

Redevelopment of Porthcawl Waterfront

CHAPTER 12 – Ground Conditions

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12. Introduction

Background

- 12.1.1. The following Chapter has been prepared by Stantec Hydrock Ltd (Stantec).
- 12.1.2. This Chapter of the Environmental Statement (ES) assesses the likely significant effects of the Proposed Development, as described in Volume 1, Chapter 12 of this ES, in terms of Ground Conditions and incorporates a summary of the Phase 1 Ground Conditions Desk Study provided in Appendix 12.1.
- 12.1.3. This Chapter should be read in conjunction with the following Technical Appendices:
- Volume 3, Appendix 12.1: Stantec. October 2025. Porthcawl Waterfront Regeneration Phase 1 Ground Conditions Desk Study. Ref: 333701677-STN-XX-XX-RP-GE-1000 P01.
 - Volume 3, Appendix 12.2: Hydrock. September 2024. Porthcawl Harbourside Multi-Disciplinary Due Diligence Review Technical Design Note. Ref: 32485-HYD-XX-XX-RP-X-0100 P02.

Site Location and Description

- 12.1.4. The Application Site is located at Porthcawl Waterfront, Bridgend County, centred around National Grid Reference 282403, 176928, and covers 41 hectares between Porthcawl Harbour and Trecco Bay. It is currently used as car parks, a former caravan park, recreation space, and a fun fair. The Application Site is generally flat, with elevations between 11 and 12 metres above ordnance datum and is primarily surfaced with hardstanding. It lies within a coastal setting adjacent to the Bristol Channel, with surrounding land use comprising residential and commercial areas, including ongoing housing expansion in Sandy Bay.

Proposed Development

- 12.1.5. The proposed development for the Porthcawl Waterfront Regeneration comprises a mixed-use scheme including residential units, commercial spaces, leisure facilities such as a hotel, a food store, and a bus terminus. The plan also incorporates areas of public open space, aiming to transform the existing site – currently occupied by car parks, a former caravan park, recreation space, and a fun fair – into a vibrant, accessible, and multifunctional coastal destination.

Legislation and Policy Framework

12.1.6. The ground conditions assessment has been undertaken within the context of relevant legislation, planning policies and guidance documents.

Legislation

12.1.7. The following legislation are of relevance for this assessment:

- Construction (Design and Management) Regulations, 2015¹;
- Contaminated Land (England) (Amendment) Regulations, 2012²;
- Control of Pollution (Oil Storage) (England) Regulations 2001³;
- Control of Substances Hazardous to Health, 2002⁴;
- The Environment Act, 2021⁵;
- Environmental Damage (Prevention and Remediation) Regulations, 2015⁶;
- Environmental Permitting (England and Wales) Regulations, 2016⁷;
- Environmental Protection Act, 1990⁸;
- Environmental Protection (Duty of Care) Regulations, 1991⁹;
- Groundwater (England and Wales) Regulations, 2009¹⁰;
- Groundwater Directive (2006/118/EC)^{11,12};
- Landfill Directive, 1999/31/EC¹³;
- Landfill Tax (Contaminated Land) Order, 1996¹⁴;
- Landfill (England and Wales) Regulations, 2002¹⁵;

¹ Health and Safety Executive (2015) Construction (Design and Management) Regulations 2015.

² The National Archives No. 263 (2012) The Contaminated Land (England) (Amendment) Regulations 2012.

³ The National Archives No. 2954 (2001) The Control of Pollution (Oil Storage) (England) Regulations 2001.

⁴ Health and Safety Executive (2002) Control of Substances Hazardous to Health (COSHH) 2002.

⁵ Environment Agency (2021) The Environment Act 2021.

⁶ Defra (2009) The Environmental Damage (Prevention and Remediation) Regulations 2015.

⁷ The National Archives No. 1154 (2016) The Environmental Permitting (England and Wales) Regulations 2016.

⁸ The National Archives, C.43 (1990) The Environmental Protection Act 1990.

⁹ The National Archives No. 2839 (1991) Environmental Protection (Duty of Care) Regulations 1991.

¹⁰ The National Archives No. 2902. (2009). The Groundwater (England and Wales) Regulations 2009.

¹¹ The National Archives No. 118 (2006) Directive 2006/118/EC of the European Parliament and of the Council (2006).

¹² Groundwater Directive (2006/118/EC), Landfill Directive 1999/31/EC and Water Framework Directive (2000/60/EC and daughter directive 2006/118/EC as amended by 2013/39/EU) are all currently covered by the EU Withdrawal Act 2018 which retained all of the EU environmental law.

¹³ The National Archives No. 31 (1991) Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste

¹⁴ The National Archives No. 1529 (1996) Landfill Tax (Contaminated Land) Order 1996.

¹⁵ The National Archives No. 1559 (2002) Landfill (England and Wales) Regulations 2002.

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- Town and Country Planning Act, 1990¹⁶;
- Water Act, 2008¹⁷;
- Water Framework Directive (2000/60/EC and daughter directive 2006/118/EC as amended by 2013/39/EU)¹⁸; and,
- Water Resources Act 1991 (WRA 1991) and amendment 2009¹⁹.

12.1.8. UK legislation for contaminated land is principally contained in Part 2A of the Environmental Protection Act 1990 ("Part 2A")²⁰. Part 2A provides for contaminated land to be identified and dealt with in a risk-based manner. Contaminated land is defined under Part 2A (Section 78A (2) of the Environmental Protection Act (inserted by Section 57 of the Environment Act) as:

'Any land which appears to the local authority in whose area it is situated, to be in such a condition, by reason of substances in, on or under the land, that:

a) Significant harm is being caused or there is significant possibility of significant harm being caused; or

b) Significant pollution of controlled waters is being caused, or there is significant possibility of such pollution being caused'.

12.1.9. The Contaminated Land (England) Regulations 2006 (SI 2006/1380)²¹ accompany and set out provisions for procedural matters under Part 2A. The 2006 Regulations were modified with the introduction of The Contaminated Land (England) (Amendment) Regulations 2012²², which came into force on 6th April 2012. The modified regulations include an amendment to Regulation 3(c) to take account of the updated definition of "controlled waters" in Section 78A(9) of the Environmental Protection Act 1990. The guidance also provides for a four-category test to clarify when land does or does not need to be remediated, where Category 1 is deemed as being high risk and Category 4 as being low risk.

12.1.10. The need to consider contaminated land issues during the planning process is set out in the Town and Country Planning Act (Section 215). This Act gives Local Authorities the

¹⁶ The National Archives (1990) Town and Country Planning Act 1990 c. 8.

¹⁷ The National Archives (2008) Water Act 2008 c. 37.

¹⁸ The National Archives No 407 (2017) Water Framework Directive (2000/60/EC and daughter directive 2006/118/EC as amended by 2013/39/EU).

¹⁹ The National Archives No 57 (1991) Water Resources Act 1991.

²⁰ The National Archives 3026. (2005). The Environmental Protection Act 1990 (Amendment of Section 57) (England and Wales) Regulations 2005.

