

Part of the STRI Group

epg

The Environmental Protection Group Ltd



Remediation method statement

Land east of Knowle Lane

Fair Oak

Version 1.0

August 2023

www.epg-ltd.co.uk

The Environmental Protection Group
Warrington Business Park
Long Lane Warrington WA2 8TX

Telephone: 01925 652980
Email: consultantrequest@epg-ltd.co.uk
Company Number: 3506162



© Copyright: The Environmental Protection Group Limited

The Environmental Protection Group Limited ("EPG") has prepared this report in accordance with the instructions of Parsons Construction Limited ("the Client") under the terms of its appointment for consulting engineering services by the Client. The document and its contents should not be used for any purpose other than that for which it was prepared and provided. Should the Client require to pass copies of the report to other parties for information, the whole of the report should be so copied, but no professional liability or warranty shall be extended to other parties by EPG in this connection without the explicit written agreement thereto by EPG.

Reference	EPG/8615/2023/RMS/V1	Version	1.0	Issue Date	August 2023
-----------	----------------------	---------	-----	------------	-------------

Contents

1. Introduction	4
1.1 Purpose	4
2. Environmental Setting	8
2.1 Natural geology	9
2.2 Hydrogeology	11
2.3 Hydrology	11
2.4 History - environs	11
2.5 History - site	13
2.6 Discussion	15
3. Ground Conditions	16
3.1 Made Ground	16
3.2 Analytical results	17
3.3 Mitigation measures	18
3.4 Discovery strategy	18
3.5 Verification	19
4. GAS REGIME, MITIGATION AND VERIFICATION	20
4.1 Mitigation measures	21
4.2 Verification	21

Appendix A – construction details with gas membrane

Appendix B – verification plan

1. INTRODUCTION

1.1 Purpose

In 2017, planning permission was granted by Eastleigh Borough Council for a hybrid commercial and low-rise/high-rise residential development covering a large site comprising distinct northern and southern areas connected by a narrow dogleg (reference F/17/80640).

In 2017 and 2018 the Environmental Protection Group Limited (EPG) were appointed by Parsons Construction Limited (the Client) to undertake works relating to the planning permission, with the following resultant and subsequent reports:

- *Preliminary gas and vapour risk assessment.* EPG, March 2017, reference EPG/8615/2017/PRA/V1;
- *Appraisal of gas regime pursuant to surrender of environmental permit.* EPG, November 2017, reference EPG/8615/2017/PS/V1;
- *Detailed quantitative gas risk assessment.* EPG, January 2018, reference EPG/8615/2018/DQRA/V1;
- *Piling risk assessment.* EPG, April 2018, reference EPG/8615/2018/PRA/V1; and
- *Remediation method statement.* EPG, June 2018, reference EPG 8615/2018/RMS/V1.
- *Impact of amended layout on gas protection requirements.* EPG, June 2018, reference EPG/8615/2018/amended layout.
- *New planning application – impact on required gas protection measures.* EPG, December 2020, reference EPG/8615/2020/amended development.
- *Detailed quantitative gas risk assessment.* EPG, May 2021, reference EPG/8615/2021/DQRA/V1.
- *Remediation method statement.* EPG, May 2021, reference EPG/8615/2021/RMS/V1.
- *New planning application – impact on required gas protection measures.* EPG, December 2022, reference EPG/0212/2022/amended development.

The following background information was also referred to in the preparation of the reports:

- Reports provided by the Client and Eastleigh Borough Council as follows:
 - *Review of archival information, the Fair Oak landfill complex.* Landscan, May 2005;

- *Fair Oak landfill study – final interpretative report.* Card Geotechnics Limited, June 2012. Reference CG/5515 revision 1;
- *Ground gas assessment letter report.* Geo-Environmental Services Limited, March 2014. Reference GE8053/GR02/140325;
- *Desk study report for the land at CWM site, Knowle Lane, Fair Oak.* Geo-Environmental Services Limited, September 2014. Reference GE10033-DSR-SEPT14 version 1.0;
- *Ground investigation report for the land at CWM site, Knowle Lane, Fair Oak.* Geo-Environmental Services Limited, May 2015. Reference GW10615/GIR.MAY15 version 1.0;
- *Desk study report for land east of Knowle Lane, Fair Oak.* Geo-Environmental Services Limited, January 2017. Reference GE10117-DSR-JAN17 version 1.0;
- Waste Acceptance Criteria analytical results for imported backfill material;
- Drawing PLA-03 revision F: *Restoration contours.* White Young Green, 2014;
- Drawing ENC-180317-7F1A provisional: *Topographical survey.* Encompass Surveys, 2017;
- Word of mouth records from the Client;
- Historic maps obtained from Landmark Information Group;
- British Geological Survey geological map: Southampton, England and Wales Sheet 315;
- Review of available web-based data resources, notably the Environment Agency's '*What's in your backyard?*' service, and the British Geological Survey's Geology of Britain viewer and borehole scans;
- Spot and high frequency gas monitoring results, 2017; and
- Results of surface emissions survey, November 2017.

The northern plot has subsequently been developed, however an amended application was recently submitted relating to the southern plot (reference F/23/94668) with the EPG May 2021 detailed quantitative gas risk assessment (DGRA) and May 2021 remediation method statement (RMS) reports as supporting documents. In response to the application, the Eastleigh Borough Council contaminated land officer advised the following:

The conclusion of the reports is that the site is subject to ground gas conditions which are classified as Characteristic situation 2, CS2, and therefore ground gas mitigation measures are required. Generic

approaches only are proposed. The RMS report also identifies that some construction work had already commenced on site (Figure 4), units B and C, and foundation levels for two other units (however this is a different layout to that currently proposed).

The RMS report also refers to an earlier site investigation by GESL in 2017 (Ground investigation report for the site at Land East of Knowle Lane, Fair Oak, GE16117-GIR-Oct17-V1.1) which concluded that soils on site were 'unlikely' to require mitigation for a commercial end use, and proposed importation of clean cover soils for areas of soft landscaping. Other generic measures such as protection of services, and a discovery strategy were also recommended.

Reviewing the reports highlighted above it appears that the development application includes an area of land on the south and east outside of the area investigated in the 2017 site investigation report, and that considered in the assessments of the 2021 ground gas reports. Referring to the proposed site layout plan this would appear (roughly) to be the area of units 12 and 13 and the HGV turning area.

