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LAND AT GREENBROW SOCIAL CLUB, WYTHENSHAW, MANCHESTER

Remediation & Enabling Works Strategy



Prepared for:

Report Ref: BEK-24100-1



July 2024



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Project Quality Assurance Information Sheet

Site	Land at Greenbrow Social Club, Wythenshawe, Manchester
Report Title	Remediation & Enabling Works Strategy
Report Status	Final
Report No	BEK-24100-1
Date	July 2024
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PROJECT NO: 24100

REPORT REF: BEK-24100-1

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REVISION STATUS / HISTORY

Rev	Date	Issue / Comment	Prepared	Checked

GENERAL REPORT LIMITATIONS

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Unless explicitly agreed otherwise, in writing, this report has been prepared under BEK's limited standard Terms and Conditions as included within our proposal to the Client. The report needs to be considered in the light of the BEK proposal and associated limitations of scope. The report needs to be read in full and isolated sections cannot be used without full reference to other elements of the report and any previous works referenced within the report.

EXECUTIVE SUMMARY

Site Address	Greenbrow Social Club, Wythenshawe, Manchester, M23 2TU
National Grid Reference	380839, 387147
Site Area	0.3 Ha
Background	<p>The site occupies an irregularly shaped plot of land of some 0.3 hectares which contains a disused former social club which is present in the centre of the site. Hardstanding car parking areas and a courtyard are present to the exterior of the social club building. Metal access gates are present off Greenbrow Road. Soft landscaped areas are present in the south and east of the site. Mature trees are present beyond the south of the site and in the east and north of the site, whilst a telephone mast is located adjacent to the east of the site. Historical mapping shows a road was present on site between 1876 and 1960, whilst the social club was constructed circa 1992. The proposed development is residential and comprises the <i>'Erection of a three storey building to form fifteen flats (10 x 1 bed, 5 x 2 bed) and eight two storey dwellinghouses (2 x 2 bed, 4 x 3 bed, 2 x 4 bed) with associated landscaping and parking, following demolition of existing social club'</i> at the site.</p>
Summary of Site Remediation & Enabling Works	<p>The site Remediation / Enabling Works Performance Specification details the contract requirements that will facilitate the regeneration of the land to negate identified pollutant linkages and construct a development platform that will be geotechnically suitable for the proposed end use. The salient features of the Remediation & Enabling Works Strategy are summarised below:</p> <ul style="list-style-type: none"> • Implementing the works with appropriate consultancy supervision so that the works can be fully validated, together with verification reporting, to the satisfaction of the Local Planning Authority (LPA). • Pre-demolition asbestos survey on the existing building on site, with any asbestos containing materials removed by a suitably qualified person(s) prior to demolition. • Management of all works so as to ensure that no environmental nuisance is created through dust emissions, noise or vibration levels. • Further site investigation and sampling within vicinity of the building footprint (following demolition), the pond area, and boreholes WS102 and WS104. • General site clearance and legislatively compliant disposal of all surface vegetation, breaking out, excavation and removal of all slabs, hard-standing and buried structures to the base of the made ground (subject to structural engineer confirmation). • Removal of any previously unidentified contamination hotspots. • Excavation and removal of all previously unidentified materials deemed to be either a potential risk to the identified receptors or the built environment. • Breaking out and subsequent crushing / processing of all surface and sub-surface structures including foundations, redundant drains and any further buried obstacles (where present). • Importation of inert and geotechnically stable fill if required. Laboratory testing of all imported material to confirm chemical and geotechnical suitability for use, in accordance with the testing schedule presented within the Remediation Strategy. • Provide suitable development platform to facilitate the construction of the proposed roadways, drainage infrastructure, pavements and areas of hard-standing; to be delivered in accordance with the Engineers Specification. • Use of potable water supply infrastructure that will be compliant with UKWIR assessment criteria. • Removal and disposal of any perched water from within excavations (if required). • Ensure that all works are completed in a manner so as not to create any structural risk to the adjacent highways/infrastructure. • Implement all temporary works as necessary to support excavations throughout the duration of the works.

	<ul style="list-style-type: none"> • Construction of the apartment building in the north-east of the site with gas mitigation measures in accordance with Characteristic Situation 2 of BS8485:2015+A1:2019. • Implement a soft cover system of 600 mm thickness in all private garden areas and 300 mm thickness in all Public Open Spaces, underlain by a geotextile membrane or 100 mm granular no-dig layer to prevent mixing. • Retained soils on site then this should be managed through exemption for Permitting (if appropriate) or through the preparation of a Material Management Plan as part of compliance with the Definition of Waste:Code of Practice (DoW:CoP). • Validation sampling to confirm material retained on-site pose no unacceptable risk to the residential end users, controlled waters or wider environ; • Removal of all soil wastes deemed unsuitable for use from site in accordance with UK Waste Management Legislation and in accordance with the UK Landfill Directive • Development of a comprehensive Validation Report to document the successful completion of the aforementioned works.
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1. INTRODUCTION

1.1 Background

- 1.1.1 BEK Enviro (BEK) has been commissioned by The Casey Group to prepare a Remediation & Enabling Work Strategy (REWS) for the development works at the former Greenbrow Social Club, Greenbrow Road, Wythenshawe, Manchester, M23 2TU (hereafter referred to as 'the site').
- 1.1.2 It is understood that The Casey Group intend to redevelop the site for residential use, with 8 No. low-rise residential dwellings and 15 No. apartments with associated gardens, car parking and other associated infrastructure at the site.
- 1.1.3 Remediation & Enabling Works are required in a manner that will ensure full compliance with the specification documented herein.

1.2 Site Location & Description

- 1.2.1 The site is located to the west of Greenbrow Road, Wythenshawe, Manchester, M23 2TU. The grid reference for the approximate centre of the site is 380839, 387147.
- 1.2.2 The site occupies an irregularly shaped plot of land of some 0.3 hectares which contains a disused former social club which is present in the centre of the site. Hardstanding car parking areas and a courtyard are present to the exterior of the social club building. Historical mapping shows a road was present on site between 1876 and 1960, whilst the social club was constructed circa 1992.

1.3 Proposed Development

- 1.3.1 Manchester City Council has granted planning permission (subject to conditions) for the 'Erection of a three storey building to form fifteen flats (10 x 1 bed, 5 x 2 bed) and eight two storey dwellinghouses (2 x 2 bed, 4 x 3 bed, 2 x 4 bed) with associated landscaping and parking, following demolition of existing social club' at the site located to the west of Greenbrow Road, Wythenshawe, Manchester, M23 2TU (Approval Ref: 137485/FO/2023).

Land contamination issues for the development are to be dealt with through planning conditions 6 and 14 which state the following:

6) 'Before the development hereby approved commences, a report (the Preliminary Risk Assessment) to identify and evaluate all potential sources and impacts of any ground contamination, groundwater contamination and/or ground gas relevant to the site shall be submitted to and approved in writing by the City Council as local planning authority. The Preliminary Risk Assessment shall conform to the City Council's current guidance document (Planning Guidance in Relation to Ground Contamination).'

'In the event of the Preliminary Risk Assessment identifying further risks which in the written opinion of the Local Planning Authority require further investigation, the development shall not commence until a scheme for the investigation of the site and the identification of remediation measures (the Site Investigation Proposal) has been submitted to and approved in writing by the City Council as local planning authority.'

'The measures for investigating the site identified in the Site Investigation Proposal shall be carried out before development commences and a report prepared outlining what measures, if any, are required to remediate the land (the Site Investigation Report and/or Remediation Strategy) which shall be submitted to and approved in writing by the City Council as local planning authority.'

