

15. LAND CONTAMINATION

Introduction

- 15.1 This chapter of the ES assesses the likely significant effects of the Development on the environment in respect of land contamination and ground conditions.

Policy Context

National Planning Policy

National Planning Policy Frameworkⁱ

- 15.2 The National Planning Policy Framework (February 2019) set out the Government's planning policies and how these are expected to be applied. The NPPF considers three dimensions to sustainable development: economic, social and environmental. In terms of land contamination, the environmental role aims to contribute to protecting and enhancing our environment, by (paragraph 109):

- Protecting and enhancing valued landscapes, geological conservation interests and soils;
- Preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability; and
- Remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land where appropriate.

- 15.3 The NPPF sets out twelve core principles at paragraph 17. The most relevant core principles to land contamination are:

- Contribute to conserving and enhancing the natural environment and reducing pollution. Allocations of land for development should prefer land of lesser environmental value, where consistent with other policies in the NPPF; and
- Encourage the effective use of land by reusing land that has been previously developed (brownfield land), provided that is not of high environmental value.

Planning Practice Guidanceⁱⁱ

- 15.4 The Planning Practice Guidance (PPG) Land affected by Contamination, released in March

2014 provides guidance in support of the NPPF and states that responsibility for securing a safe development, in relation to land contamination, rests with the developer and/or landowner. However, local planning authorities should be satisfied that a proposed development will be appropriate for its location and not pose an unacceptable risk.

- 15.5 The PPG requires that where there is a reason to believe contamination could be an issue, developers should provide proportionate but sufficient site investigation information (a risk assessment) to determine the existence or otherwise of contamination, its nature and extent, the risks it may pose and to whom/what (the 'receptors') so that these risks can be assessed and satisfactorily reduced to an acceptable level. A risk assessment of land affected by contamination should inform an Environmental Impact Assessment if one is required. The guidance indicates that on a low risk site, a desk study and site walkover would suffice.
- 15.6 Unless this initial assessment clearly demonstrates that the risk from contamination can be satisfactorily reduced to an acceptable level, further site investigations and risk assessment will be needed before the application can be determined.

Legislative Context

Environmental Protection Act (EPA) 1990 as amended by the Environment Act 1995ⁱⁱⁱ Part 2A

- 15.7 The UK legislation on land contamination is principally contained in Part 2A of the Environmental Protection Act, 1990.
- 15.8 This legislation endorses the principle of a "suitable for use" approach to contaminated land, where remedial action is only required if there are unacceptable risks to health or the environment, taking into account the use of the land and its environmental setting.
- 15.9 This statutory guidance describes a risk assessment methodology in terms of "significant pollutants" and "significant pollutant linkages" within a source-pathway-receptor conceptual model of a Site. The model comprises:
- The principal pollutant hazards associated with the Site (the sources);
 - The principal receptor(s) at risk from the identified hazards; and
 - The existence, or absence, of plausible pathways which may exist between the identified hazards and receptor(s).
- 15.10 For land to be determined to be statutorily "contaminated" and require remediation or a

change to a less sensitive use, all three elements (source-pathway-receptor) of a significant pollutant linkage must be present and a significant possibility of significant harm to one or all of a number of identified receptors should be demonstrated.

Contaminated Land (England) (Amendment) Regulations 2012^{iv}

- 15.11 The contaminated land regime applies a risk-based approach to land remediation, requiring the action taken to be proportionate and appropriate to the risk. The identification of contaminated land is based upon establishing a pollution linkage from a contaminant, through a pathway to a receptor. The regime identifies the 'appropriate' persons to bear responsibility for remediation as those 'who caused or knowingly permitted the substances to be in, on or under that land' based on the 'polluter pays' principle. If the polluter cannot be found, then responsibility shifts to the owner or occupier of the land

