

UNIVERSITY OF READING SCHOOL OF ART

Desk Top Study and Preliminary Risk Assessment

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EXECUTIVE SUMMARY

Section	Summary
Background	RPS Consulting Services Ltd (RPS) was commissioned by Fulkers Bailey Russell on behalf of University of Reading to undertake a Phase 1 Geo-Environmental Desk Study and Preliminary Environmental Risk of University of Reading Whiteknights Art School. The report has been commissioned prior to the proposed redevelopment of the site.
Site Details	Site area: 0.09 hectares National Grid Reference: 473477 171434 Current site use: The site currently comprises disused hardstanding car park/storage area. Proposed site use: The proposed development comprises an arts school building Surrounding land use: The site is located in an area of university land use.
Site Inspection	A site inspection was undertaken on 2 nd December 2021. This confirmed the findings of the historical map review.
Site History	A review of historical maps indicates the site remained undeveloped until the 1970s when it became part of the University of Reading Whiteknights campus. Two buildings encroached onto the site – an ‘Accelerator Building’ (assumed to be a physics laboratory) and a boiler house. Post late 1990s these no longer are shown on site. Off-site historical potential sources of contaminants of concern include laboratories and workshops associated with the university, a pipeline which appeared to feed the boiler house and sewage tanks.
Environmental Setting	The site is indicated to be underlain by a Secondary Undifferentiated Aquifer of High Vulnerability due to the granular nature of the superficial Head Deposits. The London Clay Formation underlies the Head Deposits which is classified as unproductive strata. It is likely Made Ground is present below the site due to the construction activity. The site is not indicated to be located in a groundwater Source Protection Zone (SPZ) and there are no sensitive groundwater abstractions in the vicinity of the site. The nearest surface water feature is a watercourse 140m to the south. One significant pollution incident is recorded in 1999 within 500m of the site. Two licenses for Registered Radioactive Substances have been granted for the University of Reading.
Preliminary Risk Assessment	An outline conceptual site model (CSM) has been derived on the basis of the desktop study and site reconnaissance. The potential risks to future site users via the dermal contact and ingestion pathways in areas of the site comprising building cover and hardstanding will be mitigated. Furthermore, the pathway for the airborne migration of soil/dust from these areas towards off-site receptors would not be active. However, these pathways may remain active in areas of soft landscaping. There is the potential for ground gas and volatile contaminants of concern in soil and/or groundwater (if present) beneath the site to impact future site users via the inhalation pathway in indoor areas. Groundwater within granular horizons of the Made Ground and the underlying Head Deposits may constitute a potential pathway for the on or off-site migration of contaminants of concern. Pathways to off-site human health receptors from potential contaminants of concern originating from the site may therefore also be active. There are also potential risks identified to foundations and service supplies for new structures/buildings from contaminants that may be present in shallow soils/groundwater.
Conclusions and Recommendations	Based on the Preliminary Risk Assessment, RPS considers that further assessment is necessary to determine whether mitigation measures are required to manage the risk associated with ground contamination. The outline CSM produced upon completion of the desk study assessment has identified a number of potential pollutant linkages that may be active upon the redevelopment of the site. It is therefore recommended that the potential for these linkages to be active is assessed through a Phase 2 Geo-Environmental Site Investigation. The investigation should be targeted to provide information on: • The concentrations of contaminants of concern (if present) within the soils beneath the site; • The concentrations of contaminants of concern within shallow groundwater (if present); and

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- The ground gas regime beneath the site.

It would be prudent to combine any site investigation undertaken for environmental purposes with geotechnical testing, in order to facilitate preliminary foundation and pavement design.

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1 INTRODUCTION

1.1 Preamble

- 1.1.1 RPS Consulting Services Ltd (RPS) was commissioned by Fulkers Bailey Russell on behalf of University of Reading to undertake a Phase 1 Preliminary Environmental Risk Assessment of a site at the University of Reading Whiteknights Campus Art School. The report has been commissioned prior to the proposed redevelopment of the site.
- 1.1.2 The site covers approximately 0.09 hectares and currently comprises a parcel of land with hardstanding cover (car park and storage area), within the University campus, at approximate grid reference 473477 171434. A site layout plan is presented as Drawing 1. The proposed development comprises a 926m² extension to the existing building immediately adjacent to the assessment site.
- 1.1.3 The Desk Study assessment is based upon a review of published information available from local, regional, and national agencies. The desk study information is derived from Envirocheck Reports provided by Landmark Information Group, Ref. 287779361_1_1 which is presented as Appendix C. Please note the terms and conditions attached to the supply of data from Landmark.

