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INTRODUCTION

1.1 BACKGROUND

ENVIRON UK Limited (ENVIRON) has been retained by Stobart Group Limited (Stobart) to assist with the co-ordination of planned remedial activities at the former AHC Warehousing Facility located of Mathieson Road, Westbank Dock Estate, Widnes and on land formerly occupied by Tessenderlo Chemicals (which forms part of the same overall development site). The land in question is to be substantially redeveloped as a regional distribution centre (located on the AHC portion of the land to the west of Desoto Road) and a refrigerated logistics centre (on the “Tessenderlo” portion of the land to the east of Desoto Road). Figure 1 gives an overview of the various areas of the site that will be referred to in this document. Whilst various elements of the overall scheme are the subject of separate planning applications and approvals, for the purposes of remedial works the entire site should be considered as a single entity.

In order to achieve optimum site levels there is a need for substantial earth movements that will disturb significant quantities of the contaminated material (mainly galigu) that is present there from historic activities in the area. This document sets out how Stobart, their Design Team and remediation contractors plan to manage the environmental issues associated with these materials and develop the site in a manner that is protective of the environment.

Whilst the overall objective of the proposals is to bring about a successful commercial development and associated employment and economic growth opportunities for the area, the redevelopment will also provide the opportunity to substantially remove a major contamination source and remediate the site in a very substantive way. This will lead to the overall environmental betterment of the site, reduced environmental impact on surface waters, eliminate human health exposure linkages and will facilitate the conversion of a potentially harmful material to a beneficial construction material, reducing the environmental burden of importing fill materials and avoiding unsustainable landfill disposal routes.
In simple terms the plan is to use bulk earthworking techniques (cut and fill) to re-level the land to create a consistent, geotechnically stable formation level. This will involve the diversion of Steward’s Brook along a new channel and into Marsh Brook (which will require re-engineering).

In developing the remedial strategy the following sustainability and environmental protection principles have been applied:

- Where possible all materials generated by the works should be dealt with on site and preferably re-used in a beneficial way to reduce the need to import make-up materials;

- Where off-site removal is unavoidable, preference should be given to re-use and recycling of materials (with pre-treatment if required) over landfill disposal;

- Where such off-site treatment and disposal is necessary the proximity principle shall be applied (namely the materials will be dealt with at competent facilities as close to the site of generation as possible);

- Existing significant pollutant linkages (identified source-pathway-receptor scenarios as defined in the Environmental Protection Act 1990 Part 2a) should be eliminated;

- The overall carbon footprint of the remedial options shall be taken into account in developing an appropriate strategy (i.e. transport and materials import must be balanced against on site solutions);

- The construction activities must not lead to increased environmental impact from the site and must be managed to prevent pollution and nuisance incidents arising; and

- Opportunities for bio-diversity enhancement should be sought.

Whilst it is recognised that there is always the option to undertake further and more detailed rounds of iterative investigation to scope the remedial links and delineate areas that need remediation, in this case the following facts are pertinent:
There have already been numerous rounds of investigation that although not covering the whole site, do give a fairly consistent picture that the site Made Ground is predominantly represented by galigu, with the odd area containing other potential contaminants like hydrocarbons. Consequently we do not expect additional investigations to tell us anything different than we already know or suspect and ultimately on any site there is the potential for unknowns to arise no matter how much you investigate first.

The primary purpose of investigations is to inform the site development and remedial strategy, but in this case we already have a good understanding of this and a remedial action plan has been developed involving cement/lime stabilization of the excavated materials and further investigation will not alter this approach significantly;

Furthermore, the works will effectively involve wholesale earth moving and, where required, on-site treatment of the contaminated material so we will deal with all contamination in the development zone as it arises rather than having a localized “hot-spot” removal approach to remediation (where pre-emptive investigation to delineate the hot spots is more important and residual material risk assessment is required);

There will be an on-site lab to validate the materials arising and enable rapid analysis and characterization of anything unusual that arises for certain simple parameters and to schedule off-site specialized contaminative analyses.

The scale of the works will be such that if a pocket of problematic material is encountered that cannot be dispatched to the stabilization system, the area will be worked around or the material will be moved to a “quarantine” area awaiting analysis and identification of treatment disposal options.

Bearing all of the above in mind, pre-emptive investigations would not provide any benefit and just introduce cost and time delays for the sake of providing non-critical information that will not influence the remedial design, which in broad terms is as follows:

Where the excavated material is uncontaminated (e.g. clay and top-soil) this will be re-used around the site for levelling and landscaping;
- Where the cut material is galigu or other similar contamination (which is expected to be the bulk of it), this will be treated ex-situ with a lime stabilisation technique operated under a Mobile Plant Licence;

- The treated (stabilised) galigu will be emplaced in layers on the area of the site formerly occupied by the Tessenderlo chemical works (now rased and levelled) to form a structurally and chemically stable cap which provides a building platform for a proposed refrigerated logistics centre but also seals the site from percolation of rainwater into contaminated sub-soils and eliminates vapour, ingestion and dermal contact human health risks to site occupiers;

- Where material is encountered during excavations that cannot be lime/cement stabilised, this material will be quarantined (either in-situ or ex-situ) pending identification of appropriate treatment and disposal options, with preference given to on-site treatment and re-use over off-site disposal. This may for example involve bio-remediation or encapsulation of materials;

- Marsh Brook will be cleared of bankside vegetation and dewatered and de-silted prior to re-engineering a new lined (hydraulically sealed) channel that will thenceforth only receive clean surface water discharges (contaminated groundwater ingress will be eliminated). Contaminated sediments and water will be characterised and treated/disposed of accordingly);

- Any groundwater/perched water encountered during the earthworks will be assumed at the outset to be contaminated and impounded accordingly. Pending characterisation analysis, the water will preferentially be treated on site and discharged locally but where this is not feasible it will be tankered away for off-site treatment;

- The site will house a dedicated laboratory for the duration of the earthworks to manage samples and undertake certain basic analyses. It will also undertake quality/validation testing of samples, supported by external verification analysis at MCERTS accredited facilities;
All the construction activities (including groundworks) will operate under a Construction Environmental Management Plan (CEMP) that will set out measures to be applied to prevent pollution and nuisance and to be protective of the environment; and

- Long-term environmental monitoring will be performed via a network of down-gradient groundwater monitoring wells to confirm that residual contaminated groundwater (especially within the former Tessenderlo plant area) is not impacting upon the River Mersey. These monitoring wells will be protected to ensure their ongoing utility during the operational life of the development.

It should be noted that the site, in parts, contains many metres thickness of contaminated soils to significant depths and it is not considered practicable or warranted in terms of risks to the site occupants and neighbours to remediate these deeper materials. As such these will remain largely undisturbed by the proposed development works, other than where piling or deeper excavations intercept them (which has been considered in this document).

1.2 OBJECTIVES

The objectives of this document are severalfold, but in summary these are:

- to provide a robust account of the specific environmental risks that are likely to be associated with the proposed site redevelopment works and subsequent operational life;

- to set out in detail practical measures to be adopted to mitigate these risks to an acceptable level and to remediate excavated materials to such an extent that they can be re-used on site where practicable; and

- to inform the regulatory authorities (Environment Agency and Halton Borough Council) and other stakeholders of these risk assessments and the remedial design to make the site fit for use and environmentally acceptable.

It should be noted that significant design responsibilities are conferred onto the Main Contractor (Stobart Group) and the selected remediation contractors (Beach Stabilisation).
and piling contractors (to be confirmed), who will effectively have to implement this plan. As such, ENVIRON and the Stobart Design Team have co-operated fully with these parties in the development of this remediation plan.

This information in this document focuses primarily upon environmental requirements and does not discuss in detail other requirements that the client and Regulators may have of the contractor as part of Health and Safety requirements under CDM Regulations (which are dealt with in the Site Health and Safety Plan).

For ease of reference this report has been divided into several sub-sections. These are:

- **Section 2** - which provides an overview of the current contamination status and environmental conditions at the site;
- **Section 3** - which presents the risk assessments considering the various potential receptors;
- **Section 4** - which presents the remediation works scope and methodology.

There are also a number of supporting appendices including the galigu stabilisation methodology and the Construction Environmental Management Plan (CEMP) that deals with the environmental protection and management measures that will be adopted throughout the construction phase.

### 1.3 ROLES & RESPONSIBILITIES

There are a number of key parties that will be involved in the remediation works and site development. For the sake of completeness these are described below.

- **Stobart Group Limited** is the Client and developer for the project and will ultimately sanction and approve all works. Stobart is also the main contractor for the works and will implement the design, manage the site and procure and manage all sub-contractors (including the remediation works). It should be noted that the Main Contractor and Remediation Contractors have the primary responsibility to ensure that the Works are free of defects and undertaken in accordance with the Remediation Plan.

- **Beach Stabilisation** is the remedial company charged with the design, management and execution of the remedial works (especially stabilisation and management of the on-site laboratory).
- **WA Fairhurst** is the Consulting Engineer responsible for providing technical design input and overall strategic design of the earthworks (and subsequent construction).

- **ENVIRON** is the Environmental Consultant to the design team and contractors and will verify that the remediation works have been carried out to the satisfaction of the authorities and client. Following completion of the works, ENVIRON will prepare a validation report (including plans, analytical results, waste transfer notes, etc., as provided by the Contractor) and undertake all liaison with the regulatory authorities (with the exception of obtaining appropriate permits and licences required by the remediation contractor, in which case ENVIRON will provide an advisory role as required).
2.0 CONTAMINATION OVERVIEW

2.1 AHC WAREHOUSING AREA OF THE SITE

In relation to the former AHC Warehousing part of the site, a comprehensive intrusive investigation was carried out by ENVIRON over a period of five weeks, from the 8th November 2004 to the 16th December 2004 with subsequent periods of sample analysis, monitoring and assessment of results, in order to provide a comprehensive characterisation of the soil and groundwater contamination at the site and to investigate previously unsampled areas. This study and its results are presented in the Environmental Statement Report (67C12665 – ES Volume 2), that was submitted as part of the planning submission (planning reference HBC Ref 07/00815/FULEIA) in November 2007 (approved on 10 March 2008). This ES report should be read in order to gain a fuller more detailed understanding of the prevailing site conditions as only a summary is presented here to avoid repetition.

Since the site investigation works undertaken by ENVIRON, additional testing has been undertaken on certain areas of the site and notably the reclamation mound where there is a large volume of galigu requiring treatment. These tests were undertaken by Beach Stabilisation to enable pilot trials of treatment techniques for the galigu. Where relevant the results of this sampling are discussed here also, although the findings generally concur with those from elsewhere on the site.

Soil Contamination

The ground investigations have shown that the site is characterised by the following geological strata:

- **Made Ground** comprising hardstanding (concrete) of varying thickness or a soil/clay matrix overlying brown/grey/black sand, silt or clay with various quantities of brick, gravel concrete, ash and occasional pieces of reinforced wire, plastic, ceramic tiles
together with fragments of wood, clinker and metal slag. The underlying layer predominantly comprised galligu chemical waste, which appeared in various guises comprising either a clayey or silty material or a loose, powdery or friable material, which ranged in colour from dark grey to grey/black, grey/white, grey/green, grey/blue and blue/white.

- **Natural deposits** comprising a variable depth of Alluvium consisting of soft to firm grey/brown/black silty clay, clayey silt or sands with occasional bands of peat and traces of gravel was encountered in the majority of the sampling locations. The alluvial deposits are further underlain by Glacial Till consisting of firm to stiff, brown/reddish brown, silty or sandy clay with inclusions of sand and gravel deposits. The solid geology underlying the site is Sandstone, which was encountered at variable depths across site.

Previous investigations of parts of the site and the site investigation undertaken in preparation for the planning submission, clearly show that the site is contaminated across large areas and most notably with galligu. The main observations from a contamination perspective are:

- throughout the made ground across the site, occasional to frequent gravel size brick, concrete, cinder, coal and inclusions of metal slag were found, along with discrete granular ashy layers;

- galligu chemical waste was encountered in a majority of the trial pit, window sample and borehole locations excavated on the Westbank Dock site, the southern section of the reclamation mound and the land to the north of the reclamation mound. This chemical waste appeared in various guises from clayey/silty, silty/clayey material to a loose unconsolidated material, which ranged in colour from dark grey to grey/black, grey/white, grey/green, grey/blue and blue/white and yellow;

- hydrogen sulphide odours were noted in some locations within the chemical waste (galligu) material together with unidentifiable odours noted within the alluvial deposits;
underlying the distinct layer of galligu within the two boreholes located on the land to the north of the reclamation site, was a soft to firm grey/black silty waste, the odour of which, reminiscent of gas works waste, a tarry, hydrocarbon rich contaminate; and

the locations positioned in close proximity to the tank farm area within the West Bank Dock site were noted to have hydrocarbon odours and/or visual evidence of hydrocarbon contamination (oily stains) within the made ground.

In specific terms the range of contaminants identified at noteworthy concentrations and their respective locations are summarised in the table below. This should be read in conjunction with the sampling location plan refer to Environmental Statement 67C12665, November 2007 for full details of these contamination findings.

<table>
<thead>
<tr>
<th>Sample Reference</th>
<th>Contaminants</th>
<th>On-Site Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>BH14 (soil)</td>
<td>S2</td>
<td>Unsurfaced area north of the Reclamation site</td>
</tr>
<tr>
<td>BH23 (soil)</td>
<td>S2</td>
<td>Unsurfaced area north of the Reclamation site</td>
</tr>
<tr>
<td>BH31 (soil)</td>
<td>Pb, As, S2</td>
<td>Adjacent to ASTs in tank farm area within West Bank Dock site</td>
</tr>
<tr>
<td>BH34 (soil)</td>
<td>VOC</td>
<td>Adjacent to AST located in northern section of West Bank Dock site</td>
</tr>
<tr>
<td>BH43 (soil)</td>
<td>Pb, Cu, S2</td>
<td>Close proximity to the derv AST within former transport yard on the West Bank Dock site</td>
</tr>
<tr>
<td>BH51 (soil)</td>
<td>Pb, As</td>
<td>Adjacent to Tessenderlo’s emergency exit route and in uncontained drum store in southern section of West Bank Dock site</td>
</tr>
<tr>
<td>BH55 (soil)</td>
<td>S2</td>
<td>Unsurfaced area in southern section of West Bank Dock site</td>
</tr>
<tr>
<td>WS6 (soil)</td>
<td>TPH</td>
<td>Adjacent to ASTs in the tank farm located on West Bank Dock site</td>
</tr>
<tr>
<td>WS7 (soil)</td>
<td>As</td>
<td>Inside Unit 2 located on West Bank Dock site comprising the liquid filling machines</td>
</tr>
<tr>
<td>WS12 (soil)</td>
<td>Pb</td>
<td>Close proximity to redundant nitromethane AST within former transport yard on the West Bank Dock site</td>
</tr>
<tr>
<td>TP5 (soil)</td>
<td>Asbestos</td>
<td>Unsurfaced area in southern section of West Bank Dock site</td>
</tr>
<tr>
<td>TP9 (soil)</td>
<td>Zn</td>
<td>Unsurfaced area north of the Reclamation site</td>
</tr>
<tr>
<td>TP10 (soil)</td>
<td>TPH</td>
<td>Unsurfaced area north of the Reclamation site</td>
</tr>
<tr>
<td>TP15 (soil)</td>
<td>S2</td>
<td>Southern section of Reclamation mound</td>
</tr>
<tr>
<td>TP16 (soil)</td>
<td>S2</td>
<td>Southern section of Reclamation mound</td>
</tr>
<tr>
<td>TP18 (soil)</td>
<td>Pb</td>
<td>Southern section of Reclamation mound</td>
</tr>
<tr>
<td>TP20 (soil)</td>
<td>As</td>
<td>Southern section of Reclamation mound</td>
</tr>
<tr>
<td>TP23 (soil)</td>
<td>S2</td>
<td>Southern section of Reclamation mound</td>
</tr>
<tr>
<td>TP23 (groundwater)</td>
<td>S2, S2</td>
<td>Southern section of Reclamation mound</td>
</tr>
</tbody>
</table>
The investigation works undertaken by Beach Stabilisation in the galigu mound confirm that the material within the mound is predominantly galigu overlain by a substantial thickness of soil and clay.

**Groundwater Contamination**

In addition to soil contamination, it was apparent from the various works at the site that there was also groundwater contamination. The hydrogeology is complex, however, as there are multiple and possibly interconnected groundwater bodies. The groundwater regime can be summarised as follows:

- Four different groundwater bodies have been identified at the site within the depth range of the site investigation. These comprise:
  - perched water located within the made ground horizon above the alluvial deposits, generally resulting from infiltration from unsurfaced ground and site drainage, which is known to be in a poor state of repair;
  - water bearing silt/sand lenses within the Alluvium. There is a possibility that the water bearing strata in the alluvial deposits (and maybe the made ground) is in continuity with the lower water body encountered beneath the site drift deposits;
  - water bearing silt/sand lenses within the clay deposits encountered in the Glacial Till. There is likely to be variability in the groundwater levels across the site area, within this stratum, which is dependent on the presence of sand/silt lenses within the clay deposits. It is believed that the thickness of the clay reduces in the eastern section of the site;
  - sand and gravel deposits encountered within the Glacial Till;
  - the groundwater within the alluvial/glacial till horizons appears to be flowing in a south-westerly direction, towards the river basin, which is not unexpected. There appears to be no discernible trend or dynamic to the perched water within the Made Ground;
it is also likely that groundwater levels are influenced by the tide. A study was undertaken using automatic hydraulic level loggers, which were inserted in Steward’s and Ditton Brooks and in four boreholes (BH8, BH23, BH43 and BH55) each representing a different groundwater body. Results indicate that there is a tidal influence on the water bodies within the Alluvium and Glacial Till, as there is clearly a cyclical fluctuation in water levels in these boreholes that has a similar signature to tidal fluctuations. It should be noted, however, that no such regular fluctuations occurred within perched water. This cyclical fluctuation in the natural groundwater implies that in the natural strata at least there is some connectivity between the surface waters and groundwater;

the groundwater regime is complicated due to the influence of other factors including for example, the installation of the sheet piled wall along the length of Steward’s Brook adjacent to the Reclamation side of the site and the Ditton Brook (in part), which was installed approximately 17 m below ground level. Furthermore, the hydrostatic pressure exerted by the reclamation mound and the adjacent HEDCO site is also likely to be an influencing factor together with the granular glacial deposits within the palaeo channel, which may affect the overall groundwater regime.

The sample analysis from retrieved groundwater samples identified that groundwater contamination is present. This can be summarised as follows:

- slightly elevated concentrations of **arsenic** (BH14, BH34, BH9, BH31), **cadmium** (WS6, BH23), lead (WS4) and **mercury** (BH43) were recorded. Generally, the elevated metal levels were recorded within the perched groundwater, with the exception of a cadmium concentration detected in BH23 and two arsenic concentrations detected in BH9 and BH31, which were detected within the natural, deeper groundwater;

- elevated levels of Total Petroleum Hydrocarbons **TPH** were recorded in WS6 (6,900 µg/l), which is significantly above the guideline value (the Dutch I value for mineral oil (600 µg/l)). The sample was interpreted by the laboratory as being consistent with diesel and lubricating oil, which accords with the on-site field evidence of contamination at that location. Elevated TPH concentrations were
also detected in BH12 (1,100 µg/l), which was interpreted as being consistent with gas oil and lubrication oil, BH43 (1,100 µg/l), which was interpreted as being consistent with lubrication oil and TP16 (900 µg/l), which was described as ranging between the C₁₀ – C₄₀ range. Three (WS6, BH43 and TP16) of the four detected concentrations were recorded in locations installed with the made ground horizon, however, the sample recovered from BH12 comprised groundwater from the silty/sandy clay deposits within the Glacial Till horizon. However TPH contamination is not considered to be widespread as elevated concentrations of TPH have not been found in the soil or groundwater at nearby locations. This is therefore, likely to be more indicative of localised hotspots associated with oil based activities in this area rather than widespread contamination of the site by hydrocarbons;

- generally, poly-aromatic hydrocarbon (PAH) contamination within the groundwater is not considered significant, as the majority of the recovered groundwater samples detected individual PAHs below their respective analytical detection limits. However, elevated concentrations of some of the individual PAH compounds were detected in perched water recovered from TP16 (fluoranthene, benzo (a) anthracene, chrysene, benzo (k) fluoranthene, benzo (a) pyrene, indeno (1,2,3-cd) pyrene and benzo (g,h,i) perylene) and BH34 (benzo (a) pyrene) together with the natural groundwater within the Fluvio-glacial Sands and Gravels horizon recovered from BH23 (indeno (1,2,3-cd) pyrene and benzo (g,h,i) perylene). The elevated PAHs in the groundwater appear to be indicative of localised hotspots rather than site wide contamination, however, in the context of the site’s environmental setting these levels are not considered to be significant;

- sulphide was detected in the groundwater at significant concentrations in the locations of BH43 (7,300 µg/l), BH14 (140,000 µg/l) and TP23 (200,000). These locations were in Made Ground. Although sulphide contamination was noted within the shallow soils, comprising galligu, the groundwater does not appear to have been significantly impacted overall;

- significantly elevated sulphate levels were recorded on-site within the groundwater, with concentrations ranging from 68 mg/l to 6,380 mg/l. All fifteen groundwater samples analysed, recorded sulphate in excess of the UK DWQ guideline value (250 µg/l), with the highest levels generally recorded within the
perched water. The galligu is the most obvious source of these elevated sulphate levels;

- significant levels of the **individual ions** were detected within the groundwater beneath the site and were generally found within the shallow perched water, where the maximum concentrations of nitrate, potassium, calcium and alkalinity were recorded. The maximum concentrations of chloride, ammonia, sodium and magnesium were detected in the natural groundwater within the alluvial and glacial clay deposits. Given the significant levels of the individual ions, it could indicate that these chemicals are leaching out of the soils and into the groundwater, but these may also be a result of saline intrusions that are likely to have occurred in the area.

A summary of the noteworthy groundwater analytical results is presented in the table below. Please refer to the Environmental Statement (67-C12665, November 2007) for fuller details of the groundwater regime and quality.