Whilst we don't object to the principle of development in land contamination terms, and the assessment of CS2 gas protection being required, there is a degree of uncertainty caused by the discrepancy over the extent of land investigated and assessed in the reports and the area of land included in the application. Reviewing the 2017 report it is clear that at the south easternmost part of the site surveyed made ground continued to be encountered, it is not unreasonable then to conclude that the additional area is also affected.

We would recommend then that should the application be granted, that it be conditioned to require further information to be submitted regarding the state of contamination in the un-investigated part of the site and an updated risk assessment and mitigation scheme as necessary for the whole development. The remediation scheme is required that is specific to the development and buildings proposed on site and which should be submitted and agreed prior to the commencement of development.

Planning permission has subsequently been granted (14th July 2023) with the following conditions relating to gas and contaminated land:

4. Contaminated land: no development, including demolition, shall take place until the following has been submitted to, and approved in writing by the Local Planning Authority:

A. A site investigation report for the south-east side of the site not previously investigated, documenting the ground conditions of the site and incorporating chemical and gas analysis identified as appropriate by the desk study;

B. A detailed site specific scheme for remedial works for the whole site, and measures to be undertaken to avoid the risk from contaminants and/or gases when the site is developed and proposals for future

maintenance and monitoring. Such a scheme shall include nomination of a competent person to oversee the implementation of the works.

This report is intended to fulfil the requirements of Condition 4(A) and 4(B). It is largely based on background information presented in previous reports and summarises rather than repeats this. As such, reference should be made in particular to *Detailed quantitative gas risk assessment*, EPG, May 2021, reference EPG/8615/2021/DQRA/V1 (DQRA). It also presents additional site investigation findings, updated risk assessments and a development-specific remedial strategy.

This remediation method statement has been produced in accordance with guidance produced by the Environment Agency (EA), the Department of Environment, Food and Rural Affairs (DEFRA), and the British Standards Institution (BSI), namely:

- *The model procedures for the management of land contamination* (CLR11, EA/DEFRA, 2004); and
- *Guidance for the safe development of housing on land affected by contamination* (R&D66, EA/NHBC, 2008); and
- *Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings* (BS8485:2015, + A1 2019).

The structure of this report is as required by the above guidance, which may be summarised as follows:

- Contents;
- Summary;
- Objectives;
- Site conditions and characterisation of the ground gas and soil regime;
- Construction and building related details;
- Product design, specifications and justification; and
- Recommended verification approach to the importation of topsoil and the installation of gas membranes.

2. ENVIRONMENTAL SETTING

The site is located in Fair Oak, approximately four miles to the east of Eastleigh. The location of the larger original site is shown in Figure 1, bounded in green. The area covered by the current application is bounded in purple.



Figure 1: Site location

The original site is an irregular shape, comprising two roughly rectangular areas joined by a dogleg. The northern area (referred to as Zone A in previous reports) comprises a recently completed commercial and residential development sloping gently to the south. The area of the site currently under consideration (referred to as Zone B in previous reports) was in use as a car park and office compound from purchase of the site by the Client in 2008, until planning permission was initially granted in 2018. It can be seen that the current planning permission boundary extends further to the southeast than the original.

The proposed development comprises construction of five general industrial buildings (Use Class B2) containing 15 separate units, including landscaping, parking and associated works, as illustrated in Figure 2 below.



Figure 2: Proposed development layout

The current site is accessed from the northeast corner, and is bounded to the northeast by open fields, to the southeast by open space with a large pond, to the southwest by a closed engineered landfill and to the northwest by a commercial premises owned by the British Sky Broadcasting Group (BskyB).

2.1 Natural geology

The 1:50,000 British Geological Survey geological map for Southampton (*England and Wales Sheet 315 solid and drift edition*, 1987) identifies bedrock comprising the London Clay Formation (LCF) across the site. No superficial deposits are shown in the area, however an element of the LCF in the form of the Whitecliff Sand Member is indicated to be present across the extreme southwestern part of the site. A cross section presented on the map sheet identifies that the overall dip of strata across the site is to the southwest. The general distribution of the LCF elements and the cross section local to the site are presented in Figures 3 and 4 below.

