

Phase I Geo-Environmental Desk Study

At:

Huggens College,
College Road,
Northfleet,
Kent,
DA11 9DL

For:

Andrew Firebrace
Partnership Ltd

Private and Confidential

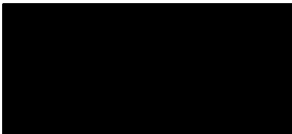
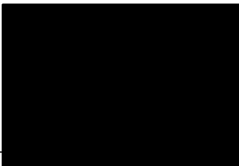
Ref: 5618 23 10 31 Rpt 01 Rev A JH AFP

Sevenoaks Environmental Consultancy Ltd,
145a Hastings Road, Pembury, Kent, TN2 4JU
Tel: 01892 822999



Sevenoaks
Environmental
Consultancy Ltd

This report was produced in accordance with the
Sevenoaks Environmental Consultancy Ltd
Quality Assurance System

Report Ref:	5618 23 10 31 Rpt 01 Rev A JH PA		
	Consultant's Name	Consultant's Signature	Date
Report written by:	James Harding <i>(Graduate Geo-Environmental Engineer)</i>		31/10/2023
Report reviewed by:	Brendan Davis <i>(Technical Director)</i>		

SCOPE, SOURCES AND LIMITATIONS

This report has been conducted in line with the source-pathway-receptor (SPR) linkage risk assessment-based methods referred to in Part IIA of the Environmental Protection Act 1990, introduced by Section 57 of the Environment Act 1995.

To establish past site use, possible indications of contamination or ground instability and potential pollutant linkages, this assessment relies on publicly available historic maps, published geological information, information from Local Authority, Building Control and other statutory and non statutory bodies, data provided by electronic search engines, a walkover survey of the site from ground level only and other information (as reported herein) obtained from non-intrusive sources. All information, comments and opinions given in this report are based on documentary records made available to us at the time of writing.

It should be noted that documentary sources and records may not be totally accurate, precise or complete. It is possible, therefore that there may be potential or actual contaminants or adverse ground conditions that remain undetected.

This report is written in the context of an agreed scope of work between SEC and the Client and should not be used in a different context. In light of additional information becoming available, a change in proposed end-use improved practices and changes in legislation amendment or re-interpretation of the assessment or report in whole or part may be necessary after its original submission.

The scope of this report is restricted to potential ground contamination and its environmental impact; it does not cover above-ground hazards (e.g. asbestos in buildings), ecological sensitivities (e.g. bats), biological or horticultural hazards (e.g. Japanese Knotweed) or structural hazards (e.g. building stability) unless specifically referred to in the text of this report.

This report may make brief reference to the risk of flooding at the subject site but does not constitute a flood risk assessment in accordance with current planning guidance. An ecological survey, an asbestos survey, a geo-technical assessment, a topographical survey, a Safety Audit a Mechanical and Electrical Survey and a flood risk assessment of the site are beyond the scope of this report.

Advice and recommendations given in this report are provided for information purposes; they are not exhaustive and do not constitute a specification for further investigation / remediation or other works.

Contents

Quality Assurance Control Sheet

Scope, Sources and Limitations

Contents

1. Introduction	Page 5
2. Site Details	Page 6
3. Geology and Hydrogeology	Page 13
4. Environmental Data Search	Page 14
5. Consultations	Page 18
6. Conceptual Site Model and Qualitative Risk Assessment	Page 19
7. Conclusions and Recommendations	Page 24
8. General Exceptions and Limitations	Page 25

Table 1	Historical Map Review
Table 2	Preliminary Qualitative Risk Assessment

Figure 1	Site Location Plan
Figure 2	Existing Site Layout Plan
Figure 3	Proposed Site Plan
Figure 4	Conceptual Site Model

Appendix A	Figures
Appendix B	Site Photographs
Appendix C	Historical Maps
Appendix D	BGS Borehole Logs
Appendix E	Environmental Data
Appendix F	Correspondence with the Regulators
Appendix G	Qualitative Risk Assessment Definitions

1 Introduction

Sevenoaks Environmental Consultancy Ltd (SEC) were commissioned by Andrew Firebrace Partnership Ltd to produce a Phase I Geo-Environmental Desk Study Report for the site Huggens College, College Road, Northfleet, Kent, DA11 9DL (see Appendix A Figure 1 – Site Location Plan)

The site is located in a suburban setting and is comprised of an approximately Trapezium shaped plot.

The site was developed by 31 no. residential bungalows and a chapel, arranged in a rectangle around soft landscaping in the centre. (see Appendix A Figure 2 – Existing Site Layout Plan). Further soft landscaping was situated between the bungalow and the site boundaries. To the northeastern corner there was another separate residential house (Chaplains House) and to the southeastern corner was a substation.

This Phase I Geo-Environmental Desk Study has been prepared to help inform risks associated with potential ground contamination in order to help support a proposed planning application for the proposed development.

The proposed development is for the demolition and clearance of the existing buildings and the construction of 98 residential units with a library, community room, laundry room and a bike and bin storage area. (see Appendix A Figure 3 – Proposed Site Plan).

This Geo-Environmental Desk Study aims to establish the likely geology and hydrogeology of the site, produce a conceptual risk model, conduct a qualitative risk assessment, and provide recommendations based upon the results of preliminary enquiries and in accordance with the current guidance.

The scope of this assessment was agreed with Andrew Firebrace Partnership Ltd and comprised:

- A site reconnaissance;
- The collection and review of geological and hydrogeological plans;
- The procurement and review of historical maps;
- The procurement and review of environmental data relating to the site setting;
- The development of a site conceptual model;
- A preliminary qualitative risk assessment of potential contamination issues; and
- Presentation of recommendations based on the risk assessment.

This Geo-Environmental Desk Study has been compiled and conducted in line with the source-pathway-receptor (SPR) linkage risk assessment-based methods referred to in Part IIA of the Environmental Protection Act 1990, introduced by Section 57 of the Environment Act 1995 and brought into force in April 2000.

SEC has not been provided with any previous reports for the site.

2 Site Details

2.1 Site Location

The site was located at Huggens College, College Road, Northfleet, Kent, DA11 9DL, and was located approximately on National Grid Reference 561663, 174621 (see Appendix A Figure 1 - Site Location Plan).

