- September 2004 – Contaminated Land Risk Assessment, Addendum 1.
- September 2004 – Contaminated Land Risk Assessment, Addendum 2a.
- October 2004 – Waste Removal and Disposal Strategy.
- November 2004 – Scrap Yard Hydrocarbon Assessment.
- November 2004 – Waste Management Update
- November 2004 – Cadmium Re-assessment.
- November 2004 – Colliery shale Leachate Assessment.
- January 2005 – Validation Report Silica Waste Area Re-assessment.
- August 2005 – Validation Report Rolling Mill Sludge Area Re-assessment.
- January 2007 – Validation Report.
- April 2007 – Refined Conceptual Site Model.
- August 2007 – Verification Report
- November 2007 – Final Verification Results

And the following report provided by Land Quality Management Limited

- November 2004 – Review of Soil Cadmium Assessment.

The report also summarises the outcome of two meetings with Carmarthenshire County Council and the Environment Agency.

4.20.2 Report Conclusions & Recommendations

The report provides limited additional information; however, it concludes by stating the site poses no risk to human health or controlled waters although this is caveated that development areas 2,5 and 6 will include a minimum of 0.6m of site won topsoil over the colliery spoil in garden areas.

4.21 ASSESSMENT OF MINING SUBSIDENCE RISK (GIW - NOVEMBER 2013)

4.21.1 Report Scope

The report presents the findings of the mining investigation and addresses the risk of ground subsidence associated with the possible presence of old coal mine workings in the Phase 1 and Phase 2 development areas.

4.21.2 Report Findings

The investigation and risk assessment presented above has established that the Phase 1 and Phase 2 development areas are underlain by the Big and Green coal seams. The Big seam has been worked extensively beneath the Phase 2 area and beneath the western and southern margins of the Phase 1 area. However, the depth of the Big Seam and of identified workings within it are considered too deep to pose a significant risk of subsidence at the ground surface. The report therefore concludes that no special remedial action is warranted in respect of such subsidence risk within the Phase 1 and Phase 2 areas.

4.22 CROSS HANDS ECONOMIC LINK ROAD PHASE 2 GEOTECHNICAL INTERPRETIVE REPORT (OVE ARUP & PARTNERS, MARCH 2014)

4.22.1 Report Scope

The report provides a geotechnical and ground contamination assessment of the proposed routes for the link road, currently under construction on the site. The area of investigation does not extend to the spur road across the site, however investigation was undertaken in the former quarry / landfill located to the west of the current study area.

4.22.2 Report Findings

The report records the made ground material within the historical landfill to a maximum depth of 1.5m bgl and notes that this material contains *"soil constituents only with inclusions of bricks".*

The results of the chemical testing of samples from the route of proposed road, including made ground samples from the former landfill were compared to generic screening values for both commercial and residential end uses. The report notes *"concentrations are typically below limits of detection and / or well below guideline values"*.

Within the context of the risk to controlled waters, a number of exceedances were also noted in soil derived leachate samples, although the report notes that *"it is anticipated that the above concentrations reflect the natural background quality of soils within the region"*.

The report also recommends that additional assessment should be undertaken on material from the former landfill for the presence of asbestos containing materials.

4.23 REMEDIAL STRATEGY TO MITIGATE RISKS FROM COAL MINING (ESP - DECEMBER 2017)

4.23.1 Report Scope

Planning permission has been granted for the development (Ref: E/32266, dated 18th October 2017). This includes Condition 19 which relates to potential risks from mining:

> "Prior to the commencement of development and in accordance with the recommendations made in the Preliminary Coal Mining Information and Mitigations Report undertaken by Earth Science Partnership dated 22 May 2017, the following need to be submitted for the written approval of the Local Planning Authority:
>
> *a)* The submission of a scheme of intrusive site investigations for shallow mine workings and the recorded entry for approval
>
> *b)* The undertaking of that scheme of intrusive site investigations
>
> *c)* The submission of a report of findings arising from the intrusive site investigations
>
> *d)* The submission of a scheme of remedial works for approval; and Subsequent implementation of those remedial works"

4.23.2 Report Findings

Between August and December 2017, ESP constructed six boreholes to a maximum depth of 50m across the Parc Emlyn Link Road (In addition to previous boreholes constructed across the site by ESG (2013) and GIW (2013).