Local Planning Policy

Arun Local Plan (July 2018)^v

- 15.12 The Arun Local Plan was adopted in July 2018 and comprises a written statement and four supporting policy maps. The documents set out Arun District Council's (ADC) vision and objectives for delivering growth over the period of 2011 to 2031. The Arun Local Plan 2018 will be used to guide decisions on planning, development and regeneration activity over this period.
- 15.13 The Site has been allocated for residential development under the housing policy SP1, and is referenced as SD8 on the policy maps.
- 15.14 Policy QE DM4 of the Arun Local Plan relates to contaminated land. The policy states that *'The Council promotes, and will permit, the use of previously developed land and the remediation of contaminated land to ensure that land is brought back into use.'*

Prior to any development, the Council will require evidence to show that unacceptable risk from contamination will be successfully addressed through remediation without undue environmental impact during and following the development'

Guidance^{vi}

- 15.15 The key regulatory regime for managing contaminated land is Part 2A of the Environmental

Protection Act (DEFRA, 1990). The framework for the assessment of the contamination status of the Site is in line with the technical approach presented in the Environment Agency (EA) document CLR 11 v ("Model Procedures for the Management of Land Contamination" CLR 11)^{vi} which provides the technical framework for applying a risk management process when dealing with land affected by contamination. The above approach fulfils the requirements of a non-intrusive Preliminary Risk Assessment; and the relevant British Standard, BS 10175:2011 Investigation of potentially contaminated sites - code of practice (+A2:2017)^{vii}.

Assessment Methodology

- 15.16 The assessment of ground conditions has involved a desk study that comprised a Site walkover and review of available historical, geological, and licensing information contained within an environmental database report to create an initial conceptual site model for the Site. An intrusive investigation involving soil and groundwater testing was carried out to test and refine the initial conceptual site model. This information has been used to characterise baseline conditions for the Site and to assess the need for mitigation to protect future users following redevelopment and the environment from any significant contaminant source identified.
- 15.17 The assessment is contained within RSK's geo-environmental site assessment, project number 29228-R01, dated November 2018^{viii}, included as Appendix 15.1. The findings of the report are discussed within the baseline conditions section of this chapter.

Assessment Approach

- 15.18 Current UK guidance (EA CLR11 "Model Procedures for the Management of Land Contamination") promotes the use of a conceptual site model for risk assessment. This provides the technical framework for applying a risk management process when dealing with land affected by contamination.
- 15.19 The magnitude and impact of pathways and receptors will vary according to the proposed use of the site being assessed, including its surroundings and setting. The potential for harm to occur requires three conditions to be present:
- Sources: potential or known contaminant sources e.g. historic site land uses;
 - Pathways: mechanisms/systems thorough which exposure to a contaminant could occur e.g. direct contact or migration through air, over land or via permeable ground etc.; and
 - Receptors: sensitive environmental receptors that could be adversely affected by a

contaminant e.g. site occupiers, groundwater resources and ecological resources.

- 15.20 Where a source, relevant pathway and receptor are present a 'contaminant linkage' is created whereby there is a circumstance through which some level of environmental harm could occur which has to be assessed and mitigation identified as appropriate.
- 15.21 The receptors which are potentially sensitive to changes related to ground conditions and have been identified following assessment of the baseline conditions and identification of potential sources of contamination.

Methodology for Assessing Sensitivity, Magnitude and Significance

- 15.22 To arrive at a judgement on the significance of effect on land contamination and ground conditions, the assessment considers the relative importance of the receptors and how these are likely to be affected, as described below.
- 15.23 The assessment has used a 'significance matrix assessment approach' which is based on the sensitivity of the receptors and magnitude and nature of the impact. This allows the relative significance of effects to be determined on a scale and ultimately the likely significant effects to be determined.

Receptor Sensitivity

- 15.24 The sensitivity of a receptor is based on the relative importance of the receptor or resource. Receptors are considered to have varying degrees of sensitivity to contamination potentially present beneath the Site based on potential impacts and the integrity of any site-specific exposure pathways. The significance of ground conditions impacts is influenced by receptor sensitivity, which is defined in Table 15.1 below.

