



Remediation Strategy Report

Site: Eagle House, Port Talbot

Prepared For: Castell Construction Ltd

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TABLE OF CONTENTS

SECTION 1 Introduction and Proposed Development	1
1.1 Introduction	1
1.2 Objectives	1
1.3 Previous Investigations and Assessments	1
1.4 Limitations and Exceptions of Investigation	1
1.5 Quality Assurance	1
SECTION 2 Site Characteristics	2
2.1 Site Location and Description	2
2.2 Site History Summary	3
2.3 Geology and Ground Conditions	5
2.4 Radon	5
2.5 Hydrogeology and Hydrology	5
2.6 Identified Contamination	5
2.6.1 Soils	5
SECTION 3 Sources of Contamination Requiring Remediation	7
SECTION 4 Proposed Remedial and Mitigating Measures	8
4.1 General	8
4.1.1 Protection of Construction & Maintenance Workers and Passers-by or Neighbouring Site Users	8
4.1.2 Protection of Future Site Users (Residents and visitors)	8
4.1.3 Protection of Construction Materials (Potable Water Supply Pipes)	9
SECTION 5 Validation of Remedial and Mitigating Measures	10
5.1 Capping System	10
5.1.1 Imported Soil Validation	10
5.2 Potable Water Supply Pipes	12
5.3 Validation Report	12
SECTION 6 Working Practices	13
6.1 Protection of Construction Workers	13
6.2 Protection of the Environment	13
6.3 Management & Disposal of Soils	14

Tables

Table 2.1 Site History Summary	3
Table 2.2 Detailed Stratigraphical Information	5
Table 2.3 Contaminants of Concern	6
Table 3.1 Summary of Significant Pollutant Linkages	7
Table 5.1 Validation Criteria	11

Figures

Figure 2.1 Site Location	2
Figure 2.2 Proposed Site Development	3

SECTION 1 Introduction and Proposed Development

1.1 Introduction

Castell Construction Ltd (the Client) is proposing a residential development consisting of a four-storey building comprising of 18 upper-floor flats, ground floor office and commercial units, and a car park on land at Eagle House, Oakwood Lane, Port Talbot, SA13 1HG.

TFW Group Ltd have been commissioned by the Client to prepare a Remediation Strategy report for the site.

Previous investigations and assessments have identified that remediation of contamination is required for the development. This report presents a Remediation Strategy for the site based on these previous investigations and assessments.

1.2 Objectives

The objective of the Remediation Strategy is to detail the remedial steps that are required to render the site fit for its intended use.

In summary, the following remediation requirements have been identified and are covered in detail in this report.

- Capping of the site.

1.3 Previous Investigations and Assessments

The Remediation Strategy is based on the findings of previous investigations and assessments. This report shall be read in conjunction with the following documents.

- Geotechnical and Geoenvironmental Site Investigation Report: Residential and Commercial Development at Eagle House, Oakwood Lane, Port Talbot. Report Reference: 160123-17400-ISSUE1, Report Number: 17400, dated: January 2023.

1.4 Limitations and Exceptions of Investigation

This report has been prepared for the sole internal reliance of the Client and its design and construction team. This report shall not be relied upon or transferred to any other parties without the express written authorisation of TFW Group Ltd. If an unauthorised third party comes into possession of this report they rely on it at their peril and the authors owe them no duty of care and skill. The report represents the findings and opinions of experienced geoenvironmental and geotechnical consultants. TFW Group Ltd does not provide legal advice and the advice of lawyers may be required.

It is not within the scope of TFW Group Ltd to:

- Provide Method Statements and Risk Assessments for the site remediation, preparation and development.
- Design, assess or install utility service trench fill and pipes for potable water supply beneath the site.

1.5 Quality Assurance

The quality and environmental aspects of the assessment and investigation comply with UKAS Accredited ISO 9001:2015 and ISO 14001:2015 standards.

