

Flemings Hall Barn Hall Road Bedingfield

**STAGE I/ TIER II
Ground Investigation Report**

Report: NE22/009/SITII

18/11/2022

Rev. 00



DOCUMENT CONTROL

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| <p>Report prepared by:</p> <p><i>Andrew Cartwright</i></p> <p>A J Cartwright BSc (Hons) Environmental Engineer</p> <p>On behalf of JPC Environmental Services A Division of JP Chick & Partners Limited</p> | <p>Report reviewed by:</p> <p><i>Adam Steele</i></p> <p>A Steele BSc (Hons) MSc MEnvSc Associate</p> <p>On behalf of JPC Environmental Services A Division of JP Chick & Partners Limited</p> |
| <p>JPC Issuing Office</p> | |
| <p>23 St Stephens Road, Norwich, NR1 3SP</p> | |

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EXECUTIVE SUMMARY

| | |
|--|--|
| Site Name & Address: | Flemings Hall Barn, Hall Road, Bedingfield, IP23 7LJ |
| Client: | Will Scott |
| Local Planning Authority: | Mid Suffolk District Council |
| Historical Site Use: | Agricultural use |
| Present Site Use: | Agricultural use |
| Proposed Site Use: | Residential Dwelling |
| Date of most recent investigation: | Monday, 03 October 2022 |
| Objectives: | |
| <ul style="list-style-type: none"> ▪ To review and consider geo-environmental data obtained by third-parties; ▪ To verify the extent of any Made Ground and the nature of the underlying geology; ▪ To obtain samples of the underlying soil for chemical testing; ▪ To utilise the resulting information to undertake a human and environmental risk assessment; and ▪ If appropriate, make recommendations on the extent of further intrusive investigations, which may be required to fully establish the condition of the site. | |
| Previous Assessments: | |
| <u>Stage I/ Tier I Geo-Environmental Desk Study Report (JPC Environmental Services, August 2022)</u> | |
| <ul style="list-style-type: none"> ▪ The site is occupied by two agricultural buildings and areas of hardstanding. From 1884 the site was occupied by two smaller buildings, which were shown to have merged at some point before 1947. A second building is shown from 1978 onwards, as well as additional buildings to the south-east and south-west of the site. The surrounding area is dominated by agricultural fields and tracks to the north, east, south and west. Fleming's Hall grounds are located on the opposite side of the main road to the north; ▪ Potential on-site sources of contamination include oil and chemical containers, machinery, possible ACMs, evidence of fuel leaks, and Made Ground; ▪ The historical review of the surrounding area (within 250m of the site) has shown nearby activities are predominantly agricultural; and ▪ Potential off-site sources include unspecified tanks; waste exemptions, and infilled ponds; | |
| Site Investigation and Analysis | |
| <ul style="list-style-type: none"> ▪ A ground investigation was undertaken on Monday, 03 October 2022 by JPC Environmental Services; ▪ The investigation identified a superficial covering of concrete hardstanding, Made Ground, and topsoil across the site. This was underlain by superficial deposits of the Lowestoft Formation, which was encountered to the base of all boreholes at 3.00mbgl; ▪ Perched groundwater was encountered within borehole WS05 at depths of between 0.75mbgl and 0.85mbgl. Groundwater was also encountered within borehole WS04 at a depth of 1.1mbgl. During subsequent monitoring, WS03 remained dry during the first monitoring visit on the 3rd October 2022, but the groundwater then ranged from 0.31mbgl in WS06 to 2.98mbgl in WS01 over a two-month period; and ▪ Chemical analysis identified elevated concentrations of PAHs within three samples of Made Ground in WS01 and WS06 when compared against the screening criteria of 'residential with | |



homegrown produce end use'. The samples were taken at depths of between 0.1mbgl and 1.0mbgl.

Risk Assessment:

An updated risk assessment following the results of the ground investigation concludes the following:

- Elevated concentrations of PAHs were identified within samples of Made Ground at WS01 and WS06. These areas are to be laid to hardstanding and the risk to human health is low;
- Although perched groundwater was encountered at depths ranging from 0.31mbgl to 2.98mbgl, the Made Ground present on site is underlain by cohesive strata. The elevated concentrations of PAHs are unlikely to pose a significant risk to controlled waters; and
- Ground gas concentrations classify the site as a Characteristic Situation 2.

Recommendations:

As a result of the latest investigation, JPC Environmental Services would make the following recommendations:

- The above risk assessment is based on the current landscape plan, which shows the contaminated soils as being below hardstanding. If the plans change to uncover those areas, then a further risk assessment will need to be undertaken;
- The attached laboratory results should be subject to a waste classification. The soils are likely to be classified as 'Non-Hazardous' or 'Inert';
- A watching brief should be maintained on-site, particularly during the groundwork stage; and
- While not directly associated with ground conditions, we would strongly recommend that an Asbestos Refurbishment and Demolition Survey is commissioned prior to any demolition, refurbishment, or construction.



