed product protects the structure against moisture, radon, methane, carbon dioxide and hydrocarbon vapours from the ground.

The product is suitable for use on ground bearing reinforced concrete slabs, suspended beam and block floors or precast concrete slabs.

When used for hydrocarbons, the product must be applied on top of the slab, with the ground below vented.

DURABILITY

Subject to normal conditions of use Gas Seal Black will remain effective against the ingress of water and water vapour, and will restrict the ingress of radon, methane, carbon dioxide and hydrocarbon vapours during the lifetime of the building.

SPECIFICATION

J40 Flexible sheet waterproofing / damp proofing
Clause 140 Loose laid polyethylene gas retardant damp proofing.

Please consult RIW for further information.

INDEPENDENT AUTHORITY

Gas Seal Black has been awarded a BBA Certificate No. 14/5156 covering its use as a low density, polyethylene gas barrier and damp proof membrane in concrete ground floors, above and below the slab not subject to hydrostatic pressure, to protect the building against moisture, radon, methane and carbon dioxide from the ground.

CE Marked to BS EN 13967 & A1. For Declaration of Performance see:

<http://www.riw.co.uk/technical-downloads/ce-marking>

PERFORMANCE & COMPOSITION

Form	loose laid composite sheet
Colour	black/white
Overall thickness	0.6mm
Roll size	2m wide x 50m long*
Weight	350g/m ² = 35kg/roll
Laps	150mm
Tensile strength MD EN 12311-1	600N/50mm 480N/50mm
Elongation EN12311-1	20%
Nail tear resistance MD EN 12311 -1	330N 400N
Radon permeability K124/02/95	8.0 x 10 ⁻¹⁵ m ² s ⁻¹
Methane gas permeability BS ISO 15105-1	<0.09ml·m ² ·day ⁻¹ ·atm ⁻¹
Carbon dioxide permeability BS ISO 15105-1	<0.09ml·m ² ·day ⁻¹ ·atm ⁻¹

The above performance figures are typical values and should not be considered a product specification. *Other roll sizes available.

ANCILLARY PRODUCTS

RIW produce a range of ancillary products for use with Gas Seal Black which include:

Gas Seal Tape - double-sided self-adhesive butyl tape for sealing between overlaps in the membrane.

Lap Tape - single-sided self-adhesive PVC tape for sealing edges of lapped product.

Lap Tape RB - reinforced single-sided self-adhesive bitumen tape for sealing edges of lapped product and repairs to membrane.

Preformed pipe collars - flexible collar for sealing around pipe penetrations.

Preformed Gas cloaks - standard or bespoke cloak units to facilitate membrane application.

Geo-fleece - textile fleece for protection of applied gas membranes.

Sheetseal GR - self-adhesive sheet membrane for gas resistant waterproofing applications.

Gas Seal GR DPC - gas resistant damp proof course/ cavity tray for building into masonry.

Geo-vent - cusped HDPE venting geo-composite incorporating geotextile to one side.

Geo-vent T connectors - geo-vent end connector incorporating 25mm slot for geo-vent.

Peri-vent sets - periscopic vent complete with airbrick and geo-vent adaptor.

Venting bollards and **ground level vent boxes** are also available.

CONSTRUCTION

GENERAL

All construction should conform with the Building Regulations, Codes of Practice and British Standards in current use at the time the building is being constructed.

PREPARATION

The membrane should be laid on a smooth surface, free from voids, hollows and objects which may damage the membrane. If used below a ground bearing slab, the product may be laid on a sand blinding.

APPLICATION

The completed gas proofing system must cover the entire footprint of the building.

Gas Seal Black should be unrolled onto the prepared surface, and be smoothed out as necessary. The product must be installed with the black side uppermost.

Subsequent rolls should then be lapped onto the previous roll by 150mm, and be sealed using Gas Seal Tape placed centrally in the lap. Lap Tape should then be laid over the edge of the upper sheet, by 50mm, and be adhered down onto the lower sheet.

Pipe penetrations should be sealed using Preformed Pipe Collars; sealed to the membrane, and pipe using Gas Seal Tape and Lap Tape; see Pipe Penetration Detail.

Gas Seal GR DPC should be used to provide continuity through the walls, with Gas Seal Black lapped and sealed onto it using Gas Seal Tape and Lap Tape as before.

Damaged areas should be patch repaired as necessary, using similar lapping/sealing details.

Gas Seal Black will achieve 2 Points in accordance with BS 8485: 2015 when installed by qualified specialists and independently validated. Where additional points are required, our Passive Venting System may need to be incorporated.

SPECIFIC USES

Gas Seal Black should be installed with the ancillary products required, in accordance with current guidance for gas protection systems; including BRE211 / 414, CIRIA C665 & BS 8485: 2015.

SAFETY

Full health and safety instructions are contained on the product material safety data sheets, and these must be referred to before use.

SUPPLY

AVAILABILITY

All products can be obtained through Builders Merchants or approved stockists. A list of approved stockists is available from RIW's offices.

PACKAGING

Gas Seal Black 2m wide x 50m long rolls

STORAGE

The rolls must be stacked on a flat surface, kept under cover and protected from sunlight and mechanical damage.

TECHNICAL SERVICES

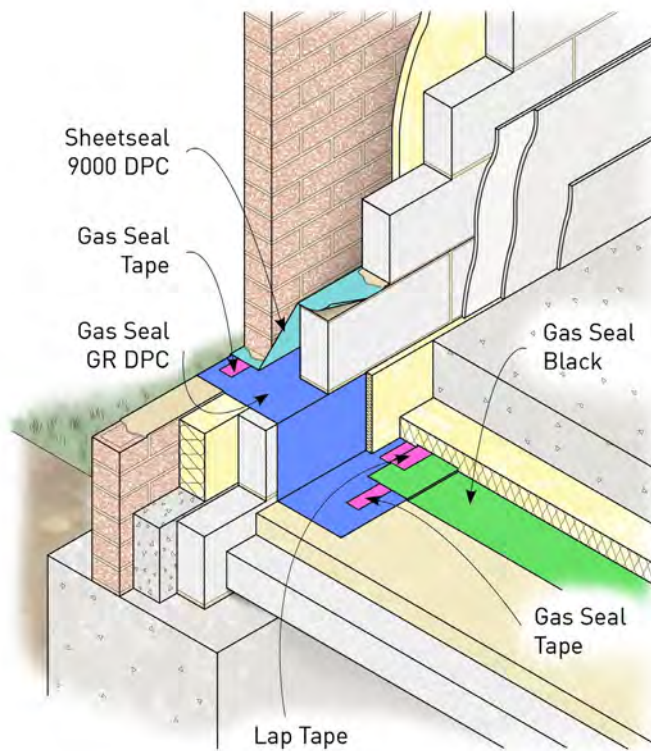
The Technical Department is available to advise on individual projects and to prepare or assist in the preparation of specifications and drawings. We can also offer design guidance to satisfy the requirements of BS 8485:2015 and CIRIA C735.

A list of experienced applicators of our materials is available from RIW's offices, along with a list of independent consultants providing validation and integrity testing services.

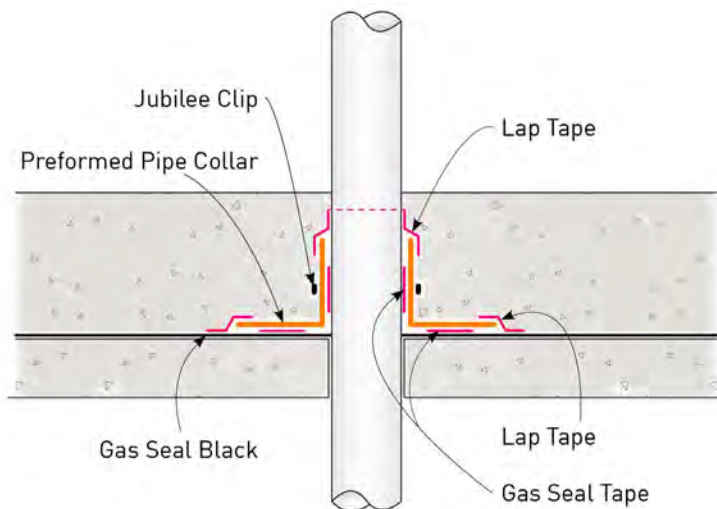
COMPATIBILITY TABLE

	BRE 211 Radon	CIRIA 665 Characteristic Situation 2	BS 8485: 2015 Characteristic Situation 2	CIRIA 665 Characteristic Situation 3-6	BS 8485: 2015 Characteristic Situation 3-6	NHBC Amber 1	NHBC Amber 2 & Red
Radon	YES	n/a	n/a	n/a	n/a	n/a	n/a
Carbon Dioxide	n/a	YES	YES	YES	YES	YES	YES
Methane	n/a	YES	YES	YES	YES	YES	YES
Hydrocarbon Vapours	n/a	YES*	YES*	YES*	YES*	YES*	YES*

* Suitable in some applications. Contact RIW Technical.



Typical Ground Bearing Slab



Pipe Penetration Detail

The information in this literature was correct at the time of going to press. However, we are committed to continually improving our products and reserve the right to change product specifications.

For the latest information, please consult RIW. Conditions of use are beyond our control, therefore we cannot warrant the results to be obtained.

RIW

Arc House, Terrace Road South, Binfield,
Bracknell, Berkshire, RG42 4PZ

Technical enquires tel: **01344 397777**

Commercial enquires tel: **01344 397788**

www.riw.co.uk

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waterproof **RIW**

Details			
ID	Grid A9 to D6	Company	Balfour Beatty UK
Name	Concreting Ground Floor Slabs - Pre Pour Inspection QUAL-TF-4154	Priority	Medium
Description	Concreting Ground Floor Slabs QUAL-TF-4154	Status	Closed
Author	lee.hawkswell@balfourbeatty.com	Location	Health & Life Sciences > Concrete Frame > Ground Floor Slab
Created On	05 Jul 2018 9:16 AM	Equipment Name	Ground Floor Slab Pour 1
Tags		Equipment Barcode	