SECTION 2 Site Characteristics

The following subsection information has been summarised from previous investigation and assessments listed in **Section 1.3**.

2.1 Site Location and Description

The development site is irregular in shape and locates at Eagle House, Oakwood Lane, Port Talbot, SA13 1HG. The site centres on an approximate National Grid Reference of 276820, 189630, occupying a plan area of approximately 0.12 Hectares.

The site is currently occupied by a carpark at the north and Eagle House (former Custom House) at the south, with a small outbuilding to the northwest. An electricity substation is located at the far northwest corner of the site.

Site boundaries are defined by residential apartments to the north, the A48 main road to the south, residential housing to the east, and Oakwood Lane to the west.

Offsite features include Port Talbot Parkway railway station approximately 40m to the southwest, Aberavon RFC stadium approximately 210m to the northeast and docklands/former docklands to the south of Port Talbot Parkway station. Otherwise, the site is mostly surrounded by residential areas/developments and shops.

Further afield is the River Afan and Port Talbot steelworks, approximately 540m and 1.1km to the northwest and south respectively.

The site elevation is approximately 10m AOD very gradually sloping down to the south.

The site location can be seen on **Figure 2.1** along with the proposed site layout on **Figure 2.1**.



Figure 2.1 Site Location

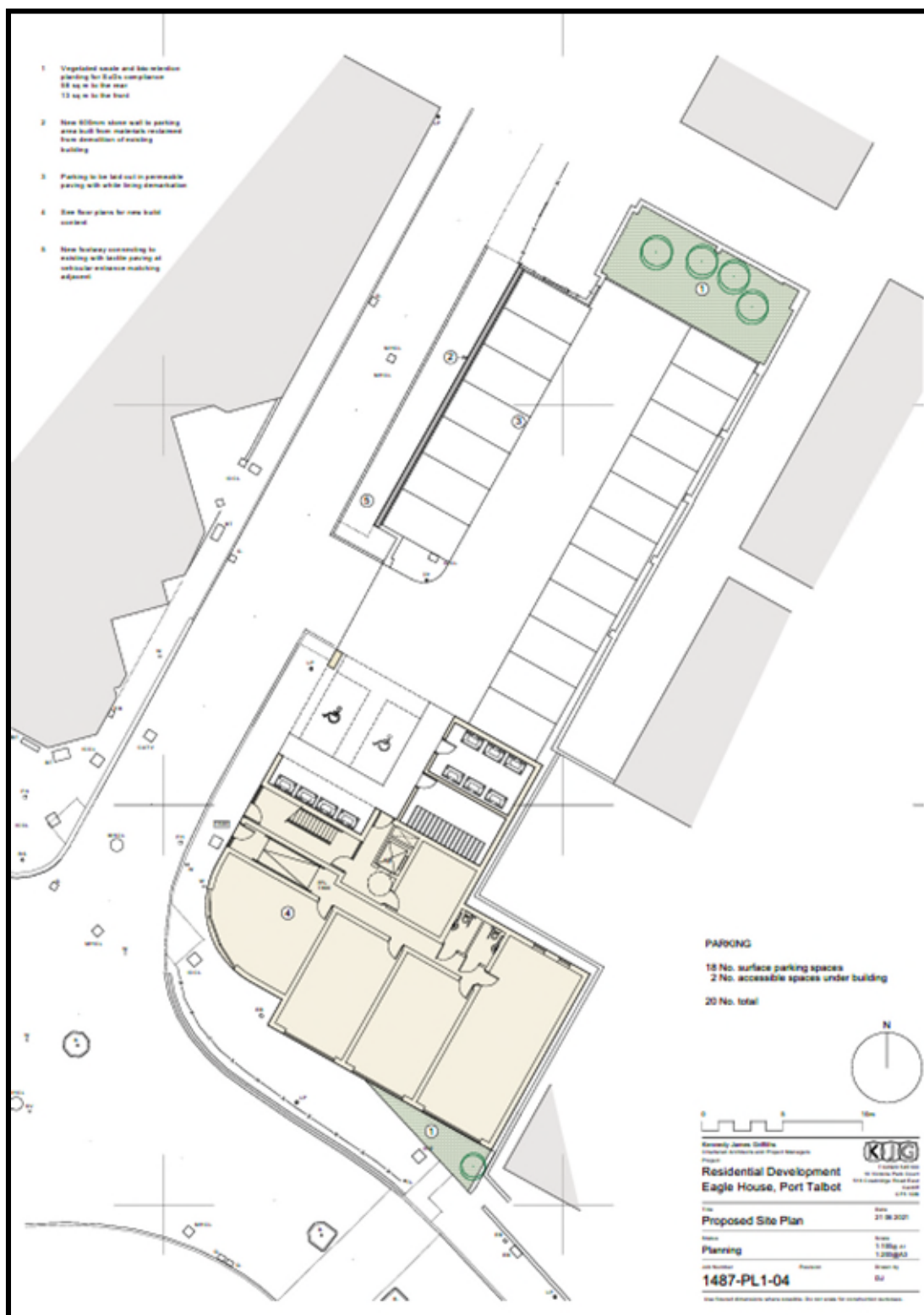


Figure 2.2 Proposed Site Development

2.2 Site History Summary

Historical maps of the site have been obtained from an Envirocheck Report, provided by Landmark Information Group, and summarised in Error! Reference source not found.. Distances, where quoted are approximate, and any changes in-between map editions may not be recorded.

Table 2.1 Site History Summary

Map Edition & Scale	Key Features on Site	Key Features off Site
1876 (1:2,500)	The site is currently occupied by a train track (running northeast to southwest) associated with Port Talbot Station. A smithy, and Eagle Inn at the northwest, and southeast of the site respectively.	Station Road is located to the immediate south, running northwest to southeast. Port Talbot Great Western Railway Line is recorded approximately 40m to the south of the site, running northwest to southeast. Otherwise, the site is mostly surrounded by fields.