1 INTRODUCTION

1.1 Brief

- 1.1.1 JPC Environmental Services were appointed by Will Scott, to undertake a Stage I/ Tier II Ground Investigation Report for 'Flemings Hall Barn, Hall Road, Bedingfield, IP23 7LJ' (hereafter referred to as 'the site').
- 1.1.2 The site has previously been the subject of a Stage I/ Tier I Geo-Environmental Desk Study Report (report ref. NE22/009/SITI, dated August 2022 by JPC Environmental Services). The report concluded that a Stage I/ Tier II assessment must be completed across the site due to the potential risks identified on and off-site as stated in Land Contamination Risk Management (LCRM) Guidance.
- 1.1.3 The investigation was carried out broadly in accordance with the following guidance:
- Environment Agency (April 2021): *Land Contamination Risk Management (LCRM)*;
 - Department for Environment, Food and Rural Affairs (2012): *Contaminated Land Statutory Guidance, Environmental Protection Act 1990: Part IIA*;
 - Ministry of Housing, Communities and Local Government. (July 2021): *National Planning and Policy Framework*; and
 - BS10175:2011 +A2:2017 "*Investigation of Potentially Contaminated Sites – Code of Practice*".
- 1.1.4 This report shall be for the private and confidential use of Will Scott for whom it was undertaken. It should not be reproduced in whole or in part or relied upon by a third party for any use without the express written authority of JPC Environmental Services.
- 1.1.5 In producing this report, we have exercised all the reasonable skill, care and diligence to be expected of an appropriately qualified and competent consultant, experienced in carrying out equivalent services for developments of a similar size, scope and complexity, value and purpose to the development.

1.2 Scope

- 1.2.1 The main elements of the investigation were as follows: -
- To confirm the depth and composition of the underlying strata present on site by completing 6 no. window sampler boreholes to 3.00mbgl;
 - To collect near surface and sub-surface soil samples for off-site chemical testing;
 - To install 3 no. combined ground gas and groundwater monitoring wells for post site work monitoring over a two-month period;
 - To utilise the resulting information to undertake a human and environmental risk assessment; and
 - If appropriate, make recommendations on the extent of further intrusive investigations, which may be required to fully establish the condition of the site.



1.3 Location

Table 1: Site Location

| | |
|-----------------------|---|
| Location | Flemings Hall Barn, Hall Road, Bedingfield, IP23 7LJ |
| Grid Reference | 619227, 267815 |
| Area | 0.15ha |
| Access | The site is accessed off Hall Road to the north-east of the site, approximately 1.5km south-east of the village of Bedingfield. |
| Topography | The site appears relatively flat, with an elevation of between 61.27m AOD and 61.84m AOD. |

1.4 Development Proposal

1.01.1 We understand development proposals comprise the demolition of an existing agricultural barn and the conversion of another existing barn into residential accommodation. The works will include the construction of a new garage building as well as associated car parking and gardens. An extract of the development proposal is shown in **Figure 1** below and the full version is included within **Appendix A**.

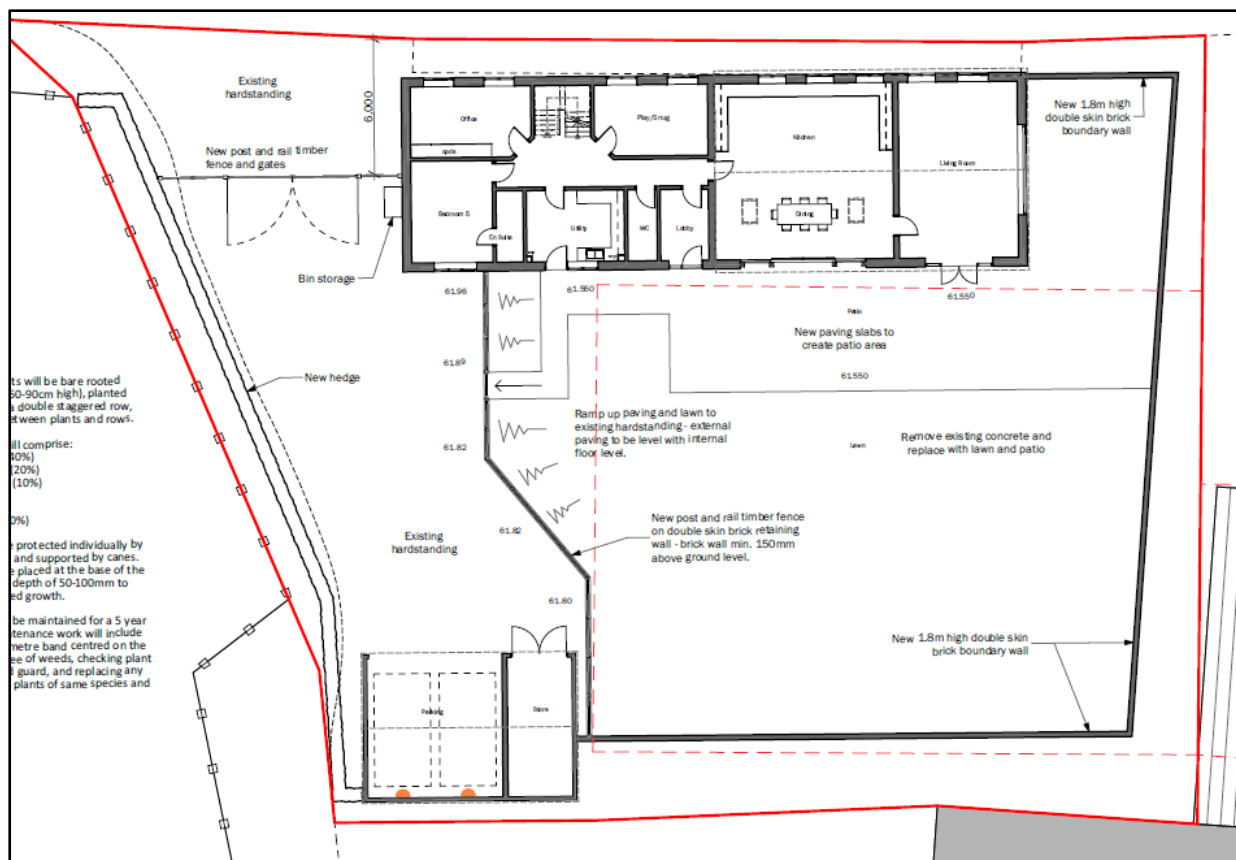


Figure 1: Architect's Proposed Layout (extract)