Table 4-2 – Summary of Coal Seams for the Emlyn Link Road

Approx. Chainage[1]	Hole Ref	Coal Seam Depths (m bgl)	Coal Seam Thickness (m)	Approx. Depth to Rockhead (m)	Existing Competent Rock over Coal Seam (m)	Approx. Proposed Earthworks	Competent Rock Post-Earthworks (m)3	Workings or Coal Seam Thickness/ Rock Cover[4]
PARC EMLYN LINK								
65	ER146	37.9 – 39.1*	1.2	8.5	29.4	5.0m Fill	29.4	24.5
125	ER107	*No Coal Seams to 50m*		12.5	*No Coal Seams*	1.0m Fill	*No Coal Seams to 50m*	
260	BH13	14.0 – 14.2	0.2	11.9	2.1	0.3m Fill	2.1	10.5
		15.1 – 15.2	0.1		3.2		3.2	32
260	BH15	47.4 – 49.5	2.1	11.3	36.1	0.3m Fill	36.1	17.2
325	BH14	19.0 - 19.2	0.2	11.9	7.1	1.0m Fill	7.1	35.5
		21.0 – 21.1	0.1		9.1		9.1	91
		52.0 – 53.5	1.5		40.1		40.1	26.7
325	BH16	48.5 – 50.5*	2.0	11.7	36.8	1.0m Fill	36.8	18.4
400	ER111	*No Coal Seams to 30m*		11.5	*No Coal Seams*	No Change	*No Coal Seams to 30m*	
440	BH09	*No Coal Seams to 50m*		5.8	*No Coal Seams*	No Change	*No Coal Seams to 50m*	
455	ER112	*No Coal Seams to 43m*		6.1	*No Coal Seams*	No Change	*No Coal Seams to 43m*	

Notes:

1. All chainages are approximate and are based on the chainages indicated on the latest route alignment (Ref: Alignment Only Jan 17, provided by CCC on 24/10/2017). Chainages begin at the intersection between the main road and the Emlyn Link.
2. The findings are specific to the investigation locations and cannot be assumed as generally representative in some areas due to the significant deformation of the stratigraphy.
3. This is based on the approximate finished formation levels indicated on a Long Section Earthworks Profile provided by the client.
4. The colour coding provides an assessment of risk: Red = Higher Risk, Amber = Moderate Risk, Green = Lower Risk.
5. * Probable Mine Workings Encountered

The Coal Authority report for the Emlyn Link Road (Rpt Ref: 51001723993001) indicates that shallow mine workings exist at a depth of the less than 10m beneath the proposed route.

Investigation along the length of the Emlyn Link Road does not concur with this (see Table 4-2 above) with no significant shallow coal seams being encountered. Workings have been identified in the Big Coal Seam

between depths of between 40 and 55m, however based on the calculated void migration ratios these are unlikely to pose a subsidence risk.

ESP consider no remedial action is warranted in this area. If any evidence of workings are encountered during clearance operations the above should be re-considered.

5.0 PLANNING CONTEXT

The site has been subject to a number of historical planning applications associated with the redevelopment of the site, with a number of supporting documents available on the Carmarthenshire County Council website for review.

The following sections provide a summary of the relevant planning applications and the associated documents considered to be pertinent to the current review.

5.1 E/32266 PROPOSED DEVELOPMENT OF PHASE 2 OF THE CROSS HANDS ECONOMIC LINK ROAD

The site remains largely undeveloped, however at the time of writing, construction of Phase 2 of the Cross Hands Economic Link Road is ongoing with a section of the new road located within the site boundary. It is understood that this road will provide access to the site for any future developments. The access road forms a spur off the main link road which is located to the west of the site, the location of the road is shown in the constraints drawing presented as Figure 3.