2.2 Site Description

The site covered an area of ~1.80Ha with boundaries forming an approximately Trapezium shaped plot (See Appendix A Figure 2 – Existing Site Layout Plan). The site area was occupied by 31 no. existing residential bungalows, a chapel, a house to the eastern side of the site and an electricity sub-station in the southeastern corner of the site.

2.3 Current Site Activity

At the time of writing the site was in use as a small residential housing community where nearly all the terraced bungalows were occupied by tenants apart from no. 9 and no. 16.

2.4 Site Setting and Topography

The site was located within a suburban setting surrounded by other residential buildings. The site is situated at the top of a hill with a gradual decline from south to north.

2.5 Site Walkover

A site walkover inspection was undertaken by SEC in September 2023. The following paragraphs note the observations made during the visit (see Appendix B – Site Photographs).

The site is an enclosed private residential community and occupied by 31 residential terraced bungalows with gardens and a chapel arranged around an approximately rectangular ring road. The site was accessed via College Road from the east of the site. The rectangular ring road surrounds a soft landscaping area with some trees and a path orientated diagonally approximately northwest/southeast. It is also noted there were a couple of parking bays on the western and eastern side of the rectangular ring road. Chaplains House was located to the far northeastern side of the site. The pathway around the buildings, both along the front and behind the gardens comprised of concrete paving slabs which were in relatively good condition.

The majority of the residential bungalows were occupied and so SEC was only provided access to two of the buildings, which were vacant, these being no. 9 and no. 16. No. 9 was also currently in the process of being improved and the floors comprised of vinyl and there was a stockpile of furniture scattered around. There was also access to an attic which contained a potential cement asbestos chimney pipe. No. 16 was clean and empty with carpeted floors in good condition. There was also anecdotal evidence from the groundskeeper that there was a cement asbestos chimney pipe in all of the buildings and that the buildings that have been refurbished don't have an asbestos panel behind the chimney.

To the southwestern corner of the site was a stockpile of carpet, overgrown grass cuttings, bark, soil, and potential rubber. Along the eastern and northern boundaries behind the residential gardens was soft landscaping and trees.

To the northeastern corner of the site was a tarmac pathway to Chaplain's House which comprised a residential house and a garage with parking bay.

To the southeastern side of the site was the visitor car parking area, nearby was also an electrical substation, a garden area, a greenhouse, a garage unit, a metal shed as well as a wooden shed. It was noted that the garage unit has a potentially cement asbestos roof and a small stoke pile of kitchen appliances. The tarmac in this area was in relatively good condition with some evidence where the tarmac has been resurfaced, some minor cracks but no staining. Inside the metal shed some paint cans and some concrete slabs were noted. Next to the wooden and metal sheds was a skip comprising organic matter such as bark, soil and wood, some bags also containing that and rubble, some barriers, cones, as well as that a loose stockpile of wood, bark, and soil.

The site is situated at the top of a hill with a gradual decline from south to north, no retaining features were noted across the site. The River Thames was located ~400m north of the site, a quarry was located ~100m north east of the site.

2.6 Services

It was outside the scope of this report to obtain and review service plans from the Statutory Authorities. Service locations should be verified with the relevant utilities where accurate information is required, for example before conducting any intrusive exploratory holes or excavation works.

2.7 Site History

The site history has been derived from a review of the available historical maps for the site (See Appendix C Historical Maps) and has been summarised below in Table 1.

Table 1: Historical Map Review

Date	Scale	On Site	Off Site
1864 – 1879	1:2,500	The site comprised numerous small buildings connected to a church to the northwest of the site in a horseshoe shape, some of these buildings cross the site boundary line. There was also lodges at the northeastern and southeastern corners of the site.	1 no. Pit was identified ~130m northeast of the site. 2 no. Cement Works were identified ~200m north and ~320m northeast of the site. 2 no. Chalk Pits were identified ~80m north and ~240m west of the site. 2 no. Clay Pits were identified ~260m northwest and ~220m southeast of the site. 1 no. Sand Pit was identified ~240m southeast of the site. 1 no. Clay Mill was identified ~320m southeast of the site. 1 no. Goods Depot was identified ~100m southwest of the site.
1869	1:10,560	The site remained relatively unchanged from that previously identified.	Land adjacent to the site remained relatively unchanged from that previously identified.
1872 – 1873	1:10,560	The site was not detailed by mapping.	Land adjacent to the site was not detailed by mapping.
1885	1:2,500	The site remained relatively unchanged from that previously identified.	Land adjacent to the site remained relatively unchanged from that previously identified.
1897 – 1898	1:2,500	9 no. new buildings were noted on the mapping and had been developed in the centre of the site. A path was also developed between those buildings and the horseshoe of buildings in an approximately rectangular shape. Within the confines of the path was another building.	Extensive development had occurred to the east, southeast, south, and west of the site. 1 no. Gravel Pit was identified ~10m east of the site. 1 no. Tank was identified ~160m northeast of the site. Both Clay pits had been infilled and were no longer identified by mapping. The Sand Pit ~240m southeast of the site had been expanded and was now identified as a quarry. The Clay Mill was identified ~320m southeast of the site had been expanded and joined to The Sand Pit to form a quarry. The Chalk Pit ~80m North had been infilled and the land was now used by the Cement Works that was identified north of it (Portland Cement Works). The Chalk Pit ~240m west of the site was identified as an Old Chalk Pit by the mapping. 1 no. Factory was identified ~300m southeast of the site.
1898	1:10,560	The site remained relatively unchanged from that previously identified.	1 no. Gas Works was identified ~480m northeast of the site. 1 no. Brick Works was identified ~480m east of the site.
1909	1:2,500	The site remained relatively unchanged from that previously identified.	Land adjacent to the site remained relatively unchanged from that previously identified. The previously identified Gravel pit is no longer identified on the mapping and has potentially been infilled. The Factory ~300m southeast of the site was no longer identified by mapping.
1910	1:10,560	The site remained relatively unchanged from that previously identified.	Land adjacent to the site remained relatively unchanged from that previously identified.

