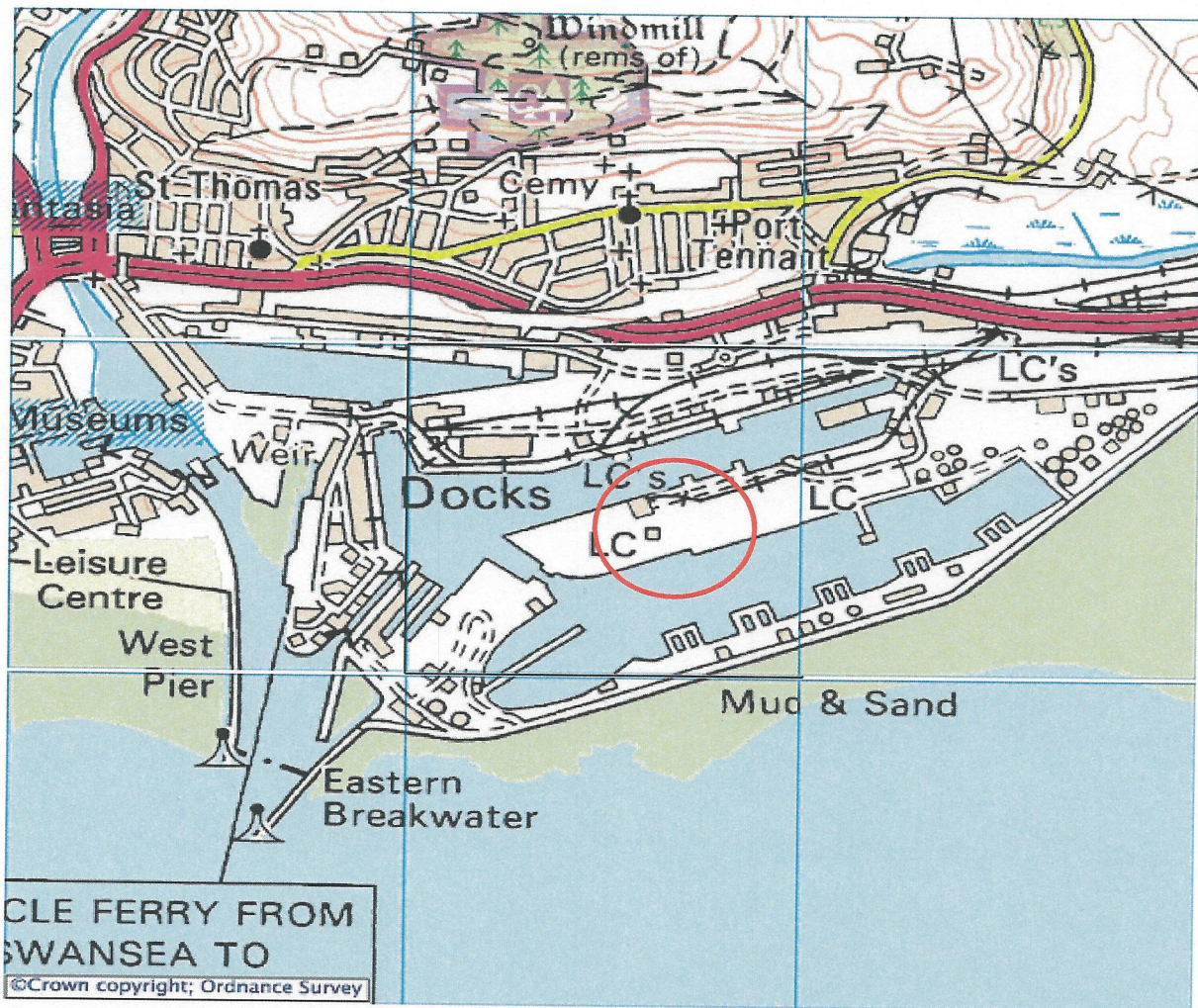


FIGURES



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Consulting Engineers THIS DRAWING IS NOT TO BE SCALED									PROJECT Graigola Wharf Waste Reclamation and Recycling Centre	
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APPENDIX 1
ENVIRONMENTAL RISK
ASSESSMENT

