



## **Linc Cymru Housing Association**

# **Devonshire Place, Port Talbot**

## **Remediation Strategy and Verification Plan**





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# Devonshire Place, Port Talbot

## Remediation Strategy and Verification Plan

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|                                  |                |                                                                           |                |                  |               |
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## 1 INTRODUCTION

### 1.1 Terms of Reference

1.1.1 TEC has been appointed by J G Hale Construction Ltd on behalf of Linc Cymru Housing Association to prepare an updated Remediation Strategy and Verification Report in support of the proposed development at Devonshire Place Port Talbot following the completion of additional assessment at the site. All works were undertaken in accordance with our proposal letter dated 13 March 2024 and referenced ST.2203011.005.

### 1.2 Background

1.2.1 The site currently comprises the recently demolished former Dyffryn Lower Comprehensive School, located on Devonshire Place, south-east of Port Talbot (Figure 1). The site covers an area of approximately 0.74 hectares with the centre of the site situated at National Grid Reference 277060, 189470. The nearest postcode is SA13 1SG.

1.2.2 The proposed development is understood to comprise the demolition of the existing structures and the construction of several 2-storey residential dwellings across the majority of the site with 3-storey apartments located to the east (Figure 2). The development is to include areas of hardstanding including access roads and car parking, with areas of soft landscaping consisting of private gardens and public open space.

1.2.3 Previous works have been undertaken at the site by TEC, on behalf of Linc Cymru Housing Association, as detailed within the following reports:

- *'Devonshire Place, Port Talbot: Desk Study'*. Ref: 2203011.001.01, dated June 2022;
- *'Devonshire Place, Port Talbot: Ground Investigation Report'*. Ref: 2203011.002.01, dated June 2022;
- *'Devonshire Place, Port Talbot: Winter Groundwater Monitoring (October 2022 to July 2023)'*. Ref: 2203011.004.01, August 2023.

1.2.4 Additional works have also been undertaken by TEC on behalf of J G Hale Construction Ltd following the demolition of the existing buildings on site, as detailed within the following reports:

- *'Devonshire Place, Port Talbot: Supplementary Geoenvironmental Assessment (Post Demolition)'* Ref: 2203011.005.01, dated 16 August 2024.; and
- *'Devonshire Place, Port Talbot: Supplementary Geoenvironmental Assessment (Post Demolition) Additional Testing'* Ref: 2203011.005.02, dated September 2024.

1.2.5 It is understood that J G Hale Construction Ltd have been instructed by Linc Cymru Housing Association as part of the development and therefore it is assumed that J G Hale Construction Ltd have reliance upon all of the above reports for the purposes of this assessment. Reference should be made to all previous reports for full site condition details, although salient information is provided in Section 2 of this report.

1.2.6 Following the site preparation works, including the demolition of on-site structures, and the subsequent supplementary geoenvironmental testing and assessment, the updating and refinement of the Remediation Strategy and Verification Plan has been undertaken within this report.

1.2.7 This Remediation Strategy and Verification Plan has been undertaken in accordance with current guidance such as, LCRM - Land contamination: risk management (Environment Agency, 2020) and NHBC Standards.

## 2 SITE CONDITIONS SUMMARY

### 2.1 Introduction

2.1.1 A summary of the salient issues relating to the site and the proposed development, in relation to ground contamination, is presented below. Reference to the previous reports should be made for detailed information. Exploratory hole locations from referenced in these previous reports are depicted on Figure 3.

### 2.2 Previous Report Summary

**Table 2.1: Previous Report Summary**

| TEC Reports – June 2022              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|--------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Site History</b>                  | <p>Earliest available mapping depicts the site as forming part of several open fields on mapping from 1876 to 1899. By 1917, the construction of 2No. structures, along the eastern and western boundaries (similar to current layout) were depicted on mapping, with the site depicted as 'Schools'.</p> <p>The addition of a third structure along the northern boundary is shown on 1939 mapping, with the site later depicted as 'Dyffryn Comprehensive (Lower) School' from 1967 and is similar to the current layout.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Environmental Setting</b>         | <p>The geology for the site is reported to Glaciofluvial Ice Contact Deposits within the northern area of the site, with alluvial fan deposits to the south. These were described by the BGS as comprising sand and gravel and are reported to be underlain by The South Wales Middle Coal Measures Formation.</p> <p>The superficial deposits and the underlying bedrock geology is designated a Secondary A Aquifers of high vulnerability. There are no reported groundwater abstractions within 1km, and the site is not reported to be located within a Source Protection Zone.</p> <p>The nearest surface water feature identified was the Ffrwd Wylt located ~310m west of the site which flow towards Port Talbot Docks. The closest surface water abstraction is recorded ~480m south of the site and associated within Port Talbot Docks. There are 2No. recorded licensed discharge consents within 500m, both recorded at ~435m south and there are 6No. pollution incidents recorded, the closets are reported ~265m west.</p> <p>No landfills were recorded within 1km of the site; however, several areas of infilled land (water and non-water) are reported within 250m of the site.</p> <p>There are 15No. recorded BGS mineral sites located within 1km of the site.</p> |
| <b>Encountered Ground Conditions</b> | <p>Made ground was recorded across the site to depths of between 0.2m and 1.0mbgl. A slight hydrocarbon odour was recorded within BH01 between 0.3-0.5mbgl.</p> <p>Cohesive superficial deposits were recorded at the site within TP02 (0.7-1.1mbgl), TP03 (0.35-0.5mbgl) and WS01 (0.2-2.6mbgl) and were recorded to comprise generally stiff orangish brown and light brown slightly gravelly sandy clay.</p> <p>Underlying the majority of the site (with the exception of the north-western area), granular deposits were recorded. These were generally recorded as medium dense, becoming very dense with depth, dark brown, orangish brown and light brown lightly clayey sandy gravel with low to moderate cobble content.</p> <p>It should be noted that all exploratory locations were terminated within these very dense granular deposits.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Contamination Summary</b>         | <p>No visual or olfactory evidence of significant contamination was observed during the ground investigation. However, a slight hydrocarbon odour was recorded within BH01 between 0.3m and 0.5mbgl.</p> <p>Laboratory analytical results of the encountered made ground materials reported elevated contaminants, including heavy metals, PAHs and TPH when considering a residential site end use with homegrown produce.</p> <p>Therefore, where soft landscaping is proposed and where made ground remain onsite after finished site levels have been achieved, exposure to potential contaminants cannot be discounted.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Ground Gas</b>                    | <p>It is considered that on the basis of the conceptual site model and limited gas monitoring completed to-date, the available data is adequate to characterise the site and, therefore, the site may be characterised as being Characteristic Situation 1 and no gas protection measures are considered necessary.</p> <p>In addition, no radon protective measures are considered necessary within the construction of new homes.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

| TEC Reports – July to September 2024 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Encountered Ground Conditions</b> | <p>The two phases of supplementary geoenvironmental assessment undertaken both during, and after the site preparation works (including the demolition of on-site structures) comprised the advancement of a number of trial pits (6No. in Phase 1 – TP101 to TP106 and 12No. in Phase 2 – TP201 to TP212).</p> <p>During these works, made ground was encountered across the site at depths of between 0.15m (TP212) and 1.0mbgl (TP105). Made ground was locally observed to be underlain by reworked natural ground (slightly sandy gravelly clays and clayey gravels) to a maximum depth of 1.0mbgl. The natural ground was observed to comprise superficial gravelly clay and clayey gravel, with low cobble content.</p> <p>It was noted that the made ground and shallow superficial deposits were observed as similar in nature to the ground conditions previously recorded during the intrusive works by TEC in 2022.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Contamination Summary</b>         | <p>No visual or olfactory evidence of contamination was recorded during the ground investigation. Screening of soil samples with a photo-ionisation detector (PID) recorded concentrations of volatile organic compounds (VOCs) to be less than the instrument level of detection (i.e. 0.0ppm). Supplementary laboratory testing of the encountered shallow made ground materials undertaken during this phase of works identified further elevated contaminant concentrations, including heavy metals (arsenic), PAHs and TPH, when considering a residential site end use with homegrown produce.</p> <p>Bioaccessibility testing undertaken during these supplementary works identified a maximum bioaccessible fraction of 1.6% within the underlying natural strata. A conservative 2% bioaccessible fraction for arsenic was therefore applied using CLEA 1.07.1, to derive a Site-Specific Assessment Criteria (SSAC) for arsenic in natural strata of 395mg/kg. Following application of this SSAC to arsenic results from natural strata, no exceedences were identified within the natural strata.</p> <p>As bioaccessibility testing is not appropriate for the assessment of made ground, the GAC for made ground remains at 37mg/kg. When made ground results from all rounds of investigation at the site were compared to this GAC, exceedences were identified in WS02 and WS03 from the 2022 investigation, and TP103 and TP201 from the July to September investigations.</p> |