07/05/18 09:18
2018-07-05 09:18:01



07/10/18 11:18
2018-07-10 11:18:45



2018-07-10 11:18:51



2018-07-10 11:19:38



2018-07-10 11:20:08



2018-07-10 11:20:44



2018-07-10 11:20:59



2018-07-10 11:21:09



07/10/18 11:21
2018-07-10 11:21:28



07/10/18 11:21
2018-07-10 11:21:35



2018-07-10 11:22:34



2018-07-13 09:17:29



2018-07-13 09:17:55



2018-07-13 09:18:02



2018-07-13 09:18:05



2018-07-13 09:18:28



2018-07-13 09:18:34



2018-07-13 09:18:43



2018-07-13 09:18:59



2018-07-18 07:38:59



2018-07-18 07:39:42



2018-07-18 07:40:00



2018-07-18 07:40:29



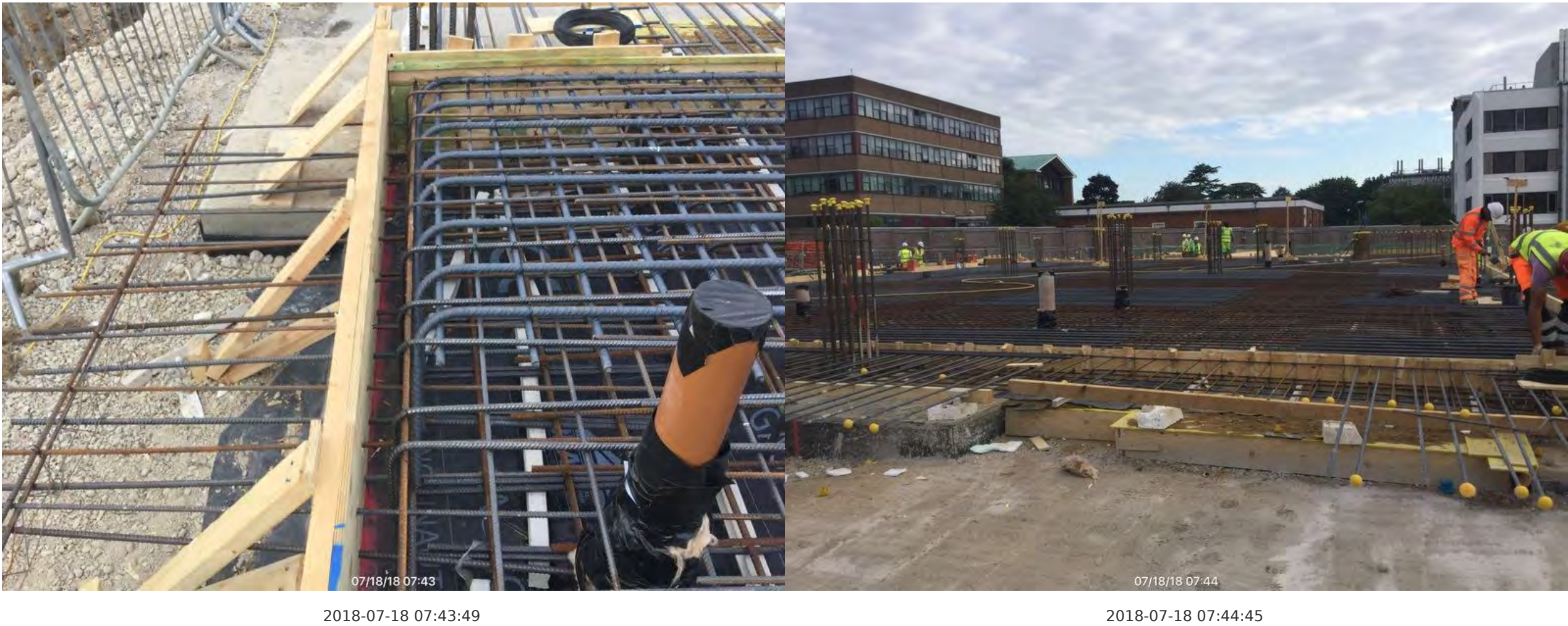
2018-07-18 07:40:41



2018-07-18 07:40:52



2018-07-18 07:43:41



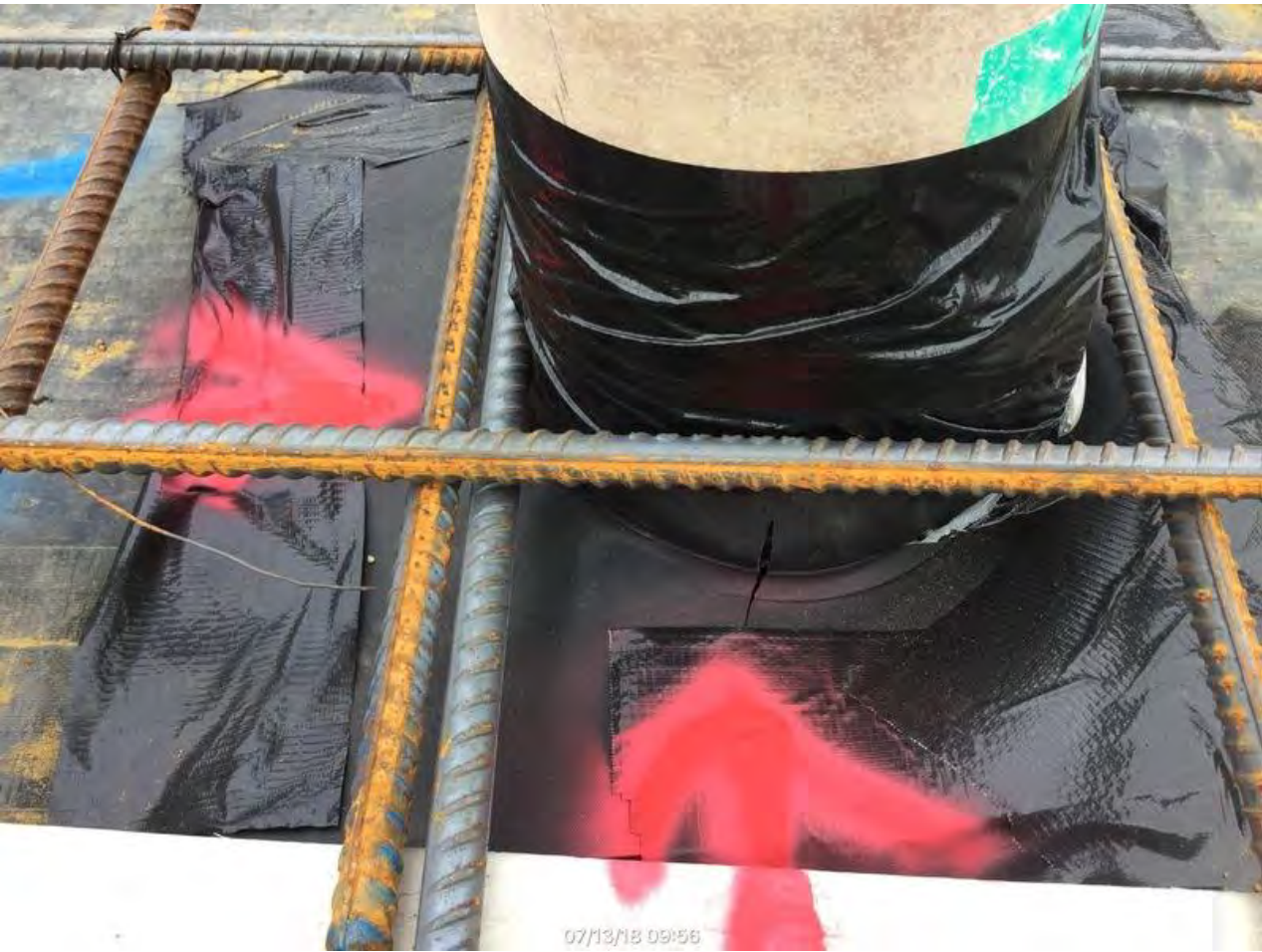
Images for: Concreting Ground Floor Slabs - Pre Pour Inspection QUAL-TF-4154 - Grid A9 to D6 Checklist

Checklist Items

Item #	Item Text	Response	# Issues
<i>Please refer to ITP - (Project responsible for uploading ITPs to Field 360)</i>			
1	Check that materials meet the specification and requirements.	Yes	0
2	Check void former installed as per manufacturer's instructions.	Yes	0
<i>Hold Point - Please enter Approved By Balfour Beatty or Subcontractor and include photograph or positive evidence of works prior to progressing</i>			
3	Check waterproofing and gas membrane is as per Stride Treglown detail. See Slab Edge detail drainings.	Yes	0
4	Check sand blinding to correct level	Yes	0

Item #	Item Text	Response	# Issues
5	Check DPM (laps etc) all holes taped, corners etc tidy	Yes	3

Issue ID	Description	Type	Status	Company	Date Created	Due Date
000086	DPM (laps etc) holes not taped and corners etc not tidy Gas membrane split around pipe penetration from manhole F7	Snag	Closed	Oliver Connell & Son Ltd	13 Jul 2018	23 Jul 2018



2018-07-13 09:56:58

End of 000086 images

Comments

Aaron O' Sullivan (aosullivan@oliverconnell.com) 30
Aug 2018 9:58 PM

This was resolved before pour.

Issue ID	Description	Type	Status	Company	Date Created	Due Date
000087	DPM (laps etc) holes not taped and corners etc not tidy Small punctures on gas membrane, in various locations. Marked with red arrow. Require taping	Snag	Closed	Oliver Connell & Son Ltd	13 Jul 2018	23 Jul 2018



07/13/18 10:01

07/16/18 09:22

2018-07-13 10:01:59

2018-07-16 09:22:35

Issue ID	Description	Type	Status	Company	Date Created	Due Date
						
	2018-07-16 09:22:41				2018-07-16 09:23:00	

Issue ID	Description	Type	Status	Company	Date Created	Due Date
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2018-07-16 09:23:07

End of 000087 images

Comments

Aaron O' Sullivan (aosullivan@oliverconnell.com) 30 Aug 2018 9:58 PM TThis was resolved before pour.

000088	DPM (laps etc) holes not taped and corners etc not tidy Pile cap C6 flaking of waterproofing, requires touching up	Snag	Closed	Oliver Connell & Son Ltd	13 Jul 2018	23 Jul 2018
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Issue ID	Description	Type	Status	Company	Date Created	Due Date
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2018-07-13 10:15:25

End of 000088 images

Comments

Aaron O' Sullivan (aosullivan@oliverconnell.com) 30 Aug 2018 9:58 PM This was resolved before pour.

Item #	Item Text	Response	# Issues
6	Check steel reinforcement is as per AECOM design.	Yes	0
7	Check drainage position and fixing	Yes	0
8	Check service ducts size and position	Yes	0

Details

ID	Slab A6 to C4
Name	Concreting Ground Floor Slabs - Pre Pour Inspection QUAL-TF-4154
Description	Concreting Ground Floor Slabs QUAL-TF-4154
Author	lee.hawkswell@balfourbeatty.com
Created On	24 Jul 2018 3:36 PM
Tags	

Company	Balfour Beatty UK
Priority	Medium
Status	Closed
Location	<Top level>
Equipment Name	Ground Floor Slab Pour 2
Equipment Barcode	



2018-07-24 16:00:54



2018-07-24 16:01:05



2018-07-24 16:01:15



2018-07-24 16:01:17



2018-07-24 16:01:32



2018-07-24 16:01:51



2018-07-24 16:01:54

Images for: Concreting Ground Floor Slabs - Pre Pour Inspection QUAL-TF-4154 - Slab A6 to C4 Checklist

Checklist Items

Item #	Item Text	Response	# Issues
<i>Please refer to ITP - (Project responsible for uploading ITPs to Field 360)</i>			
1	Check that materials meet the specification and requirements.	Yes	0
	Comments re-bar from a CRAREs supplier		
2	Check void former installed as per manufacturer's instructions.	Yes	0
	Comments Pecafil used		

Item #	Item Text	Response	# Issues
Hold Point - Please enter Approved By Balfour Beatty or Subcontractor and include photograph or positive evidence of works prior to progressing			
3	Check waterproofing and gas membrane is as per Stride Treglown detail. See Slab Edge detail draings.	Yes	1

Comments

repaires required
completed - inspected by Lee Hawkswell

Issue ID	Description	Type	Status	Company	Date Created	Due Date
000098	Gas vents not in the correct position Slab A6 to D4 minor nicks in the waterproofing require patching	Snag	Closed	Oliver Connell & Son Ltd	24 Jul 2018	03 Aug 2018