²¹ The National Archives No. 1380 (2006) The Contaminated Land (England) Regulations 2006.

²² Department of Environment, Food and Rural Affairs (April 2012) Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance.

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ability to require developers to investigate contamination and, if necessary, remediate the land.

- 12.1.11. Under the Control of Substances Hazardous to Health Regulations 2002 (COSHH)⁴ and the Construction and Design Management (CDM) Regulations 2015¹ where a developer knows or suspects the presence of contaminated soil, provision should be made to ensure that risks to the public and site workers are minimised.

National Planning Policy

The National Planning Policy Framework (NPPF) (NPPF)²³

- 12.1.12. The National Planning Policy Framework (NPPF) is the key national planning policy in considering land and contamination issues throughout the planning regime.
- 12.1.13. Section 15 'Conserving and enhancing the natural environment' describes the policy considerations the Government expects Local Planning Authorities to have regarding geology and soils as well as land contamination and agricultural land.
- 12.1.14. Paragraph 125c states that: 'Planning Policy and decisions should: ... give substantial weight to the value of using suitable brownfield land within settlements for homes and other identified needs, proposals for which should be approved unless substantial harm would be caused, and support appropriate opportunities to remediate despoiled, degraded, derelict, contaminated or unstable land';
- 12.1.15. Paragraph 187 states that: 'Planning policies and decisions should contribute to and enhance the natural and local environment by:
- a) Protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status, or identified quality in the development plan);*
 - b) Recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;*
 - e) Preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air,*

²³ Ministry of Housing, Communities and Local Government (December 2024) National Planning Policy Framework.

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water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and

f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.'

12.1.16. Paragraph 196 states 'Planning policies and decisions should ensure that:

a) a site is suitable for its proposed use taking account of ground conditions and any risks arising from land instability and contamination. This includes risks arising from natural hazards or former activities such as mining, and any proposals for mitigation including land remediation (as well as potential impacts on the natural environment arising from that remediation); b) after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990; and

c) adequate site investigation information, prepared by a competent person, is available to inform these assessments.

12.1.17. In terms of agricultural land, footnote 65 states 'where significant development of agricultural land is demonstrated to be necessary, areas of poorer quality land should be preferred to those of a higher quality.'

12.1.18. Section of the NPPF focuses on facilitating the sustainable use of minerals. It acknowledges in Paragraph 222 that:

'It is essential that there is a sufficient supply of minerals to provide the infrastructure, buildings, energy and goods that the country needs. Since minerals are a finite natural resource, and can only be worked where they are found, best use needs to be made of them to secure their long-term conservation'.

12.1.19. Local Planning Authorities are required in Paragraph 223 to protect and sustainably enhance the extraction of minerals through various means. One method is by defining Mineral Safeguarding Areas (MSAs) and by adopting appropriate policies so that known locations of specific minerals resources of local and national importance are not

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needlessly sterilised by non-mineral development where this should be avoided (whilst not creating a presumption that the resources defined will be worked). Paragraph 224 goes on to identify that great weight should be given to the benefits of mineral extraction, including to the economy.

12.1.20. Furthermore paragraph 225 states:

'Local planning authorities should not normally permit other development proposals in Minerals Safeguarding Areas if it might constrain potential future use for mineral working'.

Planning Practice Guidance²⁴

12.1.21. The NPPF is supported by Planning Practice Guidance 'Land affected by contamination' which provides guiding principles on how planning can deal with land affected by contamination.

Local Planning Policy

12.1.22. The Bridgend Replacement Local Development Plan (2018 – 2033) sets out the Council's proposals to support the regeneration and mixed-use development of Porthcawl Waterfront area. Key development objectives include the delivery of 1,100 homes (30% of which being affordable housing), new and expansion of existing education infrastructure, introduction of commercial and leisure facilities, improved public transport, all whilst ensuring climate resilience. 780 of the 1,100 homes are planned to be delivered by 2033, with the remaining 320 coming post-2033. The implementation of areas of the regeneration is supported by the Welsh Government.

12.1.23. Guidance Documents This assessment has been carried out in accordance with the following UK industry standards:

- Environment Agency, Land Contamination Risk Management (LCRM) (2025)²⁵;
- Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance²²;
- British Standards Institute, Code of practice for ground investigations BS5930:2015+A1:2020;
- British Standards Institute, Investigation of potentially contaminated sites – Code of practice BS 10175:2011+A1:2017;

²⁴ Department for Communities and Local Government (July 2019) Planning Practice Guidance: Land affected by contamination (ID:33) <https://www.gov.uk/guidance/land-affected-by-contamination>

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- BS EN 1997 Eurocode 7- Geotechnical Design- Part 1: General rules (2004) and Part 2: Ground Investigation and Testing (2007); and
- Revised guidelines and criteria for grading the quality of agricultural land. MAFF. 1988.

Limitations to the Assessment

- 12.1.24. Data used to compile this chapter consists of information derived from a variety of sources. The assumption is made that this data, as well as that derived from other secondary sources, is reasonably accurate.
- 12.1.25. This chapter is predominately based on findings of the Phase 1 desk-based assessment, which is reported in **Appendix 12.1**.
- 12.1.26. Unless otherwise specified, all distances within this report relate to the shortest distance between two described points. For example, the distance between the Application Site and the feature of interest is presented as the linear ('as the crow flies') distance between the closest points on their respective boundaries.
- 12.1.27. It is recognised that the baseline may not list all receptors within the study areas, however it includes all identified receptors from the reviews undertaken and is considered representative of the baseline at the time of the desk-based assessment. The assessment process is continually updated through the investigation process, with a reduction in conservatism and uncertainty of the information and impacts.
- 12.1.28. The assessment process is designed to enable good decision-making based on the best possible information about the environmental implications of the Proposed Development. However, there will always be some uncertainty as to the exact scale and nature of the environmental effects identified. Where this is the case, this has been highlighted in the assessment of effects. This arises through the detail of information available at the time of the assessment and the limitations of the prediction process itself.

12.2.Assessment Methodology

Background

- 12.2.1. Baseline data collection activities and the impact assessment were undertaken with reference to the current best practice guidance.
- 12.2.2. The methodology integrates desk study data, field reconnaissance, and previous site investigations to qualitatively assess geoenvironmental and geotechnical risks, supporting planning and remediation strategy development.
- 12.2.3. This Chapter is supported by further detailed information contained within the Hydrock Phase 1 Desk Study (Stantec Hydrock Ltd Report reference 333701677-STN-XX-XX-RP-GE-1000 P01) presented in **Appendix 12.1**. This desk study report contains both factual data of ground conditions and contamination, as well as review of available historical ground investigation data. Detailed ground investigation will be required to develop a remediation strategy prior to the construction of the Proposed Development commencing (to be known as the 'Works'). The approach used for gathering data for this assessment is outlined below:
- Review of third party environmental and geological databases;
 - Review of historical ordnance survey mapping to check for evidence of contaminative use;
 - A reconnaissance visit to determine current conditions and to check for visual or olfactory indicators of ground contamination associated with current and past uses;
 - Identification of current and future potential receptors that might be harmed as a result of contamination being present;
 - Preliminary Unexploded Ordnance (UXO) risk assessment; and
 - Formation of a Preliminary Conceptual Model identifying source-pathway-receptor linkages that may result in harm to the designated receptor.
- 12.2.4. Seven intrusive investigations have been undertaken across the Application Site by Earth Science Partnership and Quantum Geotech.
- 12.2.5. A conceptual site model has also been provided within **Appendix 12.1**, which identifies potential geological and contamination risks.