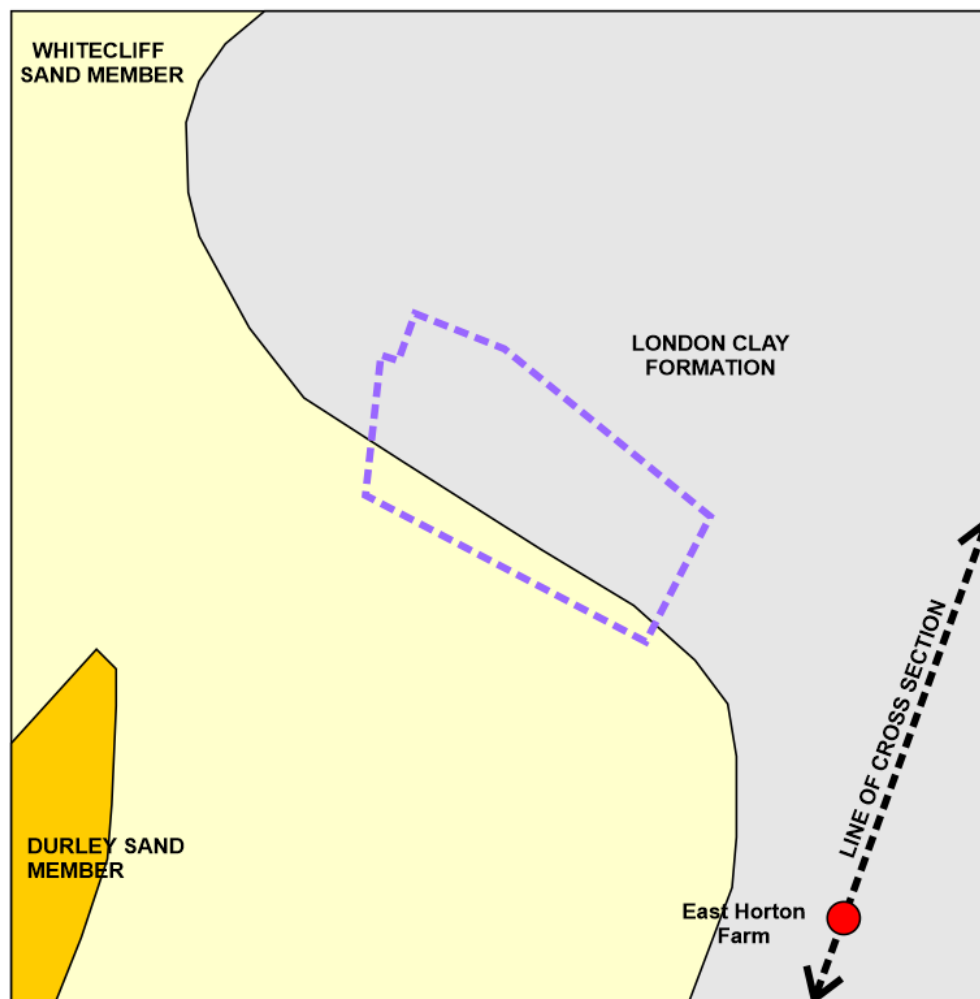


Figure 3: Geology local to the site, after BGS Sheet 315 solid and drift edition

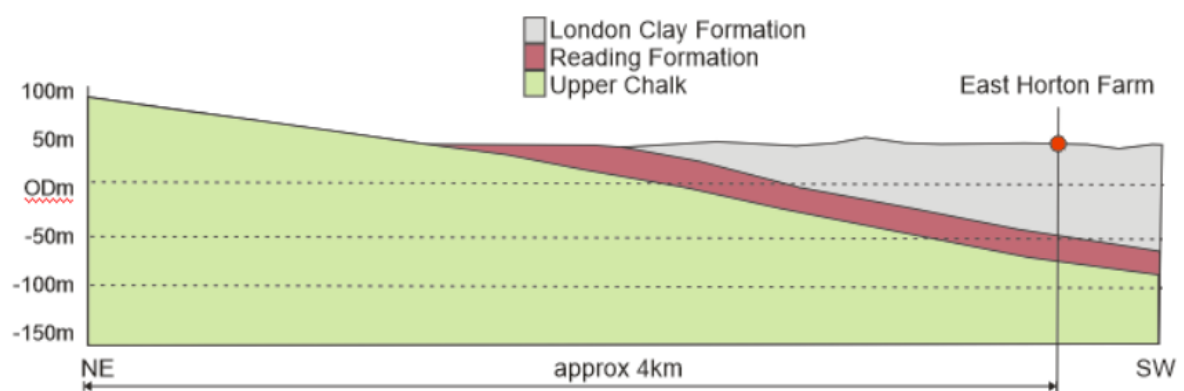


Figure 4: Geological section local to the site, after BGS Sheet 315 solid and drift edition (vertical exaggeration x4)

The Whitecliff Sand Member (WSM) is described as fine-grained sand occurring as lenticular bodies within the upper parts of the London Clay Formation (LCF) as thin discontinuous beds and channels. Within the Southampton area, the LCF consists predominantly of interbedded silty sandy clay. Underlying the LCF at depth is the Reading Formation (clay, sand and pebbles) over the Upper Chalk. In the direct vicinity of the site, the Upper Chalk lies at >100m BGL.

2.2 Hydrogeology

The Whitecliff Sand Member is designated as a Secondary A Aquifer, whilst the main body of the London Clay Formation is designated as an unproductive aquifer. The overall dip of bedrock strata across the site is to the southwest. Based on natural geology only, it is considered likely that the sandy elements of the LCF (such as the WSM) will contain groundwater perched upon the less- or non-permeable clay elements.

The history of sand extraction and landfilling across the area as detailed within the DGRA and summarised below will have resulted in the local disruption of the groundwater regime. Groundwater/leachate within the dilute and disperse landfills will migrate predominantly to the southwest in line with the underlying dip in strata, however it is also likely to 'pool' within the waste.

2.3 Hydrology

The hydrology local to the site is summarised in the 2017 desk study report produced by Geo-Environmental Services Limited as follows:

No surface water features were observed on site. The nearest surface water feature identified was located approximately 68m southeast of the site comprising a pond leading into a surface water drain. An issue leading into a surface water drain was also identified 150m west. Notwithstanding this, the site does include some run-off control, with sediment trap and collector ditch located along the eastern boundary (of Site B) and northern boundary (of Site C).

2.4 History - environs

The history of the site and its environs in the context of this report is presented in detail in the DGRA report and is summarised below.

Historic records in the form of maps, plans, aerial photographs and regulatory records indicate that the site is located in an area of intensive historic sand extraction and landfilling as illustrated in Figure 5 below.

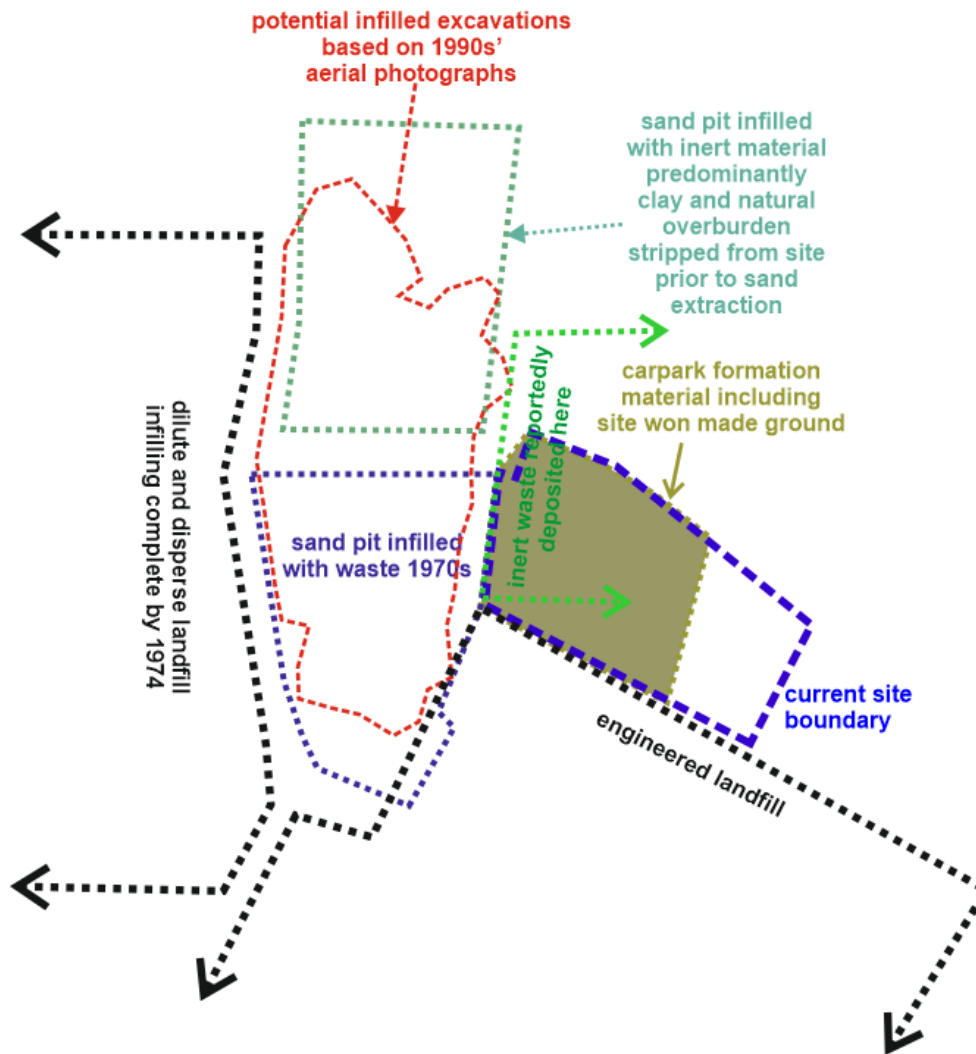


Figure 5: Approximate extent and location of landfilling as identified by historic records