1.2 Objectives

- 1.2.1 The principal objectives of this assessment were as follows:
- To assess potential sources of contamination at the site, associated with historical and current land uses both on site and in the surrounding area;
 - To review the environmental setting to assess the sensitivity of the surrounding area to contamination/pollution;
 - To produce an outline Conceptual Site Model (CSM) detailing how any contamination may impact the identified receptors via pollutant linkages; and
 - To conclude on the likely requirement for further assessment and investigation a full planning application for a building extension for a new art school.

1.3 Legislation and Guidance

- 1.3.1 The assessment has been undertaken in general accordance with British Standard BS EN ISO 21365:2020 and is considered suitable to meet the initial requirements of planning as outlined within the National Planning Policy Framework (NPPF). The assessment also reflects the recommendations of Environmental Agency guidance, Land Contamination: Risk management, (LCRM 2020).
- 1.3.2 This report has been produced in general accordance with:
- Contaminated Land (England) Regulations 2006 (as amended);
 - DEFRA Environmental Protection Act 1990: Part 2A - *Contaminated Land Statutory Guidance* (2012);
 - Environment Agency (2020) Land Contaminated: Risk Management (LCRM 2020);
 - National Planning Policy Framework (2019);
 - CIRIA Document C665: *Assessing Risks Posed by Hazardous Ground Gases to Buildings*;
 - British Standard requirements for the 'Investigation of potentially contaminated sites - Code of practice' (ref. BS10175:2011+A1:2017);

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- British Standard requirements for the '*Code of practice for ground investigations*' (ref. BS5930:2015+A1:2020); and,
 - British Standard requirements for the '*Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings*' (ref BS8485:2015+A1:2019).

1.3.3 Details of the limitations of this type of assessment are described in Appendix A.

2 SITE RECONNAISSANCE AND DESK STUDY

2.1 Site Reconnaissance

2.1.1 This section of the report is based upon observations made during a site visit carried out on 2nd December 2021. A site boundary plan is provided as Drawing 1.

The Site

Table 2-1 – Summary of on-site activities

Section	Description
Background:	The site is located at National Grid Reference SU 73482 71434. The site is accessed off Carter Drive on the main University of Reading Whiteknights Campus, RG6 6AX. It is roughly square in shape (27mx34m) and occupies an area of approximately 0.09ha.
Site Layout:	The site is generally level with a gentle slope to the north from the northern boundary (wire mesh fencing) into a grassed area with trees and a road beyond. The 'central kitchen' building is immediately adjacent to the west. The eastern boundary (wooden hoarding) steeply slopes to a concrete hardstanding compound with the storage of industrial skips. On the southern boundary a substation is present, beyond which is a wooded area separated by a wire mesh fence.
Activity / Operations:	Disused - Car park with storage/Goods-in area
Building Structure(s):	None – kitchen/canteen immediately adjacent to the west (two canopies overhang the site).
Surface Cover:	Predominantly a block paving hardstanding covers approximately 85% of the site with the remainder covered by tarmacadam (running along the western boundary adjacent to the neighbouring building) or grassed soft standing along the eastern boundary.
Drainage:	Underground pipes (manhole covers observed).
Bulk Storage / Tanks:	None observed.
Waste:	Wheelie bins/kitchen equipment stored. One 'jerry/fuel-style can' observed but contents unknown. A concrete hardstanding compound with industrial skips was located offsite approximately 20m east.
Electricity Sub-Stations /Transformers:	A substation in a wooden structure is located approximately 5m off site to the south.
Visual Evidence of Contamination:	None observed.
Statutory Nuisance:	Traffic from Pepper Lane noted off-site to the southwest. Pest control measures (rat traps) were in place.
Other Geo-Environmental Issues:	None identified.

The Surrounding Area

2.1.2 The site is located in an area of predominantly in use by the University of Reading. At the time of the site inspection, neighbouring land consisted of the following:

Table 2-2 – Neighbouring Land Uses

Direction	Description
North:	University buildings
East:	Hardstanding compound with skips and university building 'Energy Centre'
South:	Substation and vegetated/wooded area, a road with university property beyond (Leighton Park School)
West:	Disused university building 'central kitchen'

2.2 Proposed Development

- 2.2.1 The proposed development is to comprise a 926m² extension to the neighbouring building. Further details of the building construction are unknown at this time.

2.3 Site History

Historical Map Review

- 2.3.1 The following review is based on past editions of readily available Ordnance Survey (OS) maps. These include scales of 1:1,250, 1:2,500 and 1:10,000 dated 1877 to 2021.