A number of planning conditions were attached to the consent including Conditions 9 to 12 relating to contaminated land.

*9. No development shall commencement until an assessment of the nature and extent of contamination affecting the application site area (Reference - Location Plan 1:2500 scale Drawing Ref. 080/0060/061 – PA01 (Rev. A) has been submitted to and approved in writing by the local planning authority. This assessment must be carried out by or under the direction of a suitably qualified competent person *in accordance with BS10175 (2011) Investigation of Potentially Contaminated Sites Code of Practice and shall assess any contamination on the site, whether or not it originates on the site :-*

i. A preliminary risk assessment which has identified:
- *all previous uses*
- *potential contaminants associated with those uses*
- *a conceptual site model (CSM) which identifies and assesses all identified potential source, pathway and receptor linkages*
- *potentially unacceptable risks arising from contamination at the site.*

ii. An intrusive site investigation, based on (i) to provide information for a detailed assessment of the risk to all identified receptors that may be affected, including those off site.

iii. An assessment of the potential risks shall include:
- *human health,*
- *groundwater and surface waters*
- *adjoining land, • property (existing or proposed) including buildings, crops, livestock, pets,*
- *woodland and service lines and pipes,*
- *ecological systems,*
- *archaeological sites and ancient monuments; and*
- *any other receptors identified at (i)*

iv. The site investigation results and the detailed risk assessment (ii) and, based on these, an options appraisal and remediation strategy giving full details of the remediation measures required and how they are to be undertaken.

v. A verification plan providing details of the data that will be collected in order to demonstrate that the works set out in (iv) are complete and identifying any requirements for longer-term monitoring of pollutant linkages, maintenance and arrangements for contingency action.

All work and submissions carried out for the purposes of this condition must be conducted in accordance with Welsh Local Government Association and the Environment Agency Wales' 'Development of Land Affected by Contamination: A guide for Developers' (2012) Any changes to these components require the express consent of the local planning authority. The scheme shall be implemented as approved.

10. Prior to the first use of any part of the development hereby approved, a verification report demonstrating completion of the works set out in the approved remediation strategy and the effectiveness of the remediation shall be submitted to and approved, in writing, by the local planning authority. The report shall include results of sampling and monitoring carried out in accordance with the approved verification plan to demonstrate that the site remediation criteria have been met. It shall also include any plan (a "long-term monitoring and maintenance plan") for longer-term monitoring of pollutant linkages, maintenance and arrangements for contingency action, as identified in the verification plan, and for the reporting of this to the local planning authority.

11. Reports on monitoring, maintenance and any contingency action carried out in accordance with a long-term monitoring and maintenance plan shall be submitted to the local planning authority as set out in that plan. On completion of the monitoring program a final report demonstrating that all long- term site remediation criteria have been met and documenting the decision to cease monitoring shall be submitted to and approved in writing by the local planning authority.

12. In the event that, during development, contamination not previously identified is found to be present at the site then no further development (unless otherwise agreed in writing with the Local Planning Authority) shall be carried out until the developer has submitted, and obtained written approval from the Local Planning Authority for, an amendment to the remediation strategy detailing how this unsuspected contamination shall be dealt with.

5.2 E/32720 - RESIDENTIAL DEVELOPMENT OF 70 NO. DOMESTIC UNITS - PHASE II. "APPLICATION CURRENTLY UNDER REVIEW"

This application applies to the area of land to the north of the link road which is accessed from the residential development along the northern boundary of the site.

