



Photograph 7 – Finished levels across north west part of MP70



Photograph 8 – Section of pipe removed from additional excavation at IP3997



Photograph 9 – Additional excavation for VO inspection at Ip4038



Photograph 10 – Additional excavation for VO inspection at TPE3714



Photograph 11 – Excavation of 'Dust Lagoon'



Photograph 12 – Backfill of 'Dust Lagoon'



Photograph 13 – View across south west margin at finished ground level

Appendix F. Validation Table

Appendix F- Validation Table

<u>Pit ID</u>	<u>Eastings</u>	<u>Northings</u>	<u>Original Ground Elevation (m)</u>	<u>VO Failure</u>	<u>Obstructions/Pipes</u>	<u>Depth of Issue below original ground level (m)</u>	<u>Elevation of Issue (m)</u>	<u>Current Ground level</u>
IP3839	271190.011	195819.34	62.139		PIPE	0.8	61.339	59.401
IP3840	271189.948	195829.352	61.832		CONCRETE	0.4	61.432	59.403
IP3843	271200.01	195809.318	62.401		CONCRETE	0.9	61.501	59.388
IP3851	271210.622	195819.705	59.871		CONCRETE	1.2	58.671	58.291
IP3859	271254.027	195824.608	58.336		CONCRETE	1.8	56.536	57.836
IP3860	271229.83	195789.369	59.964		CONCRETE	2.7	57.264	62.05
IP3862	271229.952	195809.339	58.46		CONCRETE	1.3	57.16	58.461
IP3864	271229.984	195829.317	57.799		CONCRETE	0.3	57.499	57.399
IP3878	271249.968	195819.378	58.227		CONCRETE	1.6	56.627	57.849
IP3884	271261.844	195882.931	57.705		CONCRETE	1.4	56.305	53.905
IP3885	271260.049	195869.324	57.602		CONCRETE	1.3	56.302	55.202
IP3886	271255.765	195874.979	57.507		CONCRETE	0	57.507	55.707
IP3901	271268.279	195848.797	57.736		CONCRETE	0	57.736	54.936
IP3902	271268.577	195858.288	57.492		CONCRETE	0	57.492	54.092
IP3904	271270.252	195878.76	57.435		PIPE	1.5	55.935	53.035
IP3905	271275.23	195875.056	57.179		PIPE & CONCRETE	1.5	55.679	52.979
IP3907	271274.154	195883.845	54.926		CONCRETE	0	54.926	53.326
IP3908	271279.477	195879.748	54.973		CONCRETE	0.6	54.373	53.373
IP3909	271281.223	195868.987	56.961		CONCRETE	0.4	56.561	53.361
IP3911	271280.01	195849.325	56.664		BRICK	0.3	56.364	54.264
IP3912	271279.989	195839.294	57.577		CONCRETE	0.3	57.277	55.177
IP3913	271279.992	195829.364	57.582		CONCRETE	0.3	57.282	55.982
IP3914	271280.1	195819.257	57.952		PIPE & CONCRETE	1.1	56.852	55.168
IP3921	271290.062	195819.318	58.561		CONCRETE	1.3	57.261	56.561
IP3922	271290.053	195829.333	57.809		CONCRETE	1.2	56.609	55.609
IP3923	271289.991	195839.355	57.538		CONCRETE	0.3	57.238	54.938
IP3924	271290.221	195849.483	57.302		CONCRETE	0.3	57.002	54.102
IP3927	271287.075	195879.293	54.888		CONCRETE	0.3	54.588	52.888
IP3928	271299.28	195881.637	54.83		CONCRETE	0.6	54.23	53.03
IP3929	271299.97	195869.337	55.141		CONCRETE	0.3	54.841	52.941
IP3932	271299.948	195839.327	57.224		PIPE	1	56.224	54.624
IP3933	271299.992	195829.313	57.581		CONCRETE	1.3	56.281	55.381
IP3946	271310.034	195869.291	55.101		CONCRETE	0.6	54.501	53.701
IP3948	271308.626	195891.094	53.716		CONCRETE	2.2	51.516	51.976
IP3949	271319.983	195899.315	52.192		CONCRETE	1.7	50.492	51.118
IP3950	271319.978	195889.343	53.715		CONCRETE	0.2	53.515	52.115
IP3965	271330.018	195829.305	53.265		CONCRETE	1.3	51.965	52.818
IP3967	271329.978	195849.301	52.363		CONCRETE	1.7	50.663	52.197
IP3969	271329.932	195869.283	51.036		CONCRETE	0	51.036	51.062
IP3970	271330.022	195879.342	50.551		CONCRETE	0	50.551	50.353
IP3975	271340	195909.303	50.309		CONCRETE	0	50.309	49.909
IP3976	271339.99	195899.321	50.985		CONCRETE	0.4	50.585	50.385
IP3997	271349.966	195899.347	49.657		PIPE	0.6	49.057	49.484
IP3998	271349.95	195909.344	49.885		PIPE	0.4	49.485	49.285
IP3999	271349.993	195919.313	49.597		CONCRETE	0.2	49.397	48.997
IP4007	271359.999	195849.33	50.553		CONCRETE	0.4	50.153	50.858
IP4008	271360.027	195839.357	52.296		CONCRETE	0.4	51.896	51.018
IP4015	271370.006	195839.719	51.103		CONCRETE	0.3	50.803	50.759
IP4045	271365.802	195864.143	49.443		CONCRETE	0.3	49.143	49.143
IP4078	271199.998	196000.024	53.045		PIPE	0.4	52.645	47.833
TPE3448	271090	195975.45	61.794		CONCRETE	0	61.794	49.265
TPE3495	271100	195995.45	60.527		CONCRETE	0	60.527	57.727
TPE3496	271100	195985.45	60.955		CONCRETE	0.2	60.755	58.155
TPE3498	271100	195965.45	61.495		CONCRETE	0.2	61.295	59.495
TPE3499	271100	195955.45	61.863		CONCRETE	0.4	61.463	60.063
TPE3536	271110	195955.45	61.141		CONCRETE	0.3	60.841	59.541
TPE3537	271110	195965.45	61.029		CONCRETE	0.5	60.529	59.029
TPE3539	271110	195985.45	60.685		CONCRETE	0	60.685	57.885
TPE3540	271110	195995.45	60.18		CONCRETE	1	59.18	57.18
TPE3543	271110	196025.45	58.806		CONCRETE	0	58.806	55.206
TPE3593	271120	196005.45	59.43		CONCRETE	0	59.43	56.23
TPE3595	271120	195985.45	60.912		CONCRETE	1	59.912	60.912
TPE3596	271120	195975.45	60.931		CONCRETE	0	60.931	58.331
TPE3597	271120	195965.45	60.947		CONCRETE	0	60.947	56.247
TPE3598	271120	195955.45	61.008		CONCRETE	0.2	60.808	59.208
TPE3626	271130	195955.45	60.879 5,4		CONCRETE	1.3	59.579	57.644
TPE3627	271130	195965.45	61.006		CONCRETE	0	61.006	59.006
TPE3630	271129.972	195995.465	59.602		CONCRETE	0.4	59.202	56.802
TPE3631	271130	196005.45	59.392		PIPE	0.3	59.092	55.392
TPE3632	271130	196015.45	59.367		PIPE with product	1.2	58.167	54.567
TPE3635	271130.198	196040.653	54.442		CONCRETE	3.3	51.142	53.442
TPE3679	271140	195995.45	59.514		CONCRETE	0	59.514	55.514
TPE3681	271140	195975.45	59.186		PIPE	1.3	57.886	57.786
TPE3683	271140	195955.45	60.771 5,5		CONCRETE	0.3	60.471	58.971
TPE3705	271149.968	195955.376	59.403		CONCRETE	0	59.403	58.803
TPE3707	271150	195975.45	59.543		CONCRETE	1.2	58.343	57.743
TPE3748	271160	196055.45	51.418		CONCRETE	0	51.418	50.618
TPE3751	271160	196025.45	53.345		CONCRETE	1.3	52.045	51.745
TPE3755	271160	195985.45	59.128		PIPE	2.5	56.628	54.528
TPE3756	271161.585	195977.717	59.789		CONCRETE	2.9	56.889	55.389
TPE3758	271160	195955.45	59.548		CONCRETE	0	59.548	58.748
TPE3759	271160	195825.45	61.402		CONCRETE	0.4	61.002	57.221
TPE3773	271170	195935.45	59.448		CONCRETE	0.3	59.148	58.848
TPE3774	271169.992	195955.507	59.726		CONCRETE	2.3	57.426	58.526
TPE3775	271171.52	195967.781	59.836		CONCRETE PIPE	2.9	56.936	55.636
TPE3782	271170	196035.45	52.029		CONCRETE	2.4	49.629	50.829
TPE3785	271170	196065.45	50.062		CONCRETE	0.2	49.862	49.662
TPE3811	271180	196005.45	53.227		CONCRETE	0.5	52.727	51.227
TPE3814	271180	195975.45	56.967		CONCRETE	0.4	56.567	53.367
TPE3839	271190	195835.45	60.515		CONCRETE	0.3	60.215	54.389
TPE3880	271194.686	196045.161	50.593		CONCRETE	1.2	49.393	50.593
TPE3881	271200	196035.45	51.33		CONCRETE	1.9	49.43	48.53
TPE3884	271206.009	196027.284	51.296		PIPE	2	49.296	48.496
TPE3885	271204.727	196035.048	51.197		CONCRETE	1.8	49.397	48.397
TPE3620	271130	195875.45	63.089 4,5			2.4	60.689	60.67
TPE3628	271130	195975.45	60.577 5,4			3.2	57.377	55.391
TPE3685	271140	195935.45	61.256 3,5			3.2	58.056	50.924
TPE3699	271150	195855.45	62.251 5,5			2.6	59.651	58.912
TPE3714	271150	196045.45	53.104 5,3			2.2	50.904	51.87
IP4038	271388.088	195850.548	49.128 4,4			3.5	45.628	54.182
TPE3601	271120	195925.45	62.759		PIPE	1	61.759	60.959
TPE3706	271150	195965.45	59.603 4,3			1	58.603	58.403
TPE3860	271190	196045.45	50.924		CONCRETE	2.7	48.224	48.551

Michelle Lee

Atkins Ltd.
The Axis
10 Holliday Street
Birmingham
B1 1TF

michelle.lee@atkinsglobal.com
07812 23 7628

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St. Modwen Developments Limited

Coed Darcy - Monitor Phase 72

Geo-environmental Validation Report

June 2021

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Version Control and Approval

Version	Date	Main Contributor	Checked by	Approved by
A	21 June 2021	Liam Clark	Charlotte Smith	Mike Poland

Prepared for

St. Modwen Developments Limited

Park Point
17 High Street
Longbridge
Birmingham
B31 2UQ

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I Introduction

I.1 Background

PJA has been commissioned by St. Modwen Developments Ltd (St. Modwen) to provide consultancy advice with regard to the Coed Darcy Limited (CDL) area of the former Llandarcy Oil Refinery.

The purpose of this report is to provide data relating to Monitor Phase 72 to confirm the suitability of this area for commercial end use in line with the specific requirements of the Section 106 Agreement and to allow St. Modwen to achieve sign-off by the Monitor.

For the purpose of the Monitor sign-off, the extent of Monitor Phase 72 is shown on Drawing 04020-SK-901-P0 in Appendix A.

I.2 Scope of Work

The scope of the works include:

- A review of readily available information including geological, hydrogeological, historical site plans;
- A review of available historical maps relating to Monitor Phase 72 and adjacent areas;
- A review of historical and recent ground investigation information relating to Monitor Phase 72; and
- Assessment of the available ground investigation information and laboratory data in the context of the current use for Monitor Phase 72.

I.3 Soil Quality Assessment Standards

To maintain consistency of approach, the assessment standards for historical and recent data are those stated in the Section 106 Agreement for Coed Darcy. The visual and olfactory classification system, as previously defined by BP within the Section 106 Agreement, is provided as Table 1-1.

PJA has continued to adopt this system for the classification of all soils encountered, to aid assessment of each area in terms of the required remediation requirements. The assigned classifications for each strata are quoted on the exploratory hole logs for recent ground investigation by PJA.

**Table 1-1: Scale of Visual and Olfactory Criteria**

Class	Visual	Olfactory
0	No visible staining of soil, no visible suspect ACM*.	No detectable odour on soil.
1	Occasional staining of soil, no visible suspect ACM*.	Faint odour on soil.
2	Frequent staining of soil.	Distinct, but not strong odour on soil.
3	Occasional heavy staining of soil.	Strong odour on soil.
4	Heavy staining of soil.	Strong odour discernible in ambient air.
5	Visible hydrocarbon present.	Overwhelming odour.

*Visible suspect ACM refers to asbestos containing materials visible to the naked eye, which a reasonable and prudent person used to managing asbestos may suspect to be asbestos-containing.

The Section 106 Agreement for Coed Darcy presents a series of Risk Based Screening Levels (RBSLs), defined as the 'minimum base level standard' for redevelopment remediation works (Schedule 8, Part 2, Paragraph 2,5).

In order to update the assessment of contamination in line with current UK guidance, these RBSLs are also supplemented by a series of Remedial Target Concentrations (RTCs) derived by Atkins (Derivation of Commercial Remediation Target Criteria, March 2011, ref: 5041216-REM-RPT-000476). A summary of the adopted thresholds for Monitor Phase 72 are presented in Appendix B.

I.4 Information Sources

Information reviewed as part of the following assessment has been obtained from the following sources:

- BGS Geoindex <https://mapapps2.bgs.ac.uk/geoindex/home.html>;
- DEFRA MAGIC Map <https://magic.defra.gov.uk/MagicMap.aspx>;
- Geotechnical and Contamination Report, 31052/SR498, Applied Geology, October 1993;
- Final Factual Report for Whole Site Investigation BP Llandarcy Refinery FR1287, URS, August 2005;
- Coed D'Arcy Development BP Llandarcy Refinery Desk Study 44382742/BRRP001, URS, July 2007; and
- D'Arcy Business Centre Development Contract Completion Document, Churngold Remediation Ltd, December 2007.

I.5 Limitations

The Section 106 Agreement for Coed Darcy was envisaged primarily as a tool to aid the redevelopment of the former Llandarcy refinery and the bringing back to beneficial use existing derelict land. It stipulates frequencies for exploratory holes and sampling for commercial scenario,



primarily for the purposes of ensuring the suitability of land at the former Llandarcy oil refinery for its proposed end use within the Coed Darcy development.

The Monitor Phase 72 area is already developed with commercial business. Vehicle and pedestrian access needed to be maintained to the units within Monitor Phase 72 during the investigation. As such to maintain the functionality of these existing land uses amendments to the specified investigation frequencies, as defined in the S106, were required. This approach is in line with other areas of the site where development is limited by existing development.

The investigation works summarised within the report represent a sampling exercise to determine the in-situ ground conditions across Monitor Phase 72, in general accordance with the required methodology outlined within the S106. The works were carried out predominantly to investigate potential contamination across this area and do not include a review of any geotechnical issues or constraints that may exist, which would need to be taken into account as part of any further development and/or redevelopment of this area.

It should be noted that ground and groundwater conditions can vary between sampling points and over time in both horizontal and vertical planes.

The findings within this report are based upon information gained from a variety of sources and field observations/measurements as detailed within this report, which PJA believes are reliable. Nevertheless, PJA cannot guarantee the authenticity, accuracy or reliability of third-party information.

The conclusions made within this report are based on guidance available at the time of writing.



2 The Site

2.1 Location and Description

Monitor Phase 72 covers approximately 5.4 hectares in the north east of the former Llandarcy Oil Refinery. It is divided into two land parcels, a northern parcel (2.9 hectares) and a southern parcel (2.5 hectares), as shown on Drawing 04020-SK-901-P0.

The northern parcel includes the following areas, currently used for commercial purposes:

- Llancoed Court
- Llancoed House
- Darcy Business Park
- The Courtyard

The southern parcel includes the following areas used for commercial purposes, although it is understood that William Knox House and Heritage House are currently vacant:

- Britannic House
- NRW building
- William Knox House
- Heritage House

The northern parcel is bound to the north by land which includes an electricity substation, PeakGen compound and oil-water separators, to the east by the B4290 road, and to the south and west by undeveloped land of the wider Coed Darcy development.

The southern parcel is bound to the north by a highway junction and undeveloped land of the wider Coed Darcy development, to the east by a road, and to the south and west by residential developments.

2.1.1 Topography

Topography across the northern parcel is generally flat, with levels varying between 31mAOD and 34mAOD.

Topography across the southern parcel generally falls from the west to the north and east from 56mAOD in the west to 43mAOD in the north east of the site.

2.1.2 Surface cover

Surface cover across the northern parcel of land predominantly consists of hardstanding (Tarmacadam and block paving), buildings, with minor soft landscaped areas and an unsurfaced area in the west, currently used for car parking.

Surface cover in the southern parcel primarily comprises Tarmacadam hardstanding, buildings, gravel surfacing across car parking areas, with soft landscaping present to the north and north east of the office buildings.

2.2 Historical Land Use

Construction of Llandarcy Oil refinery commenced in 1917 but was temporarily suspended during the war due to the lack of men and resources. Construction started again in 1919 with production beginning in 1921. The refinery was officially opened in 1922.

The purpose of the refinery was to produce motor spirit, kerosene, gas fuel oil, fuel residue and lubricating oil and wax from imported crude oil. Between the wars, the oil industry developed rapidly. By 1939, the refinery had little of the original plant in operation.

In the mid 1980s a number of rationalisations occurred with the closure of the refinery being formally announced in 1997.

Both parcels of land were on the periphery of the main Llandarcy Oil Refinery and based on available historical maps within the URS desk study (ref: 44382742/BRRP001). The northern parcel lay of the eastern periphery of the main refinery but within the operational area of the site. The current developments on this parcel date from the 1980s to 2000s constructed on vacant parts of the refinery which was no longer required for operational purposes.

There appears to have been no historical refinery process infrastructure located on the southern land parcel which was primarily used for office and administrative functions.

The individual areas within the two parcels and their historical land uses are summarised in Table 2-1 below and shown on Drawing 04020-SK-903-P0.

Table 2-1: Historical Land Uses Across Monitor Phase 72

Area	Historical Land Use
Northern Parcel	
Llancoed Court	Railway sidings, hypo and limewater pumphouse, lube oil barrelling plant, electricity substation and re-run unit
Llancoed House	Railway sidings, lube oil barrelling plant and re-run unit
Darcy Business Park	Railway sidings and bottle dispatch plant, chemical drains
The Courtyard	Car park
Southern Parcel	

Area	Historical Land Use
Britannic House	Office building present since at least the 1960s
William Knox House	Office building present since at least the 1960s
NRW Building	Largely unoccupied, railway sidings passing through the far north
Heritage House	Office building present since at least the 1960s

2.3 Published Geology

A review of published geological information (BGS map 247, Swansea 1:50,000 scale) indicates the northern parcel to be underlain by Till (Diamicton), a heterogeneous deposit of glacial origin. Superficial deposits are absent at the southern parcel.

Bedrock comprises the Hughes Member of the Pennant Sandstone Formation, which is described by the BGS as *'green-grey, lithic arenites ("Pennant sandstones"), with thin mudstone/siltstone and seatearth interbeds, and mainly thin coals'*.

2.4 Hydrogeology

Till (Diamicton) underlying the northern land parcel is classified as 'Unproductive Strata'. These are defined as: *'...rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.'*

The underlying sandstone bedrock is classified as a 'Secondary A Aquifer'. This is defined as: *'permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers.'*

2.5 Hydrology

The hydrology of the northern parcel is dominated by areas of hardstanding with surface water drains feeding into the local storm water network. This feeds into the wider drainage system and discharges to a Welsh Water outfall and eventually the River Neath. The southern parcel has a greater proportion of soft landscaping surrounding the buildings and external hardstanding and connecting roadways with observable drainage gullies.

There are no natural surface water features within either parcels or within the immediate vicinity.

Immediately north of the northern parcel is the historical main drain serving the wider former refinery site. This accepts drainage from the wider site including the North Site Reservoir and passes through a licenced discharge point at Bridge House and discharges into the River Neath. It is understood that the northern parcel does not utilise this outfall.

The Tennant Canal is located approximately 600m to the east of the site at its closest point. The River Neath is located approximately 900m to the east of the site at its closest point.

There are also a series of minor surface water drains within 250m of the site but none of which are understood to interact with either parcel.

2.6 Landfills and Waste Management Facilities

Based on available information there are no recorded historical landfills within the site boundary. The closest historical refinery landfill (Crymlyn Tip) which lies approximately 800m to the south west of the site.

Crymlyn Tip is a closed landfill that was used by BP during the operational years of the refinery from the 1920s to 1999. Deposited wastes are understood to have included asbestos, boiler cleanings, sludges, bitumens and waxes, ion exchanges resin, spent clay, pyrophoric material and contaminated debris.

Work is ongoing to remediate this landfill and ultimately surrender the Environmental Permit. The parcel and the Tip lie in different hydrogeological catchments.

2.7 Sensitive Land Uses

Crymlyn Bog Site of Special Scientific Interest (SSSI) lies within the flood plain of the River Neath estuary and represents the most extensive area of lowland fen in Wales. The SSSI lies approximately 800m to the west of Monitor Phase 72.

Crymlyn Bog SSSI is internationally important for its very wet mires often identified by an unstable 'quaking' surface. Bottle sedge and bogbean are important components of some stands, together with common cottongrass, water horsetail, star sedge, mud sedge, and in places, the nationally rare slender cottongrass. Crymlyn Bog supports the largest area of calcium-rich fen dominated by great fen sedge vegetation in south Wales. Some of these stands are dominated by great fen sedge, but other areas display a more diverse vegetation in which tufted-sedge, royal fern and a range of tall-herb fen species are prominent. Some of these stands are unique in a Welsh context. In addition, there are areas of wet woodland with alder and willow being the dominant species (<http://www.ccg.gov.uk/landscape--wildlife>).



3 Historical Ground Investigation by URS

3.1 Scope of Historical Ground Investigations

Prior to redevelopment of Darcy Business Park, investigation works were undertaken in the northern parcel of Monitor Phase 72 by Applied Geology in February and March 1992. Investigation works are recorded to have comprised twenty-five machine excavated trial pits, extending to depths ranging from 0.40mbgl to 4mbgl and four cable percussion boreholes extending to depths ranging from 5.10mbgl to 7.50mbgl.

URS undertook subsequent ground investigation across Monitor Phase 72 between 1998 and 2003, comprising 14 machine-excavated trial pits and 14 boreholes. This investigation was undertaken prior to construction of Llancoed Court and Llancoed House, however, Darcy Business Park, The Courtyard, Britannic House, the NRW building, William Knox House, and Heritage House were already present.

The locations of known historical exploratory holes are shown on Drawing 04020-A-SK902-P0, presented in Appendix A.