## 2.3

### Refined Conceptual Model

#### 2.3.1

On the basis of the assessment works undertaken by TEC to-date, a number of relevant contaminant linkages (RCL) have been identified in relation to ground contamination and the proposed development, which are considered by TEC to be as follows:

- RCL1 Risk to site end users via exposure to Contaminants of Potential Concern (CoPC) within the made ground materials through ingestion, inhalation and dermal contact pathways in areas of proposed soft landscaping, where made ground remains;
- RCL2 Cumulative risk to brownfield construction workers and future site maintenance via exposure to Contaminants of Potential Concern (CoPC) within the made ground materials through the ingestion, inhalation and dermal contact pathways; and
- RCL3 Potential risk of statutory nuisance via disturbance of in-situ ground materials during development works resulting in the generation of dust, including fine particulate matter.

### 3 REMEDIATION OBJECTIVES AND CRITERIA

#### 3.1 Introduction

3.1.1 LCRM defines remediation objectives as site-specific objectives that relate solely to the reduction, control or removal of the risks associated with one or more of the relevant contaminant linkages. LCRM also defines remediation criteria as site specific measures against which compliance with remediation objectives will be assessed.

3.1.2 Remediation objectives and criteria for the identified RCL in relation to the proposed development are presented in Table 3.1.

**Table 3.1: Remediation Objectives and Criteria**

| Relevant Contaminant Linkage (RCL)                                                                                                                                                                                             | Remediation Objectives                                                                                                                                                                                                                                                                                                                                                                | Remediation Criteria                                                                                                                                                                                                                                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>RCL1:</b> Chronic risk to site end users via exposure to Contaminants of Potential Concern (CoPC) within the made ground in areas of the proposed soft landscaping through ingestion, inhalation and dermal contact.        | <ul style="list-style-type: none"> <li>Long-term effective containment of contaminated made ground i.e. eliminating exposure to contaminated made ground</li> <li>Management of contaminant pathway</li> <li>Ensure the site is suitable for use in relation to the proposed residential development</li> <li>Satisfy planning requirements in relation land contamination</li> </ul> | Compliance to be based on either the removal of made ground or the provision and maintenance of an appropriate cover system in all areas of the site, where made ground remains following site preparation.                                                                                          |
| <b>RCL2:</b> Risk to construction workers and future site maintenance workers via exposure to Contaminants of Potential Concern (CoPC) within the made ground through the ingestion, inhalation and dermal contact pathways.   | <ul style="list-style-type: none"> <li>Long-term effective containment of contaminated made ground</li> <li>Management of the pathway and receptor</li> </ul>                                                                                                                                                                                                                         | Adoption of appropriate good brownfield working practices and implementation of appropriate site maintenance procedures and risk assessments.<br><br>Compliance is to be based on the provision and maintenance of an appropriate cover system following site preparation, where made ground remains |
| <b>RCL3:</b> Short term disturbance of in-situ ground materials during development works resulting in the potential generation of dust, including fine particulate matter resulting in a potential risk of statutory nuisance. | <ul style="list-style-type: none"> <li>Effective control of dust and dust generating activities</li> </ul>                                                                                                                                                                                                                                                                            | Employ best practice methods at all times.                                                                                                                                                                                                                                                           |

#### 4 SCOPE OF REMEDIATION WORKS

4.1.1 Based upon the identified Relevant Contaminant Linkages (RCL), the following Remediation Strategy has been prepared to provide appropriate mitigation against the identified risks.

4.1.2 The Remediation Strategy has been undertaken in accordance with LCRM - *Land contamination: risk management* (Environment Agency 2020) and will require agreement in writing of the Regulatory Authorities prior to commencing any remediation on site.

#### 4.2 Remedial Measure

4.2.1 Remedial measures to achieve the site-specific remediation objectives set out in Table 3.1 for RCL1 to RCL3 are presented below.

##### **RCL1**

4.2.2 RCL1 relates to the chronic risk to site end users via exposure to identified contaminants of potential concern within the ground materials across the site, through the dermal contact, ingestion and inhalation pathways.

##### Hard Standing and Building Footprint

4.2.3 The proposed development plan (Figure 2) indicates a large part of the of the site area is to be covered by the footprint of the proposed development buildings or hardstanding. Where present, such hard cover features would remove the identified potential contaminant pathways in relation to site end users.

##### Soft Landscaped Areas

4.2.4 Based upon the proposed development layout (Figure 2), areas of soft landscaping will be present onsite.

4.2.5 Therefore, where made ground remains within these proposed soft landscaped areas, exposure to identified CoPC cannot be discounted based upon the current assessment. In order to mitigate against the potential risk to site end users, it is recommended that a cover system be provided within such areas, where made ground remains.

##### *Engineered Cover System – BH01, WS01, TP01, TP207 and TP208*

4.2.6 Where made ground materials remains within these proposed soft landscaped areas in proximity to BH01, WS01, TP01, TP207 and TP208 (Figure 3), exposure to identified CoPCs cannot be discounted based upon the current assessment. In order to mitigate against the potential risk to site end users, it is recommended that a cover system be provided within such areas, where made ground remains. However, given the contaminant concentrations recorded within these locations, a simple cover system, in accordance with Building Research Establishment (BRE) guidance (BRE 465), would not be considered appropriate. Therefore, an engineered cover system, designed to provide complete separation of the receptor from the hazard, would be recommended where made ground remains in these areas. Figure 2 depicts the areas of the proposed development where an engineered cover system is required in proposed soft landscaped areas, where made ground remains.

4.2.7 The engineered cover system would need to comprise a visual marker/break layer overlain by a suitable cover thickness, comprising topsoil and subsoil in accordance with the requirements of BS3882:2015 'Specification for topsoil' and BS8601:2013 'Specification for Subsoil and Requirements for Use'. Consequently, consolidated minimum thicknesses of 450mm will be required within the general soft landscaped (grassed) areas, 600mm in areas of shrub and 900mm in areas of tree planting. The consolidated depth of topsoil spread should not normally exceed 300mm with the remainder of the rooting depth being made up of suitable subsoil. It should be noted that the thickness of the cover system should be agreed by the regulators as policies and guidance on this issue varies between Local Authorities.

4.2.8 Prior to placement of soils and after grading and compacting, an appropriate high visibility geotextile break layer (Terram Hi-Vis or equivalent) should be laid and secured, in accordance with the manufacturer's instructions, to inhibit mixing with underlying material and minimise mixing and penetration of foreign objects such as glass, metal etc. into the clean cover. Prior to geotextile placement, the graded area should be inspected to ensure no material is protruding from the surface which may cause significant damage to the geotextile.