2 PREVIOUS ASSESSMENTS

2.1 General

2.1.1 The site has been the subject of a desktop study, undertaken to determine ground conditions and to establish the potential for any environmental risks associated with the site and its development. The previous report may be referred to in conjunction with this Ground Investigation Report. A brief overview of the findings from the previous reports has also been provided below with the full reports presented within **Appendix B**.

- Stage I/ Tier I Geo-Environmental Desk Study Report by JPC Environmental Services (Report Ref. NE22/009/SITI, dated August 2022).

2.2 JPC Environmental Services Stage I/ Tier I Geo-Environmental Desk Study Report (August 2022)

2.2.1 The Stage I/ Tier I Geo-Environmental Desk Study Report was completed in August 2022. The report described the site as occupied by agricultural buildings with associated land to the east, south and west.

Geology, Hydrogeology and Hydrology

2.2.2 The 1:50,000 scale British Geological Survey (BGS) online referencing advises that the site is likely to be underlain by superficial deposits comprising the Lowestoft Formation (diamicton), and further underlain by bedrock geology comprising the Crag Group (sand).

2.2.3 In relation to the overall hydrology the site is situated with Source Protection Zone 3 (total catchment). The site is laid predominantly to hardstanding and buildings with a few small areas of vegetation. As such, there is limited opportunity for vertical migration.

2.2.4 With reference to the groundwater mapping presented on the Department for Environment, Food & Rural Affairs' MAGIC map, the Lowestoft Formation is classified as a secondary aquifer (undifferentiated), while the Crag Group is classified as principal aquifer. Groundwater vulnerability beneath the site is designated as low to medium risk on the Environment Agency's groundwater vulnerability mapping.

Site History

2.2.5 From 1884 the site was occupied by two buildings, which were shown to have merged at some point before 1947. A second building is shown from 1978 onwards, as well as additional buildings to the south-east and south-west.



- 2.2.6 The surrounding area is dominated by agricultural fields and tracks to the north, east, south and west. Fleming's Hall grounds are located on the opposite side of the main road to the north. There is an associated moat system, ponds, and drainage ditch. Additional buildings and ponds are located to the south-east, south-west, and north-west. Several of the ponds are no longer shown and are considered to have been infilled.

Potential Sources of Contamination

- 2.2.7 Potential sources of contamination were noted within a review of the consulted GroundSure report, historical mapping and site walkover survey conducted on the 23 August 2022. The main identified potential sources were:

On-site (walkover)

- Storage of oil and chemical containers and machinery;
- Possible ACMs;
- Evidence of fuel leaks; and
- Made Ground.

Off-site

- Unspecified tanks;
- Waste exemptions; and
- Infilled ponds.

Recommendations

- 2.2.8 The Stage I/ Tier I report concluded that the identified potential sources represented a moderate to high risk to the site and to future site users. A full Stage I / Tier II Ground Investigation was recommended, including the retrieval of soil samples for off-site laboratory analysis and the installation of gas monitoring wells to determine the risk associated with the nearby infilled pond.



3 INTRUSIVE INVESTIGATION (2022)

3.1 Site Works

3.1.1 The intrusive investigation was supervised by Andrew Cartwright of JPC Environmental Services on Monday, 03 October 2022. Site photographs taken during the ground investigation are presented in **Appendix C**.

3.1.2 The fieldwork comprised 6 no. dynamic sampling to a maximum depth of 3.00mbgl, including 3 no. gas and groundwater monitoring wells. The borehole locations were targeted to cover the entire site. The borehole locations are shown in **Figure 2** below and within **Appendix D**, together with the associated logs.