The NRW consultee response includes the following with regards to Contaminated Land:

> *Our previous response of October 2015 requested further information regarding contaminated land. No further information has been submitted for review. We require the submission of a preliminary risk assessment as a minimum for the site. We consider that the controlled waters at this site are of high environmental sensitivity. There is a watercourse within the development site and contamination is known/strongly suspected from its previous use as colliery. We recommend that developers should:*
>
> 1. *Follow the risk management framework provided in CLR11, Model Procedures for the Management of Land Contamination, when dealing with land affected by contamination.*
> 2. *Refer to the Environment Agency's 'Guiding Principles for Land Contamination' for the type of information that we require in order to assess risks to controlled waters from the site. The Local Authority can advise on risk to other receptors, such as human health.*
> 3. *Refer to the Environment Agency's (2017) 'Approach to Groundwater Protection'*

6.0 HISTORICAL MINING

According to the Coal Authority Interactive Viewer (The Coal Authority, 2021) the site is located within a Coal Mining Reporting Area and a Development High Risk Area. As such, a site-specific Coal Authority Consultants Report has been obtained for the site and is presented in Appendix C and summarised in the table below.

Table 6-1 – Summary of Coal Authority Report

Feature	Details
Past Underground Coal Mining	The property is in a surface area that could be affected by from workings in 11 seams of coal at shallow to 345m depth and last worked in 1939.
Present Underground Coal Mining	None recorded within 200 metres of the enquiry boundary.
Future Underground Coal Mining	None recorded.
Mine Entries	There are nineteen known mine entries within, or within 20m of the site boundary.
Probable unrecorded shallow workings	None
Past Opencast Coal Mining	Unlicensed opencast mine to the north-east and east of the site.
Present Opencast Coal Mining	The property is not within 800 metres of the boundary of an opencast site for which a licence to remove coal by opencast methods has been granted.
Future Opencast Coal Mining	There are no licence requests outstanding to remove coal by opencast methods within 800 metres of the boundary.
Coal Mining Subsidence	The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres of the enquiry boundary, since 31 October 1994. There is no current Stop Notice delaying the start of remedial works or repairs to the property. The Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991. No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.
Mine Gas	There are no record of any mine gas issues or hazards relating to coal mining.
Withdrawal of Support	The property is not in an area where a notice to withdraw support has been given. The property is not in an area where a notice has been given under section 41 of the Coal Industry Act 1994, cancelling the entitlement to withdraw support. The property is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

6.1 MINING SUMMARY

A report on the mining conditions at the site was prepared by WYG (September 2005 E6923/PV/MSRep/Sept05/V1). This summarised previous reports (Pre 2005) relating to the Parc Emlyn Site.

Based on the probability of mining subsidence WYG produced a site constraints plan which considered the effect of shallow mining on future site development. Key information from this plan has been represented on Figure 3, The constraints plan splits the site into four classifications.

- Area suitable for development
- Areas suitable for development subject to acceptable probe drilling results
- Areas suitable for development following treatment (shallow grouting or excavation)
- Areas of suitable for development following intensive multi-stage treatment (including deep drilling and grouting)

Areas of shallow workings and shafts and adits are included in the area requiring further investigation and treatment.

6.1.1 Undermined ground

The site is undermined by the:

The Stanllyd seam
This seam has been worked below the Green Vein but at such a depth as not to jeopardise the stability of the surface in this sector.

The Green Vein
Although the Green Vein is only 1m thick it has been worked extensively and its roadways would have been at least 2m high. This void would easily pass upwards by progressive collapse to reach the workings in the Big Vein.

The Big Vein
Workings in the Big Vein were a minimum of 3m high, making the combined void height 4-5m.

Workings may be present in areas beyond and outside those indicated in the abandonment plans.