STENOR ENVIRONMENTAL SERVICES LTD
WASTE RECLAMATION AND RECYCLING CENTRE
GRAIGOLA WHARF
KING'S DOCK
SWANSEA

ENVIRONMENTAL RISK ASSESSMENT

Contents

Section	Page	WP Spec Ref.
1.0 Introduction	1	
2.0 The Site	2	
3.0 Geology	4	
4.0 Hydrogeology	5	
5.0 Environmental Targets	7	
6.0 Environmental Risk Assessment	8	
6.1 Hazard Identification and Risk Assessment	8	
6.2 Specified Waste Management Operations	14	WP/1.1
6.3 Permitted Wastes	14	WP/1.2
6.4 Site Security	14	WP/3.2
6.5 Potentially Polluting Leaks and Spills	15	WP/4.151
6.6 Mud and Debris	15	WP/4.140
6.7 Fires on Site	16	WP/4.153
6.8 Waste Acceptance and Recording	16	WP/4.210
6.9 Storage of Specified Wastes	16	WP/4.301
6.10 Site Containment and Drainage	17	WP/2.210
6.11 Litter	17	WP/6.050
6.12 Dust, Fibres and Particulates	17	WP/6.010
6.13 Odours	23	WP/6.020
6.14 Pest Infestations	23	WP/6.040
6.15 Noise	23	WP/6.030
6.16 Scavenging Birds and Other Animals	23	WP/6.041
6.17 Groundwater Monitoring	23	WP/5.400
6.18 Surface Water Monitoring	24	WP/5.500
7.0 References		

Contents (continued)

Section	Page	WP Spec Ref.
Figures		
Figure 1	Site Location Plan	
Figure 2	Geology	
Appendices		
Appendix 1	Ground Investigation Factual Information	

1.0 Introduction

The transfer, sorting and storage of inert wastes is unlikely to give rise to significant environmental impact when compared to other licensed waste management operations such as landfill or incineration. However, it is important to assess the environmental risks that may occur as a result of these site operations in order that suitable mitigation measures may be incorporated into the site design and Working Plan. The impacts arising from a waste transfer station are most likely to occur from windblown dust and particulates generated during sorting, tipping or trafficking and noise produced by the site operations. It is also important to ensure that none of the site operations cause groundwater or surface water pollution.

It is widely recognised that every waste management site is inherently different due to its use, location and environmental sensitivity, and that the design and operation must take account of the risks to the surrounding environment. Volume 1 of the Library of Licence Conditions and Working Plan Specifications: Working Plan Guidance and Specifications, August 1999, gives reference as to when and where environmental risk assessment is appropriate to specific Licence Conditions and Working Plan Specifications. This is backed up by Guidance Note 25: A Practical Guide to Environmental Risk Assessment for Waste Management Licensing issued in November 2000.

This risk assessment broadly follows the procedures set out in Guidance Note 25 referenced above for basic risk assessment. After outlining the current environmental conditions at the site, the risk assessment identifies hazards presented by the specified waste management operations to be carried out at the Graigola Wharf and a qualitative assessment of the risks is carried out. Where specific circumstances identify that a risk is perceived, more detailed discussion is carried out, and risk management procedures are formulated in order to mitigate the perceived environmental risks. These risk management procedures are referenced to specific Working Plan Specifications as set out in Volume 1 of the Library of Licence Conditions and Working Plan Specifications: Working Plan Guidance and Specifications, August 1999.

2 THE SITE

2.1 Site Location and Land Use

Graigola Wharf is situated in the Swansea Dock area approximately 1.5 miles south west of central Swansea. The site is located on a wharf surrounded by dock water on three sides. The Ordnance Survey National Grid Reference for the approximate centre of the site is SS 6764, 9242. The location of the site is shown on Figure 1.

Access to the site is off the A483 trunk road (Fabian Way), this road also provides vehicular access to other premises in this area of the Port. The site is flanked on the north and south by Queen's Dock and King's Dock, to the east by the remainder of Graigola Wharf currently used for cargo storage and to the west by a coal processing operation.

The site lies close to the Swansea Waterfront SA1 Regeneration Scheme, which will involve the development of a variety of commercial and residential properties within the area. This development is concentrated around the northern section of the Kings Dock. The closest residential development will be approximately 300m to the west of the site. The remainder of the dockland area contains industrial and commercial premises, the closest residential properties are around the Port Tennant area approximately 900m to the north.

The waste management site is broadly rectangular in shape, with the main access point on the western boundary. The land boundary of the application site is shown in Drawing No. 5040219/200/001. The site currently consists of an area of elevated land bounded to the east by partially restored land (currently used by Transco for pipe storage). To the west is a coal screening and packing plant and to the north, a cargo area currently used for timber storage. A portacabin will be placed on site to act as site control office (including welfare facilities) and there will be a variety of reclamation plant.

