Southern Testing
Environmental & Geotechnical

ST Consult
Environmental & Geotechnical

Remediation Strategy and Verification Plan

Desk Studies | Risk Assessments | Site Investigations | Geotechnical | Contamination Investigations | Remediation Design and Validation

Site: The Roundhouse Theatre,
Chalk Farm Road,
London, NW1 8EH

Client: Roundhouse Trust

Report Date: 26th August 2021

Project Reference: V0927

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SUMMARY

The site, which extends to about 0.05ha, comprised an area of car parking, currently occupied by steel shipping containers, used for storage. It is proposed to redevelop the site with a new building containing performing-arts, rehearsal / education studios and offices. Some limited areas of landscaping are associated with the proposed development.

A historical Ordnance Survey map search and desk study was carried out by others. This indicated that the site has had a history of industrial use, as railway land.

Two phases of intrusive investigation were carried out upon the subject site, comprising an initial intrusive investigation, undertaken March 2017 and further works, in November 2019. Ground investigations were undertaken by others, to the south of the subject site, in 2014.

Access to the site area was restricted by the presence of shipping containers, at the time of both intrusive investigations. The depth of penetration was limited by the presence of subsurface concrete slabs.

The soils encountered comprised Made Ground to a depth of between 4.7mbgl to 5.2mbgl, underlain by firm brown, becoming stiff and grey with depth clay (London Clay) to a depth of 18.0mbgl.

Groundwater levels were found to stand at between 3.3mbgl to 3.9mbgl, during monitoring. This represented perched water situated upon the top of the London Clay, in the zone of the Made Ground.

Relevant Pollutant Linkages have been identified, comprising elevated levels of methane and carbon dioxide.

The gas screening value calculated for the site classified the site as characteristic situation 2 (CS2). Therefore basic soil gas protection measures would be required for the development.

Potential pollutant linkages have been identified for asbestos containing materials; comprising loose fibres of chrysotile that were noted within the Made Ground tested from BH2A; and PAH compounds that can impact upon buried services.

A Remediation Strategy comprising the following is proposed:

- Ground gas protection measures are to be used for the new buildings, to CS2 standards. The protection measures should be installed by a suitably qualified contractor. Verification and certification for the installation will be needed.
- Assessment of site surface when hard standings are removed.
- A watching brief for the presence of previously un-encountered contamination during development works.
- Removal of Made Ground from areas of ground level soft landscaping and replacement with clean imported topsoil, to give a minimum clean cover thickness of 300mm. However, if trees and shrubs are proposed, consideration should be given to increasing this to 600mm.

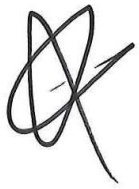
This strategy is proposed, subject to approval by regulatory authorities.

A Verification Plan and Discovery Strategy are also included.

The contamination screening values used are valid at the time of writing but may be subject to change and any such changes will have implications for the assessments based upon them. Their validity should be confirmed at the time of site development.

This report has been prepared for the sole internal use and reliance of the Roundhouse Trust, and their appointed Engineers. This report shall not be relied upon or transferred to any other parties without the express written authorisation of Southern Testing Laboratories Limited. If an unauthorised third party comes into possession of this report they rely on it at their peril and the authors owe them no duty of care and skill.

The findings and opinions conveyed via this report are based on information obtained from a variety of sources as detailed within this report, and which Southern Testing Laboratories Ltd believes are reliable. Nevertheless, Southern Testing Laboratories Ltd cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.



S K Toms MSc MIEnvSc AIEMA (Countersigned)

E Richardson ARSM MSc FGS (Signed)

For and on behalf of Southern Testing Laboratories Limited

STL: V0927
26th August 2021

TABLE OF CONTENTS

A INTRODUCTION

1 Authority

Our authority for carrying out this work is contained in a completed STL project order form, dated 6 August 2021, from the Roundhouse Trust.

2 Location

The site was located in Chalk Farm, 800m north west of Camden Town, Chalk Farm, London, NW1. The approximate National Grid Reference of the site was TQ 28189 84326.

The site location is indicated on Figure 1 within Appendix A.

3 Proposed Construction

It is proposed to construct a new building containing performing-arts, rehearsal / education studios and offices, which are to be built in the yard just to the north of the existing Roundhouse building.

There is limited soft landscaping associated with the proposals, comprising some free standing planters that are to be located on top of the hard landscaping; and some of areas of ground level planting, located adjacent to the entrance from Regent's Park Road and in front of the new building, see Figure 2 in Appendix A.

For the purposes of the contamination risk assessment, the proposed development land use is classified as **Commercial (CLEA model[1]/C4SL report[2]).** The gas sensitivity of the proposed development is rated as Low **(CIRIA C665[3]).**

4 Scope

This report presents our Remediation Options Appraisal, Remediation Strategy, and Verification Plan for the proposed remedial works at the site.

As with any site there may be differences in soil conditions between exploratory hole positions.

The findings and opinions conveyed via this report are based on information obtained from a variety of sources as detailed within this report, and which Southern Testing Laboratories Limited believes are reliable. Nevertheless, Southern Testing Laboratories Limited cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.

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[1] Environment Agency Publication SC050021/SR3 'Updated technical background to the CLEA Model' (2009).
[2] SP1010 Development of Category 4 Screening Levels DEFRA (2014)
[3] CIRIA C665 (2006) Assessing risks posed by hazardous ground gases to buildings.

The recommendations contained in this report may not be appropriate to alternative development schemes.

The contamination screening values used are valid at the time of writing but may be subject to change and any such changes will have implications for the assessments based upon them. Their validity should be confirmed at the time of site development.

B BACKGROUND INFORMATION

5 Site History

The site has a long history of use as part of the railway, with the Roundhouse being originally built in 1847 by the London and North Western Railway, to house a turntable for locomotives. It became used for concerts in circa 1964.

The surrounding area is mixed use, comprising railways and railway land uses to the south and east and a mix of commercial and residential to the other boundaries.

6 Site Investigation Works

The site has been the subject of a desk study and a series of intrusive site investigation reports.

Ref	Date	Author	Title/Ref No.	Subject
1	October 2014	AP Geotech	Phase 1 Environmental Assessment ref: 4144-1	Desk study
2	October 2014	AP Geotech	Phase 2 Geoenvironmental Investigation ref: 4144-2	Intrusive investigation for area to south of subject site
3	Mar 2017	STL	Revised Desk Study, Site Investigation & Risk Assessment Report STL Ref: J13005	Revised desk study with intrusive investigation
4	Nov 2019	STL	Additional Site Investigation & Risk Assessment Report STL Ref: J14197 issue 1	Additional site investigation & risk assessment
5	January 2020	STL	Additional Site Investigation & Risk Assessment Report STL Ref: J14197 issue 2	Additional site investigation & risk assessment, with soil gas monitoring and recommendations for soil gas protection measures

These reports provide reasonable coverage and characterisation of the site and information derived from these reports is discussed below. The reader is referred to the original reports for supporting detail if needed. These reports are referred to below by the number given in the left hand column of the above table.

