

Chapter 13: Ground Conditions and Land Contamination

GROUND CONDITIONS AND LAND CONTAMINATION	
AUTHOR	RMA Environmental Ltd
SUPPORTING APPENDIX	ES Volume 3, Appendix: Ground Conditions and Land Contamination Annex 1: Legislation and Planning Policy; Annex 2: Phase 1 Land Contamination Assessment (Phase 1 LCA) (RMA Environmental; December 2023); Annex 3: Basement Impact Assessment (Walsh 2024); Annex 4: Utilities Survey (Plowman Craven; 2018).
KEY CONSIDERATIONS	<p>The key impacts of the Proposed Development which are considered to be potentially significant with regard to Ground Conditions and Land Contamination are as follows:</p> <ul style="list-style-type: none">• Surface water, groundwater and soil contamination from general construction and demolition-related activities;• Remobilisation of any existing contamination and creation of contaminant pathways via leaching and/or migration during demolition and construction, such as piling for construction activities;• Potential for off-site users inhaling, ingesting or coming into dermal contact with windblown contaminated dust during construction;• Potential for demolition/construction workers coming into direct contact with contaminated soils;• Potential effects of existing ground conditions or any residual contaminants on infrastructure and construction materials for the development;• Potential ground gas generation/migration and/ or accumulation within lower levels of the development and its potential impact on construction workers and infrastructure;• Potential for building materials and infrastructure, construction/demolition workers and adjacent site users to be exposed to Unexploded Ordnance (UXO) and potential leaching/pollution from existing UXO on soils, hydrogeology and hydrology;• Potential contamination from routine site operations (e.g. drainage) and/ or accidental releases during the Proposed Development's operational life;• Potential future site users, services and maintenance staff and proposed planting coming into direct contact with contaminated soils and groundwater; and• Potential ground gas generation/migration and/ or accumulation within lower levels of the development and its potential impact on future site users and infrastructure.
CONSULTATION	<p>An EIA Scoping Report was prepared and submitted to the LBS on 11th January 2024 requesting a Scoping Opinion from the LBTH on the scope of the EIA. The EIA Scoping Report is appended to this ES in ES Volume 3, Appendix: EIA Methodology – Annex 1.</p> <p>An EIA Scoping Opinion was issued by LBS on 27th March 2024 and is provided in ES Volume 3, Appendix: EIA Methodology – Annex 2. This ES chapter has been produced in line with the EIA Scoping Opinion comments and a summary of the key points relating to ground conditions and land contamination and how they have been addressed in this ES chapter are summarised below.</p> <ul style="list-style-type: none">• <i>Existing and former uses of the site include a historical garage, historical and current electricity substations, existing buildings on site, as well as an associated car park and petrol station/car wash would need to be referenced.</i> This has been referenced within the Baseline section of this chapter.• <i>A Phase 1 preliminary risk assessment (desk study) has been provided as an appendix to the Scoping Report, which has been reviewed to provide additional context to the site. However, the proposed study area is not defined and this would need to be confirmed.</i> The study area has been defined within Paragraph 13.1.• <i>The Transport Analysis Guidance (TAG) Environmental Impact Appraisal has been suggested to determine the location and the sensitivity of each receptor, magnitude of each impact and effect significance. However, this document does not consider Ground Conditions and Contamination. Instead, it is suggested to use LA 109 Geology and soils, LA 113 Road drainage and the water environment, and Institute of Environmental Management & Assessment (IEMA) Guide: A New Perspective on Land and Soil in Environmental Impact Assessment.</i> As detailed within Paragraph 13.4, the guidance referenced has been followed.• <i>The acknowledgement of likely further site investigation works is welcomed as well as ground gas monitoring which will be secured via a suitably worded planning condition.</i> This has been recommended within the mitigation section of this chapter (Paragraph 13.143).

	<ul style="list-style-type: none">• <i>The proposed scheme includes a single storey basement which is not mentioned within the Scoping Report. It is recommended that a Basement Impact Assessment is appended to the ES. This is appended within ES Volume 3, Appendix: Ground Conditions and Land Contamination – Annex 3 of this ES chapter.</i>• <i>It is also recommended that the Environment Agency and Petroleum Licencing Officer should be contacted for relevant information they may hold on the history, uses and ground conditions beneath the site.</i> Consultation has been undertaken with the LBS and with the EA and the responses are included within Appendix D and E of the Phase 1 LCA.• <i>There are no suggested standard, embedded or additional mitigation measures noted in the SR. These will require careful consideration within the ES. Both standard and additional mitigation measures has been included throughout this ES chapter</i>
--	---

ASSESSMENT METHODOLOGY

Defining the Baseline

- 13.1
- The study area is defined as a 2km radius of the site which has been determined by mapping. The methodology employed in this assessment has been entirely desk-based and a review of the site and surrounding area has been based on the following reports and information sources:
- A Phase 1 LCA (RMA Environmental, December 2023) is included within **ES Volume 3, Appendix: Ground Conditions and Land Contamination – Annex 2** of this ES chapter. The objective of the Phase 1 LCA was to gather information on site conditions and to identify any potential risks of ground contamination resulting from historical or current land uses on or in close proximity to the site;
 - A Phase 1 Environmental Assessment (Delta-Simons) was undertaken for the site in March 2021 by a previous Applicant for the site (refer to the planning history within **ES Volume 1, Chapter 1: Introduction**) and has been reviewed;
 - A Utilities Report (Plowman Craven) has been undertaken for the site and has been reviewed and is included within **ES Volume 3, Appendix: Ground Conditions and Land Contamination – Annex 4**;
 - A Drainage Impact Assessment (Walsh; 2024) has been undertaken for the site and has been reviewed and is submitted in support of the planning application;
 - A Groundsure Report (August 2023) for the site and surrounding area has been reviewed and is included as Appendix A of the Phase 1 LCA (**ES Volume 3, Appendix: Ground Conditions and Land Contamination – Annex 2**); and
 - A Basement Impact Assessment (BIA) undertaken by Walsh in April 2024 for the site, and this is included as **ES Volume 3, Appendix: Ground Conditions and Land Contamination – Annex 3**.

Evolution of the Baseline

- 13.2
- The principal factor regarding the evolution or change to the current baseline conditions in relation to ground conditions is climate change. Should the Proposed Development not come forward, an increase in rainfall intensity (based on UK Climate Change predictions) because of climate change is likely to alter the quality of controlled waters by increasing/ altering pollutant pathways within groundwater and soil. This assessment has considered the existing baseline regarding surface water and groundwater quality and resources and the predicted water quality or resource status or objectives for future years as defined by the Environment Agency (EA) catchment descriptors for the relevant river or groundwater catchment.
- 13.3
- If all the cumulative schemes (as detailed in **ES Volume 1, Chapter 2: EIA Methodology**) come forward, there is unlikely to be a significant effect on the baseline conditions. This is because any associated risks and effects at individual development sites would have to be identified by the applicants to ensure that they are 'suitable for use' in accordance with the mandatory legislative requirements of Part IIA of the Environmental Protection Act, 1990¹ and associated planning conditions. In terms of water quality, new or cumulative

¹ Environmental Protection Act 1990. London: His Majesty's Stationery Office.

schemes will have to incorporate appropriate pollution control measures to protect the underlying groundwater and/ or local surface waters through planning conditions enforced by the LBS (or the relevant local planning authority (LPA)) and/ or environmental permits enforced by the EA.

Impact Assessment Methodology

Demolition and Construction

- 13.4** There is no specific quantitative assessment methodology for Ground Conditions and Land Contamination impact assessment during demolition and construction. However, the scale and nature of each potential effect (and therefore whether it is considered to be a significant effect) has been assessed using an approach which is broadly based on the established methodology from LA 109 Geology and Soils² (Highways England; 2019), LA 113 Road drainage and the water environment (Highways England; 2020)³, Institute of Environmental Management & Assessment (IEMA) Guide: A New Perspective on Land and Soil in Environmental Impact Assessment⁴ as well as the Transport Analysis Guidance (TAG) Environmental Impact Appraisal 2023⁵. Further details on how scale and nature of each potential impact is defined (and thus whether it is considered a significant effect or not) is set out in the 'defining significance' section below.

- 13.5** The assessment of demolition and construction effects is based on the demolition and construction methodology for the Proposed Development as described within **ES Volume 1, Chapter 5: Demolition and Construction**.

Phasing

- 13.6** It is important to consider any potential Ground Conditions and Land Contamination impacts associated with the construction phases (as detailed in **ES Volume 1, Chapter 5: Demolition and Construction**) of the Proposed Development on sensitive receptors such as site users.
- 13.7** The Proposed Development will be delivered across two main phases of construction. During construction of the Proposed Development, there will be times when individual phases of the Proposed Development have been completed and are in occupation at the same time as other adjacent phases are under construction. The potential ground conditions and land contamination impacts associated with each phased area will be the same as the construction impacts considered within this ES chapter.

Completed Development

- 13.8** As with the construction effects above, there is no specific quantitative assessment methodology for Ground Conditions and Land Contamination impact assessment for the operation of the Proposed Development. However, the scale and nature of each potential impact (and thus whether it is considered a significant effect or not) has been assessed using an approach which is broadly based on the established methodology from LA 109 Geology and Soils⁶ (Highways England; 2019), LA 113 Road drainage and the water environment (Highways England; 2020)⁷, Institute of Environmental Management & Assessment (IEMA) Guide: A New Perspective on Land and Soil in Environmental Impact Assessment⁸ as well as the TAG Environmental Impact Appraisal 2023⁵.
- 13.9** The assessment of operational effects is based on the Proposed Development as described in **ES Volume 1, Chapter 4: The Proposed Development**.