1899 (1:2,500)	Previously recorded smithy is no longer recorded at the site. The Port Talbot Station and Eagle Inn have now been renamed Central Station and Temperance Hotel respectively.	Port Talbot Sawmill is recorded approximately 100m to the north/northeast. Central Station has expanded with a new railway line, running north to south, approximately 20m to the east of the site. A large residential development is recorded, as close as approximately 60m to the northwest, extending up to at least 250m from the site.
1917 (1:2,500)	The site remains mostly unchanged.	The site is surrounded by the newly developed Port Talbot town centre, including terrace houses, hotels, schools, and a theatre. An Athletic Ground is recorded approximately 220m to the northeast.
1939 (1:2,500)	Five buildings recorded as 'Lavs' are now recorded at the north of the site. The previously recorded train track at the west of the site is no longer recorded.	Port Talbot Steel Works are recorded approximately 120m to the southwest. Tinplate works are also recorded approximately 250m to the south.
1950-1952 (1:1,250)	The Temperance Hotel has been renamed as Eagle House and the building at the north of the site appears to have been at least partially demolished. Otherwise the site remains mostly unchanged.	Garages (Talbot Garages) are recorded approximately 20m to the north. The Tinplate works formally recorded approximately 250m to the south of the site are no longer in evidence, with three tanks now recorded in that location.
1969 (1:2,500)	The site remains mostly unchanged, however 'Lavs' is no longer recorded as the use of buildings in the north of the site.	The previously recorded Central Station approximately 20m to the east is no longer shown. The Port Talbot Steel Works formally recorded 120m to the southwest has been replaced by an Education & Training Centre. These are located approximately 130m and 220m to the southwest respectively.
1993 (1:1,250)	Four of the buildings at the north of the site are no longer recorded, with only one small outbuilding and Eagle House at the west and south of the site, with areas to the north of the site replaced with a carpark. An Electrical Sub-Station is recorded at the northwest corner of the site.	The Saw Mills formally located approximately 100m to the north/northwest are no longer in evidence. The previously recorded Chemical Works formally located approximately 220m to the southwest of the site are no longer shown and have been replaced by an Industrial Estate.