<table>
<thead>
<tr>
<th>Sample Reference</th>
<th>Contaminants</th>
<th>On-Site Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>BH8 (groundwater)</td>
<td>Cl, Ammonia, SO₄</td>
<td>Unsurfaced area adjacent to Ditton Brook on Foundry Lane site</td>
</tr>
<tr>
<td>BH9 (groundwater)</td>
<td>As, Cl, Ammonia, SO₄</td>
<td>Unsurfaced area adjacent to Ditton Brook on Foundry Lane site</td>
</tr>
<tr>
<td>BH11 (groundwater)</td>
<td>Cl, Ammonia, SO₄</td>
<td>Unsurfaced area adjacent to Ditton Brook on Foundry Lane site</td>
</tr>
<tr>
<td>BH12 (groundwater)</td>
<td>TPH, Cl, Ammonia, SO₄</td>
<td>Northern area of the Foundry Lane site</td>
</tr>
<tr>
<td>BH14 (groundwater)</td>
<td>S2, As, Cl, Ammonia, SO₄</td>
<td>Unsurfaced area north of the Reclamation site</td>
</tr>
<tr>
<td>BH15 (groundwater)</td>
<td>Cl, Ammonia, SO₄</td>
<td>Adjacent to Excel building on Foundry Lane site</td>
</tr>
<tr>
<td>BH23 (groundwater)</td>
<td>PAH, As, Cd, Cl, Ammonia, SO₄</td>
<td>Unsurfaced area north of the Reclamation site</td>
</tr>
<tr>
<td>BH31 (groundwater)</td>
<td>As, Cl, Ammonia, SO₄</td>
<td>Adjacent to ASTs in tank farm area within West Bank Dock site</td>
</tr>
<tr>
<td>BH34 (groundwater)</td>
<td>PAH, As, Cl, Ammonia, SO₄</td>
<td>Adjacent to AST located in northern section of West Bank Dock site</td>
</tr>
<tr>
<td>BH43 (groundwater)</td>
<td>TPH, S₂, Hg, Cl, Ammonia, Nitrate, SO₄</td>
<td>Close proximity to the derv AST within former transport yard on the West Bank Dock site</td>
</tr>
<tr>
<td>BH55 (groundwater)</td>
<td>Cl, Ammonia, SO₄</td>
<td>Unsurfaced area in southern section of West Bank Dock site</td>
</tr>
<tr>
<td>WS4 (groundwater)</td>
<td>Pb, SO₄</td>
<td>Adjacent to uncontained drums behind Unit 2 on the West Bank Dock site</td>
</tr>
<tr>
<td>WS6 (groundwater)</td>
<td>TPH, As, Cd, SO₄</td>
<td>Adjacent to ASTs in the tank farm located on West Bank Dock site</td>
</tr>
<tr>
<td>TP16 (groundwater)</td>
<td>TPH, PAH, SO₃</td>
<td>Southern section of Reclamation mound</td>
</tr>
<tr>
<td>TP23 (groundwater)</td>
<td>S₂</td>
<td>Southern section of Reclamation mound</td>
</tr>
</tbody>
</table>
Building and Infrastructure Contamination

In addition to the contamination issues associated with soil and groundwater, there are also a number of buildings that will be demolished as part of the redevelopment works. Some of these buildings have asbestos containing materials within them and some have contaminated infrastructure (mainly from small scale oil and diesel handling operations).

Given that with the exception of the Excel Building that is currently occupied, all of the current site buildings and infrastructure will eventually be demolished and reused/removed, this too is considered in the Remediation Plan for the site. This is considered in more detail below.

A large amount of fuel and chemical storage occurs (or recently occurred) on-site. ENVIRON observed surface staining in a number of locations in which these chemicals and fuels were stored, as follows:

- at Foundry Lane, the office block on the western section of the site is heated via a gas oil fired boiler, which is served by an external 4,300 litre (estimated capacity) above ground storage tank (AST). The AST is a single skinned, bunded, steel tank, which appeared to be in reasonable condition, however, staining was observed along the bund wall;

- the bulk oil storage facility (tank farm) is located to the east and to the south of Unit 2 and comprises several ASTs, together with an uncontained drum storage area. House keeping within these areas is poor and significant staining was noted on the concrete hardstanding, which is also significantly cracked in places. Furthermore significant staining was noted on the concrete flooring within Unit 2, which contains the current filling machines; and

- there is an approximated 6,500 litre capacity bunded AST, comprising diesel, located between Unit 1 and Unit 3 on the West Bank Dock site, which is used for forklift truck refuelling. Heavy staining was noted along the bund wall; and
- a waste oil AST (estimated capacity of 1,000 litres) located within the HGV maintenance workshop. The AST appeared to be a single skinned, steel tank, which comprised no secondary containment. Staining was noted on the unsurfaced/unprotected ground, which the AST was sited on.

In addition to the potential hydrocarbon contamination associated with site activities, asbestos is also present within much of the building fabric. A Type 3 asbestos survey was undertaken by Blues Consultants Ltd between the 11th and 14th April 2005, a summary of the findings is detailed below:

- twelve buildings were surveyed by Blues Consultants. Samples were taken from each of these buildings with the exception of the office block on the West Bank Dock site, which is still currently in use;

- the majority of the samples taken and analysed within each of the buildings detected asbestos in the form of chrysotile (white);

- for those areas that were inaccessible during the survey, for example, those areas that were still in occupation or the electrical substations, where access could not be gained, it was presumed that they would contain asbestos in the form of crocidolite; and

- the majority of the asbestos that was found during the survey was considered to be easily and routinely disturbed; it was therefore recommended that all of the asbestos should be removed.

The asbestos removal will be undertaken as a prelude to the main demolition works and will be executed by licensed contractors with the appropriate prior notifications to the Health and Safety Executive (HSE).

It should be noted that many of the current site buildings will remain in use as the works develop, but will be cleared well in advance of the demolition works.
2.2 FORMER TESSENDERLO AREA OF THE SITE

The former Tessenderlo area of the site is considered to be quite different in character to the AHC warehousing area. This area housed a major chemical works for many decades that used a variety of pemicious organic chemicals that are likely to have made their way into the soil and groundwater. Indeed, site investigations undertaken by URS corporation associated with the site’s Integrated Pollution Prevention and Control (IPPC) permit application in 2004 confirm that contamination by organic solvents exists. This investigation was limited in scope, however, and is designed mainly establish a baseline for assessment of future contamination incidents and did not focus on historic contamination issues.

The site ceased operations shortly after receiving its permit and was subsequently closed down and decommissioned. Whilst all plant, buildings and infrastructure have now been removed from the site, the contamination is not thought to have been remediated.

Consequently, Stobart has commissioned a new phase of investigation across the entire area to adequately characterise the site’s contamination status. This investigation comprises:

- Groundwater monitoring wells to capture perched, alluvial and Sherwood sandstone water bodies. Four of these wells will be multi-level wells to enable simultaneous monitoring of shallow (alluvial) groundwater and deeper (sandstone aquifer) groundwater (with appropriate seals between the water bearing strata). One well will be towards the northern (upgradient) boundary, one will be in the centre of the former main chemical processing area and two will be on the southern edge of the site (down-gradient) close to the River Mersey;

- Soil gas vapour analysis and risk assessment (based on collection of 5 soil gas samples and off-site GCMS analysis for gasses and VOCs);
- Bulk soil sampling and characterisation from window sample, borehole and trial pit sampling locations (around 60 locations);

- Comprehensive analysis of groundwater samples; and

- Intensive groundwater level monitoring using in-well transducers (which will monitor water level in 15 minute intervals and download data to enable tidal fluctuations to be observed or to see if the various groundwater bodies move in sync or independently).

The sampling and analytical strategy will involve the following elements:

The sampling strategy is based upon:

- collecting a single bulk composite sample from the Made Ground in every trial pit (30+ soil samples);

- collecting two samples per window sample and borehole location (40+ soil samples);

- collecting a groundwater sample from every monitoring well (24 samples);

- Collecting 3 bulk composite samples of Made Ground for Waste Acceptance Criteria (WAC) testing to determine if the material would be acceptable for landfill disposal should that be required as an option (which even if not required on a large scale could be necessary for foundation excavations);

- collecting gas samples from up to 5 monitoring wells for full land gas suite and VOCs (this is to assist with the human health vapour risk assessment); and

- Installing pressure transducers in up to 5 wells to monitor groundwater fluctuations over a one week period to determine if water bodies are connected and tidally influenced (which will help assess linkages between the estuary, water bearing strata and contaminants). This data is automatically downloaded from each transducer to a dedicated laptop.

We would also recommend, however, that an allowance is made for the collection of three sediment samples from Marsh Brook as this sediment will require removal at some stage and now
would be a good time to understand the chemical nature of those sediments. We would recommend that this be analysed for a comprehensive suite of analytes as well as WAC as landfilling this material is a distinct possibility. This has been identified as a separate cost item below as it is really an optional consideration.

The samples will be analysed according to the following strategy:

- **All** soil samples will be analysed for a general suite of contaminants comprising CLEA metals (As, Cd, Cr, Cu, Pb, Ni, Hg, Se, Zn, V, Be, B, Ba), total cyanide, 2:1 sulphate extract, pH and asbestos screen. This will give a general overview of inorganic contaminants for which there is no direct field observational evidence;

- A further 50 samples (sub-set of the above) will be analysed for total speciated polyaromatic hydrocarbons, banded petroleum hydrocarbons and monohydric phenols (these samples will be selected on the basis of visual and olfactory field observations where hydrocarbons appear to be present);

- A further subset of 20 samples (where there was strong field evidence of hydrocarbon contamination) would be subjected to tests for organic matter and the Local Authority approved Contamination Working Group Total Petroleum Hydrocarbons (TPH CWG Suite) which would give a break down between aliphatic (less harmful) and aromatic (more harmful) relative concentrations of petroleum species;

- Similarly 50 samples will be subjected to analysis for Volatile Organic Compounds (VOC) and Semi Volatile Organic Compounds (SVOC) with additional Tentatively Identified Compounds (TIC) interpretation. This suite will cover most of the organic contaminants of concern (chlorinated hydrocarbons, BTEX, etc). These samples would be selected in the field on the basis of visual and olfactory observations and utilising a photo-ionisation detector (PID) for vapour headspace testing of all suspect soils;

- Analysis of 3 bulk composite samples for full WAC suite to determine landfill suitability;

- Analysis of 24 water samples for a full analytical suite comprising pH, full range of metals, anions, cations, alkalinity, bromide, chloride, total cyanide, speciated phenols, speciated hydrocarbons (aromatic/aliphatic split), speciated PAHs, SVOC with TICs, VOC with TICs, COD, BOD, TOC, PCB’s, alcohols and pesticides;
- Analysis of 5 collected gas samples for landfill gas, C1 – C7 alkanes and VOC by GC/MS (to establish the gas and vapour risks on site); and

- We would also propose to undertake leaching tests of up to 10 soil samples for a full range of metals, chloride, sulphate, cyanide, petroleum hydrocarbons, phenols and total organic carbon to determine if key chemical contaminants are leachable (and thus potentially mobile through groundwater).

The results of this investigation will be used to develop an informed conceptual site model for the site that will enable a risk assessment to be undertaken to determine appropriate remedial options for identified pollutant linkages. This investigation has just commenced and will be completed and reported over the next 6 weeks.

Outline Remedial Methodology

Notwithstanding the need for a comprehensive site investigation, at this stage, there is sufficient knowledge of the site to enable an outline remedial methodology to be presented. It is accepted that the intended approach is subject to the confirmation of a number of hypotheses that require validation via the site investigation and in that respect Stobart accepts that they are taking this proposed approach at their own risk. In other words, they accept that if there is a demonstrable need to physically remediate soils beneath the site they will have to intrude into site preparation works that may have already taken place (e.g. treated galigu emplacement).

The main pollutant linkages associated with the Tessenderlo site and the proposed remedial response are as follows:

- **HUMAN HEALTH** exposure to inhalation of vapours, ingestion of dusts or direct dermal contact with contaminants in the soil and groundwaters.

  - **Response:** This pathway will be eliminated by capping of the site with a substantial thickness (circa 2m) of non-leachable, low permeability, stabilised galigu across the entire site area. This has the added benefit of preventing infiltration and percolation of incident rainwater through contaminated soils which can then leach into groundwater and affect ecosystem and water resource pollutant linkages (see relevant sections below). This treated material will be subjected to validation testing.
(direct and leachability) to confirm it is fit for use. Construction workers will be at greatest risk in terms of human health, but site management procedures and use of Personal Protective Equipment (PPE) will adequately mitigate this;

- **ECOSYSTEMS** exposure to contaminants passing through historic and current surface water drainage systems and via groundwater through flow to Marsh Brook and then creating a point source discharge to the River Mersey.
  
  **Response:** This pathway will be eliminated by the re-engineering and relining of Marsh Brook which will sever any existing drainage inputs and seal the channel from groundwater inflow;

- **ECOSYSTEMS** exposure to contaminants passing to the foreshore sediments and estuary via groundwater throughflow (through or beneath the sea wall). It is anticipated that this pathway is not active as there are two substantial dock basins that have been infilled on the site (see diagram and photograph below) and which lie across the migration path between the main chemicals plant area and the foreshore. Given that these at one time were designed to retain water, they similarly will prevent groundwater from passing through them. If there is contaminated groundwater beneath the main production areas of the chemical plant this is unlikely to be able to migrate across two substantial dock walls and the associated infill and thence through further made ground and to the River Mersey.
  
  **Response:** The current investigation is designed in part to test this theory by confirming the existence of the dock retaining walls and examining groundwater quality and flow characteristics on both sides of the dock basin and within it. It is recognised that there is the potential for the dock infill material and any land use between the dock basin and the River Mersey itself to be contaminative, but this area has had much less intensive and prolonged industrial use and represents a relatively small source area in comparison to the main chemical production areas. If these peripheral areas in their own right represent a significant pollution source, remedial activities can be applied locally to deal with these areas.
and could include a network of down-gradient wells to monitor natural attenuation. These could be converted to intervention wells if required and the network expanded;

NOTE: Area outlined blue shows the extent of the former (now infilled) West Bank Dock basins. These were substantial and deep water retaining structures and so should form an effective barrier to groundwater migration between the central chemicals processing area and the River Mersey. The current investigation is designed in part to test this hypothesis.

These features are shown partially infilled in the aerial photograph overleaf (date unknown)
WATER RESOURCES Impact to the main aquifer from downward percolation of contaminated shallow groundwater into the underlying sandstone aquifer. This is a plausible pathway and the investigation will involve multi-level groundwater wells designed to examine the quality of groundwater in the shallow and deeper horizons simultaneously (ensuring that there is no prospect of the borehole itself forming a conduit for connecting these water bodies).

Response: At this stage it is not known whether or not the sandstone unit is significantly impacted and long term monitoring can be implemented to assess this over time (even with surface development taking place). If the aquifer is impacted, the most appropriate remedial response will be
groundwater “pump and treat” or in-situ bio-remediation/treatment, which can be implemented regardless of the surface works.

Stobart recognise that there is a risk that one of the remedial responses that could be necessary for the former Tessenderlo area would be bulk removal of shallow source material (contaminated soils). The prior emplacing of several metres of treated galigu would obviously make this difficult to achieve but not impossible and that is a financial risk that Stobart is prepared to take in order to expedite the overall remediation and substantial environmental betterment of the area as a whole.

The investigations that have been undertaken at the Tessenderlo site thus far have identified the following with regards to the site’s contamination status:

- Historically, docks within the Site boundary were used for the import and export of raw materials and products alike but these docks were infilled during the 1970s with a variety of construction, demolition and allegedly domestic wastes. There is also a suggestion that asbestos waste may have been deposited here as well;

- Site investigation works undertaken within the former main production area have revealed evidence of shallow soil and perched groundwater chemical impacts consistent with the nature of chemicals formerly used and manufactured at the Site (i.e. VOC’s, SVOCs and petroleum hydrocarbons);

- The available information indicates that the underlying Alluvium comprises bands of sand, clay and silt which may act as an aquitard, which would retard the vertical migration of the aforementioned shallow groundwater to the underlying deeper groundwater within the sandstone aquifer. There could, however, be localized breaches of this;

- The site investigation summary indicates that with the exception of localised lead, metal concentrations are below the guideline values for an industrial use. The level of sulphates and particularly high and low pH within localised areas could, however, impact upon concrete and drainage systems;

- The VOC and SVOC testing indicates elevated values of organic chemicals as would be expected from the historical use of the site, with the area immediately adjacent to Marsh Brook being noted as being particularly contaminated (TPH and Toluene); and
Testing held by the council also indicates the presence of elevated metals, toluene, cyclohexane and Sulphate in some areas.

A fuller description of the contamination status of the Tessenderlo site and potential remedial actions will be provided at a later stage when the current phase of investigation is completed. Insofar as the remediation of the main AHC site is concerned and the associated galigu treatment, the former Tessenderlo area presents a clean flat surface upon which the treated galigu can be placed and used to raise levels (and form a cap). The emplacement of this treated material does not preclude the remediation of the Tessenderlo site but if such remedial works are determined to involve bulk contaminated soil removal, the stabilized galigu would need to be “opened up” to allow suitable access. This is a risk that Stobart Group understands and accepts.

### 2.3 Contamination Summary

The various investigations at the site have identified the following key areas of concern with respect to contamination of the AHC site with potentially polluting materials:

- There is widespread galigu contamination both the surface and at depth (especially across parts of the AHC site and within the reclamation mound), much of which will be disturbed by the development works;

- There are localised pockets of hydrocarbon contamination that have caused staining of the infrastructure in those locations and there may be contamination of soil and shallow groundwater below this. The Steward’s Brook diversion works may encounter this material;

- There is evidence of deeper organic contamination that will be not be affected by the cut and fill operation but which may be affected by the piling works and

- There is asbestos present in the buildings that are scheduled to be demolished.

In addition to the findings above, there has also been a presence of Japanese Knotweed in localised patches on the site. These have been dealt with by herbicide treatment but there is a possibility that some soils will ultimately be disturbed in these areas and as such management of Japanese Knotweed contaminated soils has also been included in the remediation plan as a contingency measure.
3.0 **RISK ASSESSMENT**

3.1 **INTRODUCTION**

Clearly there is a substantial contamination source on the site that appears to be impacting upon groundwater quality to varying degrees and in turn may also be contributing to poor surface water quality to a limited extent, especially in Steward’s Brook. The redevelopment project provides a significant opportunity for site betterment in that regard and will enable a very substantial volume of the galigu contamination to be removed and rendered harmless and for new sealed water courses to be created. This will eliminate the impacts on the surface water system and prevent human health exposure to future site users. This section of the Remedial Method Statement discusses the potential risk scenarios and pollutant linkages in more detail.

Under Part IIA of the Environmental Protection Act 1990, which came into effect on 1 April 2000, “contaminated land” is defined as any land which appears to the Local Authority in whose area it is situated to be in such a condition that:

- significant harm is being caused or there is a significant possibility of such harm being caused; or

- pollution of controlled waters is being, or is likely to be caused.

“Significant harm” is defined in the Guidance on risk based criteria and must be the result of “pollutant linkage” between source and receptor via an identifiable pathway, which may be assessed using qualitative risk assessment models.

This follows the generally accepted risk assessment philosophy that requires that three elements are present in order for a potential risk to be present:

- a contaminant source;

- a plausible pathway; and
a target receptor(s), which could be affected by the contaminant.

All discussions in this section have been made in relation to the site’s proposed industrial/commercial setting and based upon the generally accepted risk assessment principles set out above. These are discussed in more detail below in the context of this site.

3.2 CONCEPTUAL SITE MODEL

In order to understand the potential significant pollutant linkages at the site a conceptual model (qualitative risk assessment) has been developed. This identifies the known sources of contaminants, potential pollution migration pathways (e.g. based on the geological and hydrogeological setting) and the potentially sensitive receptors.

It should be noted that a key contaminant in this regard is galigu, but this is a generic term used for waste from the alkali and soap industry (mainly le blanc process) and which has been deposited in the area over many decades. From a risk assessment perspective, it is the chemical species associated with the galigu that are of concern and in particular arsenic and other heavy metals. As such the risk assessment discussion refers to these specific chemical species as contaminants rather than “galigu”, although the remediation proposals address dealing with the galigu as a generic waste mass.

The table overleaf presents the risk assessment scenarios that could potentially exist at the site.
### POTENTIAL POLLUTANT LINKAGE SCENARIOS (AHC WAREHOUSING SITE)

**Sources** = Heavy Metals (galigu), petroleum hydrocarbons, VOCs, Sulphate, asbestos fragments.

<table>
<thead>
<tr>
<th>HH = Human Health Risk</th>
<th>WQR = Water Quality Risk</th>
<th>EHR = Ecology and Habitat Risk</th>
<th>BER = Built Environment Risk</th>
</tr>
</thead>
</table>

#### HH1 - Employees of and visitors to the site could be exposed to vapours and dust coming out of the ground and could thus inhale and ingest airborne contaminants whilst on site.

- **Likelihood of Pollutant Linkage Scenario Occurring At The Site In Its present state.**
  - Unlikely
- **Severity of Environmental impact if the Linkage does Prevail on the site once redeveloped.**
  - Moderate
- **Remedial Priority (i.e. degree to which there should be specific remedial actions to eliminate the pollutant linkage).**
  - Moderate - the proposed development works provide the opportunity to eliminate this linkage by re-surfacing and in effect capping the site and the opportunity for this should be maximised.

#### HH2 - Site contractors could dig into and be exposed to contaminated soils and groundwater. This could result in direct skin contact, inhalation and ingestion. This could have secondary effects as dust and vapours could be liberated exposing site occupiers and neighbouring land users to dust and vapours.

- **Likelihood of Pollutant Linkage Scenario Occurring At The Site In Its present state.**
  - Very Likely
- **Severity of Environmental impact if the Linkage does Prevail on the site once redeveloped.**
  - Severe
- **Remedial Priority (i.e. degree to which there should be specific remedial actions to eliminate the pollutant linkage).**
  - High - there is no way of avoiding earthworks contractors encountering this material so PPE and site hygiene procedures must be used for all works during the earthworks to eliminate exposure.

#### HH3 - Contamination could be migrating via groundwater through flow into surface watercourses and directly to the River Mersey where there could be recreational users and fishermen who could be exposed to contaminants in the water via skin contact.

- **Likelihood of Pollutant Linkage Scenario Occurring At The Site In Its present state.**
  - Very Unlikely
- **Severity of Environmental impact if the Linkage does Prevail on the site once redeveloped.**
  - Moderate
- **Remedial Priority (i.e. degree to which there should be specific remedial actions to eliminate the pollutant linkage).**
  - Low - whilst there may be impacts to groundwater it is not felt that there is a significant risk of this contamination affecting recreational and fishery users of the River Mersey.

#### HH4 - Contaminants could enter groundwater and be abstracted at boreholes locally where persons may come into contact with the contaminated water.

- **Likelihood of Pollutant Linkage Scenario Occurring At The Site In Its present state.**
  - Very Unlikely
- **Severity of Environmental impact if the Linkage does Prevail on the site once redeveloped.**
  - Moderate
- **Remedial Priority (i.e. degree to which there should be specific remedial actions to eliminate the pollutant linkage).**
  - Low - whilst there may be impacts to groundwater it is not felt that there is a significant risk of this contamination affecting people on sites where the water may be abstracted.
**WQR1** - Contaminated surface water run-off could transfer contaminants to the receiving waters (Steward’s Brook, Marsh Brook and Ditton Brook) and ultimately the River Mersey.

