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12 Shaftsbury Road
Reading
RG30 2QP

On behalf of
Elegant Homes

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Aviron Associates Limited

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Contents

Executive Summary

1.0	PROJECT AND SITE INFORMATION	1
2.0	HISTORICAL REVIEW	4
3.0	ENVIRONMENTAL SETTING	7
4.0	REGULATORY INFORMATION, CONSULTATIONS AND OTHER.....	11
5.0	PRELIMINARY ENVIRONMENTAL RISK ASSESSMENT	15
6.0	GEOTECHNICAL CONSIDERATIONS	20
7.0	CONCLUSIONS AND RECOMMENDATIONS	22
8.0	PROJECT INSTRUCTION AND LIMITATIONS	23
9.0	REFERENCES AND OTHER SOURCES OF INFORMATION	25

Figures

1	Site Location and Layout Plan
2	Proposed Development Plan
3	Site Photographs
4	Site Photographs

Appendices

I	Historical Maps
II	EnviroInsight Data Sheets
III	GeoInsight Data Sheets

Executive Summary | Phase I GERA

12 Shaftesbury Road, Reading, RG30 2QP | Report 16-251.01

Site Location	The site is located on Shaftesbury Road within a predominantly residential area of Reading, approximately 130 metres (m) to the north-west of Reading West railway station.
Current Land Use	The site comprises number 12 Shaftesbury Road, a single storey vacant building, until recently used as the County School of Performing Arts. A single storey workshop is to the rear.
Historical Land Use	The site has been developed as a number of buildings including a depot, before being in most recent use as a dance studio and workshop.
Proposed Land Use	The proposed development comprises demolition of the existing buildings and the construction of four two-storey residential dwellings.
Geology & Hydrogeology	Superficial geology noted as Head above the Taplow Gravel Formation, both comprising secondary (A) aquifers. Solid geology of the Seaford Chalk Formation and Newhaven Chalk Formation listed as a principal aquifer. The site is not located within an Environment Agency source protection zone. Potable water abstraction 641m to the north of the site.
Hydrology & Flooding	Nearest main river noted as the River Thames 835m to the north-west of the site. The site is located within an area at very low risk of flooding from rivers and seas. The site is located in an area at risk of surface water flooding.
Waste, Landfills & Gas	No historical landfill sites noted within 1000m of the site. Radon protection is not required.
Statutory Registers	No items identified which are considered of significant impact to the site.
Consultees	No enquiries have been made as part of this instruction.
Environmental Conclusions	The overall risk classification assigned to the redevelopment of the site is considered to be generally MODERATE. Further investigation comprising soil contamination analysis recommended.
Geotechnical Conclusions	The consistency of the overlying Head, Taplow Gravel Formation and Chalk Formations, and the influence of trees will determine the viability of conventional shallow construction. Soakaway drainage may be feasible within the overlying Taplow Gravel Formation.

This summary must not be read in isolation and should be reviewed in the context of the above report.

1.0 PROJECT AND SITE INFORMATION

1.1 APPOINTMENT

Aviron Associates Limited (Aviron) was retained by Elegant Homes (the “Client”) to prepare a Phase I Geo-Environmental Risk Assessment (GERA) of the following premises:

12 Shaftesbury Road, Reading, RG30 2QP (hereafter referred to as the “site”).

The purpose of this Phase I GERA is to present a desk based study to identify potential areas of contaminative concern with regard to a new residential development.

Aviron has relied upon information received from the Client and their agents as accurate, unless contradicted by written documentation or site observations.

1.2 THE SITE

Table 1.2 provides a summary of site details and surrounding area.

Table 1.2 : Site Details

Site Location	The site is located on Shaftesbury Road within a predominantly residential area of Reading, approximately 130 metres (m) to the north-west of Reading West railway station. Figure 1 is presented as a Site Location Plan.
National Grid Ref.	Centred at approximately 468992, 173849.
Current Land Use	The site comprises number 12 Shaftesbury Road, a single storey building most recently in use as the County School of Performing Arts, with a single storey workshop to the rear. Presently the site is vacant and being used as parking for the re-development of the adjacent property, no. 12A. Figure 1 is presented as an existing Site Layout Plan.
Surrounding Land Use	The site is surrounded by residential property, with a workshop to the north and shopfronts along Oxford Road further to the north-east.
Proposed Land Use	The proposed development comprises the demolition of the existing buildings and the construction of four new residential dwellings with associated car parking and rear gardens. Figure 2 is presented as a Proposed Development Plan.

1.3 SITE RECONNAISSANCE

A site walkover survey was undertaken on 17 July 2017 including an inspection of the site and surrounding area, where safe and accessible. The purpose of the survey is to identify any potential on-site or nearby contaminative activities or potential sources of land contamination. Additionally as part of the survey any features which may affect site re-development in terms of physical site and ground conditions were noted.

