



## **North Wales Prison, Wrexham**

Land Quality Statement: Area 1

Final Report for



**September 2014**

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## **Contents**

|            |                                                       |           |
|------------|-------------------------------------------------------|-----------|
| <b>1.0</b> | <b>INTRODUCTION .....</b>                             | <b>1</b>  |
| <b>2.0</b> | <b>PRELIMINARY INVESTIGATION (PHASE 1 STUDY).....</b> | <b>3</b>  |
| <b>3.0</b> | <b>LAND QUALITY ASSESSMENT FOR AREA 1 .....</b>       | <b>15</b> |
| <b>4.0</b> | <b>OUTLINE REMEDIATION STRATEGY .....</b>             | <b>17</b> |
| <b>5.0</b> | <b>UNCERTAINTIES AND LIMITATIONS .....</b>            | <b>19</b> |
| <b>6.0</b> | <b>REFERENCES .....</b>                               | <b>21</b> |

## **Appendices**

**Appendix A     Drawings**

**Appendix B     Contamination Test Results and Statistical Analysis**



## 1.0 INTRODUCTION

### 1.1 Terms of Reference

In August 2014, Hydrock Consultants Limited (Hydrock) was commissioned by Lend Lease (the Client) to undertake a desk study and ground contamination assessment for part of the development site of the proposed North Wales Prison, off Bridge Road South, Wrexham Industrial Estate, Wrexham.

A site location plan (Drawing 14656/D001), a site survey plan (14656/D002) and a proposed development layout (14656/D003) are presented in Appendix A.

In total, the development site covers approximately 26.7ha and currently comprises an area of open, derelict land which until August 2014 was in large part covered in dense vegetation, although this has now been removed.

It is proposed to build a prison at the site, with the main prison buildings occupying the central and eastern parts of the site; car parking areas and auxiliary buildings in the northwest; and a large, rectangular area of ground in the southwest (the Expansion Zone) which will be walled and included in the grounds of the main prison building.

Planning Permission for the development has been issued by Wrexham County Borough Council (WCBC) which imposed the following Condition 9 in respect of contaminated land:

*The reserved matters application shall include a scheme to deal with potential contamination at the site. This scheme shall include a phased investigation approach to identify the extent of contamination and any measures required to remediate the site, including post-development monitoring.*

It was subsequently agreed with WCBC that this Condition could be discharged separately for those parts of the site, with a submission for Area 1 being issued for approval separate to a second submission relating to the remaining area.

The part of the site under consideration in this report 002 is Area 1, which comprises the proposed car parking area in the north-western part of the site and the Expansion Zone in the south-western part of the site. These areas are to be subjected to varying degrees of cut-to-fill in order to achieve the required finished ground levels to allow the development to take place.

### 1.2 Objectives

The objective of this report is to present the findings of a Phase I Desk Study, Phase II Site investigation, Risk Assessment and Outline Remedial Strategy for Area 1, to allow WCBC to discharge Condition 9 for that area and thereby allow works in that area to commence. In particular, the requirement is to assess the contamination status of the soils underlying Area 1, to ensure that the soils used in the cut-to-fill are chemically suitable and will not pose a significant residual risk to human health.



### **1.3 Scope**

The scope of work for this commission comprises:

- a desk study and site walk-over reconnaissance to determine the nature of the site and its surroundings including current and former land uses, geology, hydrogeology, hydrology and geo-environmental data;
- a review of previous site investigation reports for the site, including a reassessment of past chemical soil testing results specific to the areas of the site under consideration (Area 1); and
- reporting.

### **1.4 Information Provided**

The following has been provided to Hydrock by Lend Lease for use in the preparation of this report:

- Travers Morgan Ltd: “Firestone Development Site, Wrexham”, reference 1W35245/contam, dated 31st May 1994;
- Various correspondence from Travers Morgan (and later Symonds Travers Morgan) to the Welsh Development Agency, including report summaries and recommendations for remediation;
- ESI Ltd: “Preliminary Risk Assessment, Former Firestone Site, Wrexham Industrial Estate”, reference 60895R1, dated December 2012;
- ESI Ltd: “Phase 2 Contaminated Land Investigation, Former Firestone Site, Wrexham Industrial Estate”, reference 60895R2, dated December 2012; and
- WYG Environment: “New Prison North Wales, Ground Investigation Factual Report”, Version 3, reference A083839, dated 14th January 2014.



## 2.0 PRELIMINARY INVESTIGATION (PHASE 1 STUDY)

The reports provided by the Client have been used as the basis for the following desk study for the site. In addition, historical maps have been acquired for the site by Hydrock in order to determine past site use and corroborate statements included in the various reports provided.

Note that the Phase I assessment contained herein covers the whole of the development area, apart from land to the southwest and southeast of the prison boundaries designated as a nature reserve. Features specifically relevant to Area 1 are highlighted in the text.

## 2.1 Site Referencing

The site is referenced in Table 2.1.

**Table 2.1: Site Referencing Information**

| Item                             | Brief Description                                                                                                                                                                                        |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Site name                        | North Wales Prison Site, Wrexham.                                                                                                                                                                        |
| Site location and grid reference | To the south of Bridge Road South, Wrexham Industrial Estate, Wrexham, Flintshire. The nearest postcode is LL13 3QA, and the approximate National Grid Reference of the site centre is 337900E, 349040N. |

A site location plan is provided in Appendix A (Drawing 14656-D001).

## 2.2 Site Description and Walk-Over Survey

The current site conditions are summarised in Table 2.2.

**Table 2.2: Site Description**

| Item                       | Brief Description                                                                                                                                                                                                                                                                                                                 |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Site access                | The primary access into the site is directly from Bridge Road South via locked steel double gates located on the northwest site boundary. Additional access is available from an unnamed service road serving Spectrum Business Park via locked steel double gates located in the southeastern site boundary.                     |
| Land area                  | The proposed development area extends to approximately 26.7 ha.                                                                                                                                                                                                                                                                   |
| Elevation, topography etc. | The development site is approximately rectangular in plan, with the long axis trending northeast-southwest. It is largely flat across the majority of its area, although ground levels in the southwestern half of the site rise gently towards the southwest and south.                                                          |
| Site boundaries            | The site boundaries are currently formed by steel palisade fencing on the northwestern, northeastern and most of the southeastern sides; by fencing and industrial units on the southwestern side; and by steel palisade fencing and open land on the southeastern side, with the River Clywedog approximately 200m to the south. |
| Geomorphic features        | There are no notable geomorphic features at the site, other than a drain / stream that runs approximately north-south through the eastern part of the site.                                                                                                                                                                       |



| Item             | Brief Description                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Present land use | The site represents brownfield land formerly occupied by a tyre factory and a Royal Ordnance Factory associated with the manufacture and storage of explosives. All surface structures and the vast majority of subsurface structures were removed following the closure and demolition of the facilities, and ground levels across the site were regraded to create the present day, essentially flat ground profile. |
| Vegetation       | Until recently (August 2014) the site was in large part covered in dense vegetation, although this has now been removed to allow the various stages of ground investigation etc. to be undertaken.                                                                                                                                                                                                                     |
| Surrounding land | The site is located on the southern edge of Wrexham Industrial Estate. The development area is bound to the southwest, northeast and east by industrial units. To the southeast is open land leading down to the River Clywedog; this area is to remain undeveloped and will be retained as a nature reserve. A housing estate and industrial units are located to the northwest.                                      |

## 2.3 Site History

Hydrock have acquired and reviewed historical maps for the site, and the key points are summarised in Table 2.3 below.

**Table 2.3: Site Description**

| Map Edition and Scale                   | Key Points                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1872 (1:10,560) & 1872-73 (1:2,500)     | The site is shown to be predominantly composed of a number of open fields with ponds of various size scattered throughout. A road runs northeast to southwest through the eastern half of the site, and a chapel, a farmhouse and associated farm buildings run in a line along the southern side of the road. In the southern part of the site a spur runs off the road towards the southeast.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 1898 (1:10,560) & 1899 (1:2,500)        | The buildings on the southern side of the internal road are indicated to include a smithy.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 1909 & 1938 (1:10,560) & 1912 (1:2,500) | No significant change.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 1949 (1:10,560)                         | <p>All previous structures and roads on-site have been removed, and the site is now occupied by a large number of small (mostly c. 8m x 14m or smaller), widely separated buildings connected by a network of roads and served by numerous water hydrants. Three larger (c. 7m x 40m) buildings are located along the northeastern site boundary, each of which is bound on its northwestern, southwestern and southeastern sides by large bunds, presumably for blast protection, and another larger building (c. 8m x 30m) is located in the eastern corner of the site. The internal roads extend off-site and connect up to similar buildings which are located throughout the general area surrounding the site.</p> <p>It is known from other sources (see below*) that the structures occupying the site and the surrounding areas were part of a Royal Ordnance Factory (ROF) site that was established during the Second World War to manufacture and store explosives for</p> |
|                                         | <p>munitions. However, the relatively small size of the majority of the buildings would suggest they were used for materials storage rather than any manufacturing processes. At this time (1949) at least part of this area, presumably including the site itself, was marked Wrexham Trading Estate, suggesting that the ROF facility had closed following the end of hostilities and the various buildings were now used for other purpose.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |



| Map Edition and Scale                                                                                                                                                                                                                                                                                                                                                                                                                                 | Key Points                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1960-64 (1:10,560) & 1959-60 (1:2,500)                                                                                                                                                                                                                                                                                                                                                                                                                | No significant change.                                                                                                                                                                                                                                                                                                                                                                                                      |
| 1976 & 1977-82 (1:2,500) & 1977-82 (1:10,000)                                                                                                                                                                                                                                                                                                                                                                                                         | All but two of the structures formerly occupying the northwestern half of the site have been removed, and this area is now occupied by a large, elongate factory building (i.e. the Firestone Tyre Factory) surrounded by areas of open land, presumably representing roadways and areas of hardstanding for car and lorry parking, and possibly materials storage.<br>The southeastern half of the site remains unchanged. |
| 1983-89 (1:2,500)                                                                                                                                                                                                                                                                                                                                                                                                                                     | No significant change.                                                                                                                                                                                                                                                                                                                                                                                                      |
| 1990-93 (1:2,500) & 1992 (1:10,000)                                                                                                                                                                                                                                                                                                                                                                                                                   | All of the former ROF structures, including the two relict buildings formerly located adjacent to the southeastern side of the tyre factory building, have gone, with the southeastern half of the site now shown to be open land. A large, rectangular building is now shown adjacent and parallel to the southeastern side of the main factory building in the northwest of the site.                                     |
| 1994 (1:2,500)                                                                                                                                                                                                                                                                                                                                                                                                                                        | The site has been cleared of all structures to leave open land.                                                                                                                                                                                                                                                                                                                                                             |
| 2002-2014 (1:10,000)                                                                                                                                                                                                                                                                                                                                                                                                                                  | The site is shown to be open land, with a drain running approximately north-south through the eastern part of the site, as today.                                                                                                                                                                                                                                                                                           |
| * <a href="http://www.coflein.gov.uk/en/site/308980/details/MARCHWIEL+ROYAL+ORDNANCE+FACTORY,+WREXHAM/">http://www.coflein.gov.uk/en/site/308980/details/MARCHWIEL+ROYAL+ORDNANCE+FACTORY,+WREXHAM/</a><br><a href="http://en.wikipedia.org/wiki/Wrexham_Industrial_Estate">http://en.wikipedia.org/wiki/Wrexham_Industrial_Estate</a><br><a href="http://www.theviewfromthenorth.org/rof-wrexham">http://www.theviewfromthenorth.org/rof-wrexham</a> |                                                                                                                                                                                                                                                                                                                                                                                                                             |

## 2.4 Unexploded Ordnance/Bombs

Due to the site's known past use as a Royal Ordnance Factory, qualified Explosive Ordnance Disposal Engineers were present throughout the excavation of the WYG trial pits and boreholes. In addition, selected soil samples recovered during both the ESI 2012 and WYG 2013 investigations were submitted for chemical testing to determine the presence of explosive substances and their constituent compounds, such as picric acid, nitroglycerine and 2,4,6-trinitrotoluene (TNT).

During the WYG investigation no traces of potential explosives were found within the excavations, and no explosives residues were detected in any of the ESI and WYG soil samples tested. As a consequence, it is considered that the risks from UXO at the site are low.

## 2.5 Geology

The general geology of the site area is shown on the 1:50,000 geological map of Wrexham (Sheet 121) and is summarised in Table 2.4.



**Table 2.4: Geology**

| Stratigraphic Name | Age                              | Description                                                                                                                                                     |
|--------------------|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Glacial Till       | Devensian                        | Typically clay and silt with variable amounts of sand, gravel and cobbles, and occasionally boulders, with common discontinuous lenses of sand and / or gravel. |
| Salop Formation    | Westphalian D (Cisuralian Epoch) | Red and red-brown mudstone and sandstone containing beds of pebbly sandstone and conglomerate. Thin limestone beds and caliche in the lower part of the unit.   |

Given the known site history a variable thickness of Made Ground would be expected beneath most, if not all, of the site.

## 2.1 Mining or Mineral Extraction

The site is not located within an area where coal or other materials are known to have been mined by underground methods, and no quarries or pits are shown at, or within the immediate vicinity of, the site on the historical maps. Therefore hazards associated with shallow mining at the site are considered to be low.

## 2.2 Hydrogeology

The aquifer designations given in Table 2.5 are based on the Environment Agency interactive aquifer designation map. Additional information on the hydraulic characteristics of the geological units has been abstracted from Allen *et al* (1997) and Jones *et al* (2000).

**Table 2.5: Hydraulic Characteristics of Strata**

| Stratum         | Aquifer Designation | Hydraulic Characteristics                                                                                                                                                                                                                                                                |
|-----------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Made Ground     | Unproductive strata | Moderate to high porosity because of unconsolidated nature, but permeability likely to be constrained to low where poor sorting and high clay content is present.                                                                                                                        |
| Glacial Till    | Unproductive strata | Dominated by low permeability clay and silt which is interbedded with moderate to high permeability layers of sand with occasional gravel; overall, this unit is likely to be anisotropic in nature with horizontal permeability greater than vertical permeability (i.e. $k_h > k_v$ ). |
| Salop Formation | Secondary A aquifer | Rocks with permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.                                                                                                           |

Reference to the Environment Agency web site shows the following groundwater body beneath the site and the current chemical status (Table 2.6).



**Table 2.6: Underlying Groundwater Body**

| Category                          | Label / Status               |
|-----------------------------------|------------------------------|
| Waterbody ID                      | GB41101G202400               |
| Waterbody name                    | Dee Permo-Triassic Sandstone |
| River basin district              | Dee                          |
| Current quantitative status       | Poor                         |
| Current chemical status           | Good                         |
| Upward chemical trend             | No                           |
| 2015 predicted qualitative status | Poor                         |
| 2015 predicted chemical status    | Good                         |
| Overall risk                      | At risk                      |
| Protected area                    | Yes                          |

The vast majority of the development site lies outside of any groundwater Source Protection Zones (SPZ). However, the whole of the southeastern edge of the development site lies within a SPZ III (total catchment) and SPZ II (Outer Catchment).

There is a single active groundwater abstraction in the vicinity of the site. This licence, Ref. WA/067/0007/006, is a modified version of an earlier licence and became active on 1/04/2012. It allows the abstraction of up to 131,400m<sup>3</sup> / annum or 600m<sup>3</sup> / day of groundwater from a 144m deep borehole located at the industrial unit immediately adjacent to the eastern corner of the site. The licence is due to expire on 31/03/2022.

## 2.3 Hydrology and Flooding

The surface water features in the vicinity of the site are listed in Table 2.7 and, where appropriate, are marked on the Site Zonation Plan in Appendix A.

**Table 2.7: Surface Water Features**

| Feature                        | Location Relative to the Development Site                                  |
|--------------------------------|----------------------------------------------------------------------------|
| Drain                          | On-site, running from north to south through the eastern part of the site. |
| River Clywedog (Primary River) | Approximately 200m to the southeast.                                       |
| Various drains                 | Located throughout the general area.                                       |

There are no licensed surface water abstractions within 1km of the site.

The site is in Flood Zone 1, with low probability of flooding. A Flood Zone 2 is located approximately 125m to the southeast of the development site, associated with the River Clywedog.



No further consideration of flood risk is undertaken in this report. Specialist flood risk advice should be sought with regards to drainage and flooding.

## **2.4 Previous Site Investigations**

A number of ground investigations have been undertaken at the site and are reviewed below.

## **2.5 Travers Morgan Report, May 1994**

In May 1994 Travers Morgan issued a site investigation report (Ref. 1W35245/contam) which described two phases of ground investigation at the site undertaken by, or on behalf of, Travers Morgan, as well as an earlier investigation undertaken in 1992 by Subsoil Surveys on behalf of JR Grimley Eve. The key points are summarised below.

### **2.5.1 1992: Subsoil Surveys**

Travers Morgan described this investigation as comprising the drilling of 11 boreholes with laboratory testing. No further information is provided, and the report is not available for review.

### **2.5.2 November 1993: Travers Morgan**

This investigation was undertaken by LTG Ground Engineering on behalf of Travers Morgan, and comprised the following:

- The drilling of 12 boreholes;
- The excavation of 81 trial pits and 10 trial trenches; and
- Laboratory soil and water testing;

The report concluded that there were isolated pockets of soil contamination across the northern part of the site, mostly within the upper 1m of ground.

### **2.5.3 March 1994: Travers Morgan**

This investigation was undertaken to provide greater detail of the soil contamination identified during the November 1993 investigation, and included the excavation of 35 trial pits with chemical soil testing.