Table 2-3 – Historical Site Uses

On-site Land Use and Features	Dates
Undeveloped land	1877-1973
An 'Accelerator Building' appears to cover the north west of the site. An access road/path extends from the north to the south east. There is a chimney on the northeastern border. A wooded area covers the remainder of the site.	1973-1999
No structures present – satellite images identify hardstanding area.	1999-present

- 2.3.2 The site remained undeveloped as part of Whiteknights Park until the early 1970s when it became part of the University of Reading Whiteknights Campus. The site has had buildings within its footprint during that time; most notably an 'Accelerator Building' (assumed to be a physics laboratory) and a 'Boiler Room/House' with chimneys.

Table 2-4 – Historical Neighbouring Site Uses

Surrounding Land Uses (250m radius)	Orientation	Approximate Distance	Dates	
			From	To
Undeveloped land/Whiteknights Park <i>Becoming</i> University of Reading Campus – changes in building layouts ongoing. Buildings of note are an 'Instrument Workshop' and 'Laboratory'	N and E	Adjoining site	1877	1967-1970
			1967-1970	Present
Leighton Park <i>Becoming</i> Leighton Park School	S and W	150m	1883	1900
			1900	Present day
Undeveloped land <i>Becoming</i> Residential properties	S, E and W	250m	1877	1913
			1913	Present
Sewage tank	NE	200m	1912	1987

Surrounding Land Uses (250m radius)	Orientation	Approx- imate Distance	Dates	
			From	To
Sewage tank south of site is no longer visible	S	200m	1912	1967-1970
Boiler room/house with chimneys and tanks	NE	Adjoining site	1958	1999
Unspecified 'Pipeline' – running northwest-southeast to the boiler room mentioned above	N	50m	1958	1967-1970

- 2.3.3 The area surrounding the site has remained relatively undeveloped (parkland) up until the early 1970s when to the north and east it was incorporated into the University of Reading Whiteknights Campus. The area to the west became a school from the early 1900s. Beyond the university campus and school largely residential properties are present in all directions.

Site Planning History

- 2.3.4 Relevant and readily available planning records for the site, as obtained from Reading Borough Council planning website are summarised as follows:
- Application no. 08/01511/FUL (081500) - Development of a centralised food production building with associated service yard, substation and widened access road. Permission granted January 2009.
 - Application no. 09/00211/FUL (090851) - Development of a centralised food production building with associated service yard, substation and widened access road. (Resubmission of approved planning application 08/01511/FUL). Permission granted April 2009.
- 2.3.5 Neither of the above planning permissions included planning conditions pertaining to the investigation of potentially contaminated land at the site.

2.4 Previous Reports

- 2.4.1 RPS has been provided with the following services decommissioning report:
- DSSR, University of Reading Accelerator House W014 Services Decommissioning, February 2009.
- 2.4.2 This report identifies that a helium extract system within the (former) Accelerator House has potential residual radiation where anecdotal information indicated radiation was emitted from the system (details known). The report excludes ground drainage systems.

2.5 Environmental Setting

Geology

- 2.5.1 Based on British Geological Survey (BGS) mapping (1:50,000-scale) and the Environment Agency (EA) Groundwater Vulnerability mapping (1:100,000-scale), the stratigraphic sequence and aquifer classifications beneath the site are indicated to be as follows:

Table 2-5 – Descriptions of Geological Strata

Strata	Description	Aquifer Classification
Head	Generally comprising gravel, sand and clay. Locally with lenses of silt, clay or peat and organic material.	Secondary Aquifer - Undifferentiated

Strata	Description	Aquifer Classification
London Clay	Generally comprising bioturbated or poorly laminated, blue-grey or grey-brown, slightly calcareous, silty to very silty clay, clayey silt and sometimes silt, with some layers of sandy clay. It commonly contains thin carbonate concretions ('cementstone nodules') and disseminated pyrite. It also includes a few thin beds of shells and fine sand partings or pockets of sand. Some thin beds of black rounded flint gravel occurs in places. Glauconite is present in some of the sands and in some clay beds, and white mica occurs at some levels.	Unproductive Stratum

2.5.2 BGS borehole logs (ref. SU77SW397 and SU77SW434) indicate Head deposits comprising soft to stiff orangish brown gravelly silty CLAY and/or medium dense orangish brown gravelly SAND to approximate depths of 8.5m and London Clay deposits of stiff brown or blue CLAY from approximately 8.5m. The base of the unit was not identified but is known to be approximately 150m in thickness.

2.5.3 Made Ground is likely to be present across the site as a result of past activities on and around the site as part of construction of the car park and the university campus development. No site investigation reports have been reviewed to verify this.