Table 15.1: Criteria for Defining Impact Sensitivity

Sensitivity	Criteria for defining impact
High	Receptor/resource has little ability to absorb change without fundamentally altering its present character. e.g.: During Development: • People (on site or on neighbouring sites) occupying land in 'residential with gardens' land use, or using allotments, children's play areas, and sports facilities; and • Construction workers engaged in extensive earthworks (i.e. exposure to contaminants via direct contact, inhalation or ingestion). Post Development: • Site users (future occupiers, residential, school and office visitors) may be exposed to contaminants via direct contact, inhalation or ingestion).
Moderate	Receptor/resource has moderate capacity to absorb change without

	significantly altering its present character. e.g: During Development: • People (on site or on neighbouring sites) occupying land in 'residential without gardens' land use or using public areas of soft landscaping/open space (i.e. exposure to contaminants via direct contact, inhalation or ingestion; • Construction workers engaged in moderate earthworks; • Controlled waters. The construction of foundations has the potential to create new pathways for contaminant migration to the underlying Principal Aquifer. The Site is not located within a source protection zone for a potable water supply borehole; • Mobilisation of contaminants during construction may migrate via groundwater into surface water – River Arundal; • Locally designated ecological sites; and • Buildings, including services and foundations. Post Development: • Site users (neighbours) may be exposed to contaminants via direct contact, inhalation or ingestion).
Low	Receptor/resource is tolerant of change without detriment to its character, is of low or local importance. e.g: During Development: • People (on site or on neighbouring sites) occupying or using commercial or industrial buildings, car parking, hard landscaping; • Construction workers engaged on site but with minimal disturbance to the ground; • Currently, flora/fauna are of no ecological value; and • Unproductive strata and similar water resources, water bodies of low recreational qualities. Post Development: • Redevelopment will incorporate areas of soft landscaping in planters and designated areas with imported topsoil cover.

Magnitude of Impact

15.25 The magnitude of impact (scale of change) is determined by considering the degree of deviation from the baseline conditions and whether this is likely to result in any changes in the use of the receptor concerned. The magnitude of an impact is described as major, moderate, minor or negligible. Impacts are neither beneficial nor adverse in nature. Such terms are relative to the receptor affected by the impact (i.e. a particular impact can result in a beneficial effect on one receptor and an adverse effect on another), and the criteria associated with them are summarised in Table 15.2.

Table 15.2: 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.
Moderate	Moderate Loss or alteration to one or more key elements/features of the baseline.
Minor	A minor shift away from baseline conditions. Change arising from the loss/alteration will be discernible/detectable but not material. The underlying character/composition/attributes of the baseline condition will be like the pre-Development circumstances/situation.
Negligible	Very little change from baseline conditions. Change barely distinguishable, approximating to a 'no change' situation.

Assessment of Significance of Effect

- 15.26 The relative significance of an effect is largely a product of the value and sensitivity of the identified receptor and the magnitude and duration of the impact, but the assessment is moderated by professional judgement and takes into account the considerations described above. The significance of effect matrix is provided in Table 15.3. It is assumed for the purposes of this assessment that any effects of 'moderate' significance or greater will be significant in EIA terms.

Table 15.3: Effect Significance Matrix

Magnitude	Sensitivity		
	High	Moderate	Low
Major	Major Adverse/Beneficial	Major-Moderate Adverse/Beneficial	Moderate-Minor Adverse/Beneficial
Moderate	Major-Moderate Adverse/Beneficial	Moderate-Minor Adverse/Beneficial	Minor Adverse/Beneficial
Minor	Moderate-Minor Adverse/Beneficial	Minor Adverse/Beneficial	Minor Adverse/Beneficial-Negligible
Negligible	Negligible	Negligible	Negligible

- 15.27 In the context of the Development, short to medium term (temporary) effects are generally considered to be those associated with the construction phase, and long term (permanent) effects are generally those associated with the operational phase.