### **2.5.4 Comments**

Neither the logs nor the chemical and geotechnical testing results from either of the Travers Morgan investigations were included in the copy of the report provided. However, even if present any such information would be of limited use for the following reasons:

- At the time of the Travers Morgan investigations (and the earlier Subsoil Surveys investigation) the Firestone Tyre Factory was still standing, albeit undergoing demolition. Consequently, the ground conditions that existed at that time were likely to be significantly different to those that exist today, particularly as a Site Investigation Summary report prepared by Symonds Travers Morgan, dated 27/11/1995 (Ref. 35245/REP/04), confirmed that:



- the areas of soil contamination identified by the Travers Morgan investigations had been excavated and removed off-site, with “tips of Made Ground being regraded into low spots”;
  - the factory and all above ground structures had by then been demolished, and areas of hardstanding had been broken up and either removed from site (bituminous materials) or crushed and used as backfill; and
  - buried structures, including foundations and services, had, as far as practical, generally been broken out to a depth of 3m below ground level (bgl).
- The chemical testing described in the report would today be considered to be inappropriate, both in its scope and in terms of the methodology used; for example, the testing would not be MCERTS accredited, which is a prerequisite for all modern day chemical soil testing when assessing risk to human health.

Given the above constraints, the Travers Morgan report is not considered further in this assessment.

## **2.6 ESI Phase 2 Contaminated Land Investigation Report**

The ESI ground investigation took place in October 2012, and involved the excavation of a total of 38 trial pits (as shown on Drawing 14656/D004, presented at Appendix A of this report). Of these, 24 were located within the development footprint of the prison.

Laboratory chemical testing was undertaken on a total of 33 soil samples recovered during the investigation, 8 of which were recovered from Area 1.

A further 5 soil samples were tested for the presence of explosive residues, including nitroglycerine, nitrocellulose and picrate. Four of these samples were taken from trial pits excavated within the development footprint of the prison, 3 of which were from Area 1.

Testing was also on groundwater samples recovered from 4 of the pits, although none of these were located within the development footprint of the prison.

The key findings of the ESI investigation are summarised below.

### **2.6.1 Ground Conditions**

#### ***Made Ground***

The ESI investigation recorded Made Ground at 33 of the 38 trial pits locations, being absent only in TP8, TP9, TP11 and TP12, all of which were located in the west of the site and outwith the development footprint of the prison, and at TP35, located within the proposed Expansion Zone in the southwest of the development (Area 1).

With the exception of TP35, the Made Ground within the development footprint was found to vary in thickness from 0.3m at TP6 to >1.2m at TP20 and TP23, with the latter trial pit being located within Area 1.



The Made Ground was described as typically consisting of red-brown clayey sand or sandy clay with gravel containing fragments of demolition rubble (bricks, concrete etc.) and locally included fragments of plastic, plaster, charcoal, metal, glass, ash and ceramics. At 7 locations within the development footprint, including TP5 in Area 1, the Made Ground was noted to contain significant amounts of demolition rubble and associated materials; however, it may be noted that in all 7 locations the Made Ground was relatively thin, ranging in thickness from 0.45m to 1.3m.

### ***Alluvium***

Material interpreted as representing Alluvium was recorded at 10 locations within the development footprint, with 5 of those locations being in the Expansion Zone in the southwest of the site.

The Alluvium was described as typically comprising orange-red mottled grey sands, silts and clays with rare gravel. Where present, the top of the Alluvium was recorded beneath the Made Ground at depths of between 0.25m and 1.3m bgl, and locally extended down to depths in excess of 1.4m bgl.

### ***Glacial Till***

The Glacial Till was encountered at 10 locations within the development footprint where the Made Ground and / or Alluvium was fully penetrated, and typically comprised firm to stiff red-brown clay with occasional gravel and cobbles. Depths to the top of the Glacial Till in the development footprint ranged from 0.3m to 0.9m bgl, with those specifically in Area 1 (6 of the locations) ranging from 0.3m to 0.8m bgl

## **2.6.2 Contamination Testing**

The results of the chemical soil testing carried out by ESI can be summarised as follows:

- Low concentrations of metals were recorded in the Made Ground;
- Low concentrations of more environmentally persistent petroleum hydrocarbons were observed locally;
- Low concentrations of various PAH compounds were detected in approximately 33% of the samples tested;
- All other volatile organic compounds and semi-volatile organic compounds (VOCs and SVOCs) were less than their relevant laboratory limits of detection;
- All explosive compounds tested for were less than their relevant laboratory limits of detection; and
- No asbestos fibres were detected in any of the soil samples tested.

Given the significant thickness (c.40m) of low permeability clays underlying the site, the ESI report concluded that the low concentrations of some contaminants recorded in the shallow groundwater are unlikely to pose a risk to controlled waters.



Further assessment of the chemical soil testing results from the ESI investigation is undertaken in Section 3.0 of this report.

## **2.7 2013 WYG Investigation**

The WYG investigation took place in November 2013 and the data acquired was presented in a Factual Report dated 14/01/2014. The WYG investigation included the following:

- The mechanical excavation of 18 trial pits, with in situ plate bearing and CBR testing at 6 of the trial pit locations;
- The mechanical excavation of a further 12 trial pits;
- The drilling of 19 boreholes with in situ geotechnical testing and 50mm diameter gas and groundwater monitoring standpipes in each borehole;
- The hand-excavation of 4 shallow pits;
- Laboratory soil and groundwater testing; and
- Gas and groundwater level monitoring.

All but 2 of the WYG exploratory holes, WYG TP10 and WYG BH1, were located within the development footprint of the prison, with 12 of the trial pits and 4 of the boreholes being specifically located within Area 1.

The findings of the WYG are summarised below.

### **2.7.1 Ground Conditions**

#### ***Made Ground***

Made Ground was recorded at surface at all locations except WYGBH2 and WYGTP11, where 0.2m of topsoil was found to directly overlie the Glacial Till.

The Made Ground predominantly comprised clay with varying amounts of sand and gravel, and locally also included cobbles and boulders. The sand locally included ash. Gravel and cobble components were predominantly brick, concrete, sandstone and mudstone, but locally also included metal, plastic, ceramic, clinker, limestone and coal. The boulders included concrete, sandstone and mudstone.

At 7 locations (WYGBH9, WYGBH10, WYGBH10A, WYGBH17, WYGTP7, WYGTP8 and WYGTP20) the Made Ground was represented by gravelly sand or sandy gravel with varying amounts of cobbles. The gravel component predominantly comprised brick, concrete, sandstone and mudstone, and locally also included plastic, metal, limestone and coal.

Where the base of the Made Ground was proven it was found to range in thickness from 0.2m to 2.2m. However, at one location, WYGBH10, the borehole was terminated within the Made Ground at a depth of 4.6m bgl.

In Area 1 the Made Ground varied in thickness from 0.2m to 0.8m.



## **Alluvium**

Material interpreted as representing Alluvium was recorded at 2 locations, namely WYGTP14 and WYGTP15, both of which were located in the Expansion Zone in the southwest of the development footprint. The Alluvium was described as comprising slightly clayey, fine or fine to medium sand.

## **Glacial Till**

The Glacial Till was recorded at all locations where the Made Ground and Alluvium was fully penetrated, at depths ranging from 0.15m to 2.2m bgl across the development footprint generally and at depths of 0.2m to 0.8m bgl in Area 1.

The Glacial Till was indicated on the WYG logs to comprise firm to stiff, silty clay with varying amounts of gravel and localised lenses of clayey gravel or clayey sand.

## **Groundwater**

Perched water was frequently encountered within the shallow Made Ground across the development site. Groundwater was generally absent, but where it was encountered within the Glacial Till the strikes were recorded at depths of between 2.3m and 13.0m bgl.

### **2.7.2 Asbestos**

Asbestos containing materials or loose asbestos fibres were recorded in a number of the soil samples recovered from the development area, as summarised in Table 2.8. The locations are shown on Drawing 14656/D004 in Appendix A (note: for Issue 2 of this report this drawing has been updated to include all site investigation locations completed as at 19 September 2014).

**Table 2.8: Asbestos, WYG 2013 Investigation**

| Location  | Depth (m bgl) | Asbestos Results    | Level        |
|-----------|---------------|---------------------|--------------|
| WYG BH9   | 0.5           | Amosite, chrysotile | Quantifiable |
|           | 1.0           | Amosite, chrysotile | Quantifiable |
| WYG BH17  | 0.2           | Chrysotile          | Trace        |
| WYG BH10  | 1.0           | Chrysotile          | Quantifiable |
| WYG BH10A | 0.5           | Chrysotile          | Quantifiable |
|           | 1.0           | Amosite, chrysotile | Quantifiable |
| WYG BH12  | 0.5           | Chrysotile          | Trace        |
| WYG TP17  | 0.5           | Chrysotile          | Quantifiable |
|           | 1.0           | Chrysotile          | Trace        |
| WYG BH13  | 0.5           | Chrysotile          | Quantifiable |
| WYG BH14  | 1.0           | Chrysotile          | Quantifiable |



| Location | Depth (m bgl) | Asbestos Results | Level        |
|----------|---------------|------------------|--------------|
| WYG BH19 | 0.3           | Chrysotile       | Quantifiable |
| WYG HDP1 | 0.5           | Chrysotile       | Quantifiable |
| WYG HDP3 | 0.5           | Chrysotile       | Quantifiable |
| WYG HDP4 | 0.5           | Chrysotile       | Quantifiable |

### 2.7.3 Chemical Testing Results

The chemical testing results obtained by WYG during their 2013 site investigation and that are relevant to Area 1 are assessed in Section 3.0.

## 2.8 Hydrock August 2014 Ground Investigation

At the time of writing ground investigation works are ongoing at the site, under the supervision of Hydrock.

However, a preliminary ground investigation was undertaken by Hydrock across the development area during August 2014. The findings of that preliminary investigation, which comprised the mechanical excavation of 30 trial pits and the drilling of 15 cable percussive boreholes, with gas and groundwater monitoring standpipes in 10 of the boreholes, are summarised below. All exploratory holes were located within the prison development area.

It may be noted that as the locations of the Hydrock exploratory holes were instructed by Tarmac Property Services (TPS) the August 2014 exploratory holes have been prefixed "TPS".

### 2.8.1 Ground Conditions

#### ***Made Ground***

Made Ground was recorded at all locations across the development footprint to depths of between 0.1m and >2.8m bgl, with the Made Ground thickness across Area 1 specifically ranging from 0.2m to >2.1m bgl.

The Made Ground was found to comprise sandy clay, locally a very clayey sand, with varying amounts of gravel comprising brick, concrete and sandstone, and locally also including metal and wood, and occasional cobbles of brick and concrete.

#### ***Alluvium***

Alluvium, comprising firm, brown grey and green, silty, sandy clay was recorded at a single location at the southern corner of the Expansion Zone (TPS TP03) from a depth of 0.2m to 0.7m bgl.

#### ***Glacial Till***

The Glacial Till was recorded at all locations where the Made Ground and Alluvium was fully penetrated, and comprised firm to very stiff, silty clay with pockets of siltstone. The top of the



Glacial Till was intercepted at depths of between 0.1m and 2.6m bgl across the development area generally, and between 0.2m and 2.4m bgl in Area 1 specifically.

### **Groundwater**

No groundwater was encountered during the excavation / drilling of the exploratory holes.

## **2.8.2 Asbestos**

During the site-wide August 2014 Hydrock investigation a number of the soil samples tested were found to contain asbestos containing materials or loose asbestos fibres. A sample recovered from TPS TP29, located in the area of the proposed car park in the northwest of the site (i.e. in Area 1) did not show visual evidence of asbestos fibres but subsequent testing proved it to contain 0.002 % w/w asbestos (initially identified as chrysotile but subsequently identified by a specialist laboratory as being amosite).

In another instance (Hydrock TP12, also in Area 1), an apparent visual occurrence of asbestos fibres in the trial pit was later shown by testing (on the fibrous material) not to be ACM.

The occurrence of asbestos (as confirmed by later laboratory testing) recorded during the Hydrock August 2014 investigation is summarised in Table 2.9.

**Table 2.9: Asbestos, Hydrock August 2014 Investigation**

| Location          | Depth (m bgl) | Asbestos Results    | Level       |
|-------------------|---------------|---------------------|-------------|
| TPS TP29 (Area 1) | 0.3           | Amosite             | 0.002% w/w  |
| TPS TP05          | 1.0           | Chrysotile          | Detected    |
| TPS TP16          | 0.1           | Chrysotile          | Detected    |
| TPS TP18          | 0.3           | Chrysotile, amosite | Detected    |
| TPS TP19          | 0.3           | Chrysotile          | Detected    |
| TPS TP22          | 0.2           | Chrysotile          | Detected    |
| TPS TP24          | 0.4           | Chrysotile, amosite | <0.001% w/w |
| TPS TP25          | 0.5           | Chrysotile, amosite | 0.002% w/w  |
| TPS TP30          | 0.3           | Chrysotile          | <0.001% w/w |



### **3.0 LAND QUALITY ASSESSMENT FOR AREA 1**

#### **3.1 Conceptual Model**

The various phases of ground investigation undertaken across the development area by ESI (2012), WYG (2013) and Hydrock August 2014, ongoing) has recorded Made Ground across almost all the prison footprint. The thickness of the Made Ground was variable, with deeper Made Ground (>4.6m bgl) being recorded in the northeastern part of the site formerly occupied by the factory building.

The Made Ground typically comprised sandy clay with varying amounts of gravel and cobbles of brick, concrete, sandstone and mudstone. Locally, the Made Ground also included fragments of metal, plastic, timber, clinker, limestone, coal and ceramic, as well as boulders of concrete, sandstone and mudstone.

At 7 of the WYG locations the Made Ground was represented by gravelly sand or sandy gravel with varying amounts of cobbles. The gravel at these locations component predominantly comprised brick, concrete, sandstone and mudstone, and locally also included plastic, metal, limestone and coal.

At 12 locations within the development area where the Made Ground was penetrated it was found to overlie Alluvium, typically comprising sandy, clay.

The top of the Glacial Till was intercepted at all locations where the base of the Made Ground and Alluvium was fully penetrated, at depths of between 0.1m and 2.6m bgl across the development area generally, and depths of between 0.2m and 2.4m bgl in Area 1.

#### **3.2 Preliminary Exposure Model**

The preliminary exposure model is used for geo-environmental hazard identification and establishing potential contaminant linkages in line with the Statutory Guidance to Part 2A of the Environmental Protection Act 1990, also known as 'potential pollution linkages' in the Model Procedures of CLR11 (Environment Agency, 2004). This is based on the contaminant-pathway-receptor linkage approach.

##### **3.2.1 Potential Contaminants**

- Elevated concentrations of metals and polycyclic aromatic hydrocarbons (PAHs) in the shallow Made Ground;
- Asbestos containing materials and loose asbestos fibres in the shallow Made Ground;
- Possible elevated concentrations of metals within the natural soils.

Previous investigations have not identified significant petroleum hydrocarbon, SVOC or VOC contamination of the shallow soils at the site, and these contaminants are not considered further.

##### **3.2.2 Potential Receptors**

- Humans (site end-users and users of neighbouring premises);



- Development end use (buildings, utilities and landscaping);
- Surface water: various ponds to the southeast of the site and the River Clywedog 200m to the southeast.

It is assumed that the on-site drain currently running through the east of the site will be removed as part of the development, and will therefore not constitute a viable receptor post-development.

Due to the significant thickness of low permeability clay underlying the site groundwater in the underlying sandstones is not considered to be at risk from the shallow soils beneath the site.

### **3.2.3 Potential Pathways**

- Humans: ingestion, skin contact, inhalation of dust and outdoor air;
- Humans; inhalation of indoor gases or vapours;
- Plant life: root uptake;
- Surface water: overland flow;
- Surface water: drainage discharge; and
- Buildings: direct contact with substances deleterious to building materials.

### **3.3 Chemical Soil Quality**

The end use of Area 1 may, for assessment purposes, be approximated by a commercial end use.

The results of the chemical testing undertaken on samples of soil recovered from exploratory holes located in Area 1 by ESI (2012), WYG (2013) and Hydrock (August 2014) have been considered together and statistically analysed to determine the chemical quality of the Made Ground across Area 1.

The statistical analysis is presented in Appendix B and demonstrates that the shallow Made Ground does not pose a risk to site end users and is therefore chemically suitable for its intended use.

The statistics presented at Appendix B are based on three end use scenarios, Commercial, Public Open Space, and Residential with Plant Uptake, this being to allow for uncertainties in the final end use of the expansion area. It is only at two trial pits that there are exceedences of the GAC values, both applicable to the Residential with Plant Uptake scenario. However, both pits (WYG TP 03 and WYG TP 09) are located in the future car park area so the result is unimportant.

### **3.4 Asbestos**

Testing to date has shown that the risk of encountering asbestos in Area 1 is low, with occurrences at two places only in a total area of 11.3ha. Nevertheless, additional testing of the soils in situ is ongoing and will be completed before earthworks commence in order to strengthen this conclusion.

The presence of asbestos in soils at concentrations greater than 0.001% w/w are considered to be a risk that requires mitigation and proposals to deal with this risk are presented in Section 4.



## **4.0 OUTLINE REMEDIATION STRATEGY**

### **4.1 Context**

The Land Quality Assessment presented in Section 4 shows that the only potentially unacceptable risks associated with Area 1 are those associated with asbestos. Those risks need to be assessed in the context of:

- The end use of the north-western part of Area 1 as either car parking or other forms of built environment;
- The end use of the south-western part of Area 1 as an expansion area, that an area to be left as grassed open space until such time as there is a requirement (if any) to extend the prison area;
- The bulk earthworks requirements pertaining to Area 1 which will involve:
  - A top-soil strip;
  - Cutting material from the south-western part of Area 1; and
  - Placing the material cut from the south-western part of Area 1 and using it as fill on the north-western part of Area 1 to create new landforms.

It may be noted that testing to date has shown that the risk of encountering asbestos in Area 1 is low and that additional testing with the soils in situ is to be carried out before earthworks commence in order to strengthen that conclusion.