For report 2, above, no exploratory holes were drilled within the area of the proposed development; but the reports provide useful information.

The cable percussive borehole (BH1) drilled for AWP report ref: 4144-2, extended to a depth of 18.5mbgl. The borehole encountered a 4.8m thickness of Made Ground. Two soil samples were tested for an equivalent suite to the STL Key contaminant suite. No results of concern were observed.

A significant thickness of Made Ground (>5.0m) was found to underlie the site. Based upon a commercial land use, there were no results of concern noted for the soil samples subject to chemical analysis for this site.

Traces of asbestos containing materials, comprising loose fibres of chrysotile were noted within the Made Ground tested from BH2A. Quantification analysis was carried out and the result obtained was <0.001% by weight.

Elevated levels of methane were noted during the initial ground gas monitoring visit, undertaken in October 2019, for report number 4 (ref: J14197). Six additional rounds of ground gas monitoring were undertaken, to calculate the gas screening value for this site and to characterise the site.

The site was characterised as CS2, where basic soil gas protection measures are required.

7 Relevant Pollutant Linkages

The site investigations and risk assessments carried out identified the following Relevant Pollutant Linkages for the site:

Contaminant/Source	Pathways	Receptors
Soil gas emissions	Inhalation of internal vapours	Site end users
PAH compounds in Made Ground	Direct contact	Structures/services

In addition, potential pollutant linkages have been identified for asbestos containing materials, with sept to construction workers. To date only one instance of asbestos containing materials has been found. However, following removal hard standing from across the site, a site surface inspection and soil sampling of the residual Made Ground will be needed.

C REMEDIAL OBJECTIVES AND OPTIONS

8 Remedial Objectives

Site specific remediation objectives, used to determine feasibility of remedial options (included in CLR 11), are to ensure that the site is suitable for its proposed use post redevelopment, as a new building containing performing-arts, rehearsal / education studios and offices, with some areas of soft landscaped areas.

9 Options Appraisal

Potential for Asbestos in the Made Ground

Asbestos, comprising traces of loose fibres of chrysotile, were noted to be associated with the Made Ground in one location.

The risks associated with this potential contamination are considered to potentially pose a risk to construction workers; however, it is possible that whilst ground works are being undertaken on site, pockets of buried ACMs may be encountered.

If this is the case, further investigation and a site specific risk assessment may be required, together with appropriate RPE and PPE protection.

Soil Gas Emissions

The source of the soil gas emissions appears to be the Made Ground beneath the site. Given the depth of this material and the also extent of the Made Ground beyond the boundary of the subject site, the removal is considered unfeasible. Therefore the only option to mitigate the risk are the provision of soil gas protection measures.

In this instance soil gas protection measures to CS2 are required. This should include insulated concrete plank floor (suspended). All joints and penetrations are to be sealed. Minimum 2000g reinforced gas proof membrane to be placed beneath the floor slab and passively vented under floor sub-space.

The soil gas protection measures should be inspected and verified as suitable when complete.

11 Remediation Methods

The Remediation Strategy will comprise the following:

Location	Details
Landscaping areas	Removal of Made Ground from the proposed landscaping areas that are to be installed within the ground. Replacement of these soils with clean imported topsoil, to give a minimum clean cover thickness of 300mm. However, if trees and shrubs are proposed, consideration should be given to increasing this to 600mm See Figure 2 in Appendix A.
Made Ground in development site area	A watching brief should be kept for the presence of asbestos containing materials or other contamination.
New buildings Floor slabs and voids	Soil gas protection measures to CS2 standards are required. A proprietary gas membrane will be installed beneath the ground floor slab of the new buildings. This will require verification and certification of installation.

Location	Details
	See documentation, drawings and plans in Appendix C.
Buried Services	Services are likely to require to be laid using hydrocarbon resistant materials. The service provider should be consulted at an early stage, to ascertain the specification of the materials to be used.

12 Assessment Criteria

The following assessment criteria values will be used in the verification process:

Imported soils shall be free from deleterious materials, weeds and contamination. The material to be used will be tested in accordance with the appropriate BS Specifications for Topsoil (BS 3882:2015) and Subsoil (BS 8601:2013) and the analysis shall also comply with the values given for commercial land use in the table in Appendix B.

These values are valid at the time of writing but may be subject to change and any such changes will have implications for the assessments based on them. Their validity should be confirmed at the time of site development.

D VERIFICATION PLAN

13 Data Collection

Location	Data	Responsible party
Landscaping areas	Post strip inspection of surface Post placement check of thickness Verification soil sampling and analysis Post placement soil samples Consignment Notes	Southern Testing Southern Testing Southern Testing Southern Testing Ground worker
Site surface	Inspection of site surface after removal of hard standing for presence of previously un-encountered contamination Watching brief	Southern Testing Ground worker
New buildings: Floor slabs and voids	Post installation inspection and certification of gas membrane	Specialist Contractor

Clean, site won, natural subsoil can be used to make up levels, if this is a requirement.

However, this would need to be tested to show it is suitable for the proposed end use and records stating where it was taken from and where it has been placed would need to be kept.

14 Analytical Framework

The results of the analyses will be compared with the assessment criteria given in Section 12. Due to the small number of samples anticipated, no statistical analysis will be carried out.

15 Reporting

At the end of the remediation, a verification report will be produced by Southern Testing.

16 Discovery Strategy

As with any site, areas of contamination not identified during site investigation works may come to light in the course of redevelopment. Accordingly, a discovery strategy will be adopted to ensure that any hitherto unknown contamination is identified and dealt with in an appropriate manner, as follows:

- A close watch will be maintained during all demolition and excavation works.
- In the event that unexpected or malodorous soils or liquids are encountered, excavation work shall cease in the affected area.
- The affected area shall be made safe and fenced off to prevent unauthorised access.
- The Site Manager shall notify Southern Testing Laboratories of the discovery, who will attend site to inspect the suspect materials, provide advice and take samples as necessary. Within Southern Testing Laboratories, Eliza Richardson shall be the first point of contact.
- The Site Manager shall notify Camden Council of the discovery. Within Camden Council, the environmental health officer shall be the first point of contact.