Hydrogeology

2.5.4 The site is located above a Secondary Undifferentiated Aquifer relating to the granular Head deposits. These formations have varying characteristics in different locations however this site is considered to be of High Vulnerability. This is underlain by an Unproductive Stratum relating to the London Clay: These formations have a low permeability and have negligible significance for water supply or base flow.

2.5.5 Information provided by the EA indicates that there are records of two active licensed groundwater abstractions within 2km of the site. These are detailed in the table below:

Table 2-6 – Licensed Groundwater Abstractions

Licence Holder	Approx. Distance and Direction from Site	Source	Use
University of Reading	500m Northwest	Groundwater	Schools And Colleges: Drinking; Cooking; Sanitary; Washing; (Small Garden)/ General Use (Medium Loss)
Royal Berkshire Hospital	1.7km Northwest	Groundwater	Hospitals: Drinking; Cooking; Sanitary; Washing; (Small Garden)

Surface Water

2.5.6 There are numerous unspecified watercourses within 1km of the site, the closest being approximately 140m south of the site. Whiteknights Lake is approximately 430m northeast of the site.

2.5.7 Information provided by the EA indicates that there are no records of active licensed surface water abstraction within 2km of the site.

Ecologically Sensitive Sites

- 2.5.8 Natural England data indicates that there are no ecologically sensitive sites, that constitute environmental receptors as defined within Table 1 of the DEFRA Environmental Protection Act 1990: Part 2A - Contaminated Land Statutory Guidance (2012), located within a 1km radius of the site.

Radon

- 2.5.9 According to the Indicative Atlas of Radon in England and Wales published by the Health Protection Agency (part of Public Health England) and the British Geological Survey, the site is not located in an area at risk from radon gas.

Coal Authority

- 2.5.10 The Interactive Map Viewer on the Coal Authority website indicates that the site is not located in a coal mining area.

Non-Coal Mining

- 2.5.11 The British Geological Survey indicates that the site is not located in a non-coal mining area.

BGS Ground Stability Hazard Ratings

- 2.5.12 British Geological Survey Ground Stability Hazard ratings for the site are summarised as follows

Table 2-7 – BGS Ground Stability Hazard Ratings

Ground Stability Hazard	BGS Risk rating
Collapsible ground	Very Low
Compressible ground	No hazard
Ground dissolution	No hazard
Landslide	Very Low
Running sand	Very Low
Shrinking or swelling clay	Low

2.6 Authorised Processes and Pollution Incidents

Landfills and Waste Sites

- 2.6.1 Data provided by the EA, Local Authority and BGS indicates that there are no recorded licensed or known historical landfill sites located within 250m of the site.

Environmental Permits

- 2.6.2 EA and Local Authority data indicates that there are two registered radioactive substances within 500m of the subject site. These are outlined in the table below:

Table 2-8 – Environmental Permits

Licence Holder	Approx. Distance and Direction from Site	Permit Reference	Type
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University of Reading	500m North	BW8224	Registered Radioactive Substances
University of Reading	500m North	BX6693	Registered Radioactive Substances

COMAH Sites

- 2.6.3 There are no records of any operations under the Control of Major Accident Hazards (COMAH) Regulations 1999, located within 500m of the site.

Pollution Incidents

- 2.6.4 Environment Agency data indicates that there is one record of 'major' or 'significant' pollution incidents within 500m of the site. This are outlined in the following table:

Table 2-9 – Pollution Incidents on site and significant incidents within 500m

Location/Address	Approx. Distance and Direction from Site	Receiving Medium and Date	Severity of Incident and Type
Reading	179m W	8 th April 1999	Significant – chemicals (unknown)

2.7 Unexploded Ordnance

- 2.7.1 CIRIA Report C681 (stone et al 2009) outlines recommendations for dealing with the potential risk associated with the legacy of Unexploded Ordnance Risk, largely relating the WWII bombing and military sites.
- 2.7.2 As the site is not within an area of known military history, in general accordance with CIRIA Report no further consideration of Unexploded Ordnance is considered necessary.