### **4.2 Outline Remediation Strategy**

Risks associated with asbestos in soil relate entirely to the ability of the fibres to become airborne. Therefore, remediation is entirely related to preventing the release process from occurring and the following principles apply:

- During excavation and materials movement activities, soils will be dampened to inhibit release of fibres;
- Site operatives will be trained in respect of asbestos awareness to an extent that fully complies with the Control of Asbestos Regulations 2012.

In terms of materials placement the following criteria are proposed:

- Soils in the depth zone finished ground level to 1m depth must be characterised by 'below limit of detection' that is, < 0.001% w/w;
- Soils containing 0.1% w/w – 0.001% w/w asbestos are considered to be contaminated with asbestos and can only be re-used at depths >1m below finished ground level;
- The boundary between the clean material and the asbestos contaminated materials will be marked with a coloured geotextile to warn future groundworkers. The geotextile marker will be a distinctive, clearly visible marker membrane which separates the soils with residual asbestos >1m depth from the shallower soils. There is a general preference for placing soils



containing 0.1% w/w – 0.001% w/w asbestos where they will not be disturbed in the future. An accurate record of where such soils are placed must be kept in a health & safety file.

- Soils containing >0.1% w/w asbestos must be removed from site for disposal at an appropriate facility.
- provision will need to be made for hand picking of Asbestos Containing Materials where these are observed

These criteria have been used on similar sites to the satisfaction of the relevant local authority.

#### **4.3 Materials Management Plan**

The bulk earthworks will be carried out in accordance with a Materials Management Plan (MMP) prepared in accordance with the CI:AIRE Definition of Waste Code of Practice, signed off by a Qualified Person. The MMP will include provision for asbestos testing of soils to ensure that the criteria set out in Section 4.2 above are being met.

#### **4.4 Validation**

On completion the ground will be subject to testing to ensure that the criteria proposed in 4.2 above have been complied with. The scope of the validation testing will be agreed with the Local Authority before it is undertaken but a trial pit grid on 75m testing with asbestos testing of soils is proposed.

A Validation Report will be submitted to the Local Authority for approval on completion.



## 5.0 UNCERTAINTIES AND LIMITATIONS

### 5.1 General Comments

This report details the findings of work carried out in August 2014. The report has been prepared by Hydrock on the basis of available information obtained during the study period. Although every reasonable effort has been made to gather all relevant information, all potential environmental constraints or liabilities associated with the site may not have been revealed.

The report has been prepared for the exclusive benefit of Lend Lease and those parties designated by them for the purpose of providing geotechnical and geo-environmental recommendations for the site. The report contents should only be used in that context. Furthermore, new information, changed practices or new legislation may necessitate revised interpretation of the report after the date of its submission.

Hydrock has used reasonable skill, care and diligence in the design of the investigation of the site. The inherent variation of ground conditions allows only definition of the actual conditions at the locations and depths of trial pits and boreholes at the time of the investigation. At intermediate locations, conditions can only be inferred.

Groundwater findings described are only representative of the dates on which they were made and levels may vary.

Information provided by third parties has been used in good faith and is taken at face value; however, Hydrock cannot guarantee its accuracy or completeness.

The work has been carried out in general accordance with recognised best practice as detailed in guidance documents such as the CLR 11 Model Procedures (Environment Agency 2004), BS 5930:1999 +A2:2010 and BS 10175:2011+A1:2013. Important aspects of the risk assessment process are transparency and justification. Where the phrase “suitable for use” is used in this report, it is in keeping with the terminology used in planning control and does not imply any specific warranty or guarantee offered by Hydrock.

The chemical analyses reported were scheduled for the purposes of risk assessment with respect to human health as discussed in the report. Whilst the results may be useful in applying the Hazardous Waste Assessment Methodology given in Environment Agency Technical Guidance WM2, they are not primarily intended for that purpose and additional analysis may be required should waste classification be required for consideration of off-site disposal of contaminated soils. Separate analyses will be required to meet the Waste Acceptance Criteria for specific landfill sites.

Unless otherwise stated, the chemical testing carried out for this report was not scoped to comply with the requirements of the water supply company and further work may be required.

The preliminary risk assessment process may identify potential risks to site demolition and redevelopment workers. However, consideration of occupational health and safety issues is beyond the scope of this report.



Please note that notwithstanding any site observations concerning the presence or otherwise of archaeological sites or invasive weeds such as Japanese knotweed, this report does not constitute a formal survey of these potential hazards.

Any site boundary line depicted on plans does not imply legal ownership of land.



## 6.0 REFERENCES

- ALLEN, D. L., BREWERTON, L. J., COLEBY, L. M., GIBBS, B. R., LEWIS, M. A., MACDONALD, A. M., WAGSTAFF, S. J. and WILLIAMS, A.T. 1997. The physical properties of major aquifers in England and Wales. *British Geological Survey Technical Report WD/97/34*. 312pp. Environment Agency R&D Publication 8.
- BRITISH STANDARDS INSTITUTION. 1999. Code of practice for Site Investigations. *BS 5930 Incorporating Amendment No.2:2010*. BSI, London.
- BRITISH STANDARDS INSTITUTION. 2011. Code of Practice for Investigation of Potentially Contaminated sites. *BS 10175 Incorporating Amendment No.1:2013*. BSI, London.
- BRITISH STANDARDS INSTITUTION. 2004. Soil quality. Characterization of soil related to groundwater protection. *ISO 15175*. BSI, London.
- BRITISH STANDARDS INSTITUTION. 2004. Eurocode 7 – Geotechnical design - Part 1: General rules. *BS EN 1997-1. Incorporating Corrigendum No.1*. BSI, London.
- BRITISH STANDARDS INSTITUTION. 2009. Code of practice for earthworks. *BS 6031 Incorporating Corrigendum No.1:2010*. BSI, London.
- CIEH and CL:AIRE. May 2008. *Guidance on comparing soil contamination data with a critical concentration*. Chartered Institute of Environmental Health and Contaminated Land: Applications in Real Environments, London, 66pp.
- CIRIA C733. 2014. *Asbestos in soil and made ground: a guide to understanding and managing risks*.
- DCLG. March 2012. National Planning Policy Framework. DCLG, London.
- DCLG. March 2012. Technical Guidance to the National Planning Policy Framework. DCLG, London.
- DEFRA. 1 September 2005. Soil Guideline Values and the Determination of Land as Contaminated Land under Part IIA. Guidance Note CLAN 2/05. DEFRA/LEQ, London.
- DEFRA. April 2012. Contaminated Land Statutory Guidance. DEFRA, London.
- DEFRA. March 2014. SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination – Policy Companion Document. DEFRA, London.
- EIC, AGS and CL:AIRE. 2009. The EIC/AGS/CL:AIRE Soil Generic Assessment Criteria for Human Health Risk Assessment. Environmental Industries Commission, Association of Geotechnical and Geo-environmental Specialists and Contaminated Land: Applications in Real Environments. Available from <[www.claire.co.uk](http://www.claire.co.uk)>.
- ENVIRONMENT AGENCY. 2004. Model procedures for the management of land contamination. *Contaminated Land Report 11*. The Environment Agency.



ENVIRONMENT AGENCY. April 2012. Flood risk standing advice (FRSA) for local planning authorities. Version 3.1. Interactive PDF document at <<[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/296965/LIT\\_9002\\_5a96ba.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/296965/LIT_9002_5a96ba.pdf).

JONES, H. K., MORRIS, B. L., CHENEY, C. S., BREWERTON, L. J., MERRIN, P. D., LEWIS, M. A., MACDONALD, A. M., COLEBY, L. M., TALBOT, J. C., MCKENZIE, A. A., BIRD, M. J., CUNNINGHAM, J. and ROBINSON, V. K. 2000. The physical properties of minor aquifers in England and Wales. *British Geological Survey Technical Report WD/00/04*. 234pp. Environment Agency R&D Publication 68.

NATHANAIL, P., McCAFFREY, C., ASHMORE, M., CHENG, Y., GILLETT, A., OGDNE, R. and SCOTT, D. 2009. The LQM/CIEH Generic Assessment Criteria for Human Health Risk Assessment (2nd ed.). Land Quality Press, Nottingham.

RUDLAND, D. J., LANCEFIELD, R. M. and MAYELL, P. N. 2001. Contaminated land risk assessment. A guide to good practice. *CIRIA Report C552*. CIRIA, London. 158 pp.

STONE, K., MURRAY, A., COOKE, S., FORAN, J. and GOODERHAM, L. 2009. Unexploded ordnance (UXO), a guide to the construction industry. *CIRIA Report C681*. CIRIA, London. 141 pp.

WELSH ASSEMBLY GOVERNMENT. July 2004. Development and flood risk. Planning Policy Wales, Technical Advice Note 15.



## **Appendix A**

### **Drawings**

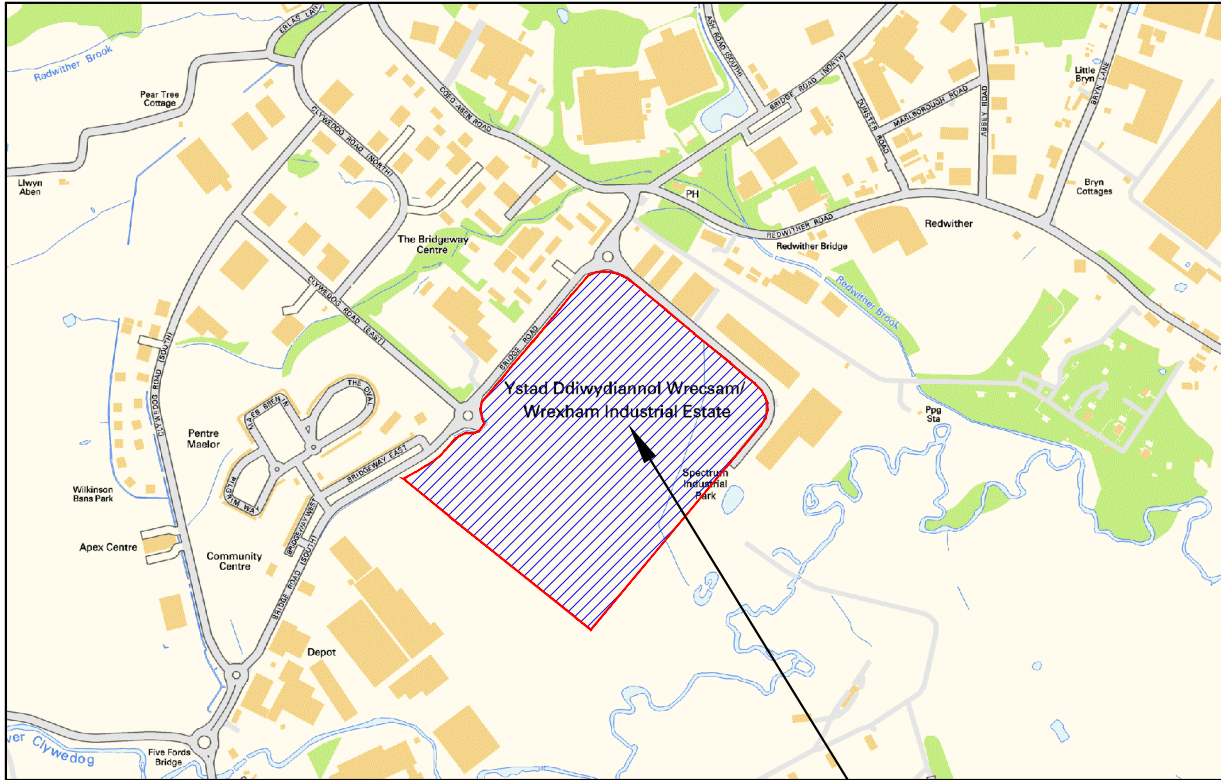
Drawings Included in this report:

C14656-D001 – Site Location Plan

C14656-D002 – Site Layout Plan

C14656-D003 – Proposed Development Plan

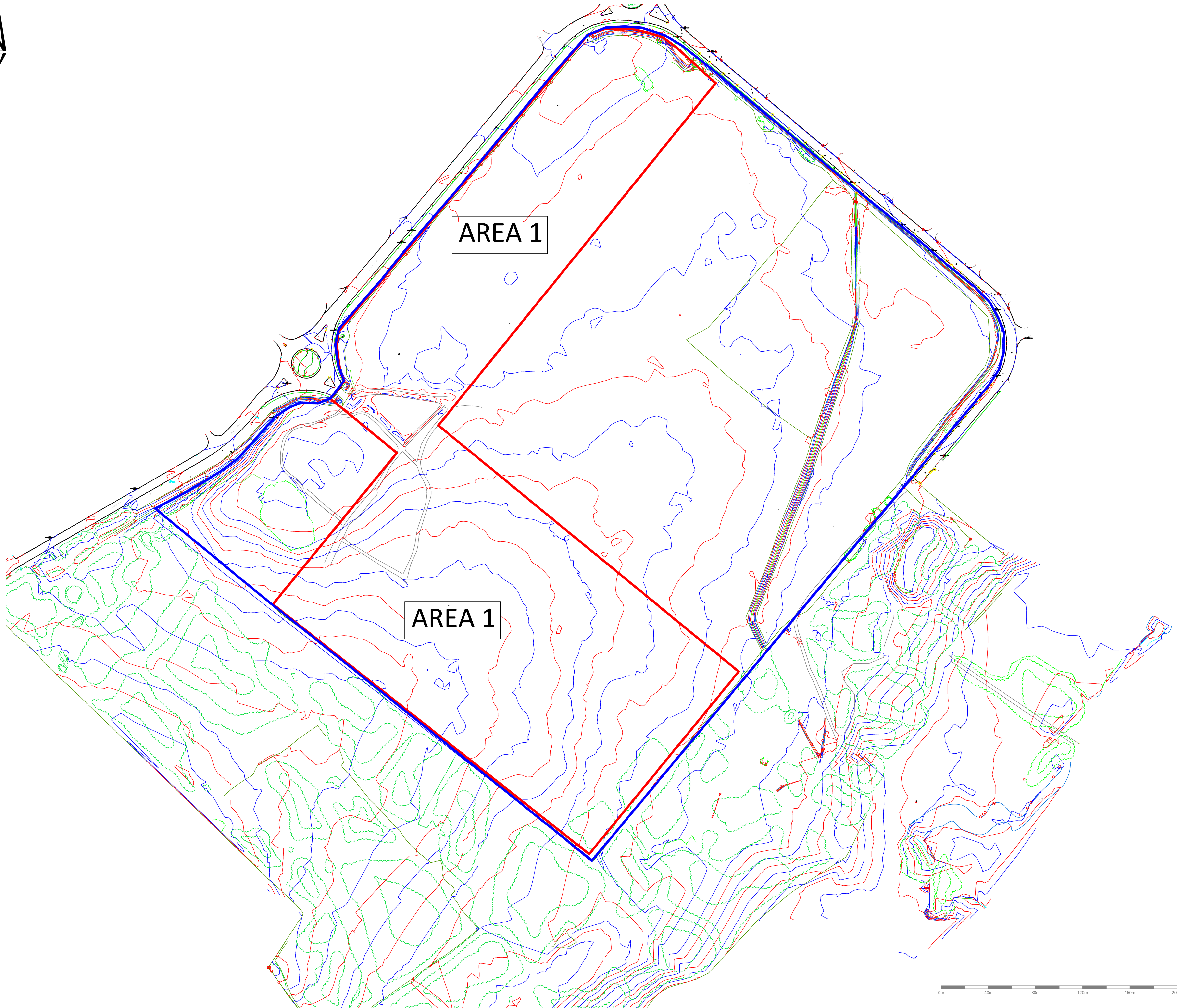
C14656-D004 – Ground Investigation Plan



**SITE LOCATION**

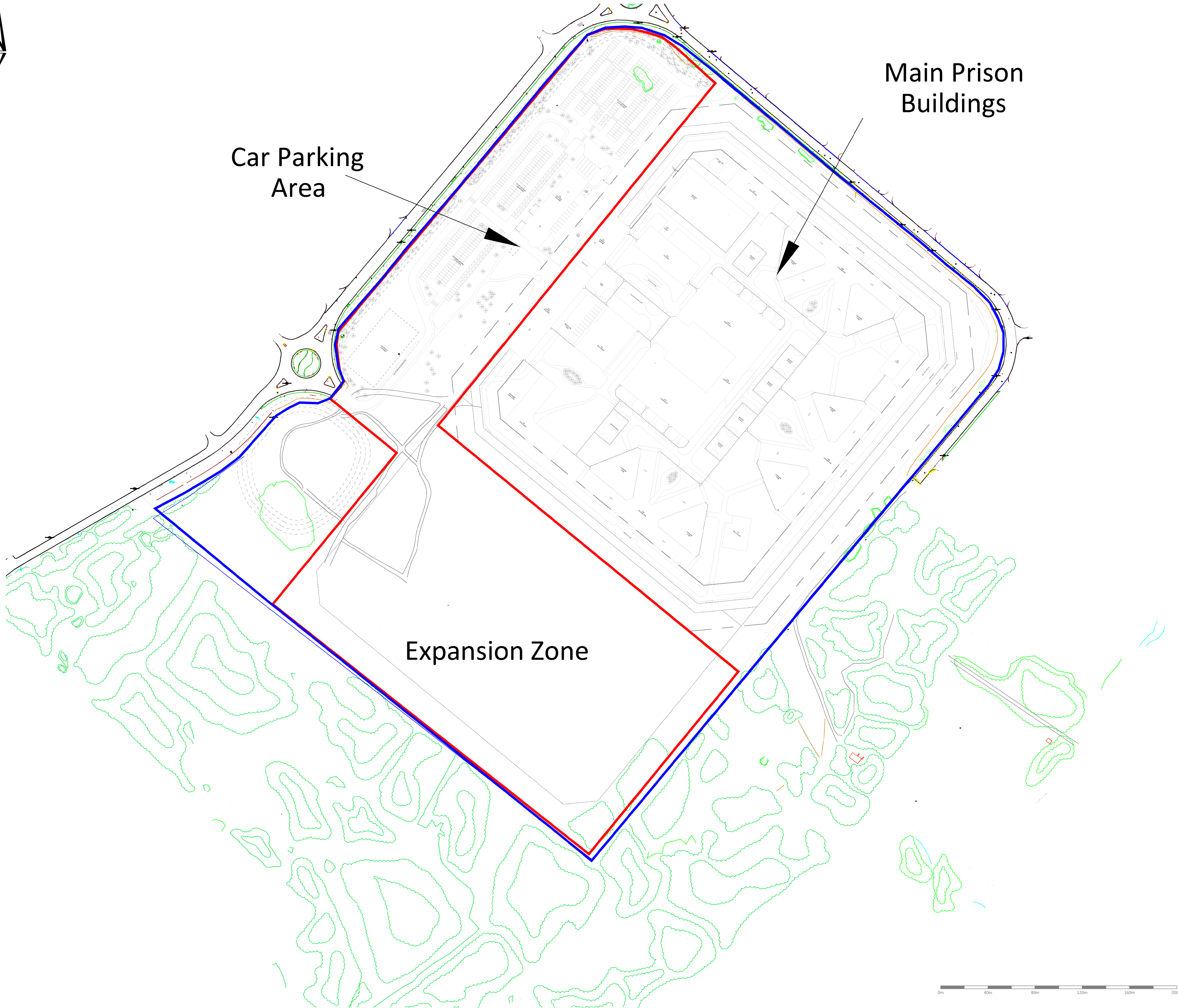


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|                     |      |             |    |     |                                                          | Drawing Status: DRAFT |                                                                                                                                                                                                                                                                           |         |            |          |            |
| Rev                 | Date | Description | By | Ckd | This drawing is the copyright of Hydrock Consultants Ltd |                       | <div><div><div></div><div></div></div><div>Hydrock</div></div> <div>Hydrock Consultants Ltd<br/>4 Lakeside<br/>Festival Park<br/>Stoke-on-Trent<br/>ST1 5RY<br/>T +44 (0)1782 261919<br/>stoke@hydrock.com<br/><a href="http://www.hydrock.com">www.hydrock.com</a></div> |         |            |          |            |
| Client : LEND LEASE |      |             |    |     | Project Title: NORTH WALES PRISON                        |                       |                                                                                                                                                                                                                                                                           |         |            |          |            |
| Architect :         |      |             |    |     | Drawing Title: Site Location Plan                        |                       | Hydrock Job No: C/14656                                                                                                                                                                                                                                                   |         |            |          |            |
|                     |      |             |    |     |                                                          |                       | Drawn                                                                                                                                                                                                                                                                     | Checked | Scale @ A4 | Date     | Issue Date |
|                     |      |             |    |     |                                                          |                       | LE                                                                                                                                                                                                                                                                        | TW      | AS SHOWN   | 12/09/14 | 12/09/14   |
|                     |      |             |    |     | Drawing Number: 14656/D001                               |                       | Revision: -                                                                                                                                                                                                                                                               |         |            |          |            |



- Notes:
- DEVELOPMENT FOOTPRINT AREA
  - AREA 1
- Survey Key (Major Features)
- Bushes
  - Minor Contours (0.5m)
  - Major Contours (1.0m)

| Rev                                                                                                                                                                                                                                                                | Date    | Description | By       | Ckd        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-------------|----------|------------|
| Architect :                                                                                                                                                                                                                                                        |         |             |          |            |
| <div><div><div>Hydrock</div><div><div>Hydrock Consultants Ltd</div><div>4 Lakeside</div><div>Festival Park</div><div>Stoke-on-Trent</div><div>ST3 3RY</div><div>T +44 (0)1782 261919</div><div>stoke@hydrock.com</div><div>www.hydrock.com</div></div></div></div> |         |             |          |            |
| Client :                                                                                                                                                                                                                                                           |         |             |          |            |
| LEND LEASE                                                                                                                                                                                                                                                         |         |             |          |            |
| Project Title:                                                                                                                                                                                                                                                     |         |             |          |            |
| NORTH WALES PRISON                                                                                                                                                                                                                                                 |         |             |          |            |
| Drawing Title:                                                                                                                                                                                                                                                     |         |             |          |            |
| Site Survey Plan                                                                                                                                                                                                                                                   |         |             |          |            |
| Drawing Status:                                                                                                                                                                                                                                                    |         |             |          |            |
| Final                                                                                                                                                                                                                                                              |         |             |          |            |
| Hydrock Job No:                                                                                                                                                                                                                                                    |         |             |          |            |
| C/14656                                                                                                                                                                                                                                                            |         |             |          |            |
| Drawn                                                                                                                                                                                                                                                              | Checked | Scale @ A1  | Date     | Issue Date |
| RD                                                                                                                                                                                                                                                                 | EC      | As Shown    | 25/09/14 | 25/09/14   |
| Drawing Number:                                                                                                                                                                                                                                                    |         |             |          | Revision:  |
| 14656/D002                                                                                                                                                                                                                                                         |         |             |          | A          |



Notes:

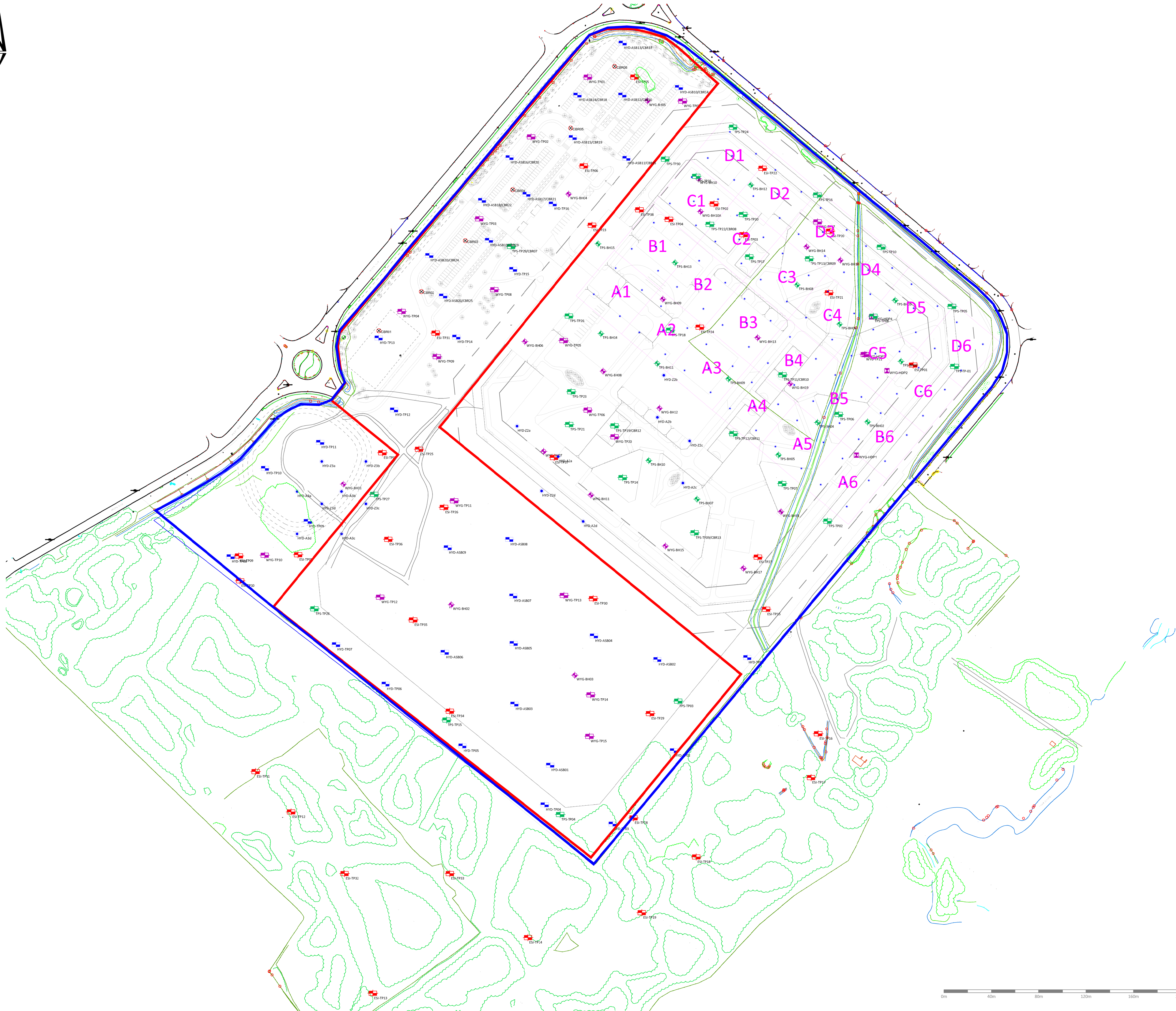
DEVELOPMENT FOOTPRINT AREA

AREA 1

Survey Key (Major Features)

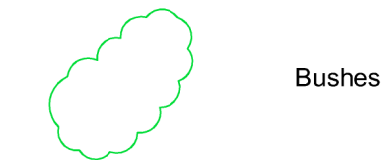
Bushes

| Rev                                                                                                                                                                                                                                                     | Date    | Description | By       | Ckd        |
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| Architect :                                                                                                                                                                                                                                             |         |             |          |            |
| <div><div>Hydrock</div><div><div>Hydrock Consultants Ltd</div><div>4 Lakeside</div><div>Festival Park</div><div>Stoke-on-Trent</div><div>ST3 3RY</div><div>T +44 (0)1782 261919</div><div>stoke@hydrock.com</div><div>www.hydrock.com</div></div></div> |         |             |          |            |
| Client :                                                                                                                                                                                                                                                |         |             |          |            |
| LEND LEASE                                                                                                                                                                                                                                              |         |             |          |            |
| Project Title:                                                                                                                                                                                                                                          |         |             |          |            |
| NORTH WALES PRISON                                                                                                                                                                                                                                      |         |             |          |            |
| Drawing Title:                                                                                                                                                                                                                                          |         |             |          |            |
| Proposed Development Plan                                                                                                                                                                                                                               |         |             |          |            |
| Drawing Status:                                                                                                                                                                                                                                         |         |             |          |            |
| FINAL                                                                                                                                                                                                                                                   |         |             |          |            |
| Hydrock Job No:                                                                                                                                                                                                                                         |         |             |          |            |
| C/14656                                                                                                                                                                                                                                                 |         |             |          |            |
| Drawn                                                                                                                                                                                                                                                   | Checked | Scale @ A1  | Date     | Issue Date |
| LW                                                                                                                                                                                                                                                      | EC      | As Shown    | 10/09/14 | 10/09/14   |
| Drawing Number:                                                                                                                                                                                                                                         |         |             |          | Revision:  |
| 14656/D003                                                                                                                                                                                                                                              |         |             |          | -          |



- Notes:
- DEVELOPMENT FOOTPRINT AREA
  - AREA 1
  - HYD-E6 HYDROCK ASBESTOS TRIALPIT 2014
  - HYD-TP01 HYDROCK TRIALPIT 2014
  - HYD-ASB01 HYDROCK ADDITIONAL ASBESTOS TRIALPIT 2014
  - HYD-ASB01/CBR013 HYDROCK ADDITIONAL ASBESTOS TRIALPIT 2014 AND CBR LOCATION
  - CBR01 CBR TESTING 2014
  - TPS-TP05 TPS HYDROCK TRIAL PIT 2014
  - TPS-TP05/CBR01 TPS HYDROCK TRIAL PIT 2014 AND CBR LOCATION
  - TPS-BH07 TPS HYDROCK BOREHOLE 2014
  - WYG-TP17 WYG TRIAL PIT 2013
  - WYG-HDP2 WYG HAND-DUG PIT 2013
  - WYG-BH13 WYG BOREHOLE 2013
  - ESI-TP30 ESI TRIALPIT 2013

Survey Key (Major Features)



| Rev                                                                                                                                                                                                                                                     | Date    | Description | By       | Ckd        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-------------|----------|------------|
| Architect :                                                                                                                                                                                                                                             |         |             |          |            |
| <div><div>Hydrock</div><div><div>Hydrock Consultants Ltd</div><div>4 Lakeside</div><div>Festival Park</div><div>Stoke-on-Trent</div><div>ST3 3RY</div><div>T +44 (0)1782 261919</div><div>stoke@hydrock.com</div><div>www.hydrock.com</div></div></div> |         |             |          |            |
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| LEND LEASE                                                                                                                                                                                                                                              |         |             |          |            |
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| NORTH WALES PRISON                                                                                                                                                                                                                                      |         |             |          |            |
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| Drawing Number:                                                                                                                                                                                                                                         |         |             |          | Revision:  |
| 14656/D004                                                                                                                                                                                                                                              |         |             |          | A          |