<table>
<thead>
<tr>
<th>Likely</th>
<th>Moderate</th>
<th>Moderate - the works will enable resurfacing of the site and elimination of this pathway. All new surface water discharge would be via new drains in clean media.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The site surface is likely to have some leachable contaminant exposed which can be caught in surface run-off.</td>
<td>There would be substantial dilution of the contaminants and the concentrations from surface run-off would be relatively low.</td>
<td></td>
</tr>
</tbody>
</table>

**WQR2** - Contaminants could leach directly into groundwater and affect groundwater quality.

<table>
<thead>
<tr>
<th>Very Likely</th>
<th>Moderate</th>
<th>Moderate - the leaching of contaminants into groundwater presents a long term risk and whilst whole scale clean-up is not possible, reduction in the leaching can be achieved by surfacing the site to eliminate water infiltration.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groundwater contamination has already been identified on the site, although this largely affects perched water which is not an abstracted resource.</td>
<td>The wider groundwater is already likely to be impaired by decades of impact from the chemical industry and the local abstractions are not potable.</td>
<td></td>
</tr>
</tbody>
</table>

**WQR3** - Contaminated groundwater could transfer to the open water courses of Ditton, Marsh and Steward’s Brooks via throughflow thus transferring contaminants to surface waters where the impacts could be more pronounced.

<table>
<thead>
<tr>
<th>Very Likely</th>
<th>Moderate</th>
<th>Moderate - the leaching of contaminants into groundwater presents a long term risk and whilst whole scale clean-up is not possible, reduction in the leaching can be achieved by surfacing the site to eliminate water infiltration.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The groundwater is likely to be feeding surface water flow (although more likely in the brooks than the Mersey and thus transferring contaminants to the surface waters.</td>
<td>The water quality is already impaired from other off site sources but over time could improve and the site contribution could become more significant.</td>
<td></td>
</tr>
</tbody>
</table>

**EHR1** - Contamination of the Brooks could be prejudicial to bio-diversity and the quality of flora and fauna in the Brook.

<table>
<thead>
<tr>
<th>Unlikely</th>
<th>Moderate</th>
<th>Moderate - Although the watercourses are poor there is a desire to make these into enhanced and ecologically diverse features on the site and the development gives substantial scope for the remediation and upgrade of these.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The brooks are of very poor Ecological quality and in effect Act like dilute chemical drains thus bio-diversity is also poor.</td>
<td>The brooks (especially the Steward’s Brook) is likely to improve with time and although current impacts may be lost in the “noise”, this will not always be the case.</td>
<td></td>
</tr>
</tbody>
</table>

**EHR2** - Deposition of contaminated dust from the site or run off discharging via Steward’s Brook and Marsh Brook could impact on the ecological quality of the River Mersey and Ditton Brook (via run-off).

<table>
<thead>
<tr>
<th>Unlikely</th>
<th>Moderate</th>
<th>Low - the development proposals themselves will eliminate this linkage by sealing the site surface</th>
</tr>
</thead>
<tbody>
<tr>
<td>The dilution factors are likely to be very substantial and the dust will be resurfaced and incident.</td>
<td>By default much of the site will be resurfaced and incident.</td>
<td></td>
</tr>
<tr>
<td>Scenario</td>
<td>Likelihood</td>
<td>Details</td>
</tr>
<tr>
<td>----------</td>
<td>------------</td>
<td>---------</td>
</tr>
<tr>
<td>BER1 - High pH and sulphate content in the site soils could aggressively attack cement based foundation and conduit materials.</td>
<td>Unlikely</td>
<td>This area is known as an SO4 rich area so most foundations will have used sulphate resistant cement.</td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>The buildings and foundations will be designed to deal with the chemical nature of the soils.</td>
</tr>
<tr>
<td></td>
<td>Low - the site works will remove the bulk of the chemically aggressive material and high spec materials will be used.</td>
<td></td>
</tr>
<tr>
<td>BER2 - Land gas (methane) could enter confined spaces within buildings and services where if it accumulates in sufficient concentrations could cause an explosion.</td>
<td>Unlikely</td>
<td>The numerous investigations to date have not found gas in elevated concentrations.</td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>The site will be substantially reworked and sealed and no substantive source of land gas exists.</td>
</tr>
<tr>
<td></td>
<td>Low - this is not an issue on this site.</td>
<td></td>
</tr>
</tbody>
</table>

Note: these are potential scenarios and consequences and are not proven.
Taking the pollutant linkage summary above into account it is possible to expand upon the potential risk assessment scenarios that may relate to these development proposals and where there is a high or moderate risk of the linkage existing post development. These are discussed below.

### 3.3 HUMAN HEALTH QUALITATIVE RISK ASSESSMENT

**Potential Risks to the Current or Future Site Occupiers**

With the exception of the reclamation mound, the area to the north of the reclamation mound, and the southern section of the West Bank Dock site, the majority of the site’s external surfacing is predominantly concrete or tarmac, of varying quality, but nonetheless forming a surface barrier of sorts. It is considered that in the unsurfaced areas there is some potential for human exposure to contaminated materials through direct skin contact, inhalation or ingestion of dust generated in these unsurfaced zones. This is particularly so for the northern area of the Reclamation site and southern section of the West Bank Dock site.

Additionally, if excavations are undertaken in the surfaced areas there is a significant potential for human exposure to contaminated ground, especially in the main body of the reclamation mound and West Bank Dock estate area. It should be noted, however, that there are no current activities undertaken on the reclamation mound.

Where good quality hardstanding exists this eliminates the exposure pathway and under the development proposals the area of hardstanding will be increased substantially. Furthermore the landscaping scheme will also provide a barrier between site occupiers and the contaminated soils. The net effect of this will be that once redeveloped there will be no unsurfaced areas of the site where direct skin contact or airborne dust generation can occur and so this potential pollutant linkage will be broken.

The presence of hardstanding over the remaining parts of the site will also limit the potential for land gas accumulation within the buildings (although it should be noted that little in the way of gas and vapour was identified during the investigation and a
significant gas presence is not anticipated on the site). We do not feel that gas protection measures are necessary on this site.

In effect the proposed development will substantially lessen the risk of exposure of site users to contaminated soils to negligible levels once fully operational as there will effectively be an impermeable physical barrier (hardstanding and managed landscaping) between the contaminants and site users. Also there will be a site wide facilities management function that will control any future site works that may intrude beyond these surfaced areas, such that it will be done in a controlled and informed manner.

It should also be noted that a substantial element of the groundworks will be the removal and treatment of galigu to form a stable, inert engineering material.

**Potential Risks to Construction Workers**

The planned redevelopment activities will involve excavation and earthworks (i.e. laying new services, cut and fill operations, maintenance of existing services and piling activities during the construction phase) and may expose construction workers to contaminated ground materials (soils and groundwater) through direct skin contact, inhalation of dust and ingestion of particles. These risks are considered to be low to moderate on the assumption that construction phase environmental protection and health and safety management plans for the site will ensure that appropriate measures are adopted to minimise and control the levels of exposure. Properly managed construction activities that are mindful of the potential exposure risks will ensure that all site workers are adequately informed of the risks to themselves and the environment and where necessary they will adopt the appropriate personal protective equipment (PPE). These controls are discussed further in the Scope of Work section of this report.

It should also be noted that there will be an over arching facilities management function at the site that will control all construction and infrastructure maintenance activities such that no ad-hoc contractor activity (that may disregard the risks) will be allowed. As such uncontrolled intrusion into the contaminated materials will not be permissible.

A further consideration is that in certain areas of the site the galigu at the near surface will be excavated and stabilised to such an extent that it would be hard (similar to
concrete) and a monolithic chemically bound material, effectively inert. As such direct contact with this material would not lead to exposure to the chemical contaminants within and the hardness of the material would make uncontrolled ad-hoc or accidental digging through it to the underlying contaminated material very difficult and highly unlikely.

3.4 GROUNDWATER QUALITATIVE RISK ASSESSMENT

Potential Risks to the Groundwater - General

The shallow groundwater encountered beneath the site, appears to be perched within the made ground. The made ground is underlain by alluvial drift deposits, which are further underlain by Glacial Till and then Fluvio-glacial Sands and Gravels, all of which are water bearing and would be sensitive to mobile site derived contamination. Equally, the possibility exists that the underlying major sandstone aquifer is in hydraulic continuity with the groundwater encountered within the alluvial deposits and may thus also be sensitive to site derived contamination. The site investigation has mainly focused on assessing shallow soil and groundwater conditions and has not been designed to include the assessment of the groundwater within the underlying Sandstone Series (which will not be affected by the development works). The glacial clay overlying the sandstone is likely to restrict the vertical migration of mobile contaminants into the sandstone to an extent, although the clay layer is not reported to be continuous across the site. Overall, the risk to groundwater from site derived contamination is considered to be moderate as there is the potential for contaminants to leach from the soils into the groundwater bodies, which may be interconnected. Groundwater sampling at the site thus far has demonstrated that the groundwater is contaminated, mainly with metal species and it seems that galigu deposits in the area are affecting water quality at shallow depth at least (see Section 14 - Environmental Statement).

The current hardstanding cover on site will reduce the potential for contaminants to leach from the contaminated soils into percolating rainwater and then migrate downwards and impact upon the quality of the groundwater within the shallow horizons. This hard cover is poor in places, however, and does not form an effective barrier to infiltration of rainwater through the site and of course there are certain areas where there is no surfacing at all.
The proposed development will have a much greater area of hard cover and larger drained landscape areas, such that effectively the site surface will be sealed thus greatly reducing the potential for percolating rainwater to leach contaminants from the unsaturated zone into the saturated zone.

The current coverage of hardstanding equates to around 46% of the site area (AHC) and hardly any of the Tessenderlo area. Once the development proposals are complete, this will have increased to over 90%, with the remainder of the area being landscaping with under drainage systems (which has the same effect practically as hard surfacing thus the net effect in terms of percolation of rainwater into underlying contaminated soils will be 100% surfacing). As such this potential pollutant linkage will also effectively be broken when the development is completed.

It is recognised, however, that during the construction phase more soils will be exposed to rainfall than would otherwise have been the case (and particularly where galigu will be uncovered in the area of the reclamation mound in preparation for construction works). As such there may be a temporary increase in infiltration rates during this period depending upon weather conditions. A surface water management protocol is presented later in this document that details how potentially contaminated run off and collected groundwater will be managed.

### 3.5 SURFACE WATER QUALITATIVE RISK ASSESSMENT

**Potential Risks to the Surface Waters**

The closest watercourses to the site are Steward’s Brook, which flows between the Reclamation site and the West Bank Dock site (i.e. crosses the site in part) and the Ditton Brook (which flows adjacent to the south-western boundary of the Foundry Lane site and to the southern boundary of the Reclamation site). There is potential for the migration of contaminants in perched and shallow groundwater into the Brooks directly where they are contiguous and via the site surface drainage system or direct run-off. Both brooks have been classified by the EA under the General Quality Assessment (GQA) scheme as water quality Grade E, i.e. of poor water quality. Steward’s Brook flows through the golf course located to the north and adjacent to the HEDCO landfill in the south both of which are known to leach contaminants into the Brook. It is also likely that given the history of the area (i.e. widespread galigu deposition) parts of Steward’s Brook base and
banks are made up of galigu. As controlled waters, however, the brooks represent a sensitive receptor to contaminants regardless of the prevailing water quality and provide a pathway for off-site migration to the River Mersey, which is a European designated habitat site.

As already stated, the development proposals will involve substantially increasing areas of hard surfacing on the site which will serve to both greatly reduce rainwater infiltration (and thus flushing and leaching of contaminants) and will also provide a “clean” barrier between incident rainfall and the contaminated soils, thus leading to uncontaminated surface run-off. In addition, the Steward’s Brook channel and site drainage systems will effectively be replaced with a new sealed water course and high integrity drainage system, removing another potential contaminant migration pathway. As such, within the development site itself, once developed, there will be an effective barrier to incident water passing through contaminated horizons on the site and into the surface waters, thus removing this potential pollutant linkage.

It is recognised that there may be off-site influences on the quality of these Brooks (and Marsh Brook) and that contamination could be migrating onto the site from the north via groundwater flow, but these influences are beyond the control of the developer and cannot be mitigated via this development project. The improved surface drainage, will however, introduce a more substantial “clean” water discharge during rainfall events and thus have a beneficial diluent effect on the Steward’s Brook in particular. The same is true to a lesser extent of the treated wastewater that will discharge to the Brooks from the package treatment plants associated with each new unit.

It is also recognised that ultimately the contamination of Steward’s Brook (and other surface waters) makes its way to the River Mersey where, although massive dilution takes place, there is still nonetheless a pollutant loading to the river and estuary, which the works will seek to eliminate insofar as site sources are concerned.

Although more related to the Tessenderlo site, the Marsh Brook upgrade will also have the effect of producing a sealed water course carrying clean water to the River Mersey.
3.6 PILING RISK ASSESSMENT

Due to the size if the proposed buildings and very low tolerance for slab movement required by the tenants, the development proposals may involve a substantial amount of piling to depths of up to 15m). It is recognised that this may provide a contaminant migration pathway between the contaminated horizons of the unsaturated zone and the saturated zone and as such a risk assessment is required that addresses this potential.

In order to correctly identify the appropriate method of piling and any possible mitigation measures required a robust assessment process has been worked through with the environmental consultants (ENVIRON), engineers (WA Fairhurts) and main contractor (Stobart Group). This methodology will be applied to the elected piling contractor (to be determined). Within this process, the potential for piling techniques to cause pollution will be considered and the likely environmental consequences estimated.

From the information available from the site investigation and the structural requirements of the buildings it is envisaged that driven piles will be used in addition to surface based ground treatment (e.g. cement stabilisation).

The following methodology will be employed on the site in determining the pile design and required environmental protection measures:

1. The first step will be to determine the initial preferred piling (or penetrative ground improvement) method based upon the structural, geotechnical and commercial considerations of the proposals for built development on the site.

2. If that particular area of the site is unaffected by contaminated soil or groundwater then the preferred piling (or penetrative ground improvement) will be adopted and there will be no need for environmental protection measures.
3. If this is not so and the piling will be through or into a significantly contaminated area then any potential adverse environmental impacts which could be affected or created by the proposed piling method will be considered.

4. If there are likely potential adverse environmental impacts in this area then a Foundation Works Risk Assessment report will be produced, which incorporates mitigation measures and QA/QC procedures associated with the piling design and specification.

5. If the mitigation measures are deemed inadequate it is recognised that an alternative foundation solution or piling method (or penetrative ground improvement) may be required, but Stobart believe that the solutions proposed and presented in this risk assessment are sufficient to enable the groundworks and be protective of the environment.

**FOUNDATION WORKS RISK ASSESSMENT**

ENVIRON and the Design Team recognise that the piling risk assessment will need to answer the following questions:

- do the mitigation measures themselves have any adverse environmental impacts?
- are the mitigation measures adequate to remove significant adverse environmental impacts?
- how will the mitigation measures be specified to ensure that they are incorporated and verified during installation works?
- what monitoring requirements are there?
- who will verify the inclusion and adequacy of the mitigation measures?
- could subsequent building works adversely affect the mitigation measures and how will this be prevented?
Once a piling contractor has been engaged ENVIRON, WA Fairhurts and Stobart Group with the Piling Contractor will work together to specify the piling design and take into account the above issues. The outcome of the assessment will be reported to the EA for review and comment before works commence. A fundamental criterion of the piling solution will be to prevent the short-circuiting of different water bearing strata and downward migration of contaminants that would not have otherwise occurred.
4.0 REMEDIATION SCOPE AND METHODOLOGY

4.1 INTRODUCTION

ENVIRON has provided below a discussion of the planned remediation works. To assist Principal Contractors with the initial identification of hazards and potential risk scenarios, reference should also be made to the Pre-Tender HS Plan.

In broad terms the remediation project will involve the following elements:

- Asbestos Removal
- Removal of Redundant/orphaned waste materials & goods
- Building Demolition & Clearance of Site Infrastructure
- Vegetation Stripping
- Soil excavation, stock piling and redeposition/disposal;
- galigu stabilisation and re-use;
- excavation and treatment/disposal of hydrocarbon contaminated materials;
- Japanese Knotweed control and treatment;
- groundwater abstraction/control/treatment/discharge;
- surface water management/control/treatment/discharge
- on-site concrete crushing;
- backfill of excavations; and
- confirmatory monitoring / reporting

Each of these are discussed in more detail later in this section.

‘Construction’ works associated with the remedial works will be undertaken in accordance with British Standard Codes of Practice (where applicable), as well as established construction industry practices.

The Works will incorporate relevant requirements in respect of environmental control, based largely on Environment Agency guidance and industry-accepted standards of
‘good working practice’. The Contractor will, at all times adhere to the provisions outlined in the Construction Environmental Management Plan (see Appendix B).

An extensive design input, fully in accordance with Regulation 13 of CDM Regulations 1994 as amended, will be provided by the Principal Contractor (Stobart Group) and their appointed sub-contractors (to be confirmed). The Pre-Tender HS Plan gives details of the level of detail required at tender and pre-construction phases of the Works.

4.2 PHASING OF THE CONSTRUCTION PROGRAMME

Before setting out the specific methodologies for dealing with the various contamination aspects of this site, it is first worth noting that the construction work will be implemented in phases and these have a bearing on the remediation programme.

In broad terms the basic sequence for all of the main works will be as follows:

Strip topsoil
Prior to the bulk excavation from the mound adjacent to Rehau, a topsoil strip is required, this will be carried out using 2no D6 dozers, 2x 5t excavators and 2x dump trucks. It is envisaged that these works will take approx 2 weeks.

Haul Road
A haul road will be excavated / constructed between the excavation (mound) area and the deposit site (Tessenderlo), the haul road will comprise of existing hard stand areas and some excavated areas around the back of the proposed Rehau site, where necessary hard core will be placed on the haul road.

The haul road condition will be monitored at all times; any remedial works will be carried out straight away, thus not holding up the bulk excavation.

Rehau Building site
The proposed Rehau building site will require a reduced level dig to form a piling mat level, this will happen at the same time the haul road is being formed around the proposed site. The excavated material will be placed on the Tessenderlo site in appropriate layers (350MM)
Laydown area

At the same time as the haul road is being formed there will be a lay down area being formed adjacent to O’Connor’s yard (Gaza Area). This involves reducing the stockpiled material to a suitable level.

A new railway boundary fence will be erected adjacent O’Connor’s siding.

Temporary culvert

Two temporary culverts are required:
- Marsh Brook
- Stewards Brook

The culvert at Marsh Brook is required so that the haul road can be constructed across Dissoto road and onto the Tessenderlo site.

The culvert at Steward’s Brook is required so access can be gained from O’Connors yard onto the new laydown area (Gaza).

Once the haul road is formed and the temporary culvert at Marsh brook is complete the main excavation works may commence.

Drawing pa00014 presented in Appendix A sets out the proposed phasing sequence for the earthworks.

Reclamation Mound excavation

The ‘mound’ area is capped off with clay approx 1.5m deep. some of this material will be stockpiled and used at a later date for lining the new ditches.

The 45t excavators will load the dump trucks initially 4x dumpers per exactor with the D6’s servicing the excavators and maintain the haul road on the mound area.
Transportation of material

The dump trucks once loaded will take the material along the haul road across Marsh brook and deposit onto the Tessenderlo site.

Tessenderlo site

2no D6 dozers on the Tessenderlo site will push out the material in 350mm layers, levels will be controlled with a laser level and or profile and traveller system.

Once a sufficient area is spread out it will be treated with lime as required by Beach Stabilisation LTD (refer to Beach Stabilisation LTD Methodology)

The material will be compacted to the required specification and tested at agreed frequencies. Testing will be ongoing through the entire earthwork operation.

I&TP to be in place prior to bulk excavation commencing

Throughout the earthworks operation Dust suppression will be provided by tractors and water bowsers.

The first major phase of the development will involve general soil stripping, vegetation clearance, building demolition and services isolation, which other than dust and noise issues has little potential for causing environmental impacts.

The next and, from a remedial perspective, most substantive stage of the works will be the commencement of the excavation, treatment and re-emplacement of treated (lime stabilised) galigu and associated soils.

The treated material will be placed in layers across the Tessenderlo portion of the land, which requires substantial volumes of material to achieve suitable finished floor levels.

In order to allow the current site activities by AHC and Rehau to continue throughout the construction works, as an early enabling works contract it will be necessary to construct a new building for Rehau which will be the subject of a separate investigation and
planning consent but within the same site area. This area, once investigated, will also be stripped and any contamination arising will be stabilised.

The excavation below current ground levels and generation of potential hydrocarbon contaminated soils (i.e. none galigu materials) would not take place until the programme is well advanced and is most likely to arise with the development of the new channel for Steward’s Brook.

In addition to these building related works there will be infrastructural works associated with the site roads, railway lines and points, parking areas, service areas and landscaping. These works will take place in tandem with the main construction works but it is not possible at this stage to state where in the phasing sequence each of these “non-building” aspects of the site development will take place (with the exception of the main site road discussed above).

From an environmental and pollution prevention perspective, however, it will be the bulk excavation work and treatment of galigu that has the potential for greatest impact both in terms of management of the materials excavated and management of potentially contaminated groundwater and surface water run-off. Once the galigu has been excavated, treated and emplaced there is relatively little in the way of potentially polluting activities on the site.

The piling method, although not finalised yet will most probably be a driven displacement method and not a bored extractive method so there is no expectation of the piling works bringing contaminated materials to the surface.

The works and associated remedial aspects are discussed in more detail below.

4.3 PRELIMINARY AND ENABLING WORKS

4.3.1 Service Utilities

Unless expressly agreed to the contrary, it is assumed that the Contractor shall allow for the safe disconnection / diversion / reinstatement of all existing services, whether underground or overhead, including electricity, gas, data networks, product lines, foul,
surface and field drains, and flows within other water courses encountered during any of the excavation and earthworks associated with the works whether indicated in the Contract documents or not.

Plans have already been provided from Service Utility providers. Further details are presented in the Pre-tender Health & Safety Plan.

It is recognised that the current drainage system will be decommissioned and a new drainage system installed that will be designed to prevent contamination in the ground from entering it and discharging to the water courses.

**Water**

A mains water supply is available on the site and will be utilised for construction purposes. No water will be taken from surface water courses for potable supply but the galigu treatment does need relatively large volumes of water which may be derived from surface water sources using temporary pumps.

### 4.3.2 Permits and Licences

Where required, all applicable permits or licences (e.g. Mobile Plant Licences, Discharge Consents) will be obtained prior to beginning any work.

The contractor shall comply with and give all notices required by any regulation or by-law applicable to the Works.

Where required, the contractor will contact the local authority and gaining approval for all equipment in terms of potential nuisance (e.g. noise and odour) and working hours.

It is anticipated that the following permits, licences and approvals may be required for the project:

- Mobile plant licence for galigu stabilisation (waste management activity);
- Site Specific Working Plan for the licensed remediation contractor;
• Trade Effluent Consent for discharge of contaminated water to sewer;
• Groundwater Consent for surface disposal of contaminated waters to sacrificial areas;
• Plant licence for screening/crushing equipment;
• HSE approval for asbestos removal contract and method;
• EA approval of proposed piling methodology and pollution prevention measures;
• EA approval for discharge of clean construction run-off to surface water courses;
• EA approval for permanent site drainage to surface waters;
• EA approval for treated sanitary wastewater to surface waters; and
• Appropriately licensed waste carriers and disposers.