14) *'When the development commences, the development shall be carried out in accordance with the previously agreed Remediation Strategy and prior to occupation a Completion/Verification Report shall be submitted to and approved in writing by the City Council as local planning authority.'*

'In the event that ground contamination, groundwater contamination and/or ground gas, not previously identified, are found to be present on the site at any time before the development in each phase is occupied, then development shall cease and/or the development shall not be occupied until, a report outlining what measures, if any, are required to remediate the land (the Revised Remediation Strategy) is submitted to and approved in writing by the City Council as local planning authority and the development shall be carried out in accordance with the Revised Remediation Strategy, which shall take precedence over any Remediation Strategy or earlier Revised Remediation Strategy.'

1.3.2 The development layout plans are presented on BTP Architects Drawing Ref: GR-BTP-00-SP-DR-A-3953_203 entitled 'Proposed Site Plan', a copy of which is presented in Appendix A and an extract of which is presented below.



Figure 1: Extract from BTP Architects 'Proposed Site Plan'

1.4 Previous Works

1.4.1 The following works have been prepared to provide an assessment of the potential risks associated with contamination and ground gas at the site:

- Dice Environmental – Phase 1 Geo-Environmental Report, Ref: 100855, dated 19/12/2022
- E3P – Phase II Geoenvironmental Site Assessment, Ref: 17-305-R1-2, dated July 2024

1.4.2 For the avoidance of any doubt, the above reports should be read as a precursor and in conjunction with the specification documented within this report.

1.5 Report Objectives

1.5.1 The purpose of this Remediation Strategy is to identify and evaluate feasible remedial technologies and to validate the successful implementation of a site remediation to ensure the safe, cost effective and regulatory compliant redevelopment of the site.

1.6 Scope of Remediation Works

1.6.1 With regard to the proposed development of the site, the main aims of the remedial works are as follows:

- To provide a remediated site that is suitable for its proposed redevelopment i.e. residential housing with gardens units, apartment buildings, associated parking and localised soft landscaping etc.
- To provide a landform/ground surface which can accommodate the design levels and acceptable gradients for the proposed road layout, drainage systems and floor slab levels.
- To provide a geotechnically suitable development platform to facilitate the subsequent construction of roads, installation of drainage and the construction of the proposed buildings.
- To ensure that construction/groundworkers are not put at an unacceptable short-term risk during the remediation and/or redevelopment of the site.
- To satisfy the requirements of the regulatory authorities (ie the Local Planning Authority, Environment Agency and National Housebuilders Council).

2.0 SITE CHARACTERISTICS

2.1 Site Location & Description

- 2.1.1 The site is located to the west of Greenbrow Road, Wythenshawe, Manchester, M23 2TU. The grid reference for the approximate centre of the site is 380839, 387147.
- 2.1.2 The site occupies an irregularly shaped plot of land of some 0.3 hectares which contains a disused former social club which is present in the centre of the site. Hardstanding car parking areas and a courtyard are present to the exterior of the social club building. Metal access gates are present off Greenbrow Road.
- 2.1.3 Soft landscaped areas are present in the south and east of the site. Mature trees are present beyond the south of the site and in the east and north of the site, whilst a telephone mast is located adjacent to the east of the site.
- 2.1.4 Historical mapping shows a road was present on site between 1876 and 1960, whilst the social club was constructed circa 1992.

2.2 Geology

- 2.2.1 Intrusive ground investigation has been carried out by others as part of the preparation of previous reporting, the details of which are provided within the reports denoted with Section 1.4 of this report. The previous site investigation provides information to characterise the shallow ground conditions across the site and is summarised in the sections below.

Made Ground

- 2.2.2 Made ground was encountered in all exploratory locations to depths between 0.3 m and 0.6 m bgl. The made ground in the south and east of the site comprised reworked topsoil described as 'dark brown slightly gravelly clay with brick, plastic, sandstone and coal fragments' to depths of between 0.2 m and 0.5 m BGL.
- 2.2.3 Other made ground encountered at the site are described as follows:
- Tarmacadam
 - Light orangish brown and greyish brown sandy gravel with limestone and sandstone
 - Black slightly clayey gravel of slag and clinker
 - Dark greyish brown slightly gravelly clay with brick, siltstone, sandstone and coal fragments

Natural Strata

- 2.2.4 Superficial deposits were encountered below the made ground across the site to a depth of 2.0 m bgl and generally comprised 'Brown and grey slightly gravelly silty CLAY with sandstone and siltstone.
- 2.2.5 Bedrock was encountered at 2 m BGL and comprised 'Brown and light grey weathered siltstone' to a maximum proven depth of 2.42 m bgl.
- 2.2.6 No obstructions were noted during the site investigation, although all boreholes drilled refused on the shallow aforementioned bedrock.

Visual & Olfactory Evidence of Contamination

- 2.2.7 No visual or olfactory evidence of contamination was encountered during the site investigation.

2.3 Groundwater & Hydrology

- 2.3.1 The site is understood to overlie a Secondary Undifferentiated aquifer (drift deposits), which are underlain by a Secondary B aquifer within the bedrock.
- 2.3.2 Continuous groundwater monitoring encountered groundwater between depths of 1.14 m and 1.96 m which was considered to be representative of surface water collecting within the monitoring standpipes as oppose to a true representation of groundwater.
- 2.3.3 Fairywell Brook is located some 170 m south-west of the site.
- 2.3.4 The site is located within a Flood Zone 1 and is therefore not considered to be at risk of flooding.

2.4 Summary of Contaminant Distribution

Human Health

- 2.4.1 Throughout the risk assessment process carried out by E3P, elevated concentrations of Lead, Mercury, and PAH Compounds (Benzo(b)fluoranthene, Benzo(a)pyrene & Dibenzo(ah)anthracene) encountered when compared with residential (with homegrown produce) thresholds.
- 2.4.2 These elevations are summarised in the table below:

Determinands	Maximum Concentration (mg/kg)	Assessment Criteria (mg/kg)	Samples Fail
Lead	1400	200	WS102 (0.2 m), WS104 (0.15 m)
Mercury	2.1	1.2	
Benzo(b)fluoranthene	3.5	2.6	
Benzo(a)pyrene	3.3	2.2	
Dibenzo(ah)anthracene	0.45	0.24	

Table 1: Summary of Elevated Contaminants of Concern in Soils Throughout Risk Assessment (Results & Assessment Criteria from E3P Report)

2.4.3 A copy of the exploratory location plan is presented in Appendix A.

Human Health – End Users - Non-volatile Contamination

2.4.4 E3P concluded that the risk to chronic human health associated with the elevated concentrations of inorganic heavy metals and non-volatile PAH compounds should be mitigated through the installation of a suitable cover system in all proposed private gardens and soft landscaping in order to remove any potential for direct exposure to impacted soils. Details pertaining to the specifications of the cover system can be found in Section 3.19.

Human Health – End Users - Volatile Contamination

2.4.5 No elevated concentrations of volatile contaminants were identified within any of the samples tested, although due to elevated concentrations of mercury, it was recommended that speciated mercury analysis is undertaken in order to assess whether elemental mercury is present which may pose a risk to future site users through vapor inhalation.

2.4.6 Should elemental mercury be present then it may be necessary to delineate and excavate the soils as hotspots and place them in an area of low sensitivity, or remove the soils from site. Alternatively, it was concluded that if there is no elemental mercury present, then a clean cover system will be sufficient to mitigate the risks to end users.