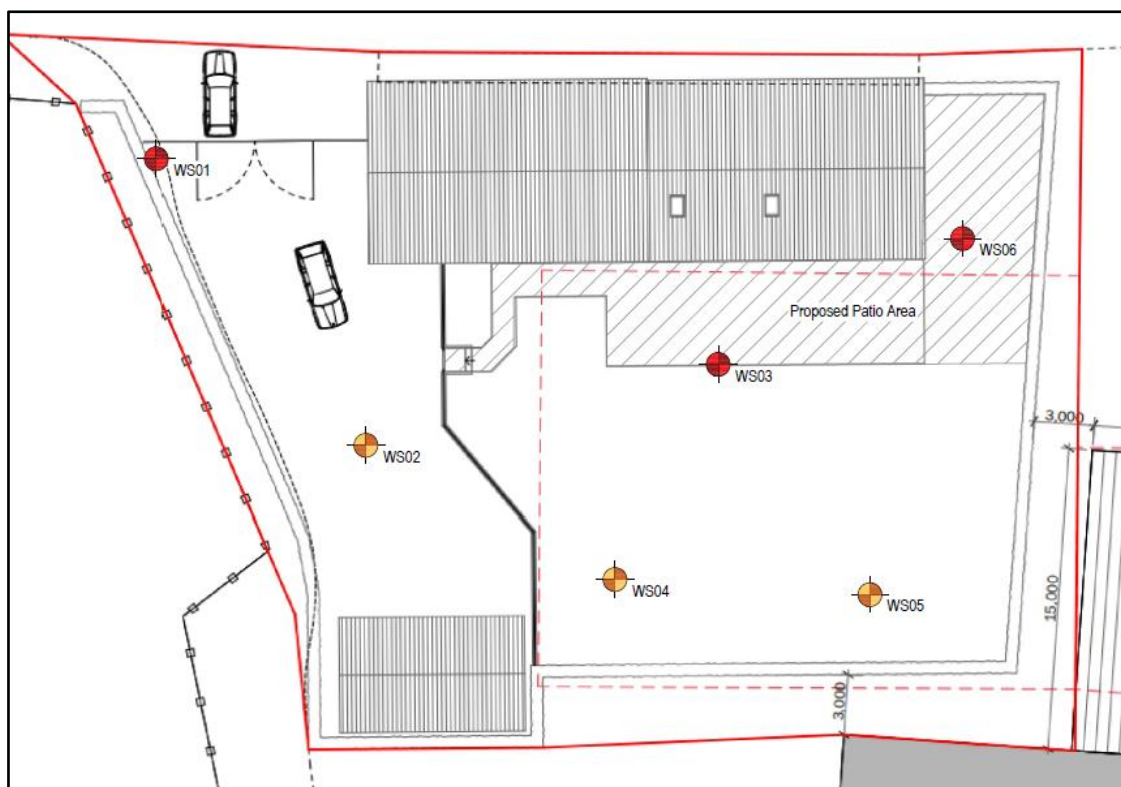


Figure 2: Borehole Location Plan (extract)

3.1.3 Recovered soil samples, taken within identified Made Ground and the underlying natural strata, were placed in laboratory supplied sealed glass jars or plastic containers prior to being stored in cool boxes during transit to the laboratory.

3.1.4 Combined ground gas and groundwater monitoring wells were installed in 3 no. locations, boreholes WS01, WS03, and WS06, while the other exploratory positions were backfilled with arisings upon completion.

3.2 Ground Conditions

3.2.1 The encountered ground conditions during the site investigation are summarised in **Table 2** and discussed below.



Table 2: Ground Conditions

| Stratum | Location ID | Surface Depth (mbgl) | Proven Basal Depth (mbgl) | Proven Thickness (m) |
|---------------------|--------------|----------------------|---------------------------|----------------------|
| Concrete | WS02 to WS06 | 0.00 | 0.20 to 0.30 | 0.20 - 0.30 |
| Topsoil | WS01 | 0.00 | 0.45 | 0.45 |
| Made Ground | WS01 to WS06 | 0.20 to 0.45 | 0.60 to 1.50 | 0.40 to 1.20 |
| Lowestoft Formation | WS01 to WS06 | 0.60 to 1.50 | Base not proven | Base not proven |

- 3.2.2 Concrete hardstanding was present on the surface across most of the site, and was present within boreholes WS02 to WS06. This was encountered from ground level to depths ranging between 0.20mbgl to 0.30mbgl.
- 3.2.3 Topsoil was present within borehole WS01, comprising a brown, slightly gravelly, fine to medium sand. This was encountered from ground level to a depth of 0.45mbgl.
- 3.2.4 Made Ground was encountered in all boreholes. This comprised either brown or grey mottled, slightly gravelly, firm to stiff clay (WS02, WS03, WS05, WS06), or brown, gravelly, clayey, fine to medium sand (WS01, WS04). This was proven from depths between 0.20mbgl and 0.45mbgl to depths of between 0.60mbgl and 1.50mbgl.
- 3.2.5 Superficial deposits of the Lowestoft Formation were encountered in boreholes WS01 to WS06 at depths of between 0.60mbgl and 1.50mbgl. The stratum predominantly comprised a brown or grey mottled, gravelly, firm to stiff clay. The boreholes were completed within this stratum at 3.00mbgl.
- 3.2.6 Hydrocarbon odours were encountered within WS02 at depths of between 0.60mbgl and 0.80mbgl, and within WS06 at depths between 0.80mbgl and 1.10mbgl. A strong hydrocarbon odour was encountered within WS04 at depths between 0.70mbgl and 0.90mbgl.
- 3.2.7 Perched groundwater was encountered within borehole WS05 at depths between 0.75mbgl and 0.85mbgl. Groundwater was also encountered within borehole WS04 at a depth of 1.10mbgl.

3.3 Chemical Testing

- 3.3.1 A total of 9 no. soil samples were submitted for chemical testing. Samples were submitted to Eurofins Chemtest Ltd who are UKAS accredited in accordance with ISO17025 and are also MCERTS accredited for soil analysis in accordance with the Environment Agency's scheme. The laboratory carries out Quality Assurance and Quality Control in accordance with BS ISO 17025 and participate in external laboratory comparison and quality control schemes. Details of the accreditation and the methods of analysis are provided on the relevant test reports.