Where relevant these are discussed in more detail at the appropriate point in this document.

4.3.3 Facilities for Design Team Personnel and Authorised Visitors

The Contractor will provide the following facilities on site during the construction works:

• free access to the site (via a signing in procedure);

• use of a dedicated working office space and access to toilets and other welfare facilities;

• provision of water, electricity, telephone line and all reasonable facilities and information for the efficient execution of their work; and

• Cleaning and decontamination facilities for personnel likely to come in to contact with contaminated soil and water.

• There will also be a dedicated on-site soils laboratory that will be capable of performing a number of physical soil tests and discussions are also underway to determine whether there is scope for use of a hand held XRF analyser for metal determinations, although the main analytical works will be undertaken by a subcontracted laboratory (MCERTS accredited).
4.3.4 Security of the Site

Stobart Group will ensure that the site will be made secure during the Works programme ensuring, so far as is reasonably practicable, the health, safety of welfare of all those involved in the Works, also having regard to the provisions of Occupiers Liability.

All appropriate Health & Safety signage and contact details will be clearly displayed at the site entrance during the works and access to the site will be controlled. Tenants carrying on business activities during the works will be required to comply with site safety rules and ensure that their operations do not encroach upon construction work areas.

4.3.5 Demolition Works

The demolition works will involve the following elements:

- Asbestos removal prior to demolition of buildings;
- Demolition - isolation of power;
- Demolition - strip out of plant / pipe runs / residuals / above ground storage tanks;
- Demolition - buildings;

Demolition of buildings and the redundant tank farm area will be required. The Principal Contractor will be responsible for all aspects of the demolition works, ensuring the removal, as appropriate, of plant, equipment, residual and deleterious materials prior to building demolition. Note especially that residual materials will not be allowed to cross-contaminate re-usable materials (e.g. crushed concrete) arising from building demolition.

The contractor shall comply in all regards with relevant statutory guidance and requirements, together with any locally-imposed and/or site specific conditions in relation to the demolition.
4.3.6 Site Activities Associated with the Excavation Works

The remedial operations which are likely to be involved (subject to design / operational variations which the Principal Contractor may offer) are:

- controlled excavation, storage, separation and processing materials;
- the physical separation and size reduction and removal physical contaminants;
- the removal and treatment of chemical contaminated materials (galigu), ensuring resultant ‘inert’ materials are ‘fit for purpose’ within the context of the proposed end use; and
- quality controls including supervision for materials management and a full audit trail of all the activities ensuring the correct handling disposal, or where feasible re-use of materials.

The classifications for the specified waste management operations expected as defined in the Waste Management Licensing Regulations 1994 are:

- Physico-chemical treatment of waste;
- recycling of re-claimed hydrocarbon compounds for a site containing known volumes of such materials which can be reclaimed as part of the site works;
- use of waste obtained from any of the operations for the sites where ‘cleaned’ soils and engineering based materials are used as fill in preparation of restoration; and
- Storage of wastes consisting of materials intended for re-use or off site removal.

All materials which are classified as hazardous waste or which impede the re-use of galigu contaminated soils or other materials on site will be segregated and preferably treated on site or disposed of off-site, at a suitably licensed facility. Identification of hazardous materials (certain asbestos containing materials, drums, contents of above ground storage tanks, if encountered etc.) will be subject to site contingency plans,
health & safety and risk assessment/method statement procedures for their identification, handling, removal and disposal.

Stockpiling of excavated and incoming materials will be required from time to time to ensure smooth running of the site works. These temporary stockpiles will be confined within the boundaries of the site. Stockpiled materials will be stored and handled in consideration of the nature of the materials and the potential to impact the surrounding environment (e.g. where necessary the control of surface water run off, dusts etc.).

4.3.7 Excavation, Handling and Off Site Disposal

An estimated volume of up to 1,000,000m³ of contaminated material (contaminated soil including galigu) will be generated from the excavation works (excluding any demolition waste) over the entire project duration. This will be in two approximately equal phases, one commencing July this year until November. The second phase would commence around June 2009. The daily movements and treatment will amount to around 6,600m³ of contaminated material. The contaminated soils will be subjected to in-situ treatment (lime or cement stabilisation) and subsequent re-use on site to form a stable building platform and substantial cap on the former Tessenderlo portion of the site.

A fuller description of the galigu remediation strategy is presented in Appendix C (Galigu Remediation Strategy).

There will be no need for vehicles to leave the site and travel on public roads for these works which will be handled by large earth-moving plant.

It is possible that some materials will not be capable of lime or cement stabilisation. These will be segregated for investigation of on-site treatment option or failing that pending off-site disposal to a licensed treatment or disposal facility. The proposed stabilisation scheme is discussed in more detail below.
4.4 **SOIL STABILISATION TECHNIQUES (GALIGU TREATMENT)**

Stabilisation/Solidification is a civil-engineering based remediation technique in which contaminated soil is mixed with lime or cementitious materials to improve its engineering properties and immobilise contaminants. The dual action means that it is suitable for both land of poor engineering properties and land affected by contamination. Many derelict and brownfield land sites are made up of poor land containing contaminants so Stabilisation/Solidification is a practical technique that provides cost effective remediation.

The objectives of stabilisation/solidification remediation are, in the case of stabilisation, to produce more chemically stable constituents. In terms of solidification the objectives relate to passing on physical and dimensional stability to contain the contaminants in a solid product and reducing the influence of external agents such as air / precipitation therefore rendering the contaminants immobile and virtually unleachable.

The proposals for the site are to excavate the galigu and transfer it to a stabilisation processing area where it will be mixed with lime to produce a stabilised material. Where possible this will operate as a continuous process but at times it will also be necessary to temporarily stockpile the material and deal with it in batches.

A detailed method statement for the galigu stabilisation is presented in Appendix C to this document and should be referred to for a detailed technical overview of the site works. This section provides an overview.

The processing of the galigu will take place using mobile plant which is licensed by the Environment Agency. A site specific working plan and deployment licence has been issued. There is also a need for a waste management licence exemption for the re-deposition of the treated galigu on the former Tessenderlo area.

The treated galigu and galigu contaminated soils will be subjected to a substantial post treatment testing regime to ensure that the material is both geotechnically suitable as construction fill and environmentally stable. In other words the contaminants of concern (heavy metals) will be demonstrated via leaching tests to be leachable at levels so low as to not present a risk of impairment of environmental quality standards (EQS) at the
nearest sensitive receptor (The River Mersey). Field trials have already been performed on this material, which demonstrate that the material is fit for use and environmentally stable. This technique has also been used successfully elsewhere in the area on several occasions.

4.5 MANAGEMENT OF CONTAMINATED WATERS

There is a possibility for the need for on-site water treatment of contaminated perched groundwater encountered. This water will require abstraction and disposal, either off-site or by means of spraying onsite under a temporary consent to discharge to land. Disposal to foul sewer will require consent from the Water Company, and may require pre-treatment.

The site features shallow groundwater, which in the Works area, is potentially contaminated. The contractor will ensure that a suitable design is in place to remove, treat and dispose of this water. Treatment options may need to include settlement, oil interception, and other contaminant-specific technologies in order to gain a consent to discharge to the foul drainage system.

The contractor will not excavate the waste materials ‘wet’, the groundwater and any surface water collecting in the open excavation will be abstracted/treated/discharged, as outlined above, in order that the excavated material can be removed ‘dry’.

During the Works surface water run off from the works area (and any stockpile areas) will be controlled and assessed prior to consented discharge.

During the site works, the Contractor will implement procedures from published guidance documents for working on contaminated sites, such as following the Control of Water Pollution from Construction Sites CIRIA C532 guidelines (CIRIA 2001).

Particular care will be exercised for work close to the any drainage (surface and foul) water systems. Measures will be put in place to intercept direct run-off from any disturbed areas or seal off ingress points to the drainage system and thereby stopping any potential impact.
The treatment/collection works will have sufficient pumping capacity and pipework to extract water from all excavations, and to discharge treated water to the surface water or foul drainage system (as agreed/consented with the appropriate authority/company).

If substantial quantities of contaminated groundwater are encountered, an indicative outline of a potential system for water treatment is provided below:

- abstracted/controlled groundwater and surface water run-off will be pumped using an appropriate size pump to the first temporary storage tank where it will be allowed to settle (to remove suspended solids). The storage tank shall be of sufficient size to allow suspended solids to settle out or additional equipment (e.g. sand filters) should be used upstream of the tank to remove solids;

- an oil/water separator for removal of any free phase contamination where this is evident in the water;

- break tanks (where necessary) to control flow rates;

- sand filtration system;

- the contaminated waste groundwater (and surface water run-off) will be appropriately treated, such as granulated activated carbon of sufficient capacity to ensure the removal of the hydrocarbons concentrations measured in the groundwater samples; and

- on completion of treatment the water will be pumped from the storage tank through a sand filter tank (or similar) to the point of agreed discharge. A sampling port and discharge meter (to record volumes) should be available on the outfall side.

All tanks will be appropriately bunded.

The contractor will undertake selected sampling and analysis (range of ‘standard’ discharge determinands and suite of VOCs –identified in the site investigation report of
the discharge water (as requested by the authorities and/or Water Company), at least every 72 hours during any discharge works.

4.6 JAPANESE KNOTWEED

4.6.1 Introduction

Japanese Knotweed is a rhizomatous perennial, which can grow up to 2-3m in height and has bamboo-like stems that produce clusters of creamy white flowers late in the growing season. The hollow woody stems persist throughout the winter, with new growth the following spring being produced from the plant’s extensive rhizome system. The dead stems and leaf litter decompose very slowly, forming a deep organic layer which prevents the germination of other plants. The plant’s rhizome system can extend to a 3m depth and 7m laterally. A fragment of rhizome, as little as 0.7 grams, can produce a new plant.

The Wildlife and Countryside Act 1981 makes it illegal to knowingly cause the spread of this plant. Control of the plant is reliant upon the death of the rhizome system, which can take a number of years. Methods of control include cutting/pulling the plant, application of herbicide and excavation of the plant, including its rhizome system, either for disposal or ex-situ treatment. Any cut and excavated material must be carefully managed. Care must be taken to avoid contamination of vehicles and equipment before leaving site to prevent the spread of the plant. Any cut and excavated material that cannot be dealt with on-site must be disposed of to a licensed landfill site. The recurrence of this plant on site after development could lead to extensive damage of the services and parking areas of the site – its control and eradication is an essential aspect of the site preparation works and onward site management.

This vegetation and affected soils must be managed in accordance with the Environment Agency Code of Practice for the Management, Destruction and Disposal of Japanese Knotweed.

Any deviations from this code of practice may lead to criminal offences under Waste Management Licensing legislation and the Wildlife and Countryside Act 1981.
4.6.2 Japanese Knotweed General Precautions

Japanese Knotweed has been identified on the site in small stands which have been regularly treated with herbicide. This weed is now under control and there is no expectation that large volumes of Japanese Knotweed contaminated soils will be excavated during the works but there may be a need to excavate near some of the stands and precautionary measures will be applied.

Prior to remedial works identifiable stands of knotweed will be cordoned off to prevent disturbance by on-site vehicles/machinery and personnel. Vehicles with caterpillar tracks will be prohibited from the knotweed contaminated areas. Only wheeled vehicles will be used in these areas so as to minimise the contamination of vehicles with knotweed material. To further minimise the possible spread of knotweed-contaminated material across the site, vehicles should be washed down before leaving the knotweed contaminated areas and a wheel wash facility must be utilised for all vehicles leaving the site that have come into contact with knotweed or knotweed contaminated soil during the works.

Knotweed contaminated areas, if disturbed, will be dealt with as follows:

- Knotweed stands are to remain in-situ as these are sited in areas that will not be affected by engineering site preparation works and can be treated with herbicide to control and eradicate the knotweed over successive sessions.

- On completion of the herbicide treatment the material will either be emplaced in a suitable void which is of the correct depth and encapsulated in a designated area and treated with herbicides over a number of seasons (in accordance with prevailing EA guidance).

- Any voids where knotweed contaminated material is deposited will be marked accurately on a plan for future reference. A photographic log will be kept of these works. The deposit of substantial amounts of vegetation in the concrete pits/voids is to be avoided to prevent the possibility of gas build-up, leachate generation and settlement.
4.7 **FURTHER CONTAMINATION DISCOVERIES**

Although the area has been comprehensively investigated, given the age of the site and variety of former uses the possibility of further contamination hot-spots being present in the cut area of the earthworks cannot be ruled out.

Should any suspect material be uncovered that is a departure from what is expected (i.e. not demolition rubble, general fill or galigu) all work in that area must stop immediately, and the site manager and ENVIRON should be informed immediately to examine the material and if necessary take samples.

Should there be a possibility of a pollution incident occurring the site emergency response procedures are to be followed and co-ordinated with AHC’s overall emergency response plan.

ENVIRON will arrange sampling and characterisation of the material and a management/disposal strategy will be agreed with the contractor and regulatory agencies. All verbal instructions are to be followed by a written confirmation and retained on file by the site manager before being actioned.

It is likely that such “unforeseen” contaminated areas will need to be isolated from the cut operation to prevent cross-contamination and allow the works to continue. All Non-Conforming Contaminating Materials must first be delineated and then isolated from all other materials. A quarantine area is to be designated in an area away from fill material. A heavy duty plastic sheet or membrane should be laid and the material placed upon it and then either covered to prevent contaminated run-off or if that is not practicable, the area should be isolated from the general run-off (temporary bunding) and the contaminated run-off should be collected and characterised for disposal. This is to ensure there is no contamination of building materials used on site. As the site works progress the most appropriate temporary quarantine area will change and thus a specific area cannot be nominated at the outset.

Where the discovery relates to drums, physically discrete items and other receptacles, the material(s) must then be securely sealed in appropriate containment receptacles.
and transported to the quarantine area awaiting characterisation and transfer to appropriate facility/facilities to be disposed of safely and in accordance with the licence conditions of those facilities. It is assumed that drummed material and material in receptacles cannot be processed on site for re-use.

It is possible that the temporary storage of such material pending its waste analysis and arrangement of its disposal may require to be registered with the Environment Agency under a Waste Management Licensing Exemption. It is imperative, therefore, that ENVIRON is notified immediately that any such contaminated materials are discovered during the works so that the appropriate assessment of the situation and regulatory notifications can be made. HBC will also be notified.

It is likely that WAC testing will be required to determine the Landfill requirements if the material cannot be treated and rendered safe on site using the lime stabilisation or another process.

Material should be transported by a licensed waste carrier, under a proper duty of care compliant contract. All documentation relating to the disposal of waste offsite is to be retained for five years.

In the unlikely event that the contaminated material is of such a volume that it cannot be handled in the manner above and it requires direct removal to avoid double handling, the works will be suspended in that area until such a time as the material has been tested, a disposal facility identified and the necessary Hazardous Waste notifications have been made.

Validation sampling will be undertaken by ENVIRON of the residual material to confirm that it is fit for use. Validation criteria will be agreed with the regulatory agencies if such a situation occurs.

Where possible ENVIRON and the client team will try to work with the EA and HBC to identify on site solutions for this material, such as encapsulation or bio-treatment (if appropriate). This will need to be considered in the light of prevailing Environmental Permit (EP) regulations and the appropriate permits may need to be obtained first. The time frame for this and the risks of keeping that material stored on site for a long time will be considered in the balance between off-site and on-site treatment options.
4.8 OFF SITE WASTE DISPOSAL


All material removed and disposed off site will be undertaken in accordance with the Duty of Care requirements of the Environmental Protection Act 1990. In addition the Contractor shall ensure that the disposal operation is carried out in accordance with the requirements of the appropriate Local Authority and Environment Agency.

In accordance with the Duty of Care Regulations (Section 34 of the Environment Protection Act 1990) the Contractor is the producer of waste and the transfer from the site and disposal shall be performed by an approved waste disposal contractor. Loading of vehicles shall be performed in an organised manner so as to prevent the spread of contaminants. All vehicles are to be sheeted and cleaned if required, prior to leaving site. The Contractor shall take all reasonable and applicable measures to prevent the escape of material during transportation.

The Contractor will keep valid copies of the waste transfer certificates for each load of material excavated (and disposed of off site) during the ground remediation works. This information will be available to the Regulatory Authorities.

The contractor will develop, implement, monitor and modify as required, a detailed Waste Management Plan for all wastes arising from the Works in accordance with the Site Waste Management Plans Regulations 2008.

4.9 LANDFILL TAX EXEMPTION

There will be no on-site landfiling and landfill tax does not apply for materials handled on site. Off-site materials may be subject to Landfill Tax. If this material qualifies (i.e. is being removed for environmental reasons and is historic) a tax exemption will be applied for.
4.10 BACKFILLING AND REINSTATEMENT

4.10.1 Backfill

Selected excavated material (where treated) may be adopted as infill material. Selected excavated material shall be categorised into the applicable type of material and such material shall be treated accordingly during spreading and compaction operations. However, the imported (or re-used crushed demolition material) or stockpiled treated materials or constituents of materials composed of the following shall be considered unacceptable as backfill:

- peat, material from bags, swamps and marshes (note: peat material has been identified on site);
- logs, pieces of wood stump and perishable material;
- materials in a frozen condition.
- material susceptible to spontaneous combustion;
- hazardous material and special waste as defined in the Environmental Protection Act 1990;
- material having hazardous chemical or physical properties requiring special measures for its excavation, handling, storing, transportation, deposition and removal.
- Controlled waste containing greater than background levels of chemical, metal or biological contamination, including hydrocarbon contamination.
- clay having a liquid limit determined in accordance with BS 1377 Test 2, exceeding 90 or plasticity index determined in accordance with BS 1377 Test 4, exceeding 65.

Where the excavation reveals a combination of acceptable and unacceptable materials the Contractor shall carry out the excavation in such a manner that the
acceptable materials are excavated separately for use in the reinstatement Works without contamination by the unacceptable materials.

Where the material is to be stored on site for later re-use, inspection of such material being used as infill to ensure no deterioration has occurred shall be carried out. In the event that such material is deemed unsuitable by the site engineer, it shall be removed from site as directed by the site engineer.

If the imported clean backfill material (inc crushed material arising from demolition waste) or treated excavated material is to be temporarily stockpiled on-site whilst excavation of contaminated materials is continuing, the Contractor will ensure that measures are in place to prevent cross-contamination.

Material used for backfilling including any material from demolition waste and treated excavated soil, shall comply with preliminary data for Waste Acceptance Criteria (WAC) as associated with the Landfill (England and Wales) (Amendment) Regulations 2003, which requires leachability testing in accordance with Environment Agency guidance on the disposal of contaminated soils.

Samples of the proposed fill materials shall be accompanied with grading charts and test certificates. The limit values identified for inert imported fill are as follows:

For inorganics the following are based on inert landfill acceptance criteria – limit values (mg/kg) for compliance leaching test using BS EN 12457-4 at L/S 10l/kg

<table>
<thead>
<tr>
<th>Element</th>
<th>Limit Value (mg/kg)</th>
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<tbody>
<tr>
<td>Arsenic</td>
<td>0.5</td>
</tr>
<tr>
<td>Molybdenum</td>
<td>0.5</td>
</tr>
<tr>
<td>Barium</td>
<td>20</td>
</tr>
<tr>
<td>Nickel</td>
<td>0.4</td>
</tr>
<tr>
<td>Cadmium</td>
<td>0.04</td>
</tr>
<tr>
<td>Lead</td>
<td>0.5</td>
</tr>
<tr>
<td>Chromium (total)</td>
<td>0.5</td>
</tr>
<tr>
<td>Antimony</td>
<td>0.06</td>
</tr>
<tr>
<td>Copper</td>
<td>2</td>
</tr>
<tr>
<td>Selenium</td>
<td>0.1</td>
</tr>
<tr>
<td>Mercury</td>
<td>0.01</td>
</tr>
<tr>
<td>Zinc</td>
<td>4</td>
</tr>
</tbody>
</table>

For organic such criteria has not as yet be fully determined, but no material with a mineral oil/petroleum hydrocarbon concentration exceeding 1000 mg/kg will be permitted for re-use or importation at the site.
Treated galigu will meet the criteria set out in Appendix C, which also sets out the testing regime for the treated material. No deliveries in bulk or backfill shall be commenced until samples have been approved as complying with this Specification.

4.11 REMEDIAL TARGETS

The objective of the remediation is to treat any galigu that is excavated in the development area to ensure that the cement stabilized material (which will be re-used on site as an engineering material) is not capable of leaching contaminants at levels that would exceed the WAC for inert wastes or breach the estuarine Environmental Quality Standards (EQSs) at the River Mersey. This will be demonstrated by appropriate lab, trials, field trials and leaching tests (and in the latter case quantitative risk assessment modeling).

The results from the recent investigation and third party monitoring have been presented to the EA, and no specific remedial targets are deemed necessary for residual galigu as all galigu contamination encountered during the excavation works will be cement stabilized to render it harmless and suitable for use as an engineering material. The residual galigu will remain in place but effectively be sealed.

In addition to the galigu remediation, it is recognized that there may also be hydrocarbon contamination on parts of the site. Where encountered this material will be quarantined and characterized to determine the need for on-site treatment or off-site disposal. If the material is to be treated for re-use on site then suitable validation criteria will be agreed with the EA and HBC, which will in turn determine treatment methodologies that could be used.

4.12 GROUNDWATER MONITORING

It may be a requirement of the EA/EHO that groundwater monitoring is undertaken prior to and post the remedial works. However, due to the nature of the works some of the current monitoring wells may be removed during the site redevelopment works, and therefore further monitoring boreholes should be emplaced around the perimeter and...
adjacent to the watercourses. Currently, a 12 month (quarterly) monitoring programme is envisaged post-remediation. The borehole locations and construction details will be confirmed with HBC and the EA prior to installation and after the remedial works have been completed.

### 4.13 REPORTING

On completion of the works, ENVIRON will produce a validation report documenting the remedial works. It will include the following:

- plans showing the areas and depths of excavation of contaminated soil
- a copy of the survey showing the site levels both before and after excavation, and the volume of soil removed;
- a photographic record of the excavation work;
- plans showing the location of validation sampling points; and
- copies of analytical certificates.

**THIS CONCLUDES THE REMEDIATION METHOD STATEMENT**
APPENDIX A: PROPOSED PHASING SEQUENCE
APPENDIX B: CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN (CEMP)
<table>
<thead>
<tr>
<th>Project No:</th>
<th>67-C12665</th>
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<tbody>
<tr>
<td>Report Status:</td>
<td>Revision 1 (draft)</td>
</tr>
<tr>
<td>Project Manager/Author</td>
<td>Neil Coyne</td>
</tr>
<tr>
<td>(signature):</td>
<td></td>
</tr>
<tr>
<td>Approved</td>
<td>Steven Rowan</td>
</tr>
<tr>
<td>(signature):</td>
<td></td>
</tr>
<tr>
<td>Date:</td>
<td>June 2008</td>
</tr>
</tbody>
</table>

This report has been prepared by ENVIRON with all reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the client. This report is confidential to the client, and ENVIRON accepts no responsibility whatsoever to third parties to whom this report, or any part thereof, is made known, unless formally agreed by ENVIRON beforehand. Any such party relies upon the report at their own risk.

