Appendix 1: 2015 Application – Planning, Design and Access Statement

Document Reference: E1627-2001

Planning Statement

incorporating a

Design & Access Statement

in support of an application for
Outline Planning
by

Sunrise Renewables (Barry) Limited

under

the Town and Country Planning Act 1990

3rd February 2015

CONTENTS

1. INTRODUCTION

1.1 The Applicant, Sunrise Renewables (Barry) Limited, is developing a renewable energy plant based on an advanced conversion technology (ACT) at Woodham Road, Barry, CF63 4JE within the Port of Barry (the "**Project**") - refer to the Location Plan at Appendix 1 for the Project site.

1.2 The principle of establishing a wood fuelled power plant at the Project site was established by planning permission reference 2008/01203/FUL, as approved by appeal reference APP/Z6950/A/09/2114605 on 2nd July 2010 (the "**2010 Permission**"). The current Applicant is an affiliate of the original applicant for the 2010 Permission, Sunrise Renewables Limited.

1.3 The Applicant is now finalizing the detailed technology selection and design layouts for the Project, as described in this Planning Statement. This requires the amendment of certain features of the 2010 Permission and in this connection the Applicant has been advised by the Planning Authority Officers that it is necessary to re-submit the changes to the Project for planning approval. The Applicant has determined to do so by submitting an Application for Outline Planning.

1.4 In summary, the changes, relative to the 2010 Permission, are as follows:

1.4.1 **Technology:** a change in the manufacturer of the advanced conversion technology (ACT) from gasification based on pyrolysis to one based on a fluidised-bed. The proposed technology is more fuel efficient and will improve the average annual power output to 10 MWe compared to 9.0 MWe in the 2010 Permission.

1.4.2 **Layout:** accommodation of the proposed technology at the Project site requires a different configuration of the buildings housing the various components – the 2010 Permission contemplated a single connected structure while the revised layout breaks this up into three separate but functionally interconnected buildings. The footprint of these buildings is 7.5% less than under the 2010 Permission.

1.4.3 **Elevations:** the revised layout comprises two buildings that are lower than the building height in the 2010 Permission and one that is higher. The average building height of the 2010 Permission is 14m while the average building height of the revised layout is 16.3m. In order to meet emissions requirements, the stack height will be increased to 43m. This is less than the stack height approved for the waste-energy plant already approved for construction at Atlantic Way on the opposite side of the dock.

1.5 The Applicant's lifecycle analysis for the Project indicates it will generate approximately £21.4 million for Barry/Glamorgan, comprising some £9.0 million for jobs, £5.0 million in business and rent for Barry Port and £7.4 million in business rates paid to the council over the life of the Project.

1.6 Except as discussed in this Planning Statement, the Project remains as described in the 2010 Permission and the supporting documents.

1.7 This Planning Statement has also been prepared with a view to meeting Design and Access Statement (DAS) recommended by Welsh Government guidelines and the Policy Review (Appendix 6).

2. TECHNOLOGY APPROVAL

2.1 It is proposed to replace the system detailed in the 2010 Permission manufactured by Prestige Thermal Equipment (which produced a 9 MW average net output) with an alternative system made by the globally established manufacturer Outotec (www.outotec.com). The Outotec technology is more efficient and will result in the average net output increasing to 10MW for the same amount of fuel input.

Photo 1 - Example of operational Outotec gasification plant in USA

2.2 The Outotec equipment produces syngas through a fluidized-bed process while the Prestige Thermal Equipment produces syngas through a pyrolysis process. Both technologies are forms of 'gasification'. The general sequence of the proposed gasification process is as follows:

2.2.1 Wood-waste feedstock is chipped off-site and delivered to the plant prior to being gasified. At the time of delivery, feedstock has a variable moisture content, the water having a function as a reformation agent in the gasification process.

2.2.2 The wood fuel is fed into the gasifier system where it is converted into a raw natural gas ('syngas') which is reformed and used as the primary fuel in the gasification boiler to generate steam to power the steam turbine. The Outotec gasifier will process up to 72,000 dry tonnes of wood waste per year to produce an average net output of up to 10 MW (compared to 9 MW with the Prestige system) and is more flexible with respect to moisture content.