A summary of recorded ground conditions is presented in Section 3.23.2. Depths, where stated, are based on metres below ground level at the time of the investigations. Surveyed ground levels are not provided on the exploratory hole logs.

3.2 Ground Conditions Summary

3.2.1 Made Ground

Made Ground encountered during the 1992 investigation within the northern parcel was variable in composition. Exploratory hole logs recorded Made Ground as clay, silt, sand and gravel, with occasional layers of ash and cobbles. Gravels were reported to consist of brick, concrete, clinker and timber.

Made Ground was encountered in all URS exploratory holes within the northern parcel. Where the base of Made Ground was proven, thicknesses ranged between 0.40m in MSTP200 located in the west and 2.50m in MSMW128 located in the east. Made Ground was similarly variable in composition, comprising clay, silt, sand, gravel and cobbles with occasional boulders. Anthropogenic inclusions were described as ash, brick, concrete, coal, asphalt, rubble, plastic, metal, wood, clinker and slag.

Made Ground within the southern parcel was noted within four of the eight URS exploratory holes and ranged in thickness between 0.35m and 1.00m. Made Ground was described as comprising sandy, gravelly clay and silt, with occasional ash and gravels of brick, clinker and sandstone and



gravel and boulders of slag. A 0.50m thick layer of concrete was recorded from ground level in MSTP342 which was located in the car park of Heritage House.

3.2.2 Devension Till – Diamicton

Till was encountered within the northern parcel at thicknesses of between 1.80m (DDTP001) and 15.20m (DDBH001d). The composition of Till was described as variable including clays, silts, sands and gravels, with occasional organic-rich material.

Cohesive clay deposits were recorded within the west of the north parcel, along with very dense gravels within MSMW127D. Clays within the western area range in colour and are described as slightly silty, slightly sandy clay with occasional gravels. Gravels in MSMW127D were recorded as very dense, brown, slightly silty gravel and directly overlies bedrock, which was encountered at 7.00m.

Till deposits in the central and eastern areas of the northern parcel were noted to comprise clay, silt, sand and gravel. Generally, cohesive soils (clays and silts) were noted at shallower depths, with coarser sands and gravels noted at depth, underlying cohesive soils.

Soft, dark brown-black silty clay was encountered between 2.00m and 2.70m in MSTP277A located in The Courtyard in the east of the northern parcel. Soft black organic-rich clayey silt with plant matter frequent wood pieces was encountered from 1.25m to approximately 2.00m in P1TP006 located in the Llancoed Court area.

Till was recorded in the southern parcel at thicknesses ranging from 0.30m to 0.5m where the base was proven, and described as slightly gravelly, sandy silt and clay with gravels consisting of sub-rounded sandstone.

3.2.3 Pennant Sandstone Formation

Bedrock of the Pennant Sandstone Formation was proven in four exploratory hole locations (MSMW127D, DDBH001d, DDTP001 and DDBH003d) in the northern parcel. The top of the Pennant Sandstone Formation was encountered at depths of between 3.00m and 15.50m. The base of the formation was not proven. Bedrock was generally described as hard/dense, grey and blue-grey, slightly fractured sandstone, with infrequent coal seams. Coal was identified within borehole DDBH100d between 18.40m and 18.80m and as infrequent coal bands in borehole DDBH003d from a depth of 9.0m.

Pennant Sandstone Formation was encountered in three exploratory holes in the southern parcel. Similar to the northern parcel, the base of bedrock was not determined, however rockhead was encountered between 0.25m and 1.20m with bedrock described as hard, bluish grey and grey, heavily fractured sandstone, with clay infill of fractures noted in MSTP297.



3.2.4 Water Strikes

Table 3-1 below summarises water strikes recorded during the URS ground investigations.

Table 3-1: Water Strikes Recorded in Historical Exploratory Holes (1998-2003)

Borehole Location	Depth	Stratum	Observations
Northern Parcel			
MSMW127D	2.00m	Glacial Till	Soils recorded as 'wet'.
	8.00m	Pennant Sandstone Formation	Groundwater strike noted.
MSMW130	3.50m	Glacial Till	Soils recorded as 'wet'.
P1BH004	1.50m	Made Ground	Soils recorded as 'wet'.
	2.00m	Glacial Till	Water ingress noted.
P1BH005	0.90m	Made Ground	Soils recorded as 'wet'.
DDBH001D	3.00m	Glacial Till	Perched water strike noted
DDTP001	2.80m	Glacial Till	Water seepage noted.
DDTP002	1.40m	Glacial Till	Water seepage noted.
DDTP003	1.00m	Made Ground	Water seepage noted.
MSTP187	1.40m	Glacial Till	Groundwater strike noted.
MSTP200	0.80m	Glacial Till	Water seepage noted.
MSTP275	1.00m	Made Ground	Soils recorded as 'damp'.
MSTP277A	2.00m	Possible Alluvium	Soils recorded as 'damp'.
Southern Parcel			
P1TP013	0.10m	Made Ground	Soils recorded as 'damp'.
P1BH009	3.00m	Pennant Sandstone Formation	Soils recorded as 'wet'.
P1BH010	3.00m – 4.00m	Pennant Sandstone Formation	Soils recorded as 'damp'.

3.3 Soil and Groundwater Contamination

3.3.1 Visual and Olfactory Evidence of Contamination

The available exploratory hole logs have been reviewed to establish recorded visual and/or olfactory evidence of contamination. Evidence (or the absence) of contamination and aesthetic criteria was not recorded on all of the exploratory hole logs.

Where recorded, aesthetic criteria were generally 4 or below with the exception of two exploratory holes located in Darcy Business Park. Visual and olfactory observations of contamination ranged from slight black staining and a slight hydrocarbon odour to free product and strong odours. A maximum PID reading of 2215ppm was recorded in borehole P1BH005 drilled in Darcy Business Park.

The recorded observations of contamination are summarised in 3-2.

**Table 3-1: Observed Contamination in Historical Exploratory Holes (1998-2003)**

Exploratory Hole (date of investigation)	Depth (bgl)	Aesthetic Criteria	Contamination Description	PID Reading (ppm)
Llancoed Court (constructed between 2006 and 2009)				
DDBH001d (04/03/03)	0.3-0.7m	2,2	Slight black staining. Hydrocarbon (light fraction) odour from 0.4m	-
	1m	2,1	Slight black staining. Hydrocarbon (light fraction) odour from 0.4m	-
	0.7-2.0m	1,1	Odour decreasing	-
	3.7-4.5m	2,0	Slight hydrocarbon odour	-
DDTP001 (12/03/03)	0-1.2m	1,0	Odour from 0.5m, black staining 0.8-1.3m, no odour from 1.8m	-
	1.2-3.0m	1,0 to 2,0	Black staining 0.8-1.3m, no odour from 1.8m	-
DDTP002 (12/03/03)	0-1.2m	0,0 to 1,2	Black staining from 0.9m	1310
	1.2-3.2m	2,2 to 3,3	Black staining decreasing from 2.1m	707
MSMW129 (02/03/99)	2.0-3.5m	-	Slight odour	-
P1TP006-well (12/02/03)	1.5m	3,4	Strong heavy hydrocarbon odour and black staining	-
	2.5-3.5m	3,2	Black staining and heavy hydrocarbon odour	-
	3.7-4.0m	2,1	Faint, heavy hydrocarbon odour	5.8
	4.2-4.5m	1,1	Hydrocarbon odour becoming fainter with depth	1.6
P1TP006+well (07/02/03)	1.5m	3,4	Stained black with strong heavy hydrocarbon odour	145
	1.6-2.3m	3,3	Heavy black staining, strong heavy hydrocarbon odour	436
	2.3-3.0m	3,2	Strong unpleasant odour, occasional black staining	207
Llancoed House (constructed between 2006 and 2009)				
DDBH003s (06/03/03)	0-5.0m	1,1 to 2,2	Slight odour from 0.7m. Some black Staining. Moist wet by 1.0m	-
MSTP275 (24/02/99)	1.7- 2.1m	-	Oily appearance - product visible	-
Darcy Business Park (constructed pre-1999)				
DDTP003 (12/03/03)	1.0-2.5	5,0 to 5,3	Heavy odour from 1.0m, black staining and sheen from 1.5m. Black staining decreasing from 2.1m	307
	2.5-2.6m	5,2	-	462
MSMW130 (13/04/99)	0.5m	-	Stained black in places	-
	1.0m	-	Stained black in places	-



Exploratory Hole (date of investigation)	Depth (bgl)	Aesthetic Criteria	Contamination Description	PID Reading (ppm)
	2.0-2.5m	-	Strong hydrocarbon odour, sheen visible	-
MSTP200 (10/06/98)	0.05-0.4m	-	Strong odour	-
	0.4-0.6m	-	Strong odour - damp	7.2
	0.6-1.6m	-	Odour becomes fainter with depth	96.6
P1BH004 (06/02/03)	1.0-1.3m	1,2	Faint heavy hydrocarbon odour and black staining	172
	1.5m	4,4	Black staining and strong hydrocarbon odour	220
	2m	4,3	Water ingress at 2.0m, hydrocarbon sheen and strong odour	-
	2.5-4.0m	2,2	-	1269
P1BH005 (06/02/03)	0.9	2,5	Wet, sheen and product droplets	1064
	0.9-1.2m	3,1	Minor staining and moderate hydrocarbon odour	1528
	1.2-1.8m	4,2	Some black staining from 1.3m and strong, light hydrocarbon odour	2215
	2m	4,2	Strong hydrocarbon odour and slight discolouration	650
	3.8m	3,1	Slight to moderate light hydrocarbon odour at base	450
The Courtyard (constructed pre-1999)				
MSMW127 (14/04/99)	0-1.4m	-	Slight hydrocarbon odour	-
	2.0-2.7m	-	Moderate hydrocarbon odour	1.8
MSMW127s (31/03/99)	0-1.4m	-	Slight hydrocarbon odour	>2000
	1.4-2.0m	-	Slight hydrocarbon odour	>2000
P1BH007 (12/02/03)	3.3m	2,0	Organic odour, wet	89
William Knox House (constructed pre-1999)				
MSTP342 (02/03/99)	1.8m	-	Slight hydrocarbon odour	-
Heritage House (constructed pre-1999)				
P1AF005-pit (11/02/03)	0.35-0.5m	0,1	Slight discolouration and staining	-

3.3.2 Free Phase Hydrocarbons

Table 3-3 below summarises historical monitoring records of free phase hydrocarbon thickness. A maximum free product thickness of 2mm was recorded in September 2003 in P1BH004, located in the Darcy Business Park area of Monitor Phase 72.

**Table 3-2: Summary of Recorded Historical Free Phase Hydrocarbons**

Exploratory Hole	Area	Date	Depth to Product	Product Thickness
DDBH002	Llancoed Court	24/03/2003	2.247m	0.001m
MSMW127d	The Courtyard	01/05/1999	2.271m	0.001m
MSTP275	Llancoed House	01/05/1999	1.692m	0.0001m
		01/09/2001	1.564m	0.001m
P1BH004	Darcy Business Park	01/02/2003	2.044m	0.001m
		15/09/2003	3.097m	0.002m
P1BH005	Darcy Business Park	01/02/2003	1.662m	0.001m
P1BH006	The Courtyard	01/02/2003	2.506m	0.001m
P1BH007	The Courtyard	01/02/2003	2.257m	0.001m
P1BH010	William Knox House	01/02/2003	2.623m	0.001m
P1TP006-well	Llancoed Court	24/03/2003	1.866m	0.001m

3.3.3 Soil Contamination

The available historical data for laboratory analysis of soil samples taken between 1998 and 2003 have been screened against the RBSL/RTC for a commercial end use based on a 1% SOM for shallow (<1m) soils to provide a conservative indication of potentially unacceptable risks to human health. The RBSL/RTC are presented in Appendix B.

Exceedances of the screening criteria for arsenic, cadmium and lead were recorded locally around the area of Llancoed Court, the area to the south of The Courtyard, and to the south of Heritage House. No exceedances of the screening criteria for PAH, TPH, BTEX or VOC were recorded.

No historical results of laboratory analysis for asbestos in soil are available.

3.3.4 Groundwater Contamination

Available historical data for PAH, TPH and VOC laboratory analysis of groundwater samples dating from 1999 to 2003 have been screened against the RBSL/RTC for a commercial end use for groundwater (>1m) and against Environmental Quality Standards (EQS) for freshwater to provide a conservative indication of potentially unacceptable risks to human health and controlled waters, respectively.

No exceedances of the RBSL/RTC screening criteria for PAH, TPH and VOC were recorded.

A limited number of exceedances of the EQS for naphthalene, anthracene, fluoranthene and benzo(b)fluoranthene and 1,2-dichloroethane. The PAH exceedances were detected locally around Llancoed House, Llancoed Court, Darcy Business Park and The Courtyard, whilst VOC exceedances were noted in one borehole in Darcy Business Park.



4 Historical Remediation

4.1 Remediation Specification

Ground investigation carried out by URS identified hydrocarbon contamination in soil and groundwater which was considered to require remediation based on a proposed commercial end use. URS prepared a remediation specification (ref: 44382625/FR1335) in February 2006 on behalf of BP for an area of the former oil refinery which also included the current locations of Llancoed Court and Llancoed House. The URS remediation specification is presented as an appendix within the Churngold Remediation Verification Report. The remediation was to be carried out prior to construction of Llancoed Court and Llancoed House and the overarching principals of the remediation specification were that:

- the site should not pose a risk to human health in the proposed commercial development;
- gross contamination will be removed to a specified quality and depth;
- an upper layer in which shallow services may be placed will be required to be of a quality such that future site occupants are unlikely to encounter contamination within that layer at concentrations that would require special precautions to protect human health or materials placed within the layer;
- a drainage system will be installed to control groundwater and the migration of contamination between remediated and untreated areas;
- a robust vapour membrane and associated passive ventilation is required to mitigate the risk of the build-up of vapours beneath or entry of vapours into buildings.

The remediation specification did not seek to mitigate risks to off-site receptors on the basis that a trench had previously been installed along the northern boundary of Darcy Business Park as part of separate Remedial Action Plan works, a requirement of the Section 106 Agreement.

The remediation specification stipulated both aesthetic and risk-based remedial criteria for soils. Risk based screening levels were set for metals, benzene, benzo(a)pyrene and total petroleum hydrocarbons. Shallow soils were required to meet an aesthetic criteria of 0 in the upper 0.5m (which it was considered would be achieved by placement of imported fill) and an aesthetic criteria of 2 from 0.5m to 1.0m below finished levels. In deep soils greater than 1.0m below finished levels, there was a requirement to remove gross soil hydrocarbon contamination from 1.0 to 2.0m below finished levels, and to recover significant free phase hydrocarbons from any depth.

For soils containing asbestos, it was considered that where recorded concentrations were below 0.1% soils could be retained providing they were beneath buildings, they were otherwise chemically and geotechnically suitable, they were located greater than 1.0m below finished levels and their location was accurately recorded in the Health and Safety file prepared for the works.



Validation sampling was required of the faces of remedial excavations and of fill materials in accordance with frequencies specified by URS. Additionally, delineation sampling of soils left in situ could be used for validation purposes.

4.2 Remediation Verification Report

Churngold Remediation Ltd prepared a remediation verification report in December 2007 which states that the following activities were carried out to achieve the requirements of the URS remediation specification for the area which included the proposed locations of Llancoed Court and Llancoed House (refer to drawing 04020-A-SK912-P0):

- completion of 33No. trial pits on an approximately 20m x 20m grid to delineate contamination identified by URS;
- installation of a perimeter drain to control groundwater migration (location shown on drawing 04020-A-SK912-P0);
- selective excavation of unsuitable soils identified by URS and by Churngold;
- excavation of all encountered obstructions to a specified depth below the earthworks platform level within building footprints;
- removal of fibrous (licensed) and cement-bound (non-licensed) asbestos by a specialist contractor to licensed landfill;
- over-pumping of surface water from the excavated hotspots to an interceptor drain;
- validation sampling of sides and base of remediation excavations at a frequency of 1 sample per 10m with a minimum of one sample per excavation face;
- bioremediation of site-won soils using biopiles with a vapour extraction system and granular activated carbon filters;
- backfill of excavations using validated site-won material and validated granular material; and
- reprofiling of the site to required formation level.

The Churngold remediation verification report does not provide clear information on the final depths of remediation excavations, or the depths to which relict foundations were removed within building footprints. However, with reference to the URS remediation specification there was a requirement for soils within the upper 2m from final finished levels to meet the respective aesthetic and risk-based criteria. Comparison between site levels shown on Figure 4 in Appendix C of the Churngold report and current site levels shown on borehole logs indicate levels across the site to be similar.



5 Preliminary Conceptual Site Model

Based on the information summarised in the preceding sections of this report, this section presents a preliminary Conceptual Site Model which has been developed using this commonly adopted source-pathway-receptor model, as recommended in Land Contamination: Risk Management published by the Environmental Agency in 2020. Where contamination sources, receptors, and pathways are present, these are referred to as potential contaminant linkages.

A preliminary assessment of the risk posed to identified receptors from potential on-site and off-site contamination sources has been made for each potential contaminant linkage, based on the information available at the time of writing this report.

The estimation of the potential significance of each linkage is based on the nature of the proposed development, the presence and mobility of potential contaminants and the plausibility of the identified migration/exposure pathways.

The preliminary risk assessment was undertaken in accordance with the CIRIA C552 risk matrix which is presented in Table 5-1. Risk Classification used to inform the preliminary risk assessment is presented in Appendix C.

Table 5-1: Estimation of the Level of Risk Based on Probability and Consequence

		Consequence			
		Severe	Medium	Mild	Minor
Probability	High likelihood	Very high risk	High risk	Moderate risk	Moderate/low risk
	High likelihood	Very high risk	High risk	Moderate risk	Moderate/low risk
	Likely	High risk	Moderate risk	Moderate/low risk	Low risk
	Low likelihood	Moderate risk	Moderate/low risk	Low risk	Very low risk
	Unlikely	Moderate/low risk	Low risk	Very low risk	Very low risk

Two conceptual models have been prepared, one for the northern parcel presented in Table 5-2 and one for the southern parcel presented in Table 5-3 in acknowledgement of the differing historical uses of these two areas of Monitor Phase 72.

**Table 5-2: Preliminary Conceptual Site Model and Preliminary Risk Assessment – Northern Parcel**

Pollutant Linkage	Potential Source	Key Contaminants	Pathway	Receptor	Probability	Consequence	Risk Without Mitigation	Rationale
1	<u>On-Site</u> Made Ground of unknown provenance associated with historical development of the Site. Potentially contaminated soil and groundwater associated with oil refinery infrastructure, historical railway sidings bottle dispatch plant, lube oil barrelling plant and an electricity substation which were formerly located on the site. Soil vapours associated with historical potentially contaminative uses of the site.	Metals and other inorganics, asbestos, oils, fuels and grease (Total Petroleum Hydrocarbons), polycyclic aromatic hydrocarbons, chlorinated solvents	Dermal contact with and/or ingestion of contaminants in soil and soil-derived dust Inhalation of contaminants in soil-derived dust Inhalation of vapours	Human – workers in and visitors to office buildings	Low Likelihood	Medium	Moderate/Low	Visual and olfactory evidence of hydrocarbon contamination was recorded in historical exploratory holes ranging from slight staining and slight odours to local free product and strong odours. Exceedances of the generic assessment criteria for a commercial end use for arsenic, cadmium and lead were recorded locally around the area of Llancoed Court in historical soil laboratory analytical data. No exceedances were recorded for organic contaminants. In line with the commercial use of the site, surface cover comprises mostly hardstanding for buildings and external areas with small areas of soft landscaping which are well vegetated with grass and hedges. It is considered unlikely that site users will come into contact with contaminants in soil via the dermal contact, ingestion or inhalation pathways under normal use of the site. Furthermore the northern parcel has been remediated, which likely removed majority of contamination within soils <2m. Localised hydrocarbon contamination was noted in historical exploratory locations, however no exceedances of TPH, VOCs or BTEX were recorded. Any potential vapour generation is likely to be limited and localised to gross hydrocarbon contamination or boreholes where VOCs were identified within groundwater. Given the localised presence of hydrocarbon contamination.
2			Dermal contact with and/or ingestion of contaminants in windblown soil-derived dust Inhalation of contaminants in windblown soil-derived dust Inhalation of migrating vapours	Human – occupants and visitors to off-site residential and commercial properties	Unlikely	Medium	Low	Visual and olfactory evidence of hydrocarbon contamination was recorded in historical exploratory holes ranging from slight staining and slight odours to free product and strong odours. Exceedances of the generic assessment criteria for a commercial end use for arsenic, cadmium and lead were recorded locally around the area of Llancoed Court in historical soil laboratory analytical data. No exceedances were recorded for organic contaminants. In line with the commercial use of the site, surface cover comprises mostly hardstanding for buildings and external areas with small areas of soft landscaping which are well vegetated with grass and hedges. Based on the historical site use, findings of historical ground investigation, and the surface conditions at the site it is considered unlikely that windblown, soil-derived dust will be generated and migrate to off-site human receptors.



Pollutant Linkage	Potential Source	Key Contaminants	Pathway	Receptor	Probability	Consequence	Risk Without Mitigation	Rationale
								It is also considered unlikely that vapours which may be associated with residual on-site contamination will migrate to off-site human receptors, the closest of which are located at residential properties 50m to the north of the site.
3			Leaching and migration of contaminants from soils in the unsaturated zone into groundwater Migration of contaminants via preferential pathways such as piles to groundwater	Controlled Waters – groundwater in Secondary A bedrock Aquifer	Low likelihood	Medium	Moderate/Low	Underlying bedrock is classified as a Secondary A Aquifer. The site is not located in a groundwater source protection zone. Historical ground investigation has suggested the presence of residual hydrocarbon and metals contamination locally at the site. Areas of soft landscaping at the site are minimal meaning there is limited potential for the generation of significant mobile or leachable contamination from unsaturated soils to groundwater.
4			Lateral migration of contaminants in groundwater through soils and bedrock with discharge to surface water receptors as base flow Migration of contaminants along preferential pathways such as installed services followed by discharge to surface water receptors	Controlled Waters – surface water in the Tennant Canal, River Neath and surface water drains	Unlikely	Medium	Low	Historical ground investigation has suggested the presence of residual hydrocarbon and metals contamination locally at the site. A limited number of exceedances of the EQS for PAH and VOC were recorded in historical groundwater laboratory analytical data. Historical groundwater data were not analysed for inorganic contaminants. The closest identified main surface water receptor is over 650m to the east of the site and the probability of a pollutant linkage being realised via the identified potential migration pathways is therefore considered to be unlikely.
5			Direct contact with contaminants in soils, perched water and/or groundwater	On-site buildings, foundations and services	Likely	Mild	Moderate/Low	The site is not directly underlain by key sulphate-bearing strata it is considered unlikely that there are risks from aggressive ground to concrete. Historical ground investigation has suggested the presence of residual contamination locally at the site. There is the potential for unacceptable risks to potable water supply pipework.



