



Remediation Strategy Report

Site: Proposed Greggs Drive Through,
Baglan Bay Retail Park, Port Talbot

Prepared For: Triple Jersey Limited

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SECTION 1 Introduction and Proposed Development

1.1 Introduction

Triple Jersey Limited (the Client) is proposing the development of a Greggs Drive Through at Baglan Bay Retail Park on Christchurch Road, Port Talbot, SA12 7BZ. The development site is roughly rectangular in shape and centres on an approximate National Grid Reference of 274700, 190880, occupying a plan area of approximately 0.17 Hectares.

The site is occupied by an asphalt-covered car park for Baglan Bay Retail Park, and stands adjacent to a B&M Store, and a KFC drive-through restaurant.

TFW Group Ltd (Terra Firma) 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.

- Installation of capping system across the site. Capping soils to be underlain by double no-dig barrier comprising a geotextile membrane and a geogrid.

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 relevant documents.

- Terra Firma (Wales) Limited Geotechnical & Geo-environmental Report – Proposed Greggs Drive Through, Baglan Bay Retail Park, Port Talbot. July 2022. Job Number 16843. Reference 010722-16843-02.

1.4 Roles and Responsibilities

Table 1.1 Roles and Responsibilities

Role	Organisation
Client	Triple Jersey Limited
Local Authority	Neath Port Talbot Council
Geoenvironmental Consultant	Terra Firma

1.5 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 geo-environmental 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 Terra Firma to:

- Provide Method Statements and Risk Assessments for the site remediation, preparation and development.

1.6 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.

2.1 Site Location and Description

The development site is roughly rectangular in shape and locates within the car park of Baglan Bay Retail Park on Christchurch Road, Port Talbot, SA12 7BZ. The site centres on an approximate National Grid Reference of 274700, 190880, occupying a plan area of approximately 0.17 Hectares.

The site is occupied by an asphalt-covered car park for Baglan Bay Retail Park, and stands adjacent to a B&M Store, and a KFC drive-through restaurant.

Site boundaries are defined by a car park access road to the northeast, car parking to the southeast and northwest and a fence separating the site from Afan Way (A4241) to the southwest.

Retail development lies to the north and east, light industrial units lie to the southwest of Afan Way, and car parking continues to the southeast.

The site elevation is approximately flat and lies at approximately 8m AOD.

The site location can be seen on **Figure 2.1** along with the proposed site layout in **Drawing 01**.