Table 1.3 provides a description of site features observed during the walkover survey and also current Ordnance Survey maps made available at the time of report writing.

Figures 3 and 4 are enclosed as Site Photographs.

Table 1.3 : Summary of Walkover Survey

Physical Site Characteristics	
Existing Structures	Main building comprising a single storey rendered building, with a pitched clay tile roof. Workshop to the rear comprising a single storey painted building with corrugated sheet roofing.
Basements	None observed during site walkover.
Visual Topography and Site Surfacing	The site is slightly sloping to the north and entirely hard surfaced with concrete. A ramp and retaining wall is noted between the school of performing arts and the workshop to the rear.
Retaining Structures and Slopes	Retaining wall between the school of performing arts and the workshop to the rear.
Drainage Issues	No surface waters or boggy ground was observed.
Trees and Hedges	Semi-mature trees/shrubs border the north and west of the site.
Made and Infilled Ground	Made Ground expected beneath buildings and hardstanding.
Contaminative Characteristics	
Above or Underground Storage Tanks and Drums	None noted during walkover.
Fuel Interceptors	None noted during site walkover.
Waste Storage and Disposal	None noted during site walkover.

Hazardous Material Storage and Use	None noted during site walkover.
Asbestos Containing Materials (ACMs)	Due to the age of the buildings ACMs may have been used as a construction material. Prior to demolition a fully intrusive asbestos survey should be completed.
Boiler Houses	No boiler houses noted during site walkover.
Sub-stations	No sub-stations were noted.
Surface Staining	No surface staining was observed. The workshop has a 'clean' painted floor.
Potentially Contaminative Activities	General 'workshop' activities. However, no significant evidence of land contamination.

1.3.1 Summary of Physical Site Characteristics

Consideration should be made towards the competency of underlying strata and influence of tree species.

1.3.2 Summary of Contaminative Site Characteristics

With the exception of general workshop activities no evidence of potentially contaminative activities was observed.

2.0 HISTORICAL REVIEW

Historical Ordnance Survey (OS) maps were obtained as part of the Groundsure database search within report package EMS_381033_510002 dated 2 September 2016. These maps were obtained as part of the desk based research obtained for the adjacent premises, for the same client in September 2016. The information contained in these maps is summarised in the following sections and included within **Appendix I**.

2.1 SITE HISTORY

2.1.1 Summary of Site History - Available Historical Mapping

The earliest map edition of **1881, 1:2,500** indicates that the site was undeveloped at this time and surrounded by woodland.

By the time of the **1899, 1:2,500** map edition, the site is shown to have been developed as a rectangular parcel of land in Shaftesbury Road. A small building is marked in the north of the site.

The site is shown to have remained unchanged until the time of the **1933, 1:10,000** and **1934, 1:2,500** map editions which indicate that a number of open-sided buildings had been constructed around the periphery of the site.

By the time of the **1960, 1:1,250** map edition, the site is shown to have been redeveloped with a large building noted in the south of the site, and further buildings in the north and west.

The **1972, 1:1,250** map edition indicates the building in the south of the site to have been in use as a depot.

An additional building is marked in the west of the site by the time of the **1973, 1:1,250** map edition.

The layout of the site is shown to have remained unchanged up until the **1993, 1:1,250** map edition, however the building in the south of the site is no longer marked as a depot.

No further changes to land use are observed up until the most recent **2014, 1:10,000** map edition, however a number of the buildings around the periphery of the site had been removed at the time of the site walkover of **2017**.

2.2 SURROUNDING LAND HISTORY

Table 2.2 provides a summary of historical land uses in the immediate vicinity of the site. This is approximately defined by the search buffer at a radius of approximately 500m on the 1:10,500 and 1:10,000 maps and 250m on the 1:2,500/1:1,250 maps.

Table 2.2 : Historical Surrounding Land Uses

Surrounding Features	Dates	Approximate distance	Direction
Pond	1881 – 1934	240m	N
Works/Depot/Depository	1960 – 2014+	60-210m	NE
Works	1960 – 2002	210m	NW
Works	1960 – 1993+	160m	NW
Garage	1973	210m	NW
- redeveloped as 'Just Tyres' and Enterprise (car rental)			
Garage (Fuel Filling Station)	1960 – 1993+	230m	NW
- redeveloped as commercial offices of Portakabin			
Brigade Depot/Barracks	1881 – 1973	210m	SE
- redeveloped as residential dwellings in Brock Gardens			
Cycle Works/Mineral Water/Soft Drinks Works	1899 – 1976	155m	S
- redeveloped as residential dwellings in Rona Court			
Garage	1971 - 1993	80m	SE
Bakery/Warehouse	1960 – 1976	80m	W
- redeveloped as residential dwellings in Rowe Court			
Residential development	1899 – present day	Immediate	N, E, S, W
No further significant land uses have been observed in the historical data set within the specified vicinity to the site.			