Human Health – End Users - Asbestos

2.4.7 Asbestos was not identified during the ground investigation, although it was noted that asbestos may be present within the existing building on site and it was recommended that a pre-demolition asbestos survey should be undertaken. It was also recommended that if any visual asbestos be encountered remediation and construction works then the visible ACM will require removal off site and the impacted soils managed in a legislatively compliant manner.

Controlled Waters

2.4.8 With respect to controlled waters, BEK is in general agreement with E3P that risks to controlled waters are low.

- 2.4.9 Leachate and groundwater testing undertaken showed that concentrations of the inorganic compounds lead, selenium and zinc were found to be elevated against relevant criteria based on Drinking Water Standards/Environmental Quality Standards.
- 2.4.10 Notwithstanding the above, the solubility and mobility of the elevated concentrations of the inorganic compounds is low and migration to the controlled waters receptors is unlikely.
- 2.4.11 Low permeability, laterally continuous superficial deposits were also encountered which offer some protection to the underlying bedrock Secondary B aquifer.
- 2.4.12 The sensitivity of the Secondary B aquifer can also be reduced due to the absence of any groundwater abstractions within 2km of the site.
- 2.4.13 Fairwell Brook was also considered to be at low risk due to the significant distance from the site (170 m south-west).
- 2.4.14 Considering the above points made by E3P, no complete pollutant linkage can be determined and risks to controlled waters are considered to be low.

2.5 Risks from Ground Gases

- 2.5.1 E3P included a Ground Gas Risk Assessment within the most recent version of their 'Phase II Geoenvironmental Site Assessment Report' (Report Ref: 17-305-R1-2).
- 2.5.2 The potential impact on the development from ground gases has been assessed in accordance with guidelines published in CIRIA 665 (Assessing Risks Posed by Hazardous Ground Gases to Buildings, 2007) and BS8485:2015+A1:2019 (Code of Practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings).
- 2.5.3 E3P concluded that due to consistently elevated concentrations of carbon dioxide within WS101 during monitoring visits 3-6, the location of WS101 (north-east of the site) was classified as Characteristic Situation 2 (low risk). This area of the site corresponds to the proposed apartment building and gas protection measures are required in the building in accordance with BS8485.
- 2.5.4 The remainder of the site was classified as Characteristic Situation 1 (very low risk), meaning gas protection measures are not likely to be required in these areas (residential dwellinghouses).
- 2.5.5 E3P also recommended that made ground/organic materials in the location of an infilled pond within the vicinity of WS101 could be removed and a subsequent programme of gas monitoring undertaken in order to possibly reduce the ground gas classification.

- 2.5.6 However, liaison with the client by BEK confirmed that an additional period of gas monitoring is undesirable and gas mitigation measures in accordance with Characteristic Situation 2 of BS8485 will be installed within the apartment building as previously discussed.

2.6 Geotechnical Considerations

- 2.6.1 All geotechnical considerations within this section are taken from the 'E3P Phase II Geoenvironmental Site Assessment Report' (Report Ref: 17-305-R1-2). Further recommendations by BEK with respect to geotechnical assessment are outside the remit of this report. A summary of the sections of the geotechnical assessment are provided below.

Underground Obstructions & Subterranean Hazards

- 2.6.2 *'No obstructions were encountered during the ground investigation; however significant obstructions will be present beneath the existing building. As part of the process of creating a suitable platform for development, all subterranean obstructions will need to be excavated and removed beneath new structures and infrastructure. This will facilitate the construction of the proposed plots as intended.'*

Allowable Bearing Capacity

- 2.6.3 *'The underlying natural clay superficial deposits have been assessed as being stiff high strength with a net allowable bearing capacity (ABC) in the order of 166 – 197 kN/m² at circa 1.00 m bgl. SILT in WS103 is stiff high strength with an ABC of 207 kN/m² at 1.00 m bgl. The weathered siltstone bedrock is dense with an ABC of <450 kN/m² at 2.00m bgl.'*

Foundation Options

- 2.6.4 *'At this time, it is not possible to accurately define the foundation types due to the absence of a detailed tree survey and final development levels. A process of remediation and enabling works will be required to remove any buried obstructions. Dependent on development levels, it is likely that plots could be constructed using traditional strip or trench fill foundations bearing on the shallow stiff CLAY or siltstone bedrock. Further investigation is required to confirm the ground conditions in the location of the existing building'*

Foundations Near Trees

- 2.6.5 *'Foundation depths within the conjectured influence of former, existing or proposed trees will need to be deepened to ensure that structural loading bears within the underlying target founding stratum, which cannot be subject to volumetric instability associated with fluctuation in moisture content.'*

Heave Precautions Near Trees

- 2.6.6 *'Given that the underlying clay is of low volume change potential, heave precautions will not be required to the internal face of a foundation less than 1.5 m in depth. Heave precautions will be required to the underside of floor slabs (where there is no 200 mm void) and pile ground beams are required within the modelled influencing distance of trees.'*

Building Floor Slabs

- 2.6.7 *'Ground bearing floor slabs are not considered viable given the anticipated depths of Made Ground > 600 mm and shallow cohesive soils.'*

Soakaway Drainage

- 2.6.8 *'Falling head permeability tests suggest soakaway drainage is unlikely to be suitable due to the presence of cohesive superficial deposits.'*

Sulphate Assessment

- 2.6.9 *'Concrete classification will be DS-1 AC-1s.'*

CBR Design %

- 2.6.10 *'Natural clay soils will provide a CBR in the order of 3–5% during drier climatic periods. However, if water is allowed to shed onto the formation, the CBR will reduce to < 2%, which will require specialist engineering of the subgrade.'*

Enabling Earthworks

- 2.6.11 *'Development levels are unknown at this time; however, significant cut-and-fill works are not anticipated to prepare the development platform. As part of the earthworks design, materials should be assessed and characterised prior to re-use in the construction of upfill to a geotechnical design. All future earthworks should be completed in accordance with a Geotechnical Design Report (GDR) that will consider the ground model within the context of the potential for settlement induced by surcharge from earthworks, dynamic and permanent loading of the development and all known hazards.'*

Civil Engineering Excavations

- 2.6.12 *'The E3P Intrusive Ground Investigation has identified the presence of weathered/competent bedrock at a shallow depth, the presence of which will impede the excavation materials to form sewerage and drainage infrastructure and foundations.'*

Waste Characterisation

- 2.6.13 *'Any material that is to be disposed off-site should undergo assessment using Technical Guidance WM3: Waste Classification – Guidance on the classification and assessment of waste. This can be done upon request and in-line with the Environment Agency sampling frequencies.'*
- 2.6.14 The full geotechnical assessment can be found in the 'E3P Phase II Geoenvironmental Site Assessment Report' (Report Ref: 17-305-R1-2).

2.7 Identified Development Constraints

- 2.7.1 The following potential development constraints have been identified:
- Potential asbestos present within the existing building. A pre-demolition asbestos survey should be undertaken to assess the potential risks.
 - Ground conditions beneath the existing building are currently unknown and additional SI will be required following the demolition of the building.
 - Obstructions will be present beneath the existing building.
 - The presence of non-volatile contaminants of concern across the site requires a 600 mm clean cover system (with a no-dig layer or geotextile marker) in all landscaped/gardens areas.
 - Gas mitigation measures in accordance with Characteristic Situation 2 are required within the apartment building in the north-east of the site. The remainder of the site was classified as Characteristic Situation 1 (very low risk) and gas mitigation measures are not likely to be required in these areas.
 - Shallow bedrock at around 2 m bgl is likely to pose risks to the viability of excavations to install infrastructure using standard construction equipment.
- 2.7.2 Permit exemptions and/or a detailed Materials Management Plan (MMP) will need to be completed in accordance with CL:AIRE COP, when reusing natural materials on site.