Assumptions and Limitations

- 15.28 The following summarises technical deficiencies or lack of knowledge encountered in compiling the required information and assumptions made about data sources, baseline conditions and assessment of effects.
- 15.29 Several assumptions have been made regarding certain environmental aspects. General assumptions include:
- The baseline is the existing Site as it stands at the time of preparation of this ES (2019);
 - The principal land uses adjacent to the Site remain as they are at the time of the ES submission (2020);
 - Information provided by third parties, including publicly available information and databases is correct at the time of publication; and
 - The Site or adjacent properties will not be the subject of any unforeseen events or subsequent adverse impacts to change the baseline conditions.

15.30 This assessment is based upon information obtained from third party sources together with observations from the Site walkover survey and findings from the geo-environmental site investigation undertaken by RSK (Appendix 15.1). Limitations relating to any difficulties (technical deficiencies or lack of know-how) encountered in compiling the required information and assumptions made about data sources, baseline conditions or assessment of effects, therefore, include the following:

- At the time of investigation, parts of the Site were occupied by commercial premises (including Highway England Compound and Sports facilities) which could not be accessed during investigation. Geographic coverage across these parts of the Site were therefore limited by the operational status of the Site;
- The intrusive investigation was exploratory in nature and was designed to target potential sources identified during the desk study phase. The scope of the investigation was therefore limited; and
- The intrusive investigation included agricultural land and landfill located to the east of the existing Grundon waste recycling facilities, which are located to the northeast of the Site.

Baseline Conditions

15.31 The baseline has been defined by a preliminary risk assessment and intrusive investigation contained within the RSK Geo-environmental and Geotechnical Report^{viii}, (Appendix 15.1).

Preliminary Risk Assessment

Site History

15.32 During the 19th Century, the Site was undeveloped agricultural land with a number of farm buildings. A canal (Chichester and Arundel Canal) oriented east-west was located in the northern portion of the Site. This was shown to be disused by the late 19th Century.

15.33 The Site was first used as an airfield during the first World War, and was re-occupied by the military during the Second World War. The airfield runways, a number of workshops, ordnance storage, and bulk fuel storage were all located within the redline boundary of the Site (Figure 1.1). However, the aircraft hangers, aircraft maintenance areas, personal offices and accommodation were all located off site.

15.34 The airfield was used by the military for training purposes up until 1958. A civilian flying club

subsequently used the Site until 1980, by which time many of the former military buildings had been demolished.

- 15.35 During the 1980's, two remaining hangers located along the north eastern boundary of the Site were occupied by Grundon as part of their waste recycling facilities, and the existing Waste Water Treatment Works (WWTW) were constructed to the east of the Site boundary. Furthermore, Industrial estates were located directly to the north and west of the Site boundary.

Site Walkover

- 15.36 The Site primarily comprises agricultural land with various commercial premises occupying the former runways, including a Highways Agency compound, and haulage company to the north of the Site. Sports facilities and a children's play centre are located in the centre of the Site. The southern portion of the former runway is currently used for car boot sales. No contaminative activities were noted with these premises, but as noted above, the Highway Agency compound and haulage company could not be accessed during the Site investigation.
- 15.37 The Grundon Waste recycling facilities and a WWTW are located along the north-eastern and eastern boundaries of the Site. Industrial estates are situated to the north, southeast, and west of the Site boundary. Residential properties are also located to the north and west of the Site.
- 15.38 An earth mound is located off site to the east of the Grundon waste recycling facilities, which is classified by the EA as a historic inert landfill. Part of the former canal situated approximately 200m southwest of the Site boundary was also used to deposit inert waste.