2.3 HISTORICAL SUMMARY

The earliest Ordnance Survey mapping of 1881 indicates that the site was undeveloped at this time. By the time of the 1899 survey the site had been developed as a small building in the north. Additional open-sided buildings had been constructed on the site by 1933-34.



A larger building was constructed in the south of the site by 1960, which was marked as a depot in 1972. An additional building was also constructed in the west of the site by 1973. With the exception that a number of the buildings around the periphery of the site had been removed, the layout remained relatively unchanged until the recent walkover. The larger building in the south of the site has been in more recent use as a dance studio.

The site is located within a predominantly residential area of Reading. A number of former historical and industrial land-uses in the area comprise a barracks, depots, a cycle works, mineral water and soft drinks works, a depository and garages within 250m. A pond, now infilled is marked 240m to the north.

The garage and fuel filling station noted 210m and 230m to the north-west of the site are now in use as 'Just Tyres', Enterprise (car rental) and the commercial offices of Portakabin.

No further notable on or off-site land uses have been observed within the historical dataset.

3.0 ENVIRONMENTAL SETTING

Unless otherwise stated Geo-Environmental Setting information has been obtained from Groundsure's EnviroInsight Data Report, referenced EMS_381033_510004 and GeoInsight Data Report referenced EMS_381033_510003 dated 2 September 2016. This information was obtained as part of the desk based research obtained for the adjacent premises, for the same client in September 2016. These are included as **Appendix II** and **III** respectively.

3.1 GEOLOGY AND HYDROGEOLOGY

The British Geological Survey (BGS) was consulted, and presented within table 3.1 is the anticipated geology.

Table 3.1 : Anticipated Geology

Stratum	Age	Possible Thickness	Typical Description	Aquifer Status
Artificial/Made Ground None indicated on site	N/A	N/A	N/A	N/A
Superficial Head	Quaternary	N/A	Polymict deposit: comprises sand and gravel, locally with lenses of silt, clay or peat and organic material	Secondary (A) aquifer
Superficial Taplow Gravel Formation	Quaternary - Wolstonian	Average 5m, locally to 9m	Sand and gravel, locally with lenses of silt, clay or peat	Secondary (A) aquifer
Solid Seaford Chalk Formation And Newhaven Chalk Formation	Cretaceous – Coniacian to Campanian	Up to 155m	Undifferentiated chalk	Principal Aquifer

An inferred fault is recorded approximately 43m to the south of the site within the chalk strata.

There are no landslips noted within influencing distance of the site.

The hydrogeology of the site has been determined by the superficial strata of Head and the Taplow Gravel Formation and the solid geology comprising the Seaford Chalk Formation and Newhaven Chalk Formation, which according to Groundsure and the Environment Agency are classified as the following;

- 🌿 Head: **Secondary (A) aquifer** comprising permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.
- 🌿 Taplow Gravel Formation: **Secondary (A) aquifer**.
- 🌿 Seaford Chalk Formation and Newhaven Chalk Formation: **Principal Aquifer**, comprising layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifer.

The nearest BGS borehole record for drilling works undertaken at the Corona soft drinks works in 1954 approximately 170m to the south of the site indicates that the rest groundwater level is approximately 12m below ground level. No data is available regarding the geological strata-type encountered at this location.

The Groundsure report indicates that the groundwater vulnerability and soil leaching potential category for the strata referenced beneath the site is H1, 'Major Aquifer/High Leaching Potential', where additional notes describe the categorisation as 'Soils which readily transmit liquid discharges because they are shallow or susceptible to rapid flow directly to rock, gravel or groundwater'.

Both Groundsure and the Environment Agency website (August 2017) indicate that the site is not located within an Environment Agency source protection zone (SPZ).

The Groundsure database indicates that there are nineteen groundwater abstraction licences including five references to potable groundwater abstraction licences for premises within 2000m of the site. The nearest and most pertinent record refers to Thames Groundwater abstracted for the purposes of 'Drinking, Cooking, Sanitary, Washing, (Small Garden) - Commercial/Industrial/Public Services' at a location approximately 641m to the north of the site.

3.2 HYDROLOGY AND FLOODING

The Groundsure detailed river network dataset indicates that there are no main rivers within 500m of the site and no surface water features referenced within 250m of the site. The River Thames is noted approximately 835m to the north-west of the site.

There are no surface water abstraction licences including potable surface water abstraction licences referenced within 2000m of the site.