2.8 Additional Assessment

- 2.8.1 Further site investigation will be undertaken following demolition of the existing building, as well as in the confines of the former pond. The findings and any recommendations made as a result of this work will be incorporated into a revised version of this report.
- 2.8.2 Elevated concentrations of mercury were encountered within the site investigation. Speciated mercury analysis will be undertaken for samples taken from the vicinity of WS102 and WS104 in order to assess whether elemental mercury is present which may pose a risk to future site users through vapor inhalation.

- 2.8.3 Should elemental mercury be present then it may be necessary to delineate and excavate the soils as hotspots and place them in an area of low sensitivity, or remove the soils from site. Alternatively, it was concluded that if there is no elemental mercury present, then a clean cover system will be sufficient to mitigate the risks to end users.
- 2.8.4 Further works required also include:
- Geotechnical Earthworks Strategy (Infrastructure)
 - Arboricultural Survey
 - Gas Verification Plan
 - UKWIR Risk Assessment for Water Pipes

3.0 SITE REMEDIATION & ENABLING WORKS

3.1 Overview

3.1.1 The outline strategy for the site remediation and enabling works will comprise:

- Implementing the works with appropriate consultancy supervision so that the works can be fully validated, together with verification reporting, to the satisfaction of the Local Planning Authority (LPA).
- Pre-demolition asbestos survey on the existing building on site, with any asbestos containing materials removed by a suitably qualified person(s) prior to demolition.
- Management of all works so as to ensure that no environmental nuisance is created through dust emissions, noise or vibration levels.
- Further site investigation and sampling within vicinity of the building footprint (following demolition), the pond area, and boreholes WS102 and WS104.
- General site clearance and legislatively compliant disposal of all surface vegetation, breaking out, excavation and removal of all slabs, hard-standing and buried structures to the base of the made ground (subject to structural engineer confirmation).
- Removal of any previously unidentified contamination hotspots.
- Excavation and removal of all previously unidentified materials deemed to be either a potential risk to the identified receptors or the built environment.
- Breaking out and subsequent crushing / processing of all surface and sub-surface structures including foundations, redundant drains and any further buried obstacles (where present).
- Importation of inert and geotechnically stable fill if required. Laboratory testing of all imported material to confirm chemical and geotechnical suitability for use, in accordance with the testing schedule presented within the Remediation Strategy.
- Provide suitable development platform to facilitate the construction of the proposed roadways, drainage infrastructure, pavements and areas of hard-standing; to be delivered in accordance with the Engineers Specification.
- Use of potable water supply infrastructure that will be compliant with UKWIR assessment criteria.
- Removal and disposal of any perched water from within excavations (if required).

- Ensure that all works are completed in a manner so as not to create any structural risk to the adjacent highways/infrastructure.
- Implement all temporary works as necessary to support excavations throughout the duration of the works.
- Construction of the apartment building in the north-east of the site with gas mitigation measures in accordance with Characteristic Situation 2 of BS8485:2015+A1:2019.
- Implement a soft cover system of 600 mm thickness in all private garden areas and 300 mm thickness in all Public Open Spaces, underlain by a geotextile membrane or 100 mm granular no-dig layer to prevent mixing.
- Retained soils on site then this should be managed through exemption for Permitting (if appropriate) or through the preparation of a Material Management Plan as part of compliance with the Definition of Waste:Code of Practice (DoW:CoP).
- Validation sampling to confirm material retained on-site pose no unacceptable risk to the residential end users, controlled waters or wider environ;
- Removal of all soil wastes deemed unsuitable for use from site in accordance with UK Waste Management Legislation and in accordance with the UK Landfill Directive
- Development of a comprehensive Validation Report to document the successful completion of the aforementioned works.

3.2 Rationale

- 3.2.1 The rationale detailed below provides a synopsis of the proposed site enabling / remediation works required to produce the suitable platform for the construction of the proposed residential development. This is intended to demonstrate that the proposed activities are to be undertaken in full compliance with the relevant regulatory controls.
- 3.2.2 The remediation strategy should be implemented with appropriate consultancy supervision so that the works can be fully validated, along with validation reporting to the satisfaction of the Local Planning Authority (LPA). Site works will be supervised by a Resident Engineer (RE) appointed by The Casey Group.

3.3 Pre-Commencement Regulatory Compliance

- 3.3.1 Prior to commencement of any works on-site, all reports relating to the assessment of risk to contaminated land should be submitted to the regulatory authorities to gain written approval.

- 3.3.2 All relevant Standard Rules Permits should be registered with the EA.
- 3.3.3 The LAPC Part B Notification for deployment of mobile crushing plant should be implemented prior to the establishment of equipment on-site.
- 3.3.4 If the proposed volume of soils to be re-used (excluding crushed materials) exceeds the parameters of the Standard Rules Permit, a CL:AIRE MMP Qualified Declaration should be made by the contractor having obtained full written approval for the Remediation Strategy from the LPA and Environment Agency.
- 3.3.5 If it is intended to treat any materials on-site (such as hydrocarbon impact soil or groundwater) the contractor must either notify the EA of their intention to complete a minor works operation or arrange for the deployment of the appropriate Environmental Permit for the specified operation.

3.4 Materials Management & Legislation Compliance

- 3.4.1 All operations as outlined in detail within this report will be subject to regulation using either Permit Exemptions (if applicable) and/or a 'Materials Management Plan' (MMP) to be created in accordance with Version 2 of the CL:AIRE Definition of Waste - Industry Code of Practice.
- 3.4.2 If required, the MMP will be created with due consideration to all proposed remediation and enabling works operations prescribed within this document and will be undertaken by a Qualified Person and a signed declaration submitted to the EA prior to reuse of materials on the site.
- 3.4.3 The MMP will be completed once the Remediation Strategy has been approved by the appropriate regulatory bodies.
- 3.4.4 A Declaration must be completed and signed by the Qualified Person in the following circumstances:
- Site of Origin scenario – Prior to use;
 - Direct Transfer scenario – Prior to dispatch. One for each receiving site;
 - Cluster Project scenario – Prior to dispatch from a Hub site (including a fixed STF acting in that capacity) to each Receiver site within the defined Cluster Project.

3.5 Site Establishment & Welfare

- 3.5.1 Prior to the commencement of works on-site, the remediation contractor must establish all necessary plant, equipment and site welfare facilities as is necessary to complete the contract within the agreed timescales to the rationale as outlined in the sections below.

3.5.2 The contractor shall comply at all times with the conditions of contract, tender documents and health and safety requirements of The Casey Group. The contractor shall prepare and submit a programme for the works to be submitted to The Casey Group prior to commencement on site.

3.5.3 The contractor shall make adequate provision to secure the site boundary and prevent unauthorised access onto the site during the course of the works. The contractor shall agree access points and routes for heavy vehicles. Suitable precautions shall be taken to prevent the spread of mud and debris on public highways.

3.5.4 Noisy operations i.e. the use of hydraulic breakers should be restricted to the hours specified on the Planning Conditions.

3.6 Environment & Nuisance Control

3.6.1 Management of all works so as to ensure no dust emissions, or that noise levels or vibration levels are not exceed.

3.6.2 Ensure that all works are completed in a manner so as not to create any structural risk to the adjacent highways.

3.6.3 Implement all temporary works as necessary to support excavations throughout the duration of the works.

3.6.4 In the event that a complaint is made in respect of dust emissions, noise or vibration levels, remedial measures and a programme of ongoing monitoring should be agreed with the local authority and implemented on site.