The reclamation station comprises a waste delivery area, waste storage area, a crusher and a screener. The site has no impermeable hardstanding and is covered in a mixture of compacted stone and hardcore with all surface water drainage soaking/percolating through the unmade-up areas of the site.

2.2 Site History

The site has had a long history of industrial use. Graigola Wharf was constructed in 1904 during the development of the dock area which continued into the 1920's. Sand and gravel dredgings were used to build up the Wharf. The primary use of Graigola Wharf was for the loading of coal onto ships. For this purpose several high level loading railway sidings existed on site both on the northern and southern banks.

A small briquetting works existed on the western peninsular of the site. This formed briquettes from coal fines. Railway sidings also entered these works.

Stenor Environmental Services Ltd (Stenor) have been operating at the site under an exemption since 2002. Stenor undertake reclamation works on behalf of ABP to return an area of sand dredging to a flat storage area that can be subsequently handed back to ABP to assist in their operations or lease to port users. In order to create a stable free-draining platform, the sand and other materials are, over time, being excavated and the resulting void being infilled with appropriate materials under an exemption from Waste Management Licensing.

Stenor held 9A and 19A Waste Management Licence Exemptions for their activities at Graigola Wharf. This enabled them to undertake the reclamation works and store inert materials on site. Due to changes in the regulations Stenor were asked by the Environment Agency in July 2005 to re-apply for these exemptions. On re-applying Stenor were granted a 9A exemption but not a 19A exemption and were advised to apply for a Waste Management License if material was to be stored and processed on site.

3 GEOLOGY

3.1 Regional Geology

The regional geology has been assessed with reference to British Geological Survey Map Sheet 247 1:50,000 scale drift (Swansea) (Ref. 1). A copy of the relevant section of the map is presented as Figure 2.

The published geological sheet indicates that the site and surrounding area is underlain by the Middle Coal Measures of Carboniferous age. These are overlain by Marine Beach Deposits. Made Ground is likely to cover the whole dockland area.

3.2 Site Geology

As Graigola Wharf is a man-made quay the whole Wharf comprises Made Ground. This is likely to be underlain by the Marine Beach Deposits.

Five trial pits were excavated in April 2006 to assess the condition of the Made Ground on site. Chemical analysis was undertaken on nine samples to assess the existing level of contamination and the leaching potential of any contamination. Appendix A contains a plan showing the location of the trial pits, the trial pit logs and the chemical analytical results.

The trial pits indicated that the majority of fill within the top 4m comprised silty sand and gravel. Some brick concrete ash and clinker were also encountered at various depths likely to be as a result of the briquetting works.

The chemical analysis of the material shows low concentrations of metals with elevated concentrations of aluminium, iron and manganese. The heavy fraction of total petroleum hydrocarbon (C12 – C35) was detected in all trial pits as was polycyclic aromatic hydrocarbons. High levels of TPH and PAH were detected at 3.50m depth within TP5. The samples contained ash and clinker likely to be associated with the previous briquetting works.

Asbestos, volatile organic compounds (VOCs) and polychlorinated biphenyls (PCBs) were not detected in any of the samples. Of the semi volatile organic compounds (SVOC) suite only two compounds were detected and these were within the sample from trial pit TP5.

The leachability analysis indicates that the metals are not highly leachable. Leachable TPH was detected within trial pit TP2, and leachable PAHs were detected within trial pits TP2 and TP5. No leachable phenols or other SVOCs were detected.

4 HYDROGEOLOGY

4.1 Regional Hydrogeology

The published Groundwater Vulnerability Map, sheet 35 for West Glamorgan (1:100,000 scale), (Ref 2) indicates that the Carboniferous Coal Measures within the vicinity of the site area is classed as a minor-aquifer. A Minor aquifer is defined as strata of variable permeability, where groundwater may be used as a local source but seldom produces sufficient water for large abstractions. As the Wharf is built out into the sea the groundwater is not classified as it is in hydraulic continuity with the seawater.

4.2 Site Hydrology and Hydrogeology

The dock water which surrounds Graigola Wharf on three sides is brackish. The River Tawe flows past the Swansea Docks and out to sea approximately 40m to the west of the site and the coastline is approximately 400m to the south. There are no other surface water features within 1km of the site.

As part of the site characterisation investigation in April 2006 two samples were taken from the dock water. One was taken off the northern bank of Graigola Wharf and the other off the southern bank. The results are presented in Appendix A. The results show the dock water to be brackish and of variable quality.

Any perched groundwater held within the Made Ground of the dock or within the Marine Beach Deposits beneath the site is likely to be in hydraulic continuity with the dock water/seawater.