2018-07-24 15:51:03

Issue ID	Description	Type	Status	Company	Date Created	Due Date
End of 000098 images						
Item #	Item Text	Response				# Issues
4	Check sand blinding to correct level	Yes				0
5	Check DPM (laps etc) all holes taped, corners etc tidy	Yes				0
	Comments repaires required completed - inspected by Lee Hawkswell					
6	Check steel reinforcement is as per AECOM design.	Yes				0
7	Check drainage position and fixing	Yes				0
	Comments pipe SVP between B5 and C6. postioned as rev C15. later drawing C20 issued after pipe laid, has moved the pipe 150mm. cleared with design coordinator that it can stay as rev C15					
	Comments no ducts in this pour					
9	Check joints detail, position and level.	Yes				0
10	Check level of flexcell (expansion joint) to perimeter and to columns.	Yes				0
11	Check drawings for changes in level - refer to Stride Treglown drawing 11020 C15.	Yes				0
12	Check DPM again for penetrations/damage.	Yes				0
13	Check area clear of debris.	Yes				0
14	Approval to pour.	Yes				0
Hold Point - Please enter Approved By Balfour Beatty or Subcontractor and include photograph or positive evidence of works prior to progressing						
16	Check correct mix and slump. Monitor placing and compaction	Approved - SubContractor				0
		Approved - BB				
Hold Point - Please enter Approved By Balfour Beatty or Subcontractor and include photograph or positive evidence of works prior to progressing						
17	Take cubes and log. Record cube numbers	Yes				0
Please add any signatures to the header section of this checklist						

Details

ID	Slab A4 to D1	Company	Balfour Beatty UK
Name	Concreting Ground Floor Slabs - Pre Pour Inspection QUAL-TF-4154	Priority	Medium
Description	Concreting Ground Floor Slabs QUAL-TF-4154	Status	Closed
Author	lee.hawkswell@balfourbeatty.com	Location	Health & Life Sciences > Concrete Frame > Ground Floor Slab
Created On	26 Jul 2018 9:36 AM	Equipment Name	Ground Floor Slab Pour 3
Tags		Equipment Barcode	



07/26/18 09:37

2018-07-26 09:37:01



07/26/18 09:37

2018-07-26 09:37:15



2018-07-26 15:04:58



2018-07-26 15:07:53



2018-07-26 15:08:03

Images for: Concreting Ground Floor Slabs - Pre Pour Inspection QUAL-TF-4154 - Slab A4 to D1 Checklist

Comments

Slab edge drawings.

Comments

AECOM UoR H&LS Structural Specification

Checklist Items

Item #	Item Text	Response	# Issues
Please refer to ITP - (Project responsible for uploading ITPs to Field 360)			

Item #	Item Text	Response	# Issues
1	Check that materials meet the specification and requirements.	Yes	0
	Comments re-bar from a CRAREs supplier		
2	Check void former installed as per manufacturer's instructions.	Yes	0
	Comments Pecafil used		
<i>Hold Point - Please enter Approved By Balfour Beatty or Subcontractor and include photograph or positive evidence of works prior to progressing</i>			
3	Check waterproofing and gas membrane is as per Stride Treglown detail. See Slab Edge detail draings.	Yes	0
	Comments repaires required completed - inspected by Lee Hawkswell		
4	Check sand blinding to correct level	Yes	0
5	Check DPM (laps etc) all holes taped, corners etc tidy	Yes	0
	Comments repaires required completed - inspected by Lee Hawkswell		
6	Check steel reinforcement is as per AECOM design.	Yes	0
7	Check drainage position and fixing	Yes	0
	Comments pipe SVP between B5 and C6. postioned as rev C15. later drawing C20 issued after pipe laid, has moved the pipe 150mm. cleared with design coordinator that it can stay as rev C15		
	Comments no ducts in this pour		
9	Check joints detail, position and level.	Yes	0
10	Check level of flexcell (expansion joint) to perimeter and to columns.	Yes	0
11	Check drawings for changes in level - refer to Stride Treglown drawing 11020 C15.	Yes	0
12	Check DPM again for penetrations/damage.	Yes	0
13	Check area clear of debris.	Yes	0

Item #	Item Text	Response	# Issues
14	Approval to pour.	Yes	0
<i>Hold Point - Please enter Approved By Balfour Beatty or Subcontractor and include photograph or positive evidence of works prior to progressing</i>			
16	Check correct mix and slump. Monitor placing and compaction	Approved - SubContractor Approved - BB	0
<i>Hold Point - Please enter Approved By Balfour Beatty or Subcontractor and include photograph or positive evidence of works prior to progressing</i>			
17	Take cubes and log. Record cube numbers	Yes	0
<i>Please add any signatures to the header section of this checklist</i>			

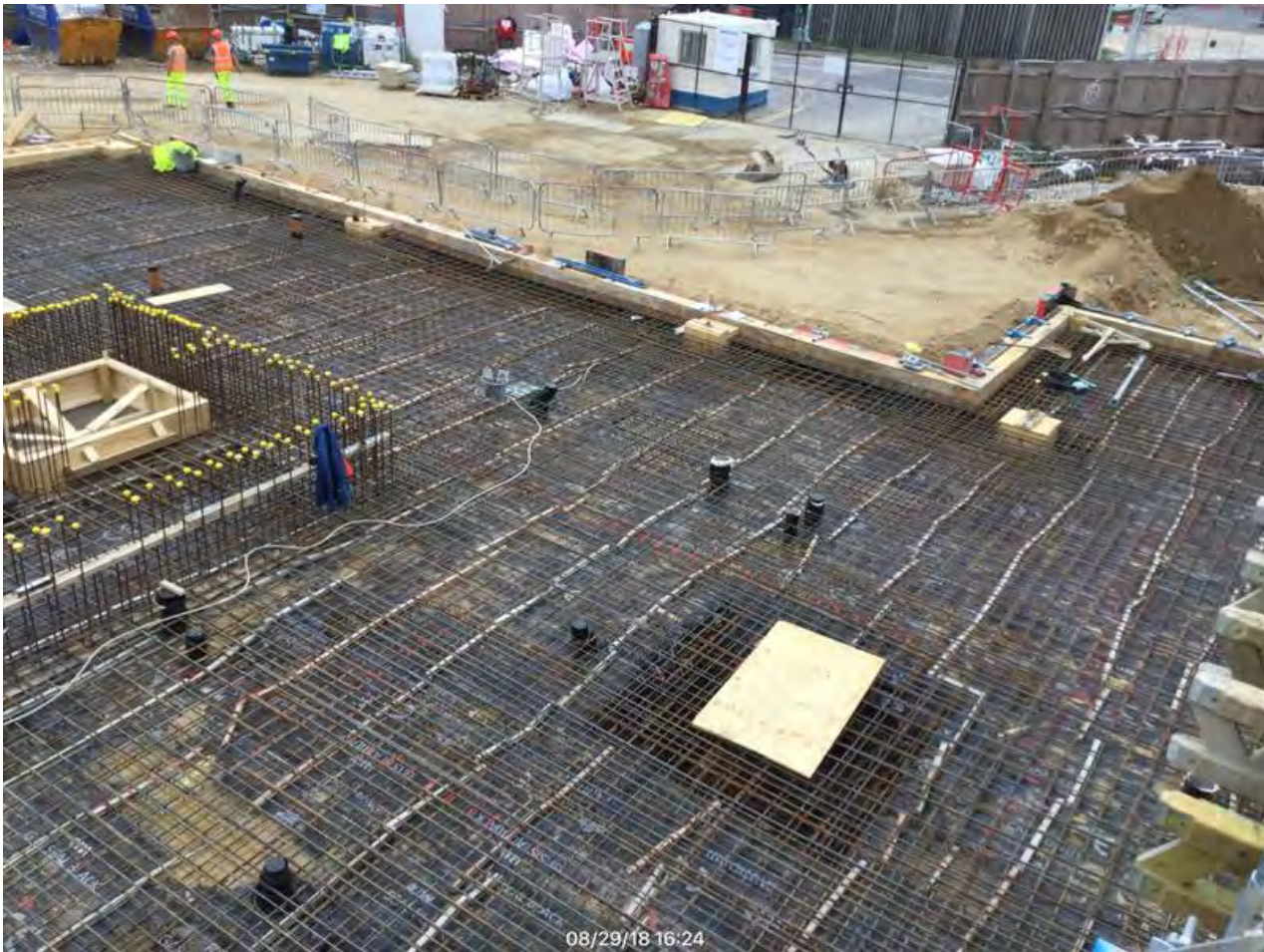
Details			
ID	000361	Company	Balfour Beatty UK
Name	Concreting Ground Floor Slabs - Pre Pour Inspection QUAL-TF-4154	Priority	Medium
Description	Concreting Ground Floor Slabs QUAL-TF-4154	Status	Closed
Author	george.dear@balfourbeatty.com	Location	Health & Life Sciences > Steel Frame > Ground Floor Slab
Created On	30 Aug 2018 7:42 AM	Equipment Name	Ground Floor Slab Pour 4
Tags		Equipment Barcode	



2018-09-06 14:26:42



2018-09-06 14:27:08



2018-09-06 14:27:38



2018-09-06 14:28:02



2018-09-06 14:28:21

Images for: Concreting Ground Floor Slabs - Pre Pour Inspection QUAL-TF-4154 - 000361 Checklist

Checklist Items

Item #	Item Text	Response	# Issues
	Drawing Ref(s)	1459939- ACM-00-00- DR-S-zzzz- 70016	0
	Specification Ref(s)	As per drawing	0
<i>Please refer to ITP - (Project responsible for uploading ITPs to Field 360)</i>			
1	Check that materials meet the specification and requirements.	Yes	0

Item #	Item Text	Response	# Issues
2	Check void former installed as per manufacturer's instructions.	Yes	0
Hold Point - Please enter Approved By Balfour Beatty or Subcontractor and include photograph or positive evidence of works prior to progressing			
3	Check waterproofing and gas membrane is as per Stride Treglown detail. See Slab Edge detail drainings.	Yes	0
4	Check sand blinding to correct level	Yes	0
5	Check DPM (laps etc) all holes taped, corners etc tidy	Yes	0
6	Check steel reinforcement is as per AECOM design.	Yes	1

Issue ID	Description	Type	Status	Company	Date Created	Due Date
000134	Pour 4 - beam sagging east side GL H	QC (Quality Check)	Closed	Oliver Connell & Son Ltd	30 Aug 2018	09 Sep 2018



2018-08-30 07:48:39



2018-08-30 09:20:54

Issue ID	Description	Type	Status	Company	Date Created	Due Date
End of 000134 images						
Comments						
Aaron O' Sullivan (aosullivan@oliverconnell.com) 30 Aug 2018 8:55 PM		Before concrete hardened beam was lifted up to sufficient level and cover adhered to				
Item #	Item Text	Response				# Issues
7	Check drainage position and fixing	Yes				0
8	Check service ducts size and position	Yes				0
10	Check level of flexcell (expansion joint) to perimeter and to columns.	Yes				0
11	Check drawings for changes in level - refer to Stride Treglown drawing 11020 C15.	Yes				0
12	Check DPM again for penetrations/damage.	Yes				0
13	Check area clear of debris.	Yes				0
14	Approval to pour.	Yes				0
Hold Point - Please enter Approved By Balfour Beatty or Subcontractor and include photograph or positive evidence of works prior to progressing						
16	Check correct mix and slump. Monitor placing and compaction	Approved - SubContractor				0
		Approved - BB				
Hold Point - Please enter Approved By Balfour Beatty or Subcontractor and include photograph or positive evidence of works prior to progressing						
17	Take cubes and log. Record cube numbers	Yes				0
Please add any signatures to the header section of this checklist						