## **Appendix B**

### Statistical Analysis

Assessment of Chemicals of Potential Concern to Human Health



| All values in mg/kg unless otherwise stated                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |         |             |            |            |                        |        |                  | Soil Type                    | MG      | MG      | MG      | MG      | MG      | MG     | MG     | MG     | MG     | MG     | MG       | MG       | MG       | MG       | MG       | MG       | MG       |          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-------------|------------|------------|------------------------|--------|------------------|------------------------------|---------|---------|---------|---------|---------|--------|--------|--------|--------|--------|----------|----------|----------|----------|----------|----------|----------|----------|
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |         |             |            |            |                        |        |                  | Location & Depth             | WYG BH5 | WYG BH4 | WYG TP8 | WYG TP9 | WYG TP4 | WYGTp1 | WYGTp2 | WYGTp3 | WYGTp3 | WYGTp7 | WYG TP11 | WYG BH02 | WYG BH02 | WYG BH03 | WYG TP12 | WYG TP13 | WYG TP14 | WYG TP15 |
| Chemical of Potential Concern                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Lab. RL | No. Samples | Min. Value | Max. Value | No. Samples > or = GAC | GAC    | US <sub>95</sub> | Result of Significance Test  | 0.5     | 0.5     | 0.5     | 0.5     | 0.5     | 0.5    | 0.5    | 0.5    | 0.6    | 0.5    | 0.5      | 0.5      | 1        | 0.5      | 0.5      | 0.5      | 0.5      |          |
| Arsenic                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1       | 29          | 2.2        | 20         | 0                      | 640    | 11.49011         | POTENTIALLY SUITABLE FOR USE | 10.2    | 8.1     | 7.5     | 11.3    | 9.1     | 5.5    | 6.6    | 11.5   | 12.5   | 8.4    | 8.9      | 11.4     | 9.5      | 8.8      | 7.4      | 11.2     | 5        | 6.9      |
| Beryllium                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 0.06    | 29          | 0.2        | 3          | 0                      | 420    | 1.707668         | POTENTIALLY SUITABLE FOR USE | 1.8     | 1.3     | 0.9     | 1.5     | 1.3     | 0.6    | 0.9    | 2.9    | 3      | 0.6    | 2.2      | 1.4      | 1.2      | 1        | 0.7      | 2.1      | 0.6      | 0.9      |
| Boron                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0.2     | 29          | 0.2        | 1.4        | 0                      | 190000 | 0.927902         | POTENTIALLY SUITABLE FOR USE | 1       | 1.1     | 0.4     | 1.4     | 1.2     | 0.6    | 0.7    | 1.3    | 0.8    | 0.2    | 0.9      | 0.8      | 0.9      | 0.4      | 0.6      | 0.8      | 0.3      | 1        |
| Cadmium                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0.2     | 29          | 0.1        | 1.1        | 0                      | 230    | 0.409653         | POTENTIALLY SUITABLE FOR USE | 0.1     | 0.1     | 0.1     | 0.2     | 0.3     | 1.1    | 0.6    | 0.2    | 0.3    | 0.3    | 0.1      | 0.1      | 0.1      | 0.2      | 0.2      | 0.2      | 0.1      | 0.2      |
| Chromium (III)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1       | 29          | 9          | 1005.7     | 0                      | 8800   | 208.8753         | POTENTIALLY SUITABLE FOR USE | 45.1    | 34      | 23.1    | 35.4    | 32.4    | 13.4   | 25.8   | 64.6   | 1005.7 | 14.8   | 58       | 41.5     | 32.3     | 22.2     | 18.8     | 50.2     | 12.4     | 23.3     |
| Chromium (VI)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1.2     | 29          | 0.3        | 4          | 0                      | 35     | 2.747445         | POTENTIALLY SUITABLE FOR USE | 0.3     | 0.3     | 0.3     | 0.3     | 0.3     | 0.3    | 0.3    | 0.3    | 0.3    | 0.3    | 0.3      | 0.3      | 0.3      | 0.3      | 0.3      | 0.3      | 0.3      |          |
| Copper                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 1       | 29          | 5.9        | 68         | 0                      | 72000  | 35.16994         | POTENTIALLY SUITABLE FOR USE | 29      | 27      | 15      | 26      | 21      | 9      | 25     | 51     | 65     | 12     | 26       | 13       | 11       | 14       | 6        | 25       | 12       | 12       |
| Lead                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2       | 29          | 19         | 180        | 0                      | 2330   | 95.09895         | POTENTIALLY SUITABLE FOR USE | 25      | 94      | 23      | 179     | 60      | 45     | 57     | 24     | 26     | 19     | 32       | 33       | 32       | 42       | 51       | 29       | 44       |          |
| Mercury, inorganic                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0.3     | 29          | 0.1        | 1.3        | 0                      | 3600   | 0.396918         | POTENTIALLY SUITABLE FOR USE | 0.1     | 0.1     | 0.1     | 0.1     | 0.1     | 0.1    | 0.1    | 0.1    | 0.1    | 0.1    | 0.1      | 0.1      | 0.1      | 0.1      | 0.1      | 0.1      | 0.1      |          |
| Nickel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2       | 29          | 6.2        | 68.4       | 0                      | 1800   | 42.00446         | POTENTIALLY SUITABLE FOR USE | 53.6    | 36.2    | 30.7    | 37.4    | 35.3    | 13.6   | 24.4   | 52.4   | 46.8   | 18.8   | 68.4     | 36.2     | 28       | 20       | 15.6     | 55       | 14.7     | 20.2     |
| Selenium                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1       | 29          | 1          | 2.3        | 0                      | 13000  | 1.456286         | POTENTIALLY SUITABLE FOR USE | 1       | 1       | 1       | 1       | 1       | 1      | 1      | 1      | 2      | 1      | 2        | 2        | 1        | 1        | 1        | 1        | 1        |          |
| Vanadium                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1       | 29          | 14         | 149        | 0                      | 3200   | 58.34172         | POTENTIALLY SUITABLE FOR USE | 53      | 42      | 28      | 46      | 39      | 16     | 35     | 55     | 149    | 18     | 65       | 53       | 43       | 25       | 24       | 55       | 14       | 29       |
| Zinc                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2       | 29          | 39         | 155        | 0                      | 670000 | 102.8364         | POTENTIALLY SUITABLE FOR USE | 96      | 112     | 73      | 123     | 104     | 155    | 108    | 50     | 65     | 55     | 106      | 98       | 78       | 58       | 49       | 101      | 44       | 98       |
| Cyanide (free)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1       | 21          | 0.5        | 1          | 0                      | 16000  | 0.742005         | POTENTIALLY SUITABLE FOR USE | 0.5     | 0.5     | 0.5     | 0.5     | 0.5     | 0.5    | 0.5    | 0.5    | 0.5    | 0.5    | 0.5      | 0.5      | 0.5      | 0.5      | 0.5      | 0.5      | 0.5      |          |
| Phenol (total)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 2       | 29          | 0.0099     | 2          | 0                      | 3200   | 1.560427         | POTENTIALLY SUITABLE FOR USE | 0.01    | 0.0099  | 0.01    | 0.01    | 0.01    | 0.01   | 0.01   | 0.01   | 0.01   | 0.01   | 0.01     | 0.01     | 0.01     | 0.01     | 0.01     | 0.01     | 0.01     |          |
| Acenaphthene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.05    | 25          | 0.05       | 0.21       | 0                      | 85000  | 0.102585         | POTENTIALLY SUITABLE FOR USE | 0.05    | 0.05    | 0.05    | 0.21    | 0.05    | 0.05   | 0.05   | 0.05   | 0.05   | 0.05   | 0.05     | 0.05     | 0.05     | 0.05     | 0.05     | 0.05     | 0.05     |          |
| Acenaphthylene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 0.05    | 25          | 0.03       | 0.2        | 0                      | 84000  | 0.121496         | POTENTIALLY SUITABLE FOR USE | 0.03    | 0.03    | 0.03    | 0.03    | 0.03    | 0.03   | 0.03   | 0.03   | 0.03   | 0.03   | 0.03     | 0.03     | 0.03     | 0.03     | 0.03     | 0.03     | 0.03     |          |
| Anthracene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 0.05    | 25          | 0.04       | 0.56       | 0                      | 520000 | 0.168405         | POTENTIALLY SUITABLE FOR USE | 0.04    | 0.04    | 0.04    | 0.56    | 0.04    | 0.04   | 0.04   | 0.04   | 0.04   | 0.04   | 0.04     | 0.04     | 0.04     | 0.04     | 0.04     | 0.04     | 0.04     |          |
| Benzo(a)anthracene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0.05    | 25          | 0.06       | 1.22       | 0                      | 89     | 0.360124         | POTENTIALLY SUITABLE FOR USE | 0.06    | 0.06    | 0.06    | 1.22    | 0.06    | 0.08   | 0.12   | 0.09   | 0.07   | 0.06   | 0.06     | 0.06     | 0.06     | 0.06     | 0.06     | 0.06     | 0.06     |          |
| Benzo(a)pyrene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 0.05    | 25          | 0.04       | 0.95       | 0                      | 14     | 0.269054         | POTENTIALLY SUITABLE FOR USE | 0.04    | 0.04    | 0.04    | 0.95    | 0.04    | 0.05   | 0.07   | 0.05   | 0.04   | 0.04   | 0.04     | 0.04     | 0.04     | 0.04     | 0.04     | 0.04     | 0.04     |          |
| Benzo(b)fluoranthene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 0.05    | 25          | 0.05       | 1.14       | 0                      | 100    | 0.323538         | POTENTIALLY SUITABLE FOR USE | 0.05    | 0.05    | 0.05    | 1.14    | 0.05    | 0.06   | 0.11   | 0.06   | 0.05   | 0.05   | 0.05     | 0.05     | 0.05     | 0.05     | 0.05     | 0.05     | 0.05     |          |
| Benzo(ghi)perylene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0.05    | 25          | 0.04       | 0.47       | 0                      | 650    | 0.1353           | POTENTIALLY SUITABLE FOR USE | 0.04    | 0.04    | 0.04    | 0.47    | 0.04    | 0.04   | 0.06   | 0.04   | 0.04   | 0.04   | 0.04     | 0.04     | 0.04     | 0.04     | 0.04     | 0.04     | 0.04     |          |
| Benzo(k)fluoranthene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 0.05    | 25          | 0.02       | 0.44       | 0                      | 140    | 0.171243         | POTENTIALLY SUITABLE FOR USE | 0.02    | 0.02    | 0.02    | 0.44    | 0.02    | 0.02   | 0.04   | 0.03   | 0.02   | 0.02   | 0.02     | 0.02     | 0.02     | 0.02     | 0.02     | 0.02     | 0.02     |          |
| Chrysene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 0.05    | 25          | 0.02       | 1.14       | 0                      | 140    | 0.307341         | POTENTIALLY SUITABLE FOR USE | 0.02    | 0.02    | 0.02    | 1.14    | 0.02    | 0.06   | 0.1    | 0.06   | 0.05   | 0.02   | 0.02     | 0.02     | 0.02     | 0.02     | 0.02     | 0.02     | 0.02     |          |
| Dibenz(a,h)anthracene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0.05    | 25          | 0.04       | 0.2        | 0                      | 13     | 0.127345         | POTENTIALLY SUITABLE FOR USE | 0.04    | 0.04    | 0.04    | 0.1     | 0.04    | 0.04   | 0.04   | 0.04   | 0.04   | 0.04   | 0.04     | 0.04     | 0.04     | 0.04     | 0.04     | 0.04     | 0.04     |          |
| Fluoranthene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.05    | 25          | 0.03       | 3.31       | 0                      | 23000  | 0.802109         | POTENTIALLY SUITABLE FOR USE | 0.04    | 0.03    | 0.03    | 3.31    | 0.03    | 0.07   | 0.12   | 0.05   | 0.05   | 0.03   | 0.03     | 0.03     | 0.03     | 0.03     | 0.03     | 0.03     | 0.03     |          |
| Fluorene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 0.05    | 25          | 0.04       | 0.2        | 0                      | 64000  | 0.128562         | POTENTIALLY SUITABLE FOR USE | 0.04    | 0.04    | 0.04    | 0.12    | 0.04    | 0.04   | 0.04   | 0.04   | 0.04   | 0.04   | 0.04     | 0.04     | 0.04     | 0.04     | 0.04     | 0.04     | 0.04     |          |
| Indeno(1,2,3.cd)pyrene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0.05    | 25          | 0.04       | 0.43       | 0                      | 60     | 0.169827         | POTENTIALLY SUITABLE FOR USE | 0.04    | 0.04    | 0.04    | 0.43    | 0.04    | 0.04   | 0.06   | 0.04   | 0.04   | 0.04   | 0.04     | 0.04     | 0.04     | 0.04     | 0.04     | 0.04     | 0.04     |          |
| Naphthalene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0.05    | 25          | 0.04       | 0.17       | 0                      | 200    | 0.074607         | POTENTIALLY SUITABLE FOR USE | 0.04    | 0.04    | 0.04    | 0.04    | 0.04    | 0.04   | 0.04   | 0.17   | 0.1    | 0.04   | 0.04     | 0.04     | 0.04     | 0.04     | 0.04     | 0.04     | 0.04     |          |
| Phenanthrene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.05    | 25          | 0.03       | 1.39       | 0                      | 22000  | 0.361501         | POTENTIALLY SUITABLE FOR USE | 0.03    | 0.03    | 0.03    | 1.39    | 0.03    | 0.03   | 0.04   | 0.03   | 0.1    | 0.06   | 0.03     | 0.03     | 0.03     | 0.03     | 0.03     | 0.03     | 0.03     |          |
| Pyrene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 0.05    | 25          | 0.03       | 2.52       | 0                      | 54000  | 0.629928         | POTENTIALLY SUITABLE FOR USE | 0.04    | 0.03    | 0.03    | 2.52    | 0.03    | 0.06   | 0.1    | 0.05   | 0.05   | 0.03   | 0.03     | 0.03     | 0.03     | 0.03     | 0.03     | 0.03     | 0.03     |          |
| Mean                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |         |             |            |            |                        |        |                  |                              |         |         |         |         |         |        |        |        |        |        |          |          |          |          |          |          |          |          |
| FOC (dimensionless)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0.015   |             |            |            |                        |        |                  |                              | 0.002   | 0.007   | 0.004   | 0.012   | 0.01    | 0.004  | 0.011  | 0.126  | 0.052  | 0.004  | 0.003    | 0.005    | 0.006    | 0.003    | 0.01     | 0.003    | 0.001    | 0.013    |
| SOM (calculated)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 2.52%   |             |            |            |                        |        |                  |                              | 0.34%   | 1.21%   | 0.69%   | 2.07%   | 1.72%   | 0.69%  | 1.90%  | 21.72% | 8.96%  | 0.69%  | 0.52%    | 0.86%    | 1.03%    | 0.52%    | 1.72%    | 0.52%    | 0.17%    | 2.24%    |
| pH (su)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 8.1     |             |            |            |                        |        |                  |                              | 8.72    | 8.26    | 8.72    | 8.3     | 8.34    | 8.74   | 8.45   | 8.62   | 8.76   | 8.83   | 8.46     | 7.95     | 8.06     | 7.91     | 7.91     | 8.22     | 7.92     | 7.67     |
| <div><div><div><b>Risk parameter:</b> Human health - commercial (1%<b>SOM</b>)</div><div><b>Data set:</b> Area 1: ESI (2012), WYG (2013) and Hydrock (August 2014) investigations combined</div><div><b>Client:</b> Lend Lease</div><div><b>Site:</b> North Wales Prison, Wrexham</div><div><b>Job no.:</b> C14656</div></div><div><div><b>Legend:</b> Values in blue are at or below the laboratory reporting limit (where a single value is indicated) and are considered as being at the detection limit for the purposes of statistical analysis, as a conservative estimate.</div><div>Values in red are equal to, or greater than, the generic assessment criterion (GAC).</div><div>MG denotes Made Ground</div><div>NAT denotes natural ground</div></div></div> |         |             |            |            |                        |        |                  |                              |         |         |         |         |         |        |        |        |        |        |          |          |          |          |          |          |          |          |

Assessment of Chemicals of Potential Concern to Human Health



| All values in mg/kg unless otherwise stated                                                                                                                                                                                   |         |             |            |            |                        |        |                  | Soil Type                    | MG       | MG      | MG      | MG       | MG       | MG       | MG       | MG       | MG       | MG       | MG       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-------------|------------|------------|------------------------|--------|------------------|------------------------------|----------|---------|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| Chemical of Potential Concern                                                                                                                                                                                                 | Lab. RL | No. Samples | Min. Value | Max. Value | No. Samples > or = GAC | GAC    | US <sub>95</sub> | Location & Depth             | ESI TP34 | ESI TP5 | ESI TP6 | ESI TP28 | ESI TP29 | ESI TP30 | ESI TP31 | ESI TP36 | TPS TP03 | TPS TP04 | TPS TP29 |
|                                                                                                                                                                                                                               |         |             |            |            |                        |        |                  |                              | 0.3      | 0.5     | 0.2     | 0.2      | 0.5      | 0.3      | 0.3      | 0.2      | 0.1      | 0.4      | 0.3      |
| Result of Significance Test                                                                                                                                                                                                   |         |             |            |            |                        |        |                  |                              |          |         |         |          |          |          |          |          |          |          |          |
| Arsenic                                                                                                                                                                                                                       | 1       | 29          | 2.2        | 20         | 0                      | 640    | 11.49011         | POTENTIALLY SUITABLE FOR USE | 4.6      | 13      | 9       | 6.2      | 2.2      | 20       | 6.2      | 10       | 8.8      | 9.6      | 5.7      |
| Beryllium                                                                                                                                                                                                                     | 0.06    | 29          | 0.2        | 3          | 0                      | 420    | 1.707668         | POTENTIALLY SUITABLE FOR USE | 0.5      | 1.4     | 0.7     | 0.6      | 0.5      | 1.4      | 0.8      | 0.9      | 0.6      | 0.7      | 0.2      |
| Boron                                                                                                                                                                                                                         | 0.2     | 29          | 0.2        | 1.4        | 0                      | 190000 | 0.927902         | POTENTIALLY SUITABLE FOR USE | 0.2      | 0.4     | 0.2     | 0.2      | 0.2      | 0.2      | 0.2      | 1        | 0.4      | 0.2      |          |
| Cadmium                                                                                                                                                                                                                       | 0.2     | 29          | 0.1        | 1.1        | 0                      | 230    | 0.409653         | POTENTIALLY SUITABLE FOR USE | 0.2      | 0.2     | 0.2     | 0.2      | 0.2      | 0.3      | 0.2      | 0.2      | 0.3      | 0.2      | 0.5      |
| Chromium (III)                                                                                                                                                                                                                | 1       | 29          | 9          | 1005.7     | 0                      | 8800   | 208.8753         | POTENTIALLY SUITABLE FOR USE | 9        | 41      | 37      | 9        | 10       | 18       | 27       | 21       | 16.8     | 22.8     | 14.8     |
| Chromium (VI)                                                                                                                                                                                                                 | 1.2     | 29          | 0.3        | 4          | 0                      | 35     | 2.747445         | POTENTIALLY SUITABLE FOR USE | 4        | 4       | 4       | 4        | 4        | 4        | 4        | 4        | 1.2      | 1.2      | 1.2      |
| Copper                                                                                                                                                                                                                        | 1       | 29          | 5.9        | 68         | 0                      | 72000  | 35.16994         | POTENTIALLY SUITABLE FOR USE | 13       | 25      | 21      | 15       | 5.9      | 68       | 28       | 20       | 22       | 25       | 19       |
| Lead                                                                                                                                                                                                                          | 2       | 29          | 19         | 180        | 0                      | 2330   | 95.09895         | POTENTIALLY SUITABLE FOR USE | 40       | 180     | 170     | 39       | 25       | 49       | 20       | 37       | 50       | 42       | 140      |
| Mercury, inorganic                                                                                                                                                                                                            | 0.3     | 29          | 0.1        | 1.3        | 0                      | 3600   | 0.396918         | POTENTIALLY SUITABLE FOR USE | 0.3      | 0.3     | 0.3     | 0.3      | 0.3      | 1.3      | 0.3      | 0.3      | 0.3      | 0.3      | 0.3      |
| Nickel                                                                                                                                                                                                                        | 2       | 29          | 6.2        | 68.4       | 0                      | 1800   | 42.00446         | POTENTIALLY SUITABLE FOR USE | 14       | 36      | 22      | 15       | 6.2      | 28       | 40       | 30       | 22       | 33       | 12       |
| Selenium                                                                                                                                                                                                                      | 1       | 29          | 1          | 2.3        | 0                      | 13000  | 1.456286         | POTENTIALLY SUITABLE FOR USE | 1        | 1       | 1       | 1        | 1        | 2.3      | 1        | 1        | 1        | 1        | 1        |
| Vanadium                                                                                                                                                                                                                      | 1       | 29          | 14         | 149        | 0                      | 3200   | 58.34172         | POTENTIALLY SUITABLE FOR USE | 15       | 46      | 40      | 20       | 16       | 34       | 31       | 31       | 23       | 27       | 15       |
| Zinc                                                                                                                                                                                                                          | 2       | 29          | 39         | 155        | 0                      | 670000 | 102.8364         | POTENTIALLY SUITABLE FOR USE | 39       | 110     | 83      | 58       | 39       | 58       | 72       | 68       | 71       | 63       | 86       |
| Cyanide (free)                                                                                                                                                                                                                | 1       | 21          | 0.5        | 1          | 0                      | 16000  | 0.742005         | POTENTIALLY SUITABLE FOR USE |          |         |         |          |          |          |          |          | 1        | 1        | 1        |
| Phenol (total)                                                                                                                                                                                                                | 2       | 29          | 0.0099     | 2          | 0                      | 3200   | 1.560427         | POTENTIALLY SUITABLE FOR USE | 2        | 2       | 2       | 2        | 2        | 2        | 2        | 2        | 2        | 2        | 2        |
| Acenaphthene                                                                                                                                                                                                                  | 0.05    | 25          | 0.05       | 0.21       | 0                      | 85000  | 0.102585         | POTENTIALLY SUITABLE FOR USE | 0.1      |         | 0.1     | 0.1      | 0.1      |          |          |          | 0.1      | 0.1      | 0.1      |
| Acenaphthylene                                                                                                                                                                                                                | 0.05    | 25          | 0.03       | 0.2        | 0                      | 84000  | 0.121496         | POTENTIALLY SUITABLE FOR USE | 0.2      |         | 0.2     | 0.2      | 0.2      |          |          |          | 0.1      | 0.1      | 0.1      |
| Anthracene                                                                                                                                                                                                                    | 0.05    | 25          | 0.04       | 0.56       | 0                      | 520000 | 0.168405         | POTENTIALLY SUITABLE FOR USE | 0.1      |         | 0.1     | 0.1      | 0.1      |          |          |          | 0.1      | 0.1      | 0.1      |
| Benz(a)anthracene                                                                                                                                                                                                             | 0.05    | 25          | 0.06       | 1.22       | 0                      | 89     | 0.360124         | POTENTIALLY SUITABLE FOR USE | 0.2      |         | 0.2     | 0.2      | 0.2      |          |          |          | 0.38     | 0.22     | 0.1      |
| Benzo(a)pyrene                                                                                                                                                                                                                | 0.05    | 25          | 0.04       | 0.95       | 0                      | 14     | 0.269054         | POTENTIALLY SUITABLE FOR USE | 0.1      |         | 0.1     | 0.1      | 0.1      |          |          |          | 0.32     | 0.17     | 0.1      |
| Benzo(b)fluoranthene                                                                                                                                                                                                          | 0.05    | 25          | 0.05       | 1.14       | 0                      | 100    | 0.323538         | POTENTIALLY SUITABLE FOR USE | 0.1      |         | 0.1     | 0.1      | 0.1      |          |          |          | 0.43     | 0.18     | 0.1      |
| Benzo(ghi)perylene                                                                                                                                                                                                            | 0.05    | 25          | 0.04       | 0.47       | 0                      | 650    | 0.1353           | POTENTIALLY SUITABLE FOR USE | 0.05     |         | 0.05    | 0.05     | 0.05     |          |          |          | 0.05     | 0.05     | 0.05     |
| Benzo(k)fluoranthene                                                                                                                                                                                                          | 0.05    | 25          | 0.02       | 0.44       | 0                      | 140    | 0.171243         | POTENTIALLY SUITABLE FOR USE | 0.2      |         | 0.2     | 0.2      | 0.2      |          |          |          | 0.18     | 0.13     | 0.1      |
| Chrysene                                                                                                                                                                                                                      | 0.05    | 25          | 0.02       | 1.14       | 0                      | 140    | 0.307341         | POTENTIALLY SUITABLE FOR USE | 0.05     |         | 0.05    | 0.05     | 0.05     |          |          |          | 0.46     | 0.19     | 0.05     |
| Dibenz(a,h)anthracene                                                                                                                                                                                                         | 0.05    | 25          | 0.04       | 0.2        | 0                      | 13     | 0.127345         | POTENTIALLY SUITABLE FOR USE | 0.2      |         | 0.2     | 0.2      | 0.2      |          |          |          | 0.1      | 0.1      | 0.1      |
| Fluoranthene                                                                                                                                                                                                                  | 0.05    | 25          | 0.03       | 3.31       | 0                      | 23000  | 0.802109         | POTENTIALLY SUITABLE FOR USE | 0.2      |         | 0.2     | 0.2      | 0.2      |          |          |          | 0.65     | 0.22     | 0.1      |
| Fluorene                                                                                                                                                                                                                      | 0.05    | 25          | 0.04       | 0.2        | 0                      | 64000  | 0.128562         | POTENTIALLY SUITABLE FOR USE | 0.2      |         | 0.2     | 0.2      | 0.2      |          |          |          | 0.1      | 0.1      | 0.1      |
| Indeno(1,2,3-cd)pyrene                                                                                                                                                                                                        | 0.05    | 25          | 0.04       | 0.43       | 0                      | 60     | 0.169827         | POTENTIALLY SUITABLE FOR USE | 0.2      |         | 0.2     | 0.2      | 0.2      |          |          |          | 0.1      | 0.1      | 0.1      |
| Naphthalene                                                                                                                                                                                                                   | 0.05    | 25          | 0.04       | 0.17       | 0                      | 200    | 0.074607         | POTENTIALLY SUITABLE FOR USE | 0.05     |         | 0.05    | 0.05     | 0.05     |          |          |          | 0.05     | 0.05     | 0.05     |
| Phenanthrene                                                                                                                                                                                                                  | 0.05    | 25          | 0.03       | 1.39       | 0                      | 22000  | 0.361501         | POTENTIALLY SUITABLE FOR USE | 0.2      |         | 0.2     | 0.2      | 0.2      |          |          |          | 0.12     | 0.1      | 0.1      |
| Pyrene                                                                                                                                                                                                                        | 0.05    | 25          | 0.03       | 2.52       | 0                      | 54000  | 0.629928         | POTENTIALLY SUITABLE FOR USE | 0.2      |         | 0.2     | 0.2      | 0.2      |          |          |          | 0.57     | 0.22     | 0.1      |
| Mean                                                                                                                                                                                                                          |         |             |            |            |                        |        |                  |                              |          |         |         |          |          |          |          |          |          |          |          |
| FOC (dimensionless)                                                                                                                                                                                                           | 0.015   |             |            |            |                        |        |                  |                              | 0.0092   | 0.028   | 0.011   | 0.0096   | 0.001    | 0.015    | 0.0007   | 0.042    | 0.02     | 0.0048   | 0.0073   |
| SOM (calculated)                                                                                                                                                                                                              | 2.52%   |             |            |            |                        |        |                  |                              | 1.59%    | 4.83%   | 1.90%   | 1.66%    | 0.17%    | 2.59%    | 0.12%    | 7.24%    | 3.45%    | 0.83%    | 1.26%    |
| pH (su)                                                                                                                                                                                                                       | 8.1     |             |            |            |                        |        |                  |                              | 7.3      | 8.1     | 7.9     | 8.4      | 7        | 7.6      | 7.9      | 8.4      | 6.8      | 7.3      | 7.9      |
| Risk parameter: Human health - commercial (1%SOM)<br>Data set: Area 1: ESI (2012), WYG (2013) and Hydrock (August 2014) investigations combined<br>Client: Lend Lease<br>Site: North Wales Prison, Wrexham<br>Job no.: C14656 |         |             |            |            |                        |        |                  |                              |          |         |         |          |          |          |          |          |          |          |          |