4.3 Assessment of Risk

Although Graigola Wharf is surrounded on three sides by dock water the risk of polluting controlled waters by the waste management operations proposed for the site is considered to be low. This is due to a number of factors:

- The waste types to be accepted at the site are generally low risk, with provision made for the temporary safe storage of any higher risk categories accepted accidentally. The waste types proposed for storage at the site will not be contaminated and will therefore not have the potential for contaminants to be leached from them.
- The site is of low environmental sensitivity. There is no classified groundwater beneath the site as it is built out into the sea. It is therefore not believed necessary to carry out a Regulation 15 hydrogeological risk assessment for waste management operations at this site.
- Surface water falling on the site is allowed to soak away into the Made Ground. There is likely to be some limited informal surface water run-off into the dock during very wet conditions. Given the inert nature of any suspended solids and the limited volume compared to surrounding industries and dredging works, the risk to the dock from surface water run-off is considered low.

5 ENVIRONMENTAL TARGETS

The environmental targets considered to be potentially at risk of being adversely affected by the inert waste transfer station can be summarised as follows:

- **Local Residences**

Although the closest residential properties are currently approximately 900m to the north, there are residential properties included as part of the SA1 development. The SA1 Waterfront Masterplan shows that the closest future residential properties to the site will be situated approximately 300m to the north and 400 to the west. These residences may be at risk from environmental pollutants such as noise, dust and particulates.

- **Neighbouring Industry**

There are a number of neighbouring industries, which, although producing their own noise and air pollution may object to the production of dust and particulates from the waste transfer station.

- **Port Water**

As the site is surrounded for the most part by port water this surface water is a receptor to any run-off from the site or any leaching of contaminants present within the Wharf.

- **Site Operatives**

Any dust and noise created by the site works are likely to have impacts on site staff.

- **Public Highways**

Vehicles tracking over the unmade surfaces of the site and then exiting the site onto local roads could deposit mud and debris off their wheels onto public highways.

6 ENVIRONMENTAL RISK ASSESSMENT

6.1 Hazard Identification and Risk Assessment

By combining the sources of environmental risk from the waste management activities with the pathways present to transport these wastes to potential targets as listed in Section 5 above, a simplistic risk assessment can be carried out. Table 1 below summarises the activities that will be undertaken at the facility and the possible hazards that may result from these activities when combined with the waste types to be accepted. Table 2 takes a more detailed look at the source-pathway-target assessment and gives a qualitative assessment of the risk attributed to each activity, the consequence of this risk being realised and the reduction in risk following risk mitigation measures.

Table 1. Hazard Identification.

Hazard		Receptor
<i>Preparatory Works and Site Engineering</i>		
1	Unacceptable noise levels from site leveling	Local Inhabitants and Site Staff
2	Release of dust and other particulates into the atmosphere due to trafficking of heavy construction plant.	
3	Suspended solids released into the surface water during rainfall.	Port Water
<i>Receipt of Wastes</i>		
4	During dry weather, vehicles trafficking over unmade site surfaces may cause dust to be raised, which, during windy conditions could be blown over local habitations leading to a reduction in air quality .	Local Inhabitants and Site Staff
5	Windblown litter from unsheeted vehicles taking waste to reclamation facility (amenity issues).	Neighbouring Industry and Residents
6	During wet periods, mud trafficked from site after tipping to local roads by waste disposal vehicles.	Local Roads
<i>Temporary Storage of Unacceptable Waste Types</i>		
7	Temporary Storage of waste types not permitted for transfer or storage under the Licence conditions such as asbestos	Site Surface, Port Water and Site Staff
<i>Sorting and Crushing of Wastes</i>		
8	Sorting of waste during windy conditions results in lighter litter being blown and causing visual nuisance to local amenity rather than actual hazard.	Local Inhabitants
9	Unacceptable noise caused by mechanical plant used for sorting larger wastes.	
10	Sorting and crushing of certain wastes such as builders/demolition rubble or soil during dry conditions may cause particulates and dust to be released into the air causing respiratory or amenity complaints .	Local Inhabitants and Site Staff

Table 1. Hazard Identification (continued).