Assessment of Significance

- 12.2.6. To arrive at a judgement on the significance of effect on ground conditions, the assessment considers the relative importance of individual elements of the ground conditions and how these are likely to be affected.
- 12.2.7. The characterisation of potential likely significant effects of the Proposed Development on geology and soils, including environmental, geotechnical and hydrogeological considerations, is based on professional judgement and a combination of factors detailed in **Tables 12.1 to 12.3**.
- 12.2.8. Assessment of impacts and effects on receptors (soils, groundwater bodies, human health, buildings or infrastructure) will be based on the receptor's vulnerability to potential impacts associated with the Proposed Development's construction and operational phases.
- 12.2.9. Source-Pathway-Receptor Linkages will be assessed in general accordance with the guidance in the Environment Agency's Land Contamination: Risk Management (LCRM)²⁵ document and CIRIA Report C552²⁶ with the relevant importance determined by level of risk associated with each linkage eventuality occurring. Source-Pathway-Receptor Linkage risk will be assessed by likelihood of eventuality and consequence of eventuality of Source-Pathway-Receptor Linkages being completed and receptor being directly or indirectly impacted.

Ranking of Sensitivity/Value

- 12.2.10. The sensitivity of a receptor/resource is based on its relative importance using the scale in **Table 12.1**.

Table 12.1: Scale of Sensitivity used in the Assessment

Sensitivity	Description
Very High	<ul style="list-style-type: none"> Geology/Topsoil resource: Very high importance and rarity, international scale and very limited potential for substitution. Contamination: very high sensitivity proposed land use (e.g. residential, allotments). Groundwater: aquifer that provides significant quantities of water and supports water supply and/or baseflow to rivers/lakes/wetlands on a strategic scale, and with a high vulnerability to pollution (e.g. Principal aquifer with high vulnerability)

²⁵ Environment Agency (2025) Land Contamination: Risk Management (LCRM).

²⁶ D J Rudland, R M Lancefield & P N Mayell (2001) CIRIA C552 Contaminated Land Risk Assessment – a guide to good practice.

	<ul style="list-style-type: none"> • Very high importance and rarity, international scale and very limited potential for substitution.
High	<ul style="list-style-type: none"> • Geology/Topsoil resource: High importance and rarity, national scale and limited potential for substitution. • Contamination: high sensitivity proposed land use (e.g. public open space). • Groundwater: aquifer that provides significant quantities of water and supports water supply and/or baseflow to rivers/lakes/wetlands on a strategic scale, and with a low vulnerability to pollution (e.g. Principal aquifer with low vulnerability). • High importance and rarity, national scale, and limited potential for substitution.
Medium	<ul style="list-style-type: none"> • Geology/Topsoil resource: High or medium importance and rarity, regional scale, limited potential for substitution. • Contamination: medium sensitivity proposed land use (e.g. commercial or industrial). • Groundwater: support water supply at a local rather than strategic scale, and with a high vulnerability to pollution (e.g. Secondary A aquifer with high vulnerability). • High or medium importance and rarity, regional scale, limited potential for substitution.
Low	<ul style="list-style-type: none"> • Geology/Topsoil resource: Low or medium importance and rarity, local scale. • Contamination: low sensitivity proposed land use (e.g. highways or rail). • Groundwater: support water supply at a local rather than strategic scale, and with a low vulnerability to pollution (e.g. Secondary A aquifer with low vulnerability). • Low or medium importance and rarity, local scale.
Negligible	<ul style="list-style-type: none"> • Geology/Topsoil resource: Very low importance and rarity, local scale. • Contamination: undeveloped surplus land. • Groundwater: rocks with negligible significance for water supply or baseflow to rivers/lakes/wetlands. • Bedrock or superficial deposits with a low permeability (e.g. Unproductive strata). • Very low importance and rarity, local scale.

Assessment of Impact Magnitude

12.2.11. The magnitude of an impact 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. 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 12.2**.

Table 12.2: Criteria used to Define the Magnitude of an Impact

Sensitivity	Description
Very Large	<ul style="list-style-type: none"> Loss of resource and / or quality and integrity of resource; severe damage to key characteristics, features or elements (Adverse). Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality (Beneficial).
Large	<ul style="list-style-type: none"> Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements (Adverse). Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality (Beneficial).
Medium	<ul style="list-style-type: none"> Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristic, feature or element (Adverse). Minor benefit to, or addition to, one (maybe more) key characteristic, features or element; some beneficial impact on attribute to a reduced risk of negative impact occurring (Beneficial).
Small	<ul style="list-style-type: none"> Very minor loss or detrimental alteration to one or more characteristics, features or elements (Adverse). Very minor benefit to or positive addition of one or more characteristics, features or elements (Beneficial).
Negligible	<ul style="list-style-type: none"> No loss or alteration of characteristics, features or elements; no observable impact in either direction.

Assessment of Significance of Effect

12.2.12. 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 the considerations described above. The significance of effect matrix is set out in **Table 12.3**. It is assumed for the purposes of this assessment that any effects of **moderate significance or greater will be significant in EIA terms**.

Table 12.3: Significance of Effect Matrix

		Magnitude of Impact (Degree of Change)					
		No Change	Negligible	Small	Medium	Large	Very Large
Environmental Value (Sensitivity)	Very High	Neutral	Minor	Moderate to Major	Major to Very Major	Very Major	Very Major
	High	Neutral	Minor	Minor to Moderate	Moderate to Major	Major to Very Major	Very Major
	Medium	Neutral	Neutral to Minor	Minor	Moderate	Moderate to Major	Major

	Low	Neutral	Neutral to Minor	Neutral to Minor	Minor	Minor to Moderate	Moderate
	Negligible	Neutral	Neutral	Neutral to Minor	Neutral to Minor	Minor	Minor

12.2.13. In the context of the Proposed 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 operation phase.

12.3. Baseline Conditions

Introduction

- 12.3.1. This section summarises the baseline conditions on the Application Site (and its immediate vicinity where appropriate). Further detailed information is provided in **Appendix 12.1.**

Site Description and Context

- 12.3.2. The proposed development is centred around National Grid Reference 282403, 176928, Eastern Promenade, CF36 5TS. The Application Site covers an area of approximately 41ha and is irregular in shape, stretching approximately 850m from the most northern point to southern tip of the breakwater, and 1km from east to west.
- 12.3.3. The former dock, shipbuilding, caravan park and amusement park areas comprises significant hardstanding and other fixed surface infrastructure, buildings and built structures. It is understood that existing infrastructure related to the Coney Beach Pleasure Park will be demolished.
- 12.3.4. The Application Site is generally flat, with elevations increasing slightly towards the northern and northeastern edge of the Application Site, where land rises away from coastal flatlands. Most of the Application Site, especially the central and southern areas near the harbours and promenade, sit between 11 and 12m AOD.