1999 (1:10,000)	The site remains mostly unchanged.	The surrounding area remains mostly unchanged.
2006 (1:10,000)	The site remains mostly unchanged.	The surrounding area remains mostly unchanged.
2022 (1:10,000)	The site remains mostly unchanged.	The previously recorded Industrial Estate formally located approximately 200m to the southwest is no longer shown.

2.3 Geology and Ground Conditions

The 1:50,000 (Sheet 247) and 1:10,560 scale British Geological Map of the area was consulted for geology underlying the site. Detailed stratigraphical information is provided in **Table 2.1**.

Table 2.1 Detailed Stratigraphical Information

Period	Group	Formation
Carboniferous	South Wales Coal Measures Group	South Wales Middle Coal Measures Formation: Grey, (productive) coal-bearing mudstones/siltstones, with seatearths and minor sandstones.

Strata are typically dipping 3° to the northeast in the local area.

Superficial deposits are recorded as Alluvial Fan Deposits (sand and gravel).

Made ground to an unknown depth is anticipated at the site.

2.4 Radon

No radon protective measures are required for new developments on the investigation site.

2.5 Hydrogeology and Hydrology

The nearest surface water feature locates off site 256m to the south and comprises a river.

The topography of the site gradually slopes down towards to the south. Surface water is likely to drain in this direction.

Superficial deposits beneath the site have an aquifer designation of secondary aquifer – A

The bedrock deposits beneath the site have an aquifer designation of secondary aquifer – A

Deeper groundwater flow within the underlying bedrock will be controlled by the strata dip and any fractures or bedding planes within the rock units.

2.6 Identified Contamination

2.6.1 Soils

Contaminants of concern are those that were found to exceed their residential without plant uptake threshold level.

A summary of substances tested for that were found to be present at concentrations above their respective human health threshold levels used in a residential setting without plant uptake are summarised in **Table 2.1**.

Table 2.3 Contaminants of Concern

Location	Depth	Contaminant	Source
WS01	0.60	Arsenic	S1, S2, S3
WS03	0.20	Lead Benzo(a,k)anthracene	S1, S2, S3
WS05	0.20	Lead	S1, S2, S3
WS05	0.60	Arsenic Lead	S1, S2, S3
WS06	0.50	Benzo(a,k)anthracene	S1, S2, S3

SECTION 3 Sources of Contamination Requiring Remediation

The summary of the refined conceptual site model is presented in **Table 3.1** and based on findings of previous investigations and assessments, detailing significant pollutant linkages requiring remediation or mitigation.

Table 3.1 Summary of Significant Pollutant Linkages

Source	Pathway	Receptor
Contaminated Soils S1, S2, S3 Arsenic, lead, Benzo(b)fluoranthene Benzo(a)pyrene Benzo(a,k)anthracene	Direct soil and dust ingestion P1	Construction and Maintenance Workers R1
	Dermal contact P3	
	Inhalation of dust and vapours P4	
	Direct soil and dust ingestion P1	Future Site Users (Residents and Visitors) R2
	Dermal contact P3	
	Inhalation of dust and vapours P4	
	Direct soil and dust ingestion P1	Passers-by and Neighbouring Site Users R3
	Dermal contact P3	
	Inhalation of dust and vapours P4	

SECTION 4 Proposed Remedial and Mitigating Measures

4.1 General

Based on the finding of previous investigations and assessments and the identified pollutant linkages the following remedial measures have been devised for the site.

Specific validation requirements for the proposed remedial measures are discussed in the following section.