Hazard		Receptor	
11	Any biodegradable waste accidentally mixed with the inert waste may attract birds and other nuisance causing scavengers to the transfer station. Odours may also occur. More of an amenity nuisance than a hazard.	Site Staff	
		Local Residents	
		Neighbouring Industry	
12	Acceptance of mixed demolition waste, which may contain bonded asbestos waste not visible during initial vehicle inspection. Fibres may be released during sorting.	Site Staff	
13	Suspended solids released into the surface water system from the storage or sorting of materials during wet conditions.	Port Water	
Storage of Fuels and Oils			
14	Accidental spillage of fuel or oils whilst using bowser, vandalism or rupture/damage due to accident during trafficking of vehicles on site. Unconsented discharge directly onto the ground..	Site Surface	
		Port Water	
Loading of Waste/Recycled Material for Removal From Site			
15	Dust and particulates released into the air during loading of vehicles with recycled aggregates may give rise to amenity or respiratory complaints	Local Inhabitants	
		Site Staff	

Table 2. Source-Pathway-Target Risk Assessment of Hazards

The following table includes a qualitative assessment of environmental risk using a prediction of the likelihood or frequency of a hazard being realised, the consequence of the hazard occurring without engineering and risk management controls in place and an estimate of the risk attributable. The final column provides an assessment of the level of risk following the implementation of risk management measures. The letters in the table relate to: N=Negligible, L=Low, M=Medium and H=High.

Contaminant/ Hazard	Source	Pathway	Target	Prob. (probability)	Cons. (consequence)	Risk	Justification and Mitigation Measures	Risk after Mitigation
Table 1: No. 8 Litter WP/6.050	Waste tipping and sorting.	Airborne	Local amenity/ inhabitants	L	L	L	Although litter is a visual nuisance, due to the types of waste being accepted at the site, the probability of windblown litter being present is very low. The actual hazard presented by litter is also not significant. Any remaining risk of windblown litter or other light wastes generated during sorting will be removed by placing these wastes within a covered skip before removal to landfill (see Working Plan Section 7.1).	N
Table 1: Nos.2,4, 10,15 Dust causing derogation of air quality. WP/6.010	Construction, receipt of waste, waste sorting/loading	Airborne	Local inhabitants/ site staff	H	M	M	The inert waste types received at the site may release dusts or particulates during construction, tipping/sorting/screening/crushing of the waste. Risk management will need to be employed such as dust suppression sprays, routine maintenance of crushing and screening plant etc. (see Working Plan Section 7.2). In addition, site staff will be provided with appropriate PPE and plant air conditioning fitted with dust filters.	L
Table 1: No. 7 WP/4.210	Temporary Storage Unacceptable Waste Types	Airborne, water leaching. surface run-off,	Site staff/ port water	L	L	L	Any loads suspected of not complying with the licence conditions will be held in a specific area /skip for further checking and verification. Prior to being accepted or turned away.	N

Table 2. Source, Pathway, Target Risk Assessment of Hazards (Continued)

Contaminant/ Hazard	Source	Pathway	Target	Prob. (probability)	Cons. (consequence)	Risk	Justification and Mitigation Measures	Risk after Mitigation
Table 1: No. 6 Mud and debris WP/4.140	Vehicles trafficking over unmade surfaces	Vehicle tyres	Public Highways	H	M	M	Due to measures to suppress dust, waste vehicles driving around the site access roads may come into contact with mud and carry it out of the site. Some vehicles will also need to track over unmade site surfaces. The length of the dock access road and provision of a wheel cleaner will prevent this debris from getting onto the public highways.	N
Table 1: No. 1 Noise construction operations WP/6.030	Construction plant	Direct (Airborne)	Local inhabitants	M	L	L	Given the site's existing infrastructure it is unlikely that significant construction works will be carried out at the site other than levelling areas to accept plant.. In addition, given the surrounding land uses, it is unlikely that noise levels will be a significant issue.	L
Table 1: No.9 Noise WP/6.030	Site plant	Direct (Airborne)	Local inhabitants	H	L	M	Although high noise levels will occur during waste sorting and crushing operations, the operation of crushing and screening plant in accordance with their Local Authority Air Pollution Control Permits will control the noise to levels acceptable to the surrounding industrial land usage (see Section 7.5 of Working Plan).	L
Table 1: No. 3,13 Suspended entering the port waters WP/2.340	Construction, sorting and crushing wastes	Surface water run- off	Port Water	M	L	L	The construction of the site surfaces and the storage and sorting of wastes in wet conditions will create suspended solids within any site surface water. Given that the site drainage involves soak away to the ground the impacts are low.. The only working SW drains are near the site entrance after the vehicles have been through the wheelwash (see Section 6.10 below).	N

Table 2. Source, Pathway, Target Risk Assessment of Hazards (Continued)