1920	1:2,500	The site was not detailed by mapping.	Only land to the northwest was detailed by mapping and remained relatively unchanged from that previously identified.
1923	1:10,560	The site remained relatively unchanged from that previously identified.	Land adjacent to the site remained relatively unchanged from that previously identified.
1932	1:10,560	The site remained relatively unchanged from that previously identified.	Land adjacent to the site remained relatively unchanged from that previously identified. 1 no. Gas Works was no longer identified by mapping ~480m northeast of the site.
1938 – 1939	1:2,500	The site remained relatively unchanged from that previously identified.	Land adjacent to the site remained relatively unchanged from that previously identified. Numerous Tanks were identified ~260m northeast of the site. 1 no. Tank ~160m northeast of the site was no longer identified by mapping. 1 no. Cement Works was no longer identified by mapping ~200m north of the site
1938	1:10,560	The site remained relatively unchanged from that previously identified.	Land adjacent to the site remained relatively unchanged from that previously identified.
1951	1:10,560	The site remained relatively unchanged from that previously identified.	Land adjacent to the site remained relatively unchanged from that previously identified.
1953	1:1,250	A Sub Station was identified to the south of the site near the southern lodge.	Land adjacent to the site remained relatively unchanged from that previously identified, except a Sub Station was identified ~100m southwest of the site and a Coal Yard was identified ~100m southwest of the site replacing the Goods Depot at this location. 1no. Coal Yard was identified ~100m southeast of the site. 1no. Electrical substation was identified ~100m southeast of the site.
1954	1:2,500	The site remained relatively unchanged from that previously identified.	Land adjacent to the site remained relatively unchanged from that previously identified.
1961 – 1962	1:10,000	The site remained relatively unchanged from that previously identified.	Land adjacent to the site remained relatively unchanged from that previously identified.
1961 – 1973	1:1,250	The site was redeveloped and the layout appeared to be fairly consistent with that of the current site layout. The lodge in the southeastern corner was no longer identifiable, along with the electrical substation.	The Quarry ~300m southeast of the site was no longer identified by mapping. 2 no. Tanks were both identified ~360m southeast of the site. 1 no. Works was identified ~180m north of the site.
1966	1:10,000	The site remained relatively unchanged from that previously identified.	Land adjacent to the site remained relatively unchanged from that previously identified.
1967	1:2,500	The site was not detailed by mapping.	Only the area to east of the site was detailed on the mapping, which remained generally unchanged from that previously identified.
1972 – 1980	1:1,250	Southeastern corner developed with a Substation and 5 no. new structures / car parking areas conjoined in a row.	The Numerous Tanks were no longer identified by mapping ~360m northeast of the site.

1973	1:1,250	The site was not detailed by mapping.	Land adjacent to the site was not detailed by mapping apart from the far northwest of the mapping which remained relatively unchanged.
1973 – 1974	1:10,000	The site remained relatively unchanged from that previously identified.	Land adjacent to the site remained relatively unchanged from that previously identified. A Depots was identified ~240m north of the site.
1977 – 1991	1:1,250	5 no. new structures conjoined in a row were developed on the southeastern corner further west from the previous 4 no. structures / car parking area which had now become 5.	Land adjacent to the site remained relatively unchanged from that previously identified. 2 no. Warehouses were identified ~160m north and 200m north of the site.
1980 – 1984	1:10,000	The site remained relatively unchanged from that previously identified.	Land adjacent to the site remained relatively unchanged from that previously identified.
1986 – 1988	1:1,250	The site was not detailed by mapping.	Land adjacent to the site was only detailed to the west and south, of which off site land remained relatively unchanged.
1991 – 1993	1:10,000	The site remained relatively unchanged from that previously identified.	Land adjacent to the site remained relatively unchanged from that previously identified.
1992	1:1,250	The site remained relatively unchanged from that previously identified.	The Substation previously identified ~100m southwest of the site was no longer identified by mapping
1993 – 1994	1:1,250	The site was not detailed by mapping.	Land adjacent to the site was only detailed to the west and northwest, which remained relatively unchanged from that previously identified.
1994	1:10,000	The site was not detailed by mapping.	Land adjacent to the site was only detailed to the northwest and southeast of the site by mapping, of which the off site land remained relatively unchanged.
1999	1:10,000	The site remained relatively unchanged from that previously identified.	Land adjacent to the site remained relatively unchanged from that previously identified.
2023	1:10,000	The site remained relatively unchanged from that previously identified.	Land adjacent to the site remained relatively unchanged from that previously identified.

Following the review of the historical maps, the following on-site sources of potential contamination were identified:

- Made Ground associated with the site's previous phases of development since 1864.
- 2 no. Electrical substations located on site 1951 – 1972 and 1972 – present.

The potential off site sources of contamination identified included:

- 2 no. Cement Works ~200m north (1864 – 1938) and ~320m northeast (1864 – Present)
- 2 no. Chalk Pits ~80m north (1864 – 1897) and ~240m west (1864 – 1897)
- 2 no. Clay Pits ~260m northwest (1864 – 1897) and ~220m southeast (1864 – 1897)
- 1 no. Sand Pit ~240m southeast (1864 – 1897)
- 1 no. Clay Mill ~320m southeast (1864 – 1897)

- 1 no. Goods Depot ~100m southwest (1864 – 1953) of the site
- 1 no. Quarry ~240m southeast (1897 – present)
- 1 no. Factory ~300m southeast (1897 - 1909)
- 1 no. Gas Works ~480m northeast (1898 – 1932)
- 1 no. Brick Works ~480m east (1898 – 1910)
- 1 no. Gravel Pit ~10m east (1897 – 1909)
- Numerous Tanks were identified in various directions:
 - 1 no. ~160m northeast (1897 – 1939)
 - 2 no. both ~360m southeast (1961 – 1999)
- 1 no. Sub Station ~100m southwest (1953 – present)
- 1 no. Coal Yard ~100m southwest (1953 – present)
- 1 no. Works ~160m northwest (1961 – present)
- 2 no. Depots ~240m north (1973 – present) and ~400m north (1973 – present)
- 2 no. Warehouses ~160m north (1977 – 1992) and 200m north (1977 – present)

Of the potential off-site sources identified, the following are considered likely to pose a low risk to the site given a combination of mitigating factors including their distance from site, or their position down or across the inferred groundwater gradient and have not been considered further:

- 2 no. Cement Works ~200m north and ~320m northeast
- 1 no. Depot ~400m north
- 1 no. Chalk Pit ~240m west
- 2 no. Clay Pits ~260m northwest and ~220m southeast
- 1 no. Sand Pit ~240m southeast
- 1 no. Clay Mill ~320m southeast
- 1 no. Factory ~300m southeast
- 1 no. Gas Works ~480m northeast
- 1 no. Brick Works ~480m east
- 2 no. Tanks ~360m southeast
- 2 no. Warehouses ~160m and ~200m north

2.8 Archaeology

The historical maps which were studied to establish the site's history, did not depict any features of obvious archaeological interest on site or within the immediate vicinity of the site. However, detailed

research on the archaeology of the site was outside the scope of this study and has not been undertaken.