3 OUTLINE CONCEPTUAL SITE MODEL

3.1 Background

- 3.1.1 An outline conceptual site model (CSM) consists of an appraisal of the *source-pathway-receptor* 'contaminant linkages' which is central to the approach used to determine the existence of 'contaminated land' according to the definition set out under Part 2A of the Environmental Protection Act 1990. For a risk to exist (under Part 2A), all three of the following components must be present to facilitate a potential 'pollutant linkage'.
- **Source** referring to the source of contamination (Hazard).
 - **Pathway** for the contaminant to move/migrate to receptor(s).
 - **Receptor** (Target) that could be affected by the contaminant(s).
- 3.1.2 Receptors include human beings, controlled waters and buildings / structures. The National Planning Policy Framework, used to address contaminated land through the planning process, follows the same principles as those set out under Part 2A. Further details on the Part 2A regime are presented within Appendix B.
- 3.1.3 As part of the assessment the potential risks to receptors for potential source is given one of the following classifications:
- **Low risk** - it is considered unlikely that issues within the category will give rise to significant harm to identified receptors
 - **Moderate risk** - it is possible, but not certain that issues within the category will give rise to significant harm to receptors
 - **High risk** - there is a high potential that issues within the category will give rise to significant harm to identified receptors

3.2 Potential Pollutant Linkages

- 3.2.1 Each stage of the potential pollutant linkage sequence has been assessed individually on the basis of information obtained during the site reconnaissance and desk study exercise and are discussed in the following section. It should be noted that no intrusive investigation, testing of soil, building materials, surface water or groundwater has been carried out within this assessment. Dependent on the findings of this CSM, recommendations for further studies by means of an intrusive investigation may be advised to evaluate any potential pollutant linkages identified.

Potential Contaminant Sources

On Site – Current

- 3.2.2 No current on site potentially contaminative land uses have been identified.
- 3.2.3 Made Ground may be present beneath the site, where present this could represent a potential source of contaminants of concern and/or ground gas.

On Site – Historical

- 3.2.4 Historical maps indicate the following potential sources of contaminants:
- a former boiler house/room with tanks and chimneys; and
 - an 'Accelerator Building' assumed to be a physics laboratory.

Off-site – Current

3.2.5 Current off-site potential sources of contaminants of concern include:

- an electricity substation.

Off-Site – Historical

3.2.6 Historical maps indicate off-site potentially contaminative land uses including:

- two sewage tanks;
- laboratories/'instrument workshops'; and
- an unspecified pipeline (appearing to connect to the boiler house).

Potential Pathways

3.2.7 In areas of the site covered by buildings or hardstanding the risks to future on site human health receptors via the pathways of dermal contact and ingestion will be mitigated. However, in areas of soft landscaping, the pathways of dermal contact and ingestion could still be active. In addition, there would be potential for the airborne migration of soil/dust from these areas.

3.2.8 There is the potential for ground gas and volatile contaminants of concern in soil and/or groundwater (if present) beneath the site to impact future site users via the inhalation pathway in indoor areas.

3.2.9 There is the potential for contaminants of concern (if present) beneath the site to migrate on or off-site via granular horizons of the Made Ground (if present) and the Superficial Head Deposits. These may impact controlled waters receptors or on/off-site human health receptors via the dermal contact, ingestion and vapour inhalation pathways.

Potential Receptors

3.2.10 Potential post development human health receptors include future site users and off-site human health receptors.

3.2.11 The Secondary Undifferentiated Superficial Aquifer beneath the site represents a sensitive receptor. The London Clay Formation (classified as Unproductive Strata) is not considered a potential receptor.

3.2.12 The nearest surface water located approximately 140m to the south and represents a sensitive receptor.

3.2.13 Proposed buildings/structures – foundations or services could be prone to chemical attack via direct contact with contaminated soils/groundwater or elevated concentrations of sulphates or acidic pH. Accumulation of toxic/explosive ground gases in buildings/structures.

3.2.14 The assessment does not consider the risk to construction/demolition workers during redevelopment. These risks will be managed through appropriate H&S legislation include H&S At works act and CDM regs.

3.3 Outline Conceptual Site Model

3.3.1 An outline CSM has been developed on the basis of the site reconnaissance and desk study. The CSM is used to identify potential sources, pathways and receptors (i.e. potential pollutant linkages) on site post development and is summarised in the table below.