Environmental setting

- 15.39 The published on line geological records^{xi} held by the British Geological Survey (BGS) indicate that the Site is underlain by superficial deposits comprising Brickearth and River Terrace Deposits over solid geology consisting of the Lewes, Seaford and Newhaven Chalk Formations. With regards to groundwater sensitivity, the underlying chalk is classified by the EA as a Principal Aquifer. However, there are no groundwater abstractions for drinking water purposes within 2km of the Site.
- 15.40 The nearest identified surface water is an unnamed stream located to the east of the WWTW. The stream flows north east toward the River Arun located approximately 500m to the east

of the Site Boundary. The base flow of the stream and River may be recharged by the groundwater beneath the Site.

- 15.41 The Site is not located within an area affected by Radon as defined by the National Radiological Protection Board Atlas^{viii}.

Unexploded ordnance (UXO)^x

- 15.42 Fellows International Limited were commissioned to undertake a UXO risk assessment for the Site, (ref 2078, dated July 2018 (included in Appendix 15.2)). The report indicates that the Site was heavily bombed during the Second World War and concluded that there is a moderate risk from German air dropped UXO on the Site. There is also the possibility that munitions may have been left behind by the Royal Air Force (RAF) due to the Site extended use as a military airfield, which includes pipe bombs that were placed beneath runways. Mitigation measures were therefore proposed in relation to the Site investigation and subsequent construction works, these are detailed within the mitigation measures in Section 15.62.

Initial Conceptual Site Model

- 15.43 The desk study identified a number of potential sources of contamination associated with the Site's former use as an airfield, and current agricultural and commercial use of the Site. To assess whether these sources are present and pose a risk to future Site users or the environment an intrusive investigation was undertaken by RSK.

- 15.44 The sensitivity of the identified receptors are considered as follows:

- Construction workers: **Moderate** sensitivity (shorter time on site than future occupants);
- Maintenance workers; **Moderate** sensitivity (considered to have High sensitivity, however, typical working hours duration on site (refer to ES chapter 5) reduces this to Moderate);
- Future Site Occupants (commercial and employment area): High sensitivity, reduces to **Moderate** due to typical working hours on site, compared with future residents;
- Future Site Occupants (community use of allotments, parks) – High sensitivity due to prolonged periods of exposure to possible contamination, but this will be less than residential occupants.
- Future Site Occupants (residential): **High** sensitivity due to prolonged periods of exposure to possible contamination;
- Third party occupant/neighbours: High sensitivity, reduced to **Moderate** (predominate

- use of surrounding area is commercial and therefore reduces sensitivity);
- Groundwater; High sensitivity as the Site is located on principal aquifer, but this has been reduced to **Moderate** because there are no drinking water abstractions within the vicinity of the Site;
 - Surface water: **Moderate** sensitivity. Groundwater is likely to provide baseflow to surface water (River Arun and unnamed stream), but given distance from the Site any impact is unlikely to significantly impact these surface waters given distance of the Site to these receptors; and
 - Built Environment: **Moderate** sensitivity (Water supply pipes and below ground concrete structures).

Intrusive Investigation

- 15.45 The intrusive phase of works used a combination of trial pits, deep and shallow boreholes to target the potential sources of contamination identified during the desk study in order to characterise the soil and groundwater condition (see report in Appendix 15.1).
- 15.46 The investigation revealed the majority of the Site to be underlain by natural soils, however, a variable thickness of made ground was encountered which often coincided with current and historic structures. This was underlain by Brickearth and River Terrace Deposits. The top of the chalk was encountered between 0.7m and 4.7m below ground level (bgl). Groundwater was recorded between 1.7m and 5.3m during the investigation.
- 15.47 To assess the risk to future Site users, flora, and groundwater, the results of soil and groundwater testing were compared against generic assessment criteria derived for the different receptors.
- 15.48 The results of the assessment identified elevated concentrations of polycyclic aromatic hydrocarbons and the presence of asbestos were recorded within the former landfill located to the east of the Grundon waste treatment facilities, to the northeast of the Site. A single elevated concentration of lead was also recorded in the field next to the landfill (to the east). The assessment did not record any elevated concentrations of contaminants elsewhere across the former airfield.
- 15.49 Based on the results of the intrusive investigation, remedial measures such as a capping layer or prevent access to the area will be required to prevent future site users coming in to contact with the inert landfill. Additional investigation will also be carried out to characterise the ground conditions in parts of the site that could not be accessed, and the elevated

concentration of lead noted in the field next to the landfill. The measures would remove the risk to future site users and workers. However, no further actions are required across the remainder of the site.