2.9 Existing Monitoring

SEC is not aware of any environmental monitoring being undertaken at (or in close proximity to) the site.

2.10 Asbestos in Buildings

This report does not constitute an asbestos survey and a survey for asbestos containing materials was outside the scope of this report.

2.11 Ecological Considerations

A formal ecological survey is beyond the scope of this assessment.

3 Geology and Hydrogeology

3.1 Geology

The geological records for the site obtained from the British Geological Survey (BGS) (England and Wales, New Series 1:63 360/1:50,000 geological map series – sheet 271, solid and drift map type, and Geology of Britain Viewer), indicate that the site is underlain by solid geology comprising the Lewes Nodular Chalk Formation, Seaford Chalk Formation and Newhaven Chalk Formation (undifferentiated) with superficial deposits comprising of the Boyn Hill Gravel Member (Sand and Gravel).

From a brief review of the BGS borehole records, a nearby borehole was identified ~360m southeast of the site within the same geology. (Ref: TQ67SW357). The record identified concrete up to 0.10m bgl, underlain by fill (bricks, soil and ashes) up to ~1.09m bgl, underlain by Sand and Gravel with flints and traces of clay up to ~4.26m bgl, underlain by Chalk with flints up to ~28m bgl. No water was recorded within the borehole log.

3.2 Hydrogeology and Hydrology

Since April 2010 the Environment Agency (EA) has implemented the use of Aquifer designations that are consistent with the Water Framework Directive. These designations reflect the importance of Aquifers in terms of groundwater as a resource (drinking water supply) but also their role in supporting surface flows and wetland ecosystems. The previous Groundwater Vulnerability maps have not been completely withdrawn as they are still relevant in relation to undisturbed natural soils and soil classes. The Aquifer designations have been split into two different types: Superficial (Drift) and Bedrock (solid permeable formations).

From a review of the Aquifer Designation mapping on the Department for Environment, Food and Rural Affairs (DEFRA) MagicMap website it would appear that based on bedrock designation, the Lewes Nodular Chalk Formation, Seaford Chalk Formation and Newhaven Chalk Formation (undifferentiated) is assigned a Principal Aquifer. The Superficial/Drift designation, the Boyn Hill Gravel Member (Sand and Gravel) is assigned a Secondary A Aquifer.

From a review of the Environmental Data Sheet, 1 no. surface water feature had been identified ~213m north of the site, relating to the Robins Creek near Northfleet Harbour.

From a review of the DEFRA MagicMap Source Protection Zone (SPZ) mapping, it would appear that the site is located within an SPZ (Zone II – Outer Protection). Given the distribution of SPZ's and local topography it is inferred that the local groundwater gradient could be orientated to the north, towards the River Thames.

4 Environmental Data Search

A search of public registers for environmental data was conducted using an automated search engine and is presented in Appendix E. It should be noted that the data search is not exhaustive, and only considers a variable search area up to 1km from the site with data that may be approximated or limited and is periodically updated. The findings of this search are summarised below:

4.1 Local Authority Pollution Prevention and Controls (LAPPCs) and Integrated Pollution Prevention and Controls (IPPCs)

There were no Local Authority Pollution Prevention and Controls or Integrated Pollution Prevention and Controls recorded in relation to the site.

There are 22 no. Local Authority Pollution Prevention and Controls recorded within 1 km of the site. The closest was recorded ~188m north on the 2nd of August 1994 relating to coating of metal and plastic, its status was authorised. Given the distance and the inferred groundwater gradient the Local Authority Pollution Prevention and Control, it has been considered to pose a low risk and has not been considered further.

There are no recorded Integrated Pollution Prevention and Controls within 1 km of the site.

It is also noted that the Environmental Data Search recorded no Contaminated Land Register Entries and Notices in relation to the site or identified within 1km of the site.

4.2 Discharge Consents

There were no Discharge Consents recorded in relation to the site.

There were 40 no. Discharge Consents within 1km of the site, the nearest recorded was ~228m north of the site and related to trade discharge into a freshwater stream/river. It was issued on the 16th of June 1993 for Blue Circle Cement, Northfleet Works. Given the distance and the inferred groundwater gradient from the Discharge Consent, it has been considered to pose a low risk and has not been considered further.

4.3 Pollution Incidents to Controlled Waters

There were no Pollution Incidents recorded in relation to the site.

There were 8 no. Pollution Incidents recorded within 1 km of the site, the closest being identified ~202m northwest relating to oil pollutants and it was categorised as a category 3 – minor incident. It was dated April 23rd, 1998.

4.4 Registered Radioactive Substances

There were no Registered Radioactive Substances recorded in relation to the site or within 1km of the site.

4.5 Substantiated Pollution Incidents Register

There were no Substantiated Pollution Incidents recorded in relation to the site.

There were 3 no. Substantiated Pollution Incidents Register entries recorded within 1km of the site. The nearest was recorded on the 4th of May 2004 and was identified ~543m southeast of the site. The incident related to atmospheric pollutants and dust and was categorised as a Category 4 – No Impact for air impact, Category 2 – Significant Incident for air impact and Category 3 – Minor Incident for land impact.

Given the distance and the time that has elapsed, it has been considered to posed a low risk and has not been considered further.

4.6 Water Abstractions

There was no groundwater, surface water or potable groundwater abstractions recorded in relation to the site.

There were 2 no. surface water abstraction recorded within 1km of the site. Both were identified 439m north of the site and related to an abstraction for Point A, Tidal River Thames at Swanscombe. 1 no. abstraction was permitted for the year in 1993 (although permit date didn't start until the 22nd of September 1993) and the other for the year in 2002.

There were 49 no. groundwater abstractions recorded within 1km of the site, the closest was identified ~730m south of the site and related to an abstraction for Point B At Blue Lake Northfleet Cement Works. It was authorised to start in April 2021 and end in October 2021.

There were no potable water abstractions recorded within 1km of the site.