The Groundsure report indicates that there is one record of Part A(2) and Part B Activities and Enforcements within 250m of the site at a location approximately 234m to the north-west, however no enforcements have been notified.

There are two records of Environment Agency recorded pollution incidents having taken place within 250m of the site, however the incidents resulted in 'minor impact' to land, and 'no impact' to water and air.

The Groundsure report and the Environment Agency website (August 2017) indicate that the site is not located within either a Zone 2 or a Zone 3 flood zone. A Zone 2 flood zone is located 90m to the north of the site associated with the River Thames. The Groundsure report indicates that the highest Risk of Flooding from Rivers and the Sea (RoFRaS) on site is shown to be 'very low'. The Environment Agency website indicates that the site is located in an area at risk of surface water flooding.

There are no flood defences indicated within 250m of the site and no areas within 250m of the site that benefit from flood defences. The site area (250m buffer) is shown not to be used for flood storage.

The site is shown to be located within 50m of a BGS groundwater flooding susceptibility flood area associated with 'clearwater flooding'; and the highest susceptibility of flooding in this search area is indicated to be 'potential at surface'. The BGS confidence rating in this result is 'high'.

3.3 WASTE MANAGEMENT, LANDFILLING AND GROUND GAS

Information from the Groundsure report indicates that there are no:

-  Records of Environment Agency landfill (including historic) data within 1000m of the site,
-  BGS/Department of the Environment (DoE) non-operational landfill sites within 1500m of the site,
-  Local Authority Landfill Sites within 1500m of the site,
-  Operational and non-operational waste treatment, transfer and disposal sites within 250m of the site, and

 Environment Agency Licensed Waste Sites within 250m of the site.

The Health Protection Agency (HPA) records indicate that the property is located within an area where <1% of properties are above the Radon Action Level. Radon protection measures are therefore not required.

Section 3 of CIRIA C665 'Assessing risks posed by hazardous ground gases to buildings' provides a flow chart to overview the risk potential. It is not considered there are any potential risks to the new development from hazardous ground gas within influencing distance of the site. This is due to the proximity to the site and the surrounding infrastructure between the site and any potential off-site sources. As such no further assessment in terms of ground gas risk is considered necessary.

4.0 REGULATORY INFORMATION, CONSULTATIONS AND OTHER

Unless otherwise stated regulatory database information has been obtained from the aforementioned Groundsure Reports included as **Appendices II** and **III**. This information was obtained as part of the desk based research obtained for the adjacent premises, for the same client in September 2016.

4.1 STATUTORY REGISTERS AND AUTHORISATIONS

Table 4.1 includes statutory registers and authorisations that relate to the site and surrounding area.

Table 4.1 : Statutory Registers and Authorisations

Item	0 – 250m	251 – 500m
Integrated Pollution Controls	0	0
Integrated Pollution Prevention and Controls	0	4
Records of Water Industry Referrals	0	0
Records of Red List Discharge Consents	0	0
Records of List 1 and 2 Dangerous Substances Inventory Sites	0	0
Records of Licensed Discharge Consents	0	0
Environment Agency Recorded Pollution Incidents	130m N – specific waste materials: tyres - <i>no impact to water</i> 135m S – specific waste materials: household waste - <i>no impact to water</i>	1
Records of Local Authority Pollution Prevent Controls	0	0
Part A(2) and Part B Activities and Enforcements	234m NW – Berkshire Printing – <i>no enforcements notified</i>	3
Records of Radioactive Substances	0	0

Table 4.1 : Statutory Registers and Authorisations

Planning Hazardous Substance Consents/Planning Hazardous Substance Enforcements	0	1
Notification of Installations Handling Hazardous Substances (NIHHS) Facilities and Control of Major Accident Hazards Facilities (COMAH)	0	1
Records of National Incidents Recording System, List 1	0	1
Records of Part 2A EPA 1990 sites	0	0
Fuel Stations	230m NW – Reading Service Station – <i>obsolete, now Portakabin (incorrectly marked as being located 90m W)</i>	463m NW – Shell Norcot - <i>open</i>
Current Industrial Sites Data (potentially contaminative)	The following industrial sites data are noted for premises within 250m of the site: 16m SE - Electrical Production and Manipulation Equipment 95m NE - Electricity Sub Station 104m SE - Vehicle Repair, Testing and Servicing 128m NE - Depot - Container and Storage 124m E - Electricity Sub Station 153m NE - Metals Manufacturers, Fabricators and Stockholders 154m N - Electricity Sub Station 155m NE - Warehouse - Container and Storage 166m E - Vehicle Repair, Testing and Servicing 178m NE - Depot - Container and Storage 163m NW - Published Goods - Industrial Products 212m SW - Pest and Vermin Control - Contract Services 183m NW - Works - Unspecified Works or Factories 191 NW - Electricity Sub Station 216m NE - Vehicle Parts and Accessories 218m NE - Construction Completion Services 218m NE - Vehicle Repair, Testing and Servicing 218m NE - Construction Completion Services - Construction Services	