Contaminant/ Hazard	Source	Pathway	Target	Prob. (probability)	Cons. (consequence)	Risk	Justification and Mitigation Measures	Risk after Mitigation
Table 1: No. 2 Windblown litter from delivery vehicles WP/2.340	Haulage vehicles	Airborne	Local amenity	M	L	L	Vehicles transporting lighter materials may give rise to windblown litter on the public highway. These vehicles will be sheeted, or the materials will be in a contained skip therefore removing this risk. (See Working Plan Section 7.1)	N
Table 1: No. 11 Odour WP/6.020	Putrescible waste	Airborne	Local Inhabitants	L	L	L	The breakdown of putrescible wastes, especially in warm weather, can result in offensive odours being given off. These odours are more of a nuisance than a hazard. The site is not licensed to accept any of these wastes, however, if such waste should be discovered during sorting, it will be placed in an enclosed skip for removal to landfill. This removal of this skip will be on a weekly frequency.	N
Table 1: No. 14 Contamination by diesel fuel, oils or other unacceptable wastes. WP/4.151	Spillage of fuel whilst refuelling	Run-off, percolation	Port Water, site surface	L	M	L	The fuel is needed for the operation of the crusher which is not mobile. Therefore a bowser will be used to fuel the crusher from the storage tanks located off site. Spill mitigation measures involve only storing the amount of fuel or oil required and the provision of spill kits and the training of operatives in preventing and containing spills.	N

Table 2. Source, Pathway, Target Risk Assessment of Hazards (Continued)

Contaminant/ Hazard	Source	Pathway	Target	Prob. (probability)	Cons. (consequence)	Risk	Justification and Mitigation Measures	Risk after Mitigation
Table 1: No. 7 Fibres from bonded asbestos giving rise to asbestosis WP/4.520	Bonded asbestos cement	Airborne	Site operatives	L	M	L	Although bonded asbestos waste is not to be accepted at the site, occasionally mixed construction wastes may contain small fragments of asbestos cement. Bonded asbestos poses a much lower risk to health than the fibrous asbestos that is fastidiously removed from buildings before demolition. This waste will be placed in appropriate bags and placed in the emergency hazardous waste skip for disposal to a suitably licensed landfill.	N

The following sections provide further information on hazard identification and risk mitigation measures.

6.2 Specified Waste Management Operations (WP/1.1)

Waste management operations carried out at the site come under Classifications D9, D15, R4 and R13. These classifications are as listed in Part III of Schedule 4 of the Waste Management Licensing Regulations and consist of:

D9 Physico-chemical treatment of wastes not listed elsewhere in Part III including screening, separation and sorting of wastes which results in final mixtures which are disposed of by means of any other disposal operations (D1-D12) for example landfill. This would include the sorting of wastes at the site leaving a component that is not recyclable and therefore disposed of to a licensed landfill.

D15 Storage of wastes pending any other operations numbered D1 to D14, where storage is an inherent part of the specified waste management operations. This is known as 'operational storage' and involves the storage of permitted waste types in specific areas as described in the working plan prior to activities under D9 or final disposal to landfill.

R4 Recycling or reclamation of other inorganic materials. This relates to the major part of the operations carried out at the site, whereby inert materials such as hardcore and soil etc are reclaimed for re-use in the construction industry.

R13 Storage of waste consisting materials intended for submission to R3 and R4 above. Some storage of waste will be required before reclamation can take place.

The hazards attributed to these activities are identified in Table 1 of the previous section and the risks presented by those hazards assessed in Table 2.

6.3 Permitted Wastes (WP/1.2)

The site will only take inert waste (Working Plan, Appendix 2). No Hazardous or biodegradable waste will be accepted at the site, therefore reducing the general environmental risk posed by the site operations and hence the level of risk management required.

Due to the specific material reclamation operations carried out at the site, the operator has a commercial impetus to ensure that wastes outside of the Licence conditions are not accepted at the site.

6.4 Site Security (WP/3.2)

Site security is important to limit the risk posed by vandalism to equipment, theft of records or scavenging of wastes from the site. The site is in an industrial location within the port site, and as such has limited risk of vandalism and other human disturbance. Security measures are required to ensure that no licence conditions are breached or environmental risks realised (see Working Plan, Section 3.5).

The wastes at the site are not liable to impact on the environment due to vandalism, however, the temporary storage of fuel at the site is a potential target. Fuel tanks are located in a secure compound near the main entrance to the Port Site and fuel will be transported with a bowser to the Stenor site on an 'as and when' required basis. A spill

and containment kit will always be at hand. The fuel compound is surrounded by a perimeter fence and is securely locked when not in use. .