4.7 Floodplains

The Environmental Data Search identified that the site was located was within an area identified to have a limited potential groundwater flooding risk.

4.8 River Quality Monitoring Data

River quality data is based on the general quality assessment headline indicators scheme (GQAHI). In England, each chemical sample is measured for ammonia and dissolved oxygen. The results are graded from A (Very Good) to F (Bad).

There were no records of chemical river quality identified on site or within 1km of the site.

4.9 Registered Landfill Sites

There were no historic landfill sites, integrated pollution control registered waste sites, licensed waste management facilities, local authority recorded landfill sites, registered waste transfer sites or registered waste treatment/disposal sites identified on site.

There were 7 no. Registered Landfill Sites within 1km of the site. The nearest recorded was ~647m west of the site and is operational as far as it is known. Given the distance of the Registered Landfill Site from the site, it has been considered likely to pose a low risk and has not been considered further.

4.10 Control of Major Accident Hazard Sites (COMAH), Notification of Installations Handling Hazardous Substances (NIHHS), Explosive Sites and Planning Hazardous Substances Consents/Enforcements.

There was no Control of Major Accident Hazard Sites (COMAH), Notification of Installations Handling Hazardous Substances (NIHHS), Explosive Sites and Planning Hazardous Substances Consents/Enforcements that were recorded in relation to the site.

There was 1 no. Control of Major Accident Hazard Sites (COMAH), Notification of Installations Handling Hazardous Substances (NIHHS), Explosive Sites and Planning Hazardous Substances Consents/Enforcements were recorded in within 1km off the site. The COMAH was recorded ~665m northwest from the site and relates to Britannia Refined Metals Limited and its status is active.

Given the distance from the site, it has been considered to pose a low risk and has not been considered further.

4.11 British Geological Survey

The environmental data indicates the geology beneath the site comprises a White Chalk Subgroup for bedrock geology. The site was described as having:

- No hazard potential associated with shrinking or swelling clay;
- Very low hazard potential associated with running sand;
- Very low hazard potential associated with collapsible ground stability;
- Very low hazard potential associated with landslide instability;
- Very low hazard potential associated with ground dissolution of soluble rocks; and
- No hazard potential associated with compressible ground.

Although the observations made above may have a bearing on foundation design measures, a geotechnical assessment of the site is beyond the scope of this report.

4.12 Natural and Mining Cavities

There were no Man-made Mining Cavities, Natural Cavities, Current Ground Working or Historical Surface Ground Workings recorded in relation of the site.

The Environmental Data search identified 4 no. Man-made Mining Cavities, Natural Cavities, Current Ground Working or Historical Surface Ground Working within 1km of the site. The nearest Man-Made Mining Cavity was 800m east of the site and the nearest natural cavity was 647m west of the site.

The Environmental Data search also identified that the site was located within an area that might not be affected by coal mining.

There were no BGS Mineral Sites recorded in relation to the site.

There were 26 no. BGS Mineral Sites recorded within 1km of the site, the closest identified was Lower Fleet Brick Field ~327m southeast of the site and was ceased in operation. It was an open cast mine which extracted Clay and Shale.

4.13 Contemporary Trade Directory Entries

The environmental data search identified 228 no. records of active or inactive potentially contaminated land uses/trade directory entries within 1km of the site.

Of those that were within ~250m, 4 no. were noted and included an active Tyre Dealers ~166m northwest of the site, a Commercial Vehicle Servicing, Repairs, Parts & Accessories business was identified ~90m southwest which is currently inactive, a Mechanical Engineers was identified ~172m northwest and an Engineering Services that was identified ~241m west.

The environmental data search identified 1. no Fuel Station Entry within 1km of the site. It was located ~332m northwest of the site and is classified as open.

Given the distance from the site and the inferred groundwater gradient the Contemporary Trade Directory Entries are considered to pose a low risk and have not been considered further.

4.14 Environmentally Sensitive Area, Ramsar Site, Site of Special Scientific Interest (SSSI), Special Protection Area (SPA), Special Area of Conservation (SAC), National Nature Reserve (NNR), Local Nature Reserve (LNR), Area of Outstanding Natural Beauty (AONB), National Park (NP), Nitrate Sensitive Areas, Ancient Woodland and Green Belt Land

The site was not identified to be positioned in or within 1km of an Environmentally Sensitive Area, Ramsar Site, Special Protection Area (SPA), Special Area of Conservation (SAC), National Nature Reserve (NNR), Local Nature Reserve (LNR), National Park (NP) or Nitrate Sensitive Areas.

The site was not noted to be located in relation to or within 1km of an Area of Adopted Green Belt.

The site was not located in relation to or within 1km of an Ancient Woodland.

There is 1 no. Site of Special Scientific Interest ~436m southwest of the site, Swanscombe Peninsula covers multiple areas and was designated an SSSI on the 11th of March 2021

4.15 Nitrate Vulnerable Zone (NVZ)

The environmental data search did identify a Nitrate Vulnerable Zone relating to groundwater within 1km of the site. The North Kent zone was located ~194m southwest of site.

4.16 Radon

The Department of Environment, Transport and Regions (DETR) 'Radon: guidance on protective measures for new dwellings' published in 2015 indicates that the site is located within an area of 'Intermediate' probability (1 – 3% of homes are estimated to be at or above the Action Level), and no radon protective measures are necessary in the construction of new dwellings or extensions.

5 Consultations

See Appendix F Correspondence with the Regulators.

5.1 Environmental Health Officer (EHO)

SEC contacted the Environmental Health Officer (EHO) at Gravesham Borough Council to enquire whether the site was listed on their Part IIa list of sites that require further investigation as well as their knowledge of the presence of any private groundwater abstractions locally to the site. SEC has had a response from the EHO stating that they were not aware of any private groundwater abstractions at this location and that the Gravesham Borough Council has no entries under Part IIa.

5.2 Building Control Officer (BCO)

SEC contacted the Building Control Officer (BCO) at Gravesham Borough Council to enquire as to their understanding of the ground conditions locally to site and the possible depth to the groundwater. SEC has had a response from the BCO stating that STG (Local Authority Building Control for Canterbury, Gravesham, Medway & Swale Councils) were involved in a project at the site in 2013 where the ground was excavated to a depth of 1.2m and encountered clay with chalk overlying hoggin. They were not aware of the depth to the groundwater on site.