Assumptions and Limitations

- 13.10** The assessment of potential effects has been largely based on the findings of the Phase 1 LCA, which is included in **ES Volume 3, Appendix: Ground Conditions and Land Contamination – Annex 2**. This is reliable for the purposes of this assessment as it gathers up to date information on site conditions and identifies any potential risks of ground contamination resulting from historical or current land uses on or in close proximity to the site.
- 13.11** When referring to data from third-party reports and web-based data searches, the distances and directions are quoted directly. These are based on reference points within the site and, therefore, it is possible that some of the data locations are at a slightly different distance and/ or direction from the closest part of the site boundary.

Embedded Mitigation

- 13.12** There are a number of standard embedded mitigation measures that are assumed to be implemented during the demolition, construction and operational phases of the Proposed Development. Each potential effect described within this ES chapter has been assessed assuming that these standard measures are in place. These standard mitigation measures are as follows:
- The implementation of a Demolition and Construction Environment Management Plan (DCEMP) via an appropriately worded planning condition will include measures such as (but not limited to):
 - Proper maintenance of demolition / construction vehicles in accordance with good site practices to reduce the risk of hydrocarbon contamination and will only be active when required;
 - Construction materials will be stored, handled and managed with due regard to the sensitivity of the local aquatic environment and thus the risk of accidental spillage or release will be minimised;
 - Any existing debris located within the area of the proposed works would be removed before the start of construction and after completion of the proposed works;
 - Any excavated material or spoil stored on-site will be located within an area surrounded by a bund to ensure that, should a heavy rainfall event occur, there will be minimal/ no risk of soil washout entering the river via a surface water flow pathway;
 - In accordance with the Control of Pollution (Oil Storage) (England) Regulations 2001⁹, any tanks storing more than 200 litres of oil will have secondary bunding and any above ground storage tanks will be located on a designated area of hardstanding;
 - Oil interceptors will be regularly inspected, cleaned and maintained. Full records will be kept of inspections, maintenance works, and measures undertaken to sustain equipment performance. These provisions should ensure no significant impacts occur on water quality. The use of settlement facilities will aid the removal of any contaminated particulate material that might be derived from construction materials;
 - The construction drainage system will be designed and managed to comply with BS6031:2009 'The British Standard Code of Practice for Earthworks'¹⁰, which details methods that should be considered for the general control of drainage on construction sites. Further advice is contained within the British Standard Code of Practice for Foundations (BS8004: 2015)¹¹;
 - The risk of redistributing any potential contamination around the site (i.e., from residual soil contamination or similar on construction vehicles) will be minimised by designating clean and dirty work areas to prevent cross-contamination;

² [LA 109 Geology and soils-web.pdf](#)

³ [LA 113 - Road drainage and the water environment \(standardsforhighways.co.uk\)](#)

⁴ [J35787 IEMA Land and Soils Guidance.pdf](#)

⁵ Department for Transport. (2023). TAG Unit A3 Environmental Impact Appraisal. Transport Analysis Guidance.

⁶ [LA 109 Geology and soils-web.pdf](#)

⁷ [LA 113 - Road drainage and the water environment \(standardsforhighways.co.uk\)](#)

⁸ [J35787 IEMA Land and Soils Guidance.pdf](#)

⁹ [The Control of Pollution \(Oil Storage\) \(England\) Regulations 2001 \(legislation.gov.uk\)](#)

¹⁰ [BS 6031:2009 | 31 Dec 2009 | BSI Knowledge \(bsigroup.com\)](#)

¹¹ [BS 8004:2015+A1:2020 | 31 Mar 2020 | BSI Knowledge \(bsigroup.com\)](#)

- Vehicles and equipment will be washed down in specially designated areas and areas of hard standing at access and egress points will be cleaned at appropriate intervals and wash-off into the ground or surface waters is prevented;
- Good site working practices for construction and maintenance workers will be enforced such that impacts from potential contamination are minimised. The contractor on-site will be responsible for implementing these requirements. This will include requiring the use of appropriate Personal Protective Equipment (PPE) and provision of welfare facilities to assist in maintaining good hygiene levels with segregation of certain activities (such as eating and drinking) from the designated dirty areas;
- Dust suppression measures will be outlined within the DCEMP such as ensuring sand and other aggregates are stored in bunded areas and, where possible, not allowed to dry out, dry sweeping of large areas should be avoided, and surfacing equipment should only be operated with any manufacturer's dust controls in place; and
- Any ponded water from excavations will be pumped into temporary (baffled) holding tanks within the site to remove suspended sediment before discharge to surface water or to the ground (subject to an appropriate consent, where required). If oil is observed in the water from the excavation, it will be diverted through temporary oil interceptors prior to being discharged. Dewatering activities may require a temporary abstraction licence, and this would need to be discussed with the EA prior to commencement of construction works.
- Any asbestos-containing materials will be managed in accordance with The Control of Asbestos Regulations (2012) which will prevent cross contamination of site soils during any demolition and construction works and protect workers from exposure to asbestos. Where required, materials would be handled by a specialist contractor.
- The Surface Water Drainage strategy (submitted in support of the planning application) is proposed to restrict surface water runoff to a greenfield QBAR calculated at 6.3 l/s for the sitewide area. Surface water storage systems are proposed across the site to help restrict surface water discharge to greenfield runoff rate. Use of blue/green roofs are maximised where possible to manage surface water run-off at source. External surfaces will be designed to direct surface water runoff to raingardens and bioretention areas where possible and tanked permeable paving will be implemented across the site. Additional below ground geocellular storage crates will be provided to further manage the peak discharge rate to greenfield runoff. The Site Surface Water system has been designed in accordance with SuDS Management Train outlined in the CIRIA SuDS Manual (section 26.8). Surface water mitigation measures will be implemented via SuDS features in order to reduce the surface water pollution hazard indices discharging from the site to the public combined sewers. Table 6.9 of the Drainage Impact Assessment confirms the post treatment pollution hazard indices and identifies that the proposed SuDS features will provide sufficient mitigation of the pollution hazard for discharging surface water to a watercourse.
- Foul water drainage is proposed to discharge via gravity to the local combined sewer outfalls within the site boundary. Foul water from basement level will be pumped to high level and discharge via gravity to the private drainage system. Thames Water have confirmed that there is sufficient capacity for foul water within the local sewer network for the Proposed Development.
- The implementation of good site working practices for maintenance workers as part of employer/ company health and safety responsibilities. With this implemented, it will ensure that impacts from potential contamination are minimised. This will include the use of appropriate PPE and any buried services will be constructed in corridors of clean material such that any future maintenance would be undertaken in clean soils, where possible.

Methodology for Defining Effects

Receptors and Receptor Sensitivity

- 13.13** The sensitivity or importance of Ground Conditions receptors has been established on the basis of their use, proximity to the site, existing quality or resource value and consideration of potential pollutant pathways; these are defined in Table 13.1.

Table 13.1 Definition of Receptor Sensitivity

Receptor Sensitivity	Receptor Type	Sensitivity Details
High	Soils and Geology	<ul style="list-style-type: none"> Geology is of rare and of national importance with little potential for replacement (e.g. geological SSSI, ASSI, National Nature Reserves (NNR)). Soils directly supporting a UK designated site (e.g. SSSI); No known area of contamination present (i.e., Greenfield).
	Hydrology	<ul style="list-style-type: none"> Water Framework Directive (WFD) catchment classification of 'High' or 'Good' with a hydrological connection/route to the surface water features.
	Hydrogeology	<ul style="list-style-type: none"> Principal Aquifer; Groundwater Source Protection Zone (SPZ) 1; Current aquifer chemical quality of 'Good'; and Shallow groundwater (i.e., 10mbgl or less).
	Human Health	<ul style="list-style-type: none"> Demolition and construction workers and service maintenance workers involved directly in groundworks; Future occupants with access to residential and public areas of soft landscaping; and Adjacent site users (residential dwellings and/ or sensitive users) within less than 100m of the Proposed Development.
	Proposed Planting*	<ul style="list-style-type: none"> Planting and areas of soft landscaping and exposed soils proposed within the site.
	Infrastructure	<ul style="list-style-type: none"> Residential – related infrastructure and services to be utilised by people.
Medium	Soils and Geology	<ul style="list-style-type: none"> Geology is of regional importance with limited potential for replacement (e.g. RIGS). Soils supporting non-statutory designated sites (e.g. Local Nature Reserves (LNR), LGS's, Sites of Nature Conservation Importance (SNCIs)) Potential areas of contamination present (i.e., Brownfield).
	Hydrology	<ul style="list-style-type: none"> WFD catchment classification of 'Moderate'.
	Hydrogeology	<ul style="list-style-type: none"> Secondary A or B Aquifer; Groundwater SPZs 2 or 3; and Current aquifer chemical quality of 'Good (deteriorating)'.
	Human Health	<ul style="list-style-type: none"> Demolition and construction workers and service maintenance workers involved around groundworks; Future occupants only utilising commercial land-uses, car parking or other areas of hardstanding; and Adjacent site users (residential dwellings and/ or sensitive users) between 100m and 500m of the Proposed Development.
	Infrastructure	<ul style="list-style-type: none"> Commercial-related infrastructure, where services are not required to be utilised by people.
Low	Soils and Geology	<ul style="list-style-type: none"> Geology is of local importance/interest with potential for replacement (e.g. Non designated geological exposures, little or no local interest). Soils are previously developed land formerly in 'hard uses' with little potential to return to agriculture and the soils supporting non-designated notable or priority habitats. Known areas of contamination present (i.e., Brownfield with contamination).