Two separate areas of dilute and disperse landfilling outside the site boundary represent potential sources of historic gas/leachate in a position to impact the site via lateral migration. These are in the form of an aged dilute and disperse landfill and an infilled sand pit to the northwest, developed for commercial use c.2000. A more recent engineered landfill located on the southern boundary of the site can be discounted as a potential source of gas/leachate due to its integrated gas extraction system and basal liner.

At the time of purchase by the Client in 2008, site investigation records identified that a large volume of waste was buried irregularly across the northern part of the site, some of which may have formed the northern extent of the infilled sand pit immediately to the south. The majority of the waste was removed as part of pre-development remedial works, with the exception of any residual material located beneath the access road. During these site clearance works; extensive sand deposits were identified beneath the site. Planning permission was granted for the commercial extraction of the sand in the northern part of the site between 2012 and 2014.

In January 2014, an environmental permit was issued by the Environment Agency authorising the importation of inert waste for the restoration of the sand extraction pit. Between 2014 and 2016, inert predominantly clay material was imported and placed as backfill, together with natural site won overburden stockpiled on site throughout sand extraction works. During placement the infill materials were spread in thin layers and compacted using a 6-tonne sheep's foot roller. The surrender of the environmental permit was approved by the Environment Agency on the 19th February 2018.

2.5 History - site

Historic maps, aerial photographs and additional sources presented in the DGRA report up to and including 1974 indicate the current site remains an open field, unimpacted by adjacent developments, extraction and landfilling. The 1985 aerial photograph suggests some ground disturbance at the entrance to the site. The 1993 map edition shows the large pond (previously not identified) to be present southeast of the current site boundary. The 1999 aerial photograph continues to show some ground disturbance within the site boundary, however it is unclear whether this is due to parking and turning or alternative reasons.

Between purchase by the Client in 2008 and surrender of the Environmental Permit in 2018, the site was consistently used as a site compound, following removal of any made ground and the placement of inert carpark formation materials. Between 2018 and 2019 when Covid stopped works, the original carpark formation material was removed, and the levels reinstated using imported predominantly clay material. The piles and ring beams to Buildings B and C permitted under the previous planning permission were installed, together with the drainage and surface water attenuation tanks beneath the car park area in the northern part of the site. The lower area (Buildings D and E) was reduced to the formation levels determined for the previous application and covered with crushed concrete. A recent aerial photograph is presented as Figure 6 below, and the Client confirms that no further works have been undertaken since 2019.



Figure 6: 2021 aerial photograph of site

To contextualise the construction works undertaken prior to the site shutting down, the approximate block locations from 2020 and the current development are presented in Figure 7.

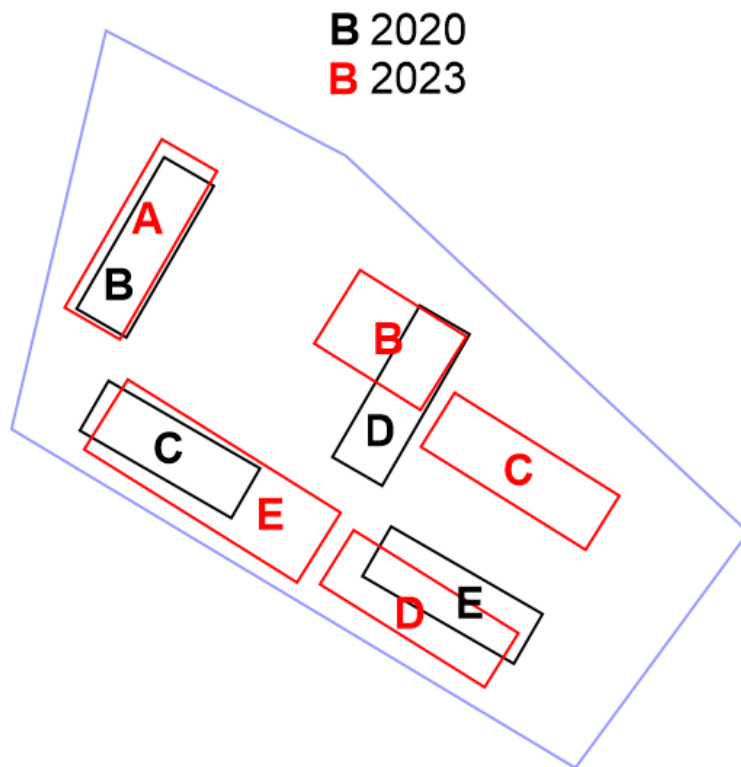


Figure 7: Current and previous proposed block locations

2.6 Discussion

In summary, the site is located in an area of extensive dilute and disperse landfilling, although no historic information suggests the use of the site for anything other than farming and subsequently parking/storage/office compound. With the exception of the southwestern boundary, it is underlain by a significant thickness of the London Clay Formation, which represents a barrier to the easy migration of gases from off-site to the ground level. Geological maps indicate that the Whitecliff Sand Member is present at the surface of the London Clay Formation at the southwestern extreme of the site, dipping to the southwest. Site investigation findings are presented in the subsequent sections.

3. GROUND CONDITIONS

The soil regime in terms of the protection of human health, building materials and controlled waters across the larger site (Zone A and the current site) is interpreted within the 2017 *Ground investigation report* (GESL, October 2017). Based on soil analytical results and risk assessment following current UK guidelines, the report did not identify any exceedances in contaminant concentrations, and concludes:

'In consideration of the current residential and commercial development proposals, it is considered that remedial measures are unlikely to be required within areas of soft landscaping for the protection of end users from soil contamination. It is considered that the use of clean imported topsoil will be required within proposed areas of soft landscaping, with these soils to be laid to a depth of at least 150mm, suitable to act as a growing medium'.