4.1.1 Protection of Construction & Maintenance Workers and Passers-by or Neighbouring Site Users

The potential production of soil dust containing contaminants during construction works presents a risk to construction and maintenance workers as well as passers-by or adjacent site users through, direct soil and dust ingestion, dermal contact and inhalation of dust.

A selection of mitigating measures is presented below to disrupt the contaminant pathway to the receptor.

- Dust suppression and measures to dampen the material.
- Site perimeter screening.
- Suitable PPE for site workers.

Standard PPE equipment such as gloves and goggles will be effective in mitigating most risks, but equipment such as FFP3 masks for protection against asbestos fibres may be necessary when dealing with surface soils with asbestos. Advice on the most appropriate PPE and other necessary protection measures should be sought from a specialist.

It is therefore essential that the contractor puts in place adequate measures to ensure the safety of all workers.

These measures should be detailed in the contractor's Risk Assessment and Method Statements as well as the contractor's Construction Management Plan.

If during the development works any other unexpected ground conditions or evidence of contamination is found, inspection by a geoenvironmental engineer should be made, and any required testing or investigation carried out prior to continuation of works.

4.1.2 Protection of Future Site Users (Residents and visitors)

Future site users will be potentially at risk from direct soil and dust ingestion, dermal contact and inhalation of dust from soils containing contaminants.

However, the majority of the site will be laid to hardstanding and no residential gardens are intended for the site.

Complete removal of the contaminant source would prove to be uneconomical given the low level of risk identified and the volume of affected soils therefore the installation of a capping system is proposed to interrupt the link between the source and receptor.

The capping system should be installed across the site and should comprise the proposed buildings and hard standing. In landscaped areas, 600mm of suitable clean topsoil/subsoil should be utilised.

Validation of the capping system and imported materials will be required.

Clean material should also be placed along service runs.

4.1.3 Protection of Construction Materials (Potable Water Supply Pipes)

Potable water supply pipes are at risk of degradation when in contact with made ground soils containing contaminants.

It is recommended that a Potable Water Supplier should complete an assessment in accordance with UK Water Industry Research guidance; Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites, UKWIR Report Ref: 10/WM/03/21. The assessment should determine the selection of Water Supply Pipe material.

SECTION 5 Validation of Remedial and Mitigating Measures

The following remedial measure will require verification and inclusion within a Validation Report:

- Capping system (importation of soils and installation)
- Potable water supply pipe (assessment and installation)

5.1 Capping System

Following the importation and placement of 600mm of clean inert material in the soft landscaped areas, verification of the capping thickness should be undertaken.

Validation of the capping system will comprise photographic evidence clearly showing the thickness, depth of individual strata. In addition, samples will either be obtained at this point for validation testing of imported soils in accordance with **Section 5.1.1**, or they will be taken from a stockpile on site prior to being laid.

The soft landscaped areas as shown on **Figure 2.2** should be validated as prescribed.

A validation report including a description of the works undertaken, validation photographs and chemical validation test results shall be presented upon completion.

5.1.1 Imported Soil Validation

Importation of soils will be required to provide a capping layer of clean inert material in identified landscaped and garden areas.

All imported soils, aggregate or stone that are not virgin quarry stone should be validated as suitable for use. Imported materials exempt from validation testing should be accompanied by a transfer note. Transfer notes should be retained and submitted for inclusion within the Validation Report upon completion of the works.

The provider should supply a laboratory analysis report to confirm that the soil/aggregate/stone is suitable for use. Depending on the source and available test data, it may be prudent to independently sample and analyse the materials (if practical) prior to being brought to site.

Sampling and analysis of the soil/aggregate/stone once imported will be required in addition to any taken at source.

In accordance with publication 'Requirements for the Chemical testing of Imported Materials for Various End Uses and Validation of Cover Systems' the number of representative samples required for analysis is dependent on the volume of each source soil. For a volume between 20m³ and 250m³ four samples should be taken. For a volume greater than 250m³, 4 samples per 250m³ should be taken.