3.7 Pre-demolition Asbestos Survey

3.7.1 The existing building on site will require an asbestos survey to be undertaken prior to demolition by a suitably qualified asbestos surveyor.

3.7.2 Any asbestos containing materials identified as a result of the survey will require removal by a suitably qualified person(s) prior to demolition.

3.8 Sampling of Soils Within the Vicinity of Demolished Building, Pond Area, and Boreholes WS102 and WS104.

3.8.1 Following the demolition of the existing building on site, further site investigation and sampling will be undertaken within the vicinity of building footprint, as well as the pond area in the north-east of the site, in order to provide a more robust dataset to establish if the material present within these areas poses a risk to human health of end users.

3.8.2 Additional samples will also be recovered from the vicinity of Boreholes WS102 and WS104 due to elevated concentrations of mercury encountered during the initial E3P site investigation. Speciated mercury analysis will be undertaken on the samples in order to assess whether elemental mercury is present which may pose a risk to future site users through vapor inhalation.

3.8.3 Should elemental mercury be present then it may be necessary to delineate and excavate the soils as hotspots and place them in an area of low sensitivity, or remove the soils from site. Alternatively, if no elemental mercury is found to be present, then a clean cover system will be sufficient to mitigate the risks to end users.

3.9 Site Preparation and Clearance

3.9.1 The site should be cleared and any vegetation below areas of proposed development and stripped in accordance with Series 200 of the Specification for Highway Works. This should include:

- Once operations have been established at the site, in terms of site security and cabins/offices, the site should be cleared of all residual debris (fly tipped materials)
- Trees, bushes and shrubs that are required to be stripped and shredded to create a mulch for re-use on site. Any debris/matter not required shall be removed off site to a suitably licensed facility.
- Roots present below the footprint of proposed structures and infrastructure should be grubbed out and the resulting void infilled with suitable compacted engineered fill;
- No invasive plant species have been identified on site. If identified during future works this material and the infested soils will require treatment / removal by a suitably qualified contractor;
- Any redundant services should be sealed off and grubbed out and replaced with suitable compacted engineered fill;
- Consideration should be given to any proposed retaining structures on the site and should be assessed by a structural engineer prior to development.
- Where materials are removed from site all Waste Transfer Notes / Duty of Care certificates should be included within the validation statement.

3.10 Delineation of Previously Unidentified Hotspots

Rationale:

- 3.10.1 Any previously unidentified hotspots including but not limited to elemental mercury, polycyclic aromatic hydrocarbons, speciated total petroleum hydrocarbon compounds, semi volatile, volatile compounds or asbestos encountered as a result of groundworks and/or additional sampling will require assessment to ensure no ongoing risks to groundworkers or risks to end users are present. Remedial strategies may include excavation, validation and treatment or installation of vapour membranes to ensure no risk to future site users.

Validation Requirements:

- 3.10.2 Upon completion of any delineation and excavation exercises, the sides and base of the resultant void(s) will be chemically validated to confirm no impacted materials remain in situ. The results of this validation testing will be directly compared to validation criteria (as defined within Section 3.21) to demonstrate that no unacceptable level of risk to human health, controlled waters or the wider environs remains in addition to being visually validated.
- 3.10.3 Any installed vapour membranes will require inspection and sign-off by a suitably qualified environmental consultant.

3.11 Excavation, Breaking & Processing of Sub-Surface Structures

- 3.11.1 As a recently demolished building will be present at the site, below ground obstructions will exist. All natural and artificially hard material (i.e. concrete, brick and stone etc.) comprising slabs, hardstanding, foundations etc. present at and below the existing site surface are to be broken out. This material is to be removed in its entirety (i.e. to full depth) from the area of the proposed new build footprint. The location and depth of all below ground obstructions removed during the works should be accurately recorded. Dust, noise and vibration should be monitored and recorded.
- 3.11.2 Appropriate care and diligence should be taken during excavation works across the site and the environmental consultant should be notified immediately should any unexpected ground conditions, structures, artefacts or contamination be encountered. Any wells encountered will need to be inspected and decommissioned in accordance with EA guidance.
- 3.11.3 The remediation contractor shall 'grub out' and remove from the site all relict drainage runs. This shall include the excavation and off-site removal of any unexpected contaminated liquids, sludges etc, as required and validation of site soils by the supervising engineer against the relevant site-specific remedial targets.

- 3.11.4 All suitable, clean, artificially hard materials recovered during the works should be crushed to a 125 mm down grading, for potential re-use on site. Stockpiles will be made, validation testing undertaken, and site won material reused on site where required, in line with suitable MMP's and regulatory permissions. Any geotechnically unsuitable/deleterious materials such as metal, plastic and wood should be removed from these materials prior to crushing and disposed offsite at a suitably licenced landfill facility.
- 3.11.5 Where any very loose or soft material is present at the base of excavations, removal of material will continue, and any material excavated will be reengineered to a suitable specification to minimise the risk of future settlement.
- 3.11.6 Site-won arisings will require chemical testing to demonstrate that they are suitable for use with the proposed development platform.
- 3.11.7 Areas will require appropriate geotechnical testing to demonstrate that the backfill material meets the required engineered standard.
- 3.12 Cut & Filling of Made Ground to Development Levels**
- 3.12.1 Where the proposed enabling work levels require the current landform to be cut, extreme care should be taken so as not to disturb the underlying stratum prior to the placement of the appropriate platform in compliance with the Engineers Specification.
- 3.12.2 Where the development levels require material to be filled, site derived made ground must be sorted in a controlled manner prior to replacement in accordance with the requirements of this specification for the intended land use.
- 3.12.3 The maximum dry density must be determined in laboratory conditions utilising UKAS accredited testing prior to the commencement of filling and compaction works. In-situ density testing may be required to demonstrate compliance with the Engineers Specification should the contractor opt to use cohesive fill material during the backfill operations.
- 3.13 Geotechnical Engineering Requirements: Highways, Driveways, Plots, POS and Gardens**
- 3.13.1 Made ground is present across the site, and it is strongly recommended that consultation regarding the specification of the highways should be made with the adopting authority regarding future highways. However, it is considered that the following options would be suitable to enable the construction of the highways.
- 3.13.2 Where made ground is present the following options are considered suitable. Excavation of the full thickness (up to a maximum of 2m) of made ground and either:

- a) Replacement with suitable aggregate in accordance with Series 600 (Earthworks) of The Highways Agency (HA) "Specification for Highway Works" 1998, or
- b) Screening, selection and replacement (in accordance with Series 600) of suitable material in engineered layers. Unsuitable materials include soft or wet materials, biodegradables including topsoil, wood, scrap metal, frozen material and oversize.

- 3.13.3 Any residual made ground materials in the base of the excavation (i.e. in areas where the thickness of made ground exceeds 2m) should be inspected and (where necessary) any soft spots removed and replaced with suitable engineered fill.
- 3.13.4 Existing made ground beneath the site will likely offer CBR values of <1%.
- 3.13.5 Fill materials shall be placed to provide a minimum CBR value of 5 % below all roads, highways and parking areas. Following excavation, the sub formation should be proof rolled and any soft material inspected. Should the road/pavement formation fail to meet this requirement then the contractor shall remove soft areas to be replaced with suitable engineering material.
- 3.13.6 Plate bearing tests or in-situ CBRs, to enable determination of CBR values, shall be undertaken at the formation level of estate roads, at approximately 25 m linear centres or as specified by the RE.
- 3.13.7 The CBR Method Compaction for plots will depend upon the foundation type. This will be specified by the structural engineer.
- 3.13.8 Gardens & POS areas will require method compaction to ensure no settlement.
- 3.13.9 Confirmation that the material is chemically and geotechnically suitable for re-use shall be in accordance with the local authority requirements.