ENVIRON disclaims any responsibility to the client and others in respect of any matters outside the agreed scope of the work.
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1.0 CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN (CEMP)

1.1 INTRODUCTION & RELEVANT LEGISLATION

This documents sets out how the groundworks and construction works associated with the redevelopment of the Project Goldfinger site in Widnes will be undertaken in such a way to be protective of the environment and to prevent pollution. This covers the following issues:

- overview of remedial operations highlighting operations likely to result in disturbance and/or working outside the core working period;
- prohibited or restricted operations (locations, hours, etc.);
- provisions for reporting, public liaison, prior notification etc.;
- proposed target criteria for environmental issues, where practicable (e.g., noise);
- possible departures from the target criteria, and the detail of how any impact will be minimised, or possible complaints addressed;
- confirmation of the mechanisms and contacts for complaints and the procedures for responding to oral complaints;
- details of all works involving interference with a public highway, including temporary carriageway/footpath closures, realignment and diversions; and
- housekeeping procedures and other environmental control measures.

Note this is not a remedial method statement and a separate document has been prepared in that regard, this document merely sets out how the remedial and groundworks will be managed in an environmentally responsible manner.
Relevant Legislation

Listed below is a list of the key legislation that is used concerning construction development.

The Environment Act 1995 was used to introduce the changes laid out by Part IIA of the Environmental Protection Act 1990. This placed a new responsibility on local authorities throughout the United Kingdom to devise and implement a strategy to identify and remEDIATE land that has been contaminated through its historical usage.

Part IIA allows Local authorities to designate land as contaminated if it is judged to:

- Have caused significant harm
- Having significant potential of causing significant harm

<table>
<thead>
<tr>
<th>Legislation</th>
<th>Year</th>
<th>Area of Concern</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control of Pollution Act</td>
<td>1974</td>
<td>Water</td>
</tr>
<tr>
<td>Highways Act</td>
<td>1980</td>
<td>Traffic</td>
</tr>
<tr>
<td>Environmental Protection Act Part IIA</td>
<td>1990</td>
<td>Earthworks, Dust</td>
</tr>
<tr>
<td>Town and Country Planning Act</td>
<td>1990</td>
<td></td>
</tr>
<tr>
<td>Water Resources Act in England and Wales</td>
<td>1991</td>
<td>Water</td>
</tr>
<tr>
<td>Clean Air Act</td>
<td>1993</td>
<td>Dust</td>
</tr>
<tr>
<td>Environment Act</td>
<td>1995</td>
<td></td>
</tr>
<tr>
<td>Hazardous Wastes (England and Wales) Regulations</td>
<td>2005</td>
<td>Waste</td>
</tr>
</tbody>
</table>

Local Authorities themselves are empowered to judge what they perceive to be significant harm and are also responsible for judging whether a site has the significant potential to cause such harm.

Part IIA of the Environmental Protection Act 1990 states that the liability for remediation of a site falls upon the ‘appropriate person’ who caused the land or ground waters to become contaminated. Local Authorities are now under duty to serve remediation notices on areas identified as contaminated land.
1.2 **ROLES AND RESPONSIBILITIES**

ENVIRON’s primary role will be as environmental advisor to the Project Manager and client team. The Principal Contractor (WA Developments) has been appointed directly by Stobart Group Limited and they in turn have appointed Beach Soil Stabilisation to undertake the galigu stabilisation works. It is these construction and remediation elements of the project that have the potential to cause local nuisance (noise, dust, odour) issues or pollution incidents if not properly managed.

1.2.1 **Role of Stobart Group Limited with Respect to Environmental Management**

Stobart Group Limited are the developer and ultimate client for this project and have overall responsibility for the development’s phasing, execution and success. They have appointed ENVIRON (UK) Limited (ENVIRON) as Environmental Advisor as part of the Project Design and Supervisory Team to support them in:

- monitoring the Contractor's performance and validity of the works;
- development of mechanisms for dealing with problems; and,
- acting as a point of contact for consultation and feedback with regulatory agencies, statutory consultees, the public and other interested parties concerned with environmental matters.

1.2.2 **Role of the Principal Contractor with Respect to Environmental Management**

The Contractor will be responsible for ensuring compliance with:

- all relevant legislation;
- best working practice and guidance for working on contaminated land including those contained in industry Code of Practice documents;
the environmental controls and mitigation measures contained in the CEMP; and

any environmental or other codes of conduct required by Stobart Group Limited.

The Contractor will be required to undertake regular environmental inspections and reporting to enable Stobart Group Limited/ENVIRON to monitor and evaluate the Contractor's performance.

The Contractor will demonstrate the means of ensuring that the requirements of the CEMP are complied with during construction, and demonstrate commitment to the CEMP at all levels in its management structure.

ENVIRON will monitor and audit the compliance of the Contractor with the CEMP. Records of compliance and non-compliance with the provisions of the CEMP, derived from audits and other inspections by ENVIRON, will be held at the Contractor's site office. These will be available for inspection by representatives of the Contractor, Stobart Group Limited, the Local Authority Environmental Health Departments, and the Environment Agency and others appropriate stakeholders.

1.2.3 Health & Safety of Works and Personnel

The requirements of the Management of Health and Safety at Work Regulations 1992, the Construction (Design and Management) Regulations 1994 and the Construction (Health, Safety and Welfare) Regulations 1996 will be adhered to. In doing so, regard will be paid to the features listed below to ensure that no compromises are made which might jeopardise the safety of employees, contractors, or the public:

- construction work on site;
- hazardous materials and chemicals;
- operating procedures;
- work permits; and
- Emergency response.

The key roles with respect to Health & safety are as follows:
Planning Supervisor (Fairhurst) will co-ordinate the health and safety aspects of the project in accordance with The Construction (Design and Management) regulations 1994 (CDM), producing Pre-tender Health and Safety Plan and appropriate input throughout and at the end of the project (Health and Safety file), including reviewing all health and safety documentation, providing technical support to the Project Manager in the modification of site health and safety requirements or work plans, reviewing and confirming any changes in PPE, establishing and ensuring compliance with site control areas and procedures; manage reporting and investigation procedures resulting from any on site incident during the works.

Principal Contractor (Stobart) – as a statutory appointment the Principal Contractor will undertake their legal responsibilities and duties in accordance with CDM regulations, and other relevant HS statutes. The appointed Principal Contractor will be a specialist civil engineering contractor competent in building decommissioning, demolition earthmoving and engineering skills, decontamination and handling of soils, sludges and process residues, and use of other remedial technologies. Where necessary, the Principal Contractor will appoint specialist sub-contractor e.g. UST removal, de-gassing etc. Details are required to ensure that the Principal Contractor and/or sub-contractor are capable of these specialist tasks. Of particular note, Beach Soil Stabilisation will be appointed to manage and execute the galigu treatment works under a mobile plant licence agreed with the EA.

1.3 EXTERNAL COMMUNICATIONS

The Contractor will be responsible for formal external communications, particularly those with statutory consultees and attend meetings as appropriate. The main consultees to be involved include:

- Environment Agency (EA)
- Health and Safety Executive (HSE)
- Local Authority (LA)
- Other appropriate stakeholders (e.g. neighbours, United Utilities, etc).

Within reason, the LA and the EA would have unrestricted access to the site, although reasonable prior notification is required and ENVIRON and/or the Contractor will accompany the Regulatory Authority personnel on any such visits. This does not effect
the statutory rights of the Regulatory Authority to enter the site, for example, the EA has
entry provisions for pollution prevention visits in accordance with Section 108 of the
'Environment Act 1995' to assess compliance with consents, and also to check the
precautions in place to prevent pollution taking place.

1.4 COMPLAINTS PROCEDURE

A designated liaison officer (from the Principal Contractor) will deal with any complaints
and enquiries. This nominated individual will be named at construction site entrance,
with a contact telephone number, and will be identified to the Local Authority and prior
to the start of construction, and whenever a change of responsibility occurs.

Any complaints will be logged on site, and reported to the relevant department of the
Local Authority (and vice versa) as soon as practicable, with provisions for addressing the
complaint. The required actions will be different in each specific case, depending on the
issue concerned, but may include monitoring or investigating the matter, alteration of
the operation, equipment or location, or applying extra controls (e.g. screening).

1.5 ENVIRONMENTAL MANAGEMENT PRINCIPLES

Environmental management issues throughout the life of the project, including design
through to commissioning, are to be governed or guided by a number of ‘standards’,
including:

- those contained in legislation;

- those established by industry codes of practice;

- those required by Stobart Group Limited environmental policy; and

- those that are specific to commitments made in the surveys, commitments made
during consultation, and measures as may be set out in conditions/contract or in
other consents such as planning permission.
1.6 TRAINING

All personnel will be made aware of their responsibilities with respect to the CEMP, and its appropriate implementation. A training programme will be developed for all site personnel. The aims of the training will be to ensure that all personnel are fully conversant with:

- the CEMP and its onsite implementation;
- the environmental sensitivities of the areas;
- dealing with unforeseen environmental incidents; and
- the roles of the Contractor's staff, stakeholders and ENVIRON in capacity as Environmental Advisor with respect to environmental issues.

All construction personnel will undergo site-specific induction to include health, safety and environmental issues, before commencing work on the site in accordance with CDM regulations.

1.7 INSPECTION AND AUDITING

It will be for the Contractor to demonstrate how the provisions of the CEMP are being complied with to Stobart Group Limited/ENVIRON's satisfaction. This may include a programme of inspections and audits by the Contractor's staff and a monitoring programme of the environmental effects of remedial works, and will:

- evaluate the effectiveness of environmental mitigation, and identify environmental problems and appropriate responses at an early stage;
- ensure that the works are carried out in accordance with the provisions of the CEMP;
identify and implement any environmental improvements which will contribute to the overall environmental performance of the project.

Where problems are identified by either Stobart Group Limited/ENVIRON or the Contractor, corrective action will be identified and the Contractor. The Contractor will undertake this corrective action, which could take the form of, for example, further direct mitigation, changes to procedures or additional training.

1.8 CONTINGENCY PLANNING FOR EMERGENCIES AND ENVIRONMENTAL INCIDENTS

It is necessary to have procedures in place to deal with accidents, emergencies and incidents. Environmental incidents can be defined as unexpected events which lead to, or could in different circumstances have led to, adverse effects on people, property or on environmental resources such as habitats or watercourses.

During the site works, the Contractor will implement procedures from published guidance documents for working on contaminated sites.

In particular the following provisions will apply:

- There will be a supervisory person on site at all times to direct staff and respond to incidents;

- Where unforeseen circumstances are encountered, works will be temporarily ceased in that area until the situation has been evaluated and an action plan agreed;

- Where the discovery of an imminent pollution threat occurs (e.g. a spillage) all reasonable actions shall be taken to curtail the incident (e.g. application of a spill kit, deployment of booms, physical intervention with dams or earth moving equipment) - provided that this response does not put individuals at risk of harm. The Environmental Agency must also be notified where this threatens controlled waters;
- Where materials arise that are not typical of the contaminants encountered thus far the material will be sent away for full chemical analysis and the area either worked around or the material moved to a secondarily contained quarantine area whilst it is being evaluated;

- If asbestos is uncovered this will be immediately reburied and the area damped down until a safe and secure method of its removal can be established; and

- All incidents and emergencies will be recorded and logged along with corrective actions taken.

1.9 BULK STORAGE OF FUELS

All liquids and solids of a potentially hazardous nature, (e.g. diesel fuel, oils, solvents) will be stored on surfaced areas, with bunding, to the satisfaction of the Environment Agency in accordance with current guidance.

All fuel and/or chemical storage tanks located on site should also be bunded in order to limit the impact of any leakages that occur. The containment area should be capable of holding 110% of the volume of the largest tank or 25% of the total volume likely to be stored for multiple containers, whichever is greater. Any fuel tankers entering the site should only be permitted to park in designated areas in order to reduce the potential for fuel to leak into watercourses or to damage construction materials present on site.

Chemical and fuel storage tanks should not be placed on flood plain land if possible as they may float during floods, severing pipes and causing leakages. However if this is unavoidable, tanks should be securely anchored to prevent such leakages occurring.

Storage areas should also be organised providing space for materials to be removed with ease when they are required. If heavy machinery is required to move materials, this should also be taken into account allowing space for machinery to manoeuvre.

The Contractor shall establish within the site an area for the refuelling of plant and vehicles away from the watercourses and on a surfaced area. The area shall be kept clean at all times.
Any spillages or leaks of fuel shall be cleaned up immediately by the Contractor. No refuelling shall be carried out outside the refuelling area.

1.10 WEATHER MONITORING

Appropriate environmental controls will be conducted during the demolition and remediation works.

Vigilance of weather conditions and potential for dust clouds will be undertaken and recorded on a daily basis. Damping will be used when dust generation is likely (see below).

Details of the prevailing weather conditions wind direction, strength and incidence of precipitation will be reported each day.

1.11 CONTROL OF DUST, ODOUR AND AIR QUALITY DURING CONSTRUCTION

Dust control and odour suppression is of importance in respect of any major demolition, earthmoving, on-site crushing/stockpiling, or vehicle loading and movement over unsurfaced areas. Residential properties are located within a few hundred metres of the site and therefore it is important that appropriate minimising dust emissions and odour suppression is carried out. Provisions for dust control may include the following:

- spraying of delimited areas with water (subject to appropriate licensing) as and when conditions dictate;
- stockpiles of dust-generating materials will be kept to a minimum and covered or wetted to prevent dust blow;
- within the limitations of the site boundaries and the orientation of receptors relative to the prevailing direction of strongest winds, stockpiles will be located in a manner that minimises dust generation;
- wheel/body washing facilities to be provided and used as necessary; and
vehicles carrying waste material off-site to be sheeted, if there is any risk of dust blow.

There are a number of other issues that need to be considered with regard to the control of dust. These include the following:

- no fires will be allowed on site; and
- should materials containing asbestos be encountered during the works, special provision will apply. A safety method statement will outline the control measures necessary to reduce the risks to an acceptable level.

Given the generally low levels of VOC identified in the ground, there will be no need to implement odour suppression techniques.

1.12 NOISE NUISANCE

The proposals in respect of noise/vibration comprise the following:

- appropriate “target criteria” will apply to the works; and
- where it is not practicable to work to the target criteria (for example, if ground conditions determine particular plant requirements, or for necessary out of hours working), provisions will be set out in advance to reduce the effect, e.g. through prior notification or by other measures.

It should be emphasised that the use of the target criteria is intended to warn of activities that may require particular care and control. Departures from the target criteria should not be taken to imply that conditions will be unacceptable or that complaints will occur.

The proposed target criteria for the works are as follows (expressed as residential façade noise levels, LAeq(T)): ¹

¹ $L_{eq}$ is the equivalent A-weighted sound pressure level in decibels of continuous sound within a specified time interval that has the same square sound pressure as the varying sound.
Monday - Friday  
0800 - 1800 hrs  
75 dB(A)  
T: 10hrs

Saturday  
0800 - 1300 hrs  
75 dB(A)  
T: 5hrs

Although it is not intended to work outside the core hours, unless particular circumstances require it, appropriate criteria would be 65 dB for evenings and Sunday.

Because of the separation distance between the construction areas and the nearest sensitive property (c.200m), noise control from construction work is not anticipated to require particular attention.

However, if any works are identified which are considered to have greater potential for local noise impact, noise predictions will be made on the basis of detailed Method Statements developed with the Principal Contractor. These predictions will be provided to the relevant Authorities, for comparison with accepted noise criteria. Where it appears not to be practicable to work within accepted criteria (for example, if ground conditions determine particular plant requirements, or for necessary out of hours working), provisions will be set out in advance to reduce the effect, e.g. through prior notification to affected groups by changing plant or construction methods. However, such works are not anticipated.

It should be emphasised that the use of the above approach is intended to identify activities which may require particular care and control. Departures from the target criteria should not be taken to imply that conditions will be unacceptable, that complaints will occur or that the construction activity should stop. Noise criteria for construction will be agreed with the Local Authority Environmental Health Officer.

Notwithstanding the above, best practical means will apply to potentially noisy operations. In particular:

- plant and equipment to be used for the works will be properly maintained, silenced where appropriate, and operated to prevent excessive noise. Plant should be certified to meet any relevant EC Directives/UK/BS5228 standards;
construction contractor will include a requirement to meet the guidance in BS5228 (Parts 1 and 2)\(^2\) which will form a pre-requisite of their appointment;

- static construction plant (e.g. compressors) should be installed such that it is appropriately enclosed or screened unless the location can be shown not to require it; and

- items of plant operating on the site in intermittent use will be shut down in the intervening periods between use.

1.13 ROAD CLEANLINESS

Wheel-washing facilities are not expected to be necessary as no earthmoving equipment or lorries will enter a public highway. Materials will be excavated, treated and emplaced on different areas of the same site.

The site compounds and access roads should be kept in a tidy in the context of the works withy regular cleaning of all surfaced roads.

1.14 LORRY MOVEMENTS/ACCESS ROUTES

In order to minimise the potential impact to the local area and residents from traffic emanating from the site (travelling to landfill/importing materials), not only will the arrival and departure be controlled where possible and practicable, but the Contractor will propose a suitable route.

The route proposed should be to avoid key residential estates and the centre of town. However, given that the landfill destination is as yet unknown, no further details of the proposed route can as yet be supplied, although this information will be provide to the appropriate departments of the Local Authority following the appointment of the Contractor. The Contractor may need to agree the actual route with the relevant authorities (LA, Highways Agency).

\(^2\) BS5228: Noise and Vibration Control on Construction and Open Sites
  Part 1: Code of Practice for basic information and procedures for noise and vibration control (1997)
  Part 2: Guide to noise and vibration control legislation for construction and demolition, including road construction and maintenance
In the event of unusual activities or events that can be anticipated (e.g., road closures, roadworks, wide loads, etc), these will be notified to the Local Authority, and to relevant property owners or occupiers, wherever possible, in advance of the activity. The relevant activities and receptor properties will be determined by agreement with the Local Authority once the detailed programme of construction is defined. Key activities requiring prior notice may include:

- any necessary night-time, weekend or evening working (outside core areas) of a type which may affect properties (although not anticipated in this instance);
- road or footpath closures/diversions and movements of wide loads; and
- work on or affecting land used by others.

However, at this stage no such eventualities are envisaged.

### 1.15 HOURS OF WORKING

Hours of works are less likely to require restrictions for reasons of noise and possible disturbances, than for most major construction projects e.g., in urban areas. In agreement with the Local Authority, the working hours will generally be:

- 0730 – 1800 hours  Weekday
- 0730 – 1330 hours  Saturday

Any work which is intended outside these hours will be subject to prior agreement, and/or reasonable notice, to the Local Authority. Night-time (2300 – 0700) working will not normally be permitted.
1.16 PROVISIONS IN RESPECT OF ARCHAEOLOGY AND CULTURAL HERITAGE

There is a planning requirement for an archaeologist to be present for excavation works in the peat bearing horizons. This is the subject of a separate document that should be referred to.

- THIS CONCLUDES THE CEMP -
APPENDIX C: GALIGU TREATMENT METHOD STATEMENT AND PROTOCOLS
Remedial Treatment & Re-use of Galigu Contaminated Soils

FORMER TESSENDERLO CHEMICALS & AHC WAREHOUSING SITE, WIDNES

Prepared On behalf of

Stobart Group

June 2008
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3 Summary

Annex A - Mobile Plant Licence
Annex B - Verification Testing Schedule
Annex C - Treatment Phasing Drawing
1 Introduction and Overview

This document sets out the proposed methodology and justification for the treatment and re-use of galigu and galigu contaminated soils covering much of the land around the AHC warehousing site and adjoining former Tessenderlo chemical works, located at Ditton, Widnes.

Stobart Group Limited (Stobart) plans to remediate and develop out the former AHC Warehousing Facility located of Mathieson Road, Westbank Dock Estate, Widnes and land formerly occupied by Tessenderlo Chemicals (which forms part of the same overall development site). The land in question is to be substantially redeveloped as a regional distribution centre (located on the AHC portion of the land to the west of Desoto Road) and a refrigerated logistics centre (on the “Tessenderlo” portion of the land to the east of Desoto Road). The land areas and planned phasing of the works are presented in Drawing pa00014.

In simple terms the plan is to use bulk earthworking techniques (cut and fill) to re-level the land to create a consistent, geotechnically stable formation level for the entire development area. This will involve the diversion of Steward’s Brook along a new channel and into Marsh Brook (which will require re-engineering) and a net loss of material from the AHC warehousing site and corresponding deposit of material on the former Tessenderlo area.

The most substantive element of the works will be the treatment of galigu and galigu contaminated soils using lime or cement/PFA stabilisation techniques whereby the contaminated soil is mixed with either lime or cement/PFA mixtures to form a physically stable, chemically inert material that can then be used for engineering purposes.

The mixing of galigu with the stabilisation additives will be undertaken in-situ using specialised mobile plant. This plant is licensed as mobile plant by the Environment Agency (EA) and a deployment licence has been issued for the use of this equipment on this site (see Appendix A). There is, however, an additional regulatory consideration in that the re-use of the treated material also requires the permission of the EA as competent authority for waste materials. Although the material will have been treated to render it chemically inert it could still be regarded as a waste material and thus its re-use could be regarded as a waste management activity. The EA has the discretion, however, to allow the re-use of such material without the need for an Environmental Permit where it can be demonstrated that the material is:
- Fit for use (i.e. physically suitable);

- Environmentally benign (i.e. non leachable and not harmful to human health);

- Used for a relevant purpose (i.e. there is a demonstrable need for the treated material to serve a designated development purpose).

This document and the supporting appendices provide the necessary information to enable the EA to grant permission to re-use this material without the need to apply for and obtain an Environmental Permit for waste disposal.
2 Galigu Remediation Proposals

2.1 Site Contamination Overview

The remedial proposals set out in this document relate to the excavation, redepotiation and treatment of materials that will be derived from and re-deposited on the same development site. For ease of description, however, the site can be considered to be a composite of a number of distinct land parcels. These are from West to East (refer to Drawing pa00014):

- The Foundry Lane “site”;
- The Reclamation “site”;
- The West Bank Dock “site”; and
- The former Tessenderlo chemical works “site”.

The former Tessenderlo site is separated from the other three land parcels (which collectively represent the AHC Warehousing site) by Desoto Road. This, however, is a private (unadopted) road within the contiguous land ownership of Stobart Group, hence the overall site is one entity and will be developed as such.

Collectively the land has been under industrial usage from at least the 1890s to the present day. The earlier maps indicate that the Foundry Lane site comprised a Cement works, which occupied the site until circa 1920, when a Tar works and a Manure works were developed. These works were subsequently replaced in the late 1950s by a Timber yard, which occupied the site until recent times.