6.1.2 Shafts and adits

Detailed investigations of the following shafts and adits were carried out by WYG in 2005. The areas of concern have been either treated or else the areas have been left. The following table presents an outline summary of the findings and recommendations:

Table 6-2 – Summary of Recorded Shafts and Adits On Site

Index	Previous recommendations	Comment
Shaft 258213-**033**	Not located in 2005 investigation, further investigation required. To be treated to Engineers specification.	Treated in 2005. Located in *'Area suitable for development following treatment'*
Shaft 258213-**034**	Located in 2005 investigation, further investigation required. To be treated to Engineers specification.	Treated in 2005. Located in *'Area suitable for development following treatment'*

Index	Previous recommendations	Comment
Shaft 258213-**035**	Probably located in 2005 investigation, further investigation required. To be treated to Engineers specification.	Requires treatment. Located in *'Area that may require further treatment'*
Shaft 258213-**061**	Not located in 2005 investigation, further investigation required. To be treated to Engineers specification.	Requires treatment. Located in *'Area that may require further treatment'*
Shaft 258213-**062**	Not located in 2005 investigation, further investigation required. To be treated to Engineers specification.	Requires treatment. Located in *'Area that may require further treatment'*
Adit 258213-**051**	Not located in recent investigation, further investigation required. To be treated to Engineers specification.	Requires treatment. Located in *'Area that may require further treatment'*

6.1.2.1 Shaft 034

Shaft 034 was capped in December 2005 as per the WYG specification.

6.1.2.2 Adit 123 and Shaft 33

Adit 123 was treated in December 2005. At the adit entrance rock head was found at a depth of 1m. The rock was broken out over a period of 4 weeks to expose the workings to a depth of approximately 13m below ground level. The adit was then treated with 9m^3 of concrete before the excavation was filled and compacted with site won material.

Shaft 33 was a 3m deep air shaft on adit 123 which was excavated during the excavation.

Ground investigation drilling works, and visual inspections indicated that the drift was orientated in the direction of the zone to the south used for the soft soil depository area. This area being to the north of the deposition area is classed as being 'Area suitable for development'.

7.0 COAL MINING RISK ASSESSMENT

Table 7-1 summarises the key hazards identified by review of the available data sources, the factors affecting risk posed by each hazard and an assessment of the estimated risk proposed to any redevelopment of the site.

Assessing risks from coal mining is based upon guidance provided by the Coal Authority following a 'risk based' approach implemented through PPG 14 – Development on Unstable Land and adopted in Wales.

The risk posed has been assessed as one of three categories.

High risk	Based upon the data available there is a significant risk of shallow ground instability associated with coal mining. Investigation will be required as part of the site re-development. Mitigation measures likely to be required.
Moderate risk	Based upon the data available there is a potentially significant risk of shallow ground instability associated with coal mining. Investigation will be required as part of the site re-development. Mitigation measures may be required.
Low risk	Based upon the data available there is a low risk of shallow ground instability associated with coal mining. No further assessment or investigation is recommended.

The table below summarises the potential risks associated with coal mining legacy at the site.

Table 7-1 – Coal Mining Risk Categories

Coal Mining Legacy	Yes	No	Risk Assessment
Underground coal mining (recorded)	✓		Required
Shallow (<30m) underground coal mining (recorded)	✓		Required
Underground coal mining (unrecorded)	✓		Required
Shallow (<30m) underground coal mining (unrecorded)	✓		Required
Recorded Mine entries (Shafts and adits)	✓		Required
Coal and ironstone mining geology	✓		Required
Record of previous mine gas emissions		x	Not Required
Record of coal mining surface hazard		x	Not Required
Surface mining (recorded/unrecorded)		x	Not Required

Based on the information obtained from this assessment, the following risk assessment has been compiled (Table 7-2), which identifies plausible risks at the site that require mitigation in the context of the proposed end use.