Table 4.1 : Statutory Registers and Authorisations

	218m NE - Depot - Container and Storage 190m SW - Electrical Equipment Repair and Servicing 198m W - Clearance and Salvage Dealers - Recycling Services 192m S – Electricity Sub Station 198m NW - Vehicle Parts and Accessories - Motoring 241m NE – Electricity Sub Station 221m NW - Vehicle Hire and Rental - Hire Services 229m W – Electricity Sub Station	
National Grid High Voltage Underground Electricity Transmission Cables	0	0
National Grid High Pressure Gas Transmission Pipelines	0	0
Environmentally Sensitive Sites	853m NW – 934m W: Local Nature Reserve On-site – 988m E: nitrate vulnerable zone	1414m NW: Ancient woodland 1700m N: Ancient replanted woodland 1064m NW – 1457m W: Local Nature Reserve 1550m N: Area of Outstanding Natural Beauty

4.2 CONSULTEES

4.2.1 Local Authority - Contaminated Land Officer

The Local Environmental Health Department has not been contacted as part of our project instruction.

4.2.2 Local Authority - Building Control Officer

The Local Planning Authority Building Control Officer has not been contacted as part of our project instruction.

4.2.3 Local Authority - Petroleum Officer

The Local Planning Authority Petroleum Officer has not been contacted as part of our project instruction.

4.2.4 Environment Agency - Contaminated Land and Groundwater

The Contaminated Land and Groundwater Team of Environment Agency has not been contacted as part of our project instruction.

4.2.5 Coal Authority and Mining Searches UK

The Coal Authority and Mining Searches UK have not been contacted as part of our project instruction.

4.3 PREVIOUS REPORTS

No previous reports have been made available.

5.0 PRELIMINARY ENVIRONMENTAL RISK ASSESSMENT

5.1 METHODOLOGY

A Preliminary Risk Assessment (PRA) and Conceptual Site Model (CSM) have been prepared in accordance with CLR11 based on the information obtained as part of this desk study and site inspection. Possible risks associated with potential source of contamination and sensitive receptors identified have been assessed via a source-pathway-receptor (SPR) model in accordance with current UK protocols.

A risk may only exist where a plausible SPR linkage is presented and where the quantity or concentration of a contaminant is sufficient to pose harm. Under the statutory definition "Contamination" may only exist where contaminants pose a risk of harm to a receptor. Risk may be defined as a function of the likelihood and severity of any adverse effects resulting from a contamination event. This risk classification has been assessed in accordance with CIRIA C552. A summary of how risk is derived and the associated definition is presented in tables 5.1.1 and 5.1.2.

Table 5.1.1 : Risk Ratings Matrix

	Consequence			
Probability	Severe	Medium	Mild	Minor
High Likelihood	Very high risk	High risk	Moderate Risk	Moderate/low risk
Likely	High risk	Moderate Risk	Moderate/low risk	Low risk
Low Likelihood	Moderate Risk	Moderate/low risk	Low risk	Very low risk
Unlikely	Moderate/low risk	Low risk	Very low risk	Very low risk

Table 5.1.2 : Risk Ratings Definition

Risk Rating	Definition
Very high risk	A high probability that severe harm could occur to determined receptor from identified contaminant - OR - evidence exists that severe harm to receptor is currently occurring. Urgent investigation and remediation should be considered. If demonstrated this risk is likely to result in substantial liability.
High risk	Harm is likely to occur to determined receptor from identified contaminant. Urgent investigation and short term risk minimisation remediation followed by longer term fit for purpose remediation should be considered. If demonstrated this risk is likely to result in substantial liability.
Moderate Risk	It is possible that harm could occur to a determined receptor from identified contaminant. It is relatively unlikely that any harm would be severe or should harm occur it is likely to be relatively mild.
Moderate/low risk	It is possible that harm could occur to a determined receptor from identified contaminant. It is unlikely that any harm would be severe or should harm occur it is probable to be relatively mild.
Low risk	It is possible that harm could occur to a determined receptor from identified contaminant. It is unlikely that such harm, if indeed present, would at worst be mild.
Very low risk	There is a low possibility that harm could occur to a receptor. In such event the harm would not be severe.

5.2 POTENTIAL SOURCES OF CONTAMINATION

Based on the desk study and site inspection completed table 5.2 presents a summary of the potential sources identified.