Future Baseline

- 15.50 In the absence of the Development, the land uses within the Site will be retained and the existing ground conditions will continue on a similar basis as the existing situation with no significant change to the current baseline.

Likely Significant Effects

- 15.51 This section defines the likely significant environmental effects (beneficial and adverse) of the Development and identifies receptors and environmental resources which may be impacted directly or indirectly by the Development. Construction and operational effects are considered separately.
- 15.52 The potential impacts and the significance of the effects are characterised in the absence of mitigation measures, beyond those identified, described and embedded within the Development. The mitigation measures are then set out prior to the determination of the residual effects.

Construction Phase

Further Intrusive Site Investigations

- 15.53 Intrusive Site investigations will take place prior to construction commencing during detailed design to supplement the existing data. Although the volume of ground disturbance will be relatively minor, there is a potential for ground contamination to be encountered resulting in a potential for:
- Direct contact between contaminants and the people engaged in the Site investigation, but only if a source is encountered, which would pose a minor adverse effect on health if encountered.

Construction Effects

- 15.54 Potential risks identified during the construction works are,

- Potential for construction workers, residents and workers visitors and built environment to come into direct contact with contamination;
- Potential for works to remobilise contamination and create new pathways to the underlying principal aquifer;
- Potential of encountering a UXO during the construction works; and
- Potential for small scale leaks and spillages associated with localised storage and use of small quantities of fuels, paints and other proprietary chemicals, and for contaminated land run-off from vehicle washing.

- 15.55 The site investigation works carried out to date has identified evidence of limited and localised contamination associated with a former inert landfill. It is considered that construction workers would only be exposed to contamination if the ground was disturbed, and this would only be of short duration. The overall impact is therefore considered to be minor adverse.
- 15.56 A UXO risk assessment undertaken by Fellows (refer to Appendix 15.2) indicates that there is a moderate risk of encountering UXO for consultants or construction workers that undertake excavations. The impact of any event would be severe however the probability of encountering a UXO is low. The overall effect is considered to be moderate adverse without mitigation measures.
- 15.57 Any release of fuel or chemicals during the construction works will be small scale and very localised. There is a limited potential for future site uses and maintenance workers to come into contact with impacted soils. Processes to safeguard the environment will also be implemented during the construction process that would reduce the chance of an event occurring. The potential impact is therefore considered to be negligible.

Effects upon Groundwater and surface water

- 15.58 Shallow foundations constructed above the water table are not likely to cause any impact on the underlying groundwater. However, piled foundations would mobilise sediment within the underlying Principal Aquifer, but this will be localised and for a short duration. Any impact is therefore considered to be minor adverse effect.
- 15.59 Exposing the natural soils and creating stockpiles during the construction works may increase the run-off of sediments. These impacts will be of short duration and are unlikely to impact the identified surface waters (unnamed stream and River Arundel) given their distance from

the Site. This impact is therefore considered to be negligible effect and is no longer considered in this assessment.

Operational Phase

- 15.60 The Development will predominantly comprise low-rise residential housing with community facilities including allotments and new sports pitches. Land will also be set aside for commercial use (refer to ES chapter 3).
- 15.61 The findings of the site investigation indicated that the majority of the Site is free from contamination. However, the presence of localised contamination has been identified associated with the former inert landfill located next to the Grundon Waste Recycling Facility and the proposed employment area to the east of the Development. Given that the landfill comprises a vegetated earth mound, any exposure to the contaminants would be very limited and therefore the effect is considered to be minor adverse.
- 15.62 No contamination was identified across the remainder of the Site. However, not all areas of the Site could be accessed during the investigation, and therefore there remains the possibility of some undetected that this may pose a risk to future Site users. However, any contamination would be very localised. Therefore, impact is considered to be minor adverse until additional works are carried to characterise these areas.