At the West Bank Dock site, a Satinite works together with a Saw mill and a Pottery works were developed during the early 1900s, which subsequently occupied the site until circa 1970. The Satinite works and the Saw mill appeared to have ceased their operations, which lead to the redevelopment of the site during the 1980s into a transport depot. The Satinite works produced calcium sulphate (which is also the main component of galigu) for use in the paper, construction and fertiliser industry.

From the early 1900s until circa 1920, a small chemical works with associated tanks appeared to have occupied the northern section of what is now the Reclamation site. From circa 1920, the ground level of the site appeared elevated. This elevation is likely to have been caused by the deposition of the galigu, a by product of the Le Blanc process (manufacture of sodium carbonate), which is also know to contain other industrial contaminants (notably...
heavy metals. In essence this area was used a general repository for galigu waste that had been deposited elsewhere in the area or used for land (marsh) reclamation.

The Reclamation site as it exists now consists of an engineered mound comprised predominantly of galigu chemical waste. The mound rises above the surrounding land from 7.0 m AOD to a maximum of 28.5 m AOD. The reclamation scheme was a project undertaken by Cheshire County Council between 1995 and 1998 and comprised the collation, re-grading, capping and landscaping of the waste material from around the area into one landform with stable slopes. This also involved the installation of a sheet piled wall along the length of the Steward’s Brook, adjacent to the mound to the east and part of the Ditton Brook, which bounds the mound to the south. There are no activities undertaken on the mound.

Halton Borough Council’s Environmental and Development Services department provided the following information, as detailed in their Environmental Search Report entitled Phase 1 Desktop Study Detailing Potentially Contaminative Landuses Affecting Foundry Lane & West Bank Dock Estate, dated October 2004:

- the land within the search area has a diverse industrial base with multiple sources of potential contamination. The length of time that these processes have operated, and the fact that the industries were all but unregulated initially, means that contamination is likely to exist in significant quantities in the area. The most voluminous potentially contaminative material deposited is that associated with the Leblanc process. These wastes are typically heterogenic with a high variance in their structural competence. They are also prone to hydrogen sulphide gas production and can also contain significant concentrations of arsenic;

- The diversity of industry will likely mean that there will also be significant quantities of other contaminants present including metals and inorganic chemicals and their derivatives;

- According to department records, there are two known landfilling areas located on the subject site. The Foundry Lane site was subjected to landfilling from 1859 onwards, known wastes deposited were all heavy chemicals, alkali, acids, sulphides, phosphates. From 1970-1984, the area occupied timber yards and mills. The Reclamation site was a tipped area dated 1970.

- It should be noted that apart from distinct landfill sites, the entire study area has been subject to waste disposal to ‘reclaim’ the former marshland;
The former Tessenderlo area of the site is considered to be quite different in character to the AHC warehousing area, which is largely developed on galigu filled land. This area housed a major chemical works for many decades that used a variety of pernicious organic chemicals that are likely to have made their way into the soil and groundwater over several areas of the site. Indeed, site investigations undertaken by URS corporation associated with the site’s Integrated Pollution Prevention and Control (IPPC) permit application in 2004 confirm that contamination by organic solvents exists. This investigation was limited in scope, however, and was designed mainly to establish a baseline for assessment of future contamination incidents rather than investigate contamination from historic and perhaps ceased activities. A detailed environmental and geotechnical investigation is currently underway on the site and will be reported in due course.

The site ceased operations shortly after receiving its permit and was subsequently closed down and decommissioned. All plant, buildings and infrastructure have now been removed from the site, which is now mostly covered in hard core with some small vegetated areas around the periphery.

In summary therefore, the AHC Warehousing land parcels between Desoto Road and Ditton Brook are predominantly characterised by substantial deposits of galigu, whereas the Tessenderlo area (east of Desoto Road) is lower lying land comprising a variety of Made Ground over sands, silts and clays, but with a much lower incidence of galigu, there is, however, more substantive contamination by organic chemicals.

2.2 Development Proposals

The whole site is about to undergo a substantial area wide regeneration project being initiated by The Stobart Group and which will involve complete redevelopment of the area to create a nationally strategic inter-modal freight and logistics park.

There are a number of planning applications in progress at present which in simple terms include a refrigerated goods logistics centre for the former Tessenderlo area, a new Rehau logistics centre for the West Bank Dock area and a large regional distribution centre for the reclamation mound and Foundry lane area.

These newly developed areas will be linked with the O’Connors rail freight terminal (also part of Stobart Group) to form a large nationally strategic freight handling and logistics centre.
order to make the scheme work in practical and logistical terms there are a number of optimal aims to be achieved:

- Steward’s Brook must be diverted to traverse the site and connect with Marsh Brook, thus allowing sufficient development space for a large distribution centre building;

- Site levels need to be substantially adjusted to provide large stable development areas as the units must have flat level floors to enable stacking and fork-lift and reach stacker operations;

- The levels also need to be adjusted to provide safe level external roadways and service yards for heavy goods vehicles, fork-lifts and pedestrians;

- Site drainage systems need to be completely replaced and laid to falls that enable predictable and maintainable drainage (which also dictates some of the level adjustments); and

- Where site levels do not require major adjustment, there is still a need for substantial ground improvement for geotechnical stability reasons.

### 2.3 Cut and Fill Operations

In order to achieve this major regeneration aim, given the current highly variable site levels and ground conditions, it will be necessary to substantially re-engineer and improve the site surface and (related to this) embark on a major cut and fill operation to achieve workable formation levels for the subsequent construction works. This has two major components:

1. The need to excavate and remove large volumes of contaminated soils (galigu waste) to reduce levels from across a wide area towards the central and western portions of the AHC site (especially the Reclamation Mound); and

2. The need to import substantial volumes of engineering fill to raise site levels on the former Tessenderlo (eastern) portion of the site (which lies several metres lower than parts of the AHC site)

This is represented graphically in Drawing pa00014 (attached).

As already stated the contamination present in the cut areas (and elsewhere) is principally in the form of galigu. This is a generic term for waste from the Le Blanc chemical process which
was associated with the local soap and alkali industry for many decades. It is primarily a calcium sulphate cake which in itself although physically weak, is not especially pernicious as a pollutant. The Le Blanc process originally used in the Widnes area, however, also contributed other process chemicals to the calcium sulphate residue (most notably arsenic) and the Le Blanc waste was also mixed with many other wastes from the chemical industry. As a result it can be heavily contaminated with heavy metals particularly.

This chemical contamination makes the material a significant potential pollution source as these metals are leachable under certain conditions, and its physical (thixotropic) properties make it useless as an engineering or fill material. Fortunately, however, it is relatively easy to treat the material and stabilise and solidify it into a stiff non-reactive material with useful engineering properties. If sufficient stabilisation additive is added, there is an additional benefit in that the metal and other contaminant species become bound and non-leachable. Effectively, it can be converted relatively simply to a physically stable and chemically inert material. This stabilisation can be achieved with the addition of either lime, cement, pulverised fuel ash (PFA) or various admixtures.

Both lime stabilisation and cement/PFA stabilisation have been used successfully in the area to stabilise this material (and other contaminated materials) into a chemically inert physically stable matrix that can be used for engineering purposes. A brief discussion of each method is provided below.

Lime Stabilisation

If quicklime is mixed with the moisture bearing soil an exothermic (heat producing) reaction takes place.

\[
\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca(OH)}_2 + 1,140 \text{ kJ/kg CaO}
\]

quicklime water hydrated lime heat produced

In a homogeneous mixture, the quicklime reacts with the moisture present in the soil. This exothermic reaction generates significant amounts of heat energy which will dry the soil (temperatures can reach in excess of 100°C) as well as chemically binding 32% of its own weight of water as hydroxide.

The next steps, Modification and Stabilisation only occur with clay soils. When quicklime or hydrated lime is added to a clay soil, the clay platelets go through an ion exchange process, which introduces calcium into the clay surface and causes a change in the way the clay platelets align. This gives an increase in soil strength and will normally occur quite rapidly (usually within two hours of mixing but can take up to a day depending on site conditions).
The silica and alumina contents of the clay soil will react with the calcium present in the lime to form calcium silicate hydrates or calcium aluminate hydrates. This reaction is slow to proceed and is similar to the reactions that occur when cement cures. The strength gain can continue for over 10 years.

**Cement/PFA Stabilisation**

Cement and pulverized fuel ash (PFA) are pozzolanic binders which when mixed with soils can form a durable monolithic mass in which the contaminants are contained and physically and chemically isolated from the effects of leaching. The material cures and hardens with time similarly to lime stabilisation but is less chemically active and does not generate substantial heat like lime stabilisation.

This presents the opportunity to take the galigu contamination (which forms the bulk of the cut) and treat it to form a stable, environmentally inert engineered fill that can be used to raise levels on the former Tessenderlo chemicals area, for which there is a reasonable materials balance.

The remedial aim is to transport and lay around 6,600m³ per day of treated galigu on the site. These works are planned to commence in Mid July and will last until Mid November. Whilst it is difficult to be precise about the total volumes involved, the estimate is between 400,000 - 500,000 m³ for Phase 1 (the Tessenderlo site levelling and capping). A similar amount will be associated with Phase 2 which relates to the redevelopment of the current Rehau site. This would not commence until around June 09, but is likely to be of shorter duration due to the lesser distance to move material during this phase.

At present field and laboratory trials have been completed with this material using lime stabilisation and tests are currently underway using cement/PFA mixtures. The most appropriate methodology will be selected shortly once the full technical and cost appraisals have been completed. Either methodology is suitable but the relative curing times, technical and financial pros and cons of each need to be assessed to make a final decision on the best method in the context of this development.

Apart from the obvious benefit of achieving an on site cut and fill balance this approach has a number of environmental advantages. These are:

- the treatment will inert a very substantial volume (circa 1,000,000 m³) of contaminated material that represents a substantial pollution source that could
otherwise pose a long-term threat to human health, surface water and groundwater in the area;

- the removal of “overburden” galigu then allows the opportunity for treatment and resurfacing of the underlying material below the new formation level thus enabling additional levels of environmental protection;

- the removed and treated galigu will form a low permeability and substantial physical cap over the former Tessenderlo chemicals plant area which will eliminate infiltration of rainwater and percolation through contaminated soils in that area and thus reduce leaching and groundwater spread of chemical contamination from that;

- the cap will also prevent direct human health exposure to chemical contaminants underneath the former Tessenderlo processing area and eliminate vapour risks (which are being assessed at present);

- the investment of installing the necessary mobile plant and treatment expertise on the site provides an additional opportunity to undertake in-situ treatment of the upper surface of large parts of the site where there is no planned excavation but where galigu lies close to the surface;

- the re-use of treated materials eliminates the need to import large volumes of aggregate from mineral extraction sites and eliminates the need to remove large volumes of waste to a landfill site (which collectively would have translated to around 100,000 HGV’s entering the public road network, not including the import quantity which could be similar); and

- aside from the reduced traffic impact, this avoidance of the need for large volumes of material to be transported considerable distances on public roads, also avoids the associated fuel emission and carbon footprint of the management of this material.

In simple terms the remedial proposals for the site are to excavate the galigu and galigu contaminated soils from the AHC area of the site (especially around the Reclamation Mound) and treat it on the former Tessenderlo area. The treatment steps are as follows:
- The galigu material will be excavated and transported via internal haul roads to the treatment area on the former Tessenderlo area (no materials will travel by public roads or leave the site). It will be laid in 375mm layers and compacted to 350mm;

- The remediation contractor (Beach Stabilisation) will spread the binders/powders on the laid out material using a purpose built spreader at a specified rate. The galigu matrix and binder/powder will then be thoroughly mixed to the full 350mm depth using specialist mobile plant (licensed by the EA). The mixing follows immediately from the spreading operation;

- The treated material will be trimmed and recompacted and then allowed to cure;

- The process will then be repeated with subsequent layers (again in 350mm lifts) until the new site levels are achieved.

There is a net deficit of materials with the cut and fill so all of the excavated galigu will be treated and used with no need for these materials to be taken off-site.

Above and in some cases within the treated galigu layer there will need to be works associated with the development proposals (Refrigerated Storage Unit), as follows:

- On top of the galigu will be a stone regulating layer, concrete yards, and the main building which is substantially concrete in contact with the ground other than for membranes

- Drainage systems, including pipe runs, manholes, pumping chambers (if required), petrol interceptors etc will be installed across the area;

- Services supplies to the site will be laid;

- On site services such as fire main, power, gas main, telecom, telemetry, CCTV cabling, etc will be laid out;

- Lighting column bases will be installed;

- Foundations including piles (if required) will be required; and
o A below ground fuel installation is proposed. (Note this is located over the former playing fields area of the Tessenderlo land so should be in the “cleanest” part of site). This will sit below the treated galigu layer.

Naturally some of these works will pass through the treated galigu, but any protrusions will be sealed to ensure the low permeability of the site surface is maintained.

The car parks will be of black top construction, providing an additional layer of protective surfacing.

The Recycled Services Unit (RSU) itself will have a number of pits and trenches in the floor, but they will all generally be founded above yard level (i.e. above the base of the treated galigu layer).

On site testing will take place throughout the laying and treatment process and there will also be compliance testing via an external accredited laboratory. This will include physical tests as well as environmental tests and especially leaching tests. The proposed validation testing schedule is set out in detail in Appendix B.

2.4 Environmental Assessment Criteria

It is recognised that the stabilised material must be chemically inert and incapable of leaching chemicals at environmentally significant levels. The criteria against which the stabilised material will be tested will be the Landfill Waste Acceptance Criteria (WAC) for Inert Wastes as follows (expressed as mg/kg based on a 10/1 L/S ratio using BS EN 12457-3 leaching test). The relevant criteria are listed in Table 2 overleaf.
Table 2 - WAC Inert Waste Leaching Criteria

<table>
<thead>
<tr>
<th>Substance</th>
<th>WAC Inert Waste Criteria (mg/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arsenic</td>
<td>0.5</td>
</tr>
<tr>
<td>Barium</td>
<td>20</td>
</tr>
<tr>
<td>Cadmium</td>
<td>0.04</td>
</tr>
<tr>
<td>Chromium</td>
<td>0.5</td>
</tr>
<tr>
<td>Copper</td>
<td>2</td>
</tr>
<tr>
<td>Mercury</td>
<td>0.01</td>
</tr>
<tr>
<td>Molybdenum</td>
<td>0.5</td>
</tr>
<tr>
<td>Nickel</td>
<td>0.4</td>
</tr>
<tr>
<td>Lead</td>
<td>0.5</td>
</tr>
<tr>
<td>Antimony</td>
<td>0.06</td>
</tr>
<tr>
<td>Selenium</td>
<td>0.1</td>
</tr>
<tr>
<td>Zinc</td>
<td>4</td>
</tr>
<tr>
<td>Chloride</td>
<td>800</td>
</tr>
<tr>
<td>Flouride</td>
<td>10</td>
</tr>
<tr>
<td>Total Dissolved Solids</td>
<td>4000</td>
</tr>
<tr>
<td>Phenol Index</td>
<td>1</td>
</tr>
<tr>
<td>Dissolved Organic Carbon</td>
<td>500</td>
</tr>
</tbody>
</table>

The results of the current round of monolithic leaching tests for the trial are due imminently and it is anticipated based on prior experience with galigu in the is area that the stabilised material will pass the inert waste WAC test, but there is an element of iterative trialling to find the optimum mix of binder with soils.

In the event that the stabilised material fails this first round “WAC test”, this can be overcome by adding further binder and if enough is added almost any material can be “chemically sealed”, but there is a law of diminishing returns in relation to cost, time and handling implications. The main consideration is whether the leachant from the stabilised mass is capable of causing environmental harm. Consequently, for any species that fails the initial inert waste test, and this cannot be improved at reasonable cost by adding further binder, the failed species will then be subjected to a P20 groundwater risk assessment to determine if the leached species is capable of breaching the coastal and estuarine Environmental Quality Standard (EQS) for that substance, on the assumption that the key potential receptor is The River Mersey. It should be noted that Marsh Brook and Steward’s Brook will be new completely engineered lined channels that will have no contact with the groundwater in the former Tessenderlo area and thus would not constitute receptors for groundwater through flow. Similarly there will be no prospect of surface waters discharged during rainfall events.
picking up leachate as the treated galigu will itself be below the surface and will not come into contact with incident rainwater.

The relevant EQS values against which the predicted environmental concentration (using P20) will be compared are:

**Table 2 - List I Substances Relevant EQS**

<table>
<thead>
<tr>
<th>Substance</th>
<th>Coastal and estuarine EQS (annual average, g/l)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mercury (dissolved)</td>
<td>0.3</td>
</tr>
<tr>
<td>Cadmium (dissolved)</td>
<td>2.5</td>
</tr>
</tbody>
</table>

In addition to the direct testing of the treated galigu, the intention for the former Tessenderlo area is to install and maintain a network of long-term groundwater quality monitoring wells that can be used to confirm over a long-term period that there is no deterioration of water quality (and in fact the expectation is that improvements will be witnessed). Whilst these are primarily intended to look at organic species, metals and inorganic parameters will be analysed for as a matter of course.

Stobart accepts that they are taking this proposed remedial approach at their own risk in that the treated material could fail the acceptability criteria, but there is a proven history of this approach working with galigu in the area and the test results due imminently should confirm this. Clearly if the material cannot be made environmentally benign it will not be suitable for use as an engineered fill material, but this is highly unlikely based on trials that have been performed thus far with this material on this site and elsewhere.

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**Table 3 - List II Substances Relevant EQS**

<table>
<thead>
<tr>
<th>Substance</th>
<th>EQS Type</th>
<th>Coastal and Estuarine EQS (g/l)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arsenic (dissolved)</td>
<td>Annual average</td>
<td>25</td>
</tr>
<tr>
<td>Boron (dissolved)</td>
<td>Annual average</td>
<td>7000</td>
</tr>
<tr>
<td>Chromium (dissolved)</td>
<td>Annual average</td>
<td>15</td>
</tr>
<tr>
<td>Copper (dissolved)</td>
<td>Annual average</td>
<td>5</td>
</tr>
<tr>
<td>Iron (dissolved)</td>
<td>Annual average</td>
<td>1000</td>
</tr>
<tr>
<td>Lead (dissolved)</td>
<td>Annual average</td>
<td>25</td>
</tr>
<tr>
<td>Nickel (dissolved)</td>
<td>Annual average</td>
<td>30</td>
</tr>
<tr>
<td>pH</td>
<td>95th percentile</td>
<td>6-8.5</td>
</tr>
<tr>
<td>Vanadium (dissolved)</td>
<td>Annual average</td>
<td>100</td>
</tr>
<tr>
<td>Zinc (total)</td>
<td>Annual average</td>
<td>40</td>
</tr>
</tbody>
</table>
2.5 Conclusions

In terms of meeting the EA criteria for allowing the deposition of this material to be used as engineering fill on the site, it is believed that the treated material meets these criteria as follows:

**Fit For Purpose**

The stabilised material will be geotechnically stable allowing it to behave as engineered fill and a building platform. Furthermore it will also be a low permeability medium that will prevent rainwater infiltration into the deeper contaminated soils of the former Tessenderlo site and eliminate leaching from those horizons. Specific tests will be undertaken to confirm that the material is geotechnically suitable and sufficiently low permeability in its own right (notwithstanding the fact that the treated areas will also be surfaced in any event and have dedicated drainage systems in place);

**Environmentally Benign**

The contaminants within the stabilised material, whilst still present, will be physically and chemically bound within the soil/binder matrix to such an extent that physical disturbance and exposure will not be possible and more importantly incident rainwater in contact with the material will not be able to leach the chemical contaminants out. It will have the same characteristics as inert waste or imported virgin aggregate and will not pose a chemical pollution risk to the environment.

Pilot scale leaching tests will demonstrate this along with post treatment validation leachate tests. These leachate tests are more aggressive and likely to generate stronger leachates that would actually occur in the natural environment and so are conservative assessments of the leachability of this material.

**Used for a Relevant Purpose**

There is a demonstrable need to re-adjust site levels to allow inter-modal connection between the roads, rail and loading facilities and to ensure that the finished floor levels are suitable for development of the required large floor plate buildings. In essence the Tessenderlo area is too low and the reclamation mound area is too high. Instead of importing hundreds of thousands of cubic metres of fill to address this imbalance, the stabilised galigu will serve the same purpose without any need for transportation on public...
highways and in that regard is a substantial resource that the opportunity should be taken to use.
3 Summary

Once emplaced and treated the material will be safe, stable, physically robust and display the same characteristics as imported virgin material would have done. It seems reasonable to conclude therefore, that the use of this treated material as engineered infill should be allowed by the EA, as has been the case elsewhere in the area.

This approach also complies with a number of important environmental and sustainability principles, namely:

- Where possible all materials generated by the works should be dealt with on site and preferably re-used in a beneficial way to reduce the need to import make-up materials;

- Existing significant pollutant linkages (identified source-pathway-receptor scenarios as defined in the Environmental Protection Act 1990 Part 2a) should be eliminated or minimised to an acceptable level of risk;

- The overall carbon footprint of the remedial options shall be taken into account in developing an appropriate strategy (i.e. transport and materials import must be balanced against on site solutions);

- The construction activities must not lead to increased environmental impact from the site and must be managed to prevent pollution and nuisance incidents arising; and

- Opportunities for bio-diversity enhancement should be sought.

The re-use of this material is also key to enabling the entire development which will have a number of substantial positive environmental benefits as follows:

- On site pollution loadings to Marsh Brook and Steward’s Brook will be eliminated;

- New watercourses will be developed with substantial ecological and water quality enhancement;
- The developed site will shed large volumes of clean rainwater to a polluted water system which will help to dilute the chemical contaminants already present from upstream sources;

- The residual contamination underneath the AHC and Tessenderlo areas will be sealed from future rainwater infiltration and leaching and there will be a substantial physical barrier preventing human health exposure; and

- The successful completion of the project will bring about substantial economic and environmental regeneration of the area and increase business confidence locally which may facilitate other redevelopment activities and associated environmental improvements on adjacent sites.

In summary, therefore, the overall net environmental benefit of allowing this material to be treated and re-used substantially outweighs any potential negative attributes (which are few if any). It is worth bearing in mind that all of these contaminants are already on site and leaching to various degrees thus presenting a long-term pollution loading to the environment. This situation will prevail in any event if the development proposals do not go ahead so the “do nothing” option is in fact the environmentally negative option, whereas the proposed treatment and re-use of the galigu has only positive environmental impacts as discussed above.
Appendix A – Mobile Plant Licence
ENVIROMENTAL PROTECTION ACT 1990.

MOBILE TREATMENT LICENCE

LICENCE REF No: EAWML/10373

FACILITY TYPE: - Mobile treatment plant for the treatment of contaminated material, substances or products, for the purpose of remedial action with respect to land or controlled waters.