Any suspect excavated soil will be stockpiled separately on polythene sheeting, covered, and tested before being removed

17 General Guidance

In general terms, the workforce and general public should be protected from contact with contaminated material. There is a range of relevant documents published by the Health and Safety Executive, and organisations such as CIRIA, and the BRE.

Some soils will require removal from site and disposal to suitably licensed landfills. Different guidelines and charges will apply to different waste classifications. As waste producers, the Developer holds responsibilities under the various governing regulations, including:-

- Ensuring that waste is characterised in accordance with current Technical Guidance.
- Ensuring that waste is disposed of at a facility appropriately licensed to receive the waste as classified.

- Keeping accurate records of all waste classification, transfer and a disposal log including information such as:
    - Date, Waste Classification, Carrier's Registration Number, Transfer Note Number, Ultimate Destination.
- Submitting full copies of those records for inclusion in validation/closure reports.

Maintaining those records for potential future regulatory inspection.

APPENDIX A

Site Plans

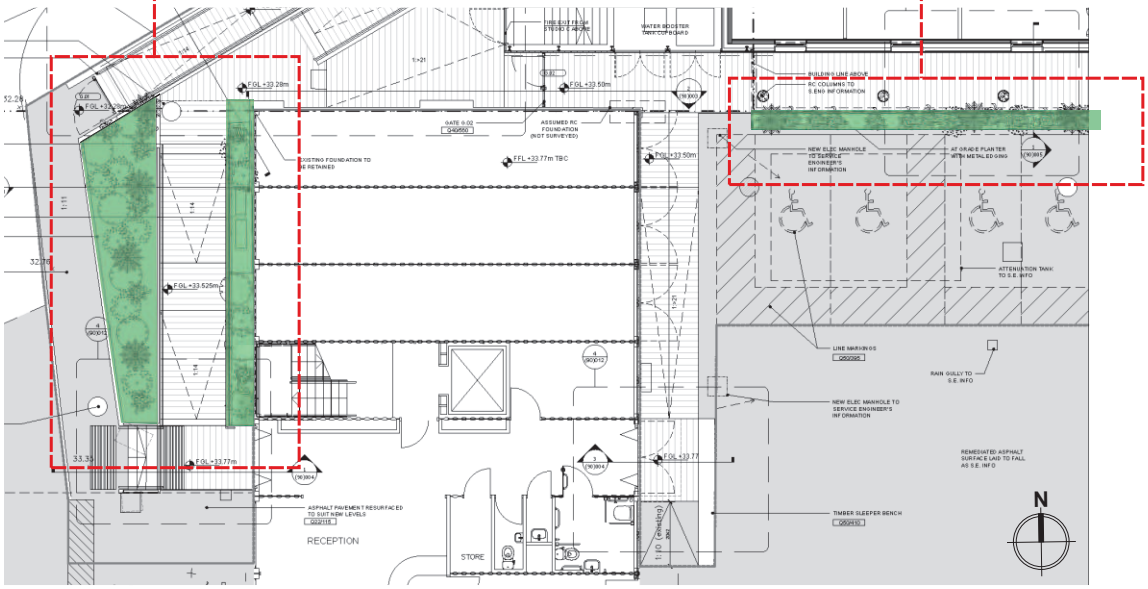
NB: Contains Ordnance Survey Data © Crown copyright and database right 2021.

Site: The Roundhouse, 100A Chalk Farm Road, London, NW1 8EH	STL: V0927	Fig No: 1
Date: 26th August 2021	Site Location Plan	