Table 7-2 - Identified Risks and Mitigation

Hazard	Area of site affected	Factors affecting risk	Risk estimate	Mitigation
Collapse of workings (recorded and unrecorded) shallow coal seams <30m	Southern portion of the site - (See Figure 3)	The Coal Authority believes that there is the potential for coal at or close to the surface which may have been worked in the past. The Coal Authority recommends that the potential for such should be considered prior to development on site. The Coal Authority Interactive Mapping of the area shows the site to lie within a high-risk development area.	High	Rotary open borehole drilling of high risk areas as identified on the constraints plan. For shallow workings excavation, re-compaction or grouting may be required remedial treatment. Deep workings may also require grouting.
Collapse of workings (recorded and unrecorded) shallow coal seams <30m	Central, eastern & northern portions of the site – (See Figure 3)	The Coal Authority believes that there is the potential for coal at or close to the surface which may have been worked in the past. The Coal Authority recommends that the potential for such should be considered prior to development on site. The Coal Authority Interactive Mapping of the area shows the site to lie within a high-risk development area.	Low	Previous investigations have shown that workings beneath these areas of the site are sufficiently deep at to not pose a risk to future development.
Collapse of workings (recorded and unrecorded) shallow coal seams <30m	Western portion of site (See Figure 3)	The Coal Authority believes that there is the potential for coal at or close to the surface which may have been worked in the past. The Coal Authority recommends that the potential for such should be considered prior to development on site. The Coal Authority Interactive Mapping of the area shows the site to lie within a high-risk development area.	Low to moderate	Although there is limited borehole data for this part of the site, it is likely that any workings will be at sufficient depth so as not to be deemed high risk. This requires confirming with a series of rotary probe hole drilling.

Hazard	Area of site affected	Factors affecting risk	Risk estimate	Mitigation
Collapse associated with shaft and adits	Southern portion of the site - (See Figure 3 & Table 5-2)	Possibility of adit and associated substantial voids close to the surface at the site or near the edge of the site boundary. High risk of void collapse and surface propagation.	High	All untreated mine entries should be located to determine their risk to the proposed development and to determine any treatment to mitigate the risk they propose.

7.1 CONCLUSIONS AND RECOMMENDATIONS

For a significant part of the site (central, eastern and northern areas), there is a low risk of ground instability as a result of recorded/unrecorded shallow (<30m) mining and mining geology. This area is delineated on Figure 3. The mine entries located in this area (Shaft 258-213-033 and Adit 258-213-123) were treated as part of the previous remedial works. No buildings should be constructed over these treated entries, but roadways or parking areas are normally permitted with use of geogrids. No further remedial works for mine workings are deemed necessary in this area.

In the southern area of the site, there is a high risk of ground instability. This is a consequence of recorded/unrecorded shallow (<30m) mining and mining geology being present in addition to the five former mine entries (four shafts and one adit) being present. Only one of the mine entries is known to have been treated (258-213-034). Based on the previous investigation undertaken this area can be further sub-divided as follows:

- Areas requiring further probing drilling to confirm absence or presence of shallow works.
- Areas requiring shallow ground treatment/remedial measures comprising excavation and re-compaction and/or shallow grouting.
- Areas requiring deep drill and grouting (multistage treatment) and may require deep foundations.

The above areas are shown on the Constraints Plan contained within the WYG Validation report and for simplicity have not been carried forward into Figure 3 within this report

The western area of the site has not been subject to extensive previous investigations. Although there is limited borehole data for this part of the site, it is likely that any workings will be at sufficient depth so as not to be deemed high risk. This will need to be confirmed by rotary probe drilling

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8.0 GEOTECHNICAL CONSIDERATIONS

Based on the information identified in the preceding sections, the table below summarises the anticipated ground conditions and associated geotechnical assessment for the site, including highlighting the potential constraints for future development. Actual ground conditions may need to be confirmed through ground investigation in due course.

8.1 ANTICIPATED GROUND CONDITIONS

The solid geology according to the British Geological Survey of Great Britain (Sheet 230 – 1:50,000 Series) indicates the site to be underlain by Middle Coal Measures of the Carboniferous Period. A synclinal structure is shown on the map trending north-east to south-west.

The site is shown on the map to be covered by Made Ground. Peat deposits are also shown within and adjacent to the site. Glacial Till is present to the south-west of the site

The following ground conditions are anticipated underlying the site:

- Made Ground – Colliery Spoil
- Peat Deposits
- Glacial Sands and Gravels
- Middle Coal Measures Mudstones

8.2 SLOPE STABILITY

The site was noted to be predominantly flat during the site walkover and as such no issues in relation to slope stability are anticipated.