The Environment Agency in pursuance of Part II of the Environmental Protection Act 1990 hereby grant a Mobile Treatment Licence (MTL) authorising the treatment and disposal of controlled wastes by means of mobile treatment plant that is specified in Schedule 1 of this licence to Pryor Mourik Ltd company registration number 05551072 of Cecil House, Harlow Common, Essex CM17 9HY the said MTL being subject to the conditions specified in Schedules 1 and 2 to this MTL.

This MTL relates to the operation of the mobile plant for the purpose of remedial action with respect to land or controlled waters at operating sites as specified in the agreed deployment form(s).

Signed **Alan Wootton**
Name **ALAN WOOTTON**
TEAM LEADER – ENVIRONMENT MANAGEMENT

Dated 2nd October 2006

HATFIELD AREA OFFICE
Apollo Court, 2 Bishops Square Business Park
St. Albans Road West
Hatfield
Herts AL10 9EX

FOR ENVIRONMENT AGENCY OFFICIAL USE ONLY.

YOUR ATTENTION IS DRAWN TO THE RIGHTS OF APPEAL DETAILED AT THE END OF THIS MTL.
EXPLANATORY NOTES - including rights of appeal.

RIGHTS OF APPEAL

Section 43(1) of the Environmental Protection Act 1990 provides that:

Where, except in pursuance of a direction given by the Secretary of State, a licence is granted subject to conditions, the applicant may appeal from the decision to the Secretary of State.

Therefore, if you feel aggrieved by the decision detailed on the attached notice, you may obtain the appropriate form on which to give written notice of an appeal from:

The Planning Inspectorate
Environment Appeals Team
Room 4/12 Eagle Wing
Temple Quay House
2 The Square
Temple Quay
Bristol
BS1 6PN

For Wales, the address is -

The Planning Inspectorate
Crown Buildings
Cathays Park
Cardiff
CF10 3NQ

Tel: 0117 372 8726  Tel: 02920 823859
Fax: 0117 372 8139  Fax: 02920 826150

This notice of appeal should be accompanied by the following information:

a statement of the grounds of appeal;
a copy of the licence;
a copy of any correspondence relevant to the appeal;
a copy of any other document relevant to the appeal including, in particular, any relevant consent, determination, notice, planning permission, established use certificate or certificate of lawful use or development and
a statement indicating whether you wish the appeal to be in the form of a hearing or on the basis of written representations.

You are also required to serve a copy of your notice of appeal, together with copies of any the above documents that have accompanied your notice of appeal, on the Environment Agency (at the address overleaf). You should appeal within 6 months of the date that this notice takes effect but the Secretary of State may allow notice of appeal to be given after the expiry of this time period.
SCHEDULE 1 – Authorised activities

1 Specified Waste Management Activities

1.1 This Mobile Treatment Licence (MTL) authorises the holder to treat contaminated materials, substances and products, for the purpose of remedial action with respect to land or controlled waters using the following technology and associated plant necessary to facilitate the remedial action, including the use of that technology and plant in combination with others listed:

- Air Sparging
- Bioremediation – in situ and ex situ (windrows, biopiles, in-vessel bioreactors)
- Biosparging
- Bioventing
- Chemical Treatment (including oxidation, dehalogenation)
- Soil Vapour Extraction (including dual phase SVE)
- Soil Washing
- Solidification
- Stabilisation

and Treatment plant for blending, mixing, bulking, screening, shredding, particle size reduction and / or particle separation in order to facilitate remedial action.

The above activities being Recovery and Disposal (the R&D codes) activities as detailed in the Waste Management Licensing Regulations 1994.

2 Agreement of the deployment form and supporting information

2.1 Remedial action, involving the treatment of waste, must not begin at any operating site until the Environment Agency has agreed a deployment form in writing for that particular site.

2.2 The remedial action shall be carried out in accordance with the application submitted in support of this MTL (where appropriate), the agreed deployment form and the conditions of this licence.

2.3 The operator shall detail in their deployment form the length of time (either actual time or event) that the deployment form will be used at any one operating site. Following the expiry of that time the deployment form will cease to be operational on that operating site, unless an extended time period is agreed by the Agency.

3 Changes to the deployment form requiring prior consent by the Agency

3.1 The Licence Holder shall give the Agency prior notice in writing of any proposed change to the agreed deployment form, and to any appendices, drawings and figures which are referenced in the deployment form.

3.2 The notice shall be accompanied by a copy of the proposed changes, and by a written assessment of the effect that implementing the proposed change to the deployment form would have on the risk posed by the site to human health and the environment.

3.3 The Licence Holder shall provide up to 6 additional copies of the proposed change and supporting risk assessment to the Agency, when required by the Agency in writing.
3.4 The proposed change to the deployment form shall not be implemented unless the Agency has given its written consent to it. The Licence Holder shall give the Agency prior written notification of the implementation date of the change, and from that date the change to the deployment form shall be deemed to replace the previous version.

SCHEDULE 2 – Additional Conditions

4 Permitted quantities of contaminated material, substances or products

4.1 The total quantity of contaminated material, substances or products treated at any operating site must not exceed that stated in the agreed deployment form for that particular site.

4.2 Only those contaminated material, substances or products types listed in the agreed deployment form can be stored and treated under this licence.

Staffing and understanding of requirements of licence conditions

5 Minimum staffing and supervision

5.1 Whenever placing material for treatment, pre-treatment, carrying out remedial action or removing materials from site it must be supervised by at least one member of staff who is suitably trained and fully conversant with the requirements of the MTL, the deployment form and MTL application regarding:

- contaminated material, substances or products acceptance and control procedures
- operational controls and environmental monitoring
- maintenance
- record-keeping
- emergency action plans
- notifications to the Agency.

With regards to the ongoing treatment of contaminated materials, substances or products alternative arrangements may be agreed in the deployment form, dependent upon the treatment method.

6 Availability of licence and deployment form

6.1 Unless otherwise agreed in writing with the Agency a copy of this MTL, the submitted application form and the agreed deployment form for the operating site must be kept available on the operating site for reference when required by all site staff carrying out work under the requirements of this MTL.

7 Understanding of licence and deployment form

7.1 All staff must be, or must work under the direct supervision of a member of staff who is, fully conversant with those aspects of the licence conditions and deployment form which are relevant to their duties.
8 Attendance of technically competent persons

8.1 The arrival and departure time of the technically competent person(s) at the operating site must be recorded in the site diary.

9 Changes in technically competent persons

9.1 The name of any incoming person and evidence that such person has the required technical competence, must be submitted to the Agency in writing, within 7 days of the change in management. In this licence, technically competent management and technical competence has the same meaning as under section 74 of the 1990 Act and Regulations 4 and 5 of the 1994 Regulations.

Relevant convictions

10 Notification of relevant convictions

10.1 If the Licence Holder and/or any relevant person is convicted of any relevant offence which is in addition to any already notified to the Environment Agency, then full details must be provided to the Agency within 14 days following sentencing, whether or not the conviction or sentence is subsequently appealed. In this licence relevant person has the same meaning as under section 74(7) of the 1990 Act. Such details must include, in respect of each relevant person, the nature of the offence, the place and date of conviction, and any fine or other penalty imposed.

11 Notifications of appeals against convictions

11.1 If the Licence Holder and/or any relevant person lodge an appeal against any such conviction or sentence, the Licence Holder must notify the Agency of this within 14 days of the lodging. The Licence Holder must notify the Agency of the results of that appeal, within 14 days of the appeal being decided.

12 Notification of change of operator's or holder's details

12.1 The following information must be notified in writing within 7 days to the Agency:
• any change in the Licence Holder's trading name, registered name or registered office address
• any steps taken with a view to the Licence Holder going into administration, entering into a company voluntary arrangement, being wound up or becoming bankrupt
• the operator at the time of issue of the licence and of any change in the operator or in the operator's trading name, address, registered name or registered office address (if different from the Licence Holder).

13 Notification of preparatory works

13.1 No preparatory works shall be undertaken until at least 7 days prior notice in writing has been given to the Agency of the intention to do so. The notification shall include details of what work is being done and when.

14 Cessation and resumption of treatment processes

14.1 If unplanned treatment ceases for longer than 21 days consecutive then within 7 days following the end of the 21 day period, the Licence Holder must inform the Agency, in writing of the date of cessation and of the planned date of resumption.

14.2 The Licence Holder must give to the Agency not less than 7 days prior notice in writing of the intention to resume treatment of contaminated material, substances or products.

14.3 The Licence Holder must give notice to the Agency that the specified time period for the use of an agreed deployment form has lapsed.

15 Removal of residual contaminated material, substances or products from operating site

15.1 If the treatment operations on an operating site cease and they are not resumed within 1 month of when the treatment stops, all plant on the site must be decontaminated. All waste resulting from the decontamination process must be removed from site within 7 days.

16 Notifications and submissions to Agency

16.1 Except where otherwise specified, all notifications and submissions to the Agency under the requirements of these licence conditions:

• must be made in writing and submitted to the Agency
• must quote the licence reference number and the name of the Licence Holder
• must clearly reference the operating site to which the notification refers.
Engineering for pollution prevention and control

17 Provision and maintenance of containment and drainage systems

17.1 Potentially polluting materials must only be deposited, stored, treated or otherwise handled in an area of the site where an engineered containment and drainage system has been provided for that area which meets the standards in Table 1.

17.2 The engineered containment and drainage systems shall be designed, constructed, inspected, validated and maintained, and shall be fully documented and recorded, to be fit for purpose and meet the standards specified in Table 1.

17.3 No liquid must run off areas of impermeable pavement other than via the appropriate drainage system.

17.4 The drainage system associated with impermeable pavements must be sealed so that it does not leak and is capable of collecting and containing liquids draining from the impermeable pavement.
<table>
<thead>
<tr>
<th>Type of Site Surface and Drainage</th>
<th>Minimum Specified Standards of Design, Construction and Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Impermeable pavement, bunding and sills</td>
<td>Areas of impermeable pavement, bunding and sills must be constructed and maintained, such that it is fit for purpose, so as to prevent fluids running off the pavement and the transmission of fluids through the pavement or joints.</td>
</tr>
</tbody>
</table>
| b) Sealed drainage systems | i) Drainage from areas of impermeable pavement must be provided with either:  
  - A sealed sump, which must be inspected and emptied when the collected liquids reach 80% of its capacity as measured using a dipstick or other appropriate gauge, and constructed and maintained so as to collect and contain all liquids which run off the pavement; or  
  - Unless otherwise agreed in the deployment form, a three chamber oil interceptor, which must have a minimum of six minutes retention time per chamber at its maximum flow rate. The interceptor shall drain to a lawful discharge and shall be maintained so as to intercept all liquids which run off the pavement.  
  ii) Inspections and emptying of sealed sumps shall be recorded in the site diary.  
  iii) Uncontaminated drainage from clean areas must be kept separate from contaminated drainage. |
| c) Roofed or covered processes | i) All roofed or covered processes must be designed, constructed and maintained to prevent ingress of rain and surface water.  
  ii) Uncontaminated drainage must be kept separate from contaminated drainage. |
| d) Fixed bays and other fixed containers | All fixed bays and other fixed containers used for the treatment of contaminated material, substances or products must be constructed and maintained to a standard which is fit for purpose. |
| e) Storage areas for skips, drums and other mobile tanks and containers | All skips, drums and other mobile tanks and containers, which are used for the storage and treatment of contaminated material, substances or products, or reagents, must be constructed and maintained so that they do not leak any liquids contained in them. |
| f) Inspection and maintenance of engineered containment | All areas of impermeable pavement, sealed drainage systems, covered buildings, roofed areas, fixed bays and other containers and storage areas for skips, drums and other mobile tanks and containers:  
  i) must be inspected no less frequently than monthly, to ensure the continuing integrity and fitness for purpose of their construction, and the inspection and any necessary maintenance must be recorded in the site diary; and  
  ii) in the event of any damage occurring which breaches the integrity of the engineered containment so that it no longer meets the specified standards, the Licence Holder must cease accepting or treating contaminated material, substances or products in the affected area and must not recommence those activities until it has been repaired to a standard at least as good as the original specification. In such circumstances the Agency must be notified immediately. |
Operating Site Infrastructure

18  Provision of mobile treatment plant identification board

18.1 No contaminated material, substances or products must be treated at the operating site until an identification board has been provided at or near the operating site entrance.

18.2 The identification board must be inspected at least once per month. In the event of damage or defect, the board must be repaired or replaced within 7 days.

18.3 The board must be easily readable from outside the operating site entrance in daylight hours, and must display the following information:

- Operating site name and address
- Operator name (company name, not individual name unless justified as necessary)
- Licence number
- Emergency contact name and telephone number
- Statement that the remedial action is licensed by the Environment Agency
- Agency national numbers, for General Enquiries (08708 506506) and Emergencies (0800 807060), or as subsequently notified in writing by the Agency
- Operational hours for licensed activities.

19  Operating site security

19.1 Operating site security systems must be provided at all times to prevent access by unauthorised persons. These must be installed, operated and maintained, and must be fully documented and recorded, in accordance with the requirements specified in Table 2.

<table>
<thead>
<tr>
<th>Table 2 Site security system standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Security system</td>
</tr>
<tr>
<td>----------------------------------------</td>
</tr>
<tr>
<td>Timetable of provision</td>
</tr>
<tr>
<td>Design standards</td>
</tr>
<tr>
<td>Operational standards</td>
</tr>
<tr>
<td>Maintenance standards</td>
</tr>
</tbody>
</table>
Mobile Plant Operations

Control of mud and debris

20 Prevention of mud and debris on road

20.1 Measures must be taken in accordance with the deployment form to prevent the deposit or tracking of mud or debris arising from the operating site onto public areas including public highways, outside the operating site.

20.2 All vehicles leaving the operating site, must be cleaned as necessary using the equipment specified in the deployment form, and must be checked to ensure that they are clear of loose contaminated material, substances or products and that their loads are secure.

21 Remediation of mud and debris on the road

21.1 In the event that mud or debris arising from the operating site is deposited onto public areas outside the operating site, the following remedial measures must be implemented immediately:
   a) the affected public areas outside the operating site must be cleaned
   b) traffic must be isolated from sources of mud and debris within the operating site to prevent further tracking of mud and debris, and measures must be taken to clear any such sources as soon as practicable.

Potentially polluting leaks and spillage of contaminated material, substances or products

22 Potentially polluting leaks and spillage from vehicles, plant and equipment

22.1 All vehicles used on the operating site and all plant and equipment used on the operating site in connection with specified contaminated material, substances or products management operations, must be operated and maintained so as to prevent potentially polluting leaks and spillages.

22.2 All plant and equipment, including vehicles, shall be routinely maintained and serviced.

23 Potentially polluting leaks and spillage from skips, drums and other mobile containers

23.1 Each skip, drum or other mobile container used to hold contaminated material, substances or products which consist of or contain potentially polluting liquids, sludge or powders, on the operating site must be:
   - loaded and unloaded
   - filled and emptied
   - clearly and unambiguously labelled regarding its contents
• inspected daily and maintained
• repaired or replaced immediately in the event of damage or deterioration to a container such that is or is likely to leak, in accordance with the standards specified in Table 3.

24 Control and remediation of leaks and spillage

24.1 In the event of any potentially polluting leak or spillage occurring on the operating site, control and remediation procedures must be implemented immediately and recorded, and must meet the standards specified in Table 3 below.

<table>
<thead>
<tr>
<th>Action</th>
<th>Specified standards</th>
</tr>
</thead>
</table>
| a) Loading and unloading skips, drums and other mobile containers | i) Loading and unloading of containers must be supervised at all times by a member of staff.  
ii) Lids/caps/bungs or other closures must be in place during loading/unloading.  
iii) Loading/unloading must be carried out in an area provided with engineered containment of the type required for that contaminated material, substances or products under condition 17. |
| b) Filling and emptying drums and other mobile containers | i) Filling and emptying of containers must be supervised at all times by a member of staff, unless agreed otherwise in the deployment form.  
ii) Lids/caps/bungs or other closures must be in place at the end of filling.  
iii) Containers must not be filled beyond their operational capacity.  
v) Measurement of level/void space must be by physical dipping prior to loading. |
| c) Inspection, maintenance and repair of drums and other mobile containers | i) Containers must be inspected for leaks.  
ii) Containers found to be leaking either must be immediately transferred to a larger over-container or must have their contents immediately transferred to an alternative container, which is appropriate for that substance. |
| d) Control and remediation of leaks and spillages | i) Minor spillages must be cleaned up immediately, using sand or proprietary absorbent to clean up liquids.  
ii) Major spillages, which are causing or are likely to cause polluting emissions to the environment:  
• immediate action must be taken to contain the spillage and prevent liquid from entering surface water drains, watercourses and unsurfaced ground;  
• the spillage must be cleared immediately and placed in alternative sealed containers;  
• the Agency must be informed immediately.  
iii) Any spillage shall be recorded in the site diary. |

25 Prohibition of fires

25.1 No contaminated material, substances or products must be burned on the operating site unless the burning forms part of an authorised treatment process under the conditions of this licence.
26  Actions to be taken in the event of a fire

26.1  In the event of a fire on the operating site, notwithstanding the implementation of actions to suppress and extinguish the fire, the following actions must be implemented immediately and subsequently recorded in the site diary:

- so far as reasonable practicable, contaminated surface water drainage must be prevented from entering any surface water drain or controlled waters or unsurfaced ground
- the Agency must be informed immediately of the fire.

27  Contaminated material, substances or products acceptance and control procedures

27.1  All contaminated material, substances or products must be received, inspected, accepted or rejected, handled, kept, despatched and recorded in accordance with the standards specified in Table 4 below.

Process plant and equipment

28  Commissioning, operating and maintenance

28.1  All process plant and equipment used under this MTL must be commissioned, operated and maintained, and must be fully documented and recorded, in accordance with the deployment form.

28.2  No mobile plant covered by this MTL must be used to treat contaminated material, substances or products, other than those required to carry out the commissioning tests specified in the deployment form, unless and until a Validation Report prepared by a suitably qualified person on the commissioning has been submitted in writing to the Agency.
<table>
<thead>
<tr>
<th>Stage of Contaminated Material, Substances or Products Handling</th>
<th>Specified standards</th>
</tr>
</thead>
</table>
| a) Contaminated material, substances or products inspection   | All contaminated material, substances or products to be treated at the operating site, for ex-situ treatment:  
   i) Must be inspected on receipt to confirm their description and composition against the relevant accompanying documentation.  
   ii) Must be kept separate from and not be covered by or mixed with other contaminated material, substances or products until they have been confirmed and recorded for acceptance at the operating site. |
| b) Quarantine storage and rejection of contaminated material, substances or products | i) Any items of non-permitted contaminated material, substances or products which are detected after acceptance at the operating site must be placed immediately in a designated quarantine storage area, bay or container, and, where these are or appear to be hazardous waste, the Agency must be informed immediately.  
   ii) All waste in the quarantine area must be kept segregated from other contaminated material, substances or products which are or are likely to be incompatible.  
   iii) Quarantined wastes must be removed from site within 7 days, unless an alternative date is agreed with the Agency.  
   iv) The maximum capacity of the quarantine storage facility must not exceed that detailed in the agreed deployment form.  
   v) A record must be kept in the site diary of all rejected wastes. |
| c) Identification of contaminated material, substances or products | i) Treatment areas and bays must be clearly defined and labelled to identify the contaminated material, substances or products undergoing treatment within them. |
| d) Inspection of contaminated material, substances or products and remediated materials for despatch | i) All contaminated material, substances or products and remediated materials despatched from the site must be inspected prior to despatch to confirm their description and composition. |
| e) Incompatible contaminated material, substances or products | i) Incompatible contaminated material, substances or products which are likely, in combination with each other or with other material at the facility, to give rise to pollution of the environment or harm to human health outside the site, must be clearly identified and kept physically separate in designated areas. |
Quantity measurement systems

29 Means of measurement

29.1 All contaminated material, substances or products and remediated materials accepted at and despatched from the operating site must be measured in accordance with the following requirements, either:

The weight of all contaminated material, substances or products to be treated and remediated materials, accepted at and despatched from the site, must be determined by means of either:

a public weighbridge designated in the deployment form, or a weighbridge or scales located within the site and detailed in the deployment form site layout plan; and

the weighbridge or scales used must record quantities of contaminated material, substances or products in tonnes to an accuracy of 0.01 tonnes;

or:

the conversion of volume to weight in tonnes, using volume / weight conversion factors which are specified in the deployment form.

30 Treatment of contaminated material, substances or products with specified hazardous properties or forms

30.1 Notwithstanding the specification of permitted contaminated material, substances or products contained in the agreed deployment form, contaminated material, substances or products displaying any of the hazardous properties or forms specified in Table 5 shall only be treated at the site if they are handled so as to meet the limitations specified in Table 5 unless alternative measures are set out in the agreed deployment form.
<table>
<thead>
<tr>
<th>Table 5: Limitations on contaminated material, substances or products with specified hazardous characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) which when handled are likely to generate significant quantities of dusts, fibres, particulates and bioaerosols.</td>
</tr>
<tr>
<td>These contaminated material, substances or products are only permitted if they are either:</td>
</tr>
<tr>
<td>• treated in sealed containers and in areas provided with impermeable pavement and sealed drainage; or</td>
</tr>
<tr>
<td>• treated in covered buildings or under covers providing containment of aerial emissions of dusts, fibres or particulate; or</td>
</tr>
<tr>
<td>• treated in areas provided with a permanent water supply and water spraying or misting equipment, and impermeable pavement and a sealed drainage system.</td>
</tr>
<tr>
<td>b) which are likely to produce odour or VOCs emissions during treatment.</td>
</tr>
<tr>
<td>These contaminated material, substances or products are only permitted if:</td>
</tr>
<tr>
<td>• treated in sealed containers and in areas provided with impermeable pavement and sealed drainage; or</td>
</tr>
<tr>
<td>• treated under covers or in covered buildings providing containment of aerial emissions; or</td>
</tr>
<tr>
<td>• treated in bays provided with an impermeable pavement and sealed drainage and cover; or</td>
</tr>
<tr>
<td>• treated in areas provided with impermeable pavement and sealed drainage and the means of controlling odour and VOC emissions is in place as detailed in the deployment form.</td>
</tr>
<tr>
<td>c) with combustible constituents</td>
</tr>
<tr>
<td>These contaminated material, substances or products are only permitted if treated in areas or bays provided with an impermeable pavement and sealed drainage, and with access to fire fighting equipment.</td>
</tr>
</tbody>
</table>
Pollution Control, Monitoring and Reporting

31 Pollution abatement provisions

31.1 All vapours, gases and aerosols from the treatment process must be contained, collected and treated to minimise pollution of the environment and harm to human health in accordance with the agreed deployment form.

32 Emissions Monitoring: Groundwater, Surface Water, Soil Gas and Emissions to Air

32.1 The following must be specified in the agreed deployment form for each operating site in relation to groundwater, surface water, soil gases and emissions to air:

- Baseline monitoring results
- Trigger levels for indicator parameters
- The construction of the monitoring points
- The location of the monitoring points
- Monitoring protocols
- Frequency of monitoring
- Experience and qualifications of personnel carrying out the monitoring and the personnel responsible for interpreting and acting upon the results of monitoring.