APPENDIX A - Planting plan areas

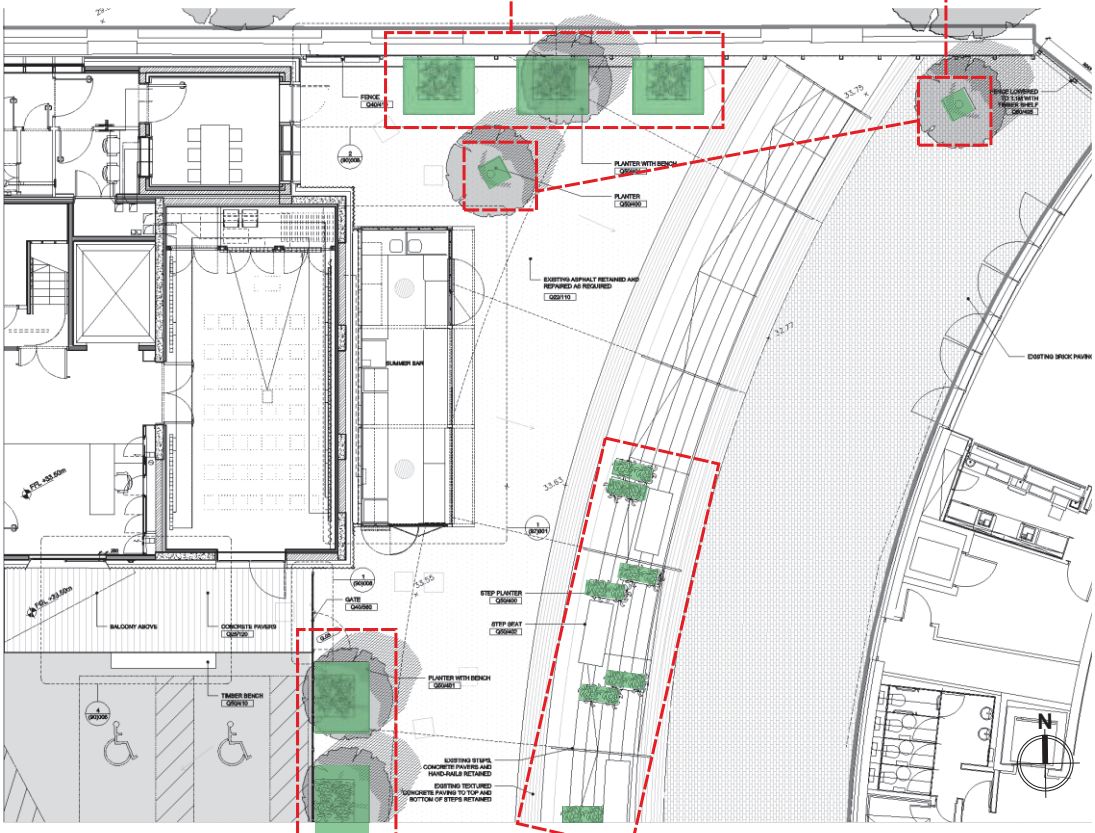
APPENDIX A
Entrance ramp

APPENDIX B
Service yard



APPENDIX C
Planter benches

APPENDIX D
Smaller planters



APPENDIX E
Planter benches

APPENDIX F
Step planters

APPENDIX B

Verification Criteria

Contaminant Screening Values for Imported Soils

Contaminant	Units	Proposed Land Use					
		Residential with homegrown produce consumption	Residential without homegrown produce consumption	Open Space* (Residential)	Open Space* (Park)	Allotments	Commercial / Industrial
Arsenic (As) [2]	mg/kg	37	40	79	170	43	640
Cadmium (Cd) [2]	mg/kg	11	85	120	555	1.9	190
Trivalent Chromium (CrIII) [2]	mg/kg	910	910	1,500	33,000	18,000	8600
Hexavalent Chromium (CrVI) [2]	mg/kg	6	6	7.7	220	1.8	33
Lead (Pb) [3]	mg/kg	200	310	630	1300	80	2330
Mercury (Hg) [1,2,7]	mg/kg	7.6-11	9.2-15	40	68-71	6.0	29-320
Selenium (Se) [2]	mg/kg	250	430	1,100	1,800	88	12,000
Nickel (Ni) [1,4]	mg/kg	pH<6.0 60 pH 6.0-7.0 75 pH>7.0 110					
Copper (Cu) [1,4]	mg/kg	pH<6.0 100 pH 6.0-7.0 135 pH>7.0 200					
Zinc (Zn) [1,4]	mg/kg	pH<6.0 200 pH 6.0-7.0 200 pH>7.0 300					
Phenol [1,2]	mg/kg	120-380	440-1200	440-1300	440-1300	23-83	440-1300
Benzo[a]pyrene [1,5]	mg/kg	1.7-2.4	2.6	4.9	10	0.67-2.7	36
Naphthalene [1,2]	mg/kg	2.3-13	2.3-13	77-430+	77-430+	4.1-24	77-430+
Total Cyanide (CN) [6]	mg/kg	/	/			/	/
Free Cyanide [6]	mg/kg	/	/			/	/
Complex Cyanides [6]	mg/kg	/	/			/	/
Thiocyanate [6]	mg/kg	/	/			/	/

Notes:

***** Open Space levels calculated on the basis of the exposure modelling developed in the C4SL research.

+ Screening values constrained to saturation limit. Higher values may be acceptable on a site specific basis.

[1] Where ranges of values are given for organic contaminants, the screening value is dependent on the Soil Organic Matter. Where ranges are given for inorganic contaminants, the screening value is dependent on the pH.

[2] LQM/CIEH S4UL (2014). Copyright Land Quality Management Ltd reproduced with permission; Publication Number S4UL 3116. All rights reserved.

[3] C4SL (DEFRA 2014).

[4] Copper Zinc and Nickel may have phototoxic effects at the GAC or SGV concentrations and alternative criteria are given for importation of Topsoil or other soils for cultivation, based on BS3882:2015 (Topsoil) and BS8601:2013 (Subsoil).

[5] Based on the Surrogate Marker approach and modelled using the modified exposure parameters of C4SL but retaining 'minimal risk' HCV.

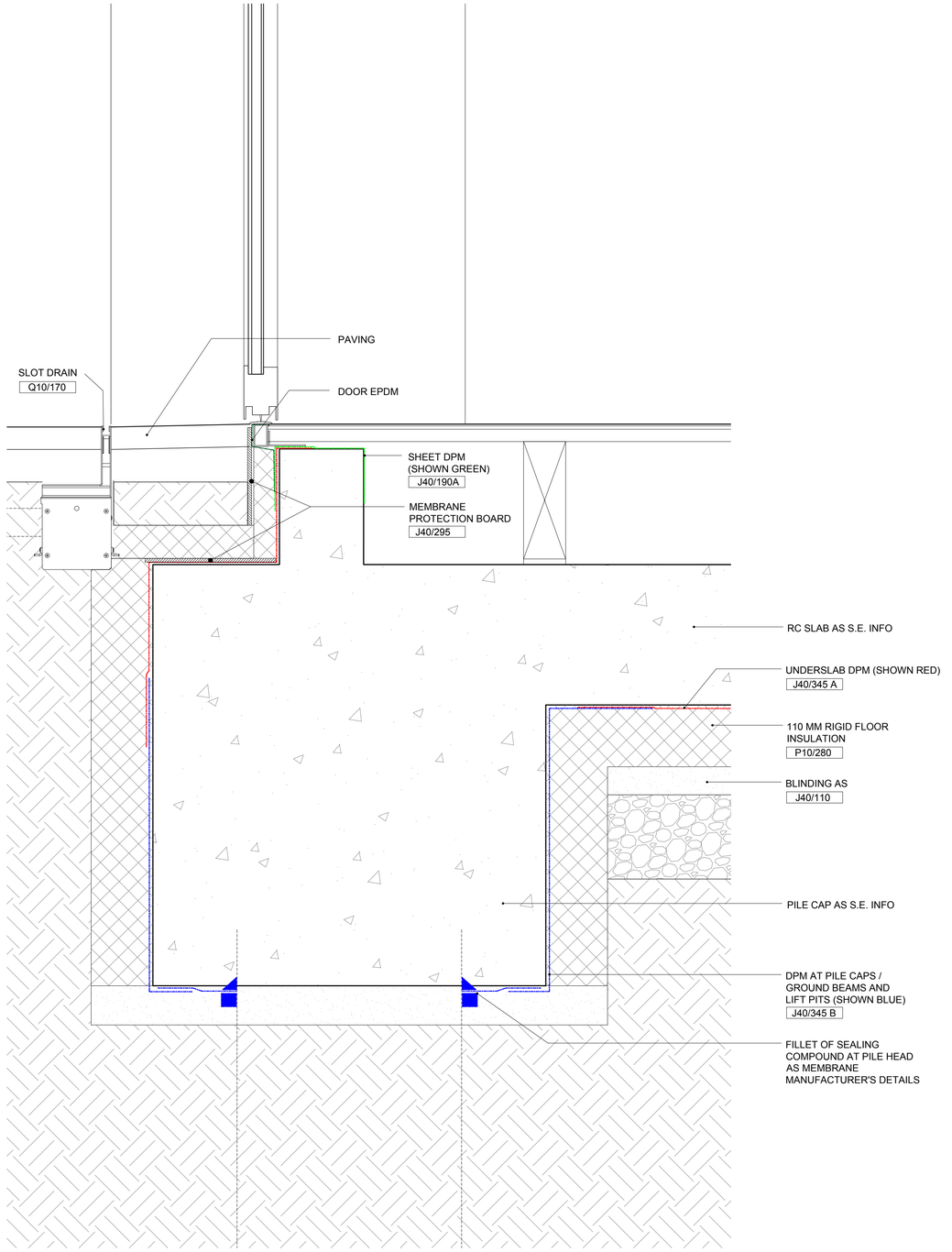
[6] Usually Non-Detect concentrations. Screening criteria to be derived on a site specific basis if test results indicate.