3.14 New Utilities

- 3.14.1 It is strongly recommended that all statutory service bodies are consulted at an early stage with respect to the ground conditions within which they will lay services in order to enable them to assess at an early stage any potential abnormal costs.
- 3.14.2 Based on the degree of soil contamination identified in soils beneath the site, it is possible that the Water Supply Company will require an increase specification of water supply pipe for the proposed development. However, this should be confirmed, and an appropriate water supply risk assessment conducted for the site.

3.15 Removal of Water

- 3.15.1 Consideration must be given to the local pumping of water within service trenches, especially after periods of heavy rainfall due to the impermeable nature of the underlying clay soils.

- 3.15.2 Any waters encountered within the formation of earthworks excavations will be assessed and disposed of in a controlled and legislatively compliant manner.

3.16 Importation of Bulk Fill

- 3.16.1 Where there is a net shortfall of material required to achieve the proposed ground levels, it will be necessary to import natural inert soils and aggregate as per the engineering requirements.

- 3.16.2 Imported material must be certified as suitable for use in strict accordance with the chemical and geotechnical performance criteria in conjunction with the required duty of care notes and waste transfer exemption. If recycled aggregates are imported laboratory testing should be completed to demonstrate compliance with the WRAP Protocol. Where inert soils are imported laboratory testing should be completed in accordance with the requirements of the pertinent Environmental Permit (i.e. U1 Standard Rules) or CL:AIRE MMP for the re-use of clean naturally occurring soils.

3.17 Provision of Subsoil

- 3.17.1 Subsoil will need to be imported to site for use. Imported subsoil will require testing in line with the determinands present within Table 4. The garden and landscaped areas will require depth validation in line with the recommendations provided within Section 3.22.

3.18 Provision of Topsoil

- 3.18.1 No material that would be deemed suitable for use as topsoil is present on-site and as such there will be requirement to import suitable material for use within the proposed development.
- 3.18.2 Imported Topsoil will require testing in line with the determinands present within Table 4. The garden and landscaped areas will require depth validation in line with the recommendations provided within Section 3.22.

3.19 Post Enabling Works Requirements

Gas Protection Measures

- Gas mitigation measures in accordance with Characteristic Situation 2 are required within the apartment building in the north-east of the site.
- The apartment building is classified as a 'Type B' building (Managed Apartments) within BS8485:2015+A1:2019, meaning a 'gas score' of 3.5pts will be required for gas measures installed within the building. BEK understands the gas mitigation measures are to comprise a Passive sub-with good performance (2.5pts) and a Gas Resistant Membrane (2pts).

- The gas protection measures should be designed in accordance with BS8485:2015+A1 (2019) and installed in accordance with BRE Report 414 (2001). In addition, the gas protection membrane utilised should be robust enough to withstand the construction process and, if unreinforced, should be a minimum of 2000 gauge.
- Following construction and prior to being covered, the gas protection measures should be inspected for validation purposes in all residential plots, in accordance with the guidance and pro forma in CIRA C735.
- The scope of the installation and validation of the gas/vapour measures should be reported within a Gas Verification Plan
- In order to ensure that the ground gas protection measures recommended have been installed correctly, it is recommended that a physical inspection of the gas membrane and passive ventilation is undertaken with evidential photographs taken and letter reports compiled for every plot.

Clean Cover System

- A clean cover system should be installed within areas of soft landscaping at the site. Within private garden areas, the cover system will comprise a thickness of at least 600 mm of physically and chemically suitable imported topsoil and subsoil. Within soft-landscaped public open space areas, the cover system will comprise a thickness of at least 300 mm of physically and chemically suitable imported topsoil and subsoil.
- The topsoil component of the clean cover system should be a minimum of (but not restricted to) 150 mm in depth. The remainder of the clean cover (450 mm in private garden areas, 150 mm in POS areas) will be composed of subsoil.
- The clean cover system should be underlain by a 100 mm granular no-dig layer or a geotextile marker membrane in all areas of the site to prevent mixing.

3.20 Demonstration of Proposed Remediation Works to Break the Identified Pollutant Linkages

- 3.20.1 It is understood that the site is to be developed for a residential end-use with soft landscaping/gardens. Residences are to comprise 8No. dwelling houses and 1No. 3-storey building to form 15 flats.
- 3.20.2 Based upon the information obtained, the following table demonstrates the risks to human health which will be satisfactorily addressed by the anticipated remedial works across the site as proposed.

Receptor	Area of Concern	Mitigation
Human Health	Non-volatile contamination across the site in proposed garden/soft landscaped areas	Clean cover system in all soft landscaped areas to 600 mm including geotextile marker membrane or 100 mm granular no-dig layer at base
	Potential for elemental mercury to be present which poses a risk through vapour inhalation	Testing of soils within vicinity of WS102 and WS104 for speciated mercury and subsequent hotspot removal should elemental mercury be above relevant assessment criteria.
	Ground Gas Risk (North-east of site)	Gas Measures which adhere to Characteristic Situation 2 are to be installed within the residential apartment building. A Gas Verification Plan will be prepared for the site.
Damage to Buildings (fire & explosion)		
Water Pipes	Potable Water Supply Pipes	Appropriate water supply risk assessment and use of barrier pipe (if required)

Table 2: Summary of Remediation Works Required

3.21 Validation Sampling Protocol

- 3.21.1 In accordance with the current requirements of the regulatory authorities, validation samples will be collected from all materials that are to either be subject to movement under the protocols outlined within this Remediation Strategy, or for materials to be imported onto site to facilitate the proposed residential development.
- 3.21.2 Soil samples destined for chemical analysis will be collected at regular intervals in appropriate sampling containers. All samples will subsequently be stored in cooled boxes prior to submission to a UKAS accredited laboratory. All testing should be carried out to MCERTS standard where applicable.
- 3.21.3 All samples will be collected using appropriate PPE and sampling equipment that will be cleaned at each sampling location. A detailed copy of the sampling methodology, QA procedures and laboratory chain of custody forms will be documented within the site records and presented within the final validation report for the site.
- 3.21.4 Where materials are found to contain concentrations of potential contaminants at levels in excess of the generic screening criteria, an environmental consultant will undertake further assessment and recommendations on the appropriate use for the material in question, which may involve the disposal of such materials offsite to a suitable waste management facility.
- 3.21.5 The specification for validity chemical testing at the site will be determined by the material source and proposed final use at the site. This will follow the guidance presented in the YALPAG document entitled 'Verification Requirements for Cover Systems' (Version 4.1, dated June 2021). An extract from the document is provided below.