3.3.2 The sample testing schedule is summarised in **Table 3** below:

Table 3: Scheduled Contamination Testing

| Testing/ Analysis | No. of Samples Tested |
|---|-----------------------|
| Metals | 9 |
| Speciated polycyclic aromatic hydrocarbons (PAHs) | 9 |
| Total Petroleum Hydrocarbons Criteria Working Group (TPH CWG) | 9 |
| Asbestos screen | 9 |
| pH | 9 |
| Soil Organic Matter (SOM) and phenols | 9 |
| SO ₄ , total sulphate, water soluble sulphate, cyanide, chloride | 9 |
| Pesticides and Herbicides | 9 |

3.3.3 A full copy of the laboratory test results is presented within **Appendix E**.



4 RESULTS OF LABORATORY ANALYSIS

4.1 Summary of Chemical Analysis and Screening Results

4.1.1 Analysis of the selected soil samples has identified elevated concentrations of PAHs in boreholes WS01 and WS06, when compared against the most stringent criteria for the 'residential with homegrown produce' end use. These are:

Table 4: Scheduled Contamination Testing

| Contaminant | Samples |
|----------------------|---|
| Benzo(a)anthracene | WS06-ES2 at 0.9mbgl at 23 mg/kg |
| Chrysene | WS06-ES2 at 0.9mbgl at 22 mg/kg |
| Benzo(b)fluoranthene | WS01-ES1 at 0.1mbgl at 3.5 mg/kg WS06-ES2 at 0.9mbgl at 22 mg/kg |
| Benzo(a)pyrene | WS01-ES1 at 0.1mbgl at 3.4 mg/kg WS06-ES1 at 0.3mbgl at 2.3 mg/kg WS06-ES2 at 0.9mbgl at 22 mg/kg |
| Dibenz(ah)anthracene | WS06-ES2 at 0.9mbgl at 2.0 mg/kg |

4.1.2 Asbestos was not detected in any of the selected samples.

4.2 Ground Gas Analysis

4.2.1 Where applicable, the results of ground gas monitoring have been compared with the following guidance:

- BS8485:2015+A1:2019 "Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings";
- BS8576:2013 "Guidance on investigations for ground gas – permanent gases and volatile organic compounds";
- CIRIA C665:2007 "Assessing risks posed by hazardous ground gases to buildings"; and
- CIRIA C735:2014 "Good practice on the testing and verification of protection systems for buildings against hazardous ground gases".

4.2.2 Flow was monitored for a period of up to two minutes and the concentrations of ground gases including methane, carbon dioxide, hydrogen sulphide, carbon monoxide and volatile organic compounds were monitored for up to five minutes. The depth to groundwater was measured using a dip-meter.

4.3 Summary of Ground Gas Results

4.3.1 Ground gas monitoring was undertaken on six occasions during this site investigation. The monitoring was completed between the 3rd October and the 8th November 2022 for WS01, WS03, and WS06.



- 4.3.2 The maximum concentrations of methane (CH₄) 0.3% and carbon dioxide (CO₂) was 2.9% both within WS06. Carbon monoxide (CO) was recorded within all boreholes at maximum levels of between 10ppm (WS06) and 28ppm (WS03). Concentrations of hydrogen sulphide (H₂S) were below detection levels. Oxygen (O₂) concentrations on site ranged from a minimum of 17.0% in WS01 to a maximum of 20.5% in WS06.
- 4.3.3 A maximum recorded flow of 3.3l/hr was recorded within WS03. PID measurements ranged from a minimum of 0.00ppm within WS06 on the 26th October, to a maximum of 1.60ppm in WS03 on the 8th November 2022. The results of the monitoring visits completed by JPC Environmental Services are presented in **Appendix F**.
- 4.3.4 The Gas Screening Value (GSV) for the site based on the recorded maximum concentrations of methane and carbon dioxide is provided in **Table 5** below. Characterisation of the site based on these values is determined in accordance with the ‘Wilson and Card Classification’ as stated in CIRIA C665.

Table 5: Gas Screening Values

| Maximum CH ₄ Concentration (%) | Maximum CO ₂ Concentration (%) | Peak Flow Rate (l/hr) | CH ₄ GSV | CO ₂ GSV |
|---|---|-----------------------|---------------------|---------------------|
| 0.3 | 2.9 | 3.3 | 0.0099 | 0.096 |

- 4.3.5 A classification of Characteristic Situation 2 (low risk) would be considered appropriate for the site based on the maximum concentrations of carbon dioxide and flow conditions.
- 4.3.6 Characterisation of the site based on these values is determined in accordance with the ‘Wilson and Card Classification’ as stated in CIRIA C665 which has been reproduced in **Table 6** below.

Table 6: Wilson and Card Classification

| Characteristic Situation (CIRIA R149) | Comparable Classification in DETR <i>et al</i> (1999) | Risk Classification | Gas Screening Value (GSV) (CH ₄ or CO ₂) (l/hr) Threshold | Additional Factors | Typical Source of Generation |
|---------------------------------------|---|---------------------|--|--|---|
| 1 | A | Very low risk | <0.07 | Typical methane <1% and/or carbon dioxide <5%. Otherwise increase to Situation 2 | Natural soils with low organic content “Typical” Made Ground |
| 2 | B | Low risk | <0.7 | Borehole air flow rate not to exceed 70l/hr. otherwise consider | Natural soil, high peat/organic content. |