With the above security measures in place, the environmental risk posed by site will be low.

6.5 Potentially Polluting Leaks and Spills (WP/4.151)

Due to the nature of the activities carried out at the site requiring the use of mechanised plant, diesel fuel/fuel oil and associated hydraulic oils and lubricating oils will need to be stored. As discussed in Section 6.4 only the fuel/oil immediately required by site plant will be stored on site, the secure fuel compound will be used at all other times.

Any leakage or spillage will be cleared up with sand or the appropriate absorbent granules from a spill kit and conveyed to a licensed disposal site.

Measures to ensure that leaks and spills do not contaminate soil, groundwater or surface water are detailed in Section 3.7 of the Working Plan. In addition to the above measures, an action plan has been formulated to provide further risk management should a spill occur. This action plan is included in Appendix 3 of the Working Plan, and includes procedures to be followed in the event of a spill. All site operatives are to be made aware of the contents and location of the spill containment action plan.

With the above measures in place the risk of a polluting leak or spill occurring will be very low. The environmental risk of any polluting spill is also low due to the site's low environmental sensitivity.

6.6 Mud and Debris (WP/4.140)

By the nature of site operations it is inevitable that mud and debris will be picked up on the wheels of haulage vehicles visiting the site. Without sufficient risk management measures in place this mud or debris could be spread around the site or carried onto the public highway, causing a hazard to other vehicles using the highway, a nuisance to other businesses and also committing an offence under the Highways Act. During dry and windy spells, this mud and debris would also form a major constituent of any dust and particulates emitted into the atmosphere.

The measures taken to reduce this risk are documented in Sections 4.5 and 7.2 of the Working Plan. These measures include the provision of a wheel washer near the main Port entrance/exit and a water bowser for further wetting down of the surface in the event of dry, windy weather. If a failure of the wheel washer were to occur, or severe weather conditions meant that mud or debris was still being carried out of the site, a rotary brush type cleaner would be contracted to sweep the access roads to avoid any debris reaching the public highway.

These conventional measures have been shown to be effective in maintaining a clean road network at other sites, and will keep the level of material for possible dust generation to a minimum.

6.7 Fires on Site (WP/4.153)

The probability of fires on the waste transfer site is low due to the non-combustible nature of the majority of waste types to be accepted and the security measures as discussed above. If fires were to occur, the segregated nature of the site storage would limit the spread of fire making it easier to control.

The site will not take any hot wastes and incoming loads will be inspected to ensure that the waste is not smouldering or alight. No waste is permitted to be burnt at the site. General procedures for dealing with fires are included in Section 4.6 of the Working Plan.

The overall environmental risk at the site from fires is regarded as negligible.

6.8 Waste Acceptance and Recording (WP/4.210)

The site will only be licensed to receive the waste as described in the Working Plan, Appendix 2. Special wastes will not be accepted at the site and as such the risks to human health and the environment are substantially reduced.

The Level 1 (detailed characterisation of waste stream) waste acceptance and recording procedures as set out in the Working Plan are believed to be acceptable as a risk management measure to ensure that unacceptable wastes are not deposited at the site.

In the event that suspect materials are discovered during the sorting of wastes already accepted and tipped at the site, a contingency Level 2 sampling and analysis programme has been provided for in Section 4.7 of the Working Plan. The sampling and analysis of wastes will not be required as a routine acceptance procedure.

6.9 Storage of Specified Wastes (WP/4.301)

The storage areas designated for specified wastes is shown on Drawing No. 5040219/200/002 and covered in Section 3.6 of the Working Plan. Both incoming inert waste and processed waste will be stored in stockpiles on compacted stone/hardcore.

The waste types to be accepted at the site are low risk with respect to both handling and the environment, and run-off is unlikely to be contaminated if the waste acceptance procedures are followed, preventing contaminated material from being accepted at the site.

Any light rubbish or biodegradable material removed from the waste during sorting will be placed in an enclosed skip for removal to landfill. Any waste suspected of being hazardous will similarly be placed in an enclosed skip whilst test results are received and a landfill licensed for disposal is located.

6.10 Site Containment and Drainage (WP/2.210)

The site is predominantly covered in compacted hardcore and has no site drainage in place. The sorting will take place on an area of compacted hardcore and any suspect wastes will be identified at this stage and segregated for off-site removal. The storage of crushed concrete and screened soils will take place on another area of compacted hardcore, however, due to the sorting procedure outlined above there should be very little possibility of significant contamination arising.