2.2.3 The steam turbine uses the steam to produce electricity and the plant transfers electricity to the grid via an alternator, transformer and on-site substation. The turbine is enclosed in an acoustically attenuated extension to the electricity switchroom, to reduce noise to a minimum. The process is regulated from a computerised control room. The buildings will be lit internally using electricity generated from the process.

2.2.4 The Outotec equipment utilises a single turbine-alternator which replaces the previously proposed system of multiple reciprocating piston engines.

2.2.5 Burning of the refined syngas in the gasifier to produce energy combined with various plant and equipment used to reduce emissions results in cleaned exhaust emissions from the facility.

The Applicant considers the proposed new plant to be better suited to the specific requirements of the Barry scheme and will maximise operational efficiencies and versatility in addition to being a more established and therefore 'bankable' technology.

2.3 Concerning other site infrastructure:

2.3.1 There will be no change to the mobile plant deployed at the site. This will include a loading shovel and / or grab, a water bowser to control dust as necessary in vehicle circulation areas and a road sweeper to maintain the site access road and the highway in a clean condition, primarily for use during the construction phase.

2.3.2 The proposed buildings will continue to be of steel portal frame construction. The colour and specification of external cladding will be agreed with the planning authority prior to construction. The floor slab of the building will be surfaced with reinforced concrete to a specification approved by Natural Resources Wales.

2.3.3 The amended plant design will continue to require an Environmental Permit from Natural Resources Wales. The Applicant consulted extensively with Natural Resources Wales' predecessor agency at the time of the original application and is consulting again in connection with the present application.

2.3.4 Internal surfaces will continue to drain to a sealed sump or foul sewer. External surfaces including roof water will drain to a sustainable surface water system.

2.3.5 Internal parking provision remain as under the 2010 Permission allows for at least 5 spaces plus 1 disabled space and 4 cycle parking spaces (two locations have been proposed). Details will be agreed with the Planning Authority.

2.3.6 The site will be enclosed by new galvanised steel palisade security fencing with entrance gates with a maximum height not greater than 2.6 metres, as under the 2010 Permission.

2.3.7 The access into the site remains essentially as in the 2010 Permission, from the southern end of the property from David Davies Road.

2.3.8 The details of plant operation for the revised scheme will remain the same as for the 2010 Permission. The plant will operate continuously in order to generate electricity with the exception of routine maintenance and other downtime. The following time limits will continue to apply for the receipt of fuel and general access:

Weekdays 07 00 - 19 00;
Saturdays 07 00 - 19 00;
Sundays and Bank/Public holidays 08 00 - 16 00.

The entrance gates will be closed outside of these hours to prevent unauthorised access.

2.4 Concerning the decision to change the manufacturer of the advanced conversion technology (ACT) for the plant: at a technical level what is being proposed is a change from gasification using pyrolysis to gasification using a fluidised bed. However, the ACT remains one based on gasification. Inspector Thickett references this in his appeal decision to (in respect of the 2010 Permission):

> *"32. The South East Wales Waste Group, Regional Waste Plan 1st Review, 2008, identifies residual waste managed by high levels of pyrolysis as the best practicable environmental option (BPEO)…..The appellant submits a site specific BPEO analysis which concludes that pyrolysis and direct combustion both represent the best practicable environmental option for waste wood. Having considered the appellant's analysis, I concur with its conclusion that pyrolysis should be preferred as it has a greater potential for electricity generation."*

2.5 It should be noted that Ofgem do not distinguish between pyrolysis and fluidised-bed based gasification for the purposes of renewable power generation and support (extracted from Ofgem Guideline for Generators):

> "*Gasification and pyrolysis are examples of advanced conversion technologies (ACTs). These technologies use waste and biomass feedstocks to produce either a synthesis gas (syngas) and / or liquid fuels (bio-oils) which can be used to generate electricity*"

2.6 Both are considered advanced conversion technologies (also called advanced thermal treatment (ATT) technologies) providing the most efficient form of biomass conversion. This was recognised in The South East Wales Waste Group, Regional Waste Plan 1st Review, 2008 report itself:

> *6.6.8 Advanced Thermal Treatment (ATT) technologies are primarily those that employ pyrolysis and/or gasification to process MSW. Pyrolysis and Gasification are considered to be multistage processes and require additional facilities to prepare the material to a suitable standard. The gasification and pyrolysis of solid materials is not a new concept. It has been extensively used to produce fuels such as charcoal, coke and town gas. It is only in recent years that pyrolysis and gasification has been commercially applied to the treatment of MSW.*
>
> *6.6.12 There are a variety of features promoted to differentiate ATT from conventional incineration technologies. These include:*
>
> - *The potential smaller scale of ATT processes in comparison to incineration, which may facilitate local use of the output heat and electricity;*
> - *Reduced emissions from ATT processes may mean that abatement costs are reduced (although all the processes must meet the same emissions standards); and*
> - *The potential to use the syngas.*

2.7 Pyrolysis and gasification using a fluidised-bed can properly be considered to be interchangeable for the purposes of selecting an advanced conversion technology to function within the power plant.

2.8 The selection of the technology discussed above also results in an increase in the average annual generating capacity to 10 MWe compared to 9.0 MWe for the 2010 Permission as a result of improved efficiency. Such increased efficiency means there will be no surplus heat generated (ie it is not a Combined Heat and Power (CHP) plant). Such increased output has no visual or technical impact and will be limited by the capacity of the transmission network to transmit the power (which is separately regulated). From a technical standpoint the change is neutral.

3. LAYOUT APPROVAL

3.1 For convenience, the revised plant layout (see Appendix 3) is shown below in comparison to the layout for the 2010 Permission:

	
2010 Permission Layout	**2015 Proposed Layout**

3.2 Originally all plant operations were located within a single structure with a total footprint of 2700 sqm. Under the revised arrangements it is proposed to separate the power plant functions into separate structures to accommodate the revised plant (total building footprint 2,497 sqm). The result will therefore be a net 7.5% reduction in building footprint at the site. Details of the structures are as follows:

3.2.1 Wood Storage and Feed Building: The wood storage and feed building (at 52.4 x 21.6 x 13.7m high) remains similar in height to that of the previously approved building (14m). The submitted Traffic Movement plan (in Appendix 5) prepared by the project contractor confirms there is adequate space for articulated vehicles to access the building.

3.2.2 Turbine, Welfare & Ancillaries Building: This building (29.1 x 17.9 x 11m high) has a reduced height compared to that of the previously approved building and incorporates switchgear, the main control room and a turbine room (to replace the formerly proposed piston engines).

3.2.3 Main Process Building: The gasification equipment will be entirely enclosed within a bespoke structure (41.4 x 20.4 x 23m high). This will significantly improve containment of the process as a whole. The maximum height of the previous plant was 14m so there will be a net increase in height of 9m for this element.

3.2.4 ACC Unit: An external air cooled condenser (ACC) unit (32m x 14.5m x 20m high) mounted on steel stilts is now proposed adjacent to the Turbine, Welfare & Ancillaries Building.

3.2.5 External Equipment: ash residue from the combustion process will be stored in two externally located silos (18.4m high x 6.7m diameter) allowing ease of access (see Traffic Movement Plan included in Appendix 5). Flue Gas treatment (FGT), exhausting to the chimney stack will also be external to the buildings.

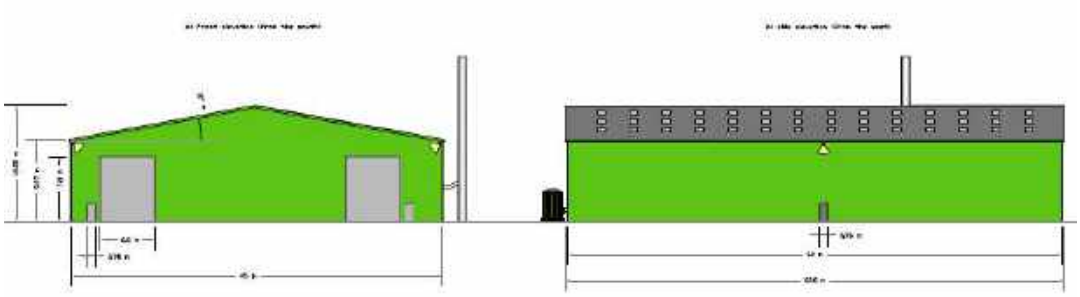
3.2.6 Chimney Stack: the chimney stack being re-sited some 20m to the south-east relative to the original location and in order to meet emissions requirements, the stack height will be increased to 43m (which is less than the stack height approved for the waste-energy plant approved for construction at Atlantic Way on the opposite side of the dock).