Table 6: Wilson and Card Classification

| Characteristic Situation (CIRIA R149) | Comparable Classification in DETR <i>et al</i> (1999) | Risk Classification | Gas Screening Value (GSV) (CH ₄ or CO ₂) (l/hr) Threshold | Additional Factors | Typical Source of Generation |
|---------------------------------------|---|-----------------------|--|--|--|
| | | | | increase to Situation 3 | “Typical” Made Ground |
| 3 | C | Moderate risk | <3.5 | | Old landfill, inert waste, mineworking flooded |
| 4 | D | Moderate to high risk | <15 | Quantitative risk assessment required to evaluate scope of protective measures | Mineworking – susceptible to flooding, completed landfill (WMP 26B criertia) |
| 5 | E | High risk | <70 | | Mineworking unflooded inactive with shallow workings near surface |
| 6 | F | Very high risk | >70 | | Recent landfill site |

5 REVISED CONCEPTUAL SITE MODEL

- 5.1.1 The “conceptual site model” is a simplified representation of the ground conditions that exist on site, which is subsequently used to assess the potential risk to human and environmental receptors. According to the LCRM guidance, “A conceptual site model is a representation of the characteristics of the site. It shows the possible relationships between contaminants, pathways and receptors”.
- 5.1.2 This assessment is undertaken based on the current proposal for the site at the time of issuing this report, which is to demolish an existing agricultural barn and convert a second barn into a residential dwelling, with associated access and gardens.
- 5.1.3 This qualitative risk assessment has been undertaken in accordance with CIRIA C552: “Contaminated Land Risk Assessment, A Guide to Good Practice” (Rudland et al., 2001).
- 5.1.4 The level of potential risk ascribed to each linkage is based on the following criteria as presented in **Table 7**.

Table 7: Risk Classification

| Risk Classification | Description |
|---------------------|---|
| Very high risk | There is a high probability that severe harm could arise to a designated receptor from an identified hazard at the site without appropriate remedial action. |
| High risk | Harm is likely to arise to a designated receptor from an identified hazard at the site without appropriate remedial action. |
| Moderate risk | It is possible that without appropriate remedial action harm could arise to a designated receptor, but it is relatively unlikely that any such harm would be severe, and if any harm were to occur it is more likely that such harm would be relatively mild. |
| Low risk | It is possible that harm could arise to a designated receptor from an identified hazard but is likely that, at worst, this harm if realised would normally be mild. |
| Negligible risk | The presence of an identified hazard does not give rise to the potential to cause significant harm to a designated receptor. |

- 5.1.5 The following potential pollutant linkages have been identified and are outlined within **Table 8** below:

Table 8: Updated Risk Assessment

| Assessment | Comments | Risk Characterisation |
|----------------------------------|--|-----------------------|
| Source | | |
| Potential for on-site pollutants | The results from the geochemical testing identified elevated concentrations of five PAHs within samples of Made Ground in WS01 and WS06 when compared against the screening criteria of ‘residential with homegrown produce end use’. The samples were taken at depths of between 0.1mbgl and 1.0mbgl. | Moderate |



Table 8: Updated Risk Assessment

| Assessment | Comments | Risk Characterisation |
|--|---|-----------------------|
| Pathway | | |
| Potential for pollutants to migrate on-site | Superficial deposits of the Lowestoft Formation underlying the site comprise a secondary aquifer (undifferentiated), and have a low to moderate permeability. The underlying bedrock geology of the Crag Group is a principal aquifer and has a high permeability. | Moderate |
| Potential for pollutants to migrate off-site | Superficial deposits of the Lowestoft Formation underlying the site comprise a secondary aquifer (undifferentiated), and have a low to moderate permeability. The underlying bedrock geology of the Crag Group is a principal aquifer and has a high permeability. | Moderate |
| Receptor | | |
| Environmental risk to human health | The proposed development will lead to an increase in the number of people occupying and visiting the site. Elevated concentrations of PAHs were identified from three samples of Made Ground in WS01 and WS06. However, these areas are proposed for hardstanding and the soils will not be accessible. Remediation is therefore not considered necessary in this instance. | Low |
| Environmental risk to controlled waters | Although perched groundwater was encountered on-site at depths ranging from 0.31mbgl to 2.98mbgl, the Made Ground present on site is underlain by cohesive strata. The elevated concentrations of PAHs are unlikely to pose a significant risk to controlled waters. | Low |
| Environmental risk to Biota | Landscaping is expected on site, due to the removal of Made Ground, which will improve biota. | Low |
| Hazards to buildings – excluding ground gas | A concrete classification assessment identifies that DS-2 AC-1s class concrete is appropriate for this site. | Low |
| Litigation | | |
| Environmental litigation (Part IIA) | Part IIA only applies to land with chemical contamination, where the contaminants pose an unacceptable risk to human health or the wider environment. Although elevated concentrations of PAHs were identified within samples of Made Ground in WS01 and WS06, it is unlikely the site would fall into this category. | Low |