Where quantities are lower than 20m³ or exceed 1000m³, the CLO/EHO should be contacted to agree a sampling scheme.

All samples should be analysed for the determinants listed in **Table 5.1**.

Table 5.1 Validation Criteria

Determinand	Units	Guideline Value (Residential)	Source
Inorganic			
Arsenic	mg/kg	40	1
Boron	mg/kg	11000	1
Cadmium	mg/kg	85	1
Chromium III	mg/kg	910	1
Chromium VI	mg/kg	6	1
Copper	mg/kg	7100	1
Lead	mg/kg	310	2
Mercury	mg/kg	40	1
Nickel	mg/kg	180	1
Selenium	mg/kg	430	1
Zinc	mg/kg	40000	1
Cyanide	mg/kg	8	3
Asbestos	%	Non Detected	-
Organics – Phenol & PAH			
Phenol	mg/kg	120	1
Naphthalene	mg/kg	2.3	4
Acenaphthylene	mg/kg	2900	4
Acenaphthene	mg/kg	3000	4
Flourene	mg/kg	2800	4
Phenanthrene	mg/kg	1300	4
Anthracene	mg/kg	31000	4
Fluoranthene	mg/kg	1500	4
Pyrene	mg/kg	3700	4
Benzo(a)anthracene	mg/kg	11	4
Chrysene	mg/kg	30	4
Benzo(b)fluoranthene	mg/kg	3.9	4
Benzo(k)fluoranthene	mg/kg	110	4
Benzo(a)pyrene	mg/kg	3.2	4
Indeno(123cd)pyrene	mg/kg	45	4
Dibenzo(ah)anthracene	mg/kg	0.31	4
Benzo(ghi)perylene	mg/kg	360	4
Organics – TPH			
PH C5 – C6 Aliphatic	mg/kg	42	4
PH C6 – C8 Aliphatic	mg/kg	100	4
PH C8 – C10 Aliphatic	mg/kg	27	4
PH C10 – C12 Aliphatic	mg/kg	130	4
PH C12 – C16 Aliphatic	mg/kg	1100	4
PH C16 – C21 Aliphatic	mg/kg	65000	4
PH C21 – C35 Aliphatic	mg/kg	65000	4
PH C5 – C7 Aromatic	mg/kg	370	4
PH C7 – C8 Aromatic	mg/kg	860	4
PH C8 – C10 Aromatic	mg/kg	47	4
PH C10 – C12 Aromatic	mg/kg	250	4
PH C12 – C16 Aromatic	mg/kg	1800	4
PH C16 – C21 Aromatic	mg/kg	1900	4
PH C21 – C35 Aromatic	mg/kg	1900	4
1 - LQM/CIEH Suitable For Use Level (S4UL) 2015			
2 - Defra Category 4 Screening Level (Provisional value)			
3 - Environment Agency CLEA v1.06 Derived Value (Now withdrawn)			
4 - S4UL threshold based on 1% soil organic matter			

5.2 Potable Water Supply Pipes

A copy of the potable water supply pipe assessment, along with evidence of the water supply pipe installation, should be retained for inclusion in the Validation Report.

Photographic evidence of the installation shall be provided by the **groundworker** for inclusion in the Validation Report.

5.3 Validation Report

Following completion of the works a verification report should be compiled demonstrating the completion and effectiveness of the works set out in the Remediation Strategy.

The Verification Report should include, but not limited to, the following:

1. A record of any areas where made ground is removed (service runs, under roads etc).
2. If made ground is disposed of off-site, a record of the volume removed, from which areas and details of the receiving landfill. Transfer tickets should be retained.
3. If excavated made ground is to be retained on site the CL:AIRE materials management plan should be provided.
4. A record of the number of imported soil sources and their respective volumes.
5. Details of the source and supplier of all imported soils.
6. Chemical test certificates for imported soils where available from the provider.
7. Chemical test data for all imported soils as sampled at source (if possible) and on site.
8. Details of the source and volume of any imported stone/aggregate.