4. ELEVATIONS APPROVAL

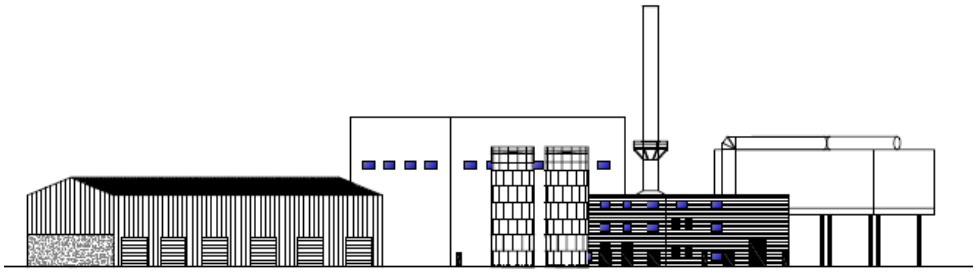
4.1 Appendix 4 contains the elevations for the revised layout; however, for convenience Elevations A and B, below illustrate the differences between the elevations for the 2010 Permission and the current application.

4.2 The revised layout comprises two buildings that are lower and one that is higher than the building height in the 2010 Permission, as more particularly detailed in Section 3.2 above, and Appendix 4. Main points to note are:

4.2.1 The average building height of the 2010 Permission is 14m while the average building height in the revised layout is 16.3m.



Elevation A: Elevations for the 2010 Permission



Elevation B: Elevations for the revised layout

4.2.2 The change in chimney stack height has been determined in order to comply with the requirements of the Waste Incineration Directive (WID)/Industrial Emissions Directive (IED). This will result in the chimney stack increasing in height from 20m to 43m with adjustments to the diameter to allow for the increase in height – the diameter will increase from 1.0m to 2.75m.

4.3 The visual impact of the proposed changes to the elevations and layout is discussed in Appendix 7; however, the Applicant does not believe them to be material given the industrial context of the plant, as was recognised during the appeal hearing in respect of the 2010 Permission.

5. OPERATIONS APPROVAL

5.1 Deliveries

5.1.1 As under the 2010 Permission, the Applicant intends to maintain flexibility as to where best to source wood products for energy conversion by the plant and how best to transport them to site, be it by road, rail or sea.

5.1.2 In so far as the Applicant arranges such transportation by road, the maximum number of annual deliveries will remain unchanged from the 2010 Permission, being 4015 per year (or 77 per week).

5.1.3 The comments of the Director of Environmental and Economic Regeneration to the Planning Committee relating to the 2010 Permission, dated 21 May 2009, are recalled:

> *"Since the trip generation in the scale of things for Barry Docks is minimal, and the highway network is already designed to take such large HGVs, the Highways Authority has no objection to the proposals."*

5.1.4 Wood fuel will normally be delivered to the site during a 12 hour day between 07:00 and 19:00 hours on weekdays (in contrast to the 2010 Permission which also allowed for deliveries on Saturdays and Sundays). Weekend deliveries would be restricted to emergency deliveries only (where required to avoid an interruption in the operation). This is considered a material improvement relative to the 2010 Permission.

5.2 Site Access

5.2.1 Access to the plant itself will remain unchanged from the 2010 Permission being from David Davies Road immediately to the south of the development and across the land leased by the applicant and covered by the 2010 Permission. Access and traffic movements to and from the plant can be seen in Appendix 5 (Traffic Movement Plan).

5.2.2 Provision for parking, including disabled parking and provision for bicycle/motorbikes remain as provided for under the 2010 Permission.

5.3 Emissions

5.3.1 In order to operate, the Project will require an Environmental Permit and this will only be given provided the plant continues to be WID/IED compliant, as was the case for the 2010 Permission. This includes a need to agree the proposed abatement technology to minimise air emissions before the site can operate and confirmation that the Best Available Technology (BAT) has been employed. Therefore, local air quality will not be adversely affected by the proposals. In this respect there is therefore no material change from the 2010 Permission.