An additional geotechnical site investigation was undertaken in April 2023, and subsequently, in order to address the Local Authority's concerns about the extended site boundary and potential previously unidentified contamination, a supplementary limited site investigation with soil analysis was undertaken in July 2023. The findings of the investigations are summarised below, and presented in full in:

- *Ground investigation report.* Ground and Water, April 2023, reference GWPR5317/GIR/April 2023 Final, and
- *Contamination assessment letter report.* Ground and Water, August 2023, reference GWPR5501/CAR/August 2023 Final.

The original reports should be referred to for additional information. The approximate locations of exploratory holes from all three site investigations are illustrated in Figure 8 below.

3.1 Made Ground

The 2017 investigation was undertaken prior to the site compound being closed and the removal of carpark formation materials. Five boreholes were excavated within the site boundary, identifying Made Ground to depths of between 1.1m and 1.9mBGL, described as clay with varied sand and gravel content/clayey gravelly sand. The gravel was recorded as stone, brick, concrete, clinker, flint, chalk, and tarmac.

Between 2018 and 2019 the carpark formation material was removed from the northern part of the site and the levels reinstated using imported predominantly clay material. The southern part of the site was reduced to the formation levels determined for the previous application and covered with crushed concrete.

The two investigations undertaken in 2023 comprised five boreholes and five trial pits. The ground conditions recorded in the geotechnical investigation identified Made Ground to depths of between 0.4m and

2.0mBGL, described as varied clay/sand/gravel mixes, with gravel inclusions identified as flint, brick, concrete and chalk. An organic odour was recorded between 0.6m and 2.0mBGL in WS2.

The ground conditions recorded in the supplementary investigation in the southeast of the site identified Made Ground to between 1.3m and 2.15mBGL, described as gravelly sandy silt over gravelly sandy clay. The gravel content was recorded as brick, concrete, flint, metal, ash, pottery, chalk, wood and bituminous material. A strong organic odour was recorded between 0.6m and 1.8mBGL in TP1.

The natural soils in all exploratory holes were described as sandy CLAY, with the exception of WS16 (2017), where clayey SAND was recorded between 1.9mBGL (the base of the Made Ground) and 3.9mBGL. This is suggestive of the Whitecliff Sand Member and ties in with the anticipated geology on the southwestern boundary as presented in Figure 3 above.

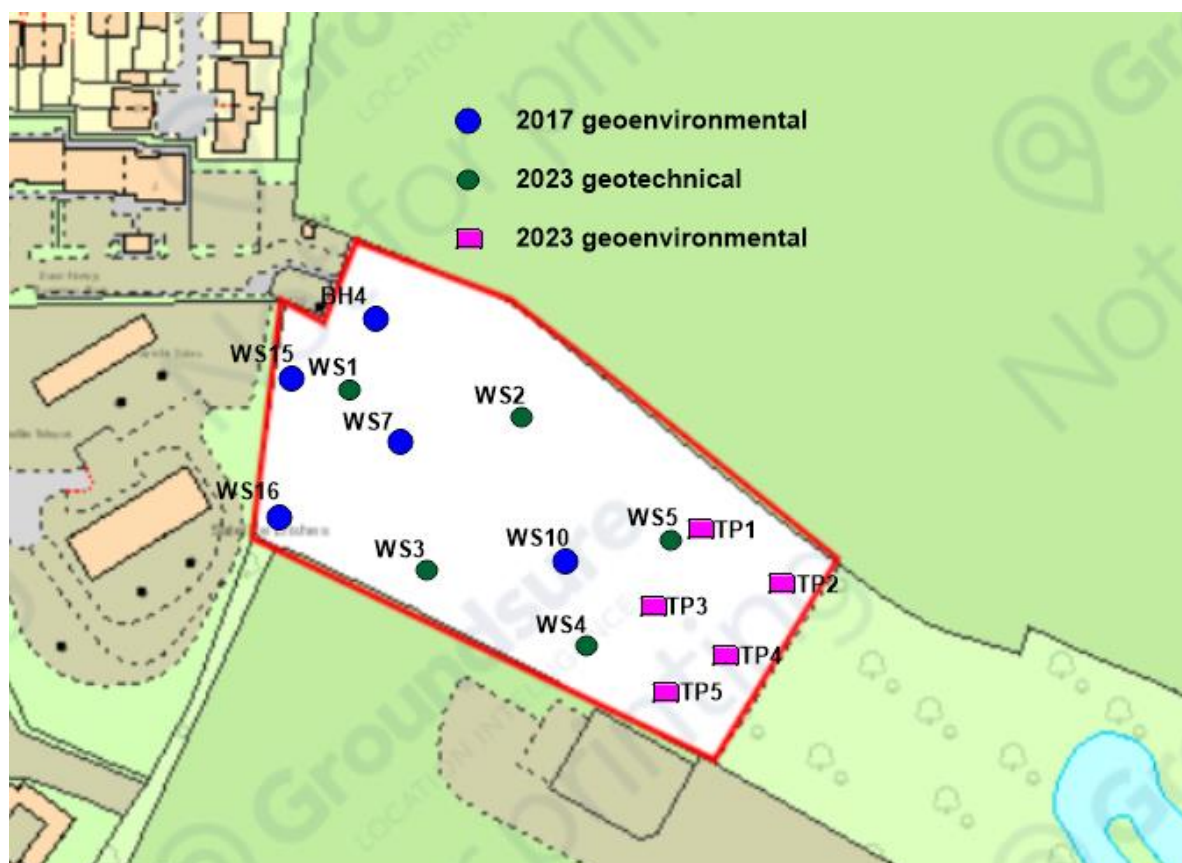


Figure 8: Exploratory hole locations

3.2 Analytical results

Analysis of soils undertaken across the site during the 2017 investigation identified no exceedances of generic assessment criteria (GAC) for commercial end use. During the trial pitting undertaken in July 2023, ten samples of Made Ground were analysed, with no exceedances of GAC for commercial end use identified.

Asbestos was identified within one sample, taken from TP3 at 0.3mBGL in the form of amosite in ACM debris. Quantification was undertaken on the sample, indicating concentrations of <0.001%. A quantitative asbestos risk assessment is presented within the *Contamination assessment letter report* for the concentration recorded, in accordance with the guidance within CIRIA 733, which concluded that the associated risk was insignificant and that no remediation procedures were considered necessary with respect to asbestos in Made Ground.