Baseline Survey Information

Current site use

- 12.3.5. At present, the Application Site is primarily used for commercial and leisure purposes, with car parks, a supermarket, and a bus station in the west, Porthcawl Marina along the southern section, and a pumping station in the central zone. The former Coney Beach Pleasure Park currently occupies part of the centre (now in the process of being demolished), while the east contains a former caravan park and open grass areas. Additional features include a telecommunications mast near the north, small commercial units along the northwest and west, emergency services toward the northern boundary, multiple electrical substations (including one active northwest of the centre), a gas valve compound, and Station Hill Garage on the western side.
- 12.3.6. In the immediate area around the Application Site, an active fire station is present 50 meters to the north, with an ambulance station 41 meters to the northwest.

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- 12.3.7. Asbestos was noted in multiple asbestos screenings within samples taken from Made Ground in the infilled dock area.

Site History**Dock**

- 12.3.8. Between 1825 and 1911, the western area of the Application Site was occupied by a dock, with a shipbuilding yard and smithy to the north. The shipbuilding yard ceased prior to 1899, whilst the harbour remained until 1906, where the inner harbour closed, followed by full operations being ceased in 1911. The inner harbour was later infilled and repurposed to, what is now, the Salt Lake car park.

Sawmill

- 12.3.9. Positioned on the western boundary, adjacent to the dock, a sawmill was recorded on Ordnance Survey maps from 1880, however was not recorded on the 1899 map.

Tramway and railway

- 12.3.10. A series of tramway and railway lines were present on the 1880 OS maps, extending northward beyond the Application Site boundary. These lines were likely used to support shipbuilding, smithy and sawmill operations. By 1899, railway and tramway lines had expanded to the west of the dock to increasing transport capacity. In 1914, an engine shed related to the tramway/railway infrastructure was constructed, later repurposed for the new Coney Beach Amusement Park (1918). By 1966, the station became disused and was demolished in 1969, the former tramway had been converted into a trackway.

Coney Beach Pleasure Park

- 12.3.11. As mentioned, the Pleasure Park (opened in 1918) occupies the former engine shed. The park was closed in October 2025 and is due to be demolished for the proposed developments.

Gas works and gasometer

- 12.3.12. Two historical gas works were identified, one located to the centre of the Application Site, first recorded in 1884, with no records beyond 1919. Off site, a gas works was present 2 meters northeast of the Application Site boundary, first recorded in 1880, with no records beyond 1900. Between 1880 and 1919, five gasometers were recorded, three of which in a cluster in the northern central part of the Application Site, with the other 2 positioned 3 meters northeast.

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Sand pit

12.3.13. Two historical sand pits were identified with the Application Site, one located centrally and first recorded in 1914, and the other in the central northern area, first recorded in 1948. Both features were only recorded in those respective years, indicating short-term extraction activities.

Electricity Substations

12.3.14. Several electricity substations were historically recorded on-site, with the earliest appearing in 1966 and the most recent in 1995. These were distributed across various parts of the Application Site, primarily in the central and northern zones.

Garages

12.3.15. A total of 24 garages were identified within 500m of the Application Site. Three were located on-site, first recorded in 1965 and last noted in 1988. The remaining garages, mostly to the northwest and northeast, were recorded between 1962 and 1996, indicating long-standing vehicle-related infrastructure in the area.

Geology

12.3.16. Porthcawl's geology comprises areas of substantial (up to 12m bgl) Made Ground, associated with the historical dock infill. Beneath this, superficial deposits include Blown Sand and Marine Beach Deposits, overlying a bedrock of Oxwich Head Limestone, characterised by interbedded limestone and mudstone of Carboniferous age. BGS Onshore Geoindex notes Mercia Mudstone as being present, however it was not encountered in any of the intrusive investigations reviewed as part of the Phase 1 Desk Study.

Hydrogeology

12.3.17. The solid geology within the Application Site (Oxwich Head Limestone) is designated as a Principal aquifer, with the superficial deposits (Blown Sand and Marine Beach Deposits) both considered as Secondary A aquifers.

12.3.18. Groundwater levels both during fieldwork and post-fieldwork varied between 0.2 and 21m bgl. The groundwater bodies across these strata are likely to be in hydraulic continuity with Sandy Bay, implying groundwater levels are tidally influenced.

12.3.19. It is anticipated that groundwater flow direction is to the south, towards Sandy Bay and the Bristol Channel.

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12.3.20. There are no recorded active groundwater abstractions within 250m of the Application Site.

12.3.21. The Application Site is not located within a Source Protection Zone.

Hydrology

12.3.22. The Application Site is directly adjacent to the Bristol Channel.

12.3.23. Two surface water features were identified within 250m of the Application Site, both small ponds, 23 meters east and 50 meters west respectively.

12.3.24. Historically there was one on-site effluent discharge to dock water (ceased in 2002), with one active sewage discharge permit 490 meters to the west.

Regulatory Information

12.3.25. There are 37 records of historical tanks within the surrounding 500m, primarily located historical industrial features (docks, railway sidings, shipyard).

12.3.26. There are 13 records of substations on-site and within the surrounding 500m between 1962 and 1996, primarily associated with pumping stations, transformers and electricity.

12.3.27. There are two records of current petrol stations within 500m to the east/northeast.

12.3.28. There are 16 records of historical garages present between 1962 and 1996, located on site and up to 464m to the northwest/northeast.

12.3.29. There are 2 records of Part A(2) and Part B installations regulated under the Environmental Permitting Regulations 2016 for the release of substances to the environment. These relate to dry cleaning, petrol storage and vehicle servicing.

12.3.30. There are no records of historical radioactive substance authorisations on or in the surrounding 500m around the Application Site.

12.3.31. There are 2 records of BritPits between 200 and 300m, related to the extraction of sandstone and limestone, both now ceased.

12.3.32. Five waste exemptions have been recorded within 500m of the site; 1 on-site on the Eastern Promenade, with the remaining 4 between 70 and 450m around site in varying directions. These waste exemptions are regulated by Natural Resources Wales (NRW), and mostly relate to pharmaceutical waste management.

12.3.33. One historical landfill (inert) was been recorded 36m north of the Application Site. There are no active or recent landfills recorded on or around the site.

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Radon

12.3.34. The radon risk is reported in the environmental report (**Appendix 12.1**) and is reported to affect between 10% and 30% of properties on site, this requires full radon protection measures to be implemented in any future developments.