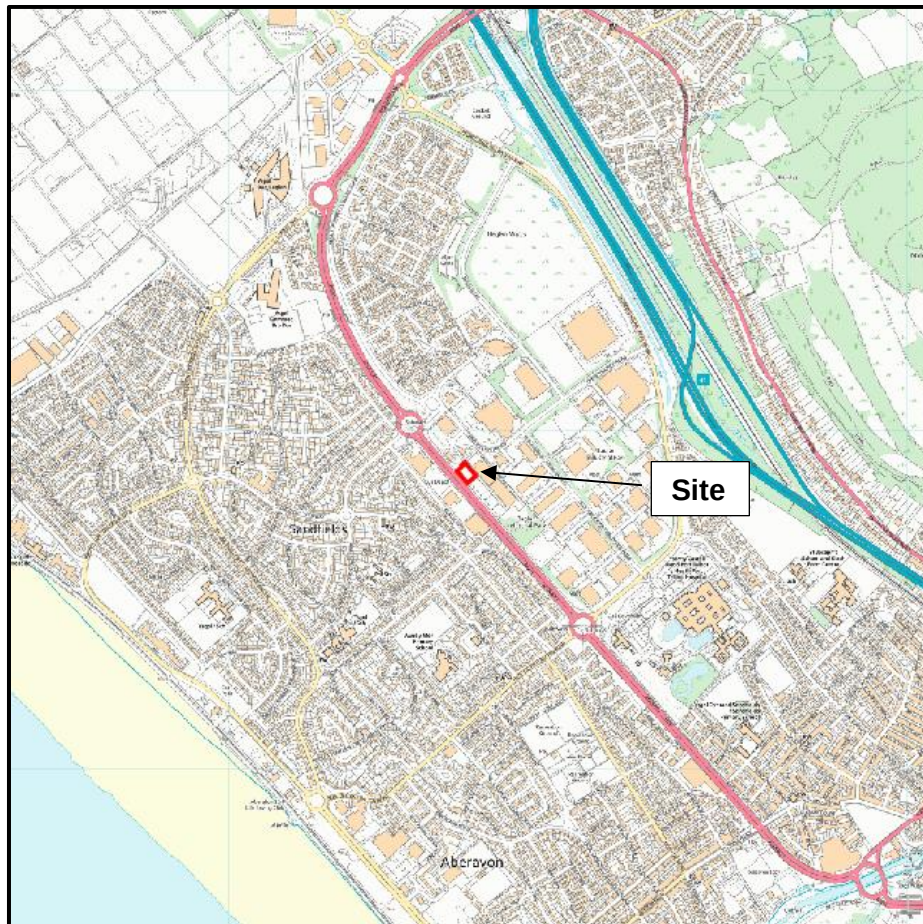


Figure 2.1 Site Location

2.2 Site History Summary

The site first became developed by a cigar factory sometime between 1952 and 1972. After its demolition sometime between 1995 and 2006 the site became occupied by a retail park car park..

2.3 Geology and Ground Conditions

The 1:50,000 scale British Geological Map of the area (Sheet 247) was consulted for geology underlying the site. The site is shown to be underlain by South Wales Middle Coal Measures rock. Detailed stratigraphical information is provided in Error! Reference source not found..

Table 2.1 Detailed Stratigraphical Information

Period	Group	Formation
Carboniferous		South Wales Middle Coal Measures Formation - Grey, (productive) coal-bearing mudstones/siltstones, with seatearths and minor sandstones.
Quaternary		Blown Sand (south) - Sand that has been transported by wind, or sand consisting predominantly of wind-borne particles. Over Tidal Flat Deposits (north) - including mud flat and sand flat deposits, are deposited on extensive nearly horizontal marshy land in the intertidal zone that is alternately covered and uncovered by the rise and fall of the tide.

There are no coal seams identified by the geological map that could lie at shallow depth beneath the site.

Superficial deposits are recorded as Blown Sand at the south and Tidal Flat deposits at the north.

Made ground of unknown depth is anticipated at the site.

The ground conditions encountered by the exploratory holes in this investigation can in general be summarised as shown in **Table 2.2**.

Table 2.2 Summary of Typical Ground Conditions

Depth (m)			Thickness (m)	Stratum
0.00	-	0.1	0.1	ASPHALT
0.1	-	0.2/0.4	0.1/0.3	MADE GROUND. Dense brown very sandy GRAVEL of angular sandstone.
0.2/0.4	-	2.2/2.3	1.9/2.25	MADE GROUND. Dense brown and grey variably clayey very sandy GRAVEL of angular concrete, bitumen, slag, brick and sandstone.
2.2/2.3	-	2.5/2.6	0.3/0.4	MADE GROUND. Medium dense black and brown fine to medium SAND .
2.5/2.6	-	>3.0	-	Medium dense light yellowish brown fine to medium SAND .

2.4 Radon

Radon protective measures are not required for new developments on the investigation site.

2.5 Hydrogeology and Hydrology

Superficial and bedrock deposits beneath the site have aquifer designations 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.

The hydraulic gradient will be at its steepest during periods of heavy rainfall and aquifer recharge.

The site does not locate within a groundwater source protection zone.

There are no groundwater abstraction points located within 1km of the site.

The site is not located within a groundwater source protection zone.

The nearest surface water feature locates 605m off site to the east and comprises a drainage channel located alongside a road.

Surface water is likely to be intercepted by on site drainage.

2.6 Identified Contamination

2.6.1 Made Ground Soils

Laboratory soil test results highlight Asbestos (chrysotile) fibres/clumps was record in made ground soils.

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 investigations and assessments, detailing significant pollutant linkages requiring remediation or mitigation.

Table 3.1 Summary of Significant Pollutant Linkages

Source	Pathway	Receptor
S1 - Contaminated Made Ground Soils	P1 - Direct soil and dust ingestion P3 - Dermal contact P4 - Inhalation of dust and vapours P12 - Inhalation of asbestos fibres	R1 - Construction and maintenance workers R3 - Passers-by or neighbouring site users R2 - Future site users (residents)

SECTION 4 Proposed Remedial and Mitigating Measures

4.1 General

Based on the finding of the 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.