Receptor Sensitivity	Receptor Type	Sensitivity Details
	Hydrology	<ul style="list-style-type: none"> WFD catchment classification of 'Poor' or 'Bad'. With no clear hydrological connection/route to the surface water features.
	Hydrogeology	<ul style="list-style-type: none"> Unproductive Strata, i.e. Non-Aquifer; Not located under groundwater SPZ; and Current aquifer chemical quality 'poor' or 'poor (deteriorating)'.
	Human Health	<ul style="list-style-type: none"> Demolition and construction workers and service maintenance workers on-site but not involved with any groundworks; Land with no access for people; and Adjacent site users (residential dwellings and/ or sensitive users) more than 500m away from of the Proposed Development.
	Proposed Planting*	<ul style="list-style-type: none"> On-site locations where there are no areas of planting/landscaping or exposed soils proposed.
	Infrastructure	<ul style="list-style-type: none"> Infrastructure with no requirement for services (such as highways, railways).
*Proposed planting has only been considered as being either high sensitivity or low sensitivity because it's either present or not.		

Magnitude of Impact

- 13.14** Evaluation of the magnitude of the potential changes in ground conditions has been broadly based on the established methodology from LA 109 Geology and Soils¹² (Highways England; 2019), LA 113 Road drainage and the water environment (Highways England; 2020)¹³, Institute of Environmental Management & Assessment (IEMA) Guide: A New Perspective on Land and Soil in Environmental Impact Assessment and the TAG Environmental Impact Assessment methodology as detailed in Table 13.2.

Table 13.2 Methodology for Assessing Magnitude

Magnitude of Impact	Criteria for Assessing Impact
Major	Total loss or major / substantial alteration to key elements / features of the baseline (pre-development) conditions such that the post-development character/ composition/ attributes will be fundamentally changed. An acute or chronic adverse effect on human health, defined as 'significant harm' by the <i>Environment Protection Act 1990</i> Part 2A Contaminated Land Statutory Guidance ¹⁴ .
Moderate	Loss or alteration to one or more key elements / features of the baseline conditions such that post development character/ composition/ attributes of the baseline will be materially changed. An acute or chronic adverse effect on human health, but not likely to be defined as 'significant harm'.
Minor	A minor shift away from baseline conditions. Change arising from the loss/ alteration will be discernible/ detectable. The underlying character / composition/ attributes of the baseline condition will be similar to the pre-development circumstances/ situation. A preventable, non-permanent adverse effect on human health.
Negligible	Very little change from baseline conditions. Change barely distinguishable, approximating to a 'no change' situation. No adverse effect on human health or the environment.

Defining the Effect

- 13.15** The potential effects have been identified through consideration of both the sensitivity of the receptor and the magnitude of the impact and given a significance scale of Negligible, Minor, Moderate or Major based on the matrix in Table 13.3 below.

Table 13.3 Effect – Scale Matrix

Magnitude of Impact	Sensitivity of Receptor		
	High	Medium	Low
Major	Major	Moderate to Major	Minor to Moderate
Moderate	Moderate to Major	Minor to Moderate	Minor
Minor	Minor to Moderate	Minor	Negligible to Minor
Negligible	Negligible	Negligible	Negligible

- 13.16** The nature of the effect is then defined as either beneficial or adverse. Effects that are adverse are those that have a detrimental effect on existing baseline conditions and/ or human health. Effects that are beneficial are those that result in an improvement on existing baseline conditions and/ or human health. This is determined from referring to the tables above.
- 13.17** It is important to consider the geographic extent of the effect, and this is defined as being one of the following:
- Local: which are those affecting the site and neighboring receptors;
 - District: which are those affecting receptors within the local planning authority boundary (i.e., LBS);
 - Regional: which are those affecting the region of London; or
 - National: which are those that could affect different parts of the country.
- 13.18** The duration of each effect is considered as either being 'temporary' (i.e., the effects last the duration of the demolition and construction works and then would no longer be applicable) or 'permanent' (i.e., the effect would last for the duration of the operational lifetime of the Proposed Development or longer).
- 13.19** Each effect considered is defined as being either 'short-term', 'medium-term' or 'long-term'; defined as the following:
- Short-term: typically, being from a few months up to three years in duration;
 - Medium-term: this would cover a duration of around three years to ten years; and
 - Long-term: this would cover a duration in excess of ten years.
- 13.20** Each considered effect is defined as being either a 'direct' or an 'indirect' effect on the receptor. A direct effect is one which would result without any intervening factors and an indirect effect is one which would not be caused directly or would result from other factors.
- Categorising Likely Significant Effects**
- 13.21** Where the predicted effects are Minor, Moderate or Major Adverse (or Beneficial), these are considered to be significant. Mitigation measures have been identified where possible to eliminate or reduce adverse effects to an acceptable level. The residual effects (post mitigation) are discussed in the final subsection of this chapter. Effects that are categorised as Negligible are not considered to be significant.

¹² [LA 109 Geology and soils-web.pdf](#)

¹³ [LA 113 - Road drainage and the water environment \(standardsforhighways.co.uk\)](#)

¹⁴ DEFRA (1990) *Environmental Protection Act 1990: Part 2A - Contaminated Land Statutory Guidance* ([publishing.service.gov.uk](#))

BASELINE CONDITIONS

Soils and Geology

Historical Potentially Contaminative Land Uses

- 13.22** A review of the Phase 1 LCA (**ES Volume 3, Appendix: Ground Conditions and Land Contamination – Annex 2**) confirmed that 1870 OS mapping showed open park spaces took up the northern, north-eastern and south-western extents of the site, 'Avenue House' was located within the eastern extent of the site and a number of large houses were located along the south and south-eastern extents of the site. There were residential houses and larger unnamed buildings in the north-west.
- 13.23** By the 1890s, new residential houses had been developed along the eastern boundary of the site and along the south-western and north-western extents of the site and many of the residential buildings had been demolished and new larger buildings developed.
- 13.24** By the 1950s, a building in the north-eastern corner of the site, described as 'Peckham Garage' and an electricity substation, had been shown along the eastern boundary.
- 13.25** By the 1960s, a car park was located in the centre of the site and, by the 1970s, the residential houses along the eastern boundary were demolished.
- 13.26** By the mid- 1980s, the large building in the eastern extent and some buildings within the southern extent of the site had been demolished and redeveloped into 'The Aylesham Centre' with associated car park. An electricity substation is shown in the south-western part of the site on 1995 mapping.
- 13.27** Mapping from the early 2000s shows that Peckham Garage in the north-eastern extent of the site has been demolished to accommodate for the extension of the Aylesham Centre to the east and existing car park to the south. A petrol station is shown to be located within the south-eastern corner of the site by 2003 and this is still present on site.
- 13.28** In summary, the surrounding area is urbanised from as early as 1870s, whereby residential, commercial and industrial land uses surround the site.
- 13.29** When reviewing the Groundsure Report (**ES Volume 3, Appendix: Ground Conditions and Land Contamination – Annex 2**), there are no records of historical potentially contaminative industrial land uses located on site. However, there are 34 potentially contaminative land uses within 250m radius of the site that include depots, police stations, railway stations/buildings/sidings and nurseries. The closest of these is located 15m west of the site and is referred to as a 'Tramway Depot'.
- 13.30** There are no records of historical tanks on site; there are, however, two records of unspecified historical tanks located within a 250m radius of the site, the closest of which is located 214m south of the site.
- 13.31** There are three records of historical energy features on site, described as electricity substations which are shown to be located within the south-western extent and far eastern boundary of the site. There are a further 28 records located within 250 m of the site relating to electricity substations.
- 13.32** There are eight records of historical garages on site described as 'London Transport Garage' whose extents cover the northern, eastern and western extents of the site. There are eight other historical garages located within 250m of the site, the closest of which is 38m west of the site.
- 13.33** There are no records of any historical petrol stations or historical military located on site or within a 250m radius. Although there is currently an active petrol station situated on the site.
- 13.34** Similarly, the Groundsure reports confirm that there are no records of any historical landfill sites or waste sites within the site or within a 250m radius of it.
- 13.35** Based on the historical land uses that occupied the site and surrounding area, there is the potential that asbestos, heavy metals, Polycyclic Aromatic Hydrocarbons (PAHs), Total Petroleum Hydrocarbons (TPH),

VOCs, sulphates, phosphates, solvents and degreasing agents may be present on-site and therefore are considered as potential contaminants.

- 13.36** According to the Groundsure Report (**ES Volume 3, Appendix: Ground Conditions and Land Contamination – Annex 2**), the site is in an area where between 1% - 3% of properties are above the Action Level for radon; however, no radon protection measures are considered to be necessary for the Proposed Development in accordance with Building Control Regulations in England.

Current Potentially Contaminative Land Uses

- 13.37** The site currently comprises of Aylesham Shopping Centre, a Morrisons supermarket, car park and petrol station. As reported within the Phase 1 LCA (**ES Volume 3, Appendix: Ground Conditions and Land Contamination – Annex 2**), a site walkover was undertaken in April 2022 although access into the buildings was restricted at the time of the visit; however, the following site observations were made:
- An electricity substation was located within the north-eastern corner along the site boundary. This looked to be well managed and contained;
 - A plant room is located in the north-eastern corner of the site, this was well managed with no evidence of any leaks or spillages;
 - All roads and entrances were well maintained with little evidence of any hydrocarbon staining on any hardstanding areas; and
 - The waste compound and storage area located at the entrance of the site in the north-western corner contained bins and skips and was well kept and maintained.
- 13.38** It should be noted that the site conditions have not changed since the site walkover was undertaken and therefore the Phase 1 LCA conclusions are considered to remain valid.
- 13.39** Given that the current land uses comprise of a petrol station and car park there is a likelihood that hydrocarbons to be present on site. As well as this, the presence of underground tanks on site cannot be ruled out and are considered as a potential source of contamination on site.
- 13.40** According to the Groundsure report, there are four records of recent industrial land uses on site including a petrol station and car wash (south-eastern corner of the site), an electricity substation (south-western extent) and consumer products specified as Specsavers Hearsare (western boundary), although this land use is not considered contaminative and therefore is not considered further within this assessment. In addition, there are 33 other records of recent industrial land uses within a 250m radius of the site. These are described as electricity substations, bus station, vehicle repair and servicing, telecommunication features and rail station.
- 13.41** There are three licensed pollutant releases (Part A(2)/B) on site. Two of these permits are related to the unloading of petrol into storage at service stations and the other permit is for 'dry cleaning' within the Morrison supermarket building.
- 13.42** There are no records of any current or active landfill sites on site or within 250m radius of the site. Similarly, there are no records of any licensed industrial activities, pollution incidents and dangerous substances on site or in the immediate surrounding area.
- 13.43** The soils on site are previously developed land formerly in 'hard uses' with little potential to return to agriculture and the soils are not supporting any notable or priority habitats.