Table 5.2 : Potential Sources

Source	Description	Comments	On/off-site
1. Workshop/Depot	Activities may have contaminated on-site soils. Metals, PAH, TPH.	For last 25 years or so. However, no evidence of surface staining upon hardstanding.	On

5.3 PATHWAYS

A pathway is one or more routes or means that a receptor can be exposed to, or affected by, a contaminant.

Table 5.3 : Plausible Pathways

On-Site and Locally
Direct contact; By humans and infrastructure
Underlying geology/hydrogeology; secondary (A) aquifer above principal aquifer
Inhalation and ingestion
Surface run-off/drainage

5.4 RECEPTORS

A receptor is either a living organism, a group of organisms, an ecological system, controlled waters or property that could be harmed or polluted by a contaminant. Table 5.4 examines the potential receptors.

Table 5.4 : Potential Receptors

Receptor	Description	Comments	Plausible
Construction workers	Groundworkers and general construction works	Potentially historical contaminative uses including workshop and depot. No current evidence of contamination.	Likely
End users	Occupants of the proposed development	Potentially historical contaminative uses including workshop and depot. No current evidence of contamination.	Likely
Adjacent land users	Sensitive land uses identified in the immediate vicinity	Land is generally flat with hard surfacing and enclosed with brick boundary wall.	Unlikely
Soft landscaping	Areas of new planting including lawns	Potentially historical contaminative uses including workshop and depot. No current	Likely

Table 5.4 : Potential Receptors

Receptor	Description	Comments	Plausible
		evidence of contamination.	
Water supply pipes	Plastic pipework for potable water supply to new homes may be effected if laid in contaminated soils	Potentially historical contaminative uses including workshop and depot. No current evidence of contamination.	Likely
Buildings & infrastructure	Buried concrete for new foundations may be in contact with aggressive ground (sulphur attack)	Potentially historical contaminative uses including workshop and depot. No current evidence of contamination.	Likely
Groundwater	Controlled waters (secondary (A) and principal aquifers) beneath the site	Potentially historical contaminative uses including workshop and depot. No current evidence of contamination.	Likely
Surface waters	Controlled water such as lakes, streams, rivers or coastal waters	River Thames 835m to the north-west.	No
Ecological receptors	Sensitive areas of ecological significance defined under Part 2A of EPA 1990	No such areas area within immediate vicinity	No

5.5 SUMMARY OF POLLUTANT LINKAGES FOR PROPOSED LAND USE - INITIAL CSM

The initial CSM is based upon the proposed site end use and the information currently consulted relating to various risk sources and plausible pollutant linkages and is presented within table 5.5.

Table 5.5 : Initial Conceptual Site Model (for plausible pollutant linkage pathways)

Source	Receptor	Pathway	Probability	Consequence	Risk & Justification
Source 1 Potentially Contaminated Soils.	Construction workers	Direct contract	Unlikely	Minor	Low Potentially historical contaminative uses including workshop and depot. No current 'surface' evidence of contamination, however, potentially contaminated Made Ground may exist beneath surfacing. Risk exposure only short term.
	End users	Direct contract	Likely	Medium	Moderate Potentially historical contaminative uses including workshop and depot. No current 'surface' evidence of contamination, however, potentially contaminated Made Ground may exist beneath surfacing.

	Soft landscaping	Root uptake	Likely	Medium	Moderate Potentially historical contaminative uses including workshop and depot. No current 'surface' evidence of contamination, however, potentially contaminated Made Ground may exist beneath surfacing, which is also considered physically unsuitable for plant growth
	Water supply pipes	Direct contact	Likely	Medium	Moderate Potentially historical contaminative uses including workshop and depot. No current 'surface' evidence of contamination, however, potentially contaminated Made Ground may exist beneath surfacing.
	Buildings & infrastructure	Direct contact	Likely	Medium	Moderate Potentially historical contaminative uses including workshop and depot. No current 'surface' evidence of contamination, however, potentially contaminated Made Ground may exist beneath surfacing.
	Groundwater Secondary (A) aquifer above principal aquifer	Vertical migration through hydrogeology. Potable GW abstraction 641m north	Likely	Medium	Moderate Potentially historical contaminative uses including workshop and depot. No current 'surface' evidence of contamination, however, potentially contaminated Made Ground may exist beneath surfacing.

The overall environmental risk classification for the site is generally **MODERATE** as a result of potential risks from historical soil contamination which may exist beneath the overlying concrete hardstanding. A 'higher' risk classification has not been considered as the hardstanding is aged and shows no evidence of contaminative staining.