Type	Number of Samples	Testing Schedule	Assessment Criteria
Please note that these guidelines apply to a typical residential development, and relaxation of the guidelines or more stringent requirements may apply dependent on local and site specific factors. Therefore, <u>all parameters need to be agreed with the Local Authority.</u>			
Virgin Quarried Material	1 or 2 depending on the type of stone utilised, to confirm the inert nature of the material.	Standard metals/metalloids (should include as a minimum As, Cd, Cr, CrVI, Cu, Hg, Ni, Pb, Se, Zn)	The assessment criteria need to be UK based, e.g. LQM S4ULs, Defra C4SLs or other similarly derived GACs.
Crushed Hardcore, Stone, Brick (excluding asphalt)	Minimum 1 per 500m ³	Standard metals/metalloids (as above), PAH (16 USEPA speciation), asbestos, total TPH. Any additional analysis dependant on the history of the donor site (e.g. phenol, total cyanide, BTEX, MTBE).	
Greenfield/ Manufactured Soils	Minimum 3 Dependent on source and receptor, between 1 per 50m ³ and 1 per 250m ³	Standard metals/metalloids (as above), PAH (16 USEPA speciation), asbestos, pH and soil organic matter (SOM) (or calculated from total organic carbon (TOC)).	
Brownfield/ Screened Soils	Minimum 6 Dependent on source and receptor, between 1 per 50m ³ and 1 per 100m ³	Standard metals/ metalloids (as above), PAH (16 USEPA speciation), TPH (CWG banded), asbestos, pH and SOM (or calculated from TOC). Any additional analysis dependant on the history of the donor site (e.g. phenol, total cyanide, BTEX, MTBE).	

Table 3: Summary of Soil Testing Frequency and Schedule (extract from YALPAG)

- 3.21.6 The sampling frequency may be varied at the discretion of the Engineer depending on the nature and variability of the imported material and its source (subject to Local Authority approval).

Validation Criteria for Imported Material

Determinand	Assessment Criteria (mg/kg)		
	Below Hardstanding Roads	Within Upper 600 mm of Private Gardens	Within Upper 300 mm of POS
Arsenic	640 ¹	37 ¹	79 ¹
Cadmium	190 ¹	11 ¹	120 ¹
Chromium	8600 ¹	910 ¹	1500 ¹
Chromium (Hexavalent)	33 ¹	6 ¹	7.7 ¹
Lead	2300 ²	200 ²	630 ²
Mercury	1100 ¹	40 ¹	120 ¹
Nickel	980 ¹	180 ¹	230 ¹
Selenium	12000 ¹	250 ¹	1100 ¹
Copper	68000 ¹	2400 ¹	12000 ¹
Zinc	730000 ¹	3700 ¹	81000 ¹
Cyanide	34 ³	34 ³	34 ³
Phenol	760 ¹	210 ¹	4900 ¹
Naphthalene	15 ²	15 ²	11000 ²
Acenaphthene	84000 ¹	210 ¹	15000 ¹
Acenaphthylene	83000 ¹	170 ¹	15000 ¹
Fluorene	63000 ¹	170 ¹	9900 ¹
Phenanthrene	22000 ¹	95 ¹	3100 ¹
Anthracene	520000 ¹	2400 ¹	74000 ¹
Fluoranthene	23000 ¹	280 ¹	3100 ¹
Pyrene	54000 ¹	620 ¹	7400 ¹
Benzo(a)anthracene	170 ¹	7.2 ¹	29 ¹
Chrysene	350 ¹	15 ¹	57 ¹
Benzo(b)fluoranthene	44 ¹	2.6 ¹	7.1 ¹
Benzo(k)fluoranthene	1200 ¹	77 ¹	190 ¹
Benzo(a)pyrene	35 ¹	2.2 ¹	5.7 ¹
Indeno(1,2,3-cd)pyrene	500 ¹	27 ¹	82 ¹
Dibenzo(ah)anthracene	3.5 ¹	0.24 ¹	0.57 ¹
Benzo(ghi)perylene	3900 ¹	320 ¹	640 ¹
Aliphatic TPH C5 - C6	42 ¹	42 ¹	570000 ¹
Aliphatic TPH C6 - C8	100 ¹	100 ¹	600000 ¹
Aliphatic TPH C8 - C10	27 ¹	27 ¹	13000 ¹
Aliphatic TPH C10 - C12	130 ¹	130 ¹	13000 ¹
Aliphatic TPH C12 - C16	1100 ¹	1100 ¹	13000 ¹
Aliphatic TPH C16 - C21	65000 ^{1*}	65000 ^{1*}	250000 ¹
Aliphatic TPH C21 - C35	65000 ^{1*}	65000 ^{1*}	250000 ¹
Aromatic TPH C5 - C7	70 ¹	70 ¹	56000 ¹
Aromatic TPH C7 - C8	130 ¹	130 ¹	56000 ¹
Aromatic TPH C8 - C10	34 ¹	34 ¹	5000 ¹
Aromatic TPH C10 - C12	74 ¹	74 ¹	5000 ¹
Aromatic TPH C12 - C16	36000 ¹	140 ¹	5100 ¹
Aromatic TPH C16 - C21	28000 ¹	260 ¹	3800 ¹
Aromatic TPH C21 - C35	28000 ¹	1100 ¹	3800 ¹

Table 4: Validation Criteria – Imported Soils

- 1 CIEH/LQM Derived Assessment Criteria (S4ULs based on 1 % SOM)
- 2 Category 4 Screening Levels (C4SL)
- 3 Atkins ATRISK

3.21.7 Table 4 above provides a list of assessment criteria for assessing suitability of imported material to be used within the capping system and within road formation. The assessment criteria for lead at the site have collated from various sources including: the Land Quality Management and Chartered Institute of Environmental Health assessment criteria (S4ULs) and the Category 4 Screening Levels (C4SLs). Imported materials beneath roads and hardstanding or clean cover will be assessed against commercial land use criteria for none volatile components where no direct contact human health pathway exists. Potentially volatile compounds will be assessed as per published residential land-use criteria.

3.22 Physical Validation

3.22.1 To mitigate risks associated with non-volatile ground contamination within the soft landscaped areas of the proposed development, it is recommended that a clean cover system should be installed within soft landscaped areas. Within private garden areas the cover system will comprise a thickness of at least 600 mm of physically and chemically suitable imported topsoil and subsoil. Within soft-landscaped public open space areas, the cover system should comprise a thickness of at least 300 mm of physically and chemically suitable imported topsoil and subsoil.

3.22.2 It is recommended that a suitably qualified and experienced engineer visit the areas of soft landscaping and undertake the excavation of a hand dug inspection pit to 600 mm/300 mm in relevant soft landscaped areas. BEK recommends one hole per garden plot and 5 holes across all impacted POS areas.

3.22.3 The engineer will record the thickness, depth and composition of both the topsoil and sub soil and would take validation photographs. In addition, if there is a requirement to import topsoil and subsoil, samples will be obtained for validation testing, as per the frequency outlined in Table 3 above.

3.22.4 BEK will ensure that the requirements of this Strategy are complied with. On satisfactory completion of the placement of clean cover BEK will provide a validation letter report.

3.22.5 This report will comprise relevant site records and act as certification that the remedial preparation works have been carried out in accordance with the Strategy.

3.22.6 Each validation report shall include the following:

- A description of the works undertaken
- Validation Photographs showing the appropriate thickness of clean cover and inspection pit in relation to the plot
- Chemical validation test results
- A statement that the works have been undertaken in accordance with the agreed Strategy

4.0 RECORD KEEPING & SITE INSPECTION

4.1 Site Manager

- The Site Manager shall be responsible for obtaining all relevant environmental permits for the works to be completed.
- The Site Manager shall be responsible for recording all environmental incidents at the site and be responsible for reporting it to the environmental consultant and the relevant regulatory bodies (if applicable).
- The Site Manager shall be responsible for recording and managing all material movements, including the location, type and volume of stockpiles created.
- The Site Manager shall be responsible for retaining copies of all delivery notes of materials imported to the site, which as a minimum should confirm the material source and volume.
- The Site Manager should ensure all wastes disposed of off-site are done so in a regulatory compliant manner and a copy of all Waste Transfer Notes and Consignments are retained for inspection.