# Assessment of Chemicals of Potential Concern to Human Health



| All values in mg/kg unless otherwise stated                                                                                                                                                                                                                                                                                                                                            |         |             |            |            |                        |       |                  | Soil Type                    | MG      | MG      | MG      | MG      | MG      | MG     | MG     | MG     | MG     | MG     | MG       | MG       | MG       | MG  |     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-------------|------------|------------|------------------------|-------|------------------|------------------------------|---------|---------|---------|---------|---------|--------|--------|--------|--------|--------|----------|----------|----------|-----|-----|
| Chemical of Potential Concern                                                                                                                                                                                                                                                                                                                                                          | Lab. RL | No. Samples | Min. Value | Max. Value | No. Samples > or = GAC | GAC   | US <sub>95</sub> | Location & Depth             | WYG BH5 | WYG BH4 | WYG TP8 | WYG TP9 | WYG TP4 | WYGTP1 | WYGTP2 | WYGTP3 | WYGTP3 | WYGTP7 | WYG TP11 | WYG BH02 | WYG BH02 |     |     |
|                                                                                                                                                                                                                                                                                                                                                                                        |         |             |            |            |                        |       |                  | Result of Significance Test  | 0.5     | 0.5     | 0.5     | 0.5     | 0.5     | 0.5    | 0.5    | 0.5    | 0.5    | 0.5    | 0.5      | 0.5      | 0.5      | 0.5 | 0.5 |
| Arsenic                                                                                                                                                                                                                                                                                                                                                                                | 1       | 29          | 2.2        | 20         | 0                      | 79    | 11.490108        | POTENTIALLY SUITABLE FOR USE | 10.2    | 8.1     | 7.5     | 11.3    | 9.1     | 5.5    | 6.6    | 11.5   | 12.5   | 8.4    | 8.9      | 11.4     | 9.5      |     |     |
| Beryllium                                                                                                                                                                                                                                                                                                                                                                              | 0.06    | 29          | 0.2        | 3          | 0                      | 93    | 1.7076677        | POTENTIALLY SUITABLE FOR USE | 1.8     | 1.3     | 0.9     | 1.5     | 1.3     | 0.6    | 0.9    | 2.9    | 3      | 0.6    | 2.2      | 1.4      | 1.2      |     |     |
| Boron                                                                                                                                                                                                                                                                                                                                                                                  | 0.2     | 29          | 0.2        | 1.4        | 0                      | 21000 | 0.9279023        | POTENTIALLY SUITABLE FOR USE | 1       | 1.1     | 0.4     | 1.4     | 1.2     | 0.6    | 0.7    | 1.3    | 0.8    | 0.2    | 0.9      | 0.8      | 0.9      |     |     |
| Cadmium                                                                                                                                                                                                                                                                                                                                                                                | 0.2     | 29          | 0.1        | 1.1        | 0                      | 120   | 0.4096529        | POTENTIALLY SUITABLE FOR USE | 0.1     | 0.1     | 0.1     | 0.2     | 0.3     | 1.1    | 0.6    | 0.2    | 0.3    | 0.3    | 0.1      | 0.1      | 0.1      |     |     |
| Chromium (III)                                                                                                                                                                                                                                                                                                                                                                         | 1       | 29          | 9          | 1005.7     | 0                      | 1500  | 208.87534        | POTENTIALLY SUITABLE FOR USE | 45.1    | 34      | 23.1    | 35.4    | 32.4    | 13.4   | 25.8   | 64.6   | 1005.7 | 14.8   | 58       | 41.5     | 32.3     |     |     |
| Chromium (VI)                                                                                                                                                                                                                                                                                                                                                                          | 1.2     | 29          | 0.3        | 4          | 0                      | 7.7   | 2.7474446        | POTENTIALLY SUITABLE FOR USE | 0.3     | 0.3     | 0.3     | 0.3     | 0.3     | 0.3    | 0.3    | 0.3    | 0.3    | 0.3    | 0.3      | 0.3      | 0.3      |     |     |
| Copper                                                                                                                                                                                                                                                                                                                                                                                 | 1       | 29          | 5.9        | 68         | 0                      | 12000 | 35.169944        | POTENTIALLY SUITABLE FOR USE | 29      | 27      | 15      | 29      | 21      | 9      | 25     | 51     | 65     | 12     | 26       | 13       | 11       |     |     |
| Lead                                                                                                                                                                                                                                                                                                                                                                                   | 2       | 29          | 19         | 180        | 0                      | 630   | 95.098954        | POTENTIALLY SUITABLE FOR USE | 25      | 94      | 23      | 179     | 60      | 45     | 57     | 24     | 26     | 19     | 19       | 32       | 33       |     |     |
| Mercury, inorganic                                                                                                                                                                                                                                                                                                                                                                     | 0.3     | 29          | 0.1        | 1.3        | 0                      | 470   | 0.3969179        | POTENTIALLY SUITABLE FOR USE | 0.1     | 0.1     | 0.1     | 0.1     | 0.1     | 0.1    | 0.1    | 0.1    | 0.1    | 0.1    | 0.1      | 0.1      | 0.1      |     |     |
| Nickel                                                                                                                                                                                                                                                                                                                                                                                 | 2       | 29          | 6.2        | 68.4       | 0                      | 290   | 42.004456        | POTENTIALLY SUITABLE FOR USE | 53.6    | 36.2    | 30.7    | 37.4    | 35.3    | 13.6   | 24.4   | 52.4   | 46.8   | 18.8   | 68.4     | 36.2     | 28       |     |     |
| Selenium                                                                                                                                                                                                                                                                                                                                                                               | 1       | 29          | 1          | 2.3        | 0                      | 1400  | 1.4562863        | POTENTIALLY SUITABLE FOR USE | 1       | 1       | 1       | 1       | 1       | 1      | 1      | 1      | 2      | 1      | 2        | 2        | 1        |     |     |
| Vanadium                                                                                                                                                                                                                                                                                                                                                                               | 1       | 29          | 14         | 149        | 0                      | 440   | 58.341715        | POTENTIALLY SUITABLE FOR USE | 53      | 42      | 28      | 46      | 39      | 16     | 35     | 55     | 149    | 18     | 65       | 53       | 43       |     |     |
| Zinc                                                                                                                                                                                                                                                                                                                                                                                   | 2       | 29          | 39         | 155        | 0                      | 81000 | 102.83637        | POTENTIALLY SUITABLE FOR USE | 96      | 112     | 73      | 123     | 104     | 155    | 108    | 50     | 65     | 55     | 106      | 98       | 78       |     |     |
| Cyanide (free)                                                                                                                                                                                                                                                                                                                                                                         | 1       | 21          | 0.5        | 1          | 0                      | 1600  | 0.742005         | POTENTIALLY SUITABLE FOR USE | 0.5     | 0.5     | 0.5     | 0.5     | 0.5     | 0.5    | 0.5    | 0.5    | 0.5    | 0.5    | 0.5      | 0.5      | 0.5      |     |     |
| Phenol (total)                                                                                                                                                                                                                                                                                                                                                                         | 2       | 29          | 0.0099     | 2          | 0                      | 3200  | 1.560427         | POTENTIALLY SUITABLE FOR USE | 0.01    | 0.0099  | 0.01    | 0.01    | 0.01    | 0.01   | 0.01   | 0.01   | 0.01   | 0.01   | 0.01     | 0.01     | 0.01     |     |     |
| Acenaphthene                                                                                                                                                                                                                                                                                                                                                                           | 0.05    | 25          | 0.05       | 0.21       | 0                      | 15000 | 0.1025853        | POTENTIALLY SUITABLE FOR USE | 0.05    | 0.05    | 0.05    | 0.21    | 0.05    | 0.05   | 0.05   | 0.05   | 0.05   | 0.05   | 0.05     | 0.05     | 0.05     |     |     |
| Acenaphthylene                                                                                                                                                                                                                                                                                                                                                                         | 0.05    | 25          | 0.03       | 0.2        | 0                      | 15000 | 0.1214965        | POTENTIALLY SUITABLE FOR USE | 0.03    | 0.03    | 0.03    | 0.03    | 0.03    | 0.03   | 0.03   | 0.03   | 0.03   | 0.03   | 0.03     | 0.03     | 0.03     |     |     |
| Anthracene                                                                                                                                                                                                                                                                                                                                                                             | 0.05    | 25          | 0.04       | 0.56       | 0                      | 74000 | 0.1684053        | POTENTIALLY SUITABLE FOR USE | 0.04    | 0.04    | 0.04    | 0.56    | 0.04    | 0.04   | 0.04   | 0.04   | 0.04   | 0.04   | 0.04     | 0.04     | 0.04     |     |     |
| Benzo(a)anthracene                                                                                                                                                                                                                                                                                                                                                                     | 0.05    | 25          | 0.06       | 1.22       | 0                      | 18    | 0.3601236        | POTENTIALLY SUITABLE FOR USE | 0.06    | 0.06    | 0.06    | 1.22    | 0.06    | 0.06   | 0.12   | 0.09   | 0.07   | 0.06   | 0.06     | 0.06     | 0.06     |     |     |
| Benzo(a)pyrene                                                                                                                                                                                                                                                                                                                                                                         | 0.05    | 25          | 0.04       | 0.95       | 0                      | 2.6   | 0.2690545        | POTENTIALLY SUITABLE FOR USE | 0.04    | 0.04    | 0.04    | 0.95    | 0.04    | 0.05   | 0.07   | 0.05   | 0.04   | 0.04   | 0.04     | 0.04     | 0.04     |     |     |
| Benzo(b)fluoranthene                                                                                                                                                                                                                                                                                                                                                                   | 0.05    | 25          | 0.05       | 1.14       | 0                      | 18    | 0.3235375        | POTENTIALLY SUITABLE FOR USE | 0.05    | 0.05    | 0.05    | 1.14    | 0.05    | 0.06   | 0.11   | 0.06   | 0.05   | 0.05   | 0.05     | 0.05     | 0.05     |     |     |
| Benzo(ghi)perylene                                                                                                                                                                                                                                                                                                                                                                     | 0.05    | 25          | 0.04       | 0.47       | 0                      | 120   | 0.1353003        | POTENTIALLY SUITABLE FOR USE | 0.04    | 0.04    | 0.04    | 0.47    | 0.04    | 0.04   | 0.06   | 0.04   | 0.04   | 0.04   | 0.04     | 0.04     | 0.04     |     |     |
| Benzo(k)fluoranthene                                                                                                                                                                                                                                                                                                                                                                   | 0.05    | 25          | 0.02       | 0.44       | 0                      | 26    | 0.1712431        | POTENTIALLY SUITABLE FOR USE | 0.02    | 0.02    | 0.02    | 0.44    | 0.02    | 0.02   | 0.04   | 0.03   | 0.02   | 0.02   | 0.02     | 0.02     | 0.02     |     |     |
| Chrysene                                                                                                                                                                                                                                                                                                                                                                               | 0.05    | 25          | 0.02       | 1.14       | 0                      | 26    | 0.3073412        | POTENTIALLY SUITABLE FOR USE | 0.02    | 0.02    | 0.02    | 1.14    | 0.02    | 0.06   | 0.1    | 0.06   | 0.05   | 0.02   | 0.02     | 0.02     | 0.02     |     |     |
| Dibenz(a,h)anthracene                                                                                                                                                                                                                                                                                                                                                                  | 0.05    | 25          | 0.04       | 0.2        | 0                      | 2.3   | 0.1273453        | POTENTIALLY SUITABLE FOR USE | 0.04    | 0.04    | 0.04    | 0.1     | 0.04    | 0.04   | 0.04   | 0.04   | 0.04   | 0.04   | 0.04     | 0.04     | 0.04     |     |     |
| Fluoranthene                                                                                                                                                                                                                                                                                                                                                                           | 0.05    | 25          | 0.03       | 3.31       | 0                      | 3100  | 0.8021093        | POTENTIALLY SUITABLE FOR USE | 0.04    | 0.03    | 0.03    | 3.31    | 0.03    | 0.03   | 0.07   | 0.12   | 0.05   | 0.05   | 0.03     | 0.03     | 0.03     |     |     |
| Fluorene                                                                                                                                                                                                                                                                                                                                                                               | 0.05    | 25          | 0.04       | 0.2        | 0                      | 9900  | 0.1285617        | POTENTIALLY SUITABLE FOR USE | 0.04    | 0.04    | 0.04    | 0.12    | 0.04    | 0.04   | 0.04   | 0.04   | 0.04   | 0.04   | 0.04     | 0.04     | 0.04     |     |     |
| Indeno(1,2,3-cd)pyrene                                                                                                                                                                                                                                                                                                                                                                 | 0.05    | 25          | 0.04       | 0.43       | 0                      | 11    | 0.1696274        | POTENTIALLY SUITABLE FOR USE | 0.04    | 0.04    | 0.04    | 0.43    | 0.04    | 0.04   | 0.06   | 0.04   | 0.04   | 0.04   | 0.04     | 0.04     | 0.04     |     |     |
| Naphthalene                                                                                                                                                                                                                                                                                                                                                                            | 0.05    | 25          | 0.04       | 0.17       | 0                      | 4100  | 0.0746075        | POTENTIALLY SUITABLE FOR USE | 0.04    | 0.04    | 0.04    | 0.04    | 0.04    | 0.04   | 0.04   | 0.17   | 0.1    | 0.04   | 0.04     | 0.04     | 0.04     |     |     |
| Phenanthrene                                                                                                                                                                                                                                                                                                                                                                           | 0.05    | 25          | 0.03       | 1.39       | 0                      | 3100  | 0.3615013        | POTENTIALLY SUITABLE FOR USE | 0.03    | 0.03    | 0.03    | 1.39    | 0.03    | 0.04   | 0.03   | 0.1    | 0.06   | 0.03   | 0.03     | 0.03     | 0.03     |     |     |
| Pyrene                                                                                                                                                                                                                                                                                                                                                                                 | 0.05    | 25          | 0.03       | 2.52       | 0                      | 7400  | 0.629928         | POTENTIALLY SUITABLE FOR USE | 0.04    | 0.03    | 0.03    | 2.52    | 0.03    | 0.06   | 0.1    | 0.05   | 0.05   | 0.03   | 0.03     | 0.03     | 0.03     |     |     |
| Mean                                                                                                                                                                                                                                                                                                                                                                                   |         |             |            |            |                        |       |                  |                              |         |         |         |         |         |        |        |        |        |        |          |          |          |     |     |
| FOC (dimensionless)                                                                                                                                                                                                                                                                                                                                                                    | 0.015   |             |            |            |                        |       |                  |                              | 0.002   | 0.007   | 0.004   | 0.012   | 0.01    | 0.004  | 0.011  | 0.126  | 0.052  | 0.004  | 0.003    | 0.005    | 0.006    |     |     |
| SOM (calculated)                                                                                                                                                                                                                                                                                                                                                                       | 2.52%   |             |            |            |                        |       |                  |                              | 0.34%   | 1.21%   | 0.69%   | 2.07%   | 1.72%   | 0.69%  | 1.90%  | 21.72% | 8.96%  | 0.69%  | 0.52%    | 0.86%    | 1.03%    |     |     |
| pH (su)                                                                                                                                                                                                                                                                                                                                                                                | 8.1     |             |            |            |                        |       |                  |                              | 8.72    | 8.26    | 8.72    | 8.3     | 8.34    | 8.74   | 8.45   | 8.62   | 8.76   | 8.83   | 8.46     | 7.95     | 8.06     |     |     |
| <b>Risk parameter: Human health - POS resi (2.5%SOM)</b>                                                                                                                                                                                                                                                                                                                               |         |             |            |            |                        |       |                  |                              |         |         |         |         |         |        |        |        |        |        |          |          |          |     |     |
| Data set: Area 1: ESI (2012), WYG (2013) and Hydrock (August 2014) investigations combined                                                                                                                                                                                                                                                                                             |         |             |            |            |                        |       |                  |                              |         |         |         |         |         |        |        |        |        |        |          |          |          |     |     |
| Client: Lend Lease                                                                                                                                                                                                                                                                                                                                                                     |         |             |            |            |                        |       |                  |                              |         |         |         |         |         |        |        |        |        |        |          |          |          |     |     |
| Site: North Wales Prison, Wrexham                                                                                                                                                                                                                                                                                                                                                      |         |             |            |            |                        |       |                  |                              |         |         |         |         |         |        |        |        |        |        |          |          |          |     |     |
| Job no. : C14656                                                                                                                                                                                                                                                                                                                                                                       |         |             |            |            |                        |       |                  |                              |         |         |         |         |         |        |        |        |        |        |          |          |          |     |     |
| <b>Legend:</b> Values in blue are at or below the laboratory reporting limit (where a single value is indicated) and are considered as being at the detection limit for the purposes of statistical analysis, as a conservative estimate. Values in red are equal to, or greater than, the generic assessment criterion (GAC).<br>MG denotes Made Ground<br>NAT denotes natural ground |         |             |            |            |                        |       |                  |                              |         |         |         |         |         |        |        |        |        |        |          |          |          |     |     |