Unexploded Ordnance (UXO)

12.3.35. A non-specialist Zetica screening exercise has been undertaken, which classified the Application Site as having low risk of UXO.

Initial Conceptual Site Model and Preliminary Risk Assessment

12.3.36. The initial Conceptual Site Model (CSM) and Preliminary Risk Assessment incorporates evidence from the site walkover, the Desk Study (**Appendix 12.1**), and previous investigations carried out in the vicinity of the Application Site. The formulation of an initial CSM is a key component of the LCRM²⁵ methodology for assessing geoenvironmental risk and incorporates the Preliminary Ground Model of the site physical conditions and the identification of potential contaminant linkages.

12.3.37. The available information has been used to identify geo-environmental hazards and to establish potential contaminant linkages based on the source-pathway-receptor (S-P-R) approach. A viable contaminant linkage requires all the components of an S-P-R to be present. If only one or two are present, there is no linkage and no further assessment is required.

12.3.38. Health and safety risks to site contractors and maintenance workers have not been assessed as part of this study and will need to be considered separately.

Potential on-site sources of contamination

12.3.39. The following potential sources of contamination have been identified.

12.3.40. Thick areas of Made Ground, associated with current and historical industrial activities, specifically the infilled shipbuilding yard and sawmill, possibly including elevated concentrations of metals, metalloids, asbestos fibres, Asbestos Containing Materials (ACM), polycyclic aromatic hydrocarbons (PAH) and petroleum hydrocarbons;

- Asbestos fibres and ACM within existing buildings / from demolition of former structures;
- Hydrocarbon fuels, lubricants, and solvents from the operation of the former (1965-1988) and existing garages and bus station;

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- Coal tar is not confirmed to be on-site, however the presence of an old gas works and gasometer on-site indicates the potential presence of coal tar or bituminous bound pavement;
- PCBs and oils related to the existing electricity sub-station;
- Unspecified leakages linked to the numerous historical tanks, likely used as storage for fuels, chemicals or waste;
- Hydrocarbon and heavy metal residues related to historical railway sidings and related buildings;
- Organic materials in the Made Ground materials producing ground gases (carbon dioxide and methane);
- Naturally occurring elevated concentrations of metal (arsenic and vanadium) within soils;
- Wastewater contamination related to the pumping station to the west of the Application Site boundary; and,
- Radon.

Potential off-site sources of contamination

12.3.41. An inert historical landfall is present 36m north of the Application Site, used for industrial, commercial and household waste purposes;

12.3.42. Nearby industry uses e.g. dry cleaning (89m W) and second-hand vehicle sales (87m NE) can pose the risk of solvent release or hydrocarbon spills respectively;

- Eleven reported pollution incidents in the surrounding 500m in various directions, including diesel spills and both soil and atmospheric pollutants, however the cause is unspecified;
- Leaks from tanks to the northeast and northwest between 1m and 441m of the Application Site (likely to represent above ground fuel tanks containing petroleum hydrocarbons); and,
- Made Ground, associated with the current and historical use of the surrounding area (specifically gas, railway and shipbuilding works), possibly including elevated concentrations of metals, metalloids, asbestos fibres, ACM, PAHs and petroleum hydrocarbons.

Potential pathways

12.3.43. The following potential pathways have been identified:

- Ingestion and dermal contact with soils;

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- Ingestion, inhalation and dermal contact with soil-derived dust;
- Ingestion of soil attached to homegrown produce (fruit/vegetables) and ingestion of homegrown produce;
- Inhalation of fibres;
- Inhalation of vapours;
- Leaching through the unsaturated zone to the groundwater in the Principal and Secondary A aquifers;
- Migration of contaminants within groundwater to the surface waters e.g. the Bristol Channel;
- Direct contact with building materials;
- Root uptake by plants/vegetation; and,
- Migration and build-up of ground gases from organic material, leading to asphyxiation or explosion.

Potential receptors

12.3.44. The following potential receptors in relation to the proposed land use have been identified:

- People (neighbours, site end users);
- Development end use (buildings, utilities and landscaping);
- Groundwater (Principal and Secondary A aquifers present with high groundwater vulnerability noted); and
- Surface water (Bristol Channel).

12.3.45. The receptor sensitivity is as follows:

- People (neighbours, site end users) – Very High;
- Development end use (buildings, utilities and landscaping) – Very High;
- Groundwater: Principal aquifer status of White Limestone Formation and Secondary A aquifer status of the Horsehay Sand Formation and Head Deposits – High; and
- Surface water: on-site drainage ditches, River Cherwell and Oxford Canal 600m west of site – Medium.

12.4. Assessment of potential Effects, Mitigation Measures and Residual Effects

Potential Effects

- 12.4.1. The potential effects of the Proposed Development and their significance during the construction phase and for the completed development are detailed below.

Construction

Health and safety risks to future users from potential existing ground contamination, ground gas or other materials

- 12.4.2. Significant potential sources of contamination have been identified based on the Application Sites historical land use. During the construction phase (assuming a phased redevelopment), the future site users and neighbours may be exposed to contaminated soils and groundwater from dermal contact, ingestion or inhalation of fugitive dust and ground gases/vapours. ACM may be present in existing buildings and airborne fibres may be released upon demolition and inhaled by ground workers, neighbours and visitors. The impact of these effects on human health receptors, prior to the implementation of mitigation, would result in **a minor to moderate adverse significance. This is not significant in EIA terms.**
- 12.4.3. Intrusive investigation is required to assess the risk to future site users. However, where contamination is discovered during construction, it will be addressed through the effective implementation of the Remediation Strategy and Verification Plan. During construction, key effects will relate to exposure of site workers and current/future site users to potentially contaminative materials and release of potentially contaminated materials, including dust, odours and groundwater from the construction activities. These will be minimised through the effective implementation of the Construction Environmental Management Plan (CEMP) which includes the requirements for appropriate induction training and provision of Personal Protective Equipment (PPE) and welfare facilities. The CEMP would be prepared as part of a planning condition.
- 12.4.4. Furthermore, health and safety documentation (Construction Management Plan (CMP)) will be prepared prior to construction commencing so that it is available to all construction workers and visitors during the construction period. The CMP will include measures to ensure worker safety and public and environmental amenity are fully compliant with the:

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Health and Safety at Work etc. Act²⁷; The Construction (Design and Management) Regulations¹; Environmental Protection Act⁸; and Control of Substances Hazardous to Health Regulations⁴. The measures will include a discovery strategy to address any areas of contamination in the event that these are encountered during construction.

- 12.4.5. Through the effective implementation of mitigation solutions such as intrusive investigation, a Remediation Strategy and Verification Plan and subsequent verification, the CEMP and CMP, the impacts will reduce to a direct minor magnitude resulting in long term effects of **neutral significance, which is not significant in EIA terms**.