Table 3-1 – Outline Conceptual Site Model

Potential Source	Contaminants of Concern	Via	Potential Pathways	Linkage Potentially Active?	Receptors	Qualitative Risk Rating	Notes
On site – historical: ‘Accelerator Building’ and boiler house, chimneys and tanks, Made Ground. Off site – current: Electricity substation	Metals, hydrocarbons, solvents, Polychlorinated biphenyls (PCBs), radioactive contamination and asbestos	Soil	Direct contact/ingestion	✓	Future site users	Low	Predominantly hard cover end use. Likely controlled use of radioactive substances.
			Inhalation of volatiles	✓		Moderate if accumulation in buildings Low for outdoor exposure	Reduced risk due to the age of potential contamination.
			Airborne migration of soil or dust	✓	Off-site users	Low	Predominantly hard cover end use.. Receptors adjacent to the site. Greater risk during construction.
			Leaching of mobile contaminants	✓	Secondary Undifferentiated Superficial Aquifer	Moderate	Predominantly hard cover end use will reduce infiltration and subsequent leaching of potential contaminants.
			Direct Contact	✓	Proposed building foundations/ water supply pipes	Moderate	Potentially deleterious Made Ground from past activities may be present and present a significant risk to buried structures or services.
		Groundwater	Direct contact/ingestion	✓ ✓	Future site users Off-site users	Low	Predominantly hard cover end use. Reduced infiltration and subsequent leaching of potential contaminants.
			Inhalation of volatiles	✓ ✓	Future site users Off-site users	Moderate if accumulation in buildings Low for outdoor exposure	Reduced risk due to the age of potential contamination.
			Vertical and lateral migration in permeable strata	✓ ✓ ✓	Secondary Undifferentiated Superficial Aquifer/ Surface watercourses	Moderate/Low	Predominantly hard cover end use will reduce infiltration and mobilisation of potential contaminants.

Off site – historical: Sewage tanks, pipeline, laboratories and 'Instrument Workshop'	Metals, hydrocarbons, solvent, Polychlorinated biphenyls (PCBs) and organic and inorganic compounds	Groundwater	Direct contact/ingestion	✓	Future site users	Low	Predominantly hard cover end use.
			Inhalation of volatiles	✓	Future site users	Moderate if accumulation in buildings Low for outdoor exposure	Reduced risk due to the age of potential contamination. Likely discontinuous nature of granular horizons within the superficial deposits reducing potential for lateral migration.
On and off-site Made Ground / natural strata, bio-degradation of contamination	Carbon dioxide, methane and hydrogen sulphide.	Ground Gas	Inhalation of ground gas	✓ ✓	Future site users Off-site users	Moderate in buildings Low – outdoor exposure	Potential contaminative uses and presence of Made Ground. Made Ground thickness and composition unproven.
			Explosive risks	✓ ✓	Future site users Off-site users Future and off-site Structures	Moderate in buildings Low – outdoor exposure	

Note The Qualitative Risk Rating does not consider the potential for the pathway to be active. In the event that a Moderate or High Qualitative Risk Rating is identified further assessment is recommended.

4 CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

Planning Assessments

4.1.1 The outline CSM produced upon completion of the desk study assessment has identified a number of potential pollutant linkages that may be active upon the redevelopment of the site. It is therefore recommended that the potential for these linkages to be active is assessed through a Phase 2 Site Investigation. The scope of this investigation should include the following:

- Drilling of a number of boreholes across the site targeting identified potential sources and pollutant linkages;
- Collection of soil and groundwater samples with chemical analysis of these samples for contaminants of concern;
- Installation and monitoring of groundwater and ground gas monitoring wells;
- Assessment of ground conditions and generic quantitative risk assessment of soil and groundwater chemical analysis results to determine the potential for the identified potential pollutant linkages to remain active upon redevelopment of the site; and
- Provision of recommendations (where necessary) for remediation/mitigation measures to ensure that any identified potential pollutant linkages are not active upon redevelopment of the site.

4.1.2 The risk of radioactive contamination at the site has been assessed as low given the likely controlled use of these substances, however we recommend that assurance monitoring is undertaken upon the site's redevelopment to include:

- Radiological monitoring, asbestos survey, and hydrocarbon contamination testing (where evidence indicates its presence) in relation to underground services / drainage.