Details

ID	000437	Company	Balfour Beatty UK
Name	Concreting Ground Floor Slabs - Pre Pour Inspection QUAL-TF-4154	Priority	Medium
Description	Concreting Ground Floor Slabs QUAL-TF-4154	Status	Closed
Author	george.dear@balfourbeatty.com	Location	Health & Life Sciences > Steel Frame > Ground Floor Slab
Created On	10 Sep 2018 5:05 PM	Equipment Name	Ground Floor Slab Pour 5
Tags		Equipment Barcode	

Checklist Items

Item #	Item Text	Response	# Issues
	Drawing Ref(s)	1459939-ACM-00-00-DR-S-ZZZZ-70017	0
	Specification Ref(s)	as per drawing	0
<i>Please refer to ITP - (Project responsible for uploading ITPs to Field 360)</i>			
1	Check that materials meet the specification and requirements.	Yes	0
2	Check void former installed as per manufacturer's instructions.	Yes	0
<i>Hold Point - Please enter Approved By Balfour Beatty or Subcontractor and include photograph or positive evidence of works prior to progressing</i>			
3	Check waterproofing and gas membrane is as per Stride Treglown detail. See Slab Edge detail drainings.	Yes	0
4	Check sand blinding to correct level	Yes	0
5	Check DPM (laps etc) all holes taped, corners etc tidy	Yes	0
6	Check steel reinforcement is as per AECOM design.	Yes	0
7	Check drainage position and fixing	Yes	0
8	Check service ducts size and position	Yes	0
9	Check joints detail, position and level.	Yes	0
11	Check drawings for changes in level - refer to Stride Treglown drawing 11020 C15.	Yes	0
12	Check DPM again for penetrations/damage.	Yes	0
13	Check area clear of debris.	Yes	0
14	Approval to pour.	Yes	0
<i>Hold Point - Please enter Approved By Balfour Beatty or Subcontractor and include photograph or positive evidence of works prior to progressing</i>			
16	Check correct mix and slump. Monitor placing and compaction	Approved - BB Approved - SubContractor	0
<i>Hold Point - Please enter Approved By Balfour Beatty or Subcontractor and include photograph or positive evidence of works prior to progressing</i>			
17	Take cubes and log. Record cube numbers	Yes	0

Item #	Item Text	Response	# Issues
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Please add any signatures to the header section of this checklist
Images for: CRXB0003 - UoR Health & Life Sciences Checklists

000437 - Concreting Ground Floor Slabs - Pre Pour Inspection QUAL-TF-4154



2018-09-10 17:06:16



2018-09-10 17:06:18



2018-09-10 17:06:20



2018-09-10 17:06:23



2018-09-10 17:06:55



2018-09-10 17:07:49



2018-09-10 17:07:52



2018-09-10 17:08:19



2018-09-10 17:09:05

End of 000437 - Concreting Ground Floor Slabs - Pre Pour Inspection QUAL-TF-4154 images

Item #	Item Text	Response	# Issues
9	Check joints detail, position and level.	Yes	0
10	Check level of flexcell (expansion joint) to perimeter and to columns.	Yes	0
11	Check drawings for changes in level - refer to Stride Treglown drawing 11020 C15.	Yes	0
12	Check DPM again for penetrations/damage.	Yes	0
13	Check area clear of debris.	Yes	0
14	Approval to pour.	Yes	0
Hold Point - Please enter Approved By Balfour Beatty or Subcontractor and include photograph or positive evidence of works prior to progressing			
16	Check correct mix and slump. Monitor placing and compaction	Approved - BB Approved - SubContractor	0
Hold Point - Please enter Approved By Balfour Beatty or Subcontractor and include photograph or positive evidence of works prior to progressing			
17	Take cubes and log. Record cube numbers	Yes	0

Please add any signatures to the header section of this checklist



UNIVERSITY OF READING - HEALTH AND LIFE
SCIENCES BUILDING

SUPPLEMENTARY GROUND GAS RISK ASSESSMENT

Prepared for UNIVERSITY OF READING

Report Ref: 32362

Geotechnical Engineering Ltd
Centurion House, Olympus Park
Quedgeley, Gloucester. GL2 4NF

01452 527743
www.geoeng.co.uk





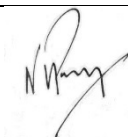
UNIVERSITY OF READING - HEALTH AND LIFE SCIENCES BUILDING

SUPPLEMENTARY GROUND GAS RISK ASSESSMENT

Prepared for UNIVERSITY OF READING

Report Ref: 32362

PROJECT: Proposed development
PROJECT MANAGER: WSP / Parsons Brinckerhoff
CONSULTANT: AECOM

VOLUME - VERSION	STATUS	ORIGINATOR	CHECKER	APPROVED	DATE
1 of 1 – A	FINAL	JI	NP	NP	10/10/16
ORIGINATOR			APPROVER		
					
Jonathan Ind BSc (Hons) MSc FGS Geotechnical Consultant			N Parry BEng MSc CEng MICE MCIHT SiLC Director		

The report is not to be used for contractual or engineering purposes unless this sheet is signed and the report designated "Final".

The report has been prepared for the sole use and reliance by the University of Reading. GEL accepts no liability as a result of the use or reliance of this report by any other parties.



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EXPLORATORY HOLE LOCATION PLAN	2

APPENDICES

APPENDIX A	GAS MONITORING RESULTS
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1. INTRODUCTION

It is proposed to replace the existing Engineering Building at the University of Reading with a new purpose-built facility. Geotechnical Engineering Limited (GEL) previously carried out a ground investigation to provide a geotechnical and geoenvironmental assessment to assist in the development of the site (GEL Report Ref: 31710 Rev B, dated 24th May 2016). As recommended in Report 31710, GEL was instructed by WSP/Parsons Brinckerhoff (acting on behalf of the University of Reading), to carry out further ground gas risk assessment and provide recommendations for precautionary measures, in accordance with CIRIA C665 (Wilson et al, 2007) and BS8485:2015. This report presents the results of additional gas monitoring and comments accordingly; it should be read in conjunction with Report 31710 (2016).

The scope of work and terms and conditions of appointment were defined in correspondence by GEL, reference T24652 dated 16th September 2016.

This report describes the investigation, presents the findings and comments accordingly.

The comments given in this report and the opinions expressed assume that ground conditions do not vary beyond the range revealed by this investigation. There may however, be conditions at or adjacent to the site, which have not been disclosed by the investigation and which, therefore, have not been considered in this report. Accordingly, a careful watch should be maintained during any future groundworks and the recommendations of this report reviewed as necessary.

The recommendations given in this report should not be used for any other schemes on or adjacent to this site without further reference to GEL.



2. BACKGROUND SETTING

The site setting is recorded in detail within the Report 31710 (GEL, 2016), with a summary of key information taken from this report presented below.

2.1 Site Location and Description

The site is situated at the University of Reading Whiteknights Campus and may be located by its National Grid co-ordinates SU 7352, 7151 or the post code RG6 6UR. A location plan is presented as Figure 1.

The existing Engineering Building was roughly T-shaped in plan, comprising a four-storey brick structure at the northern end with a single-storey element extending to the south. The ground level fell gradually from southwest to northeast, up to around 2.5m. The building was bound by a tarmac-surfaced car park to the east with the entrance at its southern end. The area to the north and south was mainly surfaced with grass with pedestrian pathways and a number of semi-mature/mature trees. A block-paved pathway was located west of the building. The building was bound by various buried services which are highlighted on Figure 2.

2.2 Radon

The Building Research Establishment (BRE) indicates that no radon protective measures are necessary for the area (BR 211, 2007). It is advised that the local Building Control body is contacted to determine their minimum requirements in respect of radon protection.



3. CONCEPTUAL SITE MODEL

Notwithstanding the limitations of the desk study carried out as part of Report 31710 (2016) (and recommendations for further assessment to suitably establish the environmental setting), a significant thickness of Made Ground was recorded within the vicinity of the existing Engineering Building, up to 1.90m thick. Despite the material not containing any obvious putrescible material, the Made Ground is considered to represent a potential source of ground gases.

4. GROUD GAS RISK ASSESSMENT

4.1 Basis of Assessment

Approved Document Part C2 of the Building Regulations (DoE) recommends a tiered risk assessment approach in respect of “methane and other gases” (used to define hazardous soil gases which originate either from waste deposited in landfill sites or are generated naturally). Approved Document C does not include radon (which is dealt with separately) but does include volatile organic compounds (VOC’s). The methodology for the semi-quantitative risk assessment is defined in BS 8485:2015, which provides a framework in line with CLR 11 (Environment Agency, 2004). For gases not covered by BS8485:2015, a risk assessment basis is considered appropriate with standards taken from occupational exposure limits or other accepted data. Reference should also be made to CIRIA Report C665 (Wilson et al, 2007).

For the determination of the acceptability of volatile vapours (VOCs) in soils, values derived from Soil Gas Acceptance Criteria for the Protection of Indoor Air Quality for a commercial end-use, documented in the New Zealand Guidelines (1999) shall be used. A “trigger” value



of 100ppm was used for the determination of acceptability of soils based on the New Zealand Guidelines.

4.2 Comparison of Results

In order to address the risk of hazardous ground gases to the proposed development, four observation wells were installed in the boreholes, referenced BH01 to BH04, as part of the previous investigation (GEL, 2016). An exploratory hole location plan is presented as Figure 2. The standpipes were monitored on four occasions following completion of the ground investigation in order to provide a comprehensive data set in accordance with CIRIA guidance. The results are included in Appendix A and summarised in Table 4.1 below.



Borehole	Response Zone/Strata (m bgl)	Evidence of Contamination	No. of Monitoring Visits	Methane (%)	Carbon Dioxide (%)	Oxygen (%)	Flow (l/hr)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)	Volatile Organic Compounds (ppm)	Water Level (m bgl)	Atmospheric Pressure (Mb)
BH01	1.00 – 6.20/ HD & BHG	No	4	0.0-0.1	1.4-4.1	9.9-20.5	0.0	0-14	0	0.0-1.8	3.50-4.34	1003-1019
BH02	1.00-4.30/ MG, HD & BHG	No	4	0.0	0.6-5.1	11.2-20.0	0.0	0-20	0	0.0-1.7	3.22-3.85	1003-1018
BH03	1.00 – 6.30/ HD & BHG	No	4	0.0-0.1	0.0-9.2	0.0-20.5	-0.2 - 0.0	0-1	0-2	0.0—6.7	3.25-3.79	1004-1020
BH04	1.00 – 6.20/ HD & BHG	No	4	0.0	1.1-4.6	12.7-20.4	0.0	0-14	0	0.0-1.7	3.83-4.3	1003-1014

Notes: MG – Made Ground; HD – Head deposits; BHG – Boyn Hill Gravel Member

Table 4.1: Summary of Gas Monitoring Data

4.3 Ground Gas Protection Measures

The risk posed by gassing sites can be determined from a semi-quantitative assessment of the risk, as proposed by Wilson and Card (1999), following development of the system as detailed in BS8485:2015. The method uses both gas concentrations and borehole flow rates to define a characteristic situation (CS) for a site based on the limiting borehole gas volume-flow or “Gas Screening Value” (GSV) for methane and carbon dioxide. The GSV (litres of gas per hour) can be calculated from the borehole flow rate (litres per hour) and gas



concentration (%). The calculation is carried out for both methane and carbon dioxide and the worst case GSV value is generally adopted for comparison with the Classification Situation.