Risks to proposed new landscaped areas from the release of existing contamination

- 12.4.6. Proposed soft landscaping may be impacted from the presence of contaminants in the soils and shallow groundwater, although visual stress/damaged to existing vegetation has not been recorded. This circumstantial evidence indicates that the likelihood of this effect over a large area of the Proposed Development is low.
- 12.4.7. Contamination identified by investigation works will be suitably mitigated during the construction stage following the implementation of a Remediation Strategy and Verification Plan and placement of clean cover, if required, following the results of the necessary survey work. Where survey work has deemed contaminants present in the soil/ shallow ground water, the sensitivity of the receptor is high. The magnitude of change for these area, prior to mitigation, is medium adverse and would result in a **moderate to major adverse significance**. Following implementation of the mitigation measures, where required, the impacts will be of direct minor magnitude resulting in long term effects of **neutral significance which is not significant in EIA terms**.

Risks to groundwater and surface water from the release of existing contamination

- 12.4.8. During construction, there is the potential for activities such as demolition of existing structures, disturbance of Made Ground, dewatering, tank decommissioning, tank removal and groundworks to result in the mobilisation of contamination within the shallow soils into nearby off-site surface water receptors (Bristol Channel). This could also lead to the leaching of potential contaminants into the underlying Principal aquifer associated with the Oxwich Head Limestone Formation, and Secondary A aquifers of the Blown Sand and Marine Beach Deposits.

²⁷ Health and Safety Executive (1974). Health and Safety at Work etc Act 1974.

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12.4.9. Following a programme of intrusive investigation, any identified contaminants will be suitably mitigated through the implementation of a Remediation Strategy and Verification Plan. Tanks that have been identified as holding contaminants will be decommissioned and removed in line with best practice and under the supervision of a geoenvironmental specialist and in line with a CEMP. Where required, impacted soils will be chased out, excavated and removed off-site.

12.4.10. The sensitivity of controlled waters is high and the magnitude of change, prior to mitigation, is large adverse and would result in a **major to very major adverse significance**. Mitigation through the effective implementation of targeted intrusive investigation, a Remediation Strategy and Verification Plan and the CEMP, the impacts to groundwater and surface water will be of a direct, minor magnitude resulting in long term effects of **neutral significance which is not significant in EIA terms**.

Risks to groundwater and surface water from potential contamination attributable to construction plant / activities

12.4.11. During the construction process, the local Controlled Waters (surface and ground) may be impacted by spillages or leakages and run-off from any potential dewatering activities, if these were not regulated and controlled. The mitigation methodology (such as the implementation of silt nets, temporary drainage channels and use of plant nappies) and implementation are to be the responsibility of the appointed Principal Contractor. Migration pathways could be created during construction of service routes, foundations, attenuation features or cut/fill exercises and contaminants could be released or remobilised during disturbance of contaminated soils if not suitably controlled.

12.4.12. The sensitivity of controlled waters is medium to high and the magnitude of change, prior to mitigation, is large adverse and would result in a **major to very major adverse significance**. Through the effective implementation mitigation strategies such as a CMP, a CEMP and a discovery strategy as part of the Remediation Strategy and verification Plan, the impacts will be of a direct minor magnitude resulting in long term effects of **neutral significance which is not significant in EIA terms**.

Risks to new structures, primarily foundations and services from ground contamination

12.4.13. Foundations required as part of the Proposed Development will likely penetrate into the Local underlying Oxwich Head Limestone Formation (Principal aquifer). Areas of Blown Sand and Marine Beach Deposits (both Secondary A aquifers) are located on-site also. As a result, mobilisation and spread of potential contaminations located in the upper strata on the Application Site may occur downwards into the underlying aquifers.

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12.4.14. Intrusive investigation is to be undertaken across the Application Site to assess the potential risks and to inform detailed design of the Proposed Development. A Remediation Strategy and Verification Plan will be undertaken which will also include recommendations for the requirements for barrier pipes for water supply pipes and appropriate design of concrete.

12.4.15. The sensitivity of development end use (buildings, utilities and landscaping) is very high and the magnitude of change, prior to mitigation, is very large adverse and would result in a **major to very major adverse significance**. Following the mitigation of intrusive investigation and the effective implementation of a Remediation Strategy and Verification Plan, the impacts will be of direct minor magnitude resulting in long term effects of **neutral significance which is not significant in EIA terms**.

Risks to existing adjacent structures, from proposed construction activities

12.4.16. During the works, the existing adjacent structures may be impacted by spillages or leakages and run-off from dewatering activities, if these were not regulated and controlled. The mitigation methodology (such as the implementation of silt nets, temporary drainage channels and use of plant nappies) and implementation are to be the responsibility of the appointed Principal Contractor and would be detailed on the CEMP and CMP. Migration pathways could be created during construction of service routes, foundations, attenuation features or cut/fill exercises and contaminants could be released or remobilised during disturbance of contaminated soils if not suitably controlled.

12.4.17. The sensitivity of adjacent structures is high and the magnitude of change, prior to mitigation, is very large adverse and would result in a **major adverse significance**. Following intrusive investigation and the effective implementation of a CEMP and CMP, the impacts will be of indirect minor magnitude resulting in long term effects of **neutral significance which is not significant in EIA terms**.

12.4.18. The opportunities to re-use soil arisings and appropriate 'management' and disposal of contamination or hazardous waste materials removed from the site.

12.4.19. **During** the construction phase there will be excavation and movement of soils within and off the Application Site. Any re-use of site won soils or importation of soils will be completed under a Definition of Waste Code of Practice (DoWCoP) Materials Management Plan (MMP), which will be declared to Contaminated Land: Applications in Real Environments (CL:AIRE) by a Qualified Person (QP), covering the movement of materials and outlining the appropriate segregation of Made Ground and natural material.

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Unsuitable soils which may be impacted by contamination will be subject to mitigation in the form of remediation or off-site disposal as appropriate.

12.4.20. With mitigation in the forms of a MMP in place, the impact to ground/soil is considered to be of minor beneficial significance due to the potential improvement of conditions at the Application Site through remediation (if required where contamination is identified) and the sustainable re-use of soils. **This minor beneficial significance is not significant in EIA terms.**

Operation

12.4.21. Once the Proposed Development is fully operational, future site users are unlikely to be exposed to contamination through the following sources:

- Dermal contact;
- Direct contact with building materials;
- Ingestion or inhalation of fugitive dust;
- Inhalation of ground gases through accumulation of unvented buildings and rooms; and,
- Ingestion of impacted drinking water through permeation of organic contamination through potable water pipe.