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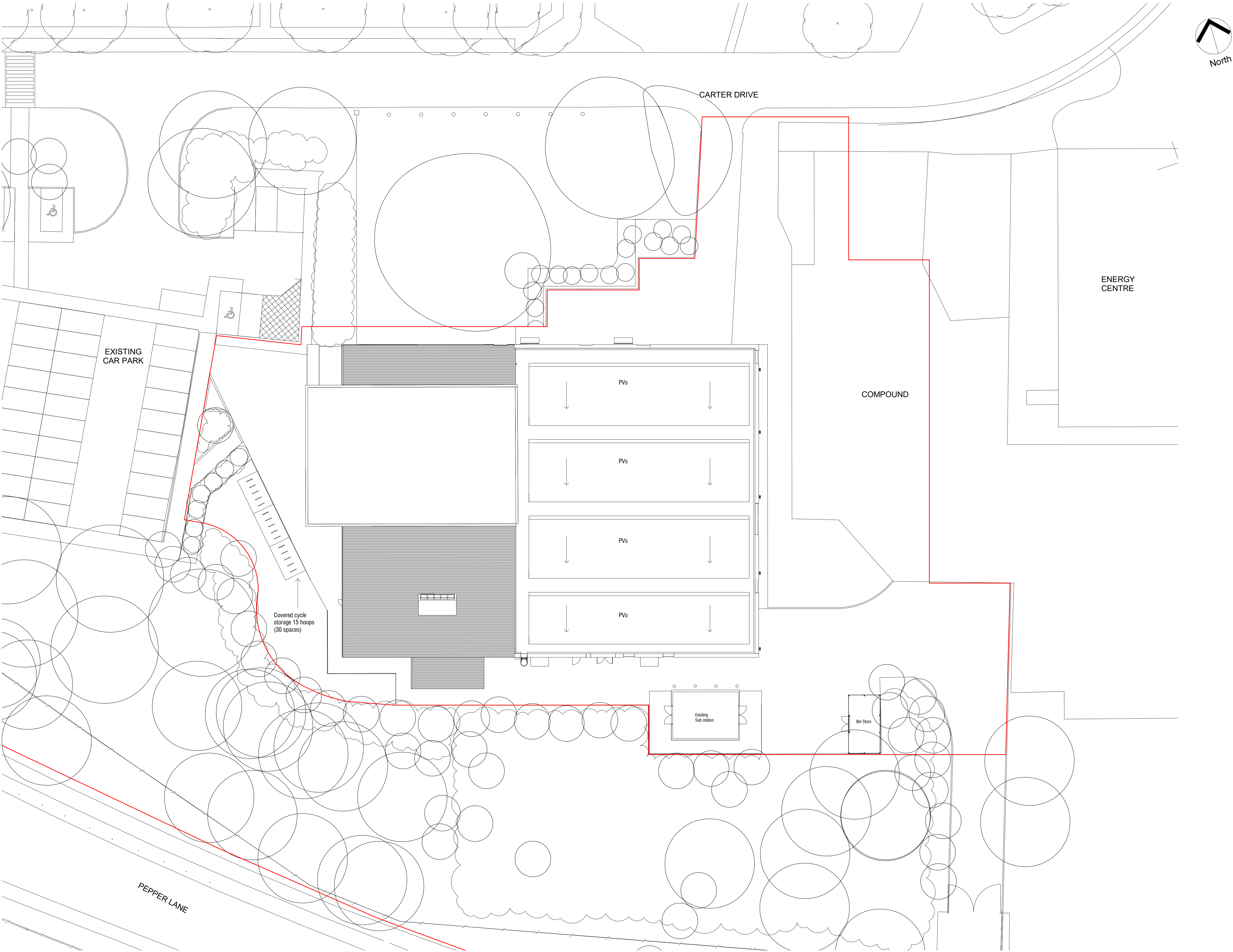
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DRAWINGS

Drawing 1



Notes

Estates and Facilities

The information shown on this drawing is given without obligation or warranty. The accuracy therefore cannot be guaranteed and it must never be used for calculation or setting out of works.

General Changes

The accuracy of these drawings relies on feedback from users. If any anomalies are discovered, please immediately inform the CAD Manager. Telephone ext 6807.

7	Issued for Planning	13/04/2022
6	Issued for Stakeholder Approval	23/03/2022
5	Draft Issue for comment	17/03/2022
4	Draft Issue	01/03/2022
3	Pre-App	18/11/2021
2	Pre-App Draft	17/11/2021
1	Stage 2 Issue - Draft Revised LAYOUT	17/09/2021

Rev

Description

Date

Checked

AB



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Building

W310

Project

School of Art Relocation

Title

Site Layout Plan

Drawn	Date	Scale
ACB/AB	13/04/22	1 : 200 @A1

Project (WREN No - Originator-Volume-Level-Type-Role-Classification-Number)	Suitability-Rev.
W310-1956132-SBR-ZZ-SW-DR-A-ZZZZ-80001 S2- 7	

APPENDICES

Appendix A

General Notes

1. A "desk study" means that no site visits have been carried out as any part thereof, unless otherwise

GENERAL NOTES

specified.