3.3 Mitigation measures

Based on all of the above, it is proposed that the following basic mitigation measures are implemented during the construction works.

- The results of the soil analysis will be presented to the water utility company, and their recommendations for pipe material will be implemented;
- Clean granular backfill will be used in all service runs;
- Dust suppression techniques, e.g. damping down exposed soils will be employed;
- A material management plan will be produced in accordance with CL:AIRE Code of Practice (2011) prior to works commencing;
- Any soils to be removed from site will be subjected to waste acceptance criteria (WAC) testing and disposed of appropriately;
- A discovery strategy will be implemented, as detailed below;
- A minimum of 150mm of topsoil will be placed in areas of soft landscaping as a growth medium.

3.4 Discovery strategy

It remains possible that unexpected soil conditions may be encountered during the process of construction. Examples may include oily pockets within the soil, pockets of cement boarding or fibrous materials within the soil, black ashy materials, soils exhibiting strong odours, brightly coloured materials, and former structures or brickwork.

Should previously undiscovered contamination be encountered during construction by the ground workers, this will be reported to the site manager immediately in order that any necessary inspection may be made, and work in that area stopped and made safe. The following procedure will then be followed:

- Discovery;

- Works stopped in the area of unusual ground conditions, and the site manager made aware;
- The environmental consultant (Ground and Water) will be notified and will attend site to assess and investigate; and
- The environmental consultant will identify whether it is safe to continue works. In the event that it is not considered safe, appropriate remedial actions will be agreed with the Local Authority.

A copy of the discovery strategy will be lodged on site and provisions made to ensure that all workers are made aware of their responsibility to observe, report and act on any potentially suspicious or contaminated materials they may encounter.

3.5 Verification

On completion of all groundworks, the verification of the placement of a minimum of 150mm of topsoil in areas of soft landscaping will be undertaken by randomly selected excavations in an appropriate number of locations. If these topsoils have been imported, analytical results at a ratio of 1:250m³ of imported soils will be compared with the criteria detailed within *Ground and Water Contamination assessment letter report*.

The analytical results together with any information generated via the discovery strategy procedure will be submitted to the Local Planning Authority for approval prior to any structure being occupied.

4. GAS REGIME, MITIGATION AND VERIFICATION

The gas regime is interpreted fully within the detailed quantitative gas risk assessment report (EPG, May 2021). Based on multiple lines of evidence, the report concludes that the site should be considered a CS2 classification, with a requirement for basic gas protection measures. Based on the history of the site, location of adjacent dilute and disperse landfills, underlying geology and groundwater, it is considered that the DQGRA remains valid for the amended development.

It should be noted, however, that the proposed foundation design differs from that previously intended (piled suspended slab with ventilated void). The current foundation design comprises 250mm thick cast in situ monolithic reinforced ground bearing rafts, with minimal service penetrations. As such, the required gas protection measures are specified as follows:

For commercial or flatted development – Type B building in accordance with BS8485 (3.5 points required):

- *Installation of a gas resistant membrane. The membrane to be specified in accordance with BS8485:2015 and installed/verified in accordance with CIRIA Report C735, Good Practice on the Testing and Verification of Protection Systems for Buildings Against Hazardous Ground Gases. Furthermore, it must be robust enough to withstand construction and should be a minimum of 0.6mm thick (e.g. Juta GPH 0.6mm) and be protected during construction by suitable protection fleece **BS8485, Table 7 – 2 points**; and*
- *Cast in situ monolithic well reinforced ground bearing raft with minimal penetrations cast in **BS8485, Table 5 – 1.5 points**.*

The membrane must be installed by a qualified and experienced installer (minimum one operative to hold an NVQ Level 2 in Gas Protection Installation). The membrane installations to all plots (100% coverage) are to be independently inspected by an independent verifier who should be able to demonstrate their competence, training and relevant experience. The inspection process should include a thorough visual inspection of the membrane. In the event of holes being identified during the membrane inspection process the inspection regime should be extended to include integrity testing (i.e. dielectric testing, or similar).

All (100%) joints, pipe penetrations etc. of the membrane should be independently air lanced to ASTM D4437.

4.1 Mitigation measures

The proposed gas protection measures are detailed in drawing 23/316/350 revision P2, *Typical external wall/slab edge detail*. GRK Architecture, July 2023 (contained in Appendix A).

They comprise a cast in situ monolithic well reinforced ground bearing raft with minimal cast penetrations, combined with a gas membrane (Juta GPH 0.6mm). The membrane is to be placed below the slab on a suitable formation layer. The membrane may terminate at the edge of the raft below ground as long as this is within 750mm of the external ground surface. The membrane will be protected from above and below by Juta 300TT protective fleece. Rebar spacers should be flat bottomed such that they do not pierce the membrane. All penetrations through the slab are required to be sealed to the membrane using appropriate compatible products such as JUTA waterproof self adhesive membrane (WP-SAM).

The gas membrane will be installed by a specialist qualified to NVQ2 level, however they are yet to be confirmed.

Ducts for service entry through the cast-in-situ slab must have their annulus sealed using closed cell expanding foam or expanding resin (e.g. Filoform MD3 duct sealing system), down to the depth of the sub-slab membrane. As shown in Figure 9.