4.2 Contaminated Made Ground Soils

4.2.1 Protection of Future Site Users (Residents)

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

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 above made ground soils in private and communal garden areas and comprise 600mm thick capping layer of imported clean inert soils. All capping soils should be directly underlain by a double no-dig barrier comprising a geotextile membrane and a geogrid.

Beneath areas of the site due to be covered by hard-standing or buildings, the made ground will be suitably capped so no further action is required.

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

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

The potential production of soil dust containing contaminants and asbestos fibres 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, inhalation of dust or inhalation of asbestos fibres.

The advice of an Asbestos Consultant is recommended and as a minimum the following precautions should be employed:

- Dust suppression and measures to dampen the material
- Suitable PPE for site workers
- Air monitoring on the site boundary
- Personal air monitors (for a time to determine actual personnel / asbestos fibre interaction)

In addition to the above it is best practise to clean down plant and change air filters on any plant used in the works with asbestos contaminated material.

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

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

4.2.3 Protection of Construction Materials (Potable Water Supply Pipes)

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

In accordance with the UK Water Industry Research publication 'Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites (Report 10/WM/03/21)' it may be prudent to adopt the use of PE-AL-PE Barrier pipe in lieu of undertaking a full UKWIR assessment. Reference should be made to the above publication for exact product specification.

Verification of the Water Supply Pipe installation may be required.

4.2.4 Surface Waters

During the construction period, there is a risk to surface waters from surface runoff derived from digging foundations, moving contaminated soil, and/or exposed ground and wheel washings.

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

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)

5.1 Capping System

Following the importation and placement of 600mm of clean inert material in the private and communal gardens of all plots, verification of the capping thickness should be undertaken by the **Geoenvironmental Consultant**. As previously stated, capping soils should be directly underlain by a geogrid and geotextile membrane.

Validation of the capping system will comprise photographic evidence clearly showing the thickness and depth of individual strata. In addition, samples will be obtained at this point for validation testing of imported soils in accordance with **Section 5.3.1**.

The private garden areas (plots 13-29) of 1 in every 2 plots should be validated as prescribed. A further 4No. locations should be validated in the communal gardens of plots 1-12 and 30-35.

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 private and communal gardens.

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 by the **Client** and submitted to the **Geoenvironmental Consultant** for inclusion within the Validation Report upon completion of the works. Imported soils should be accompanied by an appropriate permit/exemption/declaration to legitimise the import.

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. Soil sampling and analysis will need to be carried out by a **Geoenvironmental Consultant** and the result included in the Validation Report.

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 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

Determinant	Units	Guideline Value (Residential)	Source
Inorganic			
Arsenic	mg/kg	37	1
Boron	mg/kg	290	1
Cadmium	mg/kg	11	1
Chromium III	mg/kg	910	1
Chromium VI	mg/kg	6	1
Copper	mg/kg	2400	1
Lead	mg/kg	200	2
Mercury	mg/kg	40	1
Nickel	mg/kg	180	1
Selenium	mg/kg	250	1
Zinc	mg/kg	3700	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	170	4
Acenaphthene	mg/kg	210	4
Flourene	mg/kg	170	4
Phenanthrene	mg/kg	95	4
Anthracene	mg/kg	2400	4
Fluoranthene	mg/kg	280	4
Pyrene	mg/kg	620	4
Benzo(a)anthracene	mg/kg	7.2	4
Chrysene	mg/kg	15	4
Benzo(b)fluoranthene	mg/kg	2.6	4
Benzo(k)fluoranthene	mg/kg	77	4
Benzo(a)pyrene	mg/kg	2.2	4
Indeno(123cd)pyrene	mg/kg	27	4
Dibenzo(ah)anthracene	mg/kg	0.24	4
Benzo(ghi)perylene	mg/kg	320	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	70	4
PH C7 – C8 Aromatic	mg/kg	130	4
PH C8 – C10 Aromatic	mg/kg	34	4
PH C10 – C12 Aromatic	mg/kg	74	4
PH C12 – C16 Aromatic	mg/kg	140	4
PH C16 – C21 Aromatic	mg/kg	260	4
PH C21 – C35 Aromatic	mg/kg	1100	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			

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, and 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 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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