Table 8: Updated Risk Assessment

| Assessment | Comments | Risk Characterisation |
|---|---|-----------------------|
| Owner liability | Elevated concentrations of PAHs have been identified from samples of Made Ground in WS01 and WS06 when compared against the screening criteria of 'residential with homegrown produce end use'. Although, these areas are proposed for hardstanding and the soils will not be accessible, residual contamination will remain. | High |
| Development Implications | | |
| Potential for soil remediation | Elevated concentrations of PAHs have been identified within Made Ground at WS01 and WS06. However, these areas are proposed for hardstanding and the soils will not be accessible. Remediation is therefore not considered necessary in this instance. | Low |
| Potential for groundwater remediation | Although perched groundwater was encountered on-site at depths ranging from 0.31mbgl to 2.98mbgl, the Made Ground present on site is underlain by cohesive strata. The elevated concentrations of PAHs are unlikely to pose a significant risk to controlled waters. | Low |
| Potential for gas protection measures | Characteristic Situation 2 (low risk) would be considered appropriate for the site based on the maximum concentration of carbon dioxide. | Low |
| Special requirements for water supply pipes | Specialist pipework is unlikely to be required. | Low |
| Potential limitations on foundation design | Elevated concentrations of PAHs have been identified from samples of Made Ground in WS01 and WS06. The depth of Made Ground was proved to depths ranging from 0.60mg/l in WS03 to 1.50mbgl in WS05 which may impact foundation design. Specialist advice is recommended. | Moderate |
| Risk of encountering materials classed as hazardous waste | Elevated concentrations of PAHs have been identified from samples of Made Ground in WS01 and WS06. The onsite soils are unlikely to be classed as hazardous. The laboratory results should be subject to a waste classification to refine this risk. | Low |



6 ENVIRONMENTAL CONCLUSIONS AND RECOMMENDATIONS

- 6.1.1 As a result of this Stage I, Tier II Ground Investigation, JPC Environmental Services would make the following recommendations.

Further Investigation

- 6.1.2 The above risk assessment is based on the current landscape plan, which shows the contaminated soils as being below hardstanding. If the plans change to uncover those areas, then a further risk assessment will need to be undertaken.

Waste Classification

- 6.1.3 The attached laboratory results should be subject to a waste classification. The soils are likely to be classified as 'Non-Hazardous' or 'Inert'.

Watching Brief

- 6.1.4 It is recommended that a watching brief is maintained on site, particularly during the groundworks stage. During any ground works an appraisal of the exposed soils should be made by a competent person, this as an example could be the site manager. If any material is noted to show visual and/or olfactory signs of contamination it should be stockpiled separately and tested prior to its appropriate removal off-site or re-use. If soils suspected of being contaminated are encountered, it is recommended that a contaminated land specialist is consulted.

Protection of Ground Workers

- 6.1.5 The risk to ground workers due to contaminant impacted soil will be mitigated upon implementation of onsite health and safety measures following risk assessment. This should include the provision and use of welfare facilities and suitable protective measures.

Buried Services

- 6.1.6 Potable water pipework shall comply with the Water Supply Regulations, the agreement of the water provider and Local Authority should also be sought regarding the potable water pipework and fittings selected prior to commencement.

Importing and Re-Use of Soil and Materials Management Plan

- 6.1.7 Excavated soil that is to remain and be re-used on site, assuming it is suitable for the proposed use, may not be determined as waste and its re-use therefore may not require an Environmental Permit. It may be necessary to consult the Environment Agency or other statutory bodies regarding re-use of soils as part of the proposals and whether a Materials Management Plan or Environmental Permit is required. In any case, a site waste management plan or materials management plan may assist the design and cost assessment of the proposed development. This should be devised within the design phase of the scheme.



Soil Disposal

- 6.1.8 The client and contractors are advised to follow the process outlined in the Environment Agency's Technical Guidance Document WM3 'Waste Classification – Guidance on the Classification and Assessment of Waste', version 1.2.GB dated October 2021. Background information and the results of chemical laboratory analysis within this assessment may be used as part on an initial characterisation to determine the likely waste classification of waste soils.

Environmental Protection

- 6.1.9 There are several practices that should be considered as part of general good working procedures, to minimise any future potential impact on the environment. These include:
- Dust suppression during dry periods;
 - Clean any construction related vehicles prior to them leaving site e.g., rumble/ vibration grid, physical scrape of material and/ or wheel wash, to prevent the spread of mud;
 - Recycle surplus/ waste construction materials where practicable;
 - All imported topsoil should be sourced from a reputable supplier and be accompanied by laboratory test results to confirm its condition and suitability for use on site; and
 - Careful segregation of soils based on inclusions of construction materials and any visible/ olfactory presence of contaminants.

Statutory Authority Consultation

- 6.1.10 It is recommended that this report is sent to the statutory authorities including the Local Authority Environmental Health and Planning Departments prior to site works commencing to seek their comments. Where necessary, they will consult the Environment Agency or other relevant statutory authorities. A copy of this report should also be provided to the Principal Contractor and their nominated demolition sub-contractor. If applicable to this project, this report should also be provided to the relevant building warranty provider.

Health and Safety

- 6.1.11 As outlined within the HSE publication "Successful Health and Safety Management – HSG65" this report should inform your development of safe systems of work and the information used as an input to the safety management system. The contents of this report may be used to supplement the contents of the Health and Safety File as required under the Construction Design and Management (CDM) Regulations 2015.
- 6.1.12 In accordance with the Construction Design and Management (CDM) Regulations 2015, J P Chick & Partners Ltd has acted in the role of Principal Contractor and as Principal Designer for the works as described in this report. With issue of this report, J P Chick & Partners Ltd has discharged and completed all contractual and legal requirements for these positions and has no further involvement with the project. It is the developer's duty, as required by the CDM Regulations, to appoint others to fill these roles for the further development of the site.