12.4.22. The contamination identified by intrusive investigation will be addressed during the construction phase of the Proposed Development by suitable mitigation measures put in place as part of the Remediation Strategy and Verification Plan. Mitigation would be implemented to control identified risks, which would create a betterment of the Application Site and therefore these impacts are considered to be of **neutral significance which is not significant in EIA terms.**

12.4.23. New planting for the Proposed Development is unlikely to be impacted by contamination from soils or groundwater through root uptake. Contamination identified by investigation works will be suitably mitigated during the construction stage. Mitigation would be implemented to control identified risks, which would create a betterment of the Site. Implementation of the Remediation Strategy and Verification Plan, which may include mitigation measures such as a cover system in areas of soft landscaping will also reduce the potential for uptake of contamination, and therefore these impacts are considered to be of **neutral significance which is not significant in EIA terms.**

12.4.24. No additional major contamination sources are likely to be introduced with the Proposed Development, except for fuel or oil leakages around roads and car park areas which will

be mitigated through the construction design. These impacts are considered to be of **neutral significance which is not significant in EIA terms.**

Mitigation and Enhancement Measures

12.4.25. This section provides a description of the mitigation measures proposed to minimise the potential significant adverse effects identified by the assessment as set out previously.

12.4.26. It is considered that additional works in appropriate investigation locations comprising trial pits, boreholes and/or window samples will be required prior to commencement of construction of the parcel from the Proposed Development.

12.4.27. Based on the information reviewed to date and the contaminants identified within the soil and groundwater, remediation is likely to be required to mitigate risks posed to human health, controlled water receptors, buildings and structures. A Remediation Strategy and Verification Plan is likely to be required as a part of the planning process, which is to be agreed with the Local Authority following the completion of intrusive investigation. It is proposed that this need for this intrusive investigation would be a pre-commencement planning condition. A programme of remediation will be carried out as part of the enabling works in line with a Remediation Method Statement, which is to be agreed with the Local Authority. The key principles of the strategy may include, but not be limited to the following:

- Completion of site investigations to inform the remediation;
- Completion of a Remediation Options Appraisal;
- Removal of any above and below ground tanks and delineation of any visual / olfactory indicators of contamination;
- Provision of a clean cover layer or suitable break layer in soft landscaping areas where located on existing Made Ground;
- Provision of gas/vapour protection measures in the proposed buildings;
- The use of appropriate water supply pipe material, correct design of concrete and clean service corridors;
- Watching brief and discovery strategy (particularly with respect to free phase hydrocarbons and asbestos); and,
- Materials and waste management.

12.4.28. The completion of the remedial measures will be documented in a Verification Report (and plans) for submission to the Local Authority. The above outline remedial measures will be implemented in full (as per the agreed Remediation Strategy/manufacturers

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specification) prior to the occupation of the Proposed Development. Any further maintenance/construction works during operation will be subject to further assessment should the integrity of the implemented remedial measures be compromised.

Additional Mitigation

12.4.29. It is assumed that construction workers would use appropriate Personal Protective Equipment (PPE), Respiratory Protective Equipment (RPE) and good site practices throughout the duration of the works.

12.4.30. It is also assumed that standard environmental control measures are put in place in accordance with the CEMP.

12.4.31. Contaminated ground materials that cannot be reused will be suitably managed to prevent mobilisation to the environment and to minimise the potential to impact sensitive receptors, prior to disposal. A Materials Management Plan (MMP) will be produced, if necessary, following the CL:AIRE 'Definition of Waste: Development Industry Code of Practice', or exemptions/environmental permits, to ensure that soil re-use and imported materials are suitable for their intended use and will not significantly affect human health or the environment.

12.4.32. A summary of the likely required mitigation measures are summarized in **Table 12.4** below.

Table 12.4: Mitigation

Ref	Measure to avoid, reduce or manage any adverse effects and/or to deliver beneficial effects	How measure would be secured		
		By Design	By S.106	By Condition
1	Targeted Intrusive investigation			X
2	Options Appraisal			X
3	Remediation Strategy and Verification Plan (and subsequent implementation of the suggested remedial measures)	X		X
4	Remediation verification			X
5	Construction Management Plan			X
6	Construction Environmental Management Plan			X

Residual Effects

12.4.33. Assuming that the above mitigation measures are adopted, the residual effect for all receptors is considered to be a direct, permanent, long-term, beneficial residual effect which is considered to be **negligible which is not significant in EIA terms**.

12.4.34. The residual effect is considered to be insignificant.

Cumulative Effects

12.4.35. As outlined previously in this ES, cumulative effects have not been considered, and it was agreed within the BCBC Scoping Opinion response this could be scoped out of the EIA.

Demolition and Construction Phase

12.4.36. Provided that the requirements of relevant policy and legislation relating to land contamination and remediation are adopted in the scheme design and that appropriate mitigation measures are applied during the demolition and construction phases of each nearby development, it is considered that the cumulative residual effects on ground conditions will have **no significance which is not significant in EIA terms**.

Operational Phase

12.4.37. Remediation works, or the removal of contaminated soils associated with the demolition and preparatory ground works, basement and foundation excavations carried out at each of these nearby cumulative development sites would be expected to result in a minor to major beneficial cumulative effect to the local environment in terms of ground conditions. Where this beneficial effect reaches **moderate, it would be deemed significant in EIA terms**.

12.5. Conclusions

12.5.1. This section summarises the likely significant effects of the Application Site in terms of ground conditions.

Likely Significant Effects

12.5.2. Based on the baseline information, the potential significant effects have been identified as;

- Health and safety risks to future site users from potential existing ground contamination, ground gas or other materials;
- Risks to proposed new landscaped areas from the release of existing contamination;
- Risks to groundwater and surface water from the release of existing contamination;
- Risks to groundwater and surface water from potential contamination attributable to construction plant / activities;
- Risks to new structures, primarily foundations and services from ground contamination;
- Risks to existing adjacent structures, from proposed construction activities; and
- The opportunities to re-use soil arisings and appropriate 'management' and disposal of contamination or hazardous waste materials removed from the Application Site.

12.5.3. Assuming the implementation of the below mitigation measures, the above likely significant effects are considered to be insignificant.

Mitigation and Enhancement

12.5.4. Prior to redevelopment, intrusive investigation is required to refine the identified geoenvironmental risks. The results of the intrusive investigation will feed into an Options Appraisal, Remediation Strategy and Verification Plan. Likely remedial mitigation measure may include, but not be limited to, the removal of above and below ground tanks (including excavation of visual and olfactory indicators of contamination), provision of clean cover in areas of soft landscaping, provision of gas/vapour protection measures in new buildings, appropriate use of water supply pipe material, and implementation of a watching brief and discover strategy. The remedial mitigation measures will be verified in a Verification Report. It is considered that the above mitigation measures will be secured by planning condition. It is also considered that a CEMP and CMP will also be required as part of the planning condition.

Conclusion

- 12.5.5. Assuming the implementation of the Remediation Strategy and Verification Plan and subsequent verification, it is considered that there would be no significant adverse effects to the Proposed Development.
- 12.5.6. **Table 12.6** provides a summary of effects, mitigation and residual effects.