The results in Table 4.1 indicate a maximum concentration of carbon dioxide (CO₂) at 9.2% and methane (CH₄) at 0.1%. Carbon monoxide and hydrogen sulphide was recorded at a maximum concentration of 20ppm and 2ppm respectively. Oxygen concentrations varied between 0.0% and 20.5%. No positive gas flow was detected during the four visits, with a maximum negative flow of -0.2l/hr.

In accordance with the guidance in BS8485:2015, the GSV would indicate a Characteristic Gas Situation 1 (CS1), with a very low hazard, however since that the maximum recorded concentration of carbon dioxide is nearly twice the maximum “five percent” threshold, it is recommended that ground gas precautionary measures be adopted in accordance with Characteristic Situation 2 (CS2).

Once the proposed scheme has been finalised, details of the protection measures should be designed in accordance with BS8485:2015.

A maximum soil vapour concentration (VOCs) of 6.7ppm was recorded using the PID during the monitoring visits. Based on these results, vapour protection measures are not considered necessary for the site.

The requirements for radon protection (if any) should be agreed with the Local Authority.

GEOTECHNICAL ENGINEERING LIMITED



5. REFERENCES

British Standards Institution (2015): Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings. BS 8485.

Building Research Establishment (2007): Radon: guidance on protective measures for new buildings (including supplementary advice for extensions, conversions and refurbishment). BRE Report BR211.

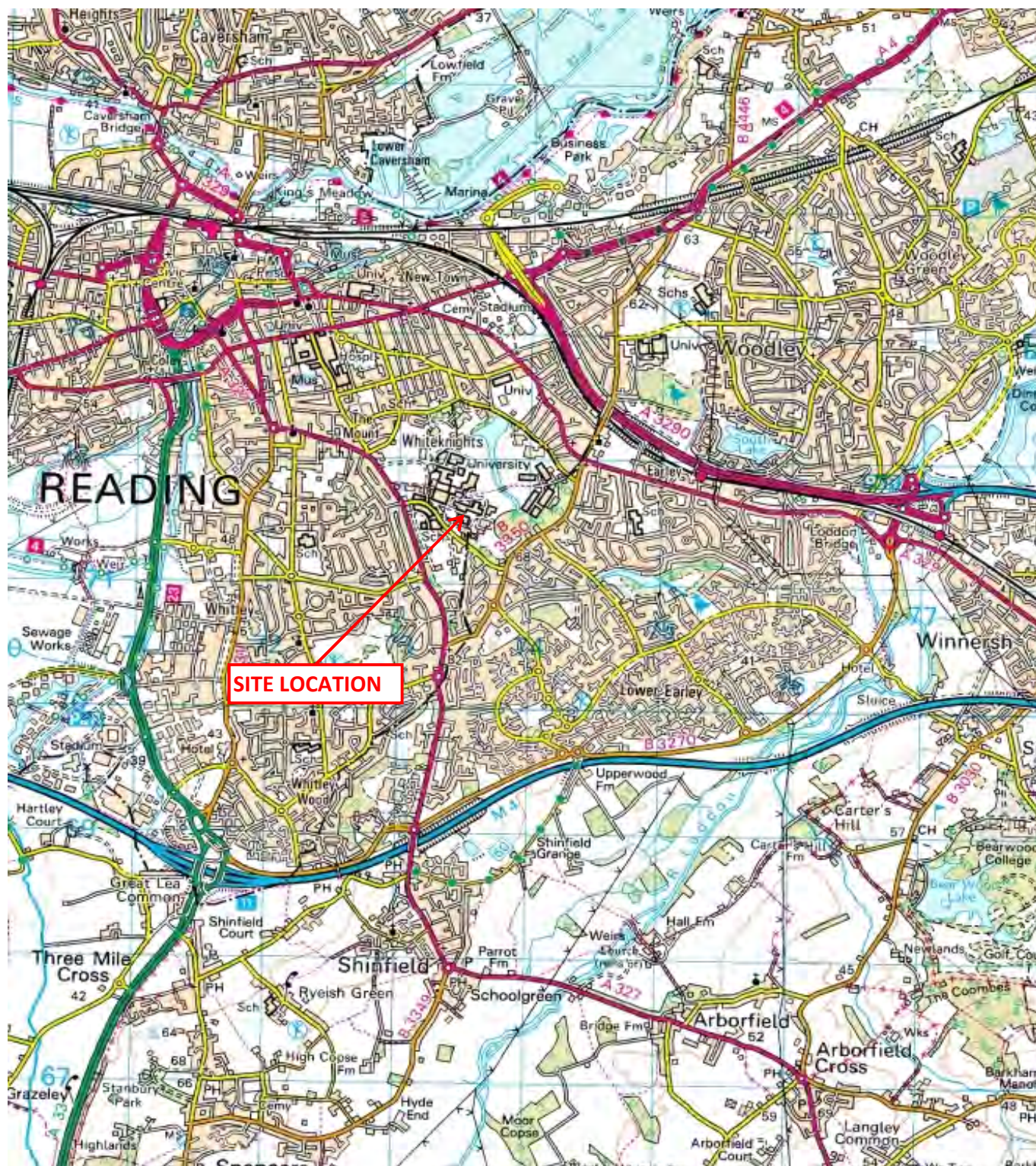
Environment Agency (2004): Model Procedures for the Management of Land Contamination (CLR 11).

Geotechnical Engineering Ltd (2016): Interpretative Report on Ground investigation: University of Reading – Health and Life Sciences Building. Report No. 31710 Rev B, dated 24th May 2016.

New Zealand Ministry for the Environment (1999): Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand. August 1999.

Wilson S and Card G (1999): Reliability and Risk in Gas Protection Design. Ground Engineering.

Wilson S, Oliver S, Mallett H, Hutchings H & Card G. (2007). Assessing risks posed by hazardous gases to buildings. CIRIA Report C665 (London)



Geotechnical Engineering Limited

LOCATION PLAN



CLIENT UNIVERSITY OF READING
SITE UNIVERSITY OF READING - HEALTH & LIFE SCIENCES BUILDING
SCALE Approximately 1:50,000

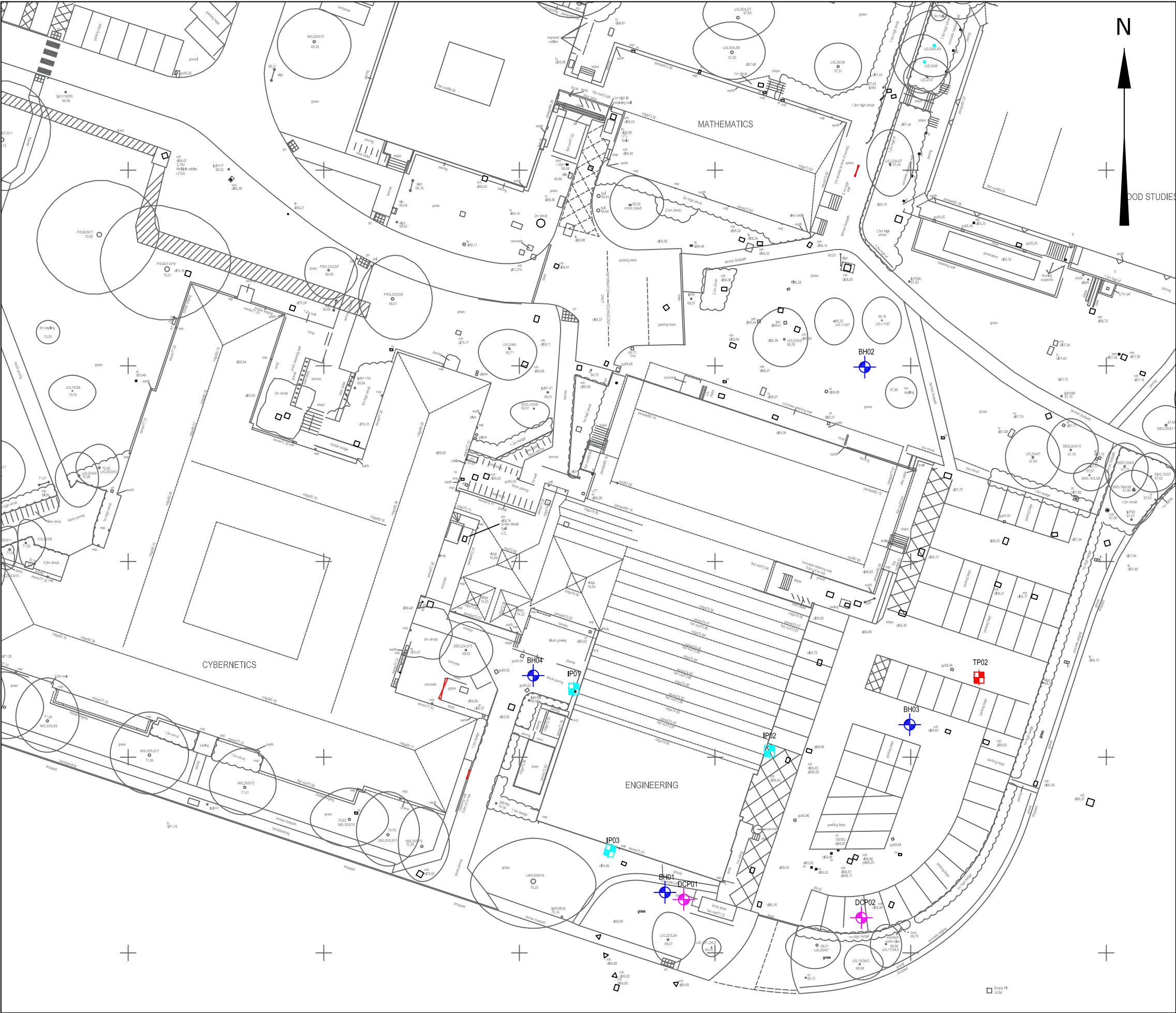
Reproduced from the 2012, 1:50,000 Ordnance Survey Map (Sheet 175 Reading & Windsor) with the permission of Ordnance Survey on behalf of The Controller of Her Majesty's Stationary Office, Crown Copyright. Geotechnical Engineering Limited, Gloucester. AL100002447.