Pollutant Linkage	Potential Source	Key Contaminants	Pathway	Receptor	Probability	Consequence	Risk Without Mitigation	Rationale
6			Direct contact with contaminants in migrating perched water and/or groundwater	Current and future off-site buildings, foundations and services	Low likelihood	Mild	Low	Mobile contamination, if present, may have migrated off-site but it is considered unlikely that there is an ongoing impact to off-site receptors. The majority of the site is covered with buildings and hardstanding so there is considered to be limited potential for mobilisation of residual contamination in the unsaturated zone and migration off-site in groundwater.
7		Asbestos	Ingestion and inhalation of airborne fibres	Human – workers in and visitors to office buildings	Unlikely	Medium	Low	There is no available historical laboratory analytical data for asbestos. The site comprises either building cover, hardstanding in external areas or soft landscaping which is well vegetated with grass and mature trees. On this basis, it is considered unlikely that asbestos fibres, if present in Made Ground at the site, will be released under normal site usage.
8	<u>On-site and off-site</u> Ground gas	Methane Carbon dioxide	Lateral/vertical migration through soils followed by accumulation in enclosed spaces and inhalation	Human – workers in and visitors to office buildings	Unlikely	Medium	Low	Ground gas may be present at the site as a result of the natural degradation of residual petroleum hydrocarbon contamination. Ground gas may accumulate in enclosed spaces leading to potentially asphyxiating conditions.
9	<u>On-site and off-site</u> Ground gas	Methane Carbon dioxide	Lateral/vertical migration through soils followed by accumulation in enclosed spaces and potentially explosive conditions	On-site buildings	Unlikely	Severe	Low*	Ground gas may be present at the site as a result of the natural degradation of residual petroleum hydrocarbon contamination. Ground gas may accumulate in enclosed spaces leading to potentially explosive conditions. * The lowest achievable risk level for a 'severe' 'unlikely' scenario is 'moderate/low', however this has been adjusted to 'low' based on professional judgement of the level of risk.
10	<u>Off-site</u> Contaminants in windblown, soil-derived dust and entrained in surface water run-off from any areas where soils (and contaminants) are exposed at the surface associated with off-site historical contaminative land uses	Total petroleum hydrocarbons, polycyclic aromatic hydrocarbons, chlorinated solvents, polychlorinated biphenyls and asbestos	Dermal contact with and/or ingestion of contaminants in windblown soil-derived dust Inhalation of contaminants in windblown soil-derived dust Inhalation of migrating soil-derived and	Human – workers in and visitors to office buildings	Low likelihood	Medium	Moderate/Low	Historical potentially contaminative land uses have been identified in the surrounding area. Migration pathways to on-site human receptors are generally considered unlikely to be realised as the areas to the south and south west have been remediated for commercial and residential purposes respectively. Residual hydrocarbon and chlorinated solvent contamination is known to be present in the area to the west of the site and there is considered to be potential for migration of vapours onto the site. It should also be noted that assessment and elements of remediation have been undertaken on all surrounding areas which have received Monitor approval.



Pollutant Linkage	Potential Source	Key Contaminants	Pathway	Receptor	Probability	Consequence	Risk Without Mitigation	Rationale
11	Potentially contaminated perched water and/or groundwater associated with off-site historical contaminative land uses Potential vapours associated with contaminated soil, perched water or groundwater associated with off-site historical potentially contaminative land uses		groundwater-derived vapours					
			Lateral migration through permeable soils	Controlled Waters – groundwater in Secondary A bedrock Aquifer	Low likelihood	Medium	Moderate/Low	Historical potentially contaminative land uses have been identified in the surrounding area. Migration of contamination to on-site groundwater is generally considered unlikely as the areas to the south and south west have been remediated for commercial and residential purposes respectively. Residual hydrocarbon and chlorinated solvent contamination is known to be present in the area to the west of the site and there is considered to be potential for migration contaminated groundwater onto the site.
12			Direct contact with contaminants in migrating perched water and/or groundwater	On-site buildings, foundations and services	Low likelihood	Mild	Low	Historical potentially contaminative land uses have been identified in the surrounding area. Migration of contamination in groundwater to on-site buildings, foundations and services is generally considered unlikely as the areas to the south and south west have been remediated for commercial and residential purposes respectively. Residual hydrocarbon and chlorinated solvent contamination is known to be present in the area to the west of the site and there is considered to be potential for migration contaminated groundwater onto the site. There is the potential for unacceptable risks to the potable water supply pipework on the site. The surrounding area is not directly underlain by key sulphate-bearing strata it is considered unlikely that there are risks from aggressive ground to concrete.

**Table 5-3: Preliminary Conceptual Site Model and Preliminary Risk Assessment – Southern Parcel**

Pollutant Linkage	Potential Source	Key Contaminants	Pathway	Receptor	Probability	Consequence	Risk Without Mitigation	Rationale
1	<u>On-Site</u> Made Ground of unknown provenance associated with historical development of the site Potentially contaminated soil and groundwater associated with historical railway sidings which formerly passed through the north of the site	Metals and other inorganics, asbestos, oils, fuels and grease (Total Petroleum Hydrocarbons), polycyclic aromatic hydrocarbons	Dermal contact with and/or ingestion of contaminants in soil and soil-derived dust Inhalation of contaminants in soil-derived dust Inhalation of vapours	Human – workers in and visitors to office buildings	Unlikely	Medium	Low	Slight staining and slight hydrocarbon odours have been recorded locally in historical exploratory holes. No exceedances of generic assessment criteria for a commercial end use were recorded in historical soil laboratory analytical data. In line with the commercial use of the site, surface cover comprises a combination of hardstanding for buildings and external areas, and soft landscaping. The soft landscaping is well vegetated with grass and established, mature trees. Based on the historical site use and findings of historical ground investigation and remedial work, it is considered unlikely that site users will come into contact with contaminants in soil via the dermal contact, ingestion or inhalation pathways under normal use of the site. It is also considered unlikely that there is a source of organic contamination sufficient to generate vapours within the commercial properties, as no exceedances of TPHs, VOCs and BTEX were recorded.
2	Soil vapours associated with historical potentially contaminative uses of the site.		Dermal contact with and/or ingestion of contaminants in windblown soil-derived dust Inhalation of contaminants in windblown soil-derived dust Inhalation of migrating vapours	Human – occupants and visitors to off-site residential and commercial properties	Unlikely	Medium	Low	Slight staining and slight hydrocarbon odours have been recorded locally in historical exploratory holes. No exceedances of generic assessment criteria for a commercial end use were recorded in historical soil laboratory analytical data. In line with the commercial use of the site, surface cover comprises a combination of hardstanding for buildings and external areas, and soft landscaping. The soft landscaping is well vegetated with grass and established, mature trees. Based on the historical site use, findings of historical ground investigation and remedial work, and the surface conditions at the site it is considered unlikely that windblown, soil-derived dust will be generated and migrate to off-site human receptors. It is also considered unlikely that there is a source of organic contamination



Pollutant Linkage	Potential Source	Key Contaminants	Pathway	Receptor	Probability	Consequence	Risk Without Mitigation	Rationale
3			Leaching and migration of contaminants from soils in the unsaturated zone into groundwater Migration of contaminants via preferential pathways such as piles to groundwater	Controlled Waters – groundwater in Secondary A bedrock Aquifer	Unlikely	Medium	Low	sufficient to generate vapours which may migrate to off-site human receptors. Underlying bedrock is classified as a Secondary A Aquifer. The site is not located in a groundwater source protection zone. Historical ground investigation has suggested the presence of low levels of contamination locally at the site. Areas of soft landscaping at the site mean there is potential for the migration of mobile or leachable contamination from unsaturated soils to groundwater; however based on the site use and with low levels of contamination it is considered unlikely that there are ongoing unacceptable risks to groundwater.
4			Lateral migration of contaminants in groundwater through soils and bedrock with discharge to surface water receptors as base flow Migration of contaminants along preferential pathways such as installed services followed by discharge to surface water receptors	Controlled Waters – surface water in the Tennant Canal, River Neath and surface water drains	Unlikely	Medium	Low	Historical ground investigation has suggested the presence of low levels of contamination locally at the site. No exceedances of EQS for PAH and VOC were recorded in historical groundwater laboratory analytical data. Historical groundwater data were not analysed for inorganic contaminants. The closest identified main surface water receptor is over 600m to the east of the site and the probability of a pollutant linkage being realised via the identified potential migration pathways is therefore considered to be unlikely.
5			Direct contact with contaminants in soils, perched water and/or groundwater	On-site buildings, foundations and services	Unlikely	Mild	Very low	The site is not directly underlain by key sulphate-bearing strata it is considered unlikely that there are risks from aggressive ground to concrete. Historical ground investigation has suggested the presence of low levels of contamination locally at the site. The presence of unacceptable risks to potable water supply pipework is considered unlikely.



Pollutant Linkage	Potential Source	Key Contaminants	Pathway	Receptor	Probability	Consequence	Risk Without Mitigation	Rationale
6			Direct contact with contaminants in migrating perched water and/or groundwater	Current and future off-site buildings, foundations and services	Unlikely	Mild	Very low	Mobile contamination, if present, may have migrated off-site but it is considered unlikely that there is an ongoing impact to off-site receptors based on the low levels of contamination identified on the site in historical ground investigation.
7		Asbestos	Ingestion and inhalation of airborne fibres	Human – workers in and visitors to office buildings	Unlikely	Medium	Low	There is no available historical laboratory analytical data for asbestos. The site comprises either building cover, hardstanding in external areas or soft landscaping which is well vegetated with grass and mature trees. On this basis, it is considered unlikely that asbestos fibres, if present in Made Ground at the site, will be released under normal site usage.
8	<u>On-site and off-site</u> Ground gas	Methane Carbon dioxide	Lateral/vertical migration through soils followed by accumulation in enclosed spaces and inhalation	Human – workers in and visitors to office buildings	Unlikely	Medium	Low	Ground gas may be present at the site as a result of the natural degradation of petroleum hydrocarbons. Based on the low levels of contamination identified on the site in historical ground investigation, the most plausible source of ground gas is considered to be from the degradation of off-site petroleum hydrocarbons. Ground gas may migrate onto the site and accumulate in enclosed spaces leading to potentially asphyxiating conditions; however there are no significant remaining sources of petroleum hydrocarbons in the vicinity of the site.
9	<u>On-site and off-site</u> Ground gas	Methane Carbon dioxide	Lateral/vertical migration through soils followed by accumulation in enclosed spaces and potentially explosive conditions	On-site buildings	Unlikely	Severe	Low*	Ground gas may be present at the site as a result of the natural degradation of petroleum hydrocarbons. Based on the low levels of contamination identified on the site in historical ground investigation, the most plausible source of ground gas is considered to be from the degradation of off-site petroleum hydrocarbons. Ground gas may migrate onto the site and accumulate in enclosed spaces leading to potentially explosive conditions; however there are no significant remaining sources of petroleum hydrocarbons in the vicinity of the site. * The lowest achievable risk level for a 'severe' 'unlikely' scenario is 'moderate/low', however this has been adjusted to 'low' based on professional judgement of the level of risk.
10	<u>Off-Site</u> Contaminants in windblown, soil-derived dust and entrained in surface water run-off	Total petroleum hydrocarbons, polycyclic aromatic hydrocarbons, chlorinated solvents,	Dermal contact with and/or ingestion of contaminants in windblown soil-derived dust	Human – workers in and visitors to office buildings	Unlikely	Medium	Low	Historical potentially contaminative land uses have been identified in the surrounding area. Migration of contamination to on-site human receptors is considered unlikely as the area to the west and south of the site has largely been remediated and redeveloped for residential purposes. The undeveloped area to the north has been remediated to a commercial standard and is at a lower elevation



Preliminary Conceptual Site Model

Pollutant Linkage	Potential Source	Key Contaminants	Pathway	Receptor	Probability	Consequence	Risk Without Mitigation	Rationale
	from any areas where soils (and contaminants) are exposed at the surface associated with off-site historical contaminative land uses Potentially contaminated perched water and/or groundwater associated with off-site historical contaminative land uses	polychlorinated biphenyls and asbestos	Inhalation of contaminants in windblown soil-derived dust Inhalation of migrating soil-derived and groundwater-derived vapours					than the site meaning that groundwater migration onto the site from the north is not plausible.
11	Potential vapours associated with contaminated soil, perched water or groundwater associated with off-site historical potentially contaminative land uses		Lateral migration through permeable soils	Controlled Waters – groundwater in Secondary A bedrock Aquifer	Unlikely	Medium	Low	Historical potentially contaminative land uses have been identified in the surrounding area. Migration of contamination to on-site groundwater is considered unlikely as the area to the west and south of the site has largely been remediated and redeveloped for residential purposes and the undeveloped areas to the north and east are at a lower elevation than the site.
12			Direct contact with contaminants in migrating perched water and/or groundwater	On-site buildings, foundations and services	Unlikely	Mild	Very low	Historical potentially contaminative land uses have been identified in the surrounding area. Migration of contamination in groundwater to on-site buildings, foundations and services is considered unlikely as the area to the west and south of the site has largely been remediated and redeveloped for residential purposes. The undeveloped area to the north is at a lower elevation than the site meaning that groundwater migration from north to south is not plausible. The presence of unacceptable risks to potable water supply pipework is considered unlikely. The surrounding area is not directly underlain by key sulphate-bearing strata it is considered unlikely that there are risks from aggressive ground to concrete.



6 Requirements under the Section 106 Agreement

6.1 Section 106 Deed of Planning Obligations Requirements

The Section 106 Agreement defines remediation requirements for a commercial scenario based on a 'commercial end use where groundwater is in soil'.

Based on this classification, the following remediation requirements are stated in the Section 106 Agreement (Schedule 8, Section 6.0):

- *All oil saturated soils and soil containing free product other than minor sheens shall be removed to a minimum depth of 2.00m below FFL (Final Finished Level) or 0.50m below the likely lowest seasonal groundwater elevation, whichever is deeper. This depth is to be established by consideration of all available groundwater level monitoring data.*
- *All soils must meet the RBSL for TPH to at least 1.00m below FFL.*
- *All soils must meet in bulk, considering both dispersed fibres and pieces of ACM (Asbestos Containing Materials), the RBSL for ACM to at least 1m below FFL. Any visible ACM encountered during construction in the first 1m below FFL is to be removed.*
- *Where there is a risk of the migration in the ground of hazardous gas or contaminated liquid into remediated areas, the Developer shall take all appropriate measures to prevent this occurring. Such measures could include the installation of interception trenches and management of discharge from those. The Developer shall monitor whatever measures are put in place after their installation to continue to demonstrate their effectiveness.*
- *Where necessary, seeps, sheens and iron rich discharges from the bedrock must be controlled such that there is no visible discharge at surface and little or no odour. Acceptable methodologies for remediation may include but are not limited to the use of land drainage via interceptors.*

Schedule 10, Paragraph 6 of the S106 states that 'Irrespective of the Intended Use of each Phase or part thereof, all existing buried services at the Property shall be removed and the routes of those services shall be backfilled with material no more permeable than the general material in the vicinity'.

Monitor Phase 72 is already developed for a commercial end use. For the purpose of the following assessment current ground levels have been considered as 'Final Finished Levels' in the context of the requirements outlined above.



7 Scope of Ground Investigation

There is a contrast in the historical land use of the northern parcel and the southern parcel of Monitor Phase 72, and the level of risk considered to be associated with the identified potential contaminant linkages. The southern parcel was occupied by unoccupied land and offices, whereas the northern parcel was predominantly occupied by railway, sidings, a bottling plant and a dispatch plant.

The preliminary conceptual model and preliminary risk assessment for the northern parcel, which has been previously remediated, presented in Table 5-2, suggests the following:

- **Moderate/low risks** to on-site human receptors, groundwater, on-site buildings; and
- **Low risks** to off-site human receptors, surface waters, off-site buildings

The preliminary conceptual model and preliminary risk assessment for the southern parcel, presented in Table 5-3, suggests the following:

- **Low risks** to on-site human receptors, off-site human receptors, groundwater, surface waters, on-site buildings; and
- **Very low risks** to off-site buildings.

Generally, potential contaminant linkages with a risk rating of moderate/low or greater are considered to require further investigation. Given the age of this historical data, there is also a requirement to provide up to date information on ground conditions in Monitor Phase 72 in order enable a comparison of the recorded ground conditions with the remediation requirements for a commercial end use as defined in the Section 106 Agreement.

The Section 106 Agreement stipulates an investigation frequency of 1 exploratory hole per 400m² (equating to 20m centres) with sampling at 0.5m intervals for a commercial land use scenario. However, it was proposed to reduce the frequency of investigation for both the northern and southern parcels of land to take account of the existing development and the findings of the preliminary risk assessment.

Based on a review of the available information and taking into consideration current access restrictions, the following scope of investigation was proposed within the northern land parcel:

- 30 dynamic windowless sampling boreholes on a non-targeted approximate regular grid on approximate 30m centres, equating to an investigation frequency of approximately 1 per 900m²; and
- environmental soil sampling at approximate 0.5m to 1m intervals.



Based on a review of the available information and taking into consideration current access restrictions, the following scope of investigation was proposed within the southern land parcel:

- 10 dynamic windowless sampling boreholes on a non-targeted regular grid at 50m centres, equating to an investigation frequency of 1 per 2,500m²; and
- environmental soil sampling at approximate 0.5m to 1m intervals.

Environmental soil samples from both parcels will be analysed for the following suite of determinants:

- pH;
- soil organic matter;
- asbestos identification (and quantification if present);
- metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, vanadium, zinc);
- Polycyclic Aromatic Hydrocarbons US EPA 16;
- Total Petroleum Hydrocarbons Criteria Working Group;
- benzene, toluene, ethylbenzene, xylenes;
- methyl tert-butyl ether; and
- polychlorinated biphenyls (in the location of the former electricity substation).



8 Recent Ground Investigation

8.1 Introduction

Ground investigation was undertaken by Quantum Geotechnical Limited under the direction of PJA in May 2021. A total of 54 exploratory holes were undertaken across Monitor Phase 72 using dynamic windowless sampling techniques, with 41 exploratory holes located in the northern parcel and 13 located in the southern parcel.

Exploratory holes were positioned in the external areas around the existing buildings, either in soft landscaping or hardstanding. It was not possible to access the area of the electricity substation located in the north east of the northern parcel.

Hand-dug inspection pits were advanced to 1.2m, with a hydraulic breaker used in locations of hardstanding and dense Made Ground. Dynamic windowless sampling boreholes were intended to progress to a maximum depth of 5.00mbgl in the absence of constraints.

Additional boreholes were added during the investigation, particularly in the western area of the northern parcel, in an attempt to delineate contamination noted in previous exploratory holes undertaken as part of the most recent investigation undertaken in May 2021. Boreholes CDL-WS43 to CDL-WS49 were included to delineate the extent of a thin layer of hydrocarbon-saturated soil encountered in CDL-WS02, however, due to obstructions the target depth could not be achieved. Excavations at these locations terminated at shallow depths (<0.40m) due to concrete obstructions. No exploratory hole logs are available for locations CDL-WS43 to CDL-WS49

In locations where obstructions were encountered in inspection pits, the exploratory hole was relocated where it was possible to do so in an attempt to avoid obstructions, giving rise to duplicate locations which were assigned an 'a' and 'b' suffix.

All boreholes were backfilled with bentonite pellets and arisings. The locations of all recent exploratory locations are shown on Drawings 04020-A-SK910-P0 and 4020-A-SK911-P0 presented in Appendix A.

Copies of exploratory hole logs are presented in Appendix D.

8.2 Recorded Ground Conditions

8.2.1 Made Ground

Made Ground was encountered in all 54 boreholes. Where the base of Made Ground was proven, thicknesses ranged from 0.40m to 2.80m.



Made Ground composition across the site was variable, comprising clay, sand and gravel with frequent cobbles. Gravels within Made Ground were described as fine to coarse, angular to rounded and consisted of brick, concrete, bituminous bound material, plastic, metal, timber, glass, clinker, sandstone, and mudstone. Ash was recorded in seven locations in the north and east of Darcy Business Park and in the east and west of the Courtyard. Frequent cobbles were encountered during the investigation and comprised brick, concrete, bituminous bound material, clinker, igneous rock, mudstone and sandstone.

A layer of sub-base was encountered beneath bituminous bound material and block paving. Subbase thickness ranged between 0.10m and 0.25m and comprised light grey and brown, fine to coarse sand and gravel, with gravels consisting of fine to coarse unidentifiable lithologies.

Whole panes of glass were encountered in a layer between 0.4m and 0.9m in CDL-WS24, located in the south west of The Courtyard.

8.2.2 Possible Alluvium

Possible Alluvium was encountered across the northern parcel within 10 exploratory locations, underlying Made Ground. Where the base of Made Ground was encountered thicknesses ranged between 0.20m and 1.10m. Alluvium deposits generally comprised grey, brown occasionally mottled orange-brown, slightly gravelly, sandy silts and clays with frequent decaying organic material noted. Gravels are reported as consisting of fine to coarse, sub-angular to sub-rounded sandstone and mudstone.

8.2.3 Devensian Till - Diamicton

Till encountered in Monitor Phase 72 was variable in composition, ranging from clays and silts to sands and gravels, with occasional organic-rich material which included decaying plant matter and occasional cobbles of mudstone and sandstone. Gravels within superficial deposits also comprised mudstone and sandstone.

The base of Till was not proven in the northern parcel of Monitor Phase 72. Till was encountered overlying sandstone bedrock in six of the 13 boreholes in the southern parcel, at thicknesses ranging from 0.35m to 1.05m.

8.2.4 Hughes Member (Pennant Sandstone Formation)

Bedrock was encountered in the southern parcel of Monitor Phase 72 at depths ranging from 0.25m in CDL-WS33 located in the west to 2.00m in CDL-WS28 located in the south. Where encountered, bedrock comprised very weak to weak grey and brown sandstone and occasional siltstone.

Bedrock was not encountered in the northern parcel.



8.2.5 Water Strikes

No clear groundwater strikes were recorded during the investigation, although perched water was encountered locally in Made Ground and in some locations natural soils were described as 'wet' or 'damp'. A summary of perched water observations is presented in Table 8-1 below.