4.2 Environmental Consultant

- The consultant will conduct spot checks on general site activities, material movements, working practices and record keeping to ensure the Remediation Strategy is being adhered to. The frequency of visits will ultimately be dependent on the type of site works being carried out, the risks associated with it and general workmanship.
- The consultant will obtain copies of all relevant documentation associated with disposal of waste off-site.
- The consultant will assess and compile all monitoring records (if undertaken).
- The consultant will ensure that all materials are sampled for validation and waste disposal purposes as necessary.
- The consultant will compile a photographic record of all key works undertaken.
- The consultant will complete a site visit diary, which includes a summary of the following:
 - Works undertaken
 - Plant, personnel and visitors present
 - Any unexpected ground conditions or contaminants
 - A summary of any sampling carried out

- Any other relevant environmental aspects relating to the works.

4.3 Validation Report

4.3.1 Following completion of the enabling works, the records listed above will be compiled into a Validation Report, summarising the works undertaken and confirming that they have been carried out in accordance with this Remediation Strategy.

4.3.2 The Validation Report will include the following:

- A summary of all works undertaken
- Provision of all relevant records and supporting evidence, including monitoring results, delivery and waste disposal records
- Copies of any regulatory correspondence relevant to the validation and site enabling works
- A summary and sketches (as appropriate) of excavations and material movements
- A selection of photographs providing evidence for the works
- Detailed drawings showing all sampling locations for both chemical and geotechnical testing
- Details of any previously unidentified contaminants, including remedial actions taken
- A statement confirming the works have been completed in compliance with this Remediation Strategy

5.0 CONTINGENCY PLAN & REGULATORY COMPLIANCE

5.1 Previously Unidentified Contaminants

- 5.1.1 Should any significantly impacted material be encountered during the development, then it should be excavated and stockpiled on an impermeable material and sampled and tested for an appropriate range of determinants.
- 5.1.2 Once the laboratory analysis of the material is available an assessment should be undertaken to determine whether it can be retained on-site as part of the Material Management Operations or whether it should be disposed off-site.
- 5.1.3 Depending on the nature of any such impact it may be necessary to undertake validation testing of the excavation faces in order to demonstrate that no such materials are left in-situ.

5.2 Regulatory Approvals

- 5.2.1 The conclusions and recommendations presented above are considered appropriate, based on the findings of the site investigation works undertaken by E3P. However, these recommendations cannot be guaranteed to gain regulatory approval and this report should be passed to the appropriate regulatory authorities and/or other organisations for their comment and approval prior to confirming remedial proposals, completing associated remedial/earthworks design and undertaking any works on site.

APPENDIX A

Drawings

Key

3000 x 6000mm parking space

Pavement

Block Paved Parking Space

Private Garden

Front Garden

Access Road - Tarmac

Shed (Cycle Storage)

Easement

Schedule of Accommodation

Social Rent
10no 1B2P Flats @ 50m²
5no 2B3P Flats @ 61m²
2no 2B4P Houses Semi-Detached @ 83m²
4no 3B5P Houses Semi-Detached @ 96m²
2no 4B6P Houses Detached @ 108m²

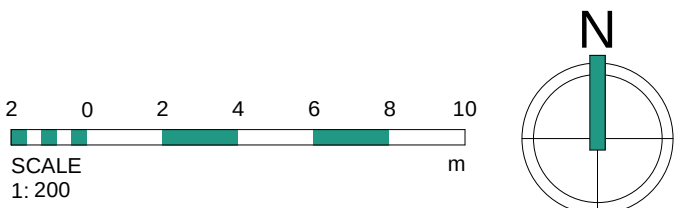
23no Total

28 no parking spaces
Flats - 100% parking spaces
2B4P Houses - 100% parking spaces
3B5P Houses - 100% parking spaces
4B6P Houses - 200% parking spaces
1no - parking space for 27 Newell Road
1no - parking space for 29 Newell Road
1no - parking space for 33 Newell Road

Site Area: 3010m²

Caveats

- Overlooking distances subject to LPA Approval
- Density and parking mix subject to LPA Approval



Layout subject to confirmation of red line boundary, all statutory approvals including highways, planning and building regulations, relevant surveys and reports such as topographical, ecology, trees, ground investigation and flood risk.

Area Schedule		
Type	Description	Area
Car Parking	Salmon	330 m²
Front Garden	Dark Green	618 m²
Plot Hardstanding	Light Grey	525 m²
Private Garden	Light Green	343 m²
Tactile Paving	Brown	4 m²
Unadopted Drive	Red Fleck	400 m²
Total: 39		2221 m²

Fence Schedule		
Type	Fence Height	Length
440x440x1800mm		0.0
1800mm Wall & Railing	1.250	88.2
Fence - TSW 1100mm	1.100	56.3
Fence - TSW 1800mm Trellis	1.800	61.7
Fence - TSW 2100mm	2.100	149.5
Total: 53		375.7



00 Proposed Site Plan
1 : 200

DO NOT SCALE FROM THIS DRAWING
ALL DIMENSIONS MUST BE CHECKED ON SITE BY CONTRACTOR
PRIOR TO CONSTRUCTION

RevDateIntDescription

btp

ARCHITECTS

RIBA

Chartered Practice

CLIENT:

WCHG

PROJECT:

Greenbrow Social Club

DESCRIPTION:

Proposed Site Plan

PURPOSE OF ISSUE:

Building Regulations

DRAWN BY:CHECKED BY:DATE:SCALE @ A1:

EDMA22.03.241: 200

JOB NO.:STATUS CODE:DRAWING NO.:REV:

3953S2203

FILE IDENTIFIER:

GR-BTP-00-SP-DR-A-3953_203

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<p>Location Symbols</p> <div><div> Approximate Window Sample Probehole Location (E3P Location February 2024)</div><div> Approximate Window Sample Probehole Location with Install (E3P Location February 2024)</div><div> Existing Building - No Access</div></div>	<p>Notes:</p> <div></div>	<p>Client:</p> <div>Shape Consulting Engineers</div>	<p>Job No:</p> <div>17-305</div>	<p>Date:</p> <div>04.03.2024</div>	 <div>Environmental Engineering Partnership Ltd Taylor Road, Trafford Park Urmston, Manchester, M41 7JQ Tel: 0161 707 9612 E-mail: info@e3p.co.uk Website: www.e3p.co.uk</div>												
<table><tr><td>P1</td><td>REVA</td><td>04,03,2024</td><td>CB</td><td>AS</td><td>AS</td></tr><tr><td>Phase</td><td>Issue</td><td>Date</td><td>Drawn</td><td>Checked</td><td>PM</td></tr></table>	P1	REVA	04,03,2024	CB	AS	AS	Phase	Issue	Date	Drawn	Checked	PM	<p>Job Title:</p> <div>Greenbrow Social Club</div>	<p>Drawing Title:</p> <div>Exploratory Hole Location Plan</div>	<p>Drawing No:</p> <div>005</div>	<p>Scale:</p> <div>NTS @ A3</div>	<p>The client must not amend any drawing, design or other intellectual property produced by E3P Ltd without permission in writing from E3P Ltd in advance of any amendments being made. In the event that such written permission is not obtained in advance of the amendments being made, E3P Ltd shall not be liable for any damage and/or losses occurring as a result of the amended drawing, design or intellectual property.</p>
P1	REVA	04,03,2024	CB	AS	AS												
Phase	Issue	Date	Drawn	Checked	PM												