8.3 ENABLING WORKS

8.3.1 Anticipated Cut and Fill

The site is predominantly flat and as such no significant cut and fill is considered likely to facilitate the proposed development.

8.3.2 Ground Improvement

Given the nature of the site and anticipated ground conditions, ground improvement may be required to enable the proposed development.

8.4 ANTICIPATED FOUNDATION REQUIREMENTS

8.4.1 Foundations

Given the anticipated ground conditions it is considered likely that traditional shallow foundations (Likely to be rafts and/or strip and pads) will be suitable within the context of the proposed development. Suitable founding strata are likely to be identified within Made Ground deposits.

Floor slabs may be ground bearing (If incorporated into reinforced rafts) or suspended depending on the proposed development and the findings of any additional ground investigations.

8.4.2 Pavements

Based on the assumed ground conditions, ground improvement may be required prior to the construction of pavements.

8.5 TEMPORARY WORKS

8.5.1 Excavations

Due to the anticipated ground conditions, excavations may exhibit some degree of instability and may require battering or site protection to facilitate the proposed development.

8.5.2 Groundwater

Shallow groundwater isn't anticipated on the site, during the 2005 intrusive investigation and subsequent monitoring it was recorded as being between 177.3m and 180m AOD. Localised dewatering of perched water may be required during the development.

8.5.3 Inground Obstructions

Given the previous developments (Earthworks) on the site, inground obstructions are not anticipated across the site, although where reclamation has not occurred in ground obstructions should be anticipated and these would require excavation prior to the development.

8.6 DRAINAGE

The shallow soils underlying the site are anticipated to exhibit low permeability.

8.7 POTENTIAL CONSTRAINTS

Previous ground works have been undertaken to remove Japanese knotweed from within the site boundary, with the contaminated soils buried in a designated area noted on Figure 3. It is recommended that advice should be sought from an invasive weed specialist with regards to the potential restrictions to development in this this area, and to inspect the site for areas of potential re-growth.

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9.0 GEOTECHNICAL RISK REGISTER

9.1 INTRODUCTION

The geotechnical risks associated with this project have been identified and relevant health and safety issues have also been considered. The register highlights the risks and consequence of those risks.

The following Geotechnical Risk Register has been considered with regard to the details of other construction related risks known at this time. The risks have been evaluated using the risk evaluation matrix suggested in Part 2 of CD622 'Managing Geotechnical Risk, which is reproduced as Table 9-1.

For the purposes of this report, risk has been assessed with reference to 'probability', 'impact' and 'risk rating'. Risk rating I = Probability (P) x Impact (I).

The Geotechnical Risk Register has been compiled to show the degree of risk attached to various ground related aspects of the proposed development. The purpose of the register is to provide an assessment of the risk to the project posed by common ground related problems, identify suitable mitigation measures that would connect the risk to an acceptable level. The risk register should be developed and refined as the geotechnical design and assessment progresses such that the register will allow the management of the geotechnical risks.

The inclusion of a risk in the register does not constitute as confirmation that the problem actually exists at the Site. A probability of "very unlikely" is indicative of a condition which the available data suggests should not be present. The calculated risk is not the risk that the impact will occur. It is the risk that mitigation will be required to enable the project to progress. For the purposes of this risk register the magnitude of each impact of the resulting severity of risk is measured against that which would/could "normally" be expected for each element. Before incorporation into the risk register, the impacts and risks for each element should be moderated by an assessment of the cost and time implication of the individual mitigation measures.

9.1.1 Risk Register

The Geotechnical Risk Register has been developed in general accordance with the guidance presented in ICE/DETR Document "Managing Geotechnical Risk" (2001) and the HA document CD622. The degree of risk (R) is determined by combining an assessment of the probability (P) of the hazard occurring with an assessment of the impact (i) the hazard and associated mitigation will cause if it occurs (R = P x i). The scale against which the probability and impact are measured, and the resulting degree of risk determined is presented below.