6 Conceptual Site Model and Qualitative Risk Assessment

6.1 Conceptual Model

In accordance with BS 10175 a conceptual site model has been developed for the site, based on the potential sources, pathways and receptors identified from the available data including site observations made by SEC at the time of writing this report and the proposed end-use (see Appendix A Figure 4 for Conceptual Site Model).

6.2 Sources of Potential Contamination / Hazards

Based on the available information the following on-site sources of contamination have been identified:

- Made Ground associated with the site's previous development since 1864; and
- Former / existing site use for multiple residential properties/small residential community, with 2 no. Electrical substations 1951 – 1972 and 1972 – present.

The following potential offsite sources of contamination identified included:

- 1 no. Chalk Pit ~80m north (1864 – 1897) of the site
- 1 no. Goods Depot ~100m southwest (1864 – 1953) of the site
- 1 no. Quarry ~240m southeast (1897 – present) of the site
- 1 no. Gravel Pit ~10m east (1897 – 1909) of the site
- 1 no. Tank ~160m northwest (1897 – 1939) of the site
- 1 no. Sub Station ~100m southwest (1953 – 1992) of the site
- 1 no. Coal Yard ~100m southwest (1953 – 1992) of the site
- 1 no. Works ~160m north (1972 – 1992) of the site
- 1 no. Depots ~240m north (1973 – 1999) of the site
- Active Tyre Dealers ~166m northwest of the site
- Former Commercial Vehicle Servicing, Repairs, Parts & Accessories business ~90m southwest of the site

6.3 Potential Receptors for Contamination / Hazards

The following potential receptors have been identified as requiring appraisal in the context of potential pollutant linkages;

- The proposed development (building fabric);
- Groundworkers;
- Neighbouring sites;

- Controlled Waters (Secondary A Aquifer over a Secondary Principal Aquifer, and 1 no. surface water feature had been identified ~213m north of the site, relating to the Robins Creek near Northfleet Harbour);
- Future site users/residents; and
- Ecological Receptors (Site of Special Scientific Interest ~436m southwest of the site - Swanscombe Peninsula, and North Kent Nitrate Vulnerable Zone ~194m southwest of site.)

6.4 Potential Pathways

The following potential pathways have been considered in relation to the sources and receptors identified above:

- Inhalation;
- Ingestion;
- Direct contact;
- Permeable Strata;
- Percolation, infiltration, and leaching;
- Groundwater and surface water migration;
- Dust migration; and
- Explosive Event.

6.5 Assessment of the Degree of Risk

A Preliminary qualitative risk assessment has been compiled using all available information based upon a source-pathway-receptor model and is presented in the table below.

The terms adopted for severity of impact are – severe, medium, mild, and minor, for probability of an exposure occurring are - high likelihood, likely, low likelihood and unlikely, and for the risk to the receptor are very high, high, moderate, low, and very low risk. (Definitions are presented in Appendix G).

Table 2: Preliminary Qualitative Risk Assessment

Sources of Potential Contamination	Receptor	Pathway	Severity of Impact	Probability	Risk	Recommended Action (to clarify level of risk and/or assess suitable mitigation measures or to mitigate the risk)
Onsite Sources: Made Ground associated with the site's previous phases of development since 1864	The proposed development (building fabric and garden / landscaped areas); Groundworkers; Neighbouring sites; Controlled Waters (Secondary A Aquifer over a Principal Aquifer, and Robins Creek ~213m north of the site; Future site users/residents; and Ecological Receptors (Site of Special Scientific Interest ~436m southwest of the site - Swanscombe Peninsula, and North Kent Nitrate Vulnerable Zone ~194m southwest of site.)	Inhalation Ingestion Direct Contact Dust Migration Permeable Strata Percolation, infiltration, and leaching Groundwater migration Explosive Event	Medium	Likely	Moderate	Made Ground is considered likely to be present across the site, associated with previous phases of development since 1864 including the construction of 31 no. existing buildings on site. Common contaminants of concern associated with general Made Ground may include the presence of asbestos and/or elevated concentrations of metals, hydrocarbons and PAHs. Based upon the currently available data, potential risks to the receptors associated with Made Ground cannot be clarified, therefore further preliminary intrusive Site Investigation is recommended to help determine the chemical suitability and the extent of Made Ground across the site in order to help clarify potential risks to the receptors associated with the development proposed. The recommended preliminary site investigation should include analysis of Made Ground for a general suite of common contaminants associated with typical Made Ground, including those referred to above. Exploratory holes should be positioned to provide representative coverage across the site as well as targeting former building locations. As part of the intrusive site investigation it would be prudent to also characterise the Made Ground for waste disposal purposes associated with the proposed development, and therefore WAC analysis and a WM3 Waste Classification Assessment is recommended to help facilitate appropriate waste disposal during the proposed development, in accordance with current EA WM3 guidelines.
Onsite Sources: Former / existing site	The proposed development (building fabric and garden /	Inhalation Ingestion	Mild	Likely	Low	Risks associated with the former and current site uses are likely to be low given the former residential use is unlikely to give rise to ground contamination however, there is the potential for impact

use for multiple residential properties/small residential community, with 2 no. Electrical substations 1951 – 1972 and 1972 – present.	landscaped areas); Groundworkers; Neighbouring sites; Controlled Waters (Secondary A Aquifer over a Principal Aquifer, and Robins Creek ~213m north of the site; Future site users/residents; and Ecological Receptors (Site of Special Scientific Interest ~436m southwest of the site - Swanscombe Peninsula, and North Kent Nitrate Vulnerable Zone ~194m southwest of site.)	Direct Contact Dust Migration Permeable Strata Percolation, infiltration, and leaching Groundwater migration Explosive Event				associated with the electrical substation associated with leaked / split transformer oil and therefore the recommended further Site Investigation discussed above should include exploratory holes to confirm an absence of impact locally to the substation, including testing for PCB's. All waste / general rubbish should be appropriately disposed of from site to suitably licensed facilities prior to the proposed redevelopment (all disposal documentation should be retained).
Offsite Sources: 1 no. Chalk Pit ~80m north (1864 – 1897) of the site 1 no. Goods Depot ~100m southwest (1864 – 1953) of the site 1 no. Quarry ~240m southeast (1897 – present) of the site	The proposed development (building fabric and garden / landscaped areas); Groundworkers; Neighbouring sites; Controlled Waters (Secondary A Aquifer over a Principal Aquifer, and Robins Creek ~213m north of the site;	Inhalation Ingestion Direct Contact Dust Migration Permeable Strata Percolation, infiltration,	Medium	Likely	Moderate	Potential risks associated with the offsite sources identified primarily relate to the migration of contamination via ground gas and groundwater migration pathways. Contaminants of concern are primarily likely to relate to ground gases associated with the infilled pits / quarries identified locally to the site. The recommended further site investigation should include a ground gas Risk Assessment in accordance with CIRIA C665 guidance and any groundwater encountered should be chemically characterised to confirm an absence impact associated with the off site sources. Potential contaminants of concern could include may include hydrocarbons, metals, phenols, ammonia, solvents and ground gases including methane, carbon dioxide and hydrocarbon vapours. Therefore, the recommended further investigation should include a ground gas risk