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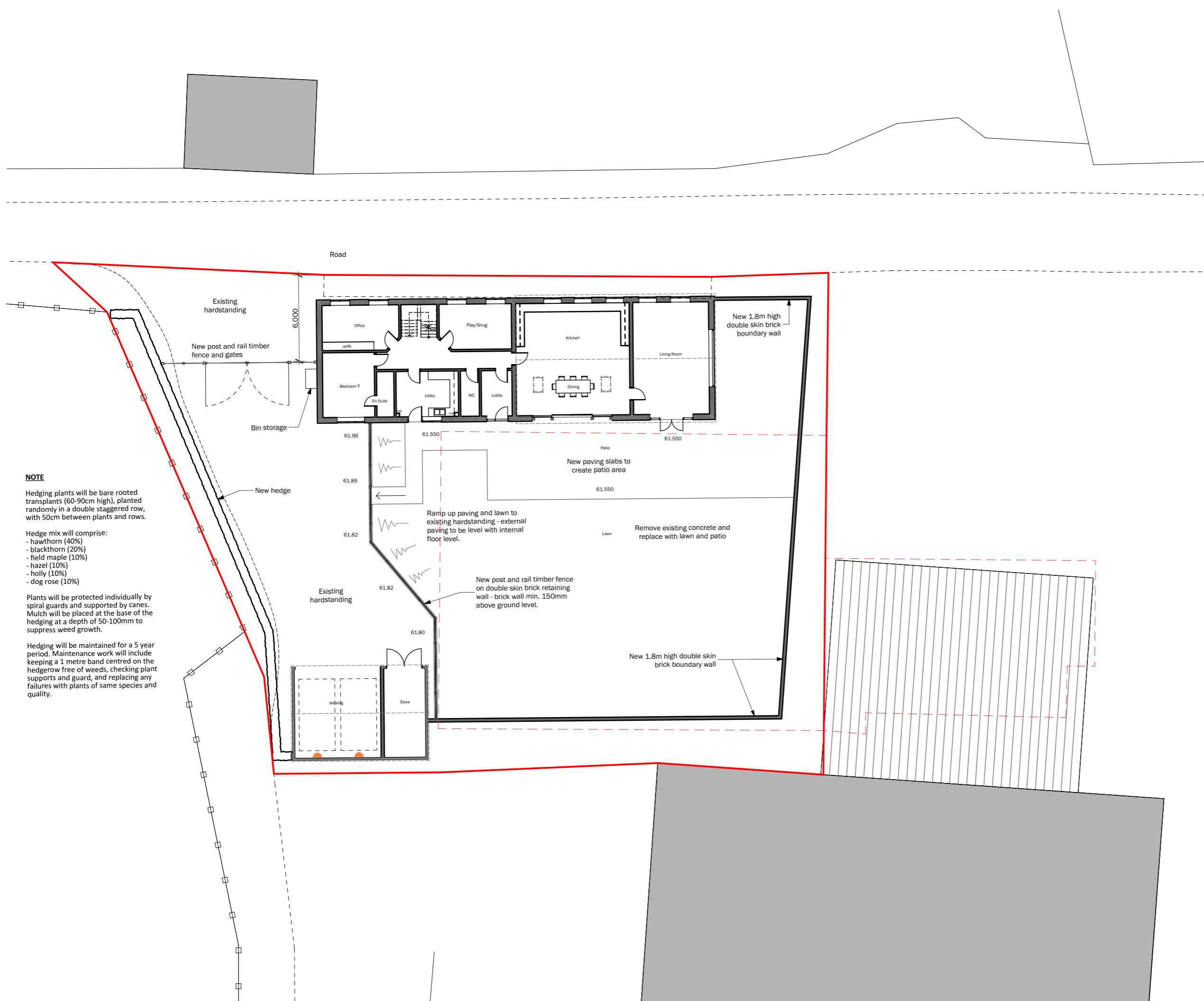
Water Regulations Advisory Scheme. 2002. Information and Guidance Note No. 9-04-03.



APPENDIX A

Architect's Layout Plan

| Issue Status | | | |
|---|-------|-------|----------|
| Planning | | | |
| This drawing is copyright. Only figured dimensions to be worked to. | | | |
| Revision | Drawn | Check | Date |
| A | JRW | NDM | 08.11.22 |
| B | JRW | NDM | 18.11.22 |



NOTE

Hedging plants will be bare rooted transplants (60-90cm high), planted randomly in a double staggered row, with 50cm between plants and rows.

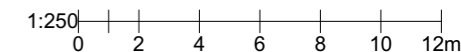
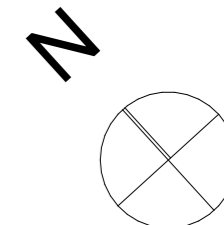
Hedge mix will comprise:
 - hawthorn (40%)
 - blackthorn (20%)
 - field maple (10%)
 - hazel (10%)
 - holly (10%)
 - dog rose (10%)

Plants will be protected individually by spiral guards and supported by canes. Mulch will be placed at the base of the hedging at a depth of 50-100mm to suppress weed growth.

Hedging will be maintained for a 5 year period. Maintenance work will include keeping a 1 metre band centred on the hedgerow free of weeds, checking plant supports and guard, and replacing any failures with plants of same species and quality.

KEY

- Demolished
- EV charging point



NOTE
 OS data provided and downloaded from ProMap.

| | | | |
|---------|---|-------|------------|
| client | Mr W. Scott | | |
| project | Barn Conversion Bedingfield Hall Farms Eye, Suffolk, IP23 7LJ | | |
| drawing | Site Plan As Proposed | | |
| date | 23/08/2022 | scale | 1:250 @ A3 |
| drawn | JRW | check | NDM |

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 ARCHITECTURE + PLANNING
 www.brown-co.com

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