Unexploded Ordnance (UXO)

- 13.44** Zetia produce unexploded bomb risk maps for sites within the UK and a review of these has confirmed that the site is located within an area with a high risk of Unexploded Ordnance (UXO) (**ES Volume 3, Appendix: Ground Conditions and Land Contamination – Annex 2**). From reviewing historical maps, the northern and north-eastern extents of the site show ruins on 1950 mapping which indicates that the area was most

likely subject to World War II (WWII) bombing. However, it can be considered that the risk of UXO on site has been reduced as the site has been redeveloped since WWII.

Asbestos

- 13.45** A Phase 1 Environmental Assessment (Delta-Simons) was undertaken for the site in March 2021 by a previous Applicant for the site (refer to the planning history within **ES Volume 1, Chapter 1: Introduction**). The Phase 1 Environmental Assessment states that asbestos containing materials (ACMs) are understood to be located within buildings on site and that various asbestos surveys have been undertaken on site over the recent years with an asbestos register reviewed annually and maintenance/removal work carried out as necessary. The most recent asbestos re-inspection survey was conducted in 2020 for the site (Tetra Consulting, 2020) which recommended eight areas of ACMs for continued management. These areas mainly comprise of flooring in the form of thermoplastic tiles/vinyl flooring and one area with containing bituminous product within a sink unit.

Geology

- 13.46** According to the British Geological Survey (BGS) online viewer, the entire site is underlain by the superficial deposits of the Interglacial Lacustrine Deposits comprising of clay and silt. The entire site is further underlain by the bedrock geology of the Lambeth Group comprising of clay, silt and sand.
- 13.47** From reviewing the BGS 1:50,000 map series England and Wales Sheet 270 for South London, it shows the site to be located in an area of previously worked ground. In addition, the Groundsure report identifies that the area of worked ground appears to be located within the southern extent of the site. The BGS map also shows that the bedrock geology of the Lambeth Group is further underlain by the Thanet Sand Formation and Upper, Middle and Lower Chalk Group Formations.
- 13.48** BGS hold historical borehole records for the UK and there are two available borehole records located on site, the first is located in the far north-western corner of the site (TQ37NW138) which was drilled to a depth of 53.64m. Groundwater was encountered within this borehole at a depth of 8.5m below ground level (bgl) and had the following geological sequence:
- Likely made ground (approximately 3.4m thick);
 - River drift deposits (Interglacial Lacustrine Deposits) (approximately 2.4m thick);
 - Woolwich and Reading beds (Lambeth Group) (approximately 12.5m thick);
 - Thanet sand formation (approximately 10.0m thick); and
 - Upper chalk (approximately 25.5m thick).
- 13.49** The second borehole record is located along the northern boundary of the site (TQ37NW387) and was drilled to a depth of 15.24m and indicates that made ground is approximately 0.30m thick which is then underlain by clay and sands.
- 13.50** The varying thicknesses of made ground could be in relation to the site being underlain by previously worked ground and suggests historical infilling has been undertaken at the site and this may represent a potential source of ground gases on-site and therefore the presence of ground gases cannot be ruled out.
- 13.51** When reviewing Natural England Magic Map viewer¹⁵ the site is not located within or within a 5km radius of a rare and or designation of national importance with little potential for replacement (e.g. geological SSSI, ASSI, National Nature Reserves (NNR)).

Hydrogeology

Aquifer Classification

- 13.52** The superficial Interglacial Lacustrine Deposits are classified by the EA as 'Unproductive Strata' and these are defined as "*rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow*".
- 13.53** The Lambeth Group and Thanet Sands are classified by the EA as Secondary A Aquifer and these rock types are described as "*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*".
- 13.54** The underlying chalk bedrock geology is classified as Principal Aquifer and is defined by the EA as "*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*".

Groundwater Depths

- 13.55** On review of the BGS historical borehole log, the borehole in the far north-western corner of the site (TQ37NW138) recorded groundwater at a depth of 8.5m within the Lambeth Group.
- 13.56** Ground investigations have been carried out for local developments as detailed within the Basement Impacts Assessment (**ES Volume 3, Appendix: Ground Conditions and Land Contamination – Annex 3**) and selected data is available and has been reviewed. Groundwater was recorded to the north of the site at a level of between 3m Above Ordnance Datum (AOD) to 4.5m AOD, some 1.74m to 3.93m below ground level, however these are likely perched water levels local to those positions; regional groundwater from deeper boreholes is more likely to be at ~0m AOD based on local data.
- 13.57** On review of the borehole data, groundwater is likely to be present in the Lambeth Group, Thanet Sands and underlying chalk and there is the potential for groundwater within these units to be in hydraulic continuity.
- 13.58** The site is located within the Greenwich Tertiaries and Chalk groundwater body which had a status of 'poor' in 2019.
- 13.59** The site is not located within a groundwater Source Protection Zone (SPZ).

Hydrology

Hydrological Features

- 13.60** From a review of EA and Ordnance survey mapping, the closest 'main river'⁷ is the Ravensbourne River which is located approximately 3.0km east of the site. The second closest 'main river' is the River Thames which is located approximately 3.2km north of the site.
- 13.61** A 'lost watercourse'⁸ is located approximately 370m south of the site, known as the 'River Peck', which is culverted / routed underground.
- 13.62** The site falls within the Water Framework Directive (WFD)⁹ London surface water management catchment. This is made up of 47 water bodies most of which had an ecological status of 'moderate' in 2019.

¹⁵ [MAGIC \(defra.gov.uk\)](https://magic.defra.gov.uk/)

Human Health

- 13.63** As detailed above, there is the potential for existing contamination to be present within the soils, geology and controlled waters (hydrology and hydrogeology) on-site due to the previous and current land uses on-site and within the surrounding area.
- 13.64** Due to the nature of the Proposed Development, demolition and construction workers will be involved directly within the groundworks.
- 13.65** The closest existing residential dwellings are located along the northern, eastern and southern boundaries of the site.

Infrastructure

- 13.66** The Utilities Report (Plowman Craven; 2018, included within **ES Volume 3, Appendix: Ground Conditions and Land Contamination – Annex 4**) for the site has been reviewed and this confirms there are a large number of utility networks in the area around the Aylesham Centre however no significant main networks pass through the site. Based on the Utility Water search provided by Thames Water, all mains water lines distribute around the Proposed Development and within the public realm. Thus, no diversion works to the Thames water main lines will be required. Based on the Utility Water search all mains gas lines distribute around the Proposed Development and within the public realm. Thus, no diversion works to the main lines will be required.

Conceptual Site Model

- 13.67** The Phase 1 LCA (**ES Volume 3, Appendix: Ground Conditions and Land Contamination – Annex 2**) includes an outline conceptual site model (CSM) based on the source-pathway-receptor approach described in CLR11. The CSM is summarised below.

Potential Contamination Sources

- 13.68** Following a review of the baseline conditions and the Groundsure Report, the main sources of contamination that have been identified at the site or in proximity are as follows:
- Historical contamination within the soils and Made Ground and within groundwater on-site as a result of historical land uses on and off-site such as the electricity substations, garages, depots and yards railway infrastructure, tanks which could result in contaminants such as asbestos, heavy metals, sulphates, phosphates, hydrocarbons and solvents to be present in the soils and groundwater;
 - Contamination as a result of the current land use on site (car park, electricity substation, petrol station) which has the potential to contain contaminants such as asbestos, heavy metals, PAHs, PCBs and other hydrocarbons;
 - Potential for ground gases / vapours to be present on-site within the soils and shallow groundwater due to the presence of Made Ground and previously worked ground on the site;
 - Presence of UXO to be present on-site due to the site location;
 - Historical and current electrical substation in the eastern and south-western extent of the site has been reported, there is the potential for PCBs to be present within the vicinity of the substations; and
 - Off-site potential contamination sources include railway infrastructure to the west as a source of TPH, PAHs, heavy metals, and asbestos.