5.5 CONTAMINANTS OF CONCERN FOR FUTURE SITE INVESTIGATION

It is recommended to undertake a ground investigation in order to confirm the perceived presence of risk. Based on the known current and historical site and surrounding land uses the following analytical suites should be selected for future ground investigation works to chemically assess soil quality;

-  Aviron's "Suite 1" of laboratory analysis shall be applied to future site investigations which includes; arsenic, barium, cadmium, total chromium, copper, nickel, zinc, lead, mercury, selenium, water soluble boron, total cyanide, total sulphate, water soluble sulphide, speciated PAH, total phenols,

pH. **To assess commonly encountered soil contaminants.**

 Total Petroleum Hydrocarbons (TPH CWG) including BTEX and MTBE. **To assess commonly encountered fuel/oil/lubricant soil contaminants.**

 Asbestos.

The listed suite of analysis is considered suitable and will provide a screening for the majority of commonly found soil contaminants for the identified risk areas.

6.0 GEOTECHNICAL CONSIDERATIONS

6.1 GEOLOGICAL AND SUBSIDENCE RISK

Table 6.1 indicates potential mining and subsidence hazard ratings identified within the Groundsure report for the site. These risk ratings were obtained as part of the desk based research obtained for the adjacent premises, for the same client in September 2016. These should be considered in terms of the proposed re-development.

Table 6.1 : Mining and Subsidence

Item	Hazard Rating
Shrink-Swell Clay	Head: Very low TGF: Negligible
Landslides	Very low
Ground Dissolution of Soluble Rocks	Low
Compressible Deposits	Negligible
Collapsible Deposits	Very low
Running Sands	Very low
Ground and Underground Workings within 250m	Pond: 231m north
Mining, Extraction and Natural Cavities within influencing distance	On-site: Chalk
Maximum Risk of Natural Ground Subsidence (50m buffer)	High

*TGF – Taplow Gravel Formation

Information from the Groundsure report indicates that there are no references to the presence of made ground or artificial ground within influencing distance of the site. There is one reference in the Groundsure report in connection with historical surface workings detailing the former pond located 241m to the north of the site.

The hazard rating associated with ground dissolution of soluble rocks is determined as 'low' and described as follows: 'Significant soluble rocks are present. Low possibility of subsidence occurring naturally, but may be possible in adverse conditions such as high surface or subsurface water flow. Consider implications for stability when changes to drainage or new construction are planned. For new build, site investigation should consider potential for dissolution problems on the site and its surroundings. Care should be taken with local

drainage into the bedrock. Some possibility (of) groundwater pollution. For existing property, possible increase in insurance risk due to soluble rocks.'

There are no records of mining, extraction and cavities located within 500m of the site, with the exception of 'non-coal mining (chalk) within the site. The assessment of the risk of likelihood is determined as follows: 'localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered'.

There are no fault lines and no landslips indicated within influencing distance of the site.

There are no railways or tunnels noted within 250m of the site.

6.2 NEW FOUNDATIONS AND DRAINAGE SUMMARY

The consistency and the material properties of the overlying horizons of Head, Taplow Gravel Formation and the Chalk Formations are likely to determine the feasibility of conventional shallow foundations beneath the proposed development buildings.

Volume change potential of the overlying strata beneath the site and adjacent tree species (existing and former) should be considered when determining foundation depths of proposed construction.

Soakaway drainage may be feasible within the overlying Taplow Gravel Formation.

7.0 CONCLUSIONS AND RECOMMENDATIONS

This Phase I Geo-Environmental Risk Assessment has reviewed a number of desk based sources of information along with a site inspection to determine any potential environmental and geotechnical risks which may impact the site.

7.1 ENVIRONMENTAL

Generally **moderate risk** has been determined to **site end users, landscaping, controlled water and building infrastructure** as a result of the site use as a workshop and depot.

It is recommended further ground investigation and risk assessment is completed to provide an assessment of in-situ soil quality and confirm the presence or absence of any perceived risk. In general and as a minimum further site investigation should;

- 🌱 Assess made ground and near surface natural strata quality across the site. It is recommended that at least five locations are chosen to provide suitable spatial coverage given the size of the site and the presence of proposed soft landscaping/gardens.
- 🌱 Soil contaminants of concern identified in section 5.5 should be analysed from both the overlying made ground and underlying natural strata.

7.2 GEOTECHNICAL

The consistency and the material properties of the overlying horizons of Head, Taplow Gravel Formation and the Chalk Formations are likely to determine the feasibility of conventional shallow foundations beneath the proposed development buildings.

Volume change potential of the overlying strata beneath the site and adjacent tree species (existing and former) should be considered when determining foundation depths of proposed construction.

Soakaway drainage may be feasible within the overlying Taplow Gravel Formation.