Mitigation Measures

- 15.63 This section outlines the mitigation measures that will be implemented to minimise the adverse effects described in the previous section during the construction and operational phases of the Development.

Construction Phase

- 15.64 As identified above, there is the potential for site workers to come into direct contact during future site investigations / constructions works. Any risks will be mitigated through risk assessment and use of adequate PPE.
- 15.65 A report compiled by Fellows Limited (see Appendix 15.2) indicated that there is a moderate risk of encountering UXO on the Site whilst undertaking excavations during site investigations and construction works. Mitigation measures that have been recommended by Fellows include a watching brief by a UXO engineer and screening deeper excavations / pile positions using a magnetometer.

- 15.66 Piling into underlying principal aquifer: Any effect on the underlying groundwater which is designated as a principal aquifer by the EA would be localised and of short duration. The Site is not located within a source protection zone for a drinking water supply borehole.
- 15.67 Any measures to mitigate the potential risks described above would be set out within a Construction Environmental Management Plan (CEMP) and the Code of Construction Practice (CoCP) etc. by the development contactor.
- 15.68 At present there is no need for any remedial measures associated with contaminated land. Further investigation is to be carried prior to the construction works to confirm this, and a remediation strategy produced if required.

Operational Phase

- 15.69 The site investigation indicates that the majority of the Site is free from contamination. However, impacted soils have been recorded associated with an inert landfill located next to the Grundon Waste recycling facilities. Simple to implement mitigation measures such as clean capping or preventing access to the area would reduce the risk. This would be confirmed within a remediation strategy for the Site. The impact to future site users and the environment is considered to be negligible.
- 15.70 Elsewhere, no impacted soils have been encountered that require mitigation measures. However, further investigation is required to fully characterise the conditions in parts of the Site that could not be accessed during the site investigation. Any impact encountered is likely localised based on the current appraisal of the Site and may be mitigate through adoption of remedial measures such a source removal or a clean capping layer. Until additional works are carried out the risk to future Site users is considered to be minor adverse.

Residual Effects

- 15.71 There are limited potential risks to people and the environment associated with the Development and the ground conditions on the Site during the construction phase. The overall residual impacts have been assessed as negligible.
- 15.72 The investigation works carried out to date identified the presence of localised impacted soils associated with a historic inert landfill. The landfill comprises a raised earth mound and any risks would be mitigated through the adoption of a clean cover system or by fencing the area off. The on-going residual effects are therefore considered to be negligible.

Cumulative Effects

15.73 There are two types of cumulative effects addressed in the ES.

- Interaction effects: the accumulation of different predicted effects generated by the Development upon the same sensitive receptors; and
- In-combination effects: the combination of predicted effects from adjacent or nearby scheme(s) together with those predicted for the Development.

15.74 Within the area surrounding the Site the cumulative schemes, as identified in Chapter 2: EIA Methodology, could give rise to likely significant cumulative effects when considered in conjunction with the Development during construction and operation.

15.75 Each of the cumulative schemes listed in Section 2 would have addressed any issues associated with land contamination issues if present. Based on the available information no mitigation measures are required on the Site to address risks from contamination. Therefore, during both the construction and operational phases it is not considered that there will be any significant adverse cumulative effects from any of the adjacent or nearby schemes together with those predicted for the Development.

Summary

15.76 A number of potential sources of contamination were identified on site primarily associated with a historic infilled canal and the previous use of the Site as an airfield. The intrusive investigation and generic risk assessment carried out by RSK indicated that the Site is largely free from contamination, but some localised impacted soils were recorded associated with an inert landfill located next to the Grundon Waste Recycling Facilities. However, the risk would be mitigated through simple remediation techniques. The impact on future site users and the environment during the operational phase is considered to be negligible following the implementation of remedial measures.