Potential Contamination Pathways

- 13.69** The potential contamination pathways identified, both within the site and surrounding area, that are considered relevant in relation to the site are as follows:
- Horizontal and vertical migration of contaminants within the permeable strata of the Made Ground, Lambeth Group, Thanet Sands and Chalk due to construction works (i.e. piling). Construction information indicates that pile depth for the Proposed Development is deeper 15m below ground level and, therefore, piling would penetrate through the Made Ground and less permeable interglacial superficial deposits and into the underlying Lambeth Group which is a permeable aquifer and is thought to be hydraulically connected to the underlying Thanet Sands and Chalk and therefore vertical migration is considered a viable pathway. Leaching from potential contamination in the soils is considered unlikely to impact the groundwater. Groundwater is expected to be within the Lambeth Group and although it is considered to be hydraulically connected to the underlying sands and chalk, the superficial deposits located above the Lambeth Group are considered relatively impermeable and so would act as a barrier for any contamination leaching from the soils into the groundwater;
 - Migration of contaminants through surface water runoff either directly or via the drainage system;
 - Demolition and construction workers and future site users and service staff as well as building materials and infrastructure (services and water mains) coming into direct contact (dermal, ingestion and inhalation) with potentially contaminated soils, vapours (including chemical vapours), surface water or shallow groundwater;
 - Adjacent site users ingesting / inhaling potentially contaminated windblown dust during demolition/construction;
 - Buildings and infrastructure being affected by an accumulation and migration of ground gas;
 - Construction workers, service repair workers and future site users coming into direct contact with migration and accumulation of ground gases and vapours via permeable soils and services;
 - Plant / root uptake of contamination in soft landscaped areas; and
 - Building materials and humans coming into direct contact with UXO.

RECEPTOR SENSITIVITY

Existing Receptors

- 13.70** Table 13.4 below identifies the existing receptors on and surrounding the site and defines their sensitivity to environmental impact.

Table 13.4 Existing Site Receptors and Sensitivity

	Receptors	Sensitivity
Soils and Geology	Superficial Deposits (Interglacial Lacustrine Deposits)	Low – from the assessment of baseline conditions at the site, it is concluded that there is likely to be contamination present within the superficial deposits underlying the site.
	Bedrock Geology (Lambeth Group, Thanet Sands and Chalk)	Low – from the assessment of baseline conditions at the site, it is concluded that there is likely to be contamination present within the bedrock geology underlying the site.
	Soils and Made Ground (including planting)	Low – from the assessment of baseline conditions at the site, it is concluded that there are likely contamination present within the soils and made ground on site given the industrial and commercial historic and current nature of the site. As well as this, the soils are previously developed land formerly in 'hard uses' with little potential to return to agriculture and the soils do not support any notable or priority habitats.
Hydrology	Surface Water (River Peck culverted 370m north)	Low – Although the site is located within the Thames Middle operational catchment which is part of the London Management Catchment which had a WFD status of 'Moderate' in 2019. The

Receptors		Sensitivity
		closest watercourse the site is the culverted 'River Peck' located 370 m south and given the distance to the site and that it is culverted there is no clear hydraulic connection to the watercourse,
Hydrogeology	Groundwater (within Lambeth Group)	High – there is groundwater recorded within the Lambeth Group around 8m bgl, as well as this the site is underlain by both Secondary A Aquifers and Principal Aquifer (at depth).
Human Health	Construction Workers and Service Maintenance Staff	High – Demolition and construction workers and service maintenance workers involved directly in groundworks
	Adjacent Site Users	High – The closest residential dwellings are located immediately to the north of the site.
Infrastructure	Services and building infrastructure	High – infrastructure and services to be utilised by people.

Introduced Receptors

- 13.71** Table 13.5 below identifies potential new receptors and defines their sensitivity to potential impacts from the Proposed Development.

Table 13.5 Introduced Site Receptors and Sensitivity

Receptors		Sensitivity
Human health	Future Site Users and service maintenance staff	High – Future occupants will have access to public areas of soft landscaping and gardens.
Proposed / Introduced Planting	Proposed Planting	High – Areas of soft landscaping, exposed soils and planting are proposed on-site.
Infrastructure	Infrastructure	High – Residential – related infrastructure and services to be utilised by people.
	Building Materials and Infrastructure	High – New building materials and infrastructure installed as part of the Proposed Development and new building foundations.

POTENTIAL EFFECTS

Demolition and Construction

- 13.72** There are six potentially significant effects on ground conditions during the demolition and construction period of the Proposed Development:
- Potential for surface water, groundwater and soil contamination from general construction and demolition-related activities;
 - Potential remobilisation of any existing contamination and creation of contaminant pathways via leaching and/or migration during demolition and construction, such as piling for construction activities;
 - Potential for demolition / construction workers coming into direct contact with contaminated soils;
 - Potential for off-site users inhaling, ingesting or coming into dermal contact with windblown contaminated dust during construction;
 - Potential ground gas generation /migration and / or accumulation within lower levels of the development and exposure to vapours and nuisance odours and its potential impact on construction workers and infrastructure and adjacent site users; and
 - Potential for building materials and infrastructure, construction/demolition workers and adjacent site users to be exposed to UXO and potential leaching/pollution from existing UXO on soils, hydrogeology and hydrology.
- 13.73** The potential effects as a result of the demolition and construction works associated with the Proposed Development are considered to be local, temporary, short term and direct.

Potential for Surface Water, Groundwater and Soil Contamination from General Construction Related Activities

- 13.74** Demolition and construction vehicles and general construction activities give rise to the potential for groundwater, surface water and soils to become contaminated with chemical contaminants such as hydrocarbons, chemicals and physical contaminants such as waste, silt and other construction materials. There is also the potential for the redistribution of contaminated material to other parts of the site via construction plant.
- 13.75** It is established that foundation piles will penetrate to an approximate depth of 15m bgl and would penetrate through the less permeable Glacial Deposits and into the Lambeth Group where the groundwater is located. Given that the Lambeth Group is a Secondary A Aquifer and the presence of the underlying bedrock geology of the Thanet Sands and chalk aquifers, there is a risk of the creation of new conduit contaminant pathways resulting from piling and other construction-related activities.
- 13.76** The closest watercourse is located 370m south of the site and is a culverted 'lost watercourse' known as the River Peck. Given that it is culverted and is at distance from the site, it is considered that the risk of this waterbody being exposed to contamination is low. It is expected that any contamination from general construction-related activities via untreated surface water runoff and overland flow prior to any mitigation would enter the drainage system prior to entering the waterbody.
- 13.77** However, with the implementation of the standard mitigation measures listed within the '*Embedded Mitigation*' section of this ES chapter, it is considered that the potential effects of contamination from general construction-related activities will be minimised. These measures will ensure that the risk of contamination from construction vehicles and equipment is reduced, and construction works are in accordance with suitable regulations includes Control of Pollution (oil storage) Regulation 2001. This will be stipulated within the DCEMP that can be controlled by a suitable worded planning condition.
- 13.78** With the implementation of standard mitigation measures, the magnitude of impact of the potential for surface water, groundwater and soil contamination from general construction related activities is considered to be Negligible for superficial deposits and bedrock geology (low sensitivity), for hydrogeology (high sensitivity) and for hydrology (River Peck) (low sensitivity). This has resulted in a Negligible (not significant) effect and therefore no additional mitigation measures are required.

Potential Remobilisation of any Existing Contamination and Creation of Contaminant Pathways via Leaching and/or Migration During Demolition and Construction, such as Piling for Construction Activities

- 13.79** As established in the '*Baseline Conditions*' section of this ES chapter, it is considered likely that contamination is present within the Made Ground, soils and superficial deposits on site associated with the historical and current land uses that have occupied the site and surrounding area (such as but not limited to the petrol station on site).
- 13.80** Demolition and construction works would disturb the ground at the site, from activities such as localised site levelling, excavation of foundations including for the proposed basement, piling and construction of drainage routes, all of which have the potential to remobilise existing contamination within the soils and hydrogeology and through drainage routes and services. It is established that foundation piles will penetrate to an approximate depth of 15m bgl and would penetrate through the Made Ground and impermeable superficial deposits and into the permeable Lambeth Group, beneath this is the permeable Thanet Sands and chalk aquifers and therefore there is a risk of the creation of new conduit contaminant pathways resulting from piling and other construction-related activities.
- 13.81** The Proposed Development includes redeveloping the site and relocating the supermarket to the eastern part of the site and the proposals includes a new single storey basement to serve the supermarket in the east of the site. The new basement will be larger in extent than the existing basement and will have a Finished Floor

Level (FFL) of around 3.8m AOD (approximately 4.9m bgl). Given that local site investigation data indicates the groundwater table is at approximately 0m AOD (8.5 m below ground level) the proposed basement is not considered to extend beneath the water table surface. Although the piling and excavation works associated with the basement and site construction could encounter groundwater.

- 13.82** This creates a potential risk of contamination remobilising directly into groundwater during these works. However, in line with standard best practice, any encountered groundwater during construction would be managed via sumps and pumps. Any water encountered during the basement works will be collected on-site to be disposed of off-site prior to this all water will be tested for contamination and any contaminated water will be treated or disposed of to foul system for treatment. If water is not contaminated, then it can be discharged back to either groundwater or surface water subject to the relevant environmental controls and any required licences.
- 13.83** It is also considered more likely that during the demolition and construction works, as the soils are exposed, that there is a risk that leaching of contaminants and/or infiltration of rainwater could remobilise any contamination within the topsoil and result in contamination of the underlying Made Ground.
- 13.84** Should leaching from contamination in soils occur, this is considered unlikely to impact the groundwater as groundwater is considered to be present within the Lambeth Group which lies beneath the interglacial deposits which are relatively impermeable acting as a barrier for contaminants to leach to the groundwater.
- 13.85** When considering the above, it is concluded that the magnitude of impact for the potential remobilisation and creation of contaminant pathways to groundwater and the underlying aquifers via horizontal and vertical migration is considered to be Moderate. As hydrogeology is a high sensitivity receptor, the effect is considered to be Moderate to Major Adverse (significant) and further mitigation measures are required.
- 13.86** It is concluded that the magnitude of impact for remobilisation contamination within the topsoil via leaching is considered to be Minor. As soils are a low sensitivity receptor, the effect is considered to be Negligible to Minor Adverse (significant) for soils and so further mitigation measures are required.
- 13.87** The closest watercourse is located 370m south of the site and is a culverted 'lost watercourse' known as River Peck. Given that it is culverted and its distance to the site, it is considered that the risk of this waterbody being exposed to any remobilised contamination is ruled out. Therefore, the magnitude of impact for the potential remobilisation and creation of contaminant pathways to the River Peck (hydrology) (low sensitivity) via surface water runoff is considered to be Negligible, effect is considered to be Negligible (not significant) for hydrology.