5.3.2 The Applicant has commissioned an Air Emissions Assessment for the present application (see attached at Appendix 2). This exercise was pre-scoped in conjunction with the local officers of Natural Resources Wales with the agreed objective of determining the increase in stack height necessary to achieve a negligible change of environmental impact relative to the previously improved scheme.

6. NOISE ASSESSMENT

6.1 Best practicable means will be used during site operations to ensure that noise does not exceed agreed levels. The Applicant has selected a leading national contractor to carry out such work and it is well versed in compliance procedures in this regard. The enclosure of the operating process within structures and/or buildings will ensure that noise levels are not significant.

6.2 The plant has been designed to meet the BAT (Best Available Technology) requirements of the Environmental Permitting regime which include noise emissions controls. The steam turbine produces the most noise, but is enclosed within an acoustically attenuated compound within the Turbine, Welfare & Ancillaries building.

6.3 The plant as a whole is designed to be fully compliant with applicable dBA requirements. The roller shutter doors will generally be closed except to receive deliveries in order to provide additional acoustic attenuation.

6.4 The Applicant has consulted extensively with the main contractor selected for the project to ensure that the plant is fully compliant and obligations have been imposed on them to ensure that the design, procurement, construction and operation comply with all applicable law and guidelines. These include the following:

- Welsh Statutory Instrument 2006 No. 2629 (W.225)
- The Environmental Noise (Wales) Regulations 2006 (as amended by the Environmental Noise (Wales) (Amendment) Regulations 2009 (SI2009/47)).
- Welsh Statutory Instrument 2007 No. 3519 (W.311) The Environmental Noise (identification of Noise Sources) (Wales) Regulations 2007
- Technical Advice Note (Wales) 11, 'Noise',
- Welsh Statutory Instrument 2006 No. 2629 (W.225) The Environmental Noise (Wales) Regulations 2006. See also Welsh Statutory Instrument 2007 No. 3519 (W.311)
- The Environmental Noise (identification of Noise Sources) (Wales) Regulations 2007
- http://wales.gov.uk/docs/desh/publications/140731planning-policy-wales-edition-7-en.pdf
- http://wales.gov.uk/docs/desh/publications/131217noise-action-plan-for-wales-en.pdf

6.5 The contractors are carrying out their work taking these points into account and also the findings from the Noise Study for the Project which has been updated by PCML for the purposes of the present application (refer to Appendix 9).

6.6 Verification that noise levels continue to comply with such legislation and guidelines will take place during commissioning of the plant in accordance with a background noise measurement scheme to be agreed with the Local Authority prior to commencement of construction. In this regard the Applicant has no objection to inclusion of the following condition from the 2010 Permission:

"16) No development shall take place until details of a scheme to measure background noise levels in the following locations has been submitted to and approved in writing by the local planning authority: i. 57 Dock View Road ii. Cory Way iii. Estrella House, Cei Dafydd The survey shall be implemented as approved and the results submitted to and agreed in writing with the local planning authority before the development hereby permitted is brought into use. At no time shall noise attributing from the site exceed the agreed background noise levels."

7. TRANSPORT ASSESSMENT

7.1 For the purposes of the present application, the Applicant has retained UKPDP to prepare an update of the Project's Traffic Assessment and this is included at Appendix 10.

7.2 The principal findings of the updated Traffic Assessment are that:

7.2.1 traffic levels in the area of Barry Docks and the approach/feeder roads are not materially different from the levels referred to in 2009 and referenced in the Transport Assessment for the 2010 Permission;

7.2.2 annual traffic movements for the Project do not exceed those contemplated in the original Traffic Assessment.

7.3 A suite of planning conditions covering highway and access matters was imposed under the 2010 Permission. This includes amongst other matters:

"15) No development shall take place until there has been submitted to and approved in writing by the local planning authority details of secure parking on site for bicycles. The bicycle parking spaces shall remain available for their designated use for as long as the development hereby permitted remains in existence.

19) The measures incorporated into the Green Travel Plan accompanying the application shall be implemented when the development is brought into use and thereafter monitored and reviewed in accordance with the Green Travel Plan.

20) Deliveries to the site, and all other external operations, shall not take place outside the hours of 07.00 to 19.00 Monday to Saturday and 08.00 to 16.00 on Sundays, Bank and Public Holidays."