[7] SGV/GAC for Methyl Mercury, higher concentrations may be tolerable if inorganic mercury is the only species present. Lower concentrations apply for elemental mercury.

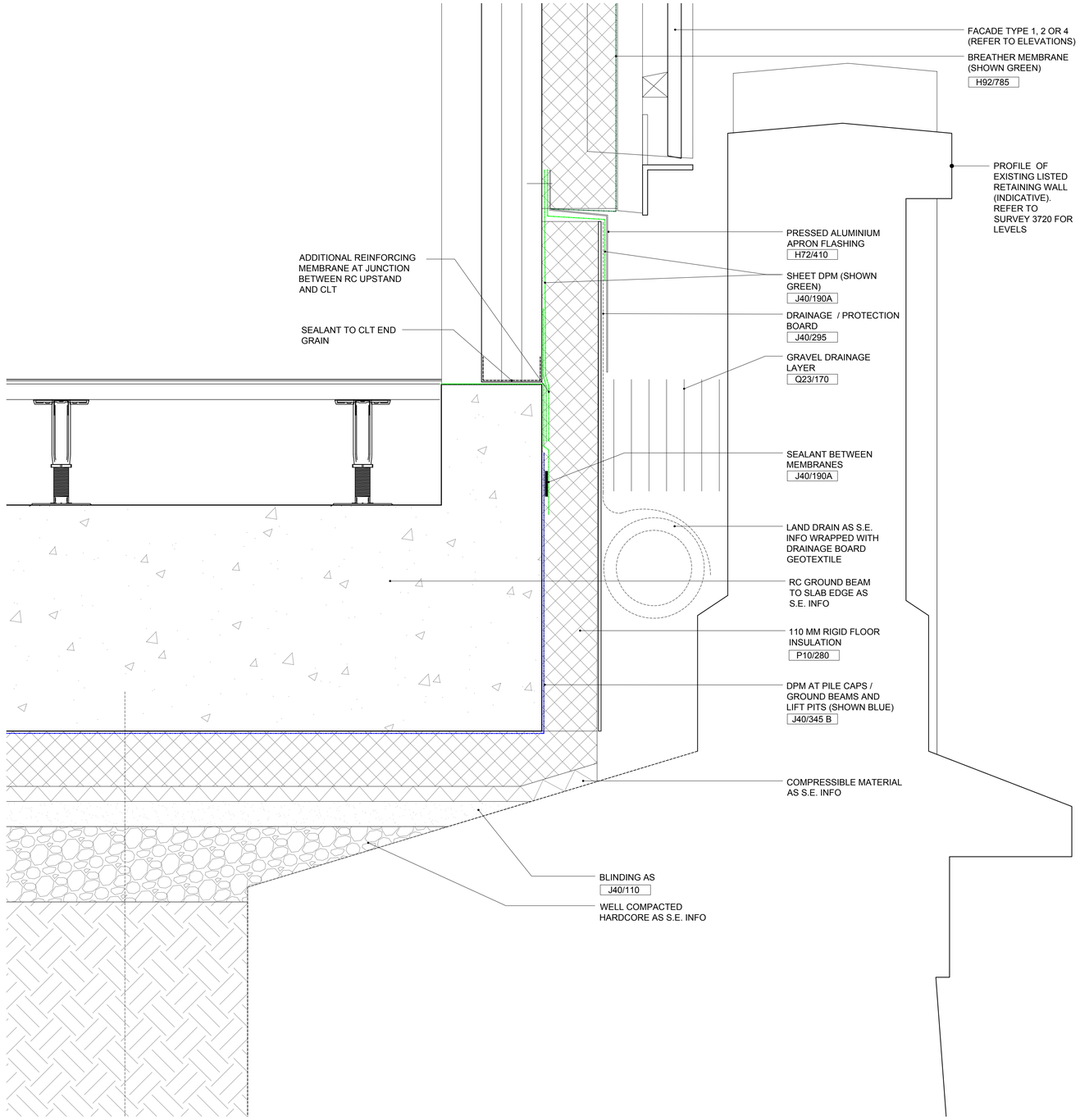
These screening values are valid at the time of writing but may be subject to change. Their validity should be confirmed at the time of site development.

APPENDIX C

Proposed Soil Gas Protection Drawings and Documentation



1. SLOT DRAIN AT FLUSH THRESHOLDS AND TYPICAL GROUND BEAM / PILE CAP



2. TYPICAL SECTION THROUGH STREET WALL

DO NOT SCALE

THE CONTRACTOR IS TO CHECK AND VERIFY ALL BUILDING AND SITE DIMENSIONS, LEVELS AND SEWER INVERT LEVELS AT CONNECTION POINTS BEFORE WORK STARTS.

THIS DRAWING IS TO BE READ AND CHECKED IN CONJUNCTION WITH ENGINEERS AND OTHER SPECIALIST DRAWINGS.

REV	DATE	DESCRIPTION
-	17.03.20	DRAFT TENDER ISSUE FOR COORDINATION
A	17.04.20	TENDER ISSUE
B	01.05.20	TENDER UPDATE
C	22.01.20	TENDER UPDATE
D	22.01.20	TENDER UPDATE
C01	05.05.21	CONSTRUCTION

DETAIL 1 APPLIES TO ALL PILE CAPS / HEADS.

ENSURE THAT LISTED WALL IS ADEQUATELY PROTECTED DURING THE WORKS TO PREVENT DAMAGE.

0 0.1 0.2 0.3m

DRAWING
WATERPROOFING DETAILS (SHEET 1)