Potential for Demolition and Construction Workers Coming into Direct Contact with Contamination

- 13.88** As set out within the 'Baseline Conditions' section of this ES chapter, soil contamination on-site cannot be ruled out due to the presence of historic and current potentially contaminative land uses within the site and surrounding area, which can be a source of a wide range of contaminants on-site. This includes the likes of asbestos, hydrocarbons, heavy metals, Polycyclic Aromatic Hydrocarbons (PAHs), Total Petroleum Hydrocarbons (TPH), VOCs, sulphates, phosphates, solvent and degreasing agents.
- 13.89** During the demolition and construction of the Proposed Development, workers will disturb the ground during excavations for foundations, site levelling and construction of services and drainage routes. This could result in workers inhaling, ingesting or coming into dermal contact with potentially contaminated soils, asbestos fibres and/ or dust from on and off-site sources. Demolition and construction workers could also come in contact with potentially contaminated vapours, surface water or underground sewers on-site. This exposure could result in an adverse effect on workers' health and well-being.
- 13.90** However, with the implementation of the standard mitigation measures listed within the 'Embedded Mitigation' section of this ES chapter, it is considered that the effect of potential for demolition and construction workers coming into direct contact with contamination will be minimised. This is because good site working practices for construction and maintenance workers will be enforced such that impacts from potential contamination

are minimised. The contractor on-site will be responsible for implementing these requirements. This will include requiring the use of appropriate Personal Protective Equipment (PPE) and provision of welfare facilities to assist in maintaining good hygiene levels with segregation of certain activities (such as eating and drinking) from the designated dirty areas.

- 13.91** With the implementation of standard mitigation measures, the magnitude of impact of the potential for demolition and construction workers coming into direct contact with contamination is considered to be Negligible for human health (high sensitivity). This has resulted in a Negligible (not significant) effect and therefore no additional mitigation measures are required.

Potential for Adjacent-Site Users Inhaling, Ingesting or Coming into Dermal Contact with Windblown Contaminated Dust

- 13.92** Due to the historical and current land uses on-site and within the surrounding area, it is considered that the site could potentially be contaminated with the following (but not limited to) heavy metals, hydrocarbons and asbestos.
- 13.93** Contaminated dust could be generated within the site if exposed during the demolition and construction works, particularly during dry and/ or windy weather. Commuters and occupants of adjacent sites have the potential to be impacted by dust generation. There is also a risk to plants within gardens as well as pets if not properly managed. Demolition and construction works will disturb the ground and off-site users could potentially inhale, ingest or come into dermal contact with potentially contaminative windblown contaminated dust.
- 13.94** However, with the implementation of the standard mitigation measures listed within the 'Embedded Mitigation' section of this ES chapter, it is considered that the effect of potential for adjacent-site users inhaling, ingesting or coming into dermal contact with windblown contaminated dust will be minimised. Dust suppression measures will be outlined within the DCEMP such as ensuring sand and other aggregates are stored in bunded areas and, where possible, not allowed to dry out, avoid dry sweeping of large areas and ensure surfacing equipment is only operated with any manufacturer's dust measurements in place.
- 13.95** With the implementation of standard mitigation measures, the magnitude of impact of the potential for adjacent-site users inhaling, ingesting or coming into dermal contact with windblown contaminated dust is considered to be Negligible for human health (high sensitivity). This has resulted in a Negligible (not significant) effect and therefore no additional mitigation measures are required.

Potential Ground Gas Generation / Migration and / or Accumulation within Lower Levels of the Development and Exposure to Vapours and Nuisance Odours and its Potential Impact on Construction Workers and Infrastructure and Adjacent Site Users

- 13.96** As reported above, there are varying thicknesses of made ground on site and this is likely to be the result of historical infilling which has been undertaken at the site and this may represent a potential source of ground gases and therefore the presence of ground gases cannot be ruled out. Although, it should be noted that the presence and possible excavation of a basement level beneath at least part of the site and the excavation of the eastern area of the site for the installation of underground storage tanks at the petrol filling station may have removed some of made ground on site and could therefore limit the migration of gases. But this risk cannot be completely ruled out.
- 13.97** Excavation of contaminated soils and groundwater on-site could give rise to the exposure of nuisance odours from contaminants such as hydrocarbons and have an adverse effect on demolition and construction workers and both commercial and residential adjacent site users.
- 13.98** As well as this, the Proposed Development includes relocating the basement area on site and therefore there is a risk associated with ground gas accumulating within the basement.

- 13.99** Based on the above, the magnitude of impact of the potential for ground gas contamination as well as from volatile and semi-volatile organic compounds and chemicals and exposure to nuisance odours and vapours is considered to be Minor. Construction and demolition workers (human health) and services and building infrastructure are classified as a high sensitivity receptor, therefore the effect is considered to be Minor to Moderate Adverse (significant) and so further mitigation measures are required.
- 13.100** Adjacent site users (both commercial and residential site users), who are located further away from the site, are classified as high sensitivity receptors and therefore the effect of exposure to odours and nuisance vapours is also considered to be Minor to Moderate Adverse (significant) and so further mitigation measures are required.
- 13.101** There is also considered to be a risk to building materials and infrastructure from ground gas exposure and accumulation and therefore the magnitude of impact of the potential for ground gas contamination and exposure to nuisance odours and vapours is considered to be Minor on building material and infrastructure (high sensitivity). The effect is therefore considered to be Minor to Moderate Adverse (significant) and so further mitigation measures are required.

Potential for Building Materials / Infrastructure and Demolition and Construction Workers and Adjacent Site Users to be Exposed to UXO and Potential Leaching / Pollution from Existing UXO on Soils, Hydrology and Hydrogeology

- 13.102** The site is located within an area with a high risk of UXO and from reviewing historical maps, the northern and north-eastern extents of the site shows ruins on 1950 mapping which indicates that the area was most likely subject to WWII bombing.
- 13.103** However, it is noted that the site has been redeveloped since WWII and has included the presence of a basement, therefore the risk of encountering any UXO in the future during any groundworks will be reduced.
- 13.104** Notwithstanding this, the risk cannot be entirely ruled out and, therefore, any demolition and construction workers, adjacent site users and existing building material could become exposed to UXO during the demolition and construction works and the potential severity of this could be fatal if not managed appropriately.
- 13.105** There is also a potential risk of pollution occurring should a UXO incident occur, as well as potential leaching and pollution from the UXO into soil and groundwater (subject to how deep the UXO is located).
- 13.106** Given that the closest watercourse is located 370m south of the site and is a culverted 'lost watercourse' known as River Peck. It is considered that the risk of this waterbody being exposed to UXO contamination is low.
- 13.107** Therefore, the magnitude of impact of the potential for UXO exposure to human health and building materials and infrastructure is considered to be Major. As construction and demolition workers, building materials and infrastructure are classified as high sensitivity receptors, the effect is considered to be Major Adverse (**significant**) and so further mitigation measures are required.
- 13.108** The magnitude of impact of the potential for UXO leaching and pollution on soils and groundwater is considered to be Minor. As soils are classified as a low sensitivity receptor, the scale of effect is considered to be Negligible to Minor Adverse (significant) on soils and so further mitigation measures are required. Hydrogeology (groundwater) is classified as a high sensitivity receptor and the scale of effect is therefore considered to be Minor to Moderate Adverse (significant) and so further mitigation measures are required.

Phasing

- 13.109** It is important to consider any potential contamination impacts associated with the construction phases (as detailed in **ES Volume 1, Chapter 5: Demolition and Construction**) of the Proposed Development on sensitive receptors such as site users.

- 13.110** The Proposed Development will be delivered in two main phases of demolition and construction. The current expectation is that Phase 1 enabling works will begin in Q2 2026 and will end in Q2 2030. Phase 2 will begin in Q2 2030 and end in Q4 2034. It can be expected that once Phase 1 is completed and in occupation, Phase 2 is likely to still be in construction. The potential contamination impacts associated with this will be the same as the construction impacts considered above.
- 13.111** There will be co-ordination between different development areas and communication between each area will be undertaken to ensure that all contaminant pathways are considered, and appropriate measures are in place to avoid adverse impacts on receptors.

Completed Development

- 13.112** There are five potentially significant effects on ground conditions during the operation of the Proposed Development, these are as follows and are discussed in more detail below:
- Potential contamination from routine site operation and / or accidental releases on soils, Made Ground, hydrology and hydrogeology;
 - Potential effects of existing ground conditions or any residual contaminants on building materials and infrastructure for the Proposed Development;
 - Potential ground gas generation / migration and or accumulation within the lower levels of the development on human health and building materials and infrastructure;
 - Potential for future site users, (human health) and proposed planting coming into direct contact with contaminated soils and groundwater; and
 - Potential for services maintenance staff (human health) coming into direct contact with contaminated soils and groundwater.
- 13.113** The potential effects as a result of the Proposed Development being complete and operational are considered to be local, long term and direct.