*Simple Cover System – Remaining Site Areas*

- 4.2.9 Based on the concentrations of contaminants recorded within the made ground materials encountered across the remaining areas of the site, a simple cover system in accordance with Building Research Establishment (BRE) guidance (BRE 465) titled “Cover Systems for Land Regeneration – Thickness of Cover Systems for Contaminated Land” may be appropriate in the proposed garden areas to mitigate against the potential risk to site end users (Appendix A).
- 4.2.10 Remedial recommendations based on BRE 465 are designed to ensure that no soil, within a specific depth of finished level within gardens, is contaminated with concentrations above the human health remedial target concentrations for each contaminant of concern.
- 4.2.11 BRE 465 details methodology for specifying depths of general clean cover for marginally elevated levels of contamination. This methodology acknowledges that mixing between clean cover and underlying contaminated materials will occur over a period of time. The depth of clean cover required is therefore calculated to ensure that the concentration of the contaminant of concern, within the depth of this mixing zone, will always remain at below a site specific level. BRE 465 reports that except in extreme circumstances, research indicates that the mixing zone is generally limited to 600mm of the surface, i.e. the maximum depth for double digging for a garden or allotment.
- 4.2.12 Based upon site specific data and BRE465 calculations (Appendix A), to ensure contaminant levels remain below relevant screening values, a minimum depth of 300mm of clean cover should be provided within proposed soft landscaped areas, where made ground remains. This is conservatively based upon the maximum contaminant concentrations recorded within the made ground in this area of the site.

*General Cover System Requirements*

- 4.2.13 Careful management of the site works will be required to ensure potential cross-contamination from materials containing CoPC is avoided (Section 5).
- 4.2.14 Imported material will likely be required to provide the proposed depth of cover system within the soft landscaped areas. Therefore, geochemical verification testing should be undertaken on all imported material as well as any excavated material proposed for re-use. The testing regime for such material is detailed below and in Section 6.
- 4.2.15 Topsoil should meet the requirements of BS3882:2015 for multipurpose topsoil whilst subsoils should meet the requirements of BS8601:2013 for multipurpose subsoil. Appropriate certificates of analysis should be provided, in advance of material importation, to demonstrate compliance with these criteria.
- 4.2.16 Further, in accordance with BS3882:2015 and BS8601:2013, all imported material should be free from propagules of aggressive weeds and bulk vegetative matter, and topsoil and subsoil should have a maximum stone size of 20mm and 50mm, respectively.

**RCL2**

- 4.2.17 RCL2 relates to the risk to construction workers and future site maintenance workers via exposure to contaminants of concern (PAHs, arsenic and TPH Aromatic C16-C21) recorded within the made ground/reworked ground materials on site through dermal contact, ingestion and inhalation pathways.
- 4.2.18 Short term (acute) exposure to the levels of contamination encountered in this area of the site is considered unlikely to cause significant harm to construction workers. The adoption of good brownfield working practices, including good site welfare and hygiene facilities and the provision of appropriate Personal Protective Equipment (PPE) should be implemented.

**RCL3**

- 4.2.19 RCL3 relates to the potential risk of statutory nuisance via disturbance of in situ ground materials during remediation and development works resulting in the generation of dust, including fine particulate matter.
- 4.2.20 Development works will provide a long-term betterment with respect to dust generation as potentially contaminated materials will be effectively capped (e.g. by hardstanding or engineered clean cover). Given the proposed development works for the site, the short-term potential for the generation of dust and fine particulate matter cannot be discounted. This is due to the requirement for the excavation and handling of potentially dry materials and their transportation on and off-site. In addition, wind blow across bare

ground or stockpiles of excavated and treated materials can also represent a potential significant source of dust generation.

4.2.21 Fugitive dust and fine particle generation from remediation and construction activities can be substantially reduced through carefully selected mitigation techniques and effective management. Once particles are airborne, it is very difficult to prevent them from dispersing into the surrounding area. The most effective technique is to control dust at source and prevent it from becoming airborne.

4.2.22 The contractor will be required to take all necessary measures to avoid creating a dust nuisance during both remediation and construction works. Best practicable means should be used to minimise dust.

#### **4.3 General Remedial Measures**

##### Previously Unidentified Contamination

4.3.1 During the site demolition, preparation or construction works, should contamination be found at any time when carrying out the development that was not previously identified, it will be reported in writing immediately to the Local Planning Authority. Following which, further investigation and risk assessment will be undertaken, and where further remediation is considered necessary, a revised remediation scheme will be produced and forwarded to the Local Planning Authority for approval in writing. Section 6 of this Remediation Strategy provides the communication process should further assessment be undertaken.

##### Services Protection

4.3.2 Should water supply pipes be placed within the made ground encountered at the site, due consideration would need to be given to the UK Water Industry Research Ltd (UKWIR) guidance, where appropriate.

## **5 GENERAL REQUIREMENTS**

### **5.1 Environmental Permits / Licences**

- 5.1.1 The Contractor will be required to comply with all relevant legislation, statutory requirements and guidance, Codes of Practice, British Standards and all relevant HSE Guidance and Approved Codes of Practice.
- 5.1.2 The Contractor will be responsible for obtaining and complying with all necessary permissions, licenses and permits required to undertake the works.

### **5.2 Materials Excavation**

- 5.2.1 As a minimum, made ground shall be segregated in accordance with current waste regulations to allow for separate treatment/disposal. Further, segregation may be required should further grossly contaminated materials be encountered. Characterisation of waste materials will be undertaken by suitably experienced person and will be limited to ensure appropriate visual characterisation of materials.
- 5.2.2 All on site waste material movements on site will be undertaken in a controlled fashion to avoid cross contamination of materials.

### **5.3 Stockpiling**

- 5.3.1 Temporary stockpiles should be on suitable hardstanding or membrane to prevent mixing with underlying materials and such stockpiles will be covered with an impermeable membrane. In addition, in order to avoid potential cross-contamination, work methodologies should be adopted such that the trafficking over contaminated areas is minimised and, wherever possible, avoided.

### **5.4 Waste Management**

- 5.4.1 Excavated contaminated material will be disposed from site to an appropriately licensed facility. Additional testing may be required in accordance with guidance outlined by the Environment Agency's document '*Waste Sampling and Testing for Disposal to Landfill*' (EBPRI 11507B), dated March 2013, to allow determination of an appropriately licensed landfill for disposal. The waste producer must develop a sampling plan using Best Practice with reference to BS EN 14899 (and supporting technical guidance CEN/TR 15310) to ensure samples are representative of the waste being produced.

### **5.5 Materials Transport and Disposal**

- 5.5.1 All waste disposal activities will be undertaken in accordance with the Waste (England and Wales) (Amendment) Regulations 2014 and consequently, the haulier will need to be a licensed waste carrier and evidence of registration will need to be obtained prior to any consignment.
- 5.5.2 All waste will only be sent to a class of disposal facility permitted to accept the materials identified.
- 5.5.3 Laboratory results of the excavated material will need to be passed on to the haulier and the material will need to be transported and disposed of accordingly. All excavated contaminated waste materials are to be transported off-site in appropriately sheeted lorries.

### **5.6 De-Watering**

- 5.6.1 Groundwater ingress was recorded within BH01 only during the investigation at 3.8mbgl, with standing water recorded at 3.45mbgl. Based on observations made during the ground investigations, groundwater ingress into excavations is considered unlikely to be significantly problematic although some dewatering may be required, particularly where excavations are left open for any length of time.
- 5.6.2 To minimise the generation of water requiring management, surface run-off and collection should be reduced by ensuring that the scale of open excavation is restricted to that necessary for the immediate works.

**5.7 Backfilling**

- 5.7.1 Where excavation of contaminated materials occurs, the resultant excavation should be backfilled with general fill or imported clean material. Excavated contaminated materials should not be used for backfilling.

**5.8 Site Maintenance**

- 5.8.1 Site maintenance procedures and risk assessments should be documented and implemented to ensure that the capping layer and hard cover areas are appropriately maintained and future maintenance workers are protected during exposure to materials beneath the capping layer and hardstanding.
- 5.8.2 Due consideration should be given as to whether the depth of any clean cover system is sufficient for the planting proposed, e.g. planting of vegetation with a rooting zone in excess of the depth of clean cover may require deepened excavations or use of containers.
- 5.8.3 Should significant future excavation works be required within the site then full reinstatement in accordance with this Remediation Strategy will be required.

**5.9 General Site Safety**

- 5.9.1 All aspects of health and safety during site works will be undertaken in accordance with the Construction (Design and Management) Regulations, 2015 (CDM), or superseding documentation. In addition, all remedial works will be undertaken in accordance with the Health and Safety Executive publication (HSG66) "Protection of workers and the general public during the development of contaminated land" (1991), CIRIA Report 132 "A guide for safe working on contaminated sites" (1996) and current best practice guidance, including CIRIA Report C765 "Asbestos in soil and made ground good practice site guide" (2017).