DRAWING NO 1906(10)001
REVISION C01

SCALE 1:5 @ A1 1:10 @ A3
DATE 17.03.20

STATUS
CONSTRUCTION

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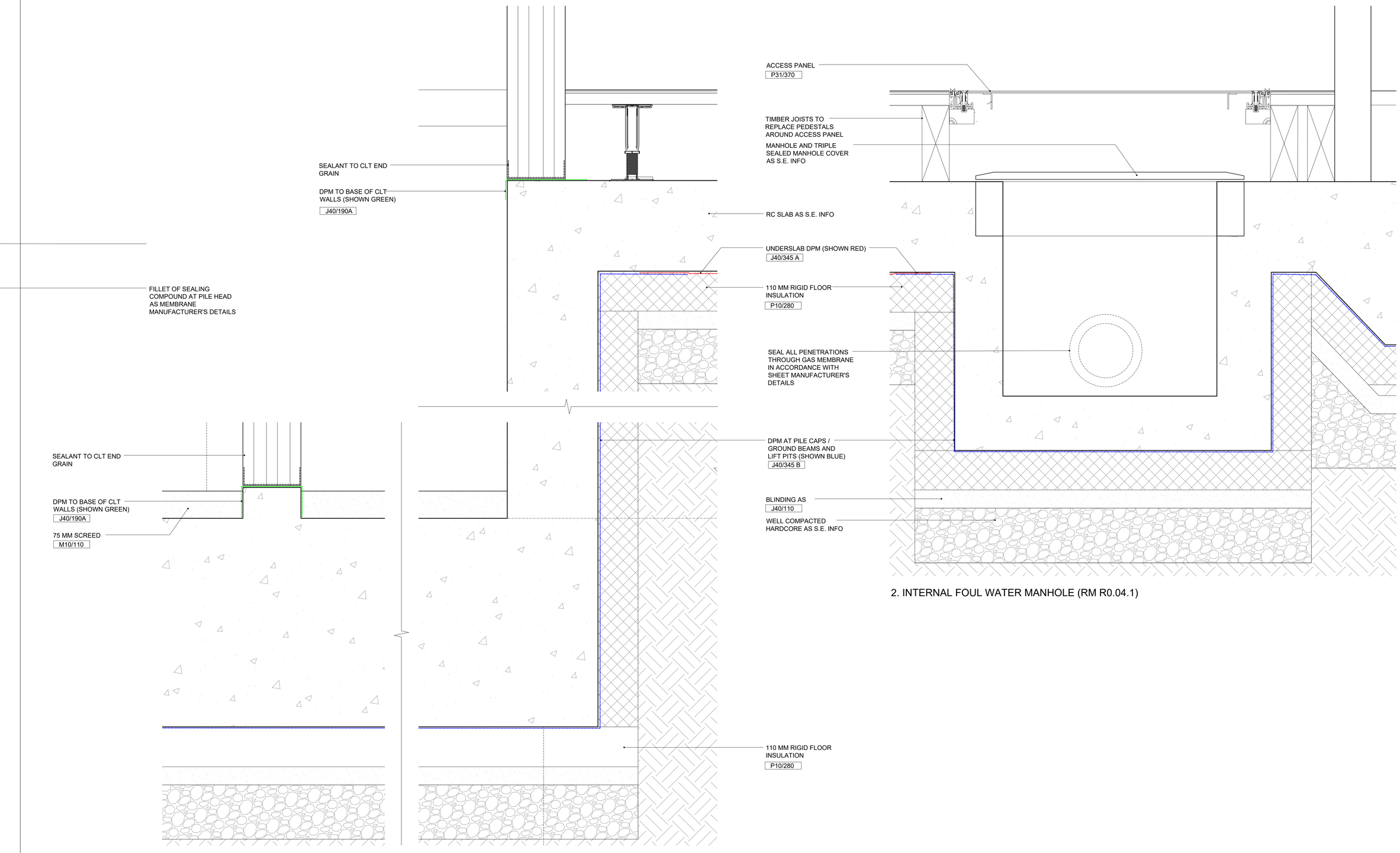
PROJECT 1906 ROUNDHOUSE CAMPUS



1. LIFT PIT / PIT AT FOOT OF SERVICES RISER TO REAR OF LIFT PIT

2. INTERNAL FOUL WATER MANHOLE (RM R0.04.1)

DO NOT SCALE

THE CONTRACTOR IS TO CHECK AND VERIFY ALL BUILDING AND SITE DIMENSIONS, LEVELS AND SEWER INVERT LEVELS AT CONNECTION POINTS BEFORE WORK STARTS.

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C01	05.05.21	CONSTRUCTION

0 0.1 0.2 0.3m

DRAWING
WATERPROOFING DETAILS (SHEET 2)