2. This report provides available factual data for the site obtained only from the sources described in the text and related to the site on the basis of the location information provided by the Client.
3. The desk study information is not necessarily exhaustive and further information relevant to the site may be available from other sources.
4. The accuracy of maps cannot be guaranteed and it should be recognised that different conditions on site may have existed between and subsequent to the various map surveys.
5. No sampling or analysis has been undertaken in relation to this desk study.
6. Any borehole data from British Geological Survey sources is included on the basis that: "The British Geological Survey accept no responsibility for omissions or misinterpretation of the data from their Data Bank as this may be old or obtained from non-BGS sources and may not represent current interpretation".
7. Where any data supplied by the Client or from other sources, including that from previous site investigations, have been used it has been assumed that the information is correct. No responsibility can be accepted by RPS for inaccuracies in the data supplied by any other party.
8. This report is prepared and written in the context of an agreed scope of work and should not be used in a different context. Furthermore, new information, improved practices and changes in legislation may necessitate a re-interpretation of the report in whole or in part after its original submission.
9. The copyright in the written materials shall remain the property of the RPS Company but with a royalty-free perpetual licence to the Client deemed to be granted on payment in full to the RPS Company by the Client of the outstanding amounts.
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11. These terms apply in addition to the RPS "Standard Terms & Conditions" (or in addition to another written contract which may be in place instead thereof) unless specifically agreed in writing. (In the event of a conflict between these terms and the said Standard Terms & Conditions the said Standard Terms & Conditions shall prevail.) In the absence of such a written contract the Standard Terms & Conditions will apply.

Appendix B

Part 2A (The Contaminated Land Regime)

Under Section 57 of the Environmental Act 1995, Part 2A was inserted into the Environmental Protection Act

CONTAMINATED LAND DEFINITION

1990 to include provisions for the management of contaminated land.

Subsequent regulations were first implemented in England in April 2000, Scotland in July 2000 and Wales in July 2001¹, providing a definition of 'contaminated land' and setting out the nature of liabilities that can be incurred by owners of contaminated land and groundwater.

According to the Act, contaminated land is defined as 'any land which appears to the local authority in whose area the land is situated to be in such a condition, by reason of substances in, on or under the land that:

1. *significant harm* is being caused or there is a *significant possibility* of such harm being caused; or
2. *significant pollution* of water environment² is being caused or there is a significant possibility of such pollution being caused³

The guidance on determining whether a particular possibility is significant is based on the principles of risk assessment and in particular on considerations of the magnitude or consequences of the different types of significant harm caused. The term 'possibility of significant harm being caused' should be taken, as referring to a measure of the probability, or frequency, of the occurrence of circumstances that could lead to significant harm being caused.

The following situations are defined where harm is to be regarded as significant:

3. Chronic or acute toxic effect, serious injury or death to humans
4. Irreversible or other adverse harm to the ecological system
5. Substantial damage to, or failure of, buildings
6. Disease, other physical damage or death of livestock or crops
7. The pollution of water environment⁴.

With regard to radioactivity, contaminated land is defined as 'any land which appears to be in such a condition, by reason of substances in, on or under the land that harm is being caused, or there is a *significant possibility of such harm being caused*⁵'.

The Risk Assessment Methodology

Risk assessment is the process of collating known information on a hazard or set of hazards in order to estimate actual or potential risks to receptors. The receptor may be humans, a water resource, a sensitive local ecosystem or future construction materials. Receptors can be connected with the hazard via one or several exposure pathways (e.g. the pathway of direct contact). Risks are generally managed by isolating or

¹ In England by The Contaminated Land (England) Regulations 2000, updated by The Contaminated Land (England) (Amendment) Regulations 2012; in Scotland by The Contaminated Land (Scotland) Regulations 2000, updated by the Contaminated Land (Scotland) Regulations 2005; and in Wales by The Contaminated Land (Wales) Regulations 2001, updated by the Contaminated Land (Wales) Regulations 2006.

² In Scotland the term "controlled water" has been updated to "water environment" under the Contaminated Land (Scotland) Regulations 2005 in line with the Water Environment and Water Services (Scotland) Act 2003.

³ The definition was amended in 2012 by implementation of the Water Act 2003.

⁴ Groundwater in this context does not include waters within underground strata but above the saturated zone.

⁵ The Radioactive Contaminated Land (Modification of Enactments) (England) Regulations 2006 and Contaminated Land (Wales) Regulations 2006.

removing the hazard, isolating the receptor, or by intercepting the exposure pathway. Without the three essential components of a source (hazard), pathway and receptor, there can be no risk. Thus, the mere presence of a hazard at a site does not mean that there will necessarily be attendant risks.

The Risk Assessment

By considering where a viable pathway exists which connects a source with a receptor, this assessment will identify where pollutant linkages may exist. A pollutant linkage is the term used by the DEFRA in their standard procedure on risk assessment. If there is no pollutant linkage, then there is no risk. Therefore, only where a viable pollutant linkage is established does this assessment go on to consider the level of risk. Risk should be based on a consideration of both:

- The likelihood of an event (probability) - takes into account both the presence of the hazard and receptor and the integrity of the pathway.
- The severity of the potential consequence - takes into account both the potential severity of the hazard and the sensitivity of the receptor.

For further information please see the Contaminated Land section on the DEFRA website (www.defra.gov.uk).