Table 8-1: Perched Water and Groundwater Observations

Borehole	Depth	Stratum	Observations
CDL-WS02	1.15m	Made Ground	Soils noted as 'wet' and a 'seepage' was noted within the inspection pit
CDL-WS04	0.90m	Made Ground	'Minor seepage' noted within inspection pit
CDL-WS11	1.90m	Till	Soils noted as 'damp'
	2.00m	Till	Soils noted as 'damp'
	4.00m	Till	Soils noted as 'wet'
CDL-WS12	1.30m	Made Ground	Soils noted as 'damp'
CDL-WS19	2.00m	Till	Soils noted as 'wet'
CDL-WS22	2.30m – 2.40m	Made Ground	Soils noted as 'damp'
CDL-WS23	0.50m	Made Ground	Perched water in inspection pit
CDL-WS24	3.90m	Till	Soils noted as 'wet'
CDL-WS36	1.60m	Till	Soils noted as 'damp'
CDL-WS39	0.40m	Made Ground	Soils noted as 'damp'
	1.50m	Made Ground	Soils noted as 'wet'
CDL-WS42	3.10m	Till	Soils noted as 'wet'
CDL-WS50	1.50m	Till	Soils noted as 'wet'
	2.40m-2.60m	Till	Soils noted as 'wet'

8.2.6 Termination of Exploratory Holes

Several exploratory holes were terminated in Made Ground for reasons including obstructions, underground services and suspected asbestos containing material (ACM).

A summary is provided in Table 8-2 of locations where exploratory holes were terminated shallower than their intended depths and the reason for termination.

Boreholes that were terminated in natural ground either refused on dense gravels in the superficial deposits or on bedrock or collapsed in granular material.

**Table 8-2: Summary of Shallow Terminations in Made Ground**

Borehole	Termination Depth	Reason for Termination	Location
CDL-WS01	1.40m	Obstruction/refusal	Northern parcel
CDL-WS02	2.40m	Obstruction/refusal	Northern parcel
CDL-WS03	0.50m	Obstruction/refusal	Northern parcel
CDL-WS06	1.25m	Obstruction/refusal	Northern parcel
CDL-WS07	3.00m	Obstruction/refusal	Northern parcel
CDL-WS08A	0.45m	Possible concrete slab	Northern parcel
CDL-WS08B	0.50m	Possible concrete slab	Northern parcel
CDL-WS09	1.20m	Obstruction/refusal	Northern parcel
CDL-WS12	1.50m	Obstruction/refusal	Northern parcel
CDL-WS13	0.40m	Obstruction/refusal	Northern parcel
CDL-WS15	1.15m	Obstruction/refusal	Northern parcel
CDL-WS16	1.00m	Obstruction/refusal	Northern parcel
CDL-WS17A	0.80m	Obstruction/refusal	Northern parcel
CDL-WS17B	0.70m	Suspected asbestos cement-bound tile in inspection pit	Northern parcel
CDL-WS18A	0.80m	Obstruction/refusal	Northern parcel
CDL-WS18B	0.95m	Obstruction/refusal	Northern parcel
CDL-WS21A	0.50m	Suspected service in the base of inspection pit	Northern parcel
CDL-WS23	0.65m	Perched water in inspection pit	Northern parcel
CDL-WS31	0.80m	Electricity cable trough present in inspection pit	Southern parcel
CDL-WS38	0.40m	Suspected ACM in inspection pit. Laboratory testing confirmed the material did not contain asbestos.	Northern parcel
CDL-WS40	0.80m	Obstruction/refusal	Northern parcel
CDL-WS43	<0.40m	Concrete obstruction	Northern parcel
CDL-WS44	<0.40m	Concrete obstruction	Northern parcel
CDL-WS45	<0.40m	Concrete obstruction	Northern parcel
CDL-WS46	<0.40m	Concrete obstruction	Northern parcel
CDL-WS47	<0.40m	Concrete obstruction	Northern parcel
CDL-WS48	<0.40m	Concrete obstruction	Northern parcel
CDL-WS49	0.10m	Concrete obstruction	Northern parcel

8.2.7 Laboratory Analysis

A total of 127 environmental soil samples, representing identified soils from across Monitor Phase 72, were collected during the ground investigation. The soil samples were stored in coolboxes packed with ice blocks and dispatched under full chain of custody to ALS, a UKAS-accredited laboratory, within 24 hours of sampling.



Laboratory analysis was carried out on 64 samples taken from the upper 1m of soil below current ground level and on 63 samples taken from depths greater than 1m.

Analysis for metals was scheduled on samples obtained within the top 1m and asbestos identification was scheduled on all samples of Made Ground.

The laboratory analytical suite comprised:

- Metals: arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, vanadium and zinc (within the top 1m);
- Polycyclic Aromatic Hydrocarbons (all samples);
- pH (all samples);
- Soil Organic Matter (all samples);
- Total Petroleum Hydrocarbons (all samples);
- Asbestos identification (samples of Made Ground, with quantification analysis on any sample with a positive identification);
- Phenols (selected samples in response to observed olfactory contamination in CDL-WS06);
- Polychlorinated biphenyls (CDL-WS01 – CDL-WS05 in the vicinity of a former electricity substation);
- Volatile Organic Compounds (VOCs) (CDL-WS02 at 1.50m and 2.00m in response to observed olfactory contamination);

8.3 Soil and Groundwater Contamination

8.3.1 Visual and Olfactory Evidence of Contamination

A review of the 54 exploratory hole logs shows that the majority of soils encountered across the northern parcel of Monitor Phase 72 were assigned aesthetic criteria scores of '0' and '1'.

A visual classification of '5' was recorded at two locations in the northern parcel due to the presence of localised hydrocarbon-saturated soil and free product below 2.0m depth, and in a single location because of observed ACM in shallow Made Ground, as summarised in Table 8-3.

Table 8-3: Visual and Olfactory Evidence of Contamination in Monitor Phase 72

Exploratory Hole	Depth	Evidence of Contamination	Stratum	Location
CDL-WS02	2.30m – 2.40m	VO = 5,3 – Coal tar-saturated soil	Made Ground	Northern parcel
CDL-WS17B	0.50m	Single piece of ACM (cement-bound tile containing chrysotile)	Made Ground	Northern parcel
CDL-WS20	2.60m – 3.00m	VO = 5,2 – Free product and staining noted on soil	Till	Northern parcel



Hydrocarbon sheens were observed in seven exploratory holes spread across the northern parcel (CDL-WS11, 12, 20, 23, 39, 42 and 50). The limited locations where hydrocarbon-saturated soils, free product and hydrocarbon sheens were identified do not appear to correlate with any specific historical land use when compared to historical maps.

All soils encountered in the southern parcel were assigned an aesthetic criteria score of '0,0'.

8.4 Comparison with Risk Based Screening Levels/Remedial Target Criteria for Shallow Soils

Comparison of the reported laboratory data with the RBSL/RTCs for shallow soils (<1.00m) in a commercial land use indicated the contaminant concentrations are largely below the adopted screening criteria. No exceedances were recorded of the RBSL/RTC for total petroleum hydrocarbon fractions.

Ten lead exceedances and a single arsenic exceedance were recorded in the northern parcel, and single benzo(a)pyrene and dibenzo(a,h)anthracene exceedances were recorded in the southern parcel of Monitor Phase 72. The recorded exceedances are summarised in Table 8-4.

Screened laboratory analytical data is presented in Appendix E.

Table 8-4: Summary of RBSL/RTC Exceedances in Shallow Soil <1.0m in Monitor Phase 72

Determinand	RBSL/RTC (mg/kg)	Concentration (mg/kg)	Location	Parcel
Lead	750	1,310	CDL-WS02 1.00m	Northern
		3,420	CDL-WS19 0.55m	Northern
		4,530	CDL-WS19 1.00m	Northern
		19,600	CDL-WS22 0.50m	Northern
		1,340	CDL-WS23 0.50m	Northern
		3,840	CDL-WS18A 0.50m	Northern
		923	CDL-WS17B 0.50m	Northern
		4,480	CDL-WS18B 0.55m	Northern
		4,460	CDL-WS18B 0.90m	Northern
		1,950	CDL-WS21B 1.0m	Northern
Arsenic	500	1,040	CDL-WS22 0.50m	Northern
Benzo(a)pyrene	24.8	94.7	CDL-WS25 0.50m	Southern
Dibenzo(a,h)anthracene	24.9	28.0	CDL-WS25 0.50m	Southern

All recorded exceedances were within samples taken from Made Ground. Ten exceedances of the RBSL/RTC for lead and arsenic were recorded in seven boreholes located in The Courtyard. A single lead exceedance was recorded in CDL-WS02 located to the south east of Llancoed House and the two PAH exceedances were recorded in CDL-WS25 to the north east of Britannic House.



PCBs were not recorded above the laboratory limit of detection in four samples taken from the upper 1m of soil in the vicinity of the former electricity substation.

A summary is presented in Table 8-5 of the locations where asbestos was identified in the upper 1m of Made Ground soils, along with the results of quantification analysis.

Table 8-5: Summary of Asbestos Identified in Shallow Made Ground Soils

Exploratory Location	Depth	Type	Quantification	Parcel
CDL-WS05	1.00m	Crocidolite (Blue Asbestos)	<0.001%	Northern
CDL-WS07	0.55m	Chrysotile (White Asbestos)	0.0018%	Northern
CDL-WS08B	0.50m	Chrysotile (White Asbestos)	<0.001%	Northern
CDL-WS16	0.50m – 0.60m	Crocidolite (Blue Asbestos)	Result awaited	Northern
CDL-WS19	0.55m	Chrysotile (White Asbestos)	<0.001%	Northern
CDL-WS27	0.60m	Chrysotile (White Asbestos)	<0.001%	Southern
CDL-WS36	0.60m	Chrysotile (White Asbestos)	<0.001%	Southern
CDL-WS39	1.00m	Chrysotile (White Asbestos)	0.0089%	Northern
CDL-WS40	0.50m	Chrysotile (White Asbestos)	0.0137%	Northern

No exceedances were identified of the asbestos threshold of 0.03% for soils in the upper 1m in a commercial scenario.

8.5 Comparison with Risk Based Screening Levels/Remedial Target Criteria for Deep Soils

Comparison of the reported laboratory data with the RBSL/RTC for deep soils (>1.00m below finished levels) in a commercial land use indicated the contaminant concentrations are largely below the adopted screening criteria. One exceedance was recorded of the respective RBSL/RTC for benzene and TPH Aromatic >C8-C10.

The recorded exceedances are summarised in Table 8-6.

Screened laboratory analytical data is presented in Appendix E.

Table 8-6: Summary of RBSL/RTC Exceedances in Deep Soil >1m in Monitor Phase 72

Determinand	RBSL/RTC (mg/kg)	Recorded Concentration (mg/kg)	Location	Parcel
Benzene	5	43.30	CDL-WS02 2.35m	Northern
TPH Aromatics >C8-C10	547	1,160	CDL-WS22 2.40m – 2.60m	Northern

The elevated concentration of benzene in CDL-WS02 was recorded in a sample taken of Made Ground that was observed to be saturated with hydrocarbons, which laboratory analysis subsequently identified as coal tar. A corresponding aesthetic criteria score of 5,3 was assigned to this material. CDL-WS02 is located to the south east of Llancoed House, within an area of soft



landscaping. Although it is located within a soft landscaped area, the area is not used by site users as it is covered with shrubs and hedges and the observation was from a depth of greater than 2m.

The exceedance of TPH Aromatic >C8-C10 was recorded in a sample of Till taken from CDL-WS22 located in the eastern area of The Courtyard, within the car park. A corresponding aesthetic criteria score of 4,2 was assigned to this material.

PCBs were not recorded above the laboratory limit of detection in five samples taken from soil at depths greater than 1m below finished levels in the vicinity of the former electricity substation.

Asbestos was identified in three samples of Made Ground taken from soils in the northern parcel at depths greater than 1m below finished levels, as summarised in Table 8-7.

The adopted asbestos threshold of 0.03% is exceeded in a single sample taken from CDL-WS21B at a depth of 1.95 – 2.05m, however the 0.03% threshold strictly only applies to soils in the upper 1m below finished floor levels in a commercial scenario.

Table 8-7: Summary of Asbestos Identified in Deep Made Ground Soils

Location	Depth (mbgl)	Type	Quantification	Parcel
CDL-WS21B	1.55 – 1.70	Chrysotile (White Asbestos)	0.0257%	Northern
	1.95 – 2.05	Amosite (Brown Asbestos)	0.0552%	
CDL-WS39	1.40 – 1.50	Amosite (Brown Asbestos)	0.0014%	Northern

9 Validation

9.1 Sampling Frequencies

The locations of the exploratory holes carried out as part of the recent ground investigation across Monitor Phase 72 are shown on Drawings 04020-A-SK910-P0 and 04020-A-SK911-P0, with exploratory hole logs presented in Appendix D.

A total of 54 exploratory holes were completed as part of the investigation undertaken in May 2021, with 127 environmental samples from Monitor Phase 72 undergoing laboratory analysis. A total of 34 exploratory holes were completed in the northern parcel, excluding seven locations which were not logged because of very shallow refusals, and 13 exploratory holes were completed in the southern parcel.

Based on an approximate area of 29,000m² across the northern parcel, 34 exploratory holes has been determined to equate to a frequency of approximately 1 per 852m² on a 29m spacing.

A total of thirteen exploratory holes in the southern parcel, which occupies an area of 25,000 m², has been determined to equate to a frequency of approximately 1 per 1,923m² on a 44m spacing.

A total of 127 environmental samples were taken at generally 0.5m to 1.0m intervals with additional samples taken to target observed contamination, where encountered. This is in accordance with the proposed frequency of investigation outlined in Section 7.

9.2 Recorded Exceedances

9.2.1 Lead and Arsenic Exceedances – Northern Parcel

Localised elevated concentrations of lead and arsenic, exceeding the respective RBSL/RTC, were recorded within localised areas in the northern parcel of Monitor Phase 72 within shallow soils (to 1m bgl).

The principal migration pathways for lead and arsenic are via direct contact with soils and inhalation of soil-derived dust. In line with the presence of hardstanding and/or buildings across much of the northern parcel, the presence of such identified contamination is not considered to pose a significant risk to current users of this area.

9.2.2 PAH Exceedances – Southern Parcel

One exceedance was recorded of the respective RBSL/RTC for benzo(a)pyrene and dibenzo(a,h)anthracene in a single sample, taken from borehole CDL-WS25 located in an area of soft landscaping in the southern parcel.

9.2.3 The principal migration pathways for benzo(a)pyrene and dibenzo(a,h)anthracene are via direct contact with soils and inhalation of soil-derived dust. In line with the presence of hardstanding and/or buildings across much of the southern parcel, the presence of such identified contamination is not considered to pose a significant risk to current users of this area. Benzene and TPH Aromatic >C8-C10 Exceedances – Northern Parcel

Localised exceedances of the respective RBSL/RTC for benzene (CDL-WS02) and TPH aromatic >C8-10 (CDL-WS22) were recorded in two samples collected from depths greater than 2.00m within the northern parcel, associated with localised hydrocarbon contamination.

Laboratory analysis of soil samples has shown that locally elevated concentrations of benzene and TPH aromatic >C8-C10. It is noted that these correlate to localised thin soil layers which were overlain by soils characterised by low levels of contamination.

The principal migration pathway associated with benzene and TPH aromatic >C8-C10 is via indoor inhalation of vapours. In line with the historical use of the site as part of an oil refinery, the URS remediation specification for Llancoed Court and Llancoed House specified installation of a vapour-resistant membrane to mitigate the potential risks associated with potential vapour intrusion. It is unknown if a similar requirement was specified for Darcy Business Park and The Courtyard. However, given no exceedances of TPH, VOCs and BTEX were recorded and combined with the localised nature and depth of the exceedances combined any potential vapour generation is likely to be limited and restricted to pockets of gross hydrocarbon contamination.

In addition, these localised exceedances are located within an area of soft landscaping (CDL-WS02) covered by shrub and bushes and within the car park in The Courtyard (CDL-WS22) which is surfaced in tarmac and block paving.

9.2.4 Free Phase Hydrocarbons – Northern Parcel

Free phase hydrocarbons were identified in very localised areas of the northern parcel of Monitor Phase 72, in exploratory positions CDL-WS02 and CDL-WS20. CDL-WS02 was located within a soft landscaped area south east of Llan Coed House adjacent to the car park. CDL-WS20 was located within The Courtyard car park, which is predominantly surfaced in block paving.

Areas where free phase hydrocarbons were noted appeared to be localised vertically, and did not appear to be laterally extensive, which would indicate isolated pockets of free phase rather than a recoverable source of free phase hydrocarbons.

An exceedance of the RBSL/RTC for benzene was recorded in a sample of oil-saturated soil from CDL-WS02, which is discussed in Section 9.2.3. No corresponding exceedances of the RBSL/RTC were recorded in six samples taken from CDL-WS20 in which free product was recorded on soils.

9.3 Validation Summary

A summary of the validation of Monitor Phase 72, in line with the requirements of the Section 106 Agreement and in line with the format of the required Monitor Certification, is presented in Table 9-1.

Table 9-1: Monitor Phase 72 Validation Summary

Requirement	Status	Comment
Chemical quality of soils in situ	Complete	Sampling of soils for laboratory analysis was undertaken generally at 0.5m to 1m intervals in exploratory holes which were completed on a 29m spacing in the northern parcel and on a 44m spacing in the southern parcel. Based upon the findings of recent ground investigation, soils across Monitor Phase 72 have been shown to be largely compliant with the RBSL/RTC for a commercial end use. Exceedances of metal contamination (arsenic and lead) were noted within a number of samples within shallow Made Ground. Localised PAHs were also encountered in two locations, within shallow soils. In line with the presence of hardstanding across the majority of Monitor Phase 72, the presence of such contamination is not considered to pose a significant use to end users of the current development.
VO quality of soils in situ	Complete	Soils across Monitor Phase 72 were largely assigned aesthetic criteria scores of 0 and 1 for visual and olfactory contamination. A maximum recorded score of 5 was recorded locally, associated with visual evidence of contamination in CDL-WS02 between 2.30m and 2.40m and in CDL-WS20 between 2.60m and 3.00m. CDL-WS02 lies within a soft landscaped area to the south east of Llan Coed House, whilst CDL-WS20 is located within a car parking area associated with The Courtyard.

Requirement	Status	Comment
		The presence of such localised VO at depths >1m bgl is acceptable in line with the requirements of the S106.
Observations of groundwater for the presence of free phase hydrocarbons	Complete	Localised hydrocarbon sheens were observed, but no free phase hydrocarbons were observed to be associated with soils that were described as 'damp' or 'wet'.
Removal of oil-saturated soils	N/A	A single 0.10m layer of hydrocarbon-saturated soil was identified locally at 2.30m depth in CDL-WS02. No other hydrocarbon-saturated soils were encountered at Monitor Phase 72 and this observation is considered likely to represent an isolated pocket of impacted soil. Based on the recorded depth and localised nature of hydrocarbon-saturated soil, there is considered to be no requirement for removal for the purposes of continued beneficial use of the site.
Asbestos assessment	Complete	Cement-bound chrysotile asbestos containing material was identified in a Made Ground within CDL-WS17B at 0.50m in The Courtyard. Asbestos fibres were detected in Made Ground soils in 13 locations. Asbestos was identified in ten shallow soil samples (<1.00m) and in three samples of deep soils (>1.00m). Quantification analysis showed no exceedances of the adopted threshold of 0.03% for soils in the upper 1m, to which the threshold applies in a commercial end use scenario.
Control of seeps, sheens and iron-staining from bedrock	N/A	No seeps, sheens or iron-staining were observed in bedrock encountered in Monitor Phase 72.

10 Conclusions

PJA has been commissioned by St. Modwen Developments to undertake an assessment of an area of Coed Darcy with a view of enabling Monitor Sign-off for this as an existing commercial area. For the purpose of the Monitor Sign-off, this area is referred to as Monitor Phase 72.

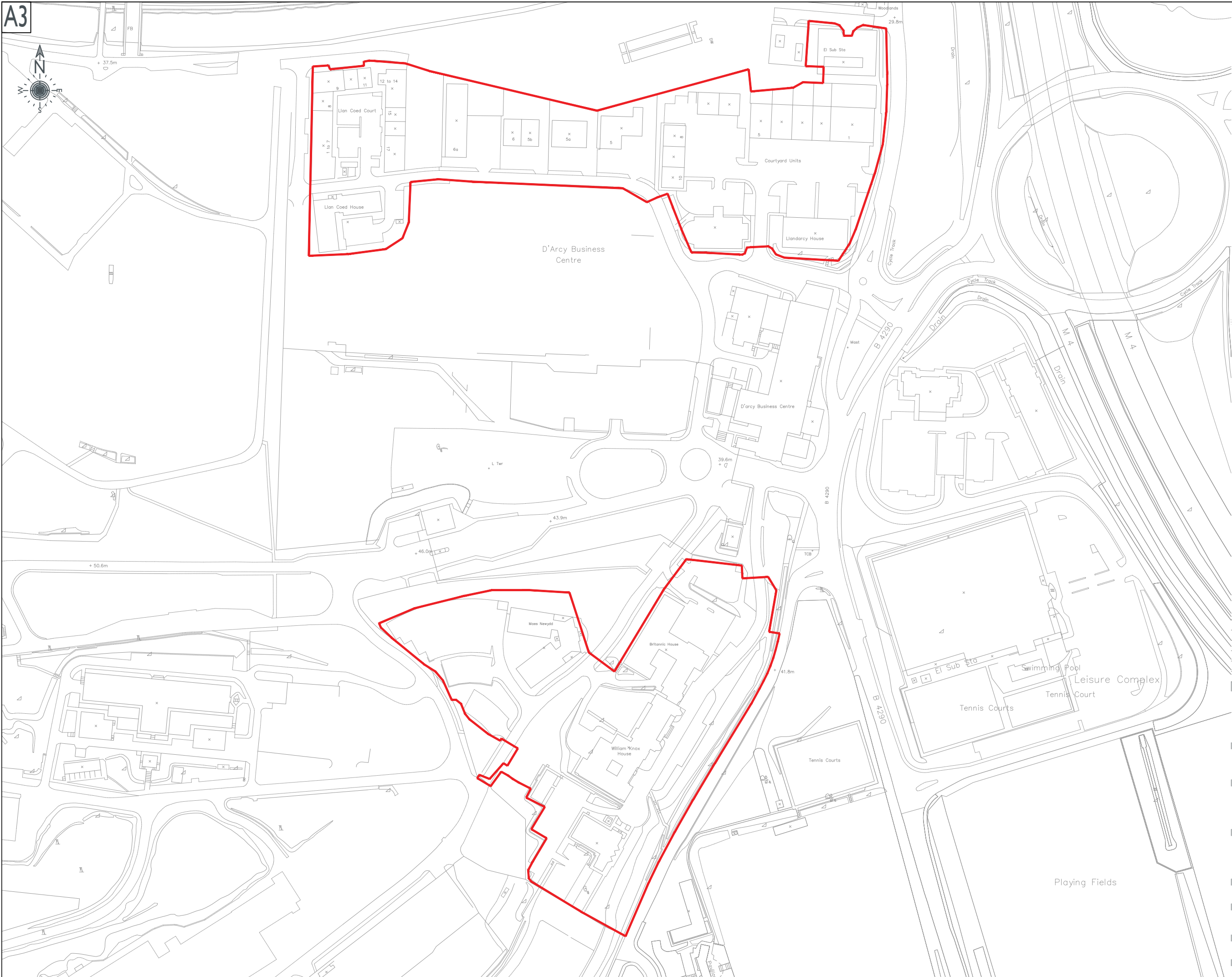
Based upon the findings of the recent investigation which was carried out in accessible areas of Monitor Phase 72, there are considered to be no unacceptable risks associated with an ongoing commercial end use of Monitor Phase 72.