1 no. Gravel Pit ~10m east (1897 – 1909) of the site 1 no. Tank ~160m northwest (1897 – 1939) of the site 1 no. Sub Station ~100m southwest (1953 – 1992) of the site 1 no. Coal Yard ~100m southwest (1953 – 1992) of the site 1 no. Works ~160m north (1972 – 1992) of the site 1 no. Depots ~240m north (1973 – 1999) of the site Active Tyre Dealers ~166m northwest of the site Former Commercial Vehicle Servicing, Repairs, Parts & Accessories business ~90m southwest of the site	Future site users/residents; and Ecological Receptors (Site of Special Scientific Interest ~436m southwest of the site - Swanscombe Peninsula, and North Kent Nitrate Vulnerable Zone ~194m southwest of site.)	and leaching Groundwater migration Explosive Event				assessment in accordance with current CIRIA C665 guidance, and chemical characterisation of any groundwater encountered for contaminants of concern.
--	---	---	--	--	--	---

7 Conclusions and Recommendations

A review of the available information has been undertaken and a qualitative risk assessment has been conducted based on the understanding from the Client that the site's proposed development is for 98 residential units for accommodation with a library, community room, laundry room and a bike and bin storage area.

The risk assessment, presented as Table 2 above, assesses the potential source-pathway-receptor linkages of concern, and provides recommended actions to either clarify the level of risk or mitigate the risks. For full details reference should be made to Table 2.

Should the existing or proposed usage change (including layout) or additional information be obtained then a re-assessment of the potential risks associated with the site will be required. The recommendations made are subject to regulatory approval.

The following key recommendations have been made in relation to the proposed development of the site:

- That further preliminary intrusive Site Investigation be conducted to help determine the chemical suitability and extent of Made Ground across the site, confirm an absence of impact from the site's current and former site usage and to clarify the potential risks to receptors associated with the offsite sources identified. Potential contaminants of concern include asbestos, metals, hydrocarbons, PAHs, solvents, ammonia, phenols, PCB's and ground gases. The site investigation should include a ground gas risk assessment in accordance with current CIRCA C665 guidance and chemical characterisation of any groundwater identified for similar potential contaminants of concern. It would also be prudent to include within the scope of further site investigation for waste classification and WAC analysis;
- Presumed asbestos chimneys and panels behind the chimneys were noted on the properties as well as the roof of the garage located to the southeast of the site. To begin compliance with the Control of Asbestos Regulations 2012, a Pre-Demolition/Major Refurbishment Asbestos Survey should be conducted prior to any disturbance to the existing structures;
- That all general rubbish be disposed of appropriately to licensed facilities prior to the proposed redevelopment and that all waste disposal duty of care documents be retained;

It is noted that it would be cost effective to combine the recommended Geo-Environmental Site Investigation with a Geotechnical Site Investigation to help inform foundation design for the proposed development.

All discharges from site should be appropriately consented by the EA.

The findings of this assessment are based upon SEC's current understanding of the site. Should circumstances change then the Risk Assessment should be revisited by an Environmental Consultant. The recommendations made above are subject to regulatory approval.

An ecological survey, an asbestos survey, a geotechnical assessment, a topographical survey, and a flood risk assessment of the site were beyond the scope of this report.

8 General Limitations and Exceptions

1. The advice given in this report with respect to contaminated land/pollution is based on the guidelines available at the time of writing.
2. The Client is advised that the conditions observed on site by SEC at the time of the investigation or assessments are subject to change. Certain indicators of the presence of hazardous substances may have been latent at the time of the most recent site reconnaissance or investigation and they may subsequently have become observable.
3. Comments made relating to land gas or groundwater conditions are based on observations made at the time of the investigation unless otherwise stated. The normal rate of conduct of an exploratory hole does not usually permit the recording of an equilibrium groundwater level for any one strike. Land gas and / or groundwater conditions may vary as a result of seasonal or other effects.
4. The opinions expressed in this report are based on the ground conditions revealed by the site works, together with an assessment of the site and of laboratory test results. Whilst opinions may be expressed relating to sub-soil conditions in parts of the site not investigated, for example between or beyond borehole positions, these are only for guidance only and no liability can be accepted for their accuracy.
5. Ground contamination often exists as small discrete areas of contamination and there can be no certainty that any or all such areas have been located, sampled and/or identified.
6. This assessment may be subject to amendment in light of additional information becoming available.
7. The findings and opinions conveyed in this report are based on information obtained from a variety of sources, including that from 1) previous site investigations and 2) chemical testing laboratories, and which SEC has assumed are correct. Nevertheless, SEC cannot and does not guarantee the authenticity or reliability of the information it has relied upon. SEC can accept no responsibility for inaccuracies within the data supplied by other parties.
8. This report is written in the context of an agreed scope of work between SEC and the Client and should not be used in a different context. In light of additional information becoming available, improved practices and changes in legislation amendment or re-interpretation of the assessment or report in whole or part may be necessary after its original submission.
9. This report is provided for sole use by the Client and is confidential to them. No responsibility whatsoever for the contents of the report will be accepted to anyone other than the Client.
10. SEC believes that providing information about limitations is essential to help the Client identify and thereby manage risks.
11. The copyright of written materials supplied shall remain the property of SEC but with a royalty free perpetual licence, granted to the Client on payment in full of any outstanding monies.
12. SEC does not provide legal advice and the advice of the Clients legal advisors may also be required.
13. SEC notes that this assessment is subject to regulatory review and approval.
14. This report represents a stage in an iterative process of investigation and assessment and as such it is possible that further work may be recommended.
15. An ecological, topographical, or asbestos survey was outside of the scope of this report.
16. The use of data generated by this site investigation for the design of foundations or geo-technical assessment was outside the scope of this report.