## 6 VERIFICATION PLAN

### 6.1 Materials Importation and Verification Testing

#### Material Importation

- 6.1.1 Appropriate chemical testing of imported materials will be required if the origin of the imported clean cover capping materials is other than one of the following:
- A “greenfield” site where an appropriate desk study has been undertaken in accordance with BS10175:2011+A2:2017 which shows that no sources of contamination are or have been present; or
  - A site where suitable site investigation and testing has been undertaken in accordance with BS10175:2011+A2:2017 which clearly demonstrates the chemical suitability of the imported material.
- 6.1.2 If the source of the capping materials does not comply with the above or is from a site that is known to be, or suspected of being, contaminated, sufficient testing should be undertaken to confirm the materials are suitable for use. Where separate subsoil and topsoil materials are used in the cover system, it will be necessary to confirm the chemical quality of both of these components.
- 6.1.3 All imported material, whether used as part of a clean cover system or not, will comply with the limits set out within Table 6.1.
- 6.1.4 In addition, all imported topsoil and subsoil materials should meet the requirements of BS3882:2015 and BS8601:2013. All imported topsoil and subsoil should be free from foreign objects discernible by the naked eye (e.g. glass, brick, concrete, wire, tarmac, plastic, ceramic, metal, treated wood) or potentially hazardous foreign matter which may represent a risk of traumatic injury or damage to health.
- 6.1.5 In all cases, a copy of the delivery ticket should be available to confirm the imported materials have been transferred directly from the approved source site.
- 6.1.6 Where capping materials (including manufactured soils) are sourced from a commercial provider, a copy of the supplier’s routine chemical test certificate(s) and delivery tickets to site should be included within the remediation Verification Report. All test certificates should be current and representative of the material actually being used on site. Should importation be undertaken over an extended period of time, separate certification may be required. The amount of testing undertaken by the commercial provider should be linked to the former uses of the source site and the potential for contamination to be present. It is noted that the use of skip waste will not be accepted as capping materials without extensive testing to confirm it is suitable for use.
- 6.1.7 Quarried aggregate need not be subject to this testing regime where supported by appropriate certification.
- 6.1.8 Placement of fill materials associated with these remedial works should not be permitted unless this information has been received and approved in advance by the Client’s representative.
- 6.1.9 All samples will be submitted to an appropriate accredited laboratory (MCERTS/UKAS) for analysis. Given the proposed development includes residential garden areas and areas of communal soft landscaping, limits have been set on the basis of a ‘*residential with homegrown produce*’ site end use.

**Table 6.1: Importation & Re-use Criteria**

| Contaminant      | Maximum Import Concentration (mg/kg) <sup>(1)</sup> |
|------------------|-----------------------------------------------------|
| Arsenic          | 18.5 <sup>(3)</sup>                                 |
| Boron            | 290                                                 |
| Cadmium          | 22                                                  |
| Chromium (Total) | 910                                                 |
| Chromium (VI)    | 21                                                  |
| Copper           | 2400                                                |
| Lead             | 200                                                 |
| Mercury          | 40                                                  |

| Contaminant                                        | Maximum Import Concentration (mg/kg) <sup>(1)</sup> |
|----------------------------------------------------|-----------------------------------------------------|
| Nickel                                             | 130                                                 |
| Selenium                                           | 350                                                 |
| Zinc                                               | 3700                                                |
| Beryllium                                          | 1.7                                                 |
| Barium                                             | 1300                                                |
| Vanadium                                           | 410                                                 |
| Cyanide (Total)                                    | 20                                                  |
| Total Phenol                                       | 120                                                 |
| <i>Banded Petroleum Hydrocarbons<sup>(2)</sup></i> |                                                     |
| TPH Aliphatic C5-C6                                | 42                                                  |
| TPH Aliphatic C6-C8                                | 100                                                 |
| TPH Aliphatic C8-C10                               | 27                                                  |
| TPH Aliphatic C10-C12                              | 130                                                 |
| TPH Aromatic C5-C7                                 | 70                                                  |
| TPH Aromatic C7-C8                                 | 130                                                 |
| TPH Aromatic C8-C10                                | 34                                                  |
| TPH Aromatic C10-C12                               | 74                                                  |
| TPH Aromatic C12-C16                               | 140                                                 |
| TPH Aromatic C16-C21                               | 260                                                 |
| Total Petroleum Hydrocarbons (TPH)                 | 500 <sup>(2)</sup>                                  |
| <i>Other Petroleum Hydrocarbons<sup>(2)</sup></i>  |                                                     |
| Naphthalene                                        | 2.3                                                 |
| Acenaphthylene                                     | 170                                                 |
| Acenaphthene                                       | 210                                                 |
| Fluorene                                           | 170                                                 |
| Phenanthrene                                       | 95                                                  |
| Fluoranthene                                       | 280                                                 |
| Benzo(a)anthracene                                 | 7.2                                                 |
| Chrysene                                           | 15                                                  |
| Benzo(b)fluoranthene                               | 2.6                                                 |
| Benzo(k)fluoranthene                               | 77                                                  |
| Benzo(a)pyrene                                     | 2.2                                                 |
| Indeno(1,2,3-cd)pyrene                             | 27                                                  |
| Dibenzo(a,h)anthracene                             | 0.24                                                |
| Benzo(g,h,i)perylene                               | 320                                                 |
| Benzene                                            | 0.087                                               |

| Contaminant     | Maximum Import Concentration (mg/kg) <sup>(1)</sup> |
|-----------------|-----------------------------------------------------|
| Toluene         | 130                                                 |
| Ethylbenzene    | 47                                                  |
| m & p-xylene    | 56                                                  |
| o-xylene        | 60                                                  |
| MTBE            | 49                                                  |
| <i>Other</i>    |                                                     |
| Asbestos Screen | Absent                                              |

Notes:

1.Importation criteria based on human health screening values for 'residential (without homegrown produce)' end use (based on DEFRA C4SL (2014), Environment Agency Soil Guideline Values (2009) and CIEH/LQM GAC (2014), where appropriate, based upon a 'worst-case' Soil Organic Matter (SOM) of 1%).

2. Speciated hydrocarbon contaminants with screening values >500mg/kg are not included as total TPH limit has been set at 500mg/kg.

3. Concentrations of Contaminants of Potential Concern have been set at half the screening value for residential site end use (with homegrown produce) as detailed within the BRE 465 Spreadsheet (Appendix A) for the simple cover system areas only

### Verification Testing

6.1.10 Following the placement of the appropriate cover system, verification pits should be excavated to prove the depth, and where necessary, the chemical quality of the clean cover. A written description and photographic record of each verification pit shall be obtained.

6.1.11 Given the proposed development, it is suggested that where appropriate supporting current certification is not available an appropriate number of validation samples of the placed imported cover system will be taken and chemically analysed.

6.1.12 In addition, where appropriate supporting current certification is not available in relation to the chemical quality of placed imported cover system material, verification samples will be taken and chemically analysed. The number of validation samples required will be confirmed with the regulatory authorities prior to undertaking the sampling but would be initially suggested as follows:

- One sample for every 100m<sup>3</sup> of fill, if the material is imported from a known 'Greenfield' source.
- One sample per 50m<sup>3</sup> of fill if the material is derived from site or imported from an unknown source or off site source without appropriate documentation of non-contaminative history.

6.1.13 However, where different sources are utilised to provide the cover system, there may be the need for further testing to confirm the chemical composition of the imported materials.

## **6.2 Verification Reporting**

6.2.1 In accordance with current guidance, upon completion of the final works a verification report(s) will be prepared that demonstrates the effectiveness of the remediation carried out and identifying any requirements for longer-term monitoring of identified contaminant linkages, maintenance and arrangements for contingency action, if appropriate. It may be that, with prior agreement of the regulatory authorities, partial verification of the site may be obtained should the development be completed in a phased manner.