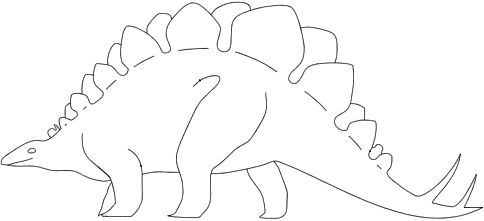
CONTRACT

FIGURE

32362

1



Key. Borehole Location DCP Location Trial Pit Location Inspection Pit Location		
Notes: Drawing supplied by client.		
 geotechnical Geotechnical Engineering Ltd Centurion House, Olympus Park, Quedgeley, Gloucester GL2 4NF Telephone: (01452) 527743 Facsimile: (01452) 729314 E-mail: geotech@geoeng.co.uk Web: www.geoeng.co.uk		
Client: UNIVERSITY OF READING		
Engineer: AECOM		
Site: UNIVERSITY OF READING - HEALTH AND LIFE SCIENCES BUILDING		
Title: EXPLORATORY HOLE LOCATION PLAN		
Drawn By:	GJS	Checked By: JI Paper Size: A3
Scale:	1:500	Date: October 2016
Contract:	32362	Figure: 02



APPENDIX A

GROUND GAS MONITORING RESULTS

GAS AND GROUNDWATER LEVELS

CLIENT: KNOWLES & SON (OXFORD) LIMITED

SITE: UNIVERSITY OF READING - HEALTH AND LIFE SCIENCES BUILDING

Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H ₂ O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (litr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH01	15/04/16 12:00:00	1001										10		Weather Underground data (Farnborough): falling barometric pressure, mostly cloudy.
BH01	16/04/16 12:00:00	1005										5		Weather Underground data (Farnborough): rising barometric pressure, mostly cloudy.
BH01	17/04/16 12:00:00	1016										9		Weather Underground data (Farnborough): rising barometric pressure, mostly cloudy.
BH01	18/04/16 09:50:00	1017	-0.52								0.0	8		Weather Underground data (Farnborough): rising barometric pressure, partly cloudy.
BH01	18/04/16 09:51:00										0.0			
BH01	18/04/16 09:52:00										0.0			
BH01	18/04/16 09:53:00										0.0			
BH01	18/04/16 09:54:00										0.0			
BH01	18/04/16 09:55:00			3.4	0.0	13.0	0.0	0	0	1.8				
BH01	18/04/16 09:56:00			3.4	0.0	13.0	0.0	0	0	1.8				
BH01	18/04/16 09:57:00			3.4	0.0	13.0	0.0	0	0	1.8				
BH01	18/04/16 09:58:00			3.4	0.0	13.0	0.0	0	0	1.8				
BH01	18/04/16 09:59:00			3.4	0.0	13.0	0.0	0	0	1.8				
BH01	18/04/16 10:00:00			3.4	0.0	13.0	0.0	0	0	1.7				
remarks # denotes result exceeding capacity of gas monitoring equipment VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.													CONTRACT 31710	CHECKED Jl

GAS AND GROUNDWATER LEVELS

CLIENT: KNOWLES & SON (OXFORD) LIMITED

SITE: UNIVERSITY OF READING - HEALTH AND LIFE SCIENCES BUILDING

Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H ₂ O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH01	18/04/16 10:01:00			3.3	0.0	13.0	0.0	0	0	1.7				
BH01	18/04/16 10:02:00			3.2	0.0	13.0	0.0	0	1	1.7				
BH01	18/04/16 10:03:00			3.1	0.0	13.0	0.0	0	1	1.6				
BH01	18/04/16 10:04:00			3.1	0.0	13.1	0.0	0	1	1.5				
BH01	18/04/16 10:05:00												3.91	
BH01	22/04/16 12:00:00	1021										10		Weather Underground data (Farnborough): falling barometric pressure, partly cloudy.
BH01	23/04/16 12:00:00	1021										8		Weather Underground data (Farnborough): steady barometric pressure, mostly cloudy.
BH01	24/04/16 12:00:00	1021										8		Weather Underground data (Farnborough): falling barometric pressure, partly cloudy.
BH01	25/04/16 10:00:00	1003	0.38								0.0	9		Weather Underground data (Farnborough): falling barometric pressure, partly cloudy.
BH01	25/04/16 10:01:00										0.0			
BH01	25/04/16 10:02:00										0.0			
BH01	25/04/16 10:03:00										0.0			
BH01	25/04/16 10:04:00										0.0			
BH01	25/04/16 10:05:00			2.8	0.1	11.2	2.0	0	0	1.8				
remarks # denotes result exceeding capacity of gas monitoring equipment VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.													CONTRACT 31710	CHECKED Jl

GAS AND GROUNDWATER LEVELS

CLIENT: KNOWLES & SON (OXFORD) LIMITED

SITE: UNIVERSITY OF READING - HEALTH AND LIFE SCIENCES BUILDING

Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H ₂ O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (litr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH01	25/04/16 10:06:00			2.8	0.1	11.1	2.0	0	0	1.8				
BH01	25/04/16 10:07:00			2.9	0.1	11.0	2.0	0	0	1.8				
BH01	25/04/16 10:08:00			2.9	0.1	11.0	2.0	0	0	1.8				
BH01	25/04/16 10:09:00			3.2	0.1	10.7	2.0	0	0	1.8				
BH01	25/04/16 10:10:00			3.5	0.1	10.5	2.0	0	0	1.8				
BH01	25/04/16 10:11:00			3.7	0.1	10.3	2.0	0	0	1.8				
BH01	25/04/16 10:12:00			3.9	0.1	10.1	2.0	0	0	1.8				
BH01	25/04/16 10:13:00			4.0	0.1	10.0	2.0	0	0	1.8				
BH01	25/04/16 10:14:00			4.1	0.1	9.9	2.0	0	0	1.8				
BH01	25/04/16 10:15:00												3.50	
remarks # denotes result exceeding capacity of gas monitoring equipment VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.													CONTRACT 31710	CHECKED Jl

GAS AND GROUNDWATER LEVELS

CLIENT: KNOWLES & SON (OXFORD) LIMITED

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Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H ₂ O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH02	15/04/16 12:00:00	1001										10		Weather Underground data (Farnborough): falling barometric pressure, mostly cloudy.
BH02	16/04/16 12:00:00	1005										5		Weather Underground data (Farnborough): rising barometric pressure, mostly cloudy.
BH02	17/04/16 12:00:00	1016										9		Weather Underground data (Farnborough): rising barometric pressure, mostly cloudy.
BH02	18/04/16 11:30:00	1010	-0.51								0.0	8		Weather Underground data (Farnborough): rising barometric pressure, partly cloudy.
BH02	18/04/16 11:31:00										0.0			
BH02	18/04/16 11:32:00										0.0			
BH02	18/04/16 11:33:00										0.0			
BH02	18/04/16 11:34:00										0.0			
BH02	18/04/16 11:35:00			4.3	0.0	11.9	0.0	0	1	1.4				
BH02	18/04/16 11:36:00			4.3	0.0	11.8	0.0	0	0	1.4				
BH02	18/04/16 11:37:00			4.6	0.0	11.6	0.0	0	0	1.3				
BH02	18/04/16 11:38:00			4.8	0.0	11.4	0.0	0	0	1.3				
BH02	18/04/16 11:39:00			5.0	0.0	11.3	0.0	0	0	0.2				
BH02	18/04/16 11:40:00			5.1	0.0	11.2	0.0	0	0	1.1				
remarks # denotes result exceeding capacity of gas monitoring equipment VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.													CONTRACT 31710	CHECKED Jl

GAS AND GROUNDWATER LEVELS

CLIENT: KNOWLES & SON (OXFORD) LIMITED

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Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H ₂ O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH02	18/04/16 11:41:00			5.1	0.0	11.2	0.0	0	0	1.1				
BH02	18/04/16 11:42:00			5.1	0.0	11.2	0.0	0	0	1.1				
BH02	18/04/16 11:43:00			5.1	0.0	11.2	0.0	0	0	1.1				
BH02	18/04/16 11:44:00			5.0	0.0	11.3	0.0	0	0	1.1				
BH02	18/04/16 11:45:00												3.22	
BH02	22/04/16 12:00:00	1021										10		Weather Underground data (Farnborough): falling barometric pressure, partly cloudy.
BH02	23/04/16 12:00:00	1021										8		Weather Underground data (Farnborough): steady barometric pressure, mostly cloudy.
BH02	24/04/16 12:00:00	1021										8		Weather Underground data (Farnborough): falling barometric pressure, partly cloudy.
BH02	25/04/16 11:00:00	1003	0.33								0.0	9		Weather Underground data (Farnborough): falling barometric pressure, partly cloudy.
BH02	25/04/16 11:01:00										0.0			
BH02	25/04/16 11:02:00										0.0			
BH02	25/04/16 11:03:00										0.0			
BH02	25/04/16 11:04:00										0.0			
BH02	25/04/16 11:05:00			2.2	0.0	17.7	0.0	0	0	0.6				
remarks # denotes result exceeding capacity of gas monitoring equipment VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.													CONTRACT 31710	CHECKED Jl

GAS AND GROUNDWATER LEVELS

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Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H ₂ O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (litr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH02	25/04/16 11:06:00			2.2	0.0	17.7	0.0	0	0	0.6				
BH02	25/04/16 11:07:00			2.2	0.0	17.7	0.0	0	0	0.6				
BH02	25/04/16 11:08:00			2.2	0.0	17.7	0.0	0	0	0.6				
BH02	25/04/16 11:09:00			2.2	0.0	17.8	0.0	0	0	0.6				
BH02	25/04/16 11:10:00			2.1	0.0	17.9	0.0	0	0	0.6				
BH02	25/04/16 11:11:00			2.1	0.0	17.8	0.0	0	0	0.6				
BH02	25/04/16 11:12:00			2.1	0.0	17.8	0.0	0	0	0.6				
BH02	25/04/16 11:13:00			2.2	0.0	17.7	0.0	0	0	0.6				
BH02	25/04/16 11:14:00			2.2	0.0	17.7	0.0	0	0	0.6				
BH02	25/04/16 11:15:00												3.82	
remarks # denotes result exceeding capacity of gas monitoring equipment VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.													CONTRACT 31710	CHECKED Jl

GAS AND GROUNDWATER LEVELS

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Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H ₂ O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (litr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH03	15/04/16 12:00:00	1001										10		Weather Underground data (Farnborough): falling barometric pressure, mostly cloudy.
BH03	16/04/16 12:00:00	1005										5		Weather Underground data (Farnborough): rising barometric pressure, mostly cloudy.
BH03	17/04/16 12:00:00	1016										9		Weather Underground data (Farnborough): rising barometric pressure, mostly cloudy.
BH03	18/04/16 09:00:00	1019	-0.81								0.0	8		Weather Underground data (Farnborough): rising barometric pressure, partly cloudy.
BH03	18/04/16 09:01:00										0.0			
BH03	18/04/16 09:02:00										0.0			
BH03	18/04/16 09:03:00										0.0			
BH03	18/04/16 09:04:00										0.0			
BH03	18/04/16 09:05:00			0.2	0.0	19.8	0.0	0	0	0.9				
BH03	18/04/16 09:06:00			0.2	0.0	19.9	0.0	0	0	0.8				
BH03	18/04/16 09:07:00			0.3	0.0	19.7	0.0	0	0	0.8				
BH03	18/04/16 09:08:00			0.3	0.0	19.5	0.0	0	0	0.8				
BH03	18/04/16 09:09:00			0.4	0.0	19.2	1.0	0	0	0.8				
BH03	18/04/16 09:10:00			0.5	0.0	18.7	1.0	0	0	0.9				
remarks # denotes result exceeding capacity of gas monitoring equipment VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.													CONTRACT 31710	CHECKED Jl

GAS AND GROUNDWATER LEVELS

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Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H ₂ O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH03	18/04/16 09:11:00			0.7	0.1	18.2	1.0	0	0	0.9				
BH03	18/04/16 09:12:00			0.9	0.1	17.9	1.0	0	1	0.9				
BH03	18/04/16 09:13:00			0.9	0.1	17.9	1.0	0	1	0.9				
BH03	18/04/16 09:14:00			0.9	0.1	18.0	1.0	0	1	0.9				
BH03	18/04/16 09:15:00												3.52	
BH03	22/04/16 12:00:00	1021										10		Weather Underground data (Farnborough): falling barometric pressure, partly cloudy.
BH03	23/04/16 12:00:00	1021										8		Weather Underground data (Farnborough): steady barometric pressure, mostly cloudy.
BH03	24/04/16 12:00:00	1021										8		Weather Underground data (Farnborough): falling barometric pressure, partly cloudy.
BH03	25/04/16 10:00:00	1004									0.0	9		Weather Underground data (Farnborough): falling barometric pressure, partly cloudy.
BH03	25/04/16 10:01:00										0.0			
BH03	25/04/16 10:02:00										0.0			
BH03	25/04/16 10:03:00										0.0			
BH03	25/04/16 10:04:00										0.0			
BH03	25/04/16 10:05:00			3.4	0.0	16.1	0.0	0	0	0.8				
remarks # denotes result exceeding capacity of gas monitoring equipment VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.													CONTRACT 31710	CHECKED Jl