Potential Contamination from Routine Site Operation and / or Accidental Releases

- 13.114** The Proposed Development could have the potential to contaminate soils, Made Ground, superficial and bedrock geology, hydrogeology and hydrology from a number of sources. The range of potential contaminants present within the site will vary dependent on the land use proposed. The site will be utilised for residential and commercial uses including a supermarket which includes a service yard and, as such, the typical range of potential contaminants will likely be limited to hydrocarbons, as well as small quantities of general cleaning chemicals.
- 13.115** The Proposed Development will provide landscaping at ground level including Aylesham Gardens which will comprise of additional trees and areas of planting and landscaping. Therefore, there is the potential for soils, Made Ground and groundwater to become contaminated from routine site operation and/ or accidental releases if not managed appropriately.
- 13.116** It is considered that the risk to the River Peck is Negligible given that the waterbody is culverted and 370m south of the site and therefore lateral migration is ruled out.
- 13.117** The majority of maintenance chemicals are likely to be stored internally and, as such, would be contained within the foul drainage system and would not affect the underlying soils or Made Ground. Similarly, runoff from the service yard would be routed to foul drainage system.
- 13.118** With the implementation of the standard mitigation measures listed within the '*Embedded Mitigation*' section of this ES chapter, it is considered that the effect of potential contamination from routine site operation will be minimised. The standard measures include the implementation of the Surface Water and Foul Drainage Strategy, which has been submitted with the planning application and incorporated into the design of the

Proposed Development. The Surface Water Drainage strategy will restrict surface water runoff to a greenfield QBAR calculated at 6.3 l/s for the sitewide area. Surface water storage systems are proposed across the site to help restrict surface water discharge to greenfield runoff rate. Use of blue / green roofs are maximised where possible to manage surface water run-off at source. External surfaces will be designed to direct surface water runoff to raingardens and bioretention areas where possible and tanked permeable paving will be implemented across the site. Additional below ground geocellular storage crates will be provided to further manage the peak discharge rate to greenfield runoff.

- 13.119** The Site Surface Water system has been designed in accordance with SuDS Management Train outlined in the CIRIA SuDS Manual (section 26.8). Surface water mitigation measures will be implemented via SuDS features in order to reduce the surface water pollution hazard indices discharging from the site to the public combined sewers. Table 6.9 of the Drainage Impact Assessment confirms the post treatment pollution hazard indices and identifies that the proposed SuDS features will provide sufficient mitigation of the pollution hazard for discharging surface water to a watercourse.
- 13.120** Foul water drainage is proposed to discharge via gravity to the local combined sewer outfalls within the site boundary. Foul water from basement level will be pumped to high level and discharge via gravity to the private drainage system. Thames Water have confirmed that there is sufficient capacity for foul water within the local sewer network for the proposed development.
- 13.121** Based on the above, and with the implementation of the surface water and foul drainage strategy included within the design of the Proposed Development, the magnitude of impact is considered to be Negligible for soils and Made Ground (low sensitivity), superficial and bedrock geology (low sensitivity), hydrology (low sensitivity) and groundwater (high sensitivity). Therefore, the effect is considered to be Negligible (not significant) and so no additional mitigation measures are required.

Potential Effects of Existing Ground Conditions or any Residual Contaminants on Infrastructure for the Proposed Development

- 13.122** As established within the 'Baseline Conditions' section of this ES chapter, there is evidence of historical contamination of the site due to previous land uses. Therefore, the risk of existing ground contamination potentially affecting existing and introduced below-ground structures such as concrete foundations or service pipelines cannot be ruled out, such as the risk to buried water supply pipes.
- 13.123** Therefore, the magnitude of impact of existing ground conditions or residual contaminants on infrastructure is considered to be Moderate. As infrastructure and building materials are high sensitivity receptors, the effect is Moderate to Major Adverse (significant) and so mitigation measures are required.

Potential Ground Gas Generation and Accumulation and / or Migration on Human Health and Infrastructure

- 13.124** The risk of ground gases on site cannot be ruled out due to the varying thicknesses of made ground and previously worked ground.
- 13.125** The proposal includes a single storey basement which will be larger than the existing basement currently on site and is in a different location. This basement could accumulate ground gas if not mitigated appropriately and could result in potential risk to human health receptors and building infrastructure.
- 13.126** The magnitude of impact of the potential for ground gas generation is considered to be Minor. Future site users and service maintenance staff (human health) as well as building infrastructure are classified as a high sensitivity receptor, the scale of effect is therefore considered to be Minor to Moderate Adverse (significant) and so further mitigation measures are required.

Potential Future Site Users and Proposed Planting Coming into Direct Contact with Contaminated Soils and Groundwater

- 13.127** There is the potential for the soils and groundwater to be contaminated with various contaminants such as hydrocarbons, metals and asbestos. The Proposed Development will provide landscaping and planting at ground floor within the new Aylsham Gardens. Future site users could be potentially exposed to contaminants via dermal contact, inhalation, ingestion of soil and soil dust within the areas of public open space if not managed appropriately.
- 13.128** Any contaminated soils or groundwater could have an effect on any proposed planting and landscaping via plant uptake.
- 13.129** Therefore, the magnitude of impact of the potential for future site users and proposed planting coming into direct contact with contaminated soils and or groundwater is considered to be Moderate. Future site users (human health) and proposed planting are considered to be high sensitivity receptors and therefore the scale of effect is considered to be Moderate to Major Adverse (significant) and so further mitigation measures are required.

Potential for Services / Maintenance Staff Coming into Direct Contact with Contaminated Soils and Groundwater

- 13.130** As stated above, there is the potential for the soils, made ground and groundwater to be contaminated with various substances such as hydrocarbons, metals and asbestos. Maintenance staff coming into contact with soils when installing or working on buried services could be exposed to potential contaminants within the soils.
- 13.131** However, with the implementation of the standard mitigation measures listed within the 'Embedded Mitigation' section of this ES chapter, it is considered that the effect of potential for services/ maintenance staff coming into direct contact with contaminated soils and groundwater will be minimised. This will include the implementation of good site working practices for maintenance workers as part of employer/ company health and safety responsibilities. This will include the use of appropriate PPE and any buried services will be constructed in corridors of clean material such that any future maintenance would be undertaken in clean soils, where possible.
- 13.132** With the implementation of standard mitigation measures, the magnitude of impact of the potential for services/ maintenance staff coming into direct contact with contaminated soils and groundwater is considered to be Negligible for human health (high sensitivity). This has resulted in a Negligible (not significant) effect and therefore no additional mitigation measures are required.

MITIGATION, MONITORING AND RESIDUAL EFFECTS

Demolition and Construction Mitigation

Potential Remobilisation of any Existing Contamination and Creation of Contaminant Pathways via Leaching and / or Migration During Demolition and Construction, such as Piling for Construction Activities

- 13.133** To verify contamination conditions on site, a comprehensive intrusive investigation will be undertaken on site, and recommendations will be provided based on the analysis of results. This will include groundwater monitoring to confirm the groundwater levels at the site. This will be secured by a suitably worded planning condition attached to any planning consent and will assist in deriving the final risk assessment for the site which will identify if there any specific remediation or mitigation measures required to be implemented.

- 13.134** A strategy for dealing with any contamination identified and information will be prepared and agreed with the LBS. The remediation and/or mitigation strategy and verification report will also be prepared and agreed. It is considered that it will be possible to eliminate or minimise all significant pollutant linkages to an acceptable level with appropriate remediation and control measures (such as capping of contaminated soils).
- 13.135** An appropriate foundation works risk assessment including a piling method statement will be prepared to inform the foundation design for the various elements of the Proposed Development, including the basement works and any appropriate quality assurance and control regime would be implemented. This would ensure that the contamination source or pathway (or both) would be removed. The piling method statement will ensure that all infrastructure, including below ground utility services, are considered within the piling method statement.
- 13.136** If during demolition and construction works unexpected contamination is encountered, the LBS shall be notified, and no further development shall be carried out until an addendum to the remediation implementation and verification method statement has been submitted to and approved in writing by the LBS.
- 13.137** No occupation of any part of the Proposed Development shall take place until a verification report demonstrating completion of works set out in the remediation implementation and verification method statement, has been submitted to and approved in writing by the LBS.
- 13.138** Any imported material required for the construction of the Proposed Development will undergo verification testing prior to being used on site to ensure that it is suitable quality.
- 13.139** As reported above, ACMs are understood to be located within buildings on site and various asbestos surveys have been undertaken over the recent years with an asbestos register reviewed annually and maintenance / removal work is carried out as necessary. Prior to any works being undertaken on site it is recommended that an asbestos refurbishment/demolition survey should be undertaken. This can be controlled via a suitably worded planning condition.
- 13.140** With these mitigation measures in place, it is considered that the residual effect would be Negligible on the soils and made ground, superficial and bedrock geology and groundwater. The residual effect is not significant.
- 13.141** If contamination is found on site following the intrusive site investigations, remediation will be put in place to meet appropriate land use criteria with the intention to achieve environmental betterment and therefore this would give rise to a Minor Beneficial (significant) effect when compared to the existing site use on soils, made ground, geology and groundwater.

Potential Ground Gas Generation / Migration and / or Accumulation within Lower Levels of the Development and Exposure to Vapours and Nuisance Odours and its Potential Impact on Construction Workers and Infrastructure and Adjacent Site Users

- 13.142** It is recommended that ground gas monitoring is included within the intrusive investigations that will be undertaken prior to demolition/construction at the site. This will include an investigation of the presence of any speciated volatile and semi-volatile organic compounds as well as other potential chemicals that could be present on site. These could especially be released during any excavation or remediation works. Therefore, a Gas Risk Assessment will be prepared and agreed with the LBS and, if necessary, a ground gas mitigation strategy will be prepared, agreed and employed as recommended by the CIRIA Report 665 'Assessing risks posed by hazardous ground gases in buildings' (commercial land uses) and the National House Builders Council (NHBC) 'Guidance on evaluation of development proposals on sites where methane and carbon dioxide are present' (residential uses). This will be secured via a suitably worded planning condition attached to any planning consent.
- 13.143** With these mitigation measures in place, it is considered that the residual effect on construction/demolition workers and adjacent site users would be Negligible. The residual effect is not significant.