It should be noted that recent ground investigation works focused only on contamination and no assessment of the geotechnical properties of the ground has been carried out.

Should the site be redeveloped, the end use or ground levels of Monitor Phase 72 change, further work including investigation and assessment is likely to be required, as part of a standard planning application, to assess risks to the specific development and the receptors identified..

Appendix A Drawings

A3



NOTES
These drawings have been produced with reference to the CDM Regulations 2015. Please note that these are pre-construction phase drawings and should be subject to further design risk management as required in accordance with Regulation 9

KEY
— Monitor Phase Boundary

REV	DATE	REVISION NOTE	BY
P0	26.02.21	Issued	JAL

PJA
CLIENT

Seven House - High Street
Longbridge - Birmingham
B31 2UQ - Tel: 0121 475 0234
Birmingham - Bristol
Exeter - London - Reading
pja.co.uk

St Modwen Development Ltd
PROJECT

Coed Darcy
DRAWING TITLE

**Proposed Phase Boundary
Monitor Phase 72**

DRAWING ISSUE STATUS

PJA JOB No.	SUB-CODE	DRAWING NO.	REVISION
04020	- A -	SK901	- P0

Revision Letter : P - Prelim / A - Approval / T - Tender / C - Construction
BIM DRAWING REFERENCE

SCALE	DRAWN	REVIEWED	DATE
A3@NTS	JAL	CS	26.02.21

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A3



NOTES

These drawings have been produced with reference to the CDM Regulations 2015. Please note that these are pre-construction phase drawings and should be subject to further design risk management as required in accordance with Regulation 9

KEY



Monitor Phase Boundary

Historic Positions

REV	DATE	REVISION NOTE	BY
-----	------	---------------	----

PJA  Seven House - High Street
Longbridge - Birmingham
B31 2UQ - Tel: 0121 475 0234

Birmingham - Bristol
Exeter - London - Reading
pja.co.uk

CLIENT

St Modwen Development Ltd

PROJECT _____

Coed Darcy

DRAWING TITLE

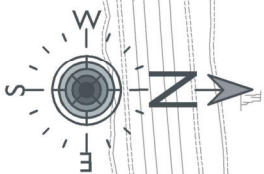
Historical Exploratory
hole location plan

DRAWING ISSUE STATUS

PJA JOB No. SUB-CODE DRAWING NO. REVISION
04020 - A - SK902 - P0
Revision Letter : P - Prelim / A - Approval / T - Tender / C - Construction
BIM DRAWING REFERENCE

SCALE	DRAWN	REVIEWED	DATE
A3 @ 1:2500	JP	CS	04.03.21

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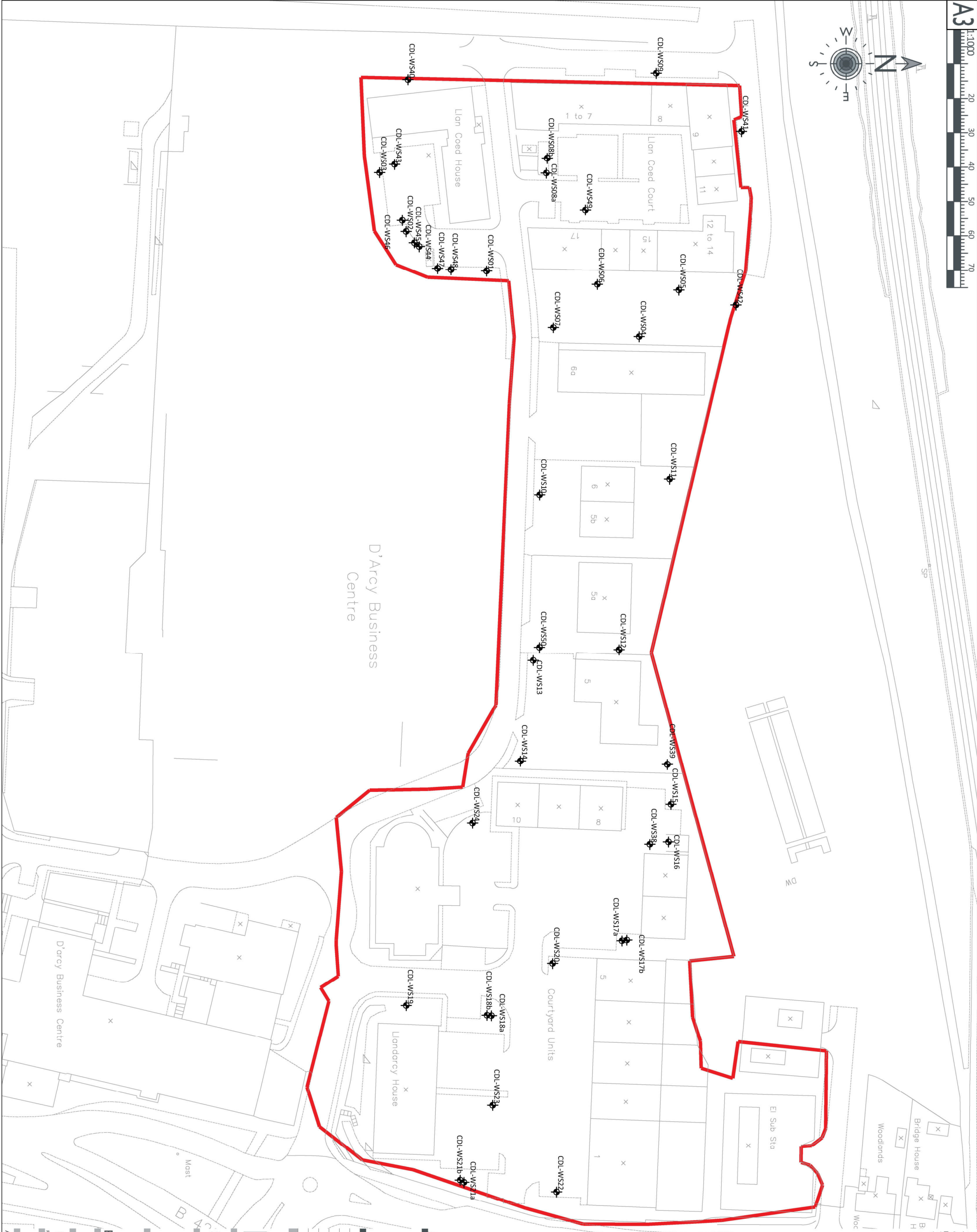


NOTES

These drawings have been produced with reference to the CDM Regulations 2015. Please note that these are pre-construction phase drawings and should be subject to further design risk management as required in accordance with Regulation 3

KEY

Borehole location



DRAFT
FOR DISCUSSION ONLY

PJA
Sreen House - High Street
Bristol
B3 1JQ
Tel: 0121 455 0234
Birmingham - Bristol
Exeter - London - Reading
Plymouth

CLIENT
St Modwen Development Ltd

PROJECT
Coed Darcy

DRAWING TITLE
Monitor Phase 72
Northern Land Parcel -
Exploratory Hole Location Plan

DRAWING ISSUE STATUS

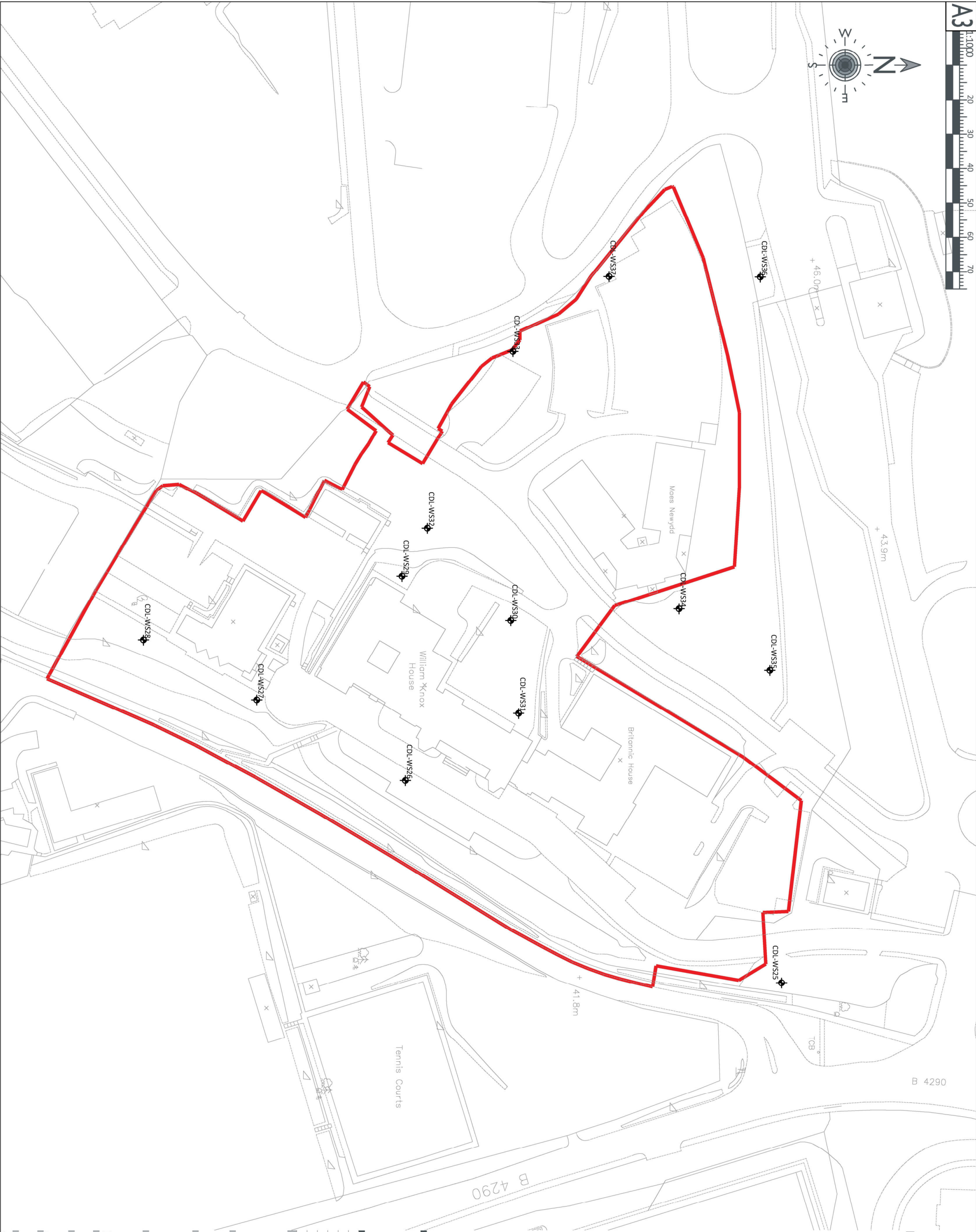
INFORMATION

Revision Number: SUB-CODE DRAWING NO. REVISION
04020 - A - SK910 - P0
Revision Letter: P - Prelim / A - Approval / T - Tender / C - Construction
BIM DRAWING REFERENCE

SCALE DRAWN REVIEWED DATE
A3 @ 1:1000 JAL LC 23.06.21

These drawings have been produced with reference to the CDM Regulations 2015. Please note that these are pre-construction phase drawings and should be subject to further design risk management as required in accordance with Regulation 9

 Borehole Location



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[illegible]

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Seven House • High Street
Longbridge • Birmingham
B31 2UQ • Tel: 0121 475 0234
Birmingham • Bristol
Exeter • London • Reading
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St Modwen Development Ltd

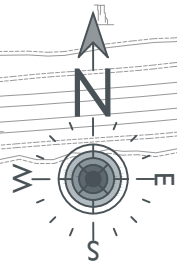
Coed Darcy

Monitor Phase 72
Southern Land Parcel -
Exploratory Hole Location Plan

INFORMATION

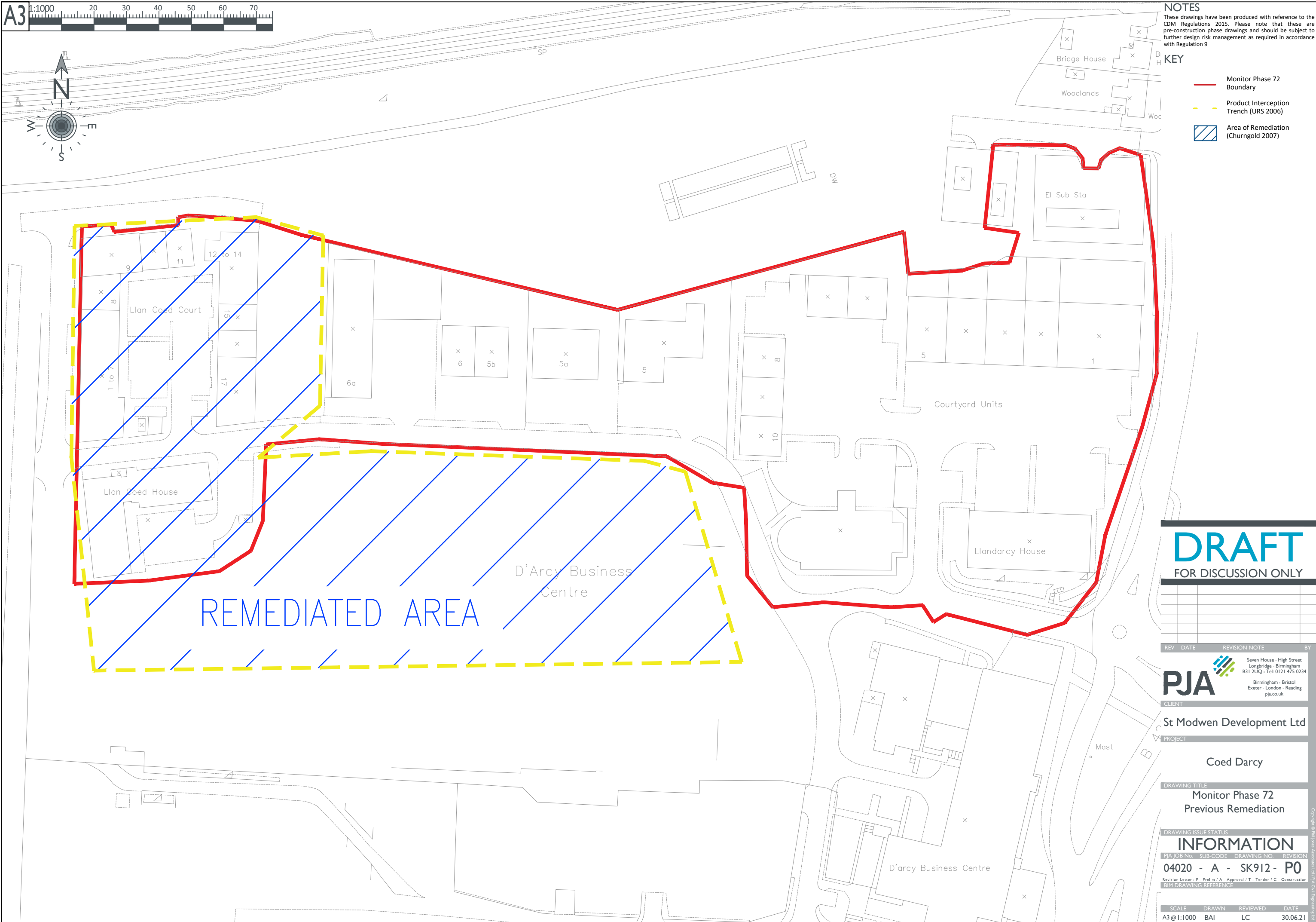
PIA JOB NO. SUB-CODE DRAWING NO. REVISION
04020 - A - SK911 - P0
Revision Letter : P - Prelim / A - Approval / T - Tender / C - Construction
BIM DRAWING REFERENCE

SCALE	DRAWN	REVIEWED	DATE
A3@1:1000	JAL	LC	23.06.21



NOTES
These drawings have been produced with reference to the CDM Regulations 2015. Please note that these are pre-construction phase drawings and should be subject to further design risk management as required in accordance with Regulation 9

- KEY**
- Monitor Phase 72 Boundary
 - Product Interception Trench (URS 2006)
 - Area of Remediation (Churrngold 2007)



DRAFT
FOR DISCUSSION ONLY

REV	DATE	REVISION NOTE	BY

PJA
CLIENT
St Modwen Development Ltd
PROJECT
Coed Darcy

Seven House - High Street
Longbridge - Birmingham
B31 2JQ - Tel: 0121 475 0234
Birmingham - Bristol
Exeter - London - Reading
pja.co.uk

DRAWING TITLE
Monitor Phase 72
Previous Remediation

DRAWING ISSUE STATUS
INFORMATION
PJA JOB No. SUB-CODE DRAWING NO. REVISION
04020 - A - SK912 - P0
Revision Letter: P - Prelim / A - Approval / T - Tender / C - Construction
BIM DRAWING REFERENCE

SCALE	DRAWN	REVIEWED	DATE
A3@1:1000	BAI	LC	30.06.21

Appendix B Summary of Adopted Thresholds

Lowest of the Remedial Target Criterion/Risk Based Screening Level for Commercial land use, Shallow Soil

Contaminant	Minimum RBSL/ RTC 1% (mg/kg)	Minimum of RBSL/ RTC 3% (mg/kg)
Arsenic	500	500
Chromium	365	365
Cadmium	243	243
Mercury (inorganic)	480	480
Nickel	1990	1990
Selenium	8000	8000
Lead	750	750
Vanadium	7590	7590
Copper	115000	115000
Zinc	918000	918000
Benzo(a)pyrene	24.7	24.8
Benzene	5	5
Toluene	1160	1160
Ethylbenzene	122000	122000
Xylene	121000	121000
TPH aromatic C7-C8	1840	1840
TPH aromatic C8-C10	913	913
TPH aromatic C10-C12	26515	26515
TPH aromatic C12-C16	64875	64875
TPH aliphatic C6-C8	≤1.00E+06	≤1.00E+06
TPH aliphatic C8-C10	158890	158890
TPH aliphatic C10-C12	163360	163360
TPH aliphatic C12-C16	169032	169032
TPH aromatic C16-C21	28500	28500
TPH aromatic C21-C35	28500	28500
TPH aliphatic C16-C21	≤1.00E+06	≤1.00E+06
TPH aliphatic C21-C35	≤1.00E+06	≤1.00E+06
Total TPH (Phase 1)	81413	81413
Total TPH (Process Area)	44344	44344
Total TPH (North Tank Farm)	25875	25875
Total TPH (South Tank Farm)	37230	37230
1,2-Dichloroethane	0.401	2
1,1,1-Trichloroethane	443	3140
Tetrachloroethene	103	788
Trichloroethene	7.48	54.9
Vinyl chloride	0.045	0.174
Dichloromethane	158	734
Cis-1,2-Dichloroethene	8.7	53
Trans-1,2 Dichloroethene	13.8	87.7
Chromium III	221000	221000
Acenaphthene	109000 a	106000
Anthracene	539000	545000
Benzo(a)anthracene	222	242
Benzo(b)fluoranthene	246	247
Benzo(g,h,i)perylene	2490	2500
Benzo(k)fluoranthene	2470	2480
Chrysene	24100	24500
Dibenz(a,h)anthracene	24.6	24.9
Fluoranthene	72500	72700
Fluorene	68400	72200
Indeno(1,2,3-cd)pyrene	245	247
Pyrene	54300	54500
Phenol	686	1720
Mercury, methyl	418 a	411
Mercury, elemental	4.3	12.9
Naphthalene	15800 a	29300 a
TPH aliphatic C5-C6	≤1.00E+06	≤1.00E+06
1,1,1,2-Tetrachloroethane	71.4	559
1,1,2,2-Tetrachloroethane	178	1180
Carbon tetrachloride	1.97	14.7
Chlorobenzene (mono)	688 a	2730 a
TPH aromatic C5-C7	17.8	99.8

Notes

a) based on a value produced from following the approach outlined in SR4 for substances at saturation

1. Xylene - the lowest RTC of the three isomers has been presented. Users must consider total exposure from all xylene isomers and not consider them in isolation.