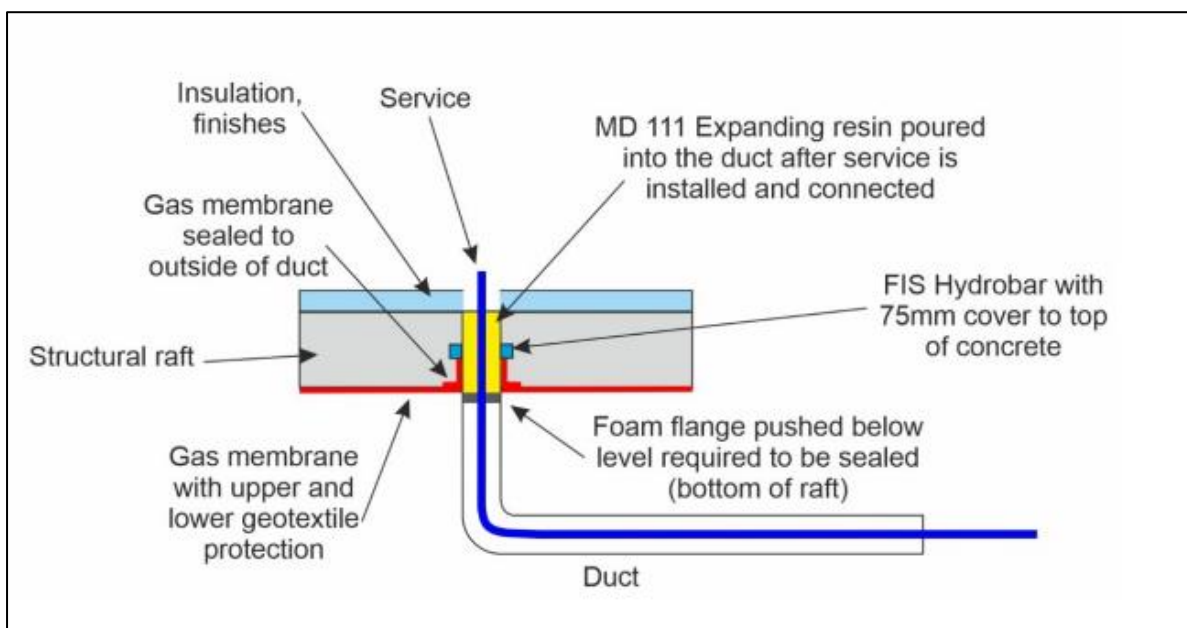


Figure 9: Duct sealing diagram

4.2 Verification

Verification of the installation of the gas protection measures will be undertaken by an appropriately qualified specialist from MEC Environmental Limited (MEC). The methodology will follow that detailed in the

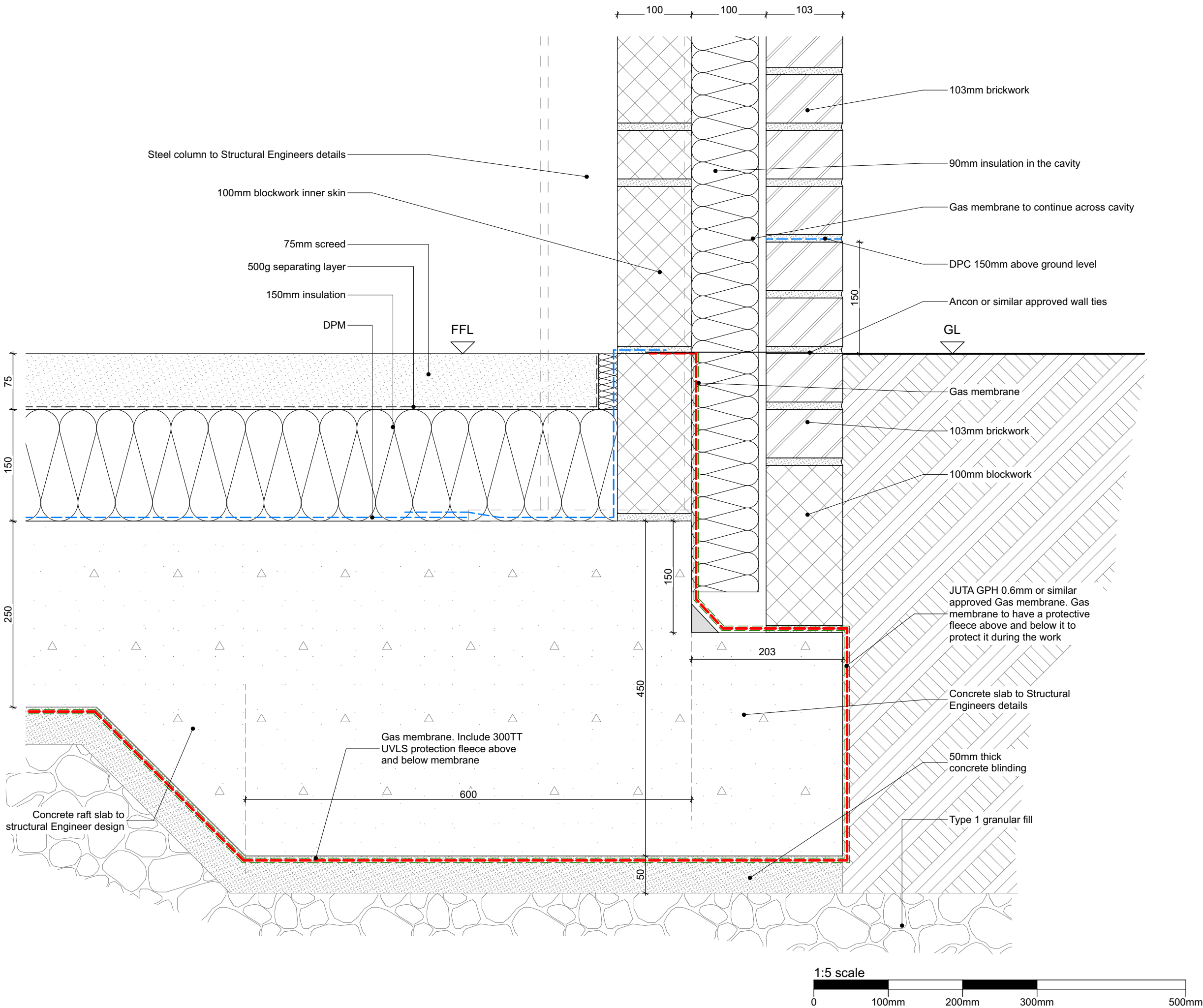
Verification Plan, contained in Appendix B. On completion, MEC will produce a validation report containing the following information:

- Reference/name of job;
- Scope of work undertaken;
- Contractor's CQA evidence for membrane;
- Inspection survey sheets for all site visits; and
- Records of all non-destructive quality control tests and apparent failures.

This information will be made available to the Local Planning Authority prior to occupation of any structures.

APPENDIX A

Construction details with gas membrane



© GRKA 2023
NOT TO BE SCALED. DIMENSIONS TO BE CHECKED ON SITE
SCALING FOR LOCAL AUTHORITY PURPOSES ONLY

NOTES

In addition to the hazard/risks normally associated with the types of work detailed on this drawing take note of the above. It is assumed that all works on this drawing will be carried out by a competent contractor working, where appropriate, to an appropriate method statement.

CDM Risk Schedule	
	Specific health & safety risks associated with this building are highlighted, but not limited to the caution symbol adjacent to the item of risk. Refer to risk schedule on individual drawing.
	Injury caused by incorrect handling of large / heavy items.
	Potential to fall from height.
	Potential to fall from height through voids within floors.
	Harm caused by handling lead.
	Harm caused by Electrocution.