# Assessment of Chemicals of Potential Concern to Human Health



| All values in mg/kg unless otherwise stated                                                |         |             |            |            |                        |       |                  | Soil Type                    | MG       | MG       | MG       | MG       | MG       | MG       | MG      | MG      | MG       | MG       | MG       | MG       | MG       | MG       | MG       | MG       | MG | MG |
|--------------------------------------------------------------------------------------------|---------|-------------|------------|------------|------------------------|-------|------------------|------------------------------|----------|----------|----------|----------|----------|----------|---------|---------|----------|----------|----------|----------|----------|----------|----------|----------|----|----|
| Chemical of Potential Concern                                                              | Lab. RL | No. Samples | Min. Value | Max. Value | No. Samples > or = GAC | GAC   | US <sub>95</sub> | Location & Depth             | WYG BH03 | WYG TP12 | WYG TP13 | WYG TP14 | WYG TP15 | ESI TP34 | ESI TP5 | ESI TP6 | ESI TP28 | ESI TP29 | ESI TP30 | ESI TP31 | ESI TP36 | TPS TP03 | TPS TP04 | TPS TP29 |    |    |
|                                                                                            |         |             |            |            |                        |       |                  |                              | 0.5      | 0.5      | 0.5      | 0.5      | 0.5      | 0.3      | 0.5     | 0.2     | 0.2      | 0.5      | 0.3      | 0.3      | 0.2      | 0.1      | 0.4      | 0.3      |    |    |
| Arsenic                                                                                    | 1       | 29          | 2.2        | 20         | 0                      | 79    | 11.490108        | POTENTIALLY SUITABLE FOR USE | 8.8      | 7.4      | 11.2     | 5        | 6.9      | 4.6      | 13      | 9       | 6.2      | 2.2      | 20       | 6.2      | 10       | 8.8      | 9.6      | 5.7      |    |    |
| Beryllium                                                                                  | 0.06    | 29          | 0.2        | 3          | 0                      | 93    | 1.7076677        | POTENTIALLY SUITABLE FOR USE | 1        | 0.7      | 2.1      | 0.6      | 0.9      | 0.5      | 1.4     | 0.7     | 0.6      | 0.5      | 1.4      | 0.8      | 0.9      | 0.6      | 0.7      | 0.2      |    |    |
| Boron                                                                                      | 0.2     | 29          | 0.2        | 1.4        | 0                      | 21000 | 0.9279023        | POTENTIALLY SUITABLE FOR USE | 0.4      | 0.6      | 0.8      | 0.3      | 1        | 0.2      | 0.4     | 0.2     | 0.2      | 0.2      | 0.2      | 0.2      | 1        | 0.4      | 0.2      |          |    |    |
| Cadmium                                                                                    | 0.2     | 29          | 0.1        | 1.1        | 0                      | 120   | 0.4096529        | POTENTIALLY SUITABLE FOR USE | 0.2      | 0.2      | 0.2      | 0.1      | 0.2      | 0.2      | 0.2     | 0.2     | 0.2      | 0.2      | 0.3      | 0.2      | 0.3      | 0.2      | 0.5      |          |    |    |
| Chromium (III)                                                                             | 1       | 29          | 9          | 1005.7     | 0                      | 1500  | 208.87534        | POTENTIALLY SUITABLE FOR USE | 22.2     | 18.8     | 50.2     | 12.4     | 23.3     | 9        | 41      | 37      | 9        | 10       | 18       | 27       | 21       | 16.8     | 22.8     | 14.8     |    |    |
| Chromium (VI)                                                                              | 1.2     | 29          | 0.3        | 4          | 0                      | 7.7   | 2.7474446        | POTENTIALLY SUITABLE FOR USE | 0.3      | 0.3      | 0.3      | 0.3      | 0.3      | 4        | 4       | 4       | 4        | 4        | 4        | 4        | 4        | 1.2      | 1.2      | 1.2      |    |    |
| Copper                                                                                     | 1       | 29          | 5.9        | 68         | 0                      | 12000 | 35.169944        | POTENTIALLY SUITABLE FOR USE | 14       | 6        | 25       | 12       | 12       | 13       | 25      | 21      | 15       | 5.9      | 68       | 28       | 20       | 22       | 25       | 19       |    |    |
| Lead                                                                                       | 2       | 29          | 19         | 180        | 0                      | 630   | 95.098954        | POTENTIALLY SUITABLE FOR USE | 32       | 42       | 51       | 29       | 44       | 40       | 180     | 170     | 39       | 25       | 49       | 20       | 37       | 50       | 42       | 140      |    |    |
| Mercury, inorganic                                                                         | 0.3     | 29          | 0.1        | 1.3        | 0                      | 470   | 0.3969179        | POTENTIALLY SUITABLE FOR USE | 0.1      | 0.1      | 0.1      | 0.1      | 0.3      | 0.3      | 0.3     | 0.3     | 1.3      | 0.3      | 0.3      | 0.3      | 0.3      | 0.3      | 0.3      |          |    |    |
| Nickel                                                                                     | 2       | 29          | 6.2        | 68.4       | 0                      | 290   | 42.004456        | POTENTIALLY SUITABLE FOR USE | 20       | 15.6     | 55       | 14.7     | 20.2     | 14       | 36      | 22      | 15       | 6.2      | 28       | 40       | 30       | 22       | 33       | 12       |    |    |
| Selenium                                                                                   | 1       | 29          | 1          | 2.3        | 0                      | 1400  | 1.4562863        | POTENTIALLY SUITABLE FOR USE | 1        | 1        | 1        | 1        | 1        | 1        | 1       | 1       | 1        | 1        | 1        | 1        | 1        | 1        | 1        |          |    |    |
| Vanadium                                                                                   | 1       | 29          | 14         | 149        | 0                      | 440   | 58.341715        | POTENTIALLY SUITABLE FOR USE | 25       | 24       | 55       | 14       | 29       | 15       | 46      | 40      | 20       | 16       | 34       | 31       | 31       | 23       | 27       | 15       |    |    |
| Zinc                                                                                       | 2       | 29          | 39         | 155        | 0                      | 81000 | 102.83637        | POTENTIALLY SUITABLE FOR USE | 58       | 49       | 101      | 44       | 98       | 39       | 110     | 83      | 58       | 39       | 58       | 72       | 68       | 71       | 63       | 86       |    |    |
| Cyanide (free)                                                                             | 1       | 21          | 0.5        | 1          | 0                      | 1600  | 0.742005         | POTENTIALLY SUITABLE FOR USE | 0.5      | 0.5      | 0.5      | 0.5      | 0.5      |          |         |         |          |          |          |          | 1        | 1        | 1        |          |    |    |
| Phenol (total)                                                                             | 2       | 29          | 0.0099     | 2          | 0                      | 3200  | 1.560427         | POTENTIALLY SUITABLE FOR USE | 0.01     | 0.01     | 0.01     | 0.01     | 0.01     | 2        | 2       | 2       | 2        | 2        | 2        | 2        | 2        | 2        | 2        |          |    |    |
| Acenaphthene                                                                               | 0.05    | 25          | 0.05       | 0.21       | 0                      | 15000 | 0.1025853        | POTENTIALLY SUITABLE FOR USE | 0.05     | 0.05     | 0.05     | 0.05     | 0.05     | 0.1      |         | 0.1     | 0.1      | 0.1      |          |          | 0.1      | 0.1      | 0.1      |          |    |    |
| Acenaphthylene                                                                             | 0.05    | 25          | 0.03       | 0.2        | 0                      | 15000 | 0.1214965        | POTENTIALLY SUITABLE FOR USE | 0.03     | 0.03     | 0.03     | 0.03     | 0.03     | 0.2      |         | 0.2     | 0.2      | 0.2      |          |          | 0.1      | 0.1      | 0.1      |          |    |    |
| Anthracene                                                                                 | 0.05    | 25          | 0.04       | 0.56       | 0                      | 74000 | 0.1684053        | POTENTIALLY SUITABLE FOR USE | 0.04     | 0.04     | 0.04     | 0.04     | 0.04     | 0.1      |         | 0.1     | 0.1      | 0.1      |          |          | 0.1      | 0.1      | 0.1      |          |    |    |
| Benzo(a)anthracene                                                                         | 0.05    | 25          | 0.06       | 1.22       | 0                      | 18    | 0.3601236        | POTENTIALLY SUITABLE FOR USE | 0.06     | 0.06     | 0.06     | 0.06     | 0.06     | 0.2      |         | 0.2     | 0.2      | 0.2      |          |          | 0.38     | 0.22     | 0.1      |          |    |    |
| Benzo(a)pyrene                                                                             | 0.05    | 25          | 0.04       | 0.95       | 0                      | 2.6   | 0.2690545        | POTENTIALLY SUITABLE FOR USE | 0.04     | 0.04     | 0.04     | 0.04     | 0.04     | 0.1      |         | 0.1     | 0.1      | 0.1      |          |          | 0.32     | 0.17     | 0.1      |          |    |    |
| Benzo(b)fluoranthene                                                                       | 0.05    | 25          | 0.05       | 1.14       | 0                      | 18    | 0.3235375        | POTENTIALLY SUITABLE FOR USE | 0.05     | 0.05     | 0.05     | 0.05     | 0.05     | 0.1      |         | 0.1     | 0.1      | 0.1      |          |          | 0.43     | 0.18     | 0.1      |          |    |    |
| Benzo(ghi)perylene                                                                         | 0.05    | 25          | 0.04       | 0.47       | 0                      | 120   | 0.1353003        | POTENTIALLY SUITABLE FOR USE | 0.04     | 0.04     | 0.04     | 0.04     | 0.04     | 0.05     |         | 0.05    | 0.05     | 0.05     |          |          | 0.05     | 0.05     | 0.05     |          |    |    |
| Benzo(k)fluoranthene                                                                       | 0.05    | 25          | 0.02       | 0.44       | 0                      | 26    | 0.1712431        | POTENTIALLY SUITABLE FOR USE | 0.02     | 0.02     | 0.02     | 0.02     | 0.02     | 0.2      |         | 0.2     | 0.2      | 0.2      |          |          | 0.18     | 0.13     | 0.1      |          |    |    |
| Chrysene                                                                                   | 0.05    | 25          | 0.02       | 1.14       | 0                      | 26    | 0.3073412        | POTENTIALLY SUITABLE FOR USE | 0.02     | 0.02     | 0.02     | 0.02     | 0.02     | 0.05     |         | 0.05    | 0.05     | 0.05     |          |          | 0.46     | 0.19     | 0.05     |          |    |    |
| Dibenz(a,h)anthracene                                                                      | 0.05    | 25          | 0.04       | 0.2        | 0                      | 2.3   | 0.1273453        | POTENTIALLY SUITABLE FOR USE | 0.04     | 0.04     | 0.04     | 0.04     | 0.04     | 0.2      |         | 0.2     | 0.2      | 0.2      |          |          | 0.1      | 0.1      | 0.1      |          |    |    |
| Fluoranthene                                                                               | 0.05    | 25          | 0.03       | 3.31       | 0                      | 3100  | 0.8021093        | POTENTIALLY SUITABLE FOR USE | 0.03     | 0.03     | 0.03     | 0.03     | 0.03     | 0.2      |         | 0.2     | 0.2      | 0.2      |          |          | 0.65     | 0.22     | 0.1      |          |    |    |
| Fluorene                                                                                   | 0.05    | 25          | 0.04       | 0.2        | 0                      | 9900  | 0.1285617        | POTENTIALLY SUITABLE FOR USE | 0.04     | 0.04     | 0.04     | 0.04     | 0.04     | 0.2      |         | 0.2     | 0.2      | 0.2      |          |          | 0.1      | 0.1      | 0.1      |          |    |    |
| Indeno(1,2,3-cd)pyrene                                                                     | 0.05    | 25          | 0.04       | 0.43       | 0                      | 11    | 0.1696274        | POTENTIALLY SUITABLE FOR USE | 0.04     | 0.04     | 0.04     | 0.04     | 0.04     | 0.2      |         | 0.2     | 0.2      | 0.2      |          |          | 0.1      | 0.1      | 0.1      |          |    |    |
| Naphthalene                                                                                | 0.05    | 25          | 0.04       | 0.17       | 0                      | 4100  | 0.0746075        | POTENTIALLY SUITABLE FOR USE | 0.04     | 0.04     | 0.04     | 0.04     | 0.04     | 0.05     |         | 0.05    | 0.05     | 0.05     |          |          | 0.05     | 0.05     | 0.05     |          |    |    |
| Phenanthrene                                                                               | 0.05    | 25          | 0.03       | 1.39       | 0                      | 3100  | 0.3615013        | POTENTIALLY SUITABLE FOR USE | 0.03     | 0.03     | 0.03     | 0.03     | 0.03     | 0.2      |         | 0.2     | 0.2      | 0.2      |          |          | 0.12     | 0.1      | 0.1      |          |    |    |
| Pyrene                                                                                     | 0.05    | 25          | 0.03       | 2.52       | 0                      | 7400  | 0.629928         | POTENTIALLY SUITABLE FOR USE | 0.03     | 0.03     | 0.03     | 0.03     | 0.03     | 0.2      |         | 0.2     | 0.2      | 0.2      |          |          | 0.57     | 0.22     | 0.1      |          |    |    |
| Mean                                                                                       |         |             |            |            |                        |       |                  |                              |          |          |          |          |          |          |         |         |          |          |          |          |          |          |          |          |    |    |
| FOC (dimensionless)                                                                        | 0.015   |             |            |            |                        |       |                  |                              | 0.003    | 0.01     | 0.003    | 0.001    | 0.013    | 0.0092   | 0.028   | 0.011   | 0.0096   | 0.001    | 0.015    | 0.0007   | 0.042    | 0.02     | 0.0048   | 0.0073   |    |    |
| SOM (calculated)                                                                           | 2.52%   |             |            |            |                        |       |                  |                              | 0.52%    | 1.72%    | 0.52%    | 0.17%    | 2.24%    | 1.59%    | 4.83%   | 1.90%   | 1.79%    | 0.17%    | 2.59%    | 0.12%    | 7.24%    | 3.45%    | 0.83%    | 1.26%    |    |    |
| pH (su)                                                                                    | 8.1     |             |            |            |                        |       |                  |                              | 7.91     | 7.91     | 8.22     | 7.92     | 7.67     | 7.3      | 8.1     | 7.9     | 8.4      | 7        | 7.6      | 7.9      | 8.4      | 6.8      | 7.3      | 7.9      |    |    |
| Risk parameter: Human health - POS resi (2.5%SOM)                                          |         |             |            |            |                        |       |                  |                              |          |          |          |          |          |          |         |         |          |          |          |          |          |          |          |          |    |    |
| Data set: Area 1: ESI (2012), WYG (2013) and Hydrock (August 2014) investigations combined |         |             |            |            |                        |       |                  |                              |          |          |          |          |          |          |         |         |          |          |          |          |          |          |          |          |    |    |
| Client: Lend Lease                                                                         |         |             |            |            |                        |       |                  |                              |          |          |          |          |          |          |         |         |          |          |          |          |          |          |          |          |    |    |
| Site: North Wales Prison, Wrexham                                                          |         |             |            |            |                        |       |                  |                              |          |          |          |          |          |          |         |         |          |          |          |          |          |          |          |          |    |    |
| Job no.: C14656                                                                            |         |             |            |            |                        |       |                  |                              |          |          |          |          |          |          |         |         |          |          |          |          |          |          |          |          |    |    |