2. TPH aromatic C7-C8 is considered to comprise toluene only by Atkins

3. It is assumed that no visible free product is present within the top 1.0m of soil. The presence of free product should be assessed in accordance with information in the S106

4. In the S106 only one value was presented for 1,2-dichloroethene of 273 mg/kg

5. 'Total' TPH RBSL derived for an area of development, based on individual RBSL and available mass fraction TPH data in soil at time of derivation, using the inverse weighted average approach

6. The values for metals may not be protective of phytotoxic effects

7. Benzo(a)pyrene RBSL to be compared against sum of 16 US EPA Priority List PAHs using Toxicity Equivalence approach

8. No RTC was produced for total TPH as this will be considered further at validation stage

9. Asbestos has not been considered here as it is being considered in a separate report

10. Additivity for TPHs and PAHs to be undertaken in line with guidance in Atkins report 5041216-REM-RPT-000476

11. Elemental mercury is based on the inhalation pathway only and the saturation limit has been presented

12. TPH aromatic C5-C7 is considered to comprise benzene only by Atkins

13. Values for phenol are calculated to be protective of dermal effects in line with the approach used by the Environment Agency to derive the commercial phenol SGV

Lowest of the Remedial Target Criterion/Risk Based Screening Level for Commercial land use, Deep Soil (>1m)

Contaminant	Minimum RBSL/ RTC 1% (mg/kg)	Minimum of RBSL/ RTC 3% (mg/kg)
Benzo(a)pyrene	>sat	>sat
Benzene	5	5
Toluene	389	389
Ethylbenzene	>sat	>sat
Xylene	>sat	>sat
TPH aromatic C7-C8	617	617
TPH aromatic C8-C10	547	547
TPH aromatic C10-C12	>sat	>sat
TPH aromatic C12-C16	>sat	>sat
TPH aliphatic C6-C8	>sat	>sat
TPH aliphatic C8-C10	>sat	>sat
TPH aliphatic C10-C12	>sat	>sat
TPH aliphatic C12-C16	>sat	>sat
TPH aliphatic C16-C21	None	None
TPH aliphatic C21-C35	None	None
TPH aromatic C16-C21	None	None
TPH aromatic C21-C35	None	None
Total TPH (Phase 1)	81956	81956
Total TPH (Process Area)	35014	35014
Total TPH (North Tank Farm)	13974	13974
Total TPH (South Tank Farm)	34797	34797
1,2-Dichloroethane	0.65	0.65
1,1,1-Trichloroethane	3250	3250
Tetrachloroethene	368	368
Trichloroethene	28	28
Vinyl chloride	0.154	0.214
Dichloromethane	665	665
Cis-1,2-Dichloroethene	35.1	67
Trans-1,2 Dichloroethene	53.4	91
Acenaphthene	>sat	>sat
Anthracene	>sat	>sat
Benzo(a)anthracene	>sat	>sat
Benzo(b)fluoranthene	>sat	>sat
Benzo(g,h,i)perylene	>sat	>sat
Benzo(k)fluoranthene	>sat	>sat
Chrysene	>sat	>sat
Dibenz(a,h)anthracene	>sat	>sat
Fluoranthene	>sat	>sat
Fluorene	>sat	>sat
Indeno(1,2,3-cd)pyrene	>sat	>sat
Pyrene	>sat	>sat
Phenol	>sat	>sat
Mercury, methyl	>sat	>sat
Mercury, elemental	>sat	>sat
Naphthalene	>sat	>sat
1,1,1,2-Tetrachloroethane	278	768
1,1,2,2-Tetrachloroethane	718	1720
Carbon tetrachloride	7.34	19
Chlorobenzene (mono)	>sat	>sat
TPH aliphatic C5-C6	>sat	>sat
TPH aromatic C5-C7	71	152

Notes

1. Where the lower of the vapour or aqueous saturation limits have been exceeded by the RTC calculated, the hazard quotient is considered to be less than 1 and as such >sat has been presented

2. Xylene - the lowest RTC of the three isomers has been presented. Users must consider total exposure from all xylene isomers and not consider them in isolation

3. TPH >C16 are not considered to be volatile according to TPHCWG. Consequently the inhalation of vapour pathways have not been considered and therefore no RTC value has been presented here

4. "None" indicates theoretical RBSL greater than solubility limit

5. In the S106 only one value was presented for 1,2-dichloroethene of 91 mg/kg

6. 'Total' TPH RBSL derived for an area of development, based on individual RBSL and available mass fraction TPH data in soil at time of derivation, using the inverse weighted average approach

7. Benzo(a)pyrene RBSL to be compared against sum of 16 US EPA Priority List PAHs using Toxicity Equivalence approach

8. TPH aromatic C7-C8 is considered to comprise toluene only by Atkins

9. No RTC was produced for total TPH as this will be considered further at validation stage

10. Asbestos has not been considered here as it is being considered in a separate report

11. Additivity for TPHs and PAHs to be undertaken in line with guidance in Atkins report 5041216-REM-RPT-000476

12. The potential presence of free product should be assessed in accordance with information in the S106

13. TPH aromatic C5-C7 is considered to comprise benzene only by Atkins

14. Values for phenol are calculated to be protective of dermal effects in line with the approach used by the Environment Agency to derive the commercial phenol SGV

Appendix C Risk Assessment Classification

The approach to risk evaluation is a qualitative method in general accordance with the CIRIA C552 2001 document. It involves the classification of the potential consequence of risk occurring and the probability of the risk occurring.

Classification of Consequence

The terms and definitions relating to the classification of consequence are summarised in Table E1:

Table C1: Classification of Consequence

Classification	Definition	Example
Severe	Short term (acute) risk to human health likely to result in "significant harm" as defined by the Environment Protection Act 1990, Part IIA. Short term risk of pollution (note: Water Resources Act contains no scope for considering significance of pollution) of sensitive water resource. Catastrophic damage to buildings/property. A short-term risk to a particular ecosystem, or organism forming part of such ecosystem (note: the definitions of ecological systems within the Circular on Contaminated Land, DETR, 2000).	- High concentrations of cyanide on the surface of an informal recreation area. - Major spillage of contaminants from site into controlled water. - Explosion, causing building collapse (can also equate to a short term human health risk if buildings are occupied).
Medium	Chronic damage to Human Health ("significant harm" as defined in the DETR, 2000). Pollution of sensitive water resources (note: Water Resources Act contains no scope for considering significance of pollution). A significant change in a particular ecosystem, or organism forming part of such ecosystem. (note: the definitions of ecological systems within Circular on Contaminated Land, DETR, 2000).	- Concentrations of a contaminant from site exceed the generic, or site-specific assessment criteria. - Leaching of contaminants from a site to a major or minor aquifer (renamed principal, secondary and significant drift under the Water Framework Directive). - Death of a species within a designated nature reserve.
Mild	Pollution of non-sensitive water resources. Significant damage to buildings/structures and crops ("significant harm" as defined in the Circular on Contaminated Land, DETR, 2000). Damage to sensitive buildings/structures or the environment.	- Pollution of non-classified groundwater. - Damage to building rendering it unsafe to occupy (e.g. foundation damage resulting in instability).
Minor	Harm, although not necessarily significant harm, which may result in a financial loss, or expenditure to resolve. Non-permanent health effects to human health (easily prevented by means such as Personal Protective Clothing, etc.). Easily repairable effects of damage to buildings/structures.	- The presence of contaminants at such concentrations that protective equipment is required during site works. - The loss of plants in a landscaping scheme. - Discolouration of concrete.

Classification of Probability

Probability is classified based on the following terms and definitions:



Table C2: Classification of Probability

Classification	Definition
High Likelihood	There is a pollution linkage and an event which would either appear very likely in the short term and almost inevitable over the long term, or, there is evidence at the receptor of harm or pollution.
Moderate Likelihood	There is a pollution linkage and all the elements are present and in the right place which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term.
Low Likelihood	There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such event would take place and is less likely in the shorter term.
Unlikely	There is a pollution linkage, but circumstances are such that it is improbable that an event would occur even in the very long term.

Risk Matrix

The risk matrix based on probability and consequence is presented in Table E3:

Table C3: Risk Matrix

		Consequences			
		Severe	Medium	Mild	Minor
Probability	High Likelihood	Very high	High	Moderate	Moderate / Low
	Moderate Likelihood	High	Moderate	Moderate / Low	Low
	Low likelihood	Moderate	Moderate / Low	Low	Very Low
	Unlikely	Moderate / Low	Low	Very Low	Very Low

Risk Descriptions

Definitions of the risk categories are presented in Table E4:

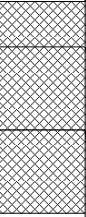
Table C4: Description of the classified risks and likely action required

Classification	Definition
Very High Risk	There is a high probability that severe harm could arise to a designated receptor from an identified hazard, or there is evidence that severe harm to a designated receptor is currently happening. This risk, if realised, is likely to result in a substantial liability. Urgent investigation (if not undertaken already) and remediation are likely to be required.
High Risk	Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation (if not undertaken already) is required and remedial works may be necessary in the short term and are likely over the longer term.
Moderate Risk	It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild. Investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer term.
Low Risk	It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild.
Very Low Risk	There is a low probability that harm could arise to a receptor. In the event of such harm being realised it is not likely to be severe.



Appendix D Exploratory Hole Logs

					Borehole Log			Borehole No. CDL-WS01	
Project Name: CDL Ground Investigation					Project No. 04020/J		Co-ords: 271732.90 - 196065.70		Sheet 1 of 1 Hole Type WLS
Location: Coed Darcy, Neath					Level: 33.47		Scale 1:50		Logged By
Client: St. Modwen Developments					Dates: 17/05/2021 -				

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.30	33.17		MADE GROUND - Woodchip onto brown and grey, gravelly, clayey sand. Gravels consist of fine to medium, sub-angular to sub-rounded brick and glass. VO = 0,0	
		0.75	ES		0.85	32.62		MADE GROUND - Dark grey, slightly clayey, sand and gravel. Gravel consists of fine to coarse, sub-angular to sub-rounded, concrete, brick, timber and sandstone. Occasional cobbles of angular to rounded brick and concrete. VO = 0,1	1
		1.05	ES						
		1.45	ES		1.40	32.07		MADE GROUND - Dark grey and brown, sandy, very gravelly clay. Gravels consist of fine to coarse, sub-angular, brick, sandstone and clinker. VO = 0,2 End of borehole at 1.50 m	2
									3
									4
									5
									6
									7
									8
									9
									10

Remarks Borehole terminated at 1.50m due to obstruction/refusal.								
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Borehole Log

Borehole No.

CDL-WS02

Sheet 1 of 1

Project Name: CDL Ground Investigation

Project No.
04020/J

Co-ords: 271721.50 - 196042.30

Hole Type
WLS

Location: Coed Darcy, Neath

Level: 33.83

Scale
1:50

Client: St. Modwen Developments

Dates: 17/05/2021 -

Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.25			0.40	33.58 33.43		MADE GROUND - Woodchip onto brown and grey, gravelly, clayey sand. Gravels consist of fine to medium, sub-angular to sub-rounded brick and glass. VO = 0,0	
		0.55	ES					MADE GROUND - Orange-brown and brown, sandy, gravelly clay. Gravels consist of fine to coarse, sub-angular sandstone with occasional roots. VO = 0,0	1
		1.00	ES		1.20	32.63		MADE GROUND - Dark grey sand and gravel. Gravels consist of fine to coarse, angular to sub-rounded brick, concrete and bituminous bound material. VO = 0,1	
		1.50	ES					...becoming clayey from 0.70m. VO = 0,2	
		2.00	ES					...wet/seepage at 1.15m.	2
		2.35	ES		2.40	31.43		MADE GROUND - Dark grey and black, sand and gravel. Gravels consist of fine to coarse, angular to sub-angular brick, concrete and clinker. VO = 0,2	
								...gas' odour noted from 1.25m to 2.30m.	
								...coal tar present from 2.30m. VO = 5,3	3
								End of borehole at 2.40 m	
									4
									5
									6
									7
									8
									9
									10

Remarks

Borehole terminated at 2.40m due to obstruction/refusal.





					Borehole Log			Borehole No. CDL-WS05	
Project Name: CDL Ground Investigation					Project No. 04020/J		Co-ords: 271738.50 - 196121.60		Sheet 1 of 1
Location: Coed Darcy, Neath					Level: 33.26		Hole Type WLS		Scale 1:50
Client: St. Modwen Developments					Dates: 17/05/2021 -		Logged By		

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.50	ES		0.55	32.71	 MADE GROUND - Dark grey, sand and gravel. Gravels consist of fine to coarse, sub-angular to sub-rounded, brick, concrete, metal, mudstone and frequent cobbles of brick and concrete. VO = 0,1  MADE GROUND - Dark brown, sand and gravel. Gravels consist of fine to coarse, angular to sub-rounded brick, concrete, clinker, sandstone and mudstone. VO = 0,1  MADE GROUND - Black, slightly clayey, sand and gravel. Gravels consist of fine to coarse, angular to rounded brick, clinker, mudstone and sandstone. VO = 0,1  Light grey, mottled dark blue, silty, sandy CLAY, with frequent decaying organic material. VO = 0,0  ...pockets of sand and gravel present, with gravels consisting of medium, sub-angular to sub-rounded sandstone from 1.50m to 2.00m. ...slight TPH odour noted from 2.40m to 2.50m. End of borehole at 2.60 m		
		1.00	ES		0.80	32.46			1
		1.50	ES		1.20	32.06			
		2.00	ES						2
		2.50	ES		2.60	30.66			3
									4
								5	
								6	
								7	
								8	
								9	
								10	

Remarks Borehole terminated at 2.60m due to obstruction/refusal.		
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Borehole Log

Borehole No.

CDL-WS06

Sheet 1 of 1

Project Name: CDL Ground Investigation

Project No.
04020/J

Co-ords: 271736.80 - 196097.90

Hole Type
WLS

Location: Coed Darcy, Neath

Level: 32.86

Scale
1:50

Client: St. Modwen Developments

Dates: 18/05/2021 -

Logged By

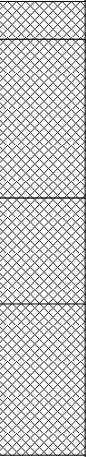
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.55	ES		0.35 0.60 0.65	32.51 32.26 32.21		MADE GROUND - Grey, very sandy gravel. Gravels consist of fine to coarse, sub-angular brick, concrete and bituminous bound material. VO = 0,0	
		1.00	ES					MADE GROUND - Dark grey, very sandy gravel. Gravels consist of fine to coarse, angular to sub-rounded brick, concrete and mudstone. VO = 0,0	1
		1.20	ES		1.25	31.61		MADE GROUND - Red brown, sandy gravel. Gravels consist of fine to medium, sub-angular brick and timber. VO = 0,2 ...strong solvent/creosote odour noted from 0.60m. MADE GROUND - Grey, slightly sandy clay. VO = 0,0	2
								End of borehole at 1.25 m	3
									4
									5
									6
									7
									8
									9
									10

Remarks

Borehole terminated at 1.25m due to obstruction/refusal



					Borehole Log			Borehole No. CDL-WS07 Sheet 1 of 1	
Project Name: CDL Ground Investigation					Project No. 04020/J		Co-ords: 271749.50 - 196085.10		Hole Type WLS
Location: Coed Darcy, Neath					Level: 32.63		Scale 1:50		
Client: St. Modwen Developments					Dates: 18/05/2021 -		Logged By		

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.25	32.38		MADE GROUND - Light grey, very sandy gravel. Gravels consist of fine to coarse, sub-angular to sub-rounded mudstone and granite. VO = 0,0	1
		0.55	ES					MADE GROUND - Dark grey sand and gravel. Gravels consist of fine to coarse, angular to sub-rounded brick, concrete, with occasional bituminous bound material. VO = 0,0	
		1.00	ES					...becoming clayey from 0.90m.	
		1.50	ES		1.30	31.32		MADE GROUND - Orange-brown, grey and dark grey, sandy, gravelly clay. Gravels consist of fine to coarse, sub-angular, brick, concrete, mudstone, sandstone and occasional cobbles of bituminous bound material and brick. VO = 1,1	
		1.95	ES		2.00	30.62		MADE GROUND - Grey, slightly sandy gravel. Gravels consist of medium to coarse, sub-angular to sub-rounded mudstone. VO - 1,1	2
					3.00	29.62		...woven black fabric/membrane at 2.10m.	
								End of borehole at 3.00 m	3
									4
									5
									6
									7
									8
									9
									10

Remarks Borehole terminated at 3.00m due to obstruction/refusal.								
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Borehole Log

Borehole No.
CDL-WS08A
Sheet 1 of 1

Project Name: CDL Ground Investigation

Project No.
04020/J

Co-ords: 271704.50 - 196083.10

Hole Type
WLS

Location: Coed Darcy, Neath

Level: 33.93

Scale
1:50

Client: St. Modwen Developments

Dates: 18/05/2021 -

Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.40	ES		0.30	33.63		MADE GROUND - Brown, slightly gravelly, sandy clay. Gravels consist of fine to medium, sub-angular to sub-rounded sandstone. VO = 0,0 ...becoming very sandy from 0.20m.	
		0.45	ES		0.40	33.53			
					0.50	33.43			
								MADE GROUND - Light grey, sandy gravel. Gravels consist of fine to coarse, angular to sub-rounded concrete. VO = 0,0	1
								MADE GROUND - Brown and grey, slightly clayey, sand and gravel. Gravels consist of fine to coarse, angular to sub-rounded, brick, concrete and clinker. VO = 0,0 End of borehole at 0.50 m	2
									3
									4
									5
									6
									7
									8
									9
									10

Remarks

Inspection pit terminated at 0.45m on concrete obstruction.





Borehole Log

Borehole No.
CDL-WS08B
Sheet 1 of 1

Project Name: CDL Ground Investigation

Project No.
04020/J

Co-ords: 271700.20 - 196083.30

Hole Type
WLS

Location: Coed Darcy, Neath

Level: 33.98

Scale
1:50

Client: St. Modwen Developments

Dates: 18/05/2021 -

Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.50	ES		0.25 0.45 0.55	33.73 33.53 33.43		MADE GROUND - Brown, slightly gravelly, sandy clay. Gravels consist of fine to medium, sub-angular to sub-rounded sandstone. VO = 0,0	
								MADE GROUND - Light grey, sandy gravel. Gravels consist of fine to coarse, angular to sub-rounded concrete. VO = 0,0	
								MADE GROUND - Brown and grey, slightly clayey, sand and gravel. Gravels consist of fine to coarse, angular to sub-rounded brick, concrete and clinker. VO = 0,0	1
								End of borehole at 0.55 m	2
									3
									4
									5
									6
									7
									8
									9
									10

Remarks

Inspection pit terminated at 0.50m on concrete obstruction.





Borehole Log

Borehole No.
CDL-WS09
Sheet 1 of 1

Project Name: CDL Ground Investigation

Project No.
04020/J

Co-ords: 271675.50 - 196115.00

Hole Type
WLS

Location: Coed Darcy, Neath

Level: 33.74

Scale
1:50

Client: St. Modwen Developments

Dates: 18/05/2021 -

Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20			0.20	33.54		MADE GROUD - Bituminous bound material and subbase. VO = 0,0	
		0.50	ES					MADE GROUND - Grey and brown, sand and gravel, with frequent cobbles. Gravels consist of fine to coarse, angular to sub-rounded, brick, concrete, clinker, metal, mudstone and cobbles of concrete. VO = 0,0	1
		1.00	ES		1.20	32.54		End of borehole at 1.20 m	2
									3
									4
									5
									6
									7
									8
									9
									10

Remarks
Borehole terminated at 1.20m due to obstruction/refusal.



					Borehole Log			Borehole No. CDL-WS10 Sheet 1 of 1	
Project Name: CDL Ground Investigation					Project No. 04020/J		Co-ords: 271798.10 - 196081.10		Hole Type WLS
Location: Coed Darcy, Neath					Level: 32.02		Scale 1:50		Logged By
Client: St. Modwen Developments					Dates: 18/05/2021 -				

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.25	31.77		MADE GROUND - Bituminous bound material and subbase. VO = 0,0	
		0.50	ES					MADE GROUND - Black/dark grey sand and gravel, with frequent cobbles. Gravels consist of fine to coarse, angular to sub-rounded brick, concrete, bituminous bound material and rare clinker. Cobbles consist of concrete. VO = 0,0	
		1.10	ES		1.00	31.02		MADE GROUND - Dark grey, mottled dark blue, slightly gravelly, sandy clay. Gravels consist of medium to coarse, sub-angular to sub-rounded mudstone, sandstone and decaying organic material. VO = 4,2	1
		1.50 - 1.60	ES		1.20	30.82		Dark blue and grey CLAY with frequent decaying organic matter. VO = 0,0	
		1.90 - 2.00	ES		1.75	30.27		Dark blue-grey fine SAND. VO = 3,3	
					1.90	30.12		Grey, mottled orange, silty, gravelly CLAY. Gravels consist of fine to medium, sub-rounded unidentifiable lithologies. VO = 0,2	2
					2.00	30.02		No recovery between 2.00m and 2.80m. End of borehole at 2.80 m	
					2.80	29.22			3
									4
									5
									6
									7
									8
									9
									10

Remarks Borehole terminated at 2.80m due to obstruction/refusal.		
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					Borehole Log			Borehole No. CDL-WS11 Sheet 1 of 1	
Project Name: CDL Ground Investigation					Project No. 04020/J		Co-ords: 271793.40 - 196118.90		Hole Type WLS
Location: Coed Darcy, Neath					Level: 32.08		Scale 1:50		Logged By
Client: St. Modwen Developments					Dates: 19/05/2021 -				
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.25	31.83	 MADE GROUND - Bituminous bound material and subbase. VO = 0,0  MADE GROUND - Brown and black, sand and gravel, with frequent cobbles. Gravels consist of fine to coarse, sub-angular unidentifiable lithologies. Cobbles consist of clinker and igneous rocks. VO = 0,0  MADE GROUND - Black, ashy, slightly gravelly sand. Gravels consist of fine to coarse, sub-angular to sub-rounded unidentifiable lithologies. VO = 0,0  Grey and brown, mottled orange silty CLAY, with decaying organic material. VO = 0,0  Light grey and brown, silty fine SAND. VO = 0,1  Green-grey, mottled orange-brown, silty CLAY, with decaying organic material. VO = 0,2  Green-grey, mottled orange-brown, sandy, gravelly CLAY with cobbles. Gravels consist of fine to coarse, sub-angular to sub-rounded mudstone and sandstone. VO = 1,3  Orange-brown, slightly gravelly, fine to medium SAND. Gravels consist of fine to coarse, sub-angular sandstone. VO = 0,3		
		0.50	ES		0.70	31.38			
		0.80 - 0.90	ES		0.90	31.18			
		1.45 - 1.50	ES		1.35	30.73			
					1.40	30.68			
		2.00 - 2.20	ES		1.90	30.18			
		3.00 - 3.20	ES						
		4.00 - 4.40	ES		3.85	28.23			
					4.40	27.68			
		End of borehole at 4.40 m							

Remarks
 Borehole terminated at 4.40m due to obstruction/refusal.



					Borehole Log			Borehole No. CDL-WS12	
Project Name: CDL Ground Investigation					Project No. 04020/J		Co-ords: 271843.10 - 196104.20		Sheet 1 of 1 Hole Type WLS
Location: Coed Darcy, Neath					Level: 31.33		Scale 1:50		
Client: St. Modwen Developments					Dates: 19/05/2021 -		Logged By		

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.25	31.08		MADE GROUND - Bituminous bound material and subbase. VO = 0,0	
		0.50	ES					MADE GROUND - Brown, slightly clayey, sandy gravel and cobbles. Gravels consist of fine to coarse, angular to sub-angular brick, and sandstone. Cobbles consist of sandstone. VO = 0,0	1
		0.90 - 1.00	ES		0.75	30.58		MADE GROUND - Black, ashy, gravelly sand. Gravels consist of fine to coarse, sub-angular to sub-rounded unidentifiable lithologies. VO = 0,0	
		1.30 - 1.50	ES		1.30	30.03		MADE GROUND - Black, ashy, sandy gravel, with cobbles. Gravels consist of fine to coarse, sub-angular to sub-rounded unidentifiable lithologies. VO = 4,2	2
					1.50	29.83		...damp with hydrocarbon sheen from 1.30m... End of borehole at 1.50 m	
									3
									4
									5
									6
									7
									8
									9
									10

Remarks Borehole terminated at 1.50m due to obstruction/refusal.								
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Borehole Log

Borehole No.
CDL-WS13
Sheet 1 of 1

Project Name: CDL Ground Investigation

Project No.
04020/J

Co-ords: 271846.20 - 196079.30

Hole Type
WLS

Location: Coed Darcy, Neath

Level: 31.63

Scale
1:50

Client: St. Modwen Developments

Dates: 19/05/2021 -

Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.38	31.25		MADE GROUND - Bituminous bound material and subbase. VO = 0,0 ----- End of borehole at 0.40 m	1
									2
									3
									4
									5
									6
									7
									8
									9
									10

Remarks
Inspection pit terminated at 0.40m due to obstruction/refusal.



Borehole Log

Borehole No.