There are no drainage arrangements on the site, with the majority of surface water percolating through the impermeable hard standing into the wharf.

6.11 Litter (WP/6.050)

Although litter is an amenity nuisance, the measures set out in Section 7.1 of the Working Plan combined with the general nature of the wastes to be accepted will control this nuisance to an acceptable level. Risk management measures to reduce the risk posed by litter include:

- waste vehicles visiting the site carrying light materials to be covered to avoid litter on public highway
- placing any light litter found in a covered container prior to disposal

With these measures in place, the risk of litter causing an amenity nuisance is negligible.

6.12 Dust, Fibres and Particulates (WP/6.010)

Dust, fibres and particulates released into the atmosphere by waste operations pose a potential risk to air quality in the locality, a reduction in amenity and the associated respiratory complaints. The deterioration in air quality can be realised on a site level by site operatives and on a local level by local inhabitants and neighbouring industries. Mitigation measures for the reduction of dust and particulates are included in Section 7.2 of the Working Plan.

The creation of dust on the site can come from a number of different material sources and waste recycling activities to be carried out. Those operations likely to give rise to dust or particulates at the site include:

- tipping of materials into storage bays
- sorting of materials using mechanised plant
- screening of materials to remove topsoil and subsoil from the larger fraction
- crushing of concrete and bricks
- trafficking of lorries and plant over dirty hardstanding
- loading of lorries from stockpiles

An assessment has been made of the potential impacts on local air quality from the operations listed above in order to assess the mitigation measures required.

6.12.1 Meteorology

The nearest and most appropriate source of meteorological data to the Stenor site is the former Meteorological Office station at The Mumbles. The meteorological station location is at 51.567 N, 3.98 W which is approximately 5 km to the south-west of Swansea. Meteorological conditions at Mumbles are considered to be similar to those at the Stenor Site as there are no geographic features in the area that would affect atmospheric conditions. Whilst there may be minor localised fluctuations in wind directions in the lee of buildings, the directional windspeed information from this station is relevant to the potential dispersion and deposition of dust at the Stenor site. Dust deposition is a long term phenomenon that will not be significantly affected by minor short term perturbations.

Data from the Mumbles for the years 2003 to 2005 was used to generate a three year frequency distribution of wind speed and direction. This is shown in Table 3 and as a windrose diagram.

Were the wind to be equally distributed from each directional sector, the frequency would be 6.25% in each sector. It is evident from the data for these years that there is a very pronounced prevailing wind from the west and west south-west. Winds from the adjoining sectors in the south-west and north-west are also relatively frequent. Winds from these four sectors occur for approximately 48% of the time, nearly two times more frequent than the evenly distributed case. The prevalence of high wind speeds also follows the same pattern. This prevailing wind direction will mean that the majority of dust and particulates leaving the site will be towards the Kings Dock and other industrial areas of the port to the north-east and east rather than the more sensitive residential housing to the north-west.

There is a secondary prevailing wind from the north-east and east north-east, where winds are nearly one and a half times as frequent as the evenly distributed case. This would have the effect of blowing dust and particulates out to sea. Winds from all other sectors are relatively infrequent.

Table 3 - Relative Frequency Distribution of Wind Speed and Direction, The Mumbles 2003-2005

Speed m/s Direction	≤1.54	1.54 to 3.09	3.09 to 5.14	5.14 to 8.23	8.23 to 10.8	>10.8	Total %
0.0	0.141	1.760	2.707	2.140	0.243	0.065	7.056
30.0	0.148	1.726	2.247	1.798	0.589	0.175	6.683
60.0	0.171	1.498	1.156	1.639	0.703	0.673	5.839
90.0	0.106	0.639	0.943	3.148	1.954	1.011	7.801
120.0	0.137	0.494	0.673	2.384	1.540	1.262	6.490
150.0	0.118	0.703	0.768	1.072	0.384	0.228	3.273
180.0	0.171	0.745	0.593	1.338	1.243	0.623	4.714
210.0	0.114	0.867	0.528	1.741	1.996	3.627	8.873
240.0	0.148	1.532	1.642	3.821	3.372	5.227	15.743
270.0	0.156	2.019	3.665	5.208	2.357	2.194	15.598
300.0	0.137	2.038	2.916	2.372	0.449	0.068	7.980
330.0	0.118	2.053	2.083	1.528	0.182	0.046	6.010
Total %	1.665	16.074	19.921	28.190	15.013	15.199	96.061
Calms							3.939
Total %							100.000