The contractor is to ensure that the proposed works will be executed in accordance with any relevant conditions appended to the Local Planning Authority's Decision Notice; the current Building Regulations or warranty providers standards if required; the requirements of the Fire Officer; the Institute of Electrical Engineers handbook (current edition) and the requirements of the local Water Authority where required.

Materials and workmanship should, where applicable, comply with the current British Standards institute specifications and Codes of Practice. Where such guidance does not exist, materials and workmanship should conform to established good practice.

The location of existing services should be established prior to the commencement of any works - if discovered to be at variance with that shown on the drawings or services maps, the design consultants must be notified immediately.

The contractor is to check all dimensions, both internal and external, prior to the commencement of any works, including the ordering of materials - Any errors must be reported to the design team.

Where proprietary materials, fixtures or fittings are used, they must be placed / fitted strictly in accordance with the manufacturers written instructions and published details pertaining to the circumstance in which they are to be used.

The specification must be read in conjunction with all other drawings, schedules and documents which form part of this design package and Building Regulations submission.

Ensure All joints are taped / sealed in walls, floors and ceilings.

Any variations to be carried out on site should be brought to the attention of the design team for verification of compliance with statutory requirements and regulations prior to work commencing on site.

The drawing should be read in conjunction with Structural Engineers drawings and calculations.

All Structural Elements including steel beams, pad stones, all timber joists, lintels and ground floor structure to be carried out in accordance with Structural Engineers details. Any Structural sizes shown on this drawing are indicative only and must be read in conjunction with the Structural Engineers report.

BUILDING REGULATIONS

P3	Gas membrane arrangement updated	23.08.23	PR
P2	Coordination with Structural Engineers raft slab design	08.08.23	PR
P1	Preliminary Issue	03.08.23	PR
Revision	Description	Date	Drawn

Designer :



Project :

Knowle Lane, Eastleigh
Proposed Commerical units

Drawing :

Typical external wall / slab edge detail

Date :	Scale :	
July 2023	1:5 @ A3	
Drawing No. :	Status :	Revision:
23 / 316 / 350		P3

APPENDIX B

Verification plan

Validation Procedures

Inspection/testing schedule – Knowle Lane, Fairoak

No covering such as reinforcement steel, insulation etc. shall be laid until the area under consideration has been fully inspected and signed off by the validation consultant. For programming purposes approx. 8 hours should be allowed from completion of the installation of the membrane for inspection and remedial works to be carried out.

Table 1			
Gas regime/risk	Slab type	Installer experience	Suggested minimum levels of verification and integrity testing
Amber 1/CS2	Poured concrete	50% of operatives to hold NVQ Level 2 Gas Membrane Installation	• Verifier to conduct thorough visual inspection to full surface area of membrane. • All joints, pipe penetrations etc. air lanced to ASTM D4437. • Leak detection testing (dielectric) min 25% (Ground Bearing % 100% Beam and Block)

1.0 Submissions

The following are to be submitted to MEC Environmental prior to work commencing on site;

- Full set of annotated drawings of the position and detailing of gas membrane
- Specialist Installers installation and CQA plan
- An experience and capability statement from the specialist installer along with relevant qualifications and membership of relevant trade associations/accreditation.
- A protection plan from the main contractor detailing how the membrane will be protected from damage prior to permanent covering.

2.0 Inspection method

The Validation Consultant will visually inspect 100% of the surface area of the gas membrane, gas resistant DPC and the like. The Validation Consultant will carry out leak detection testing by means of dielectric testing to a min. 25% of the surface area of the membrane to ground bearing slab and 100% to beam and block.

The Validation Consultant will integrity test (air lance to ASTM D 4437) 100% of all joints, pipe penetrations, corner details of the gas membrane.

Any defects will be repaired and recorded as per section 3.3 & 3.4 respectively. The purpose of this method of inspection and testing is to identify any holes, areas of bridging, poorly adhered seals or defects in the gas membrane and ancillary products. Validator reserves the right to undertake dielectric validation of the surface area of the membrane.

The Validation Consultant will:

- Perform all Visual Inspections and testing;
- Record all testing and photograph for inclusion in the final validation report
- Inform the Installation Contractor of any required repairs.
- The Installer will complete any required repairs in accordance with Section 3.3.
- Observe the repair and re-inspect/re-test the repair;
- Mark on the gas membrane that the repair has been successfully made and tested, photograph for inclusion in the final validation report

2.1 Equipment

- Electronic Tablet (IPad), Tape Measure, Air lancing Equipment, P1-20D Dielectric Testing Machine and PPE

3.0 Defects and repair

3.1 Identification

All seams and non-seam areas of the gas membrane will be inspected/tested as per 1.0 by the Validation Consultant for identification of defects, protruding and penetrating objects, lack of subgrade support, overheating, holes, blisters, undispersed raw materials, scratches and gouges, and any sign of contamination by foreign matter. To facilitate the examination the gas membrane surface will be kept clean by the Installer (or as agreed at the Preconstruction Meeting).

3.2 Evaluation

In areas that fail the visual inspection/testing, the Validation Consultant will communicate the defect to the Installer who will then repair this. Work will not proceed with any materials, which will cover locations that have been repaired until the Validation Consultant has passed the repair, and taken photographs, a sample of which will be included in the final validation report.

3.3 Repair procedures

Any portion of the gas membrane exhibiting a flaw, or failing a visual inspection/testing, will be repaired. Several procedures exist for the repair of these areas. The final decision as to the appropriate repair procedure will be agreed upon between the Validation Consultant and the Installer.

The procedures available include:

- Self-adhesive patching, used to repair all penetrating holes, tears, undispersed raw materials, and contamination by foreign matter;
- Capping with a strip of gas membrane, used to repair long lengths of failed seams.

In addition, the following provisions will be satisfied:

- All surfaces must be clean, free of all particulate matter, and dry at the time of the repair;
- All seaming equipment used in repairing procedures must be approved;
- The repair procedures, materials, and techniques will be approved in advance of the specific repair by the Validation Consultant;
- Patches and caps will extend at least 150 mm beyond the edge of the defect, and all corners of patches will be rounded with a radius exceeding 15 mm;
- Sharp ends of slits and cuts in the gas membrane should be rounded before patches are placed over them;

3.4 Verification of repairs

Each repair will be visually inspected/tested, repairs passing the inspection/testing will be considered acceptable. Failed tests will require the repair to be redone and re-inspected until a pass is obtained.

4.0 Validation report

A validation report will be produced by MEC Environmental on completion of the installation and

submitted to the client. The report will contain the following information as a minimum.

- Reference/name of job
- Scope of work undertaken (as per this document)
- Inspection survey sheets for all site visits