CDL-WS14

Sheet 1 of 1

Project Name: CDL Ground Investigation

Project No.
04020/J

Co-ords: 271875.40 - 196075.50

Hole Type
WLS

Location: Coed Darcy, Neath

Level: 31.68

Scale
1:50

Client: St. Modwen Developments

Dates: 19/05/2021 -

Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.25			0.25	31.42		MADE GROUND - Bituminous bound material and subbase. VO = 0,0	
		0.50	ES					MADE GROUND - Dark grey and black, ashy, sandy gravel. Gravels consist of fine to coarse, sub-angular to sub-rounded brick, concrete and clinker. VO = 0,0	1
		1.00	ES		1.20	30.48		Dark and light grey, slightly gravelly, silty, sandy CLAY. Gravels consist of fine to coarse, sub-angular to sub-rounded mudstone and sandstone. VO = 0,2	
		1.50 - 1.60	ES					...becoming light grey and mottled orange brown from 1.40m to 1.70m with frequent decaying organic material. VO = 0,1	2
		1.90 - 2.00	ES		2.00	29.68		...VO = 0,0	
								Brown/grey brown, gravelly, very sandy CLAY. Gravels consist of fine to coarse, sub-rounded to rounded mudstone and sandstone. VO = 0,0	3
		2.90 - 3.00	ES		3.30	28.38		Grey/brown, clayey, fine to coarse SAND. VO = 0,0	
		3.60 - 4.10	ES		3.70	27.98		Grey/brown, slightly clayey, slightly sandy GRAVEL. Gravels consist of fine to coarse, angular to sub-angular mudstone. VO = 0,0	4
					4.15	27.52		Orange-brown/brown, clayey, gravelly, medium to coarse SAND. Gravels consist of fine to coarse, angular to sub-angular mudstone and sandstone. VO = 0,0	
		4.70 - 5.00	ES		5.00	26.68		End of borehole at 5.00 m	5
									6
									7
									8
									9
									10

Remarks

Borehole terminated at 5.00m as this was the target depth.



Borehole Log

Borehole No.
CDL-WS15
Sheet 1 of 1

Project Name: CDL Ground Investigation

Project No.
04020/J

Co-ords: 271887.90 - 196119.30

Hole Type
WLS

Location: Coed Darcy, Neath

Level: 31.85

Scale
1:50

Client: St. Modwen Developments

Dates: 19/05/2021 -

Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.45 - 0.55	ES		0.60	31.25		MADE GROUND - Grass onto dark brown/dark grey, sandy, very gravelly clay. Gravels consist of fine to coarse, angular to sub-rounded brick, concrete, mudstone and sandstone. VO = 0,0	
		1.00 - 1.10	ES		1.15	30.70		MADE GROUND - Dark grey, mottled orange-brown, very sandy, very gravelly clay with frequent cobbles. Gravels consist of fine to coarse, angular to sub-rounded brick, concrete, metal, bituminous bound material, unidentifiable lithologies and mudstone. Cobbles consist of brick, concrete and timber. VO = 2,1 End of borehole at 1.15 m	1
									2
									3
									4
									5
									6
									7
									8
									9
									10

Remarks

Inspection pit terminated at 1.15m due to obstruction/refusal.





Borehole Log

Borehole No.
CDL-WS16
Sheet 1 of 1

Project Name: CDL Ground Investigation

Project No.
04020/J

Co-ords: 271898.90 - 196118.50

Hole Type
WLS

Location: Coed Darcy, Neath

Level: 34.31

Scale
1:50

Client: St. Modwen Developments

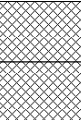
Dates: 19/05/2021 -

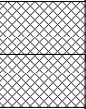
Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30 - 0.60	ES		0.30 0.50	34.01 33.81		MADE GROUND - Grey, slightly sandy, gravel. Gravels consist of unidentifiable lithologies. VO = 0.0	
		0.95 - 1.05	ES		1.00	33.31		MADE GROUND - Light grey, very sandy gravel. Gravels consist of unidentifiable lithologies. VO = 0.0	
								MADE GROUND - Dark brown and grey, sandy, gravelly clay. Gravels consist of fine to coarse, angular to sub-rounded brick, concrete, metal, plastic, glass, bituminous bound material and mudstone. VO = 0.0	1
								End of borehole at 1.00 m	2
									3
									4
									5
									6
									7
									8
									9
									10

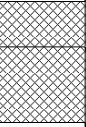
Remarks
Inspection pit terminated at 1.00m due to obstruction/refusal.



					Borehole Log			Borehole No. CDL-WS17A	
Project Name: CDL Ground Investigation					Project No. 04020/J		Co-ords: 271927.70 - 196105.00		Sheet 1 of 1 Hole Type WLS
Location: Coed Darcy, Neath					Level: 31.84		Scale 1:50		
Client: St. Modwen Developments					Dates: 20/05/2021 -		Logged By		
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30 - 0.40	ES		0.40	31.44		MADE GROUND - Grass onto brown, sandy, gravelly clay. Gravels consist of fine to coarse, angular to sub-rounded brick, concrete, metal, bituminous bound material, mudstone and sandstone. VO = 0,0 MADE GROUND - Light grey and dark grey, sandy gravel. Gravels consist of fine to coarse, angular to sub-angular mudstone. VO = 0,0 End of borehole at 0.80 m	
					0.80	31.04			
									1
									2
									3
									4
									5
									6
									7
									8
									9
									10
Remarks Inspection pit terminated at 0.80m due to obstruction/refusal.									

					Borehole Log			Borehole No. CDL-WS17B	
Project Name: CDL Ground Investigation					Project No. 04020/J		Co-ords: 271927.40 - 196106.40		Sheet 1 of 1 Hole Type WLS
Location: Coed Darcy, Neath					Level: 31.89		Scale 1:50		
Client: St. Modwen Developments					Dates: 20/05/2021 -		Logged By		
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.50	ES		0.35	31.54		MADE GROUND - Grass onto brown, sandy, gravelly clay. Gravels consist of fine to coarse, angular to sub-rounded brick, concrete, metal, bituminous bound material, mudstone and sandstone. VO = 0,0 MADE GROUND - Dark grey and brown, clayey, very sandy gravel. Gravels consist of fine to coarse, angular to sub-angular brick, concrete, bituminous bound material, glass and mudstone. VO = 0,1 ...ACM (chrysotile) noted at 0.50m. VO=2,1 End of borehole at 0.70 m	
		0.70	ES		0.70	31.19			
1 2 3 4 5 6 7 8 9 10									
Remarks Inspection pit terminated at 0.70m due to suspected ACM noted in pit. Laboratory testing confirmed the material contained asbestos (chrysotile),									

					Borehole Log			Borehole No. CDL-WS18A	
Project Name: CDL Ground Investigation					Project No. 04020/J		Co-ords: 271949.40 - 196067.10		Sheet 1 of 1 Hole Type WLS
Location: Coed Darcy, Neath					Level: 32.27		Scale 1:50		Logged By
Client: St. Modwen Developments					Dates: 20/05/2021 -				

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.50	ES		0.30 31.97 0.80 31.47		MADE GROUND - Grass onto dark brown, slightly clayey, slightly gravelly sand. Gravels consist of fine to medium, sub-angular flint and sandstone. VO = 0.0 MADE GROUND - Dark grey and black, clayey, very sandy gravel with frequent cobbles. Gravels consist of fine to coarse, angular to sub-rounded brick, concrete, bituminous bound material and glass. Cobbles consist of brick, concrete and bituminous bound material. VO = 0.0 End of borehole at 0.80 m	1 2 3 4 5 6 7 8 9 10	

Remarks
 Inspection pit terminated at 0.80m due to obstruction/refusal.



Borehole Log

Borehole No.

CDL-WS19

Sheet 1 of 1

Project Name: CDL Ground Investigation

Project No.
04020/J

Co-ords: 271946.50 - 196042.40

Hole Type
WLS

Location: Coed Darcy, Neath

Level: 32.84

Scale
1:50

Client: St. Modwen Developments

Dates: 20/05/2021 -

Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20			0.20	32.64		MADE GROUND - Grass onto dark brown, slightly clayey, slightly gravelly sand. Gravels consist of fine to medium, sub-angular flint and sandstone. VO = 0,0	
		0.55	ES					MADE GROUND - Dark grey and brown, slightly clayey, very sandy gravel with frequent cobbles. Gravels consist of fine to coarse, angular to sub-rounded brick, concrete, bituminous bound material, metal, clinker, mudstone and sandstone. Cobbles consist of concrete, bituminous bound material, mudstone and sandstone. VO = 0,0	1
		1.00	ES						
		1.50 - 1.60	ES		1.40	31.44			
		1.75 - 1.95	ES		1.70	31.14			
					2.00	30.84		MADE GROUND - Grey and brown, gravelly, very sandy clay. Gravels consist of fine to coarse, sub-angular sandstone and rare brick. VO = 1,1	2
								Light grey and orange brown, clayey, very gravelly, fine SAND. Gravels consist of fine to coarse, sub-angular to sub-rounded sandstone. VO = 0,0	
					3.30	29.54		Brown, slightly clayey, slightly sandy GRAVEL. Gravels consist of fine to coarse, angular mudstone. VO = 0,0	3
								...becoming wet from 2.00m.	
		3.80 - 4.00	ES					Soft becoming very stiff with depth, grey, slightly gravelly, very sandy CLAY. Gravels consist of fine to medium, sub-angular mudstone. VO = 0,0	4
					4.00	28.84		End of borehole at 4.00 m	

Remarks

Borehole terminated at 4.00m due to borehole collapse. Borehole collapsed to 2.60m.

					Borehole Log			Borehole No. CDL-WS20 Sheet 1 of 1	
Project Name: CDL Ground Investigation					Project No. 04020/J		Co-ords: 271934.20 - 196084.90		Hole Type WLS
Location: Coed Darcy, Neath					Level: 31.55		Scale 1:50		
Client: St. Modwen Developments					Dates: 20/05/2021 -		Logged By		

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.30	31.25		MADE GROUND - Block paving and subbase. VO = 0,0	
		0.60	ES					MADE GROUND - Dark grey and brown, very clayey, very sandy gravel. Gravels consists of fine to coarse, angular to sub-rounded brick, concrete, bituminous bound material and sandstone. VO = 0,0	1
		1.00 - 1.10	ES		1.20	30.35			
		1.50 - 1.60	ES		1.50	30.05		MADE GROUND - Grey and brown, gravelly, very sandy clay. Gravels consists of fine to coarse, angular to sub-rounded mudstone and sandstone, with occasional concrete. VO = 0,0	
		2.00 - 2.10	ES					MADE GROUND - Black and red-brown, ashy, very sandy gravel. Gravels consist of fine to coarse, angular to sub-rounded clinker. VO = 0,0	2
								...petrol/benzene odour and hydrocarbon sheen between 2.00m and 2.40m.	
		2.80 - 3.00	ES		2.60	28.95		Soft, grey, gravelly, very clayey SAND. Gravels consist of fine to coarse, sub-angular to sub-rounded mudstone and decaying organic material. VO = 4,2	3
								...black product and staining noted between 2.60m and 3.00m. VO = 5,2	
		3.80 - 4.00	ES		4.00	27.55		End of borehole at 4.00 m	4
									5
									6
									7
									8
									9
									10

Remarks Borehole terminated at 4.00m due to borehole collapse. Borehole collapsed to 2.20m.		
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					Borehole Log			Borehole No. CDL-WS21A	
Project Name: CDL Ground Investigation					Project No. 04020/J		Co-ords: 271997.90 - 196059.10		Sheet 1 of 1 Hole Type WLS
Location: Coed Darcy, Neath					Level: 32.29		Scale 1:50		
Client: St. Modwen Developments					Dates: 20/05/2021 -		Logged By		
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.45	ES		0.20 0.50	32.09 31.79		MADE GROUND - Grass onto dark brown, slightly clayey, slightly gravelly sand. Gravels consist of fine to medium, sub-angular flint and sandstone. VO = 0,0 MADE GROUND - Brown and grey, clayey, very sandy gravel. Gravels consist of fine to coarse, angular to sub-rounded brick, concrete, bituminous bound material, clinker, mudstone and sandstone. VO = 0,0 End of borehole at 0.50 m	1 2 3 4 5 6 7 8 9 10
Remarks Inspection pit terminated at 0.50m due to suspected service in the base of the pit.									

Borehole Log

Borehole No.
CDL-WS21B
Sheet 1 of 1

Project Name: CDL Ground Investigation

Project No.
04020/J

Co-ords: 271997.20 - 196058.00

Hole Type
WLS

Location: Coed Darcy, Neath

Level: 32.30

Scale
1:50

Client: St. Modwen Developments

Dates: 20/05/2021 -

Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.30			0.30	32.00		MADE GROUND - Grass onto dark brown, slightly clayey, slightly gravelly sand. Gravels consist of fine to medium, sub-angular flint and sandstone. VO = 0,0	
		1.00	ES		1.20	31.10		MADE GROUND - Brown and grey, clayey, very sandy gravel with frequent cobbles. Gravels consist of fine to coarse, angular to sub-rounded brick, concrete, bituminous bound material, clinker, mudstone and sandstone. Cobbles consist of brick and concrete. VO = 0,0	1
		1.55 - 1.70	ES					MADE GROUND - Dark grey and brown, sandy, gravelly clay. Gravels consist of fine to coarse, angular mudstone and rare brick fragments. VO = 0,0	2
		1.95 - 2.05	ES		2.30	30.00		...VO = 2,2 from 1.50m to 1.80m. ...VO = 0,0 from 1.80m to 2.00m. ...VO = 0,1 from 2.00m to 2.30m.	
		2.85 - 3.00	ES		2.60	29.70		MADE GROUND - Black, ashy, very sandy gravel. Gravels consist of unidentifiable lithologies. VO = 0,1	3
					2.80	29.50		MADE GROUND - Black, very sandy clay. VO = 2,1	
		3.80 - 4.00	ES					Firm, light grey and orange brown, very sandy CLAY. VO = 0,0	4
		4.80 - 5.00	ES		5.00	27.30		...becoming grey brown from 4.75m.	5
								End of borehole at 5.00 m	
									6
									7
									8
									9
									10

Remarks

Borehole terminated at 5.00m as this was the target depth.

Borehole Log

Borehole No.

CDL-WS22

Sheet 1 of 1

Project Name: CDL Ground Investigation

Project No.
04020/J

Co-ords: 272000.70 - 196086.00

Hole Type
WLS

Location: Coed Darcy, Neath

Level: 31.60

Scale
1:50

Client: St. Modwen Developments

Dates: 21/05/2021 -

Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.15			0.15	31.45		MADE GROUND - Block paving and subbase. VO = 0,0	
		0.50	ES		0.40	31.20		MADE GROUND - Light grey and brown, fine to coarse sand and gravel. Gravels consist of fine to coarse, angular to sub-angular unidentifiable lithologies (Subbase). VO = 0,0	
		0.90 - 1.00	ES		0.60	31.00		MADE GROUND - Brown, slightly clayey, fine to coarse sandy gravel, with cobbles. Gravels and cobbles consist of clinker. VO = 0,0	1
		1.80 - 2.00	ES		0.75	30.85		MADE GROUND - Grey, slightly clayey, fine to coarse sandy gravel. Gravels consist of fine to medium, sub-angular to sub-rounded unidentifiable lithologies. VO = 0,0	
		2.40 - 2.60	ES		1.65	29.95		MADE GROUND - Grey, mottled orange-brown, slightly gravelly, silty clay with occasional decaying organic material. Gravels consist of fine to medium, sub-angular to rounded unidentifiable lithologies (Reworked Natural). VO = 0,1	2
		2.90 - 3.00	ES		2.40	29.20		MADE GROUND - Black, ashy, slightly gravelly, fine to coarse sand. Gravels consist of fine to medium, angular to sub-angular unidentifiable lithologies. VO = 0,0	3
					3.00	28.60		...damp between 2.30m and 2.40m. Grey, brown and mottled orange-brown, slightly silty CLAY with decaying organic material. VO = 0,0 ...VO = 4,2 between 2.40m and 2.60m. ...VO = 0,0 between 2.60m and 3.00m. End of borehole at 3.00 m	4
									5
									6
									7
									8
									9
									10

Remarks

Borehole terminated at 3.00m due to borehole collapse.

Borehole Log

Borehole No.
CDL-WS23

Sheet 1 of 1

Project Name: CDL Ground Investigation

Project No.
04020/J

Co-ords: 271975.40 - 196067.50

Hole Type
WLS

Location: Coed Darcy, Neath

Level: 31.93

Scale
1:50

Client: St. Modwen Developments

Dates: 21/05/2021 -

Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.15			0.15	31.78		MADE GROUND - Block paving and subbase. VO = 0,0	
		0.40			0.40	31.53		MADE GROUND - Light grey and brown, fine to coarse sand and gravel. Gravels consist of fine to coarse, angular to sub-angular unidentifiable lithologies. (Subbase). VO = 0,0	
		0.65			0.65	31.28		MADE GROUND - Brown, slightly clayey, sandy gravel with cobbles. Gravels consist of fine to coarse, sub-angular to sub-rounded unknown lithologies with cobbles of clinker. VO = 0,0	1
								...damp from 0.50m.	
								...perched water present with hydrocarbon sheen present at 0.60m. VO = 4,1	
								End of borehole at 0.65 m	2
									3
									4
									5
									6
									7
									8
									9
									10

Remarks

Inspection pit terminated at 0.65m due to perched water filling base of pit.

Borehole Log

Borehole No.

CDL-WS24

Sheet 1 of 1

Project Name: CDL Ground Investigation

Project No.
04020/J

Co-ords: 271893.50 - 196061.60

Hole Type
WLS

Location: Coed Darcy, Neath

Level: 31.67

Scale
1:50

Client: St. Modwen Developments

Dates: 21/05/2021 -

Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10			0.10	31.56		MADE GROUND - Bituminous bound material.	
		0.40			0.40	31.26		MADE GROUND - Grey and brown, fine to coarse sand and gravel. Gravels consist of fine to medium, angular to sub-angular unidentifiable lithologies (Subbase). VO = 0,0	
		0.90 - 1.00	ES		0.90	30.76		MADE GROUND - Brown and grey, fine to coarse sand and gravel. Gravels consist of fine to medium, angular unidentifiable lithologies.. VO = 3,2	1
		1.30 - 1.50	ES		1.30	30.36		...panes of broken glass noted from 0.40m to 0.90m.	
					1.50	30.16		MADE GROUND - Black, ashy, sand and gravel. Gravels consist of fine to medium, angular to sub-angular unidentifiable lithologies. VO = 0,0	
		2.20 - 2.40	ES					Brown, organic silty CLAY with frequent decaying organic material. VO = 0,0	2
								Green-grey, mottled orange-brown, slightly gravelly, silty CLAY. Gravels consist of coarse, sub-angular to sub-rounded unidentifiable lithologies. VO = 0,0	3
		3.30 - 3.60	ES						
					3.70	27.96		Orange-brown, clayey GRAVEL. Gravels consist of fine to medium, sub-angular to sub-rounded unidentifiable lithologies. VO = 0,0	4
					4.00	27.66		...wet from 3.90m.	
								End of borehole at 4.00 m	

Remarks

Borehole terminated at 4.00m due to borehole collapse. Borehole collapsed to 3.50m.



Borehole Log

Borehole No.
CDL-WS25

Sheet 1 of 1

Project Name: CDL Ground Investigation

Project No.
04020/J

Co-ords: 271949.00 - 195847.30

Hole Type
WLS

Location: Coed Darcy, Neath

Level: 43.22

Scale
1:50

Client: St. Modwen Developments

Dates: 24/05/2021 -

Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.12			0.12	43.10		MADE GROUND - Grass onto topsoil.	
		0.28			0.28	42.94		MADE GROUND - Black and dark brown, fine to coarse sand and gravel. Gravels consist of fine to medium, angular to sub-angular unidentifiable lithologies. VO = 0,0	
		0.50	ES		0.70	42.52		MADE GROUND - Brown, slightly gravelly, clayey silt. Gravels consist of fine, sub-angular to sub-rounded unidentifiable lithologies. VO = 0,0	1
		0.80	ES		1.20	42.02		Orange-brown, slightly gravelly, silty CLAY with occasional cobbles. Gravels consist of fine to coarse, sub-angular to sub-rounded unidentifiable lithologies. VO = 0,0	
					1.25	41.97		Very weak, tabular siltstone and sandstone. VO = 0,0	2
								End of borehole at 1.25 m	
									3
									4
									5
									6
									7
									8
									9
									10

Remarks

Borehole terminated at 1.25m on suspected bedrock.





Borehole Log

Borehole No.

CDL-WS26

Sheet 1 of 1

Project Name: CDL Ground Investigation

Project No.
04020/J

Co-ords: 271890.20 - 195738.20

Hole Type
WLS

Location: Coed Darcy, Neath

Level: 48.99

Scale
1:50

Client: St. Modwen Developments

Dates: 24/05/2021 -

Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10			0.10	48.89		MADE GROUND - Bituminous bound material. VO = 0,0	
		0.50	ES		0.50	48.49		MADE GROUND - Light grey and grey-brown, sandy gravel with cobbles. Gravels consist of fine to medium, angular to sub-angular unidentifiable lithologies. VO = 0,0	1
		1.40 - 1.55	ES		1.55	47.44		Orange-brown, slightly gravelly, sandy, friable SILT. Gravels consist of fine to coarse, sub-rounded to rounded unidentifiable lithologies. VO = 0,0	
					1.60	47.39		Very weak to weak, grey SANDSTONE. VO = 0,0	2
								End of borehole at 1.60 m	3
									4
									5
									6
									7
									8
									9
									10

Remarks

Borehole terminated at 1.60m on suspected bedrock.



					Borehole Log			Borehole No. CDL-WS27 Sheet 1 of 1	
Project Name: CDL Ground Investigation					Project No. 04020/J		Co-ords: 271866.80 - 195695.00		Hole Type WLS
Location: Coed Darcy, Neath					Level: 49.60		Scale 1:50		Logged By
Client: St. Modwen Developments					Dates: 24/05/2021 -				

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20			49.40		MADE GROUND - Grass onto topsoil. VO = 0,0		
		0.60	ES				MADE GROUND - Brown, silty, sandy, gravelly clay with frequent cobbles. Gravels consist of fine to coarse, angular to sub-angular unidentifiable lithologies. Cobbles are angular to sub-angular. VO = 0,0	1	
		1.40 - 1.60	ES		1.30		Brown, slightly gravelly, clayey, sandy SILT with decaying organic material. Gravels consist of fine to medium, sub-angular to sub-rounded unidentifiable lithologies. VO = 0,0		
					1.70		Very weak to weak, grey SANDSTONE. VO = 0,0	2	
					1.75		End of borehole at 1.75 m		
								3	
								4	
								5	
								6	
								7	
								8	
								9	
								10	

Remarks Borehole terminated at 1.75m on suspected bedrock.								
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Borehole Log

Borehole No.
CDL-WS28
Sheet 1 of 1

Project Name: CDL Ground Investigation

Project No.
04020/J

Co-ords: 271849.30 - 195662.10

Hole Type
WLS

Location: Coed Darcy, Neath

Level: 50.81

Scale
1:50

Client: St. Modwen Developments

Dates: 24/05/2021 -

Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.25			0.25	50.56		MADE GROUND - Grass onto topsoil. VO = 0,0	
		0.50	ES					MADE GROUND - Brown, clayey, silty, sandy gravel with frequent cobbles. Gravels consist of fine to coarse, sub-angular to sub-rounded brick, concrete and clinker. Cobbles consist of brick, concrete and clinker. VO = 0,0	1
		1.35 - 1.60	ES						
					2.00	48.81		End of borehole at 2.00 m	2
									3
									4
									5
									6
									7
									8
									9
									10

Remarks
Borehole terminated at 2.00m on suspected bedrock.