6.2.2 The verification report(s) will be prepared in accordance with the Environment Agency's Land Contamination: Risk Management guidance (2020).

## **6.3 Communications Plan**

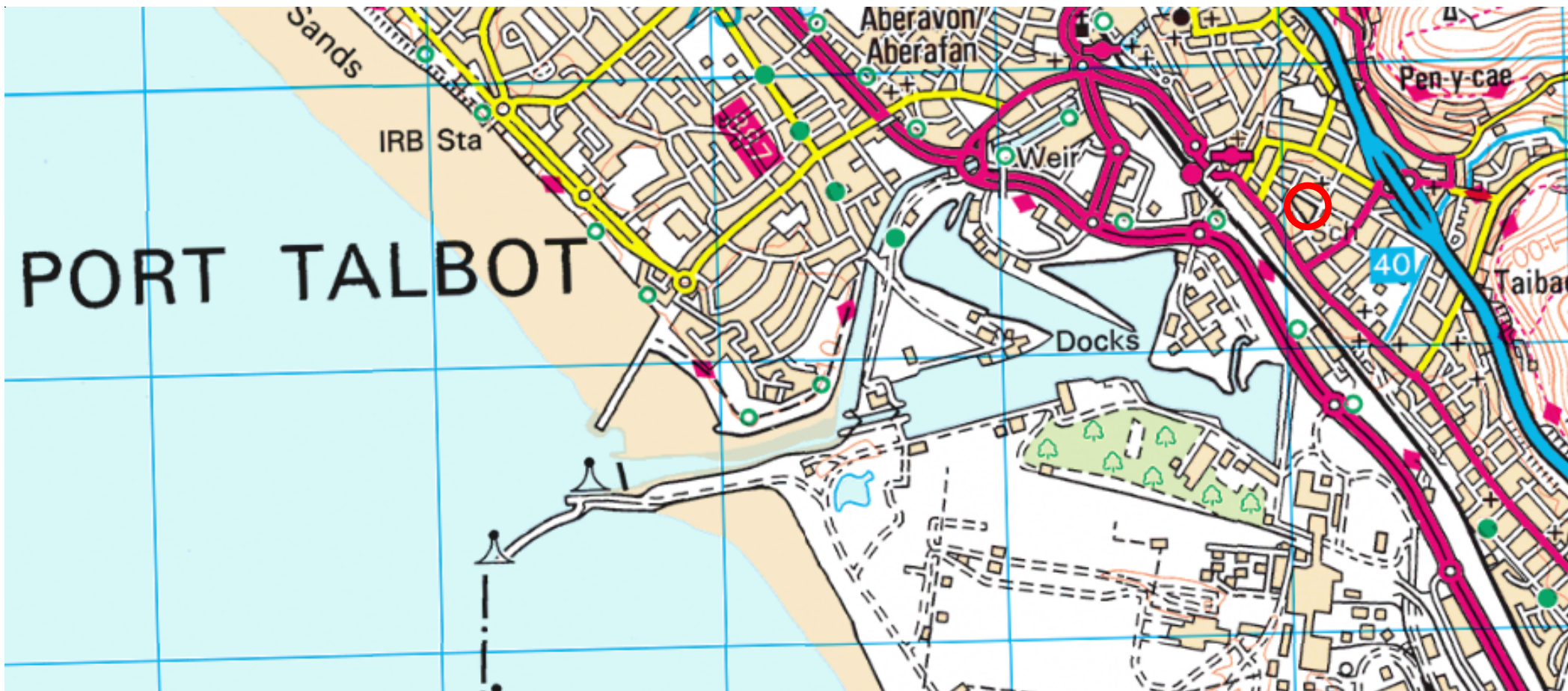
6.3.1 Should, at any time, verification information show that remediation activities have not achieved the remediation criteria derived for the relevant contaminant linkages or additional assessment is undertaken, the following action plan shall be implemented:

- The results shall be notified to the Local Planning Authority immediately and confirmed in writing;

- Any agreed remedial action will be undertaken within such reasonable time as required by the Local Planning Authority; and
- A report detailing any remedial works undertaken, the monitoring results and the effectiveness of the action plan shall be forwarded to the Local Planning Authority.

**TEC**

## Figures and Drawings



Approximate Site Location:



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TEC  
The Old Chapel  
35a Southover  
Wells, Somerset  
BAS 1UH

Tel: 01749 677760  
Email: [info@tecon.co.uk](mailto:info@tecon.co.uk)  
Web: [www.tecon.co.uk](http://www.tecon.co.uk)

Site Name:

Devonshire Place, Port Talbot

Drawing Name:

Site Location Plan

Client Name:

Linc Cymru Housing Association

Project No:

2203011.003.02

Figure No:

1

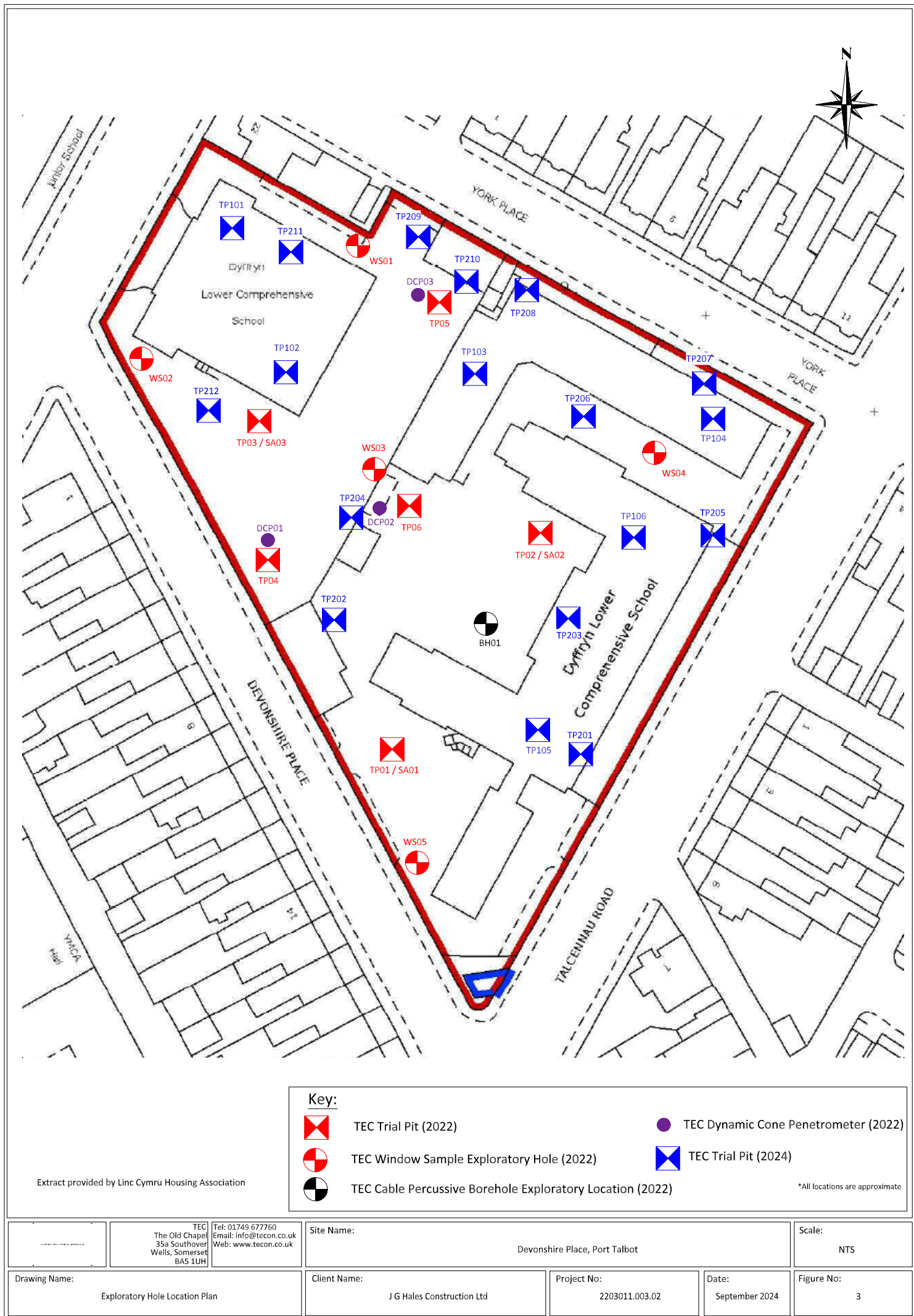
Date:

September 2024

Scale:

NTS





Appendix A

BRE 465 Spreadsheet

|                                      |     |    |
|--------------------------------------|-----|----|
| Calculations based on mixed zone (M) | 600 | mm |
|--------------------------------------|-----|----|

| Contaminant                      | Site Data                    |                             |                          |                          | Expressed as a Factor of Target Guideline Value |                                     |                                    |                                     | Cover Thickness Required for Compliance to Specified Target Guideline Value |                          |
|----------------------------------|------------------------------|-----------------------------|--------------------------|--------------------------|-------------------------------------------------|-------------------------------------|------------------------------------|-------------------------------------|-----------------------------------------------------------------------------|--------------------------|
|                                  | Contamination of Ground (Cg) | Contamination of Cover (Cc) | Target Guideline Value 1 | Target Guideline Value 2 | Target Guideline Value<br>Soil / 1              | Target Guideline Value<br>Cover / 1 | Target Guideline Value<br>Soil / 2 | Target Guideline Value<br>Cover / 2 | Target Guideline Value 1                                                    | Target Guideline Value 2 |
|                                  | Units                        |                             | Units                    |                          | Fraction                                        |                                     |                                    |                                     | (mm)                                                                        |                          |
|                                  |                              |                             |                          |                          |                                                 |                                     |                                    |                                     |                                                                             |                          |
| <b>Arsenic WS02</b>              | 53                           | 18.5                        | 37                       |                          | 1.4                                             | 0.5                                 | No TV                              | No TV                               | 278                                                                         | No TV                    |
| Arsenic WS03                     | 43                           | 18.5                        | 37                       |                          | 1.2                                             | 0.5                                 | No TV                              | No TV                               | 147                                                                         | No TV                    |
| Arsenic TP103                    | 48                           | 18.5                        | 37                       |                          | 1.3                                             | 0.5                                 | No TV                              | No TV                               | 224                                                                         | No TV                    |
|                                  |                              |                             |                          |                          |                                                 |                                     |                                    |                                     |                                                                             |                          |
| <b>Phenanthrene WS01</b>         | 340                          | 47.5                        | 95                       |                          | 3.6                                             | 0.5                                 | No TV                              | No TV                               | 503                                                                         | No TV                    |
| Phenanthrene TP01                | 180                          | 47.5                        | 95                       |                          | 1.9                                             | 0.5                                 | No TV                              | No TV                               | 385                                                                         | No TV                    |
|                                  |                              |                             |                          |                          |                                                 |                                     |                                    |                                     |                                                                             |                          |
| <b>Fluoranthene WS01</b>         | 450                          | 140                         | 280                      |                          | 1.6                                             | 0.5                                 | No TV                              | No TV                               | 329                                                                         | No TV                    |
|                                  |                              |                             |                          |                          |                                                 |                                     |                                    |                                     |                                                                             |                          |
| Benzo(a)anthracene BH01          | 35                           | 3.6                         | 7.2                      |                          | 4.9                                             | 0.5                                 | No TV                              | No TV                               | 531                                                                         | No TV                    |
| <b>Benzo(a)anthracene WS01</b>   | 190                          | 3.6                         | 7.2                      |                          | 26.4                                            | 0.5                                 | No TV                              | No TV                               | 588                                                                         | No TV                    |
| Benzo(a)anthracene TP01          | 58                           | 3.6                         | 7.2                      |                          | 8.1                                             | 0.5                                 | No TV                              | No TV                               | 560                                                                         | No TV                    |
| Benzo(a)anthracene TP207         | 15                           | 3.6                         | 7.2                      |                          | 2.1                                             | 0.5                                 | No TV                              | No TV                               | 411                                                                         | No TV                    |
| Benzo(a)anthracene TP208         | 14                           | 3.6                         | 7.2                      |                          | 1.9                                             | 0.5                                 | No TV                              | No TV                               | 392                                                                         | No TV                    |
|                                  |                              |                             |                          |                          |                                                 |                                     |                                    |                                     |                                                                             |                          |
| Chrysene BH01                    | 25                           | 7.5                         | 15                       |                          | 1.7                                             | 0.5                                 | No TV                              | No TV                               | 343                                                                         | No TV                    |
| <b>Chrysene WS01</b>             | 140                          | 7.5                         | 15                       |                          | 9.3                                             | 0.5                                 | No TV                              | No TV                               | 566                                                                         | No TV                    |
| Chrysene TP01                    | 50                           | 7.5                         | 15                       |                          | 3.3                                             | 0.5                                 | No TV                              | No TV                               | 494                                                                         | No TV                    |
|                                  |                              |                             |                          |                          |                                                 |                                     |                                    |                                     |                                                                             |                          |
| <b>TPH Aromatic C16-C21 BH01</b> | 370                          | 130                         | 260                      |                          | 1.4                                             | 0.5                                 | No TV                              | No TV                               | 275                                                                         | No TV                    |
|                                  |                              |                             |                          |                          |                                                 |                                     |                                    |                                     |                                                                             |                          |
|                                  |                              |                             |                          |                          |                                                 |                                     |                                    |                                     |                                                                             |                          |
|                                  |                              |                             |                          |                          |                                                 |                                     |                                    |                                     |                                                                             |                          |
|                                  |                              |                             |                          |                          |                                                 |                                     |                                    |                                     |                                                                             |                          |
|                                  |                              |                             |                          |                          |                                                 |                                     |                                    |                                     |                                                                             |                          |
|                                  |                              |                             |                          |                          |                                                 |                                     |                                    |                                     |                                                                             |                          |