Potential for Building Materials / Infrastructure and Demolition and Construction Workers and Adjacent Site Users to be Exposed to UXO and Potential Leaching/ Pollution from Existing UXO on Soils, Hydrology and Hydrogeology

- 13.144** As reported above, the site is located within an area with a high risk of Unexploded Ordnance (UXO) and from reviewing historical maps, the northern and north-eastern extent of the site shows ruins in 1950 mapping which indicates that the area was most likely subject to WWII bombing. However, it is noted that the site has been redeveloped since WWII, and has included the presence of a basement, therefore the risk of encountering any UXO in the future during any groundworks will be reduced.
- 13.145** Notwithstanding this, the risk cannot be entirely ruled out, it is therefore recommended that a UXO Risk Management Plan is undertaken for the full site area prior to any excavation works to define the level of risk and to recommend appropriate mitigation measures. A phasing plan for any remediation works would be provided following the results of the comprehensive intrusive investigation. This plan will be submitted to the LBS alongside a remediation report to inform the demolition and construction works with the purpose to achieve an environmental betterment.
- 13.146** Should any UXO be identified on-site, then the immediate area surrounding the UXO should be tested for potential leaching and/ or pollution and from here a remediation strategy will be prepared, agreed and employed prior to any further works on-site. It is also recommended that UXO awareness briefings are given to all personnel undertaking any works on-site.
- 13.147** With these mitigation measures in place, the magnitude of the impact will be reduced to Negligible and it is considered that the residual effect on demolition and construction workers, including adjacent sites users and (human health), building materials and infrastructure and on soils, hydrology and hydrogeology would be Negligible (not significant).

Completed Development Mitigation

Potential Effects of Existing Ground Conditions or any Residual Contaminants on Building Materials and Infrastructure for the Proposed Development.

- 13.148** The intrusive investigation that will be undertaken prior to construction will be assessed with regard to any potential contaminants on site (i.e. hydrocarbons, pH and water-soluble sulphate) which could affect building materials or buried services. The results of this will then allow the determination of the appropriate concrete class in accordance with BRE Special Digest 1 (2005).
- 13.149** For the majority of the site, Polyvinyl Chloride (PVC) or Polyethylene (PE) plastic water supply pipes are likely to be suitable. This will be confirmed with the appropriate water supplier prior to installation of the potable network infrastructure. Where any pollutant linkages are identified, remediation, avoidance or the use of other appropriate materials will be implemented.
- 13.150** With these mitigation measures in place, it is considered that the residual effects would be Negligible (not significant).

Potential Ground Gas Generation and Accumulation and / or Migration on Human Health and Infrastructure

- 13.151** It is recommended that gas monitoring is undertaken prior to demolition/construction works and following this, a Gas Risk Assessment will be prepared and agreed with the LBS and, if necessary, a ground gas mitigation strategy will be prepared, agreed and employed as recommended by the CIRIA Report 665 'Assessing risks posed by hazardous ground gases in buildings' (commercial land uses) and the National House Builders Council (NHBC) 'Guidance on evaluation of development proposals on sites where methane and carbon dioxide are present' (residential uses). This will be secured via a suitably worded planning condition attached to any planning consent.

13.152 With these mitigation measures in place, it is considered that the residual effect would be Negligible (not significant).

Potential Future Site Users and Proposed Planting Coming into Direct Contact with Contaminated Soils and Groundwater

13.153 The findings of the intrusive investigation will be reported to the LBS and a remediation and/or mitigation strategy and verification report will be prepared and agreed, this will include a phasing plan for the remediation works. The investigation will include the areas proposed as exposed soils to confirm that soil quality is appropriate for end users.

13.154 The intrusive investigation results will also be assessed in relation to the proposed planting on site to ensure the ground conditions are suitable. Where necessary, planting and trees will be planted in above ground planters and using clean soils.

13.155 With these mitigation measures in place, it is considered that the residual effects would be Negligible (not significant).

Residual Effects

13.156 All the residual effects resulting from the Proposed Development are presented in Table 13.6, identifying whether the effect is significant or not.

Table 13.6 Summary of Residual Effects

Receptor	Description of the Residual Effect	Scale and Nature	Significant / Not Significant	Geo	D I	P T	St Mt Lt
Demolition and Construction							
Soils and Made Ground	Potential contamination from general construction and demolition activities.	Negligible	Not Significant	L	D	T	St
Superficial Deposits (Interglacial Lacustrine Deposits)							
Bedrock Geology (Lambeth, Thanet Sands and Chalk)							
Hydrogeology							
Hydrology (River Peck)							
Hydrogeology	Remobilisation and creation of contaminant pathways to controlled waters.	Negligible (Potentially Minor Beneficial on soils made ground, geology and Hydrogeology following remediation)	Not Significant (Significant)	L	D	T	St
Hydrology (River Peck)							
Soils and Made Ground							
Superficial Deposits (Interglacial Lacustrine Deposits)							
Bedrock Geology (Lambeth, Thanet Sands and Chalk)							
Human Health	Potential for demolition and construction workers coming into direct contact with contaminated soils	Negligible	Not Significant	L	D	T	St
Human Health	Potential for adjacent site users and occupants inhaling, ingesting or coming into dermal contact with windblown contaminated dust.	Negligible	Not Significant	L	D	T	St
Human Health		Negligible	Not Significant	L	D	T	St

Receptor	Description of the Residual Effect	Scale and Nature	Significant / Not Significant	Geo	D I	P T	St Mt Lt
(Construction workers and adjacent site users)	Potential for Demolition and Construction Workers to be Exposed to Ground Gas						
Infrastructure and Building Materials							
Human Health (Construction workers and adjacent site users)	Potential for Demolition and Construction Workers to be Exposed to UXO and leaching and potential leaching from existing UXO.	Negligible	Not Significant	L	D	T	St
Building Materials and Infrastructure							
Soils and Made Ground							
Hydrogeology							
Completed Development							
Soils and Made Ground	Contamination from routine site operation and/ or accidental releases on soils and Made Ground, hydrology and hydrogeology.	Negligible	Not Significant	L	D	P	Lt
Hydrogeology							
Hydrology (River Peck)							
Superficial Deposits (Interglacial Lacustrine Deposits)							
Bedrock Geology (Lambeth, Thanet Sands and Chalk)							
Infrastructure and Building Materials	Effects of existing ground conditions or any residual contaminants on infrastructure for the Proposed Development.	Negligible	Not Significant	L	D	P	Lt
Human Health (future site users and service maintenance staff)	Ground gas generation.	Negligible	Not Significant	L	D	P	Lt
Infrastructure Building Materials							
Human Health (Future site users)	Future site users and planting coming into direct contact with contamination.	Negligible	Not Significant	L	D	P	Lt
Proposed Planting							
Human Health (Service staff)	Services maintenance staff coming into direct contact with contamination.	Negligible	Not Significant	L	D	P	Lt
Notes: Residual Effect - Scale = Negligible / Minor / Moderate / Major - Nature = Beneficial or Adverse Geo (Geographic Extent) = Local (L), Borough (B), Regional (R), National (N) D = Direct / I = Indirect P = Permanent / T = Temporary St = Short Term / Mt = Medium Term / Lt = Long Term N/A = not applicable / not assessed							

ASSESSMENT OF THE FUTURE ENVIRONMENT

Cumulative Effects Assessment

- 13.157** The cumulative schemes described in **ES Volume 1, Chapter 2: EIA Methodology** have been considered within the assessment of cumulative effects.
- 13.158** It is important to consider the cumulative impacts associated with schemes due to come forward. The potential for contamination and associated risks and effects at individual development sites would be identified by the applicants of all cumulative schemes to ensure that each development would be 'suitable for use' in accordance with the mandatory legislative requirements of Part IIA of the Environmental Protection Act, 1990¹⁶ and associated planning conditions.
- 13.159** Sites where contamination may be present will be required to undertake intrusive investigation and risk assessments and the relevant planning authority would require a site-specific DCEMP, to avoid detrimental effects to sensitive receptors, such as residential users considering the area is dominated by residential development. Where significant pollutant linkages are identified for the site or other local cumulative schemes, a subsequent remediation strategy and verification plan will be required. Therefore, it can be considered in some cases that the implementation of remediation strategy within sites with contamination could result in a Minor Beneficial impact on ground conditions (minor magnitude).
- 13.160** In terms of water quality, new or cumulative schemes will have to incorporate appropriate pollution control measures to protect the underlying groundwater and/ or local surface waters through planning conditions enforced by the LBS and/ or discharge consents enforced by the EA.
- 13.161** As all new developments are required to meet these criteria; the cumulative impact of site-specific remediation will improve general ground conditions at the local scale, leading to a Negligible to Minor Beneficial effect (significant).

LIKELY SIGNIFICANT EFFECTS

- 13.162** Following the implementation of the standard mitigation measures and the proposed mitigation measures set out in this ES chapter, it is considered that there are no significant adverse residual effects resulting from the Proposed Development on ground conditions, including water quality.
- 13.163** There is the potential that a Minor Beneficial effect (significant) could arise as a result of the Proposed Development because the existing contamination on-site will be remediated and therefore provide a significant beneficial impact when compared to the existing site conditions.
- 13.164** As all new developments are required to meet these criteria; the cumulative impact of site-specific remediation will improve general ground conditions at the local scale, leading to a Negligible (not significant) to Minor Beneficial effect (significant).

¹⁶ *Environmental Protection Act 1990. London: His Majesty's Stationery Office*