Table 12.6: Summary of Effects, Mitigation and Residual Effects

Receptor / Receiving Environment	Description of Effect	Nature of Effect *	Sensitivity Value**	Magnitude of Effect**	Geographical Importance ***	Significance of Effects ****	Mitigation / Enhancement Measures	Residual Effects ****
Construction								
Construction Workers	Health and safety risks to future users from potential existing ground contamination, ground gas or other materials	Permanent direct	Very High	Very Large adverse	District or Local	Minor to moderate adverse	Intrusive investigation to inform a Remediation Strategy and Verification Plan. Implementation of a CEMP Provision of PPE/RPE (PPE) and welfare facilities for protection to construction workers Subsequent verification of remedial measures.	Neutral Not significant
Soft landscaping	Risks to proposed new landscaped areas from the release of existing contamination	Permanent direct	High	Large adverse	District or Local	Moderate to major adverse	Intrusive investigation to inform a Remediation Strategy and Verification Plan. Anticipated clean cover in areas of proposed soft landscaping	Neutral Not Significant

Receptor / Receiving Environment	Description of Effect	Nature of Effect *	Sensitivity Value**	Magnitude of Effect**	Geographical Importance ***	Significance of Effects ****	Mitigation / Enhancement Measures	Residual Effects ****
							Subsequent verification of remedial measures.	
Controlled waters (surface and groundwater)	Risks to groundwater and surface water from the release of existing contamination	Permanent direct	High	Large adverse	District or Local	Major to very major adverse	Intrusive investigation to inform a Remediation Strategy and Verification Plan. Implementation of a CEMP Subsequent verification of remedial measures.	Neutral Not Significant
Controlled waters (surface and groundwater)	Risks to groundwater and surface water from potential contamination attributable to construction plant / activities	Permanent direct	Medium to High	Large adverse	District or Local	Major to very major adverse	Intrusive investigation to inform a Remediation Strategy and Verification Plan. Implementation of a CMP and CEMP Subsequent verification of remedial measures.	Neutral Not Significant
Structures (foundations and services)	Risks to new structures, primarily foundations and services from ground contamination	Permanent direct	Very High	Very large adverse	District or Local	Very major adverse	Intrusive investigation to inform a Remediation Strategy and Verification Plan including design	Neutral Not Significant

Receptor / Receiving Environment	Description of Effect	Nature of Effect *	Sensitivity Value**	Magnitude of Effect**	Geographical Importance ***	Significance of Effects ****	Mitigation / Enhancement Measures	Residual Effects ****
							of water pipes and concrete. Subsequent verification of remedial measures.	
Adjacent structures	Risks to existing adjacent structures, from proposed construction activities	Permanent direct	Very High	Very large adverse	District or Local	Very major adverse	Intrusive investigation to inform a Remediation Strategy and Verification Plan. Implementation of a CMP and CEMP Subsequent verification of remedial measures.	Neutral Not Significant
Operation								
Operational site users	Health and safety risks to future users from potential existing ground contamination, ground gas or other materials	The summary of effects are considered to be the same as the construction phase.						
Soft landscaping	Risks to proposed new landscaped areas from the release of existing contamination	The summary of effects are considered to be the same as the construction phase.						
Controlled waters (surface and groundwater)	Risks to groundwater and surface water from the release of	The summary of effects are considered to be the same as the construction phase.						

Receptor / Receiving Environment	Description of Effect	Nature of Effect *	Sensitivity Value**	Magnitude of Effect**	Geographical Importance ***	Significance of Effects ****	Mitigation / Enhancement Measures	Residual Effects ****
	existing contamination							
Controlled waters (surface and groundwater)	Risks to groundwater and surface water from potential contamination attributable to construction plant / activities	The summary of effects are considered to be the same as the construction phase.						
Structures (foundations and services)	Risks to new structures, primarily foundations and services from ground contamination	The summary of effects are considered to be the same as the construction phase.						
Adjacent structures	Risks to existing adjacent structures, from proposed construction activities	The summary of effects are considered to be the same as the construction phase.						
Cumulative and In-Combination								
Not applicable								

12.6. References

AGS (2006) 'AGS Guidelines for Good Practice in Site Investigations'.

BS EN 1997 Eurocode 7- Geotechnical Design- Part 1: General rules (2004) and Part 2: Ground Investigation and Testing (2007); and

British Standards Institute, Code of practice for ground investigations BS5930:2015+A1:2020

British Standards Institute, 'Investigation of potentially contaminated sites – Code of practice'. BS 10175:2011+A2:2017

British Standards Institute, 'Soil quality – Conceptual site models for potentially contaminated sites. BS EN ISO 21365:2020

Defra (2009) The Environmental Damage (Prevention and Remediation) Regulations 2015.

Department for Communities and Local Government (July 2019) Planning Practice Guidance: Land affected by contamination (ID:33) <https://www.gov.uk/guidance/land-affected-by-contamination>

D J Rudland, R M Lancefield & P N Mayell (2001) CIRIA C552 Contaminated Land Risk Assessment – a guide to good practice.

Environment Agency (2021) The Environment Act 2021.

Environment Agency (EA) guidance 'Land Contamination Risk Management' (LCRM), 2025.

Groundwater Directive (2006/118/EC), Landfill Directive 1999/31/EC and Water Framework Directive (2000/60/EC and daughter directive 2006/118/EC as amended by 2013/39/EU) are all currently covered by the EU Withdrawal Act 2018 which retained all of the EU environmental law.

Health and Safety Executive (1974). Health and Safety at Work etc Act 1974.

Health and Safety Executive (2002) Control of Substances Hazardous to Health (COSHH) 2002.

Health and Safety Executive (2015) Construction (Design and Management) Regulations 2015.

Ministry of Housing, Communities and Local Government (December 2024) National Planning Policy Framework.

R&D Publication 66: 2008 'Guidance for the Safe Development of Housing on Land Affected by Contamination' published by NHBC, the Environment Agency and CIEH.

Revised guidelines and criteria for grading the quality of agricultural land. MAFF. 1988

The Environmental Protection Act 1990 (Amendment of Section 57) (England and Wales) Regulations 2005.

The National Archives, C.43 (1990) The Environmental Protection Act 1990.

The National Archives (1990) Town and Country Planning Act 1990 c. 8.

The National Archives No. 2839 (1991) Environmental Protection (Duty of Care) Regulations 1991.

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The National Archives No. 31 (1991) Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste.

The National Archives No 57 (1991) Water Resources Act 1991.

The National Archives No. 1529 (1996) Landfill Tax (Contaminated Land) Order 1996.

The National Archives No. 2954 (2001) The Control of Pollution (Oil Storage) (England) Regulations 2001.

The National Archives No. 1559 (2002) Landfill (England and Wales) Regulations 2002.

The National Archives No. 118 (2006) Directive 2006/118/EC of the European Parliament and of the Council (2006).

The National Archives (2008) Water Act 2008 c. 37.

The National Archives No. 2902. (2009). The Groundwater (England and Wales) Regulations 2009.

The National Archives No. 263 (2012) The Contaminated Land (England) (Amendment) Regulations 2012.

The National Archives No. 1154 (2016) The Environmental Permitting (England and Wales) Regulations 2016.

The National Archives No 407 (2017) Water Framework Directive (2000/60/EC and daughter directive 2006/118/EC as amended by 2013/39/EU).