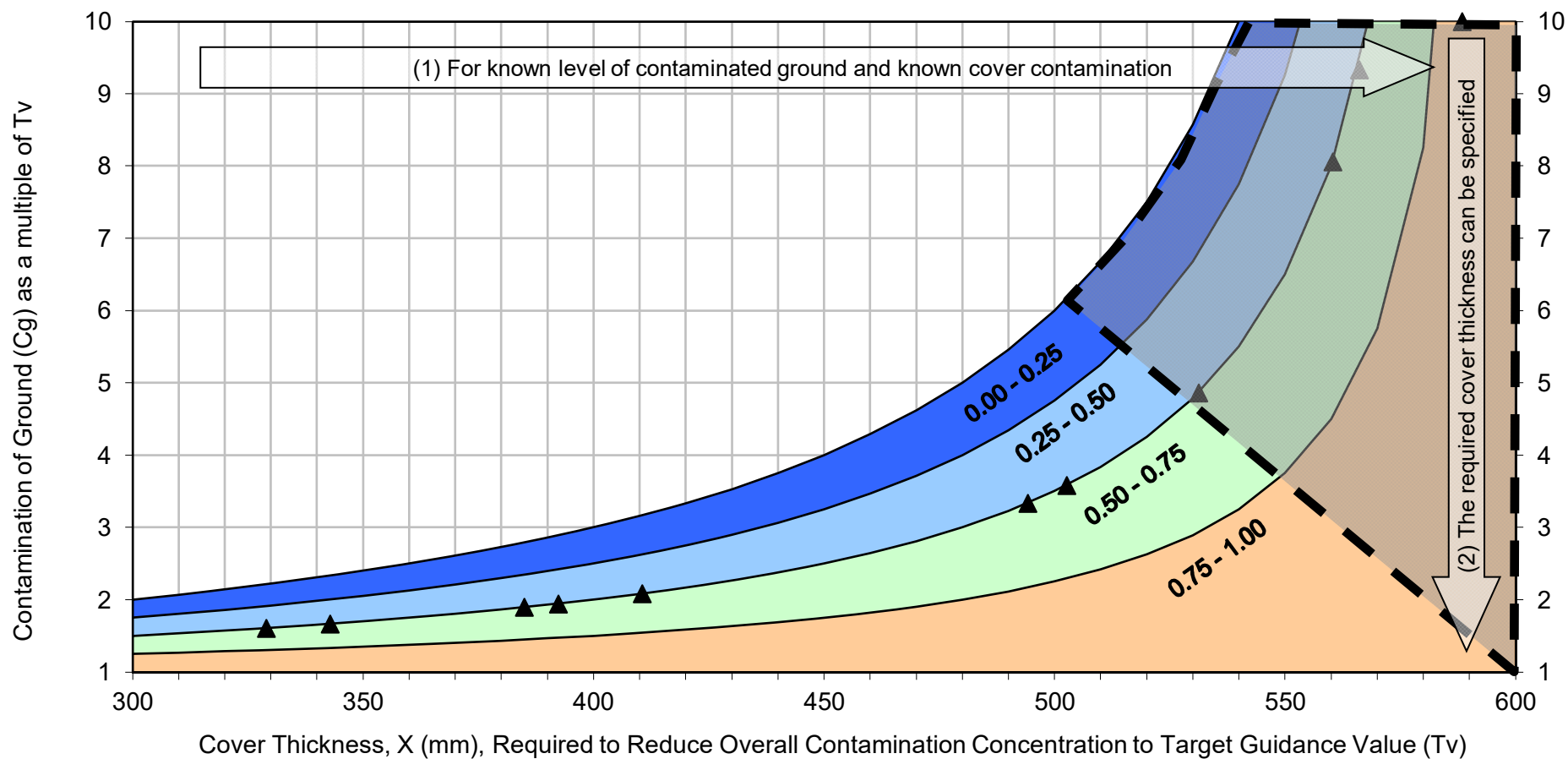
| Summary                                                     |                          |                          |
|-------------------------------------------------------------|--------------------------|--------------------------|
|                                                             | Target Guideline Value 1 | Target Guideline Value 2 |
| Number of contaminants                                      | 15                       | 15                       |
| Number of contaminants <b>with no</b> thickness calculation | 0                        | 15                       |
| Breakdown - Number for which no TV specfied                 | 0                        | 15                       |
| Breakdown - Number for which no soil specified              | 0                        | 0                        |
| Breakdown - Number for which no cover specified             | 0                        | 0                        |
| Breakdown - Number for which cover > TV                     | 0                        | 0                        |
|                                                             |                          |                          |
| Number of contaminants <b>with</b> thickness calculation    | 15                       | 0                        |
| Breakdown - Number for which no cover required              | 0                        | 0                        |
| Breakdown - Number for which cover required                 | 15                       | 0                        |
| <b>Overall thickness of cover required</b>                  | <b>588</b>               | <b>0</b>                 |

## Design Chart

- $C_c = 0.00 - 0.25 \times \text{Trigger levels}$
- $C_c = 0.25 - 0.50 \times \text{Trigger levels}$
- $C_c = 0.50 - 0.75 \times \text{Trigger levels}$
- $C_c = 0.75 - 1.00 \times \text{Trigger levels}$
- ▲ Target Guideline Value 2
- ▲ Target Guideline Value 1



If site specific data falls in shaded area consideration should be given to the applicability of using a cover system



|                                      |     |    |
|--------------------------------------|-----|----|
| Calculations based on mixed zone (M) | 600 | mm |
|--------------------------------------|-----|----|

| Contaminant                      | Site Data                    |                             |                          |                          | Expressed as a Factor of Target Guideline Value |                                     |                                    |                                     | Cover Thickness Required for Compliance to Specified Target Guideline Value |                          |
|----------------------------------|------------------------------|-----------------------------|--------------------------|--------------------------|-------------------------------------------------|-------------------------------------|------------------------------------|-------------------------------------|-----------------------------------------------------------------------------|--------------------------|
|                                  | Contamination of Ground (Cg) | Contamination of Cover (Cc) | Target Guideline Value 1 | Target Guideline Value 2 | Target Guideline Value<br>Soil / 1              | Target Guideline Value<br>Cover / 1 | Target Guideline Value<br>Soil / 2 | Target Guideline Value<br>Cover / 2 | Target Guideline Value 1                                                    | Target Guideline Value 2 |
|                                  | Units                        |                             | Units                    |                          | Fraction                                        |                                     |                                    |                                     | (mm)                                                                        |                          |
|                                  |                              |                             |                          |                          |                                                 |                                     |                                    |                                     |                                                                             |                          |
| Benzo(b)fluoranthene BH01        | 34                           | 1.3                         | 2.6                      |                          | 13.1                                            | 0.5                                 | No TV                              | No TV                               | 576                                                                         | No TV                    |
| <b>Benzo(b)fluoranthene WS01</b> | 180                          | 1.3                         | 2.6                      |                          | 69.2                                            | 0.5                                 | No TV                              | No TV                               | 596                                                                         | No TV                    |
| Benzo(b)fluoranthene TP01        | 51                           | 1.3                         | 2.6                      |                          | 19.6                                            | 0.5                                 | No TV                              | No TV                               | 584                                                                         | No TV                    |
| Benzo(b)fluoranthene TP104       | 2.9                          | 1.3                         | 2.6                      |                          | 1.1                                             | 0.5                                 | No TV                              | No TV                               | 113                                                                         | No TV                    |
| Benzo(b)fluoranthene TP206       | 4.5                          | 1.3                         | 2.6                      |                          | 1.7                                             | 0.5                                 | No TV                              | No TV                               | 356                                                                         | No TV                    |
| Benzo(b)fluoranthene TP207       | 12                           | 1.3                         | 2.6                      |                          | 4.6                                             | 0.5                                 | No TV                              | No TV                               | 527                                                                         | No TV                    |
| Benzo(b)fluoranthene TP208       | 15                           | 1.3                         | 2.6                      |                          | 5.8                                             | 0.5                                 | No TV                              | No TV                               | 543                                                                         | No TV                    |
| Benzo(b)fluoranthene TP210       | 3.3                          | 1.3                         | 2.6                      |                          | 1.3                                             | 0.5                                 | No TV                              | No TV                               | 210                                                                         | No TV                    |
|                                  |                              |                             |                          |                          |                                                 |                                     |                                    |                                     |                                                                             |                          |
| Benzo(a)pyrene BH01              | 27                           | 1.1                         | 2.2                      |                          | 12.3                                            | 0.5                                 | No TV                              | No TV                               | 575                                                                         | No TV                    |
| <b>Benzo(a)pyrene WS01</b>       | 160                          | 1.1                         | 2.2                      |                          | 72.7                                            | 0.5                                 | No TV                              | No TV                               | 596                                                                         | No TV                    |
| Benzo(a)pyrene TP01              | 38                           | 1.1                         | 2.2                      |                          | 17.3                                            | 0.5                                 | No TV                              | No TV                               | 582                                                                         | No TV                    |
| Benzo(a)pyrene TP104             | 2.5                          | 1.1                         | 2.2                      |                          | 1.1                                             | 0.5                                 | No TV                              | No TV                               | 129                                                                         | No TV                    |
| Benzo(a)pyrene TP206             | 4                            | 1.1                         | 2.2                      |                          | 1.8                                             | 0.5                                 | No TV                              | No TV                               | 372                                                                         | No TV                    |
| Benzo(a)pyrene T207              | 11                           | 1.1                         | 2.2                      |                          | 5.0                                             | 0.5                                 | No TV                              | No TV                               | 533                                                                         | No TV                    |
| Benzo(a)pyrene TP208             | 13                           | 1.1                         | 2.2                      |                          | 5.9                                             | 0.5                                 | No TV                              | No TV                               | 545                                                                         | No TV                    |
| Benzo(a)pyrene TP210             | 2.8                          | 1.1                         | 2.2                      |                          | 1.3                                             | 0.5                                 | No TV                              | No TV                               | 212                                                                         | No TV                    |
|                                  |                              |                             |                          |                          |                                                 |                                     |                                    |                                     |                                                                             |                          |
| <b>Indeno(123-cd)pyrene WS01</b> | 83                           | 13.5                        | 27                       |                          | 3.1                                             | 0.5                                 | No TV                              | No TV                               | 483                                                                         | No TV                    |
|                                  |                              |                             |                          |                          |                                                 |                                     |                                    |                                     |                                                                             |                          |
| Dibenz(ah)anthracene BH01        | 3.5                          | 0.12                        | 0.24                     |                          |                                                 |                                     |                                    |                                     |                                                                             |                          |
| <b>Dibenz(ah)anthracene WS01</b> | 19                           | 0.12                        | 0.24                     |                          | 79.2                                            | 0.5                                 | No TV                              | No TV                               | 596                                                                         | No TV                    |
| Dibenz(ah)anthracene WS04        | 0.27                         | 0.12                        | 0.24                     |                          | 1.1                                             | 0.5                                 | No TV                              | No TV                               | 120                                                                         | No TV                    |
| Dibenz(ah)anthracene TP01        | 2.7                          | 0.12                        | 0.24                     |                          | 11.3                                            | 0.5                                 | No TV                              | No TV                               | 572                                                                         | No TV                    |
| Dibenz(ah)anthracene TP104       | 0.27                         | 0.12                        | 0.24                     |                          | 1.1                                             | 0.5                                 | No TV                              | No TV                               | 120                                                                         | No TV                    |
| Dibenz(ah)anthracene TP206       | 0.31                         | 0.12                        | 0.24                     |                          | 1.3                                             | 0.5                                 | No TV                              | No TV                               | 221                                                                         | No TV                    |
| Dibenz(ah)anthracene TP207       | 0.91                         | 0.12                        | 0.24                     |                          | 3.8                                             | 0.5                                 | No TV                              | No TV                               | 509                                                                         | No TV                    |
| Dibenz(ah)anthracene TP208       | 1.1                          | 0.12                        | 0.24                     |                          | 4.6                                             | 0.5                                 | No TV                              | No TV                               | 527                                                                         | No TV                    |
| Dibenz(ah)anthracene TP210       | 0.29                         | 0.12                        | 0.24                     |                          | 1.2                                             | 0.5                                 | No TV                              | No TV                               | 176                                                                         | No TV                    |