SECTION 6 Working Practices

6.1 Protection of Construction Workers

In order that construction workers are protected during site works across the site the following should be adhered to:

1. Compliance with health and safety regulations.
2. Provision of Method Statements and Risk Assessments.
3. Compliance with Control of Substances Hazardous to Health (COSHH) Assessment.
4. Good level of Personal Protection Equipment (PPE).
5. Good level of hygiene by site workers.
6. Dust suppression measures.
7. Emergency contingencies should be defined prior to commencement of site works.

6.2 Protection of the Environment

During the remediation and construction periods, there is a risk to the environment and adjacent sites from de-watering, excavations, moving contaminated soil, drainage misconnections, discharges of perched groundwater to local surface waters or the ground, runoff from construction materials and/or exposed ground, wheel washing and oil or chemical spills.

A drainage plan should be devised, identifying manholes to prevent pollutants accidentally reaching surface water sewers. Temporary drainage measures may need to be put in place.

The contractor(s) must also strictly adhere to the Pollution Prevention Guidelines for Working at Construction and Demolition Sites (PPG6). This publication gives both advice and guidelines which should be followed with regards to the planning and preparation of site works, site drainage, delivery and storage of construction materials, the management of waste, good housekeeping in particular to prevent runoff of silt and other fines into nearby water courses, refuelling, concrete and what to do in the event of an emergency.

Within the documentation prepared by the contractor(s), the following information should be provided, but not limited to:

- Project Description.
- Key participants/contractor(s).
- Technical procedures.
- Phasing of works and approximate timescales.
- Site plans to scale.
- Details of consents or license needed.
- Health and Safety, COSHH Assessment, Method Statements and Risk Assessments.
- Emergency contingencies.

In addition, the following precautions should also be taken.

- All potential chemicals and associated risks and emergency procedures for spills/leaks should be considered in the site risk assessment and the details provided to all site employees.
- Any potential pollutant materials or chemicals/detergents used on site should be adequately stored in suitable containers, with clear labelling.
- Any oil or hazardous substance containers and associated pipe works should be enclosed within a bund.
- Care taken during delivery of materials, with correct supervision and labelling detailing the substance and its quantities.
- All delivery drivers should be informed of procedures and restrictions.

- Any materials on delivery should be covered to ensure there is no spillage.
- Any detergents, paints, chemicals etc should not be allowed to be discharged into surface drains or water courses.
- Washing out and cleaning of concrete/cement plant should be carried out in a contained area with adequate measures to collect all run-off water.
- Security and prevention of vandalism, especially of oil drums/containers.

6.3 Management & Disposal of Soils

During site works excavations of the made ground are anticipated.

All materials excavated should be managed and stored appropriately in a controlled manner to ensure protection of site construction workers and neighbouring site users, and to prevent the transfer of contamination to other areas of the site.

If possible, and if levels allow, any excavated made ground should be retained on site and relocated beneath areas of hardstanding. This would provide the most sustainable approach and avoid landfill and haulage fees, disruption and aggravation of local residents caused by haulage lorries and would avoid unnecessary CO₂ emissions.

Any movement and transfer of materials on site should be documented in a materials management plan, in accordance with 'CL:AIRE Definition of Waste: Development Industry Code of Practice (DoW CoP)'.

Alternatively, excavated made ground may be disposed of at landfill. Prior to disposal classification of the material will need to be completed in accordance with Environment Agency protocol detailed in 'Technical Guidance WM3 – Waste Classification - Guidance on the Classification and Assessment of Waste'.

A contaminated land specialist should supervise and document any earthworks on site.

Waste transfer and disposal must be undertaken by an authorised person. A waste transfer note must accompany each load and records should be maintained for inspection if required.



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