GAS AND GROUNDWATER LEVELS

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Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H ₂ O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (litr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH03	25/04/16 10:06:00			3.8	0.1	15.6	1.0	0	0	0.8				
BH03	25/04/16 10:07:00			4.3	0.1	15.0	1.0	0	0	0.7				
BH03	25/04/16 10:08:00			5.0	0.1	14.2	1.0	0	0	0.6				
BH03	25/04/16 10:09:00			5.2	0.1	14.0	1.0	0	0	0.5				
BH03	25/04/16 10:10:00			5.0	0.1	14.3	1.0	0	0	0.5				
BH03	25/04/16 10:11:00			5.0	0.1	14.3	1.0	0	0	0.5				
BH03	25/04/16 10:12:00			4.7	0.1	14.6	1.0	0	0	0.5				
BH03	25/04/16 10:13:00			4.7	0.1	14.7	1.0	0	0	0.5				
BH03	25/04/16 10:14:00			4.7	0.1	14.8	1.0	0	0	0.5				
BH03	25/04/16 10:15:00												3.25	
remarks # denotes result exceeding capacity of gas monitoring equipment VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.													CONTRACT 31710	CHECKED Jl

GAS AND GROUNDWATER LEVELS

CLIENT: KNOWLES & SON (OXFORD) LIMITED

SITE: UNIVERSITY OF READING - HEALTH AND LIFE SCIENCES BUILDING

Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H ₂ O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (litr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH04	15/04/16 12:00:00	1001										10		Weather Underground data (Farnborough): falling barometric pressure, mostly cloudy.
BH04	16/04/16 12:00:00	1005										5		Weather Underground data (Farnborough): rising barometric pressure, mostly cloudy.
BH04	17/04/16 12:00:00	1016										9		Weather Underground data (Farnborough): rising barometric pressure, mostly cloudy.
BH04	18/04/16 10:20:00	1016	-0.29								0.0	8		Weather Underground data (Farnborough): rising barometric pressure, partly cloudy.
BH04	18/04/16 10:21:00										0.0			
BH04	18/04/16 10:22:00										0.0			
BH04	18/04/16 10:23:00										0.0			
BH04	18/04/16 10:24:00										0.0			
BH04	18/04/16 10:25:00			1.3	0.0	18.4	0.0	0	1	0.7				
BH04	18/04/16 10:26:00			1.3	0.0	18.5	0.0	0	0	0.7				
BH04	18/04/16 10:27:00			1.3	0.0	18.4	0.0	0	1	0.7				
BH04	18/04/16 10:28:00			1.1	0.0	18.7	0.0	0	0	0.6				
BH04	18/04/16 10:29:00			1.1	0.0	18.8	0.0	0	0	0.6				
BH04	18/04/16 10:30:00			1.3	0.0	18.6	0.0	0	0	0.6				
remarks # denotes result exceeding capacity of gas monitoring equipment VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.													CONTRACT 31710	CHECKED Jl

GAS AND GROUNDWATER LEVELS

CLIENT: KNOWLES & SON (OXFORD) LIMITED

SITE: UNIVERSITY OF READING - HEALTH AND LIFE SCIENCES BUILDING

Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H ₂ O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (litr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH04	18/04/16 10:31:00			1.4	0.0	18.4	0.0	0	0	0.6				
BH04	18/04/16 10:32:00			1.4	0.0	18.5	0.0	0	0	0.6				
BH04	18/04/16 10:33:00			1.6	0.0	18.2	0.0	0	0	0.6				
BH04	18/04/16 10:34:00			1.7	0.0	18.1	0.0	0	0	0.6				
BH04	18/04/16 10:35:00												3.83	
BH04	22/04/16 12:00:00	1021										10		Weather Underground data (Farnborough): falling barometric pressure, partly cloudy.
BH04	23/04/16 12:00:00	1021										8		Weather Underground data (Farnborough): steady barometric pressure, mostly cloudy.
BH04	24/04/16 12:00:00	1021										8		Weather Underground data (Farnborough): falling barometric pressure, partly cloudy.
BH04	25/04/16 10:40:00	1003	0.68								0.0	9		Weather Underground data (Farnborough): falling barometric pressure, partly cloudy.
BH04	25/04/16 10:41:00										0.0			
BH04	25/04/16 10:42:00										0.0			
BH04	25/04/16 10:43:00										0.0			
BH04	25/04/16 10:44:00										0.0			
BH04	25/04/16 10:45:00			2.6	0.0	16.1	0.0	0	1	1.6				
remarks # denotes result exceeding capacity of gas monitoring equipment VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.													CONTRACT 31710	CHECKED Jl

GAS AND GROUNDWATER LEVELS

CLIENT: KNOWLES & SON (OXFORD) LIMITED

SITE: UNIVERSITY OF READING - HEALTH AND LIFE SCIENCES BUILDING

Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H ₂ O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH04	25/04/16 10:46:00			2.7	0.0	16.0	0.0	0	0	1.7				
BH04	25/04/16 10:47:00			2.7	0.0	15.9	0.0	0	0	1.7				
BH04	25/04/16 10:48:00			2.8	0.0	15.8	0.0	0	0	1.6				
BH04	25/04/16 10:49:00			2.9	0.0	15.7	0.0	0	0	1.6				
BH04	25/04/16 10:50:00			3.0	0.0	15.6	0.0	0	0	1.5				
BH04	25/04/16 10:51:00			3.0	0.0	15.5	0.0	0	0	1.4				
BH04	25/04/16 10:52:00			3.0	0.0	15.5	0.0	0	0	1.4				
BH04	25/04/16 10:53:00			3.0	0.0	15.6	0.0	0	0	1.4				
BH04	25/04/16 10:54:00			3.0	0.0	15.6	0.0	0	0	1.4				
BH04	25/04/16 10:55:00												3.91	
remarks # denotes result exceeding capacity of gas monitoring equipment VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.													CONTRACT 31710	CHECKED Jl

GAS AND GROUNDWATER LEVELS

CLIENT: UNIVERSITY OF READING

SITE: UNIVERSITY OF READING - HEALTH AND LIFE SCIENCES BUILDING

Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H ₂ O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH01	20/09/16 12:00:00	1021										15		Weather Underground data (Farnborough): steady barometric pressure, overcast.
BH01	21/09/16 12:00:00	1018										19		Weather Underground data (Farnborough): steady barometric pressure, partly cloudy.
BH01	22/09/16 12:00:00	1019										17		Weather Underground data (Farnborough): steady barometric pressure, mostly cloudy.
BH01	23/09/16 12:02:00	1013	0									20		Weather Underground data (Farnborough): falling barometric pressure, mostly cloudy.
BH01	23/09/16 12:03:00										0.0			
BH01	23/09/16 12:04:00										0.0			
BH01	23/09/16 12:05:00										0.0			
BH01	23/09/16 12:06:00										0.0			
BH01	23/09/16 12:07:00										0.0			
BH01	23/09/16 12:08:00										0.0			
BH01	23/09/16 12:09:00										0.0			
BH01	23/09/16 12:10:00										0.0			
BH01	23/09/16 12:11:00										0.0			
BH01	23/09/16 12:12:00										0.0			
remarks # denotes result exceeding capacity of gas monitoring equipment VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.													CONTRACT 32362	CHECKED Jl

GAS AND GROUNDWATER LEVELS

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Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H ₂ O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks	
BH01	23/09/16 12:13:00			1.4	0.0	19.6	0.0	0	0	0.6					
BH01	23/09/16 12:14:00			1.5	0.0	19.6	0.0	0	0	0.6					
BH01	23/09/16 12:15:00			1.5	0.0	19.7	0.0	0	10	0.6					
BH01	23/09/16 12:16:00			1.6	0.0	19.6	0.0	0	10	0.4					
BH01	23/09/16 12:17:00			1.6	0.0	19.6	0.0	0	10	0.2					
BH01	23/09/16 12:18:00			1.6	0.0	19.6	0.0	0	10	0.2					
BH01	23/09/16 12:19:00			1.6	0.0	19.6	0.0	0	11	0.2					
BH01	23/09/16 12:20:00			1.6	0.0	19.6	0.0	0	11	0.2					
BH01	23/09/16 12:21:00			1.6	0.0	19.6	0.0	0	14	0.2					
BH01	23/09/16 12:22:00			1.6	0.0	19.6	0.0	0	0	0.2					
BH01	23/09/16 12:23:00												4.34		
BH01	30/09/16 12:00:00	1013										17		Weather Underground data (Farnborough): falling barometric pressure, scattered clouds.	
BH01	01/10/16 12:00:00	1005										12		Weather Underground data (Farnborough): falling barometric pressure, mostly cloudy.	
BH01	02/10/16 11:50:00	1017										13		Weather Underground data (Farnborough): rising barometric pressure, scattered clouds.	
BH01	03/10/16 11:00:00	1019	0								0.0	18		Weather Underground data (Farnborough): steady barometric	
remarks # denotes result exceeding capacity of gas monitoring equipment VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.														CONTRACT 32362	CHECKED JI



Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H ₂ O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks	
BH01	03/10/16 11:01:00										0.0			pressure.	
BH01	03/10/16 11:02:00										0.0				
BH01	03/10/16 11:03:00										0.0				
BH01	03/10/16 11:04:00										0.0				
BH01	03/10/16 11:05:00			0.0	0.0	20.5	0.0	0	0	0.0					
BH01	03/10/16 11:06:00			0.0	0.0	20.5	0.0	0	0	0.0					
BH01	03/10/16 11:07:00			0.0	0.0	20.5	0.0	0	0	0.0					
BH01	03/10/16 11:08:00			0.0	0.0	20.5	0.0	0	0	0.0					
BH01	03/10/16 11:09:00			0.0	0.0	20.5	0.0	0	0	0.0					
BH01	03/10/16 11:15:00											4.34			
remarks # denotes result exceeding capacity of gas monitoring equipment VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.														CONTRACT 32362	CHECKED JI

GAS AND GROUNDWATER LEVELS

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Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H ₂ O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH02	20/09/16 12:00:00	1021										15		Weather Underground data (Farnborough): steady barometric pressure, overcast.
BH02	21/09/16 12:00:00	1018										19		Weather Underground data (Farnborough): steady barometric pressure, partly cloudy.
BH02	22/09/16 12:00:00	1019										17		Weather Underground data (Farnborough): steady barometric pressure, mostly cloudy.
BH02	23/09/16 10:52:00	1014	0									20		Weather Underground data (Farnborough): falling barometric pressure, mostly cloudy.
BH02	23/09/16 10:53:00										0.0			
BH02	23/09/16 10:54:00										0.0			
BH02	23/09/16 10:55:00										0.0			
BH02	23/09/16 10:56:00										0.0			
BH02	23/09/16 10:57:00										0.0			
BH02	23/09/16 10:58:00										0.0			
BH02	23/09/16 10:59:00										0.0			
BH02	23/09/16 11:00:00										0.0			
BH02	23/09/16 11:01:00										0.0			
BH02	23/09/16 11:02:00										0.0			
remarks # denotes result exceeding capacity of gas monitoring equipment VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.													CONTRACT 32362	CHECKED Jl