15.77 Furthermore, some additional investigation is also required to fully characterise the ground conditions in areas that could not be accessed during the Site works. However, based on the currently appraise of the Site, any contamination would be localised and therefore considered to be minor adverse risk to Site users and the environment during the operational phase until additional investigation is carried out to clarify the risk.

15.78 During the construction works, if some of the foundations were to be piled then there may be

a minor adverse impact to the underlying Principal Aquifer caused by the release of sediment, but any impact would be very localised and temporary.

- 15.79 Construction works will be subject to a range of controls required under current legislation and managed through adoption of industry standard working practices as identified within the Applicant's Code of Construction Practice (CoCP) and Contractor's Environmental Management Plan (CEMP). This will minimise the likelihood of spills and leaks from construction plant and machinery.
- 15.80 Upon completion of the Development, it is not considered that there would be any residual effects.
- 15.81 During the construction and operational phase, it is not considered that there will be any significant cumulative effects from any of the adjacent or nearby schemes.
- 15.82 Table 15.7 contains a summary of the likely significant effects of the Development.

Table 15.7: Table of Significance – Land Contamination

Potential Effect	Nature of Effect (Permanent/Temporary)	Significance (Major/Moderate/Minor) (Beneficial/Adverse/Negligible)	Mitigation / Enhancement Measures	Geographical Importance*							Residual Effects (Major/Moderate/Minor) (Beneficial/Adverse/Negligible)	
				I	UK	E	R	C	D	L		
Construction												
Health effects during construction on construction workers, neighbours, residents and built environment from contamination.	Temporary	Negligible	Construction works will be managed through industry standard working practices (e.g PPE, HSE risk assessments), CoCP and CEMP.							*	Negligible	
Mobilisation of sediment during piling operations that may impact on Principal Aquifer	Temporary	Minor adverse	Piling into underlying principal aquifer: Any impact on the aquifer will be very localised and temporary. There are no groundwater abstractions for drinking water purposes within 2km of the Site.							*	Negligible	
Risk of encountering unexploded ordnance during site investigation and construction works	Temporary	Moderate adverse	UXO engineer required during excavations and to clear pile positions.							*	Negligible	
Releases of fuel and chemicals from storage and use during construction works.	Temporary	Negligible	Construction works will be managed through industry standard working practices (e.g PPE, HSE risk assessments), CoCP and CEMP.							*	Negligible	
Operational Phase (completed development)												
Health effects to future Site users including residential and works as well as flora from contamination within an inert landfill.	Permanent	Minor Adverse	The site investigation has identified some localised contamination associated with an inert landfill. This would be mitigated through the adoption of simple techniques such as a clean cover system or fencing. This will be confirmed in a remediation strategy developed for the Site.							*	Negligible	

Health effects on future Site users including residential, workers and neighbours, flora and fauna and built environment from contamination in areas not investigated.	Permanent	Minor adverse	Further investigation will be carried out fully characterised the ground conditions in areas of the Site that could not be accessed during the site investigation. However, the results show that the majority of the Site is free from contamination.								*	Minor adverse
Cumulative Effects												
Construction and Operation												
None Identified												

*** Geographical Level of Importance**

I = International; UK = United Kingdom; E = England; R = Regional; C = County; D = District; L = Local

REFERENCES

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- ^{iv} HMSO (2012) *The Contaminated Land (England) (Amendment) Regulations*
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- ^{vii} British Standards Institution (2011), 'BS 10175:2011 + A2:2017. Investigation of potentially contaminated sites: Code of practice.
- ^{viii} Geo-environmental and geotechnical site assessment of Ford Airfield, RSK Limited, ref 29228-R01 (00), dated November 2018.
- ^{ix} National Radiological Protection Board (Radon Atlas of England and Wales, NRPB-W26-2002)
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