DRAWING NO 1906(10)002
REVISION C01

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DATE 17.03.20

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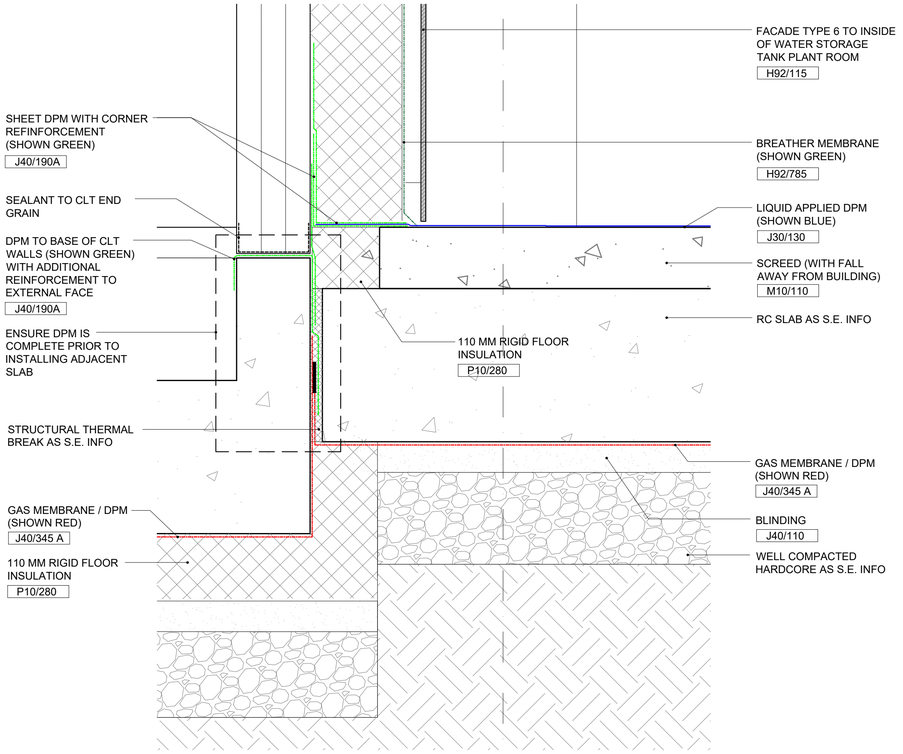
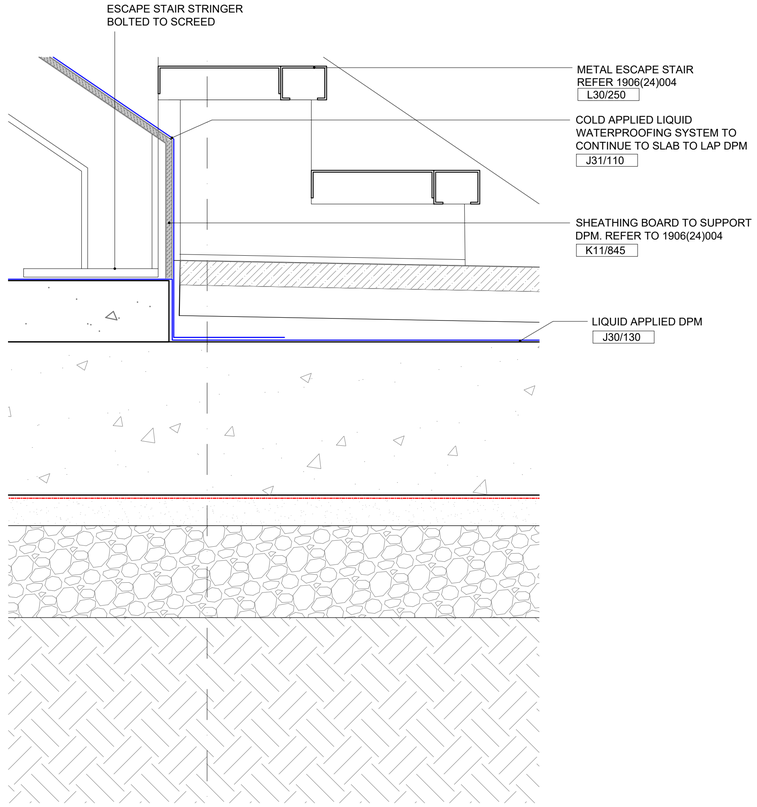
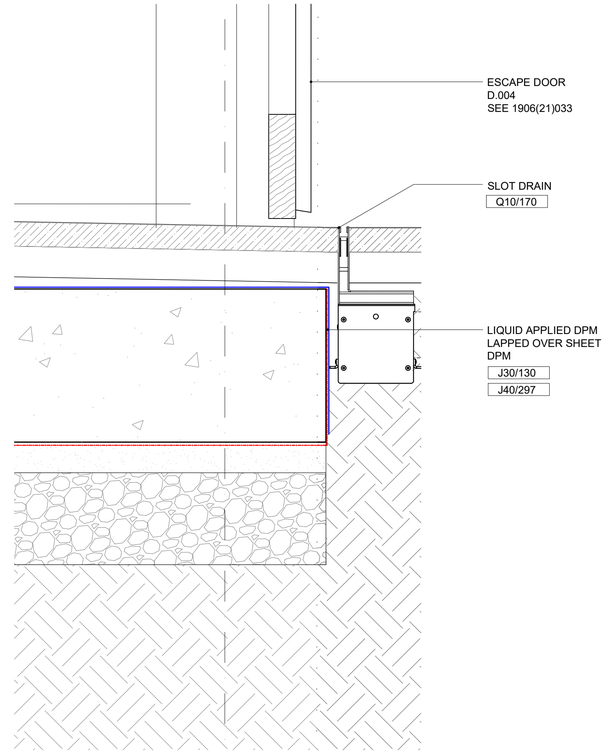


1. EDGE OF GROUND FLOOR TO WATER TANK PLANT ROOM



2. FOOT OF EXTERNAL ESCAPE STAIR AND LANDSCAPING



3. ESCAPE STAIR DOOR THRESHOLD

DO NOT SCALE

THE CONTRACTOR IS TO CHECK AND VERIFY ALL BUILDING AND SITE DIMENSIONS, LEVELS AND SEWER INVERT LEVELS AT CONNECTION POINTS BEFORE WORK STARTS.

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A	17.04.20	TENDER ISSUE
B	01.05.20	TENDER UPDATE
C	22.01.21	TENDER UPDATE
C01	05.05.21	CONSTRUCTION

0 0.1 0.2 0.3m

DRAWING
WATERPROOFING DETAILS (SHEET 3)

DRAWING NO 1906(10)003
REVISION C01

SCALE 1:5 @ A1 1:10 @ A3
DATE 17.03.20

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PROJECT 1906 ROUNDHOUSE CAMPUS

REED WATTS

Roundhouse Campus

Architectural Specification J40

For Construction

C01

17-06-2021

1906(SP)J40

Contents

J40
Flexible sheet waterproofing/ damp proofing

To be read with preliminaries/ general conditions.

115 Concrete blinding to hardcore beds

1. Concrete: Designated GEN 1 or Standardized prescribed ST2.
   1.1. Thickness: 50 mm
2. Finish on completion: Smooth.

Types of tanking/ damp proofing

145 Loose laid weldable polyethylene gas retardant damp proofing Type A

1. Location: Under and to perimeter of RC slab
2. Substrate: Insulation as shown on drawings 1906(10)001-003
3. Manufacturer: RIW Ltd, 580-581 Ipswich Road, Slough, Berkshire SL1 4EQ
   Tel : +44 1344 397777
   E-mail : technical@riw.co.uk
   Web : www.riw.co.uk
   3.1. Product reference: RIW Gas Seal HC
4. Thickness/ Gauge: 0.5mm
5. Colour: Black
6. Joints
   6.1. Surfaces to be joined: Clean and dry beyond full width of joint.
   6.2. Laps (minimum): 150mm
   6.3. Jointing: Hot-air welded
   6.4. Sealing: RIW Lap Tape. Roll to provide gas tight joints.
7. Installation: To be carried out by installed by qualified specialists and strictly in accordance with manufacturers requirements to achieve CS2 standard in conjunction with concrete slab (to BS 8485: 2015). Protect membrane using boards as clause 295 to edge and top of slab where likely to be damaged by site activities.
8. Penetrations: Pipe penetrations should minimised. Where they occur, they are to be sealed using Preformed Pipe Collars; sealed to the membrane, and pipe using Gas Seal Tape HC and Lap Tape ; see manufacturer's Pipe Penetration Detail.

145 Loose laid weldable polyethylene gas retardant damp proofing Type B

1. Locations: To pile caps / ground beams and lift pit
2. Substrate: Insulation as shown on drawings 1906(10)001-003
3. Manufacturer: RIW Ltd, 580-581 Ipswich Road, Slough, Berkshire SL1 4EQ
   Tel : +44 1344 397777
   E-mail : technical@riw.co.uk
   Web : www.riw.co.uk
   3.1. Product reference: RIW Structureseal GPT
4. Thickness/ Gauge: 1.5mm
5. Colour: Black
6. Joints
   6.1. Surfaces to be joined: Clean and dry beyond full width of joint.
   6.2. Laps (minimum): 100mm selvedge.