GAS AND GROUNDWATER LEVELS

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Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H ₂ O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks	
BH02	23/09/16 11:03:00			4.4	0.0	15.6	0.0	0	0	1.7					
BH02	23/09/16 11:04:00			4.8	0.0	15.2	0.0	0	0	1.6					
BH02	23/09/16 11:05:00			5.0	0.0	15.1	0.0	0	0	1.2					
BH02	23/09/16 11:06:00			5.1	0.0	15.1	0.0	0	0	1.0					
BH02	23/09/16 11:07:00			5.1	0.0	15.1	0.0	0	0	0.9					
BH02	23/09/16 11:08:00			5.0	0.0	15.1	0.0	0	0	0.7					
BH02	23/09/16 11:09:00			5.0	0.0	15.1	0.0	0	0	0.6					
BH02	23/09/16 11:10:00			4.9	0.0	15.1	0.0	0	0	0.6					
BH02	23/09/16 11:11:00			5.0	0.0	15.4	0.0	0	0	0.5					
BH02	23/09/16 11:12:00			5.0	0.0	15.1	0.0	0	0	0.4					
BH02	23/09/16 11:13:00												3.45		
BH02	30/09/16 12:00:00	1013										17		Weather Underground data (Farnborough): falling barometric pressure, scattered clouds.	
BH02	01/10/16 12:00:00	1005										12		Weather Underground data (Farnborough): falling barometric pressure, mostly cloudy.	
BH02	02/10/16 11:50:00	1017										13		Weather Underground data (Farnborough): rising barometric pressure, scattered clouds.	
BH02	03/10/16 11:40:00	1018	0								0.0	18		Weather Underground data (Farnborough): steady barometric	
remarks # denotes result exceeding capacity of gas monitoring equipment VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.														CONTRACT 32362	CHECKED JI

GAS AND GROUNDWATER LEVELS

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Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H ₂ O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH02	03/10/16 11:41:00										0.0			pressure.
BH02	03/10/16 11:42:00										0.0			
BH02	03/10/16 11:43:00										0.0			
BH02	03/10/16 11:44:00										0.0			
BH02	03/10/16 11:45:00			0.6	0.0	20.0	0.0	0	0	0.0				
BH02	03/10/16 11:46:00			0.7	0.0	19.9	0.0	0	0	0.0				
BH02	03/10/16 11:47:00			0.7	0.0	19.9	0.0	0	0	0.0				
BH02	03/10/16 11:48:00			0.7	0.0	19.9	0.0	0	0	0.0				
BH02	03/10/16 11:49:00			0.7	0.0	20.0	0.0	0	0	0.0				
BH02	03/10/16 11:50:00			0.7	0.0	19.9	0.0	0	0	0.0				
BH02	03/10/16 11:51:00			0.7	0.0	19.9	0.0	0	0	0.0				
BH02	03/10/16 11:52:00			0.7	0.0	20.0	0.0	0	0	0.0				
BH02	03/10/16 11:53:00			0.7	0.0	19.8	0.0	0	10	0.0				
BH02	03/10/16 11:54:00			0.7	0.0	19.9	0.0	0	20	0.0				
BH02	03/10/16 11:55:00												3.44	
remarks # denotes result exceeding capacity of gas monitoring equipment VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.													CONTRACT 32362	CHECKED Jl

GAS AND GROUNDWATER LEVELS

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Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H ₂ O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH03	20/09/16 12:00:00	1021										15		Weather Underground data (Farnborough): steady barometric pressure, overcast.
BH03	21/09/16 12:00:00	1018										19		Weather Underground data (Farnborough): steady barometric pressure, partly cloudy.
BH03	22/09/16 12:00:00	1019										17		Weather Underground data (Farnborough): steady barometric pressure, mostly cloudy.
BH03	23/09/16 10:14:00	1015	0									20		Weather Underground data (Farnborough): falling barometric pressure, mostly cloudy.
BH03	23/09/16 10:15:00										-0.2			
BH03	23/09/16 10:16:00										-0.1			
BH03	23/09/16 10:17:00										0.0			
BH03	23/09/16 10:18:00										0.0			
BH03	23/09/16 10:19:00										0.0			
BH03	23/09/16 10:20:00										0.0			
BH03	23/09/16 10:21:00										0.0			
BH03	23/09/16 10:22:00										0.0			
BH03	23/09/16 10:23:00										0.0			
BH03	23/09/16 10:24:00										0.0			
remarks # denotes result exceeding capacity of gas monitoring equipment VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.													CONTRACT 32362	CHECKED Jl

GAS AND GROUNDWATER LEVELS

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Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H ₂ O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks		
BH03	23/09/16 10:25:00			8.0	0.0	0.0	2.6	0	0	4.2						
BH03	23/09/16 10:26:00			8.3	0.0	0.0	1.6	0	0	5.8						
BH03	23/09/16 10:27:00			8.6	0.0	0.0	0.9	0	0	6.3						
BH03	23/09/16 10:28:00			8.9	0.0	0.0	0.4	0	0	6.6						
BH03	23/09/16 10:29:00			9.0	0.0	0.0	0.4	1	0	6.7						
BH03	23/09/16 10:30:00			9.0	0.0	0.0	0.6	0	0	6.4						
BH03	23/09/16 10:31:00			9.1	0.0	0.0	0.2	0	0	6.6						
BH03	23/09/16 10:32:00			9.1	0.0	0.1	0.3	2	0	6.7						
BH03	23/09/16 10:33:00			9.2	0.0	0.0	0.3	0	0	6.7						
BH03	23/09/16 10:34:00			9.2	0.0	0.0	0.3	0	0	6.7						
BH03	23/09/16 10:35:00												3.77			
BH03	30/09/16 12:00:00	1013										17		Weather Underground data (Farnborough): falling barometric pressure, scattered clouds.		
BH03	01/10/16 12:00:00	1005										12		Weather Underground data (Farnborough): falling barometric pressure, mostly cloudy.		
BH03	02/10/16 11:50:00	1017										13		Weather Underground data (Farnborough): rising barometric pressure, scattered clouds.		
BH03	03/10/16 10:45:00	1020	0								0.0	17		Weather Underground data (Farnborough): steady barometric		
remarks # denotes result exceeding capacity of gas monitoring equipment VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.														CONTRACT 32362		CHECKED JI



Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H ₂ O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks	
BH03	03/10/16 10:46:00										0.0			pressure.	
BH03	03/10/16 10:47:00										0.0				
BH03	03/10/16 10:48:00										0.0				
BH03	03/10/16 10:49:00										0.0				
BH03	03/10/16 10:50:00			0.2	0.0	20.4	0.0	0	0	0.0					
BH03	03/10/16 10:51:00			0.2	0.0	20.5	0.0	0	0	0.0					
BH03	03/10/16 10:52:00			0.1	0.0	20.4	0.0	0	0	0.0					
BH03	03/10/16 10:53:00			0.0	0.0	20.4	0.0	0	0	0.0					
BH03	03/10/16 10:54:00			0.0	0.0	20.4	0.0	0	0	0.0					
BH03	03/10/16 11:00:00											3.79			
remarks # denotes result exceeding capacity of gas monitoring equipment VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.														CONTRACT 32362	CHECKED JI

GAS AND GROUNDWATER LEVELS

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Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H ₂ O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (litr/hr)	temperature (°C)	water level (m - bgl)	remarks
BH04	20/09/16 12:00:00	1021										15		Weather Underground data (Farnborough): steady barometric pressure, overcast.
BH04	21/09/16 12:00:00	1018										19		Weather Underground data (Farnborough): steady barometric pressure, partly cloudy.
BH04	22/09/16 12:00:00	1019										17		Weather Underground data (Farnborough): steady barometric pressure, mostly cloudy.
BH04	23/09/16 11:25:00	1014	0									18		Weather Underground data (Farnborough): falling barometric pressure, mostly cloudy.
BH04	23/09/16 11:26:00										0.0			
BH04	23/09/16 11:27:00										0.0			
BH04	23/09/16 11:28:00										0.0			
BH04	23/09/16 11:29:00										0.0			
BH04	23/09/16 11:30:00										0.0			
BH04	23/09/16 11:31:00										0.0			
BH04	23/09/16 11:32:00										0.0			
BH04	23/09/16 11:33:00										0.0			
BH04	23/09/16 11:34:00										0.0			
BH04	23/09/16 11:35:00										0.0			
remarks # denotes result exceeding capacity of gas monitoring equipment VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.													CONTRACT 32362	CHECKED Jl

GAS AND GROUNDWATER LEVELS

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Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H ₂ O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks	
BH04	23/09/16 11:36:00			4.2	0.0	14.4	0.0	0	14	0.2					
BH04	23/09/16 11:37:00			4.3	0.0	13.3	0.0	0	0	0.5					
BH04	23/09/16 11:38:00			4.0	0.0	12.7	0.0	0	0	0.5					
BH04	23/09/16 11:39:00			4.5	0.0	13.0	0.0	0	0	0.4					
BH04	23/09/16 11:40:00			4.5	0.0	13.0	0.0	0	0	0.3					
BH04	23/09/16 11:41:00			4.6	0.0	13.0	0.0	0	0	0.4					
BH04	23/09/16 11:42:00			4.6	0.0	13.0	0.0	0	0	0.4					
BH04	23/09/16 11:43:00			4.6	0.0	13.0	0.0	0	0	0.4					
BH04	23/09/16 11:44:00			4.6	0.0	12.9	0.0	0	0	0.2					
BH04	23/09/16 11:45:00			4.6	0.0	12.8	0.0	0	0	0.2					
BH04	23/09/16 11:46:00											4.29			
BH04	30/09/16 12:00:00	1013										17		Weather Underground data (Farnborough): falling barometric pressure, scattered clouds.	
BH04	01/10/16 12:00:00	1005										12		Weather Underground data (Farnborough): falling barometric pressure, mostly cloudy.	
BH04	02/10/16 11:50:00	1017										13		Weather Underground data (Farnborough): rising barometric pressure, scattered clouds.	
BH04	03/10/16 11:20:00	1013									0.0	14		Weather Underground data (Farnborough): steady barometric	
remarks # denotes result exceeding capacity of gas monitoring equipment VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.														CONTRACT 32362	CHECKED JI



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Borehole /trial pit no.	date and time	barometric pressure (mb)	pressure differentiation (mm H ₂ O)	carbon dioxide (%)	methane (%)	oxygen (%)	LEL (%)	hydrogen sulphide (ppm)	carbon monoxide (ppm)	VOC (ppm)	gas flow (ltr/hr)	temperature (°C)	water level (m - bgl)	remarks	
BH04	03/10/16 11:21:00										0.0			pressure.	
BH04	03/10/16 11:22:00										0.0				
BH04	03/10/16 11:23:00										0.0				
BH04	03/10/16 11:24:00										0.0				
BH04	03/10/16 11:25:00			0.0	0.0	20.4	0.0	0	0	0.0					
BH04	03/10/16 11:26:00			0.0	0.0	20.4	0.0	0	0	0.0					
BH04	03/10/16 11:27:00			0.0	0.0	20.4	0.0	0	0	0.0					
BH04	03/10/16 11:28:00			0.0	0.0	20.4	0.0	0	0	0.0					
BH04	03/10/16 11:29:00			0.0	0.0	20.4	0.0	0	0	0.0					
BH04	03/10/16 11:30:00											4.30			
remarks # denotes result exceeding capacity of gas monitoring equipment VOC - Photoionisation Detector Mini RAE 2000 measures VOC vapours with 10.6eV lamp calibrated against isobutylene.														CONTRACT 32362	CHECKED JI