8.0 PROJECT INSTRUCTION AND LIMITATIONS

8.1 SCOPE OF WORKS

The following scope of work was undertaken to an agreed brief set out in Aviron's proposal of and involves the following;

- 📍 Site reconnaissance survey, to include inspection of the infrastructure and potential discussions with the owner regarding site activities.
- 📍 Procurement of available historical map editions, geo-environmental sensitivity data and British Geological Survey (BGS) borehole records.
- 📍 Identification of potential areas of environmental concern relating to current and/or historic site use and surroundings to prepare a refined Conceptual Site Model (CSM).
- 📍 Preparation of suitable conclusions and recommendations with regard to the site's suitability for use or the requirement for further assessment and site investigation on the basis of the CSM.

Aviron has relied upon information received from the Client and their agents as accurate, unless contradicted by written documentation or site observations.

8.2 PUBLISHED GUIDANCE

This report follows the technical approach presented in Contaminated Land Report 11 (CLR11) "Model Procedures for the Management of Land Contamination" prepared by the Environment Agency in 2004. CLR11 provides guidance on the application of management processes when assessing potentially contaminated land.

This project and report have been designed to fulfil the information requirements set out in the Environment Agency Guidance on Requirements for Land Contamination Reports prepared by the Environment Agency in 2005.

Notwithstanding the above this report is additionally prepared in accordance with current guidance notes, standards and practices as set out by the Environment Agency and statutory organisations in order to establish potential and significant pollutant linkages as defined in Part IIA of the Environmental Protection Act 1990.

8.3 LIMITATIONS

Should changes in legislation, statutory requirements or industry practices occurred following issue of this report, this report should be viewed in light of these changes.

Should a notable time period elapse between the date issue of this report and the date of application of this report changes to site dynamics may occur and in particular the site inspection notes may no longer be applicable should any change of use occur to the site in the interim.

9.0 REFERENCES AND OTHER SOURCES OF INFORMATION

Groundsure® Report Pack. Historical Maps EMS_381033_510002, GeoInsight – Geo-Environmental Data Sheets EMS_381033_510003, EnviroInsight - Environmental Data Sheets EMS_381033_510004, dated 2 September 2016. This report pack was obtained as part of the desk based research obtained for the adjacent premises, for the same client in September 2016.

DEFRA and Environment Agency, 2004. Model Procedures for the Management of Land Contamination, Contaminated Land Report 11.

British Geological Survey. Solid and drift edition sheet BGS map 268.

British Geological Survey Website. www.bgs.ac.uk

Environment Agency Website: www.environment-agency.gov.uk

BS10175. British Standards Institute. 2011, Investigation of Potentially Contaminated Land - Code of Practice.

Environment Agency. July 2005. Guidance on Requirements for Land Contamination Reports.

Figures

- 1 Site Location and Layout Plan
- 2 Proposed Development Plan
- 3 Site Photographs
- 4 Site Photographs



Legend

— Indicative Boundary

Notes

Figure 1

Drawing Title

Existing Site Layout Plan

Project Number 17-229.01

Project Title
12 Shaftesbury Road, Reading, RG30 2QP

Drawn by JB

Checked by OB

Scale NTS





Legend

— Indicative Boundary

Notes

Figure 2

Drawing Title

Proposed Development Plan

Project Number 17-229.01

Project Title
12 Shaftsbury Road, Reading, RG30 2QP

Drawn by JB

Checked by OB

Scale NTS





Photo 1
Shaftsbury Road
South towards Oxford Road



Photo 2
No. 12 Shaftsbury Road



Photo 3
Side Access



Photo 4
Rear yard area

Legend

Notes

Figure 2

Drawing Title

Site Photographs

Project Number 17-229.01

Project Title
12 Shaftsbury Road, Reading, RG30 2QP

Drawn by JB

Checked by OB

Scale NTS





Photo 5
Rear yard area

Legend

Notes

Figure 4

Drawing Title

Site Photographs

Project Number 17-229.01

Project Title
12 Shaftsbury Road, Reading, RG30 2QP

Drawn by JB

Checked by OB

Scale NTS



Appendices

- I Historical Maps
- II EnviroInsight Data Sheets
- III GeolInsight Data Sheets

Appendix

I Historical Maps

Appendix

II EnviroInsight Data Sheets

Appendix

III GeolInsight Data Sheets

AVIRON ASSOCIATES LIMITED

is a dynamic company of Chartered Environmental Surveyors and Geotechnical Engineers.

We continuously work hard to ensure our services are the most technically competent, efficient and viable in our market place. Our years of experience of vastly varied sites and projects compliment our ability to deliver assured and effective Ground Investigations and Risk Assessments of both Brownfield, Greenfield and Currently Developed Land.

Our clients choose Aviron to plan, design and manage their Ground Investigations and Land Remediation Schemes assisting in land procurement to deliver engineering requirements, discharge planning and ensure their sites are suitable, developable and sustainable.

Our tenaciously committed team ensure regardless of project value we will always deliver quickly, effectively and exceed expectations.



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