# Assessment of Chemicals of Potential Concern to Human Health

| All values in mg/kg unless otherwise stated |  |  |  |  |  |  |  | Soil Type | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG | MG</ |
|---------------------------------------------|--|--|--|--|--|--|--|-----------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|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|---------------------------------------------|--|--|--|--|--|--|--|-----------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|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# Assessment of Chemicals of Potential Concern to Human Health

| All values in mg/kg unless otherwise stated                                                |         |             |            |            |                        |      |                  | Soil Type                    |          |          |          |          |         |         |          |          |          |          |          |          |          |          |        |     |
|--------------------------------------------------------------------------------------------|---------|-------------|------------|------------|------------------------|------|------------------|------------------------------|----------|----------|----------|----------|---------|---------|----------|----------|----------|----------|----------|----------|----------|----------|--------|-----|
| Chemical of Potential Concern                                                              | Lab. RL | No. Samples | Min. Value | Max. Value | No. Samples > or = GAC | GAC  | US <sub>95</sub> | Location & Depth             | MG       | MG       | MG       | MG       | MG      | MG      | MG       | MG       | MG       | MG       | MG       | MG       | MG       | MG       | MG     | MG  |
|                                                                                            |         |             |            |            |                        |      |                  | WYG TP12                     | WYG TP13 | WYG TP14 | WYG TP15 | ESI TP34 | ESI TP5 | ESI TP6 | ESI TP28 | ESI TP29 | ESI TP30 | ESI TP31 | ESI TP36 | TPS TP03 | TPS TP04 | TPS TP29 |        |     |
|                                                                                            |         |             |            |            |                        |      |                  |                              | 0.5      | 0.5      | 0.5      | 0.5      | 0.3     | 0.5     | 0.2      | 0.2      | 0.5      | 0.3      | 0.3      | 0.2      | 0.1      | 0.4      | 0.3    | 0.3 |
|                                                                                            |         |             |            |            |                        |      |                  | Result of Significance Test  |          |          |          |          |         |         |          |          |          |          |          |          |          |          |        |     |
| Arsenic                                                                                    | 1       | 29          | 2.2        | 20         | 0                      | 32   | 11.490108        | POTENTIALLY SUITABLE FOR USE | 7.4      | 11.2     | 5        | 6.9      | 4.6     | 13      | 9        | 6.2      | 2.2      | 20       | 6.2      | 10       | 8.8      | 9.6      | 5.7    |     |
| Beryllium                                                                                  | 0.06    | 29          | 0.2        | 3          | 0                      | 51   | 1.7076677        | POTENTIALLY SUITABLE FOR USE | 0.7      | 2.1      | 0.6      | 0.9      | 0.5     | 1.4     | 0.7      | 0.6      | 0.5      | 1.4      | 0.8      | 0.9      | 0.6      | 0.7      | 0.2    |     |
| Boron                                                                                      | 0.2     | 29          | 0.2        | 1.4        | 0                      | 290  | 0.9279023        | POTENTIALLY SUITABLE FOR USE | 0.6      | 0.8      | 0.3      | 1        | 0.2     | 0.4     | 0.2      | 0.2      | 0.2      | 0.2      | 0.2      | 1        | 0.4      | 0.2      |        |     |
| Cadmium                                                                                    | 0.2     | 29          | 0.1        | 1.1        | 0                      | 11   | 0.4096529        | POTENTIALLY SUITABLE FOR USE | 0.2      | 0.2      | 0.1      | 0.2      | 0.2     | 0.2     | 0.2      | 0.2      | 0.2      | 0.3      | 0.2      | 0.3      | 0.2      | 0.5      |        |     |
| Chromium (III)                                                                             | 1       | 29          | 9          | 1005.7     | 1                      | 630  | 208.87534        | POTENTIALLY SUITABLE FOR USE | 18.8     | 50.2     | 12.4     | 23.3     | 9       | 41      | 37       | 9        | 10       | 18       | 27       | 21       | 16.8     | 22.8     | 14.8   |     |
| Chromium (VI)                                                                              | 1.2     | 29          | 0.3        | 4          | 0                      | 4.3  | 2.7474446        | POTENTIALLY SUITABLE FOR USE | 0.3      | 0.3      | 0.3      | 0.3      | 4       | 4       | 4        | 4        | 4        | 4        | 4        | 4        | 1.2      | 1.2      | 1.2    |     |
| Copper                                                                                     | 1       | 29          | 5.9        | 68         | 0                      | 2300 | 35.169944        | POTENTIALLY SUITABLE FOR USE | 6        | 25       | 12       | 12       | 13      | 25      | 21       | 15       | 5.9      | 68       | 28       | 20       | 22       | 25       | 19     |     |
| Lead                                                                                       | 2       | 29          | 19         | 180        | 0                      | 200  | 95.098954        | POTENTIALLY SUITABLE FOR USE | 42       | 51       | 29       | 44       | 40      | 180     | 170      | 39       | 25       | 49       | 20       | 37       | 50       | 42       | 140    |     |
| Mercury, inorganic                                                                         | 0.3     | 29          | 0.1        | 1.3        | 0                      | 170  | 0.3969179        | POTENTIALLY SUITABLE FOR USE | 0.1      | 0.1      | 0.1      | 0.1      | 0.3     | 0.3     | 0.3      | 0.3      | 0.3      | 1.3      | 0.3      | 0.3      | 0.3      | 0.3      | 0.3    |     |
| Nickel                                                                                     | 2       | 29          | 6.2        | 68.4       | 0                      | 130  | 42.004456        | POTENTIALLY SUITABLE FOR USE | 15.6     | 55       | 14.7     | 20.2     | 14      | 36      | 22       | 15       | 6.2      | 28       | 40       | 30       | 22       | 33       | 12     |     |
| Selenium                                                                                   | 1       | 29          | 1          | 2.3        | 0                      | 350  | 1.4562863        | POTENTIALLY SUITABLE FOR USE | 1        | 1        | 1        | 1        | 1       | 1       | 1        | 1        | 1        | 2.3      | 1        | 1        | 1        | 1        | 1      |     |
| Vanadium                                                                                   | 1       | 29          | 14         | 149        | 1                      | 74   | 58.341715        | POTENTIALLY SUITABLE FOR USE | 24       | 55       | 14       | 29       | 15      | 46      | 40       | 20       | 16       | 34       | 31       | 31       | 23       | 27       | 15     |     |
| Zinc                                                                                       | 2       | 29          | 39         | 155        | 0                      | 3700 | 102.83637        | POTENTIALLY SUITABLE FOR USE | 49       | 101      | 44       | 98       | 39      | 110     | 83       | 58       | 39       | 58       | 72       | 68       | 71       | 63       | 86     |     |
| Cyanide (free)                                                                             | 1       | 21          | 0.5        | 1          | 0                      | 750  | 0.742005         | POTENTIALLY SUITABLE FOR USE | 0.5      | 0.5      | 0.5      | 0.5      |         |         |          |          |          |          |          | 1        | 1        | 1        |        |     |
| Phenol (total)                                                                             | 2       | 29          | 0.0099     | 2          | 0                      | 290  | 1.560427         | POTENTIALLY SUITABLE FOR USE | 0.01     | 0.01     | 0.01     | 0.01     | 2       | 2       | 2        | 2        | 2        | 2        | 2        | 2        | 2        | 2        | 2      |     |
| Acenaphthene                                                                               | 0.05    | 25          | 0.05       | 0.21       | 0                      | 480  | 0.1025853        | POTENTIALLY SUITABLE FOR USE | 0.05     | 0.05     | 0.05     | 0.05     | 0.1     |         | 0.1      | 0.1      | 0.1      |          |          | 0.1      | 0.1      | 0.1      |        |     |
| Acenaphthylene                                                                             | 0.05    | 25          | 0.03       | 0.2        | 0                      | 400  | 0.1214965        | POTENTIALLY SUITABLE FOR USE | 0.03     | 0.03     | 0.03     | 0.03     | 0.2     |         | 0.2      | 0.2      | 0.2      |          |          | 0.1      | 0.1      | 0.1      |        |     |
| Anthracene                                                                                 | 0.05    | 25          | 0.04       | 0.56       | 0                      | 4900 | 0.1684053        | POTENTIALLY SUITABLE FOR USE | 0.04     | 0.04     | 0.04     | 0.04     | 0.1     |         | 0.1      | 0.1      | 0.1      |          |          | 0.1      | 0.1      | 0.1      |        |     |
| Benz(a)anthracene                                                                          | 0.05    | 25          | 0.06       | 1.22       | 0                      | 4.7  | 0.3601236        | POTENTIALLY SUITABLE FOR USE | 0.06     | 0.06     | 0.06     | 0.06     | 0.2     |         | 0.2      | 0.2      | 0.2      |          |          | 0.38     | 0.22     | 0.1      |        |     |
| Benzo(a)pyrene                                                                             | 0.05    | 25          | 0.04       | 0.95       | 1                      | 0.94 | 0.2690545        | POTENTIALLY SUITABLE FOR USE | 0.04     | 0.04     | 0.04     | 0.04     | 0.1     |         | 0.1      | 0.1      | 0.1      |          |          | 0.32     | 0.17     | 0.1      |        |     |
| Benzo(b)fluoranthene                                                                       | 0.05    | 25          | 0.05       | 1.14       | 0                      | 6.5  | 0.3235375        | POTENTIALLY SUITABLE FOR USE | 0.05     | 0.05     | 0.05     | 0.05     | 0.1     |         | 0.1      | 0.1      | 0.1      |          |          | 0.43     | 0.18     | 0.1      |        |     |
| Benzo(ghi)perylene                                                                         | 0.05    | 25          | 0.04       | 0.47       | 0                      | 46   | 0.1353003        | POTENTIALLY SUITABLE FOR USE | 0.04     | 0.04     | 0.04     | 0.04     | 0.05    |         | 0.05     | 0.05     | 0.05     |          |          | 0.05     | 0.05     | 0.05     |        |     |
| Benzo(k)fluoranthene                                                                       | 0.05    | 25          | 0.02       | 0.44       | 0                      | 9.6  | 0.1712431        | POTENTIALLY SUITABLE FOR USE | 0.02     | 0.02     | 0.02     | 0.02     | 0.2     |         | 0.2      | 0.2      | 0.2      |          |          | 0.18     | 0.13     | 0.1      |        |     |
| Chrysene                                                                                   | 0.05    | 25          | 0.02       | 1.14       | 0                      | 8    | 0.3073412        | POTENTIALLY SUITABLE FOR USE | 0.02     | 0.02     | 0.02     | 0.02     | 0.05    |         | 0.05     | 0.05     | 0.05     |          |          | 0.46     | 0.19     | 0.05     |        |     |
| Dibenz(a,h)anthracene                                                                      | 0.05    | 25          | 0.04       | 0.2        | 0                      | 0.86 | 0.1273453        | POTENTIALLY SUITABLE FOR USE | 0.04     | 0.04     | 0.04     | 0.04     | 0.2     |         | 0.2      | 0.2      | 0.2      |          |          | 0.1      | 0.1      | 0.1      |        |     |
| Fluoranthene                                                                               | 0.05    | 25          | 0.03       | 3.31       | 0                      | 460  | 0.8021093        | POTENTIALLY SUITABLE FOR USE | 0.03     | 0.03     | 0.03     | 0.03     | 0.2     |         | 0.2      | 0.2      | 0.2      |          |          | 0.65     | 0.22     | 0.1      |        |     |
| Fluorene                                                                                   | 0.05    | 25          | 0.04       | 0.2        | 0                      | 380  | 0.1285617        | POTENTIALLY SUITABLE FOR USE | 0.04     | 0.04     | 0.04     | 0.04     | 0.2     |         | 0.2      | 0.2      | 0.2      |          |          | 0.1      | 0.1      | 0.1      |        |     |
| Indeno(1,2,3-cd)pyrene                                                                     | 0.05    | 25          | 0.04       | 0.43       | 0                      | 3.9  | 0.1698274        | POTENTIALLY SUITABLE FOR USE | 0.04     | 0.04     | 0.04     | 0.04     | 0.2     |         | 0.2      | 0.2      | 0.2      |          |          | 0.1      | 0.1      | 0.1      |        |     |
| Naphthalene                                                                                | 0.05    | 25          | 0.04       | 0.17       | 0                      | 3.7  | 0.0746075        | POTENTIALLY SUITABLE FOR USE | 0.04     | 0.04     | 0.04     | 0.04     | 0.05    |         | 0.05     | 0.05     | 0.05     |          |          | 0.05     | 0.05     | 0.05     |        |     |
| Phenanthrene                                                                               | 0.05    | 25          | 0.03       | 1.39       | 0                      | 200  | 0.3615013        | POTENTIALLY SUITABLE FOR USE | 0.03     | 0.03     | 0.03     | 0.03     | 0.2     |         | 0.2      | 0.2      | 0.2      |          |          | 0.12     | 0.1      | 0.1      |        |     |
| Pyrene                                                                                     | 0.05    | 25          | 0.03       | 2.52       | 0                      | 1000 | 0.629928         | POTENTIALLY SUITABLE FOR USE | 0.03     | 0.03     | 0.03     | 0.03     | 0.2     |         | 0.2      | 0.2      | 0.2      |          |          | 0.57     | 0.22     | 0.1      |        |     |
|                                                                                            | Mean    |             |            |            |                        |      |                  |                              |          |          |          |          |         |         |          |          |          |          |          |          |          |          |        |     |
| FOC (dimensionless)                                                                        | 0.015   |             |            |            |                        |      |                  |                              | 0.01     | 0.003    | 0.001    | 0.013    | 0.0092  | 0.028   | 0.011    | 0.0096   | 0.001    | 0.015    | 0.0007   | 0.042    | 0.02     | 0.0048   | 0.0073 |     |
| SOM (calculated)                                                                           | 2.52%   |             |            |            |                        |      |                  |                              | 1.72%    | 0.52%    | 0.17%    | 2.24%    | 1.59%   | 4.83%   | 1.90%    | 1.66%    | 0.17%    | 2.59%    | 0.12%    | 7.24%    | 3.45%    | 0.83%    | 1.26%  |     |
| pH (su)                                                                                    | 8.1     |             |            |            |                        |      |                  |                              | 7.91     | 8.22     | 7.92     | 7.67     | 7.3     | 8.1     | 7.9      | 8.4      | 7        | 7.6      | 7.9      | 8.4      | 6.8      | 7.3      | 7.9    |     |
| Risk parameter: Human health - residential with plant uptake (2.5%SOM)                     |         |             |            |            |                        |      |                  |                              |          |          |          |          |         |         |          |          |          |          |          |          |          |          |        |     |
| Data set: Area 1: ESI (2012), WYG (2013) and Hydrock (August 2014) investigations combined |         |             |            |            |                        |      |                  |                              |          |          |          |          |         |         |          |          |          |          |          |          |          |          |        |     |
| Client: Lend Lease                                                                         |         |             |            |            |                        |      |                  |                              |          |          |          |          |         |         |          |          |          |          |          |          |          |          |        |     |
| Site: North Wales Prison, Wrexham                                                          |         |             |            |            |                        |      |                  |                              |          |          |          |          |         |         |          |          |          |          |          |          |          |          |        |     |
| Job no.: C14656                                                                            |         |             |            |            |                        |      |                  |                              |          |          |          |          |         |         |          |          |          |          |          |          |          |          |        |     |