32.2 All monitoring facilities must be designed, constructed, operated and maintained to ensure that a representative sample is obtained.

33 Emissions action plan

33.1 If any emissions exceed the specified trigger level specified in the deployment form for the operating site:

- the results must be notified to the Agency immediately and confirmed in writing immediately
- the emissions action plan specified in the deployment form must be implemented immediately.

34 Keeping and maintenance of records

34.1 A record of the emissions monitoring and sampling results must be kept and maintained by the licence holder.

35 Submission of records

35.1 A copy of the records of each monitoring and sampling result, with an interpretation of the results against baseline and trigger levels, must be submitted to the Agency on a monthly basis, within 1 month of the monitoring being carried out.
Amenity management and reporting

36  Monitoring and control of aerial emissions of dusts, fibres, particulates, bioaerosols, VOCs and odours

36.1 Measures to monitor, control and minimise the aerial emission of dusts, fibres, particulates, bioaerosols, VOCs and odours from the operating site shell meet the standards specified in Table 6 below or as otherwise agreed in the deployment form.

<table>
<thead>
<tr>
<th>Table 6 Standards for monitoring and control of aerial emissions of dusts, fibres, particulates, bioaerosols VOCs and odours</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Monitoring of aerial emissions</td>
</tr>
<tr>
<td>• Visual and olfactory monitoring of aerial emissions must be</td>
</tr>
<tr>
<td>carried out by site staff supervising contaminated material,</td>
</tr>
<tr>
<td>substances or products handling operations. The site manager</td>
</tr>
<tr>
<td>or supervisor must, at least twice per day, visually and olfactory</td>
</tr>
<tr>
<td>monitor at the site boundary downwind of the operating site, and</td>
</tr>
<tr>
<td>must record such monitoring in the site diary.</td>
</tr>
<tr>
<td>b) Aerial emissions action plan</td>
</tr>
<tr>
<td>i) On detection, or notification, of aerial emissions that are, or are</td>
</tr>
<tr>
<td>likely to be, transported beyond the site boundary, immediate action</td>
</tr>
<tr>
<td>must be taken to stop operations giving rise to the emissions and to</td>
</tr>
<tr>
<td>suppress the aerial emissions from that operation or area.</td>
</tr>
<tr>
<td>ii) The incident and the remedial action must be recorded in the</td>
</tr>
<tr>
<td>site diary.</td>
</tr>
</tbody>
</table>

37  Monitoring and control of pest infestations, scavengers and litter

37.1 Measures to control and minimise pests, scavengers and litter on the operating site must be carried out in accordance with the agreed deployment form.

38  Control of noise

38.1 Throughout the operation of the MTL at the operating site, measures must be implemented and maintained, in accordance with the deployment form, to control and minimise the levels of noise from operations on the site beyond the site boundary.
Operating Site records

Security and availability of records

39  Security of records

39.1 All records which are required to be made under the conditions of this licence and the deployment form must be maintained and kept secure from loss, damage or deterioration in accordance with the requirements specified in Table 7 below.

40  Availability of records

40.1 All records which are required to be made under the conditions of this licence and the deployment form must be made available for inspection at the place where they are kept immediately when required by an authorised officer of the Agency.

<table>
<thead>
<tr>
<th>Table 7 Standards for keeping of operating site records</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site records</td>
</tr>
<tr>
<td>Contaminated material, substances or products treated at the operating site.</td>
</tr>
<tr>
<td>Contaminated material, substances or products rejected and/or despatched from the operating site.</td>
</tr>
<tr>
<td>Remediated material. Site diaries.</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

41  Recording of contaminated material, substances or products accepted, treated or removed

41.1 A record must be kept of each load of contaminated material, substances or products accepted and each load of contaminated material, substances or products and remediated material removed from site. This record must include the following details:

- Contaminated material, substances or products to be treated: - Nature (solid, sludge, liquid or gas), waste type as specified under condition 4.2 and the deployment form, quantity (tonnes), date received, date accepted.

- Contaminated material, substances or products removed from the operating site: - Nature, (solid, sludge, liquid or gas), waste type as specified under condition 4.2 and the deployment form, quantity of contaminated material, substances or products removed (tonnes), date removed.

- Treated materials: - quantity of materials treated (tonnes).
Summary records of contaminated material, substances or products accepted and removed and materials remediated

42.1 A summary record of the contaminated material, substances or products accepted, treated or removed from the operating site must be made for each quarter and must be submitted to the Agency within 1 month following the end of the quarter. The summary record must be in the format specified in Appendix A and must include the specified information.

Site diary

43.1 A site diary must be kept secure and must be available for inspection at the operating site when required by an authorised officer of the Agency. This must include a record of the following events and information required in accordance with the other conditions of this licence:

- construction work
- maintenance
- breakdowns
- emergencies
- problems with contaminated material, substances or products treated, received and action taken
- operating site inspections and consequent actions carried out by the operator
- technically competent management attendance on the operating site: the date and the time onto the operating site and the time left operating site
- severe weather conditions
- complaints about authorised operations and actions taken
- environmental problems and remedial actions.

43.2 Each record must be completed within 24 hours of the relevant event.
Interpretation

In these conditions and their interpretation, unless the context otherwise requires, the following terms have the specified meanings:

"Accepted"
   For contaminated material, substances or products being delivered to the operating site, means accepted as contaminated material, substances or products input to the operating site for storage and/or processing and/or disposal under the specified waste management operations;

"authorised officer of the Agency"
   means any person(s) authorised in writing by the Agency pursuant to section 108(1) of the 1995 Act to exercise any of the powers specified in subsection (4) of that section;

"consequences"
   for risk assessments carried out within these conditions, means the adverse effects of harm as a result of realising a hazard which cause the quality of human health (other than health and safety of site staff or visitors to the operating site covered under the Health and Safety at Work Act 1974) or the environment to be impaired in the short or longer term.

"deployment form"
   means the deployment form for an operating site agreed in writing by the Agency. Site Specific working plans previously approved by the Environment Agency in respect of a site shall continue to have effect, as if they were deployment forms, until the activities it relates to ceases at the relevant site.

"D6"
   Biological treatment of waste as defined under Part III of Schedule 4 to the 1994 Regulations

"D9"
   Physico-chemical treatment of waste as defined under Part III of Schedule 4 to the 1994 Regulations

"engineer"
   for engineering works specified in these conditions, means a person who works in the relevant branch of engineering, as a qualified professional;

"engineered"
   for works specified in these conditions, means carried out and completed using the relevant engineering process specified in these conditions;

"engineered containment and drainage system"
   means all elements relating to engineered containment of activities on the operating site, other than final disposal to land, and incorporating surfacing, bunding and drainage systems, buildings and fixed tanks;

"engineering"
   for engineering works specified in these conditions, means the relevant process of design, construction or installation, quality assurance or validation or commissioning specified in these conditions;
"environmental targets or receptors"
for risk assessments carried out within these conditions, means identified human and environmental populations or components, as specified in these conditions or otherwise agreed by the Agency within these conditions;

"groundwater"
means any water contained in underground strata;

"hazard"
means a property or situation that in particular circumstances could lead to harm;

"immediately"
for carrying out actions under the conditions, means without delay and within a reasonable time, taking into account any more immediate direct action necessary to prevent or minimise risk to human health and the environment. For carrying out notifications to the Agency, shall also mean by the fastest effective means available (for example, telephone) and confirmed in writing within 1 working day (or such other time as may be agreed by the Agency within the conditions);

"inert contaminated material, substances or products"
means contaminated material, substances or products which when disposed of in or on land does not undergo any significant physical, chemical or biological transformation;

"maintenance"
for engineering maintenance specified in these conditions, means the process of inspection, testing, or repair of the relevant engineering works specified in these conditions;

"mobile plant"
plant for the treatment of contaminated material, substances or products, as defined in the Waste Management Licensing Regulations (as amended) 1994 and as specified in this licence.

"operating site:
The areas in the agreed deployment form, including operational storage areas, engineered containment, operational controls and monitoring.

"operational storage"
Storage which is an inherent and integral part of the mobile treatment plant process, or which is within the boundary of the specified operating site, so as to provide a reasonable working capacity for inputs to and or outputs from the mobile treatment plant process.

"probability"
means the quantified expression of chance, denoted either as:
• the ratio or percentage of the occurrence of a particular event as one among a number of possible events;
• or as the frequency of occurrence of a particular event in a given period of time;

"R4"
Recycling or reclamation of other inorganic materials as defined in Part III of Schedule 4 to the 1994 Regulations.
for contaminated material, substances or products being delivered to the operating site, means delivered to the operating site and undergoing waste acceptance procedures specified in the deployment form, including storage of those contaminated material, substances or products during those procedures prior to acceptance of the contaminated material, substances or products;

"release pathways" for risk assessments carried out within these conditions, means the routes by which defined hazards may potentially realise their consequences, defined in terms of releases or emissions from the operating site that go beyond the operating site containment or boundary via one or more of the following routes, either directly or indirectly: Land; Groundwater; Surface water; Atmosphere;

"relevant offences" are offences within the meaning of regulation 3 of the 1994 Regulations or any statutory provisions or regulations amending or replacing them;

"risk" means a combination of the probability and consequences of occurrence of a defined hazard;

"risk assessment" means the systematic identification, analysis, estimation and evaluation within a defined scope of the defined risks of a particular activity, operation, process or design, carried out and reported by suitably qualified or competent persons, using recognised quantified or semi-quantified methods and techniques. Unless otherwise agreed by the Agency within these conditions, a risk assessment shall include and record the following:
• definition of the hazards associated with an activity, operation, process or design;
• assessment of the probability of those hazards occurring;
• determination of the potential consequences of those hazards for defined environmental targets or receptors, taking into account defined release pathways and defined protective measures;
• evaluation of the potential magnitude of those consequences and the probability of their occurrence;

"scope of risk assessment" means the boundaries of the risk assessment and the risks to be assessed within those boundaries, as defined in the conditions or otherwise agreed by the Agency within the conditions;

"sealed container" means a container which does not permit either the ingress or egress of liquids, or the escape of dusts or contaminated material, substances or products contained within it;

"specified waste management operations" means the waste management operations authorised by condition 1.1 of this licence;

"surface water" means any lake, pond, river or watercourse whether natural or artificial,
"the 1994 Regulations"  
means the Waste Management Licensing Regulations 1994 and any statutory provisions or regulations amending or replacing them.

"the Agency"  
means the Environment Agency, and where not specified shall be taken to refer to the Agency’s Local Office;

"the Licence Holder"  
means the Licence Holder specified in this licence or other person to whom the licence has been transferred in accordance with section 40 of the Environmental Protection Act 1990;

"the operator"  
A person who is in charge of the licensed mobile treatment plant and has responsibility for carrying out day to day activities with the plant;

"time periods, e.g. annually, quarterly, monthly, per year, etc. "  
Where periods are referred to in conditions, they must be calculated in the following way:
- annually or per year: 1 April to 31 March;
- quarterly: 1 April to 30 June, 1 July to 30 September, 1 October to 31 December, 1 January to 31 March;
- monthly: calendar month;
- weekly: Monday to Sunday.
Where the issue of the licence does not coincide with the start of any of these periods, then any relevant limits for the first period shall apply pro rata;

"VOCs"  
means volatile organic compounds

"waste"  
means waste as defined in section 75(4) of the 1990 Act and the Controlled Waste Regulations 1992 or any statutory provisions or regulations amending or replacing them;
Appendices to conditions

Appendix A: Format for summary records of contaminated material, substances or products accepted, treated and removed (Condition 42.1)

Summary record to be submitted on the electronic form as supplied by the Environment Agency.
Waste Management Licensing

Decision Document and Compliance Plan

1. Introduction

<table>
<thead>
<tr>
<th>Area</th>
<th>Chelmsford</th>
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<tbody>
<tr>
<td>Region</td>
<td>Thames</td>
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</table>

| EAWML Number | 10373       |
| Facility Name | Mobile Plant  |
| Applicant/Licence Holder | Pryor Mourik Ltd |
| Status of Applicant | Company |

Registered Office Address
- Coal House
- Harlow Common
- ESSEX CM17 9HY

| Company Number (if applicable) | 05551072 |
| Correspondence Address | As registered office |
| Facility Address including NGR | N/A Mobile Plant |
| What activities will be authorised by the licence | Treat |
| For modifications only, what are the activities authorised by the existing Licence | N/A |
| Facility Type (OPRA category) | A24 |
| Full Charging Table Reference | T5(a) |

Permitting Officer: Claudine Russell
Inspecting Officer: Note: If the licence is pre-operational and hence is not incurring subsistence charges, it is the Inspecting Officer's responsibility to trigger the start of Subsistence Charges by informing Income Teams.

- In Situ and Ex Situ treatment of waste soil by using mobile plant.

2. Receipt of submission

Calculation of fee paid and correct Charging Table:

A sum of £6,750 was received which is the correct amount under charging table band(s) T5(a).

Claims for commercial confidentiality.
Under Section 66 (1) of The Environmental Protection Act 1990 (the Act), the person furnishing information, for the purpose of an application or for the modification of a licence,
can apply to the Agency to have that information excluded from the public register on the
grounds that it is commercially confidential.

- No Claim made

Occupancy

Not applicable as Mobile Plant.

3. Consultation & Other Representations

Comments and actions
Appendix 1 details the comments received from consultees and any other representations,
and the actions subsequently taken by the Permitting Officer to address these comments.

Consultation and Compensation Provisions (applications for new licences and
modifications to licence conditions only)
Under the Waste Management Licence (Consultation and Compensation) Regulations 1999, before
requiring a licence holder to do works by way of condition that he may or may not be entitled to do, the
Agency must consult with every person that appears to be likely to have to grant rights to the licence
holder to do the work, and to take into consideration any representations made.

Planning Status
The planning status of this site has been confirmed as appropriate for this activity by Essex
County Council in their letter dated 22 August 2006.

Habitats Directive / SSSI
This will be assessed when the mobile plant is deployed, by way of the deployment forms that
are completed for each site where the plant is to be used.

4. Licence Conditions
The standard MTL licence conditions were used and no amendment was made to these- they
were felt to adequately control the risks posed by the plant and the technologies that the
company wanted to employ.
5. Fit and Proper Status

Assessment of Relevant Convictions
All known sources have been checked to ensure that all relevant convictions have been declared.

No convictions are held.

Assessment of Technical Competence:

1. Certification level. Certificate required 4TMHCL
2. Nominated Managers. Mr Phil Makin – WAMITAB qualified
3. Site attendance. Minimum of 1 hour per week.

Financial Provision
Regional Finance has confirmed that the applicant has demonstrated that adequate finances are available to meet the obligations of the licence in the memo dated 17/09/2006 from Linda McCarthy.

6. Decision

It has been decided that this application should be granted.

i) Signed...........................................
Designation: Permitting Officer Date...........................................

(ii) Decision document and determination of application approved by designated person under NFSoD

 Signed...........................................
Designation...........................................
Date 2nd Oct 2006
Compliance Plan
The setting of the compliance plan for the site will formally commence with the handover of the licence or modification from the Permitting Officer to the Inspecting Officer. The Inspecting Officer will have been involved in the process of determining the application, either directly as the Permitting Officer, or indirectly through attendance at meetings or consultation responses.

If necessary, it is suggested that following the issue of the licence / modification of the licence conditions, a meeting be held between the Permitting Officer and the Inspecting Officer to set the Compliance Limits for the site or initial mobile plant deployment. This discussion would include background issues, the reasons for certain decisions, the provision and attendance of the Technically Competent Management, any Relevant Convictions and Post Conviction Plan, financial provision (if any e.g. transfer of a landfill licence) and any conditions which require information to be submitted or work to be done by the licence holder prior to waste acceptance.

During the meeting between the Inspecting Officer and the Permitting Officer, the following matters may be relevant:

- the background to the application / applicant / site.
- the nature of the relationship between the licence holder or operator and the Agency, so that the Inspecting Officer is aware of any potential conflict situations.
- any activities which may affect the findings of a site inspection e.g. nearby industrial or agricultural processes which may give rise to their own odour / dust emissions
- nearby areas of environmental sensitivity e.g. watercourses which may be vulnerable, residential areas and sites of special scientific interest.
- specific issues which are of note or which may need addressing through the conditions later.
- deviations from the library of licence conditions due to site or mobile plant specific reasons.
- conditions in the licence requiring action on the part of the applicant, either within a certain timescale or prior to acceptance of waste.

- Requirements of the planning permission for the site.
- details of the financial provision. [if any]
- who the TCM is and how TCM has been provided (COTC, Agency assessment or transitional provisions).
- mechanism for feeding back comments to the Waste Management Licensing Technical Manager on the enforceability of the conditions
- Details of when subsistence charge will be triggered if the site has not been prepared or if the mobile plant has not yet been deployed and how to inform finance when the subsistence charge is due.

In certain cases it may be helpful for both the Inspecting Officer and the Permitting Officer to have a joint meeting with the licence holder at the site, to discuss the licence conditions: However, this would only happen where both officers consider it necessary.

At the end of the meeting a note confirming the date of the meeting and the officers present shall be placed on eDM.
### Appendix 1 – Consultee comments and other representations, and subsequent actions

<table>
<thead>
<tr>
<th>Comments from</th>
<th>Comment</th>
<th>Actions, or justification for none required</th>
</tr>
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<tbody>
<tr>
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Part F

F1 Data protection and confidentiality

The information you give will be used by the Environment Agency to process your application. It will be placed on the relevant public register(s), and used to monitor compliance with licence/permit conditions, or to process renewal applications.

We may also use and/or disclose any of the information you give us in order to: offer/provide you with our literature/services relating to environmental matters, consult with the public, public bodies and other organisations (for example Health and Safety Executive, local authorities, emergency services, DEFRA on environmental issues, carry out statistical analysis, research and development on environmental issues, provide public register information to enquirers, investigate possible breaches of environmental law and take any resulting action, prevent breaches of environmental law, assess customer service satisfaction and improve our service.

We may pass on the information to agents/representatives who we ask to do any of these things on our behalf.

Individuals have a right to see the information we hold about them. We will correct it if it is inaccurate.

You should ensure that any persons named on this form are informed of the contents of this data protection notice. Disclosing information you give us in this application

The law says we must place your application on the public register unless you provide good reasons why it should stay confidential.

If you want any of the information in your application to remain confidential, enclose a letter with the completed application, giving your reasons in full.

We will let you know within 14 days if we agree that the information is confidential.
Annex B - Validation Testing Schedule
A1.0 INTRODUCTION

A1.1 This method statement addresses the on-site and laboratory testing that will be conducted during soil stabilisation works to be undertaken at the Stobart Holdings Limited Site, Widnes.

A1.2 The on-site and laboratory testing will be undertaken by Earthworks Testing Solutions Limited (ETS Ltd). The works will be supervised by a Materials Technician provided by the ETS Ltd who will be supplemented by a Technical Assistant. Additional engineering advice may be provided by the Principle Materials Engineer of ETS Ltd, Mr Jon Hardcastle.

A1.3 This Method Statement was produced at the request of Mr J A McDermid of Beach Soil Stabilisation Limited (BEACH) and should be read in association with the Construction Method Statement completed by BEACH and any requirements of the Contract Specification.

A2.0 OBJECTIVES

A2.1 The first objective of the Method Statement is to put in place effective mechanisms for ensuring that the testing conducted during this phase of the scheme is carried out in accordance with the contract specification supplied and our client’s requirements.

A2.2 The second objective is to ensure that the approach and actions undertaken are well documented for the purposes of regulation, insurance and legal liability.
A3.0 ENGINEERING WORKS SUPERVISION

A3.1 General

A3.1.1 The Materials Technician and Principle Materials Engineer are responsible for undertaking any compliance testing, checking, monitoring, recording and reporting all test data.

A3.1.2 A Materials Technician for this phase of the works will be nominated from ETS Ltd.

A3.1.3 The Principle Materials Engineer will be, Jon Hardcastle of ETS Ltd.

A3.1.4 ETS Ltd will carry out Control and Compliance testing on site and off site testing at their Doncaster Laboratory.

A3.1.5 The Principle Materials Engineer will be responsible for preparing draft results summaries and final test certificates. Where appropriate, test reports will detail the required specification limits.

A3.2 Responsibilities

A3.2.1 The Principle Materials Engineer:

- Attends selected progress or liaison meetings and is the key contact with BEACH and their Client;
- Reviews all designs, plans, and specifications;
- Reviews other site specific documentation;
- Administrates this method statement;
- Manages the daily activities of the laboratory Compliance Testing requirements;
- Compiles all test result summaries and issues all final test certificates

A3.2.2 The Material Technician:

- Acts as the on site representative;
- Familiarises himself with all relevant specification extracts for the contract and the content of this Method Statement;
- Manages the daily activities of the on-site Control and Compliance Testing requirements;
- Attends site progress meetings as required;
- Assigns locations for sampling and testing, arranges collections and shipping of all samples for laboratory testing;
- Reviews results of laboratory testing and makes appropriate recommendations;
- Compiles daily inspection reports;
- Reports to the Principle Materials Engineer any relevant observations, unresolved deviations from the Method Statement or Contract Specification and or any on-site activities that could result affect the integrity of the works.
A4.0 CONTROL TESTS

A4.1 All testing will be undertaken by ETS Ltd. The following control testing shall be conducted in accordance with BS 1377 and BS 1924 and other appropriate methods during the progress of the works:

A4.2 Table A4.2/1

<table>
<thead>
<tr>
<th>Test</th>
<th>Frequency</th>
<th>Specification Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Moisture Content</td>
<td>As required</td>
<td>Information Only</td>
</tr>
<tr>
<td>MCV @ Natural MC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Sulphate</td>
<td>1/1000m³</td>
<td>Information Only</td>
</tr>
</tbody>
</table>

Table A4.2/2

<table>
<thead>
<tr>
<th>Test</th>
<th>Frequency</th>
<th>Specification Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCV @ Natural MC (including refusal density)</td>
<td>1/1000m³</td>
<td>8-13</td>
</tr>
<tr>
<td>Natural Moisture Content</td>
<td>1/1000m³</td>
<td>Information Only</td>
</tr>
<tr>
<td>Insitu Density</td>
<td>&gt;95% of Refusal Density</td>
<td></td>
</tr>
<tr>
<td>Insitu CBR (@ 1 day)</td>
<td>1/2500m³</td>
<td>Target &gt;8%</td>
</tr>
<tr>
<td>Soaked CBR</td>
<td>1/5000m³</td>
<td>&gt;8%</td>
</tr>
<tr>
<td>OMC/MDD (2.5kg)</td>
<td>1/week/ material type</td>
<td>Limits as determined by ongoing trials</td>
</tr>
<tr>
<td>Permeability Tests</td>
<td>1/20000m³</td>
<td>Limits as determined by ongoing trials</td>
</tr>
<tr>
<td>Monolithic (8 Stage Leachate Tests)</td>
<td>1/10000m³</td>
<td>Limits as determined by ongoing trials</td>
</tr>
</tbody>
</table>
Annex C - Treatment Phasing Drawing