Appendix A

Figures



SITE: Huggens College, College Road, Northfleet, Kent, DA11 9DL

SCALE: NTS

JOB NO: 5618

FIGURE TITLE: Site Location Plan

REV: 01

FIGURE NO: 1

 SEVENOAKS
ENVIRONMENTAL
CONSULTANCY

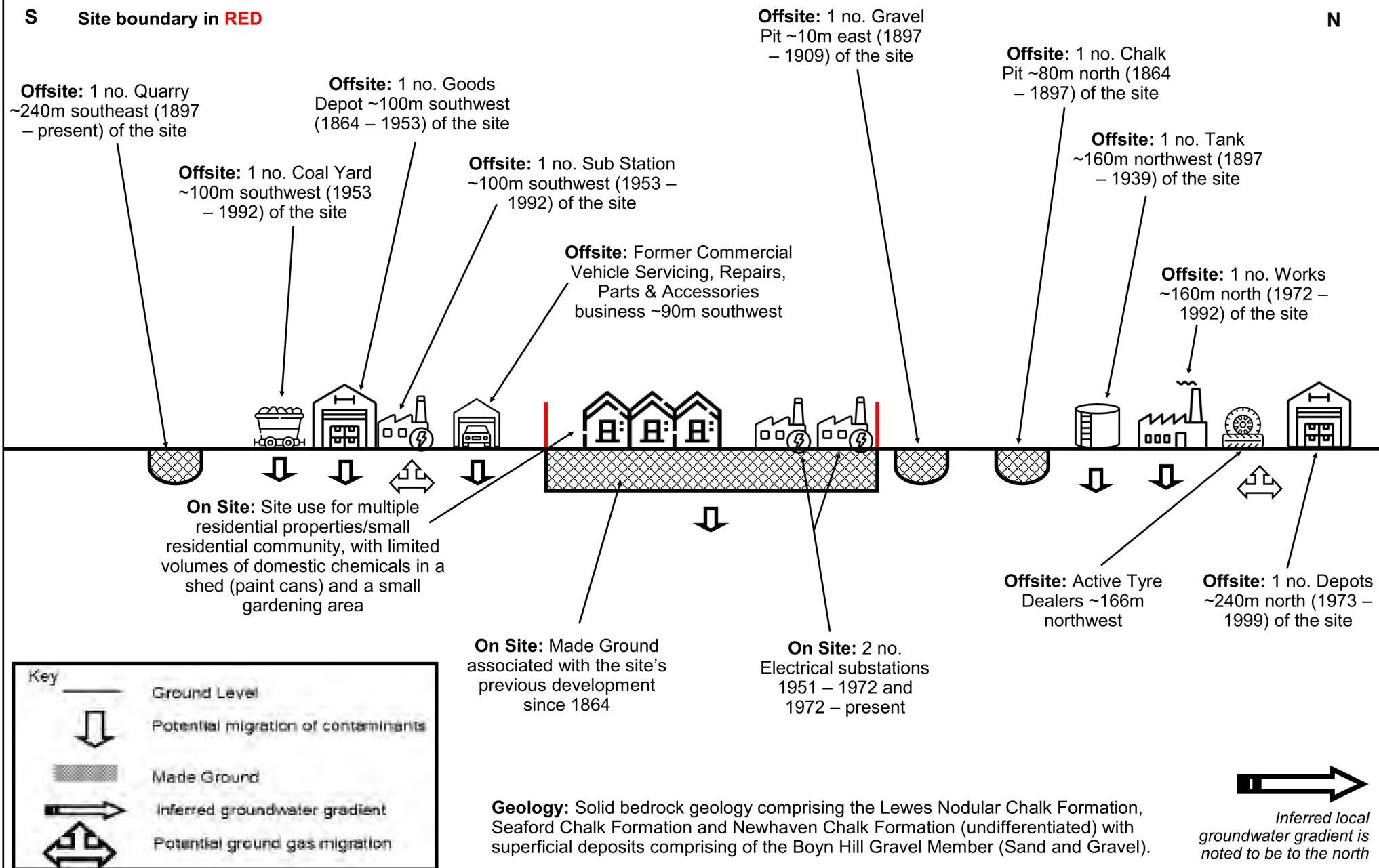


SITE: Huggens College, College Road, Northfleet, Kent, DA11 9DL	SCALE: NTS	JOB NO: 5618	 SEVENOAKS ENVIRONMENTAL CONSULTANCY
FIGURE TITLE: Existing Site Layout Plan	REV: 01	FIGURE NO: 2	



S **Site boundary in RED**

N



SITE: Huggens College, College Road, Northfleet, Kent, DA11 9DL

SCALE: NTS

JOB NO: 5618

FIGURE TITLE: Conceptual Site Model

REV: 01

FIGURE NO: 4

SEVENOAKS
ENVIRONMENTAL
CONSULTANCY

Appendix B

Site Photographs



Photo 1—Entrance to the site



Photo 2—View of soft landscaping with concrete path up the centre



Photo 3—Visitor parking area to southeastern side of the site



Photo 4—Pathway to Chaplains House on the northeastern side of the site.



Photo 5—Chaplains House on the northeastern side of the site.



Photo 6—view of soft landscaping and concrete pathway around the back of the residential bungalows



Photo 7—view of soft landscaping and concrete pathway around the back of the residential bungalows



Photo 8—view of soft landscaping and concrete pathway around the back of the residential bungalows nearby the chapel



Photo 9—Garage with asbestos roof and stockpile of kitchen appliances



Photo 10—Metal shed with concrete slabs and paint cans



Photo 11—skip comprising rubble and organic matter such as bark, soil and wood. Barriers and cones, and a stockpile of wood, bark, and soil was noted adjacent to the skip



Photo 12—small gardening area, greenhouse and substation (behind wooden fence) on the southeastern side of the site.



Photo 13—Stockpile of carpet, overgrown grass cuttings, bark, soil, and potential rubber on the southwestern side of the site



Photo 14—Evidence of cracked concrete in the visitor car parking area



Photo 15—View of residential bungalows from the entrance looking west