Borehole Log

Borehole No.
CDL-WS29
Sheet 1 of 1

Project Name: CDL Ground Investigation

Project No.
04020/J

Co-ords: 271828.80 - 195736.60

Hole Type
WLS

Location: Coed Darcy, Neath

Level: 50.64

Scale
1:50

Client: St. Modwen Developments

Dates: 24/05/2021 -

Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20	ES		0.15 0.27 0.27	50.49 50.37 50.37		MADE GROUND - Grass onto topsoil. VO = 0,0 MADE GROUND - Brown, slightly gravelly clay. Gravels consist of fine to medium, sub-angular to sub-rounded unidentifiable lithologies. VO = 0,0 Very weak to weak, grey and brown SANDSTONE. VO = 0,0 End of borehole at 0.27 m	1 2 3 4 5 6 7 8 9 10

Remarks
Inspection pit terminated at 0.27m on bedrock.





Borehole Log

Borehole No.
CDL-WS30
Sheet 1 of 1

Project Name: CDL Ground Investigation

Project No.
04020/J

Co-ords: 271843.70 - 195768.70

Hole Type
WLS

Location: Coed Darcy, Neath

Level: 52.40

Scale
1:50

Client: St. Modwen Developments

Dates: 24/05/2021 -

Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.60	ES		0.20 0.50 1.00 1.05	52.20 51.90 51.40 51.34	   	MADE GROUND - Grass onto topsoil. VO = 0,0 MADE GROUND - Brown, slightly sandy, slightly gravelly clay. Gravels consist of fine to coarse, sub-angular to sub-rounded unidentifiable lithologies. VO = 0,0 Orange-brown, sandy, gravelly SILT. Gravels consist of fine to coarse, angular to sub-rounded unidentifiable lithologies. VO = 0,0 Very weak to weak, grey and brown SANDSTONE. VO = 0,0 End of borehole at 1.05 m	1 2 3 4 5 6 7 8 9 10

Remarks
Inspection pit terminated at 1.05m on bedrock.





Borehole Log

Borehole No.
CDL-WS31
Sheet 1 of 1

Project Name: CDL Ground Investigation

Project No.
04020/J

Co-ords: 271870.70 - 195771.00

Hole Type
WLS

Location: Coed Darcy, Neath

Level: 51.16

Scale
1:50

Client: St. Modwen Developments

Dates: 24/05/2021 -

Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20			0.20	50.96		MADE GROUND - Grass onto topsoil. VO = 0,0	
		0.45			0.45	50.70		MADE GROUND - Dark orange-brown, sandy, gravelly clay, with occasional cobbles. Gravels consist of fine to coarse, sub-angular to sub-rounded unidentifiable lithologies. VO = 0,0	
		0.80	ES		0.80	50.36		MADE GROUND - Dark brown, sandy gravel with occasional cobbles. Gravels consist of fine to coarse, sub-angular to sub-rounded unidentifiable lithologies. VO = 0,0 End of borehole at 0.80 m	1
									2
									3
									4
									5
									6
									7
									8
									9
									10

Remarks
Inspection pit terminated at 0.80m due to presence of electricity cable.





Borehole Log

Borehole No.

CDL-WS32

Sheet 1 of 1

Project Name: CDL Ground Investigation

Project No.
04020/J

Co-ords: 271816.90 - 195744.50

Hole Type
WLS

Location: Coed Darcy, Neath

Level: 54.49

Scale
1:50

Client: St. Modwen Developments

Dates: 24/05/2021 -

Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.15			0.15	54.34		MADE GROUND - Grass onto topsoil. VO = 0,0	
		0.40			0.40	54.09		MADE GROUND - Brown, silty, sandy gravels with cobbles. Gravels consist of fine to coarse, angular to sub-angular unidentifiable lithologies. VO = 0,0	
		0.75			0.75	53.74		Orange-brown, slightly sandy, gravelly SILT. Gravels consist of fine to coarse, sub-angular to sub-rounded unidentifiable lithologies. VO = 0,0	1
		0.80			0.80	53.69		Very weak to weak, grey and brown SANDSTONE. VO = 0,0 End of borehole at 0.80 m	2
									3
									4
									5
									6
									7
									8
									9
									10

Remarks

Inspection pit terminated at 0.80m on bedrock.







Borehole Log

Borehole No.
CDL-WS34
Sheet 1 of 1

Project Name: CDL Ground Investigation

Project No.
04020/J

Co-ords: 271840.30 - 195817.60

Hole Type
WLS

Location: Coed Darcy, Neath

Level: 50.58

Scale
1:50

Client: St. Modwen Developments

Dates: 24/05/2021 -

Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.25	ES		0.17 0.35 0.35	50.41 50.23 50.23		MADE GROUND - Grass onto topsoil. VO = 0,0	
								MADE GROUND - Brown, sandy, gravelly clay. Gravels consist of fine to coarse, sub angular to sub-rounded unidentifiable lithologies. VO = 0,0	
								Weak, grey SANDSTONE. VO = 0,0	
								End of borehole at 0.35 m	

1
2
3
4
5
6
7
8
9
10

Remarks
Inspection pit terminated at 0.35m on bedrock.



					Borehole Log			Borehole No. CDL-WS35 Sheet 1 of 1	
Project Name: CDL Ground Investigation					Project No. 04020/J		Co-ords: 271858.80 - 195844.50		Hole Type WLS
Location: Coed Darcy, Neath					Level: 48.02		Scale 1:50		Logged By
Client: St. Modwen Developments					Dates: 24/05/2021 -				

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.15			0.15	47.87		MADE GROUND - Grass onto topsoil. VO = 0,0	
		0.50	ES		0.70	47.32		MADE GROUND - Brown, gravelly, sandy clay. Gravels consist of fine to coarse, sub-angular to sub-rounded unidentifiable lithologies. VO = 0,0	
					0.70	47.32		Weak, grey SANDSTONE. VO = 0,0 End of borehole at 0.70 m	

Remarks

Inspection pit terminated at 0.70m on bedrock.



Borehole Log

Borehole No.

CDL-WS36

Sheet 1 of 1

Project Name: CDL Ground Investigation

Project No.
04020/J

Co-ords: 271743.90 - 195841.20

Hole Type
WLS

Location: Coed Darcy, Neath

Level: 47.78

Scale
1:50

Client: St. Modwen Developments

Dates: 24/05/2021 -

Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10			0.10	47.68		MADE GROUND - Grass onto topsoil. VO = 0,0	
		0.60	ES					MADE GROUND - Brown, clayey, sandy, gravelly silt with occasional cobbles. Gravels consist of fine to coarse, sub-angular to sub-rounded clinker, glass, tile and plastic. Cobbles consist of clinker. VO = 0,0	1
		1.10			1.10	46.68		Brown and black, sandy, gravelly SILT. Gravels consist of fine to medium, sub-angular to sub-rounded sandstone. VO = 0,0	
		1.20			1.20	46.58		Orange-brown, slightly gravelly, sandy SILT. Gravels consist of fine to medium, sub-angular to sub-rounded sandstone. VO = 0,0	
		1.60	ES					...damp from 1.60m.	2
		1.90			1.90	45.88		Very weak to weak, grey SANDSTONE. VO = 0,0	
		2.10			2.10	45.68		End of borehole at 2.10 m	

Remarks

Borehole terminated at 2.10m on suspected bedrock.

				Borehole Log				Borehole No. CDL-WS37 Sheet 1 of 1	
Project Name: CDL Ground Investigation				Project No. 04020/J		Co-ords: 271743.70 - 195797.30		Hole Type WLS	
Location: Coed Darcy, Neath				Level: 52.96		Scale 1:50			
Client: St. Modwen Developments				Dates: 25/05/2021 -		Logged By			
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.40	ES		0.45	52.51		MADE GROUND - Grass onto dark brown, slightly clayey, sandy gravel with occasional cobbles. Gravels consist of fine to coarse, angular to sub-angular plastic and sandstone. Cobbles consist of sandstone. VO = 0,0 End of borehole at 0.45 m	1 2 3 4 5 6 7 8 9 10
Remarks Inspection pit terminated at 0.45m on bedrock.									



Borehole Log

Borehole No.
CDL-WS38
Sheet 1 of 1

Project Name: CDL Ground Investigation

Project No.
04020/J

Co-ords: 271889.60 - 196113.10

Hole Type
WLS

Location: Coed Darcy, Neath

Level: 33.99

Scale
1:50

Client: St. Modwen Developments

Dates: 25/05/2021 -

Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.20	33.79		MADE GROUND - Block paving and subbase. VO = 0,0	
					0.40	33.59		MADE GROUND - Light grey sand and gravel. Gravels consist of fine to coarse, angular to sub-angular mudstone. VO = 0,0 End of borehole at 0.40 m	
									1
									2
									3
									4
									5
									6
									7
									8
									9
									10

Remarks

Inspection pit terminated at 0.40m due to suspected ACM encountered in the base of the pit. Laboratory testing confirmed the material did not contain asbestos.



Borehole Log

Borehole No.

CDL-WS39

Sheet 1 of 1

Project Name: CDL Ground Investigation

Project No.
04020/J

Co-ords: 271876.30 - 196118.20

Hole Type
WLS

Location: Coed Darcy, Neath

Level: 31.50

Scale
1:50

Client: St. Modwen Developments

Dates: 25/05/2021 -

Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10			0.10	31.40		MADE GROUND - Brown sand and woodchip. VO = 0,0	
		0.50	ES		0.60	30.90		MADE GROUND - Light and dark grey, slightly clayey, sand and gravel. Gravels consist of fine to coarse, angular to sub-rounded brick and mudstone. VO = 0,0 ...damp from 0.40m	1
		1.00	ES					MADE GROUND - Black and dark grey, slightly clayey, very sandy gravel. Gravels consist of fine to coarse, angular to sub-rounded brick, metal, plastic, glass, clinker and sandstone. VO = 0,0 ...suspected railway sleeper at 1.00m within inspection pit. Creosote odour noted associated with railway sleeper. ...wet at 1.50m, with visible hydrocarbon sheen. VO = 4,2	2
		1.40 - 1.50	ES		1.55	29.95		Light and dark grey, silty, sandy CLAY with decaying organic material. VO = 0,1 ...becoming very sandy from 1.70m.	
		1.80 - 2.00	ES						
		2.80 - 3.00	ES		3.00	28.50		End of borehole at 3.00 m	3
									4
									5
									6
									7
									8
									9
									10

Remarks

Borehole terminated at 3.00m due to borehole collapse. Borehole collapsed to 2.65m.

					Borehole Log			Borehole No. CDL-WS40	
Project Name: CDL Ground Investigation					Project No. 04020/J		Co-ords: 271677.40 - 196042.90		Sheet 1 of 1
Location: Coed Darcy, Neath					Level: 34.12		Hole Type WLS		Scale 1:50
Client: St. Modwen Developments					Dates: 25/05/2021 -		Logged By		

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10			0.10	34.02		MADE GROUND - Bituminous bound material. VO = 0,0	
		0.20			0.20	33.92		MADE GROUND - Light grey, very sandy gravel. Gravels consist of fine to coarse, sub-angular brick, concrete and mudstone. VO = 0,0	
		0.50	ES		0.80	33.32		MADE GROUND - Light grey, very sandy gravel. Gravels consist of fine to coarse, angular to sub-angular brick, concrete and mudstone. VO = 0,0 End of borehole at 0.80 m	1
									2
									3
									4
									5
									6
									7
									8
									9
									10

Remarks Inspection pit terminated at 0.80m due to obstruction/refusal.								
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Borehole Log

Borehole No.
CDL-WS41

Sheet 1 of 1

Project Name: CDL Ground Investigation

Project No.
04020/J

Co-ords: 271692.90 - 196140.50

Hole Type
WLS

Location: Coed Darcy, Neath

Level: 33.93

Scale
1:50

Client: St. Modwen Developments

Dates: 25/05/2021 -

Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10			0.10	33.83		MADE GROUND - Bituminous bound material. VO = 0,0	
		0.50	ES		0.70	33.23		MADE GROUND - Light grey, very sandy gravel. Gravels consist of fine to coarse, sub-angular to sub-rounded brick, concrete and mudstone. VO = 0,0	1
		1.00	ES					Light grey, mottled orange-brown, slightly gravelly, clayey SAND with frequent decaying organic material. Gravels consist of fine to coarse, sub-angular to sub-rounded sandstone. VO = 0,0	
		1.35 - 1.45	ES		1.45	32.48		End of borehole at 1.45 m	2
									3
									4
									5
									6
									7
									8
									9
									10

Remarks

Borehole terminated at 1.45m due to obstruction/refusal.



					Borehole Log			Borehole No. CDL-WS42	
Project Name: CDL Ground Investigation					Project No. 04020/J		Co-ords: 271742.80 - 196138.10		Sheet 1 of 1 Hole Type WLS
Location: Coed Darcy, Neath					Level: 33.54		Scale 1:50		
Client: St. Modwen Developments					Dates: 26/05/2021 -		Logged By		
Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.15			0.15	33.39		MADE GROUND - Dark brown, clayey, very sandy gravel. Gravels consist of fine to coarse, angular to sub-rounded brick, concrete and bituminous bound material. VO = 0,0	
		0.50	ES		0.80	32.74		MADE GROUND - Brown and grey, slightly clayey, very sandy gravel with cobbles. Gravels consist of fine to coarse, angular to sub-rounded brick, concrete, bituminous bound material and sandstone. Cobbles consist of sandstone. VO = 0,1	1
		1.00	ES		1.20	32.34		MADE GROUND - Black and dark grey, slightly gravelly, very sandy clay. Gravels consist of fine to coarse, sub-angular to sub-rounded brick, concrete and sandstone. VO = 0,1	2
		1.40 - 1.50	ES		2.30	31.24		Light grey, brown and orange-brown, slightly gravelly, very sandy CLAY with frequent decaying organic material. Gravels consist of fine to coarse, angular to rounded sandstone. VO = 0,1	
		1.90 - 2.00	ES		3.20	30.34		Red-brown, brown and grey, slightly gravelly, very clayey SAND. Gravels consist of fine to coarse, sub-angular to sub-rounded sandstone. VO = 0,1	3
		2.80 - 3.00	ES		3.45	30.09		...becoming wet from 3.10m and slight hydrocarbon sheen noted. VO = 1,1	
		3.35 - 3.45	ES					Green and brown, slightly clayey SAND. VO = 0,1	4
								End of borehole at 3.45 m	
									5
									6
									7
									8
									9
									10
Remarks Borehole terminated at 3.45m due to obstruction/refusal.									



Borehole Log

Borehole No.
CDL-WS43
Sheet 1 of 1

Project Name: CDL Ground Investigation

Project No.
04020/J

Co-ords: 271700.70 - 196042.20

Hole Type
WLS

Location: Coed Darcy, Neath

Level: 33.88

Scale
1:50

Client: St. Modwen Developments

Dates: 26/05/2021 -

Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
									1
									2
									3
									4
									5
									6
									7
									8
									9
									10

Remarks
Inspection pit terminated at circa 0.40m due to obstruction/refusal.





Borehole Log

Borehole No.
CDL-WS44
Sheet 1 of 1

Project Name: CDL Ground Investigation

Project No.
04020/J

Co-ords: 271725.90 - 196046.20

Hole Type
WLS

Location: Coed Darcy, Neath

Level: 33.74

Scale
1:50

Client: St. Modwen Developments

Dates: 26/05/2021 -

Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
									1
									2
									3
									4
									5
									6
									7
									8
									9
									10

Remarks
Inspection pit terminated at circa 0.40m due to obstruction/refusal.





Borehole Log

Borehole No.
CDL-WS45

Sheet 1 of 1

Project Name: CDL Ground Investigation

Project No.
04020/J

Co-ords: 271724.80 - 196044.70

Hole Type
WLS

Location: Coed Darcy, Neath

Level: 33.76

Scale
1:50

Client: St. Modwen Developments

Dates: 26/05/2021 -

Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
									1
									2
									3
									4
									5
									6
									7
									8
									9
									10

Remarks
Inspection pit terminated at circa 0.40m due to obstruction/refusal.





Borehole Log

Borehole No.
CDL-WS46
Sheet 1 of 1

Project Name: CDL Ground Investigation

Project No.
04020/J

Co-ords: 271718.30 - 196041.20

Hole Type
WLS

Location: Coed Darcy, Neath

Level: 33.74

Scale
1:50

Client: St. Modwen Developments

Dates: 26/05/2021 -

Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
									1
									2
									3
									4
									5
									6
									7
									8
									9
									10

Remarks
Inspection pit terminated at circa 0.40m due to obstruction/refusal.





Borehole Log

Borehole No.
CDL-WS47
Sheet 1 of 1

Project Name: CDL Ground Investigation

Project No.
04020/J

Co-ords: 271732.20 - 196051.50

Hole Type
WLS

Location: Coed Darcy, Neath

Level: 33.63

Scale
1:50

Client: St. Modwen Developments

Dates: 26/05/2021 -

Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
									1
									2
									3
									4
									5
									6
									7
									8
									9
									10

Remarks
Inspection pit terminated at circa 0.40m due to obstruction/refusal.





Borehole Log

Borehole No.
CDL-WS48
Sheet 1 of 1

Project Name: CDL Ground Investigation

Project No.
04020/J

Co-ords: 271732.50 - 196055.40

Hole Type
WLS

Location: Coed Darcy, Neath

Level: 33.60

Scale
1:50

Client: St. Modwen Developments

Dates: 26/05/2021 -

Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
									1
									2
									3
									4
									5
									6
									7
									8
									9
									10

Remarks
Inspection pit terminated at circa 0.40m due to obstruction/refusal.





Borehole Log

Borehole No.
CDL-WS49
Sheet 1 of 1

Project Name: CDL Ground Investigation	Project No. 04020/J	Co-ords: 271715.20 - 196094.40	Hole Type WLS
Location: Coed Darcy, Neath		Level: 33.68	Scale 1:50
Client: St. Modwen Developments		Dates: 26/05/2021 -	Logged By

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
									1
									2
									3
									4
									5
									6
									7
									8
									9
									10

Remarks
Inspection pit terminated at 0.10m due to concrete obstruction.



					Borehole Log			Borehole No. CDL-WS50 Sheet 1 of 1	
Project Name: CDL Ground Investigation					Project No. 04020/J		Co-ords: 271842.40 - 196081.10		Hole Type WLS
Location: Coed Darcy, Neath					Level: 31.60		Scale 1:50		
Client: St. Modwen Developments					Dates: 26/05/2021 -		Logged By		

Well	Water Strikes	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20			31.40	 MADE GROUND - Bituminous bound material and subbase. VO = 0,0  MADE GROUND - Dark grey and black, clayey, sandy gravel. Gravels consist of fine to coarse, angular and sub-rounded brick, concrete and mudstone. VO = 0,1 <i>...clay pipe noted in side wall of inspection pit at 0.70m.</i>  MADE GROUND - Blue-grey, mottled grey-brown, slightly gravelly, very clayey SAND. Gravels consist of fine to coarse, sub-angular to sub-rounded sandstone (REWORKED NATURAL). VO = 0,2  Light grey, blue-grey, mottled orange-brown, gravelly, very clayey SAND. Gravels consist of fine to coarse, angular to rounded mudstone and sandstone. (TILL) VO = 0,2 <i>...wet from 1.50m and hydrocarbon sheen noted.</i> <i>...wet and coarse gravels present from 2.40m to 2.60m.</i>  Gravels consist of fine to coarse, sub-angular sandstone. End of borehole at 2.80 m			
		0.50	ES						
		1.00	ES		30.70				1
		1.45 - 1.55	ES		30.40				
		1.90 - 2.00	ES						2
		2.70 - 2.80	ES		2.80				3
								4	
								5	
								6	
								7	
								8	
								9	
								10	

Remarks Borehole terminated at 2.80m due to obstruction/refusal.		
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Appendix E Laboratory Analytical Results – Ground Investigation



Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US
Tel: (01244) 528700
Fax: (01244) 528701
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

PJA Civil Engineering
Seven House
High Street
Longbridge
Birmingham
B31 2UQ

Attention: Liam Clark

CERTIFICATE OF ANALYSIS

Date of report Generation:	01 June 2021
Customer:	PJA Civil Engineering
Sample Delivery Group (SDG):	210519-29
Your Reference:	CDL - Coed Darcy
Location:	Llandarcy Business Park, Skewen, Neath
Report No:	600098

This report has been revised and directly supersedes 599787 in its entirety.

We received 19 samples on Tuesday May 18, 2021 and 19 of these samples were scheduled for analysis which was completed on Tuesday June 01, 2021. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 210519-29 **Client Reference:** CDL - Coed Darcy **Report Number:** 600098
Location: Llandarcy Business Park, Sk Order Number: **Superseded Report:** 599787

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
24293092	CDLWS01		1.05 - 1.05	17/05/2021
24293030	CDL-WS01		0.75 - 0.75	17/05/2021
24293097	CDL-WS01		1.45 - 1.45	17/05/2021
24293102	CDL-WS02		0.55 - 0.55	17/05/2021
24293107	CDL-WS02		1.00 - 1.00	17/05/2021
24293113	CDL-WS02		1.50 - 1.50	17/05/2021
24293119	CDL-WS02		2.00 - 2.00	17/05/2021
24293125	CDL-WS02		2.35 - 2.35	17/05/2021
24293130	CDL-WS03		0.50 - 0.50	17/05/2021
24293036	CDL-WS04		0.60 - 0.60	17/05/2021
24293042	CDL-WS04		1.10 - 1.10	17/05/2021
24293047	CDL-WS04		1.50 - 1.50	17/05/2021
24293053	CDL-WS04		2.00 - 2.00	17/05/2021
24293060	CDL-WS04		2.90 - 2.90	17/05/2021
24293065	CDL-WS05		0.50 - 0.50	17/05/2021
24293070	CDL-WS05		1.00 - 1.00	17/05/2021
24293076	CDL-WS05		1.50 - 1.50	17/05/2021
24293082	CDL-WS05		2.00 - 2.00	17/05/2021
24293087	CDL-WS05		2.50 - 2.50	17/05/2021

Only received samples which have had analysis scheduled will be shown on the following pages.