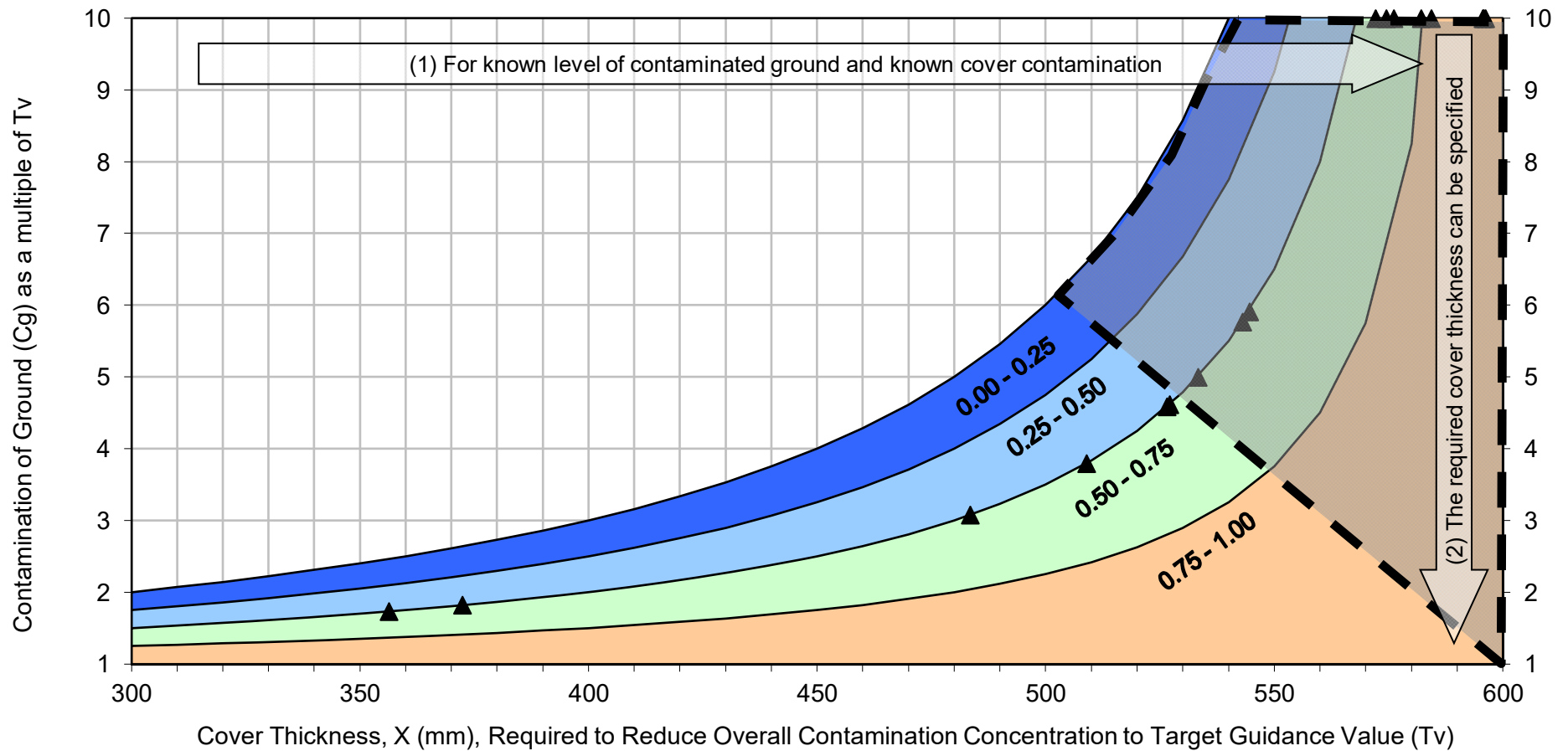
| Summary                                                     |                          |                          |
|-------------------------------------------------------------|--------------------------|--------------------------|
|                                                             | Target Guideline Value 1 | Target Guideline Value 2 |
| Number of contaminants                                      | 24                       | 24                       |
| Number of contaminants <b>with no</b> thickness calculation | 0                        | 24                       |
| Breakdown - Number for which no TV specified                | 0                        | 24                       |
| Breakdown - Number for which no soil specified              | 0                        | 0                        |
| Breakdown - Number for which no cover specified             | 0                        | 0                        |
| Breakdown - Number for which cover > TV                     | 0                        | 0                        |
|                                                             |                          |                          |
| Number of contaminants <b>with</b> thickness calculation    | 24                       | 0                        |
| Breakdown - Number for which no cover required              | 0                        | 0                        |
| Breakdown - Number for which cover required                 | 24                       | 0                        |
|                                                             |                          |                          |
| <b>Overall thickness of cover required</b>                  | <b>596</b>               | <b>0</b>                 |

## Design Chart

- $C_c = 0.00 - 0.25 \times \text{Trigger levels}$
- $C_c = 0.25 - 0.50 \times \text{Trigger levels}$
- $C_c = 0.50 - 0.75 \times \text{Trigger levels}$
- $C_c = 0.75 - 1.00 \times \text{Trigger levels}$
- ▲ Target Guideline Value 2
- ▲ Target Guideline Value 1



If site specific data falls in shaded area consideration should be given to the applicability of using a cover system





## Design Chart

- $C_c = 0.00 - 0.25 \times \text{Trigger levels}$
- $C_c = 0.25 - 0.50 \times \text{Trigger levels}$
- $C_c = 0.50 - 0.75 \times \text{Trigger levels}$
- $C_c = 0.75 - 1.00 \times \text{Trigger levels}$
- ▲ Target Guideline Value 2
- ▲ Target Guideline Value 1



If site specific data falls in shaded area consideration should be given to the applicability of using a cover system