6.3. Jointing: Hot-air welded

7. Installation: To be carried out by installed by qualified specialists and strictly in accordance with manufacturers requirements to achieve CS2 standard in conjunction with concrete slab (to BS 8485: 2015). Protect membrane using boards as clause 295 to edge and top of slab where likely to be damaged by site activities.

190 A Self-adhesive bitumen damp proofing/ tanking

1. Manufacturer: RIW
   1.1. Web: www.riw.co.uk
   1.2. Email: technical@riw.co.uk
2. Product reference: RIW Sheetseal GR
3. Primer: RIW Sheetseal Primer
4. Number of layers: One (plus reinforcing layers where recommended by the manufacturer or indicated on drawings)
5. Bonding: Full. Smooth out to exclude air.
6. Joints
   6.1. Surfaces to be joined: Clean and dry beyond full width of joint.
7. Other requirements: Where overlapping gas membrane, provide 50 x 5mm thick bead of Sealing compound between the membrane and the Sheetseal 226 in accordance with the manufacturer's details.

295 Geocomposite studded cavity drainage board

1. Substrate: DPM as clause 297
2. Manufacturer: RIW
   RIW Limited, Arc House, Terrace Road South, Binfield, RG42 4PZ. Tel : 01344 397777 Fax : 01344 862010
   E-mail : technical@riw.co.uk Web : www.riw.co.uk
   2.1. Product reference: RIW Double Drain
3. Stud height: 8mm
4. Fixing: RIW Adhesive Tape, unless noted otherwise.
   4.1. Fixing centres: 2000mm maximum
5. Joints: Separate geotextile fabric from studded sheet, make overlapped joint and connect in accordance with manufacturer’s recommendations.
6. Exposed edges and corners: Seal with geotextile fabric to prevent silt entering the core.
7. Backfilling: Carry out when tanking, loading and protection are complete.
8. Accessories: RIW Top Edging Strip

Workmanship

310 Workmanship generally

1. Condition of substrate
   1.1. Clean and even textured, free from voids and sharp protrusions.
   1.2. Moisture content: Compatible with damp proofing/ tanking.
2. Air and surface temperature: Do not apply sheets if below minimum recommended by membrane manufacturer.
3. Condition of membrane at completion
   3.1. Neat, smooth and fully supported, dressed well into abutments and around intrusions.
   3.2. Completely impervious and continuous.
   3.3. Undamaged. Prevent puncturing during following work.

4. Permanent overlying construction: Cover membrane as soon as possible.

320 Inspection and Verification

1. Verification: The gas proof membrane is to be independently inspected and verified prior to covering.
   1.1. Appointment: The Contractor is to appoint a suitably qualified, independent third party (ie a company not related to the Contractor, Installer or membrane supplier) to carry out inspections and to provide verification reports.
   1.2. Approval: Details of the proposed verification company shall be supplied to the CA for approval at least two weeks prior to the first inspection taking place in order to demonstrate their suitability and independence.
   Approval shall not be unreasonably withheld.
   1.3. Standard: Verification to be carried out in accordance with CIRIA C735, Good practice on the testing and verification of protection systems
   for buildings against hazardous ground gases
   1.4. Making good: Carry out any repairs to the membrane / gas protection system as necessary prior to proceeding covering.
   1.5. Reports: Submit copies of all verification reports on completion.
2. Give notice: In addition to independent verification, give notice to the Architect prior to covering any part of membrane with overlying construction.

360 Junctions with projecting dpcs/ cavity trays

1. Adjoining surfaces: Clean and dry.
2. Dpcs/ Cavity trays: Lap and fully bond/ seal with sheeting.
   2.1. Laps (minimum): 100mm
   2.2. Bonding/ Sealing: As main sheeting.

365 Junctions with flush dpcs/ cavity trays

1. Adjoining surfaces: Clean and dry.
2. Preparation of adjacent dpcs/ cavity trays
   2.1. Expose edge where concealed.
   2.2. Lap and fully bond/ seal sheeting to wall.
   2.3. Dressing of sheeting beyond dpc/ cavity tray (minimum): 50 mm.
   2.4. Bonding/ Sealing: As main sheeting.

370 Pipes, ducts, cables etc A

1. Where these pass through sheeting, make junctions completely impervious using preformed collars as supplied by sheeting manufacturer.

380 Protection boards for damp proofing/ tanking

1. Membrane protection:: As clause 295.

Ω End of Section

REED
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P1.8 Concrete

P1.8.2 Designed concrete

To be in accordance with BS 8500-2 and BS EN 206-1

Notes:
1. All sections of the specification must be completed before it is passed to the producer. The person sending the final specification to the producer must send copies of the document to all other parties (CA, Engineer, Employer as appropriate) who have contributed to the specification.
2. Where 'None' is entered in the table this is a default value to ensure that the specification is complete. All those involved in completing the specification need to check if 'None' is appropriate.
3. Guidance on specification of designed concrete can be found in BS 8500-1: 2015, Section 4.3.

	Requirements	Location 1	Location 2	Location 3	Location 4
1	Concrete reference	Foundations, Retaining Walls & Ground Floor Slab	Columns & First Floor Slab		
2	Strength class	C35/45	C35/45		
3	Maximum water-cement ratio	0.45	0.40		
4	Minimum cement content kg/m^3	360	380		
5	DC-Class where appropriate	DC-4	NA		
6	Permitted cement types - See BS 8500-1:2015, Cl. 4.3.2, Note 3	All in table A.6	All in table A.6		
7	Maximum aggregate size (mm) - Enter 10, 14, 20 or 40	20	20		
8	Chloride class (a value must be entered unless Cl 0,40 is acceptable)	Cl 0,40	Cl 0,40		
9	Target density/density class (for lightweight and heavyweight concrete)	N/A	N/A		
10	Consistence class S1, S2, S3, S4	S3	S3		
11	Method of placing concrete	pump	pump		
12	Requirement for finishing concrete	See P1.9	See P1.9		
13	Type and dosage of fibres	NA	NA		
14	Use of RA conforming to BS 8500-2:2015, Cl. 4.3, permitted? If YES: enter requirements for:		Yes		
	Maximum acid-soluble sulphate, method for determination of the chloride content classification with respect to ASR, method for determination of alkali content., any limitations on use in concrete, e.g. exposure classes, maximum mass fractions etc (Enter details in P1.13)	RCA permitted to 20% mass fraction	RCA permitted to 20% mass fraction		
15	Special requirements for aggregates	None	None		
16	Minimum air content, or other requirements to resist freeze-thaw attack	None	None		
17	Special requirements for temperature of fresh concrete	None	None		
18	Special requirements for strength development	None	None		
19	Special requirements for heat development during hydration	None	None		
20	Special requirements for retarded stiffening	None	None