If permission is granted for the current proposals it is therefore assumed and accepted that these conditions would be imposed.

8. ENVIRONMENTAL CONTROL

8.1 **Air emissions:** As the site exceeds the 3MW threshold it requires an Environmental Permit from Natural Resources Wales and the gasification process must meet strict limits on air emissions set out in the Environmental Permit. This includes a need to agree the proposed abatement technology to minimise air emissions before the site can operate and confirmation that the Best Available Technology (BAT) has been employed. Therefore, local air quality will not be adversely affected by the proposals.

8.2 **Dust:** There is no material change to the proposed environmental control measures. Site operations will be carried out to minimise the creation of dust. A mains water supply will be available and all external water pipes are to be lagged to prevent frost damage. Water sprays and/or bowsers will be used as necessary to reduce dust levels in external circulation areas. Staff will monitor dust emissions continuously whilst the plant is in operation and will take appropriate action when required. Regular visual inspection will take place with recording of results in a diary.

8.3 **Mud / detritus:** Measures will be put in place to prevent any deposit of debris on the highway. There will be regular visual inspection and a road sweeper will be deployed as necessary, including during the construction phase

8.4 **Odour:** No material will be accepted which is likely to cause an odour nuisance. The biomass plant itself does not produce odorous emissions.

8.5 **Pests / vermin:** The proposed fuel type will ensure that the site will not suffer from a vermin infestation. However, the site will be inspected daily given the presence of nearby water bodies and a pest control contractor will be hired if necessary.

9. ENVIRONMENTAL IMPACT

The Project's environmental and geology studies, prepared by Groundsure, continue to be applicable to the Project and are reproduced at Appendix 11 and Appendix 12). The main conclusions were that:

9.1 the site is partially vacant and occupied by a container storage and refurbishment operation;

9.2 the site is within an area affected by flooding and is within the indicative Zone 3 floodplain;

9.3 the site is not located over a groundwater Source Protection Zone (SPZ). In any event the site will not impact upon groundwater as any potentially polluting outputs will be discharged to foul sewer in accordance with the requirements of a trade effluent consent or removed from the site by vehicle;

9.4 an ecological survey is not required [although one was carried out] as the site is previously developed and consists only of a compacted hard standing surface which is not vegetated. There are no sites with sensitive flora or fauna having a statutory or local nature conservation designation within 500 metres of the site. The nearest designated site is the SSSI named "Hayes Point to Bendrick Rock" at a distance of 616 metres from the site (SSSI 510 administered by the Countryside Council for Wales) and covering an area of 29 hectares;

9.5 the site has no clearly defined planning history but historical maps indicate that the following uses have occurred on the site:

1879: Undeveloped estuarine land and river bed of Cadoxton River

1898 to 1900: Land reclaimed to rail head, coal tip/loading dock

1920 to 1973: Railway engineering works/rail head

1989: Builder's yard

These conclusions remain unchanged for the purposes of the present application.

10. FLOOD RISK ASSESSMENT

10.1 The Project's Flood Risk Assessment from RSK Group continues to be applicable to the Project and is reproduced at Appendix 13. The conclusions were that:

10.1.1 the proposed development is located within Zone B but outside Zone C2, as identified by Technical Advice Note 15: Development & Flood Risk (July 2004) (TAN15). Zone B can be defined as "*areas known to have been flooded in the past evidenced by sedimentary deposits*" and Zone C2 as "*areas of floodplain without significant flood defence infrastructure*". Any development within Zone C would require a full Flood Consequences Assessment (FCA);

10.1.2 the proposed development is also located outside the Environment Agency Wales (EAW) extreme (0.1%) Flood Map, which would normally underlay Zone B;

A topographic survey of the site (prepared on a precautionary basis, in line with EAW recommendations) produced three cross sections from north of the site through to the direction of the dock to confirm that the development is above the adjacent extreme flood outline and corresponding Zone C2;

Following submission of this information to the EAW, the Development Control Officer of the EAW confirmed that the site was not at risk of flooding and the cross sections were acceptable.

Policy changes within the EAW at the time meant that applications in Zone B were taken on a risk-based approach and since the zone is outside the Q1000 Flood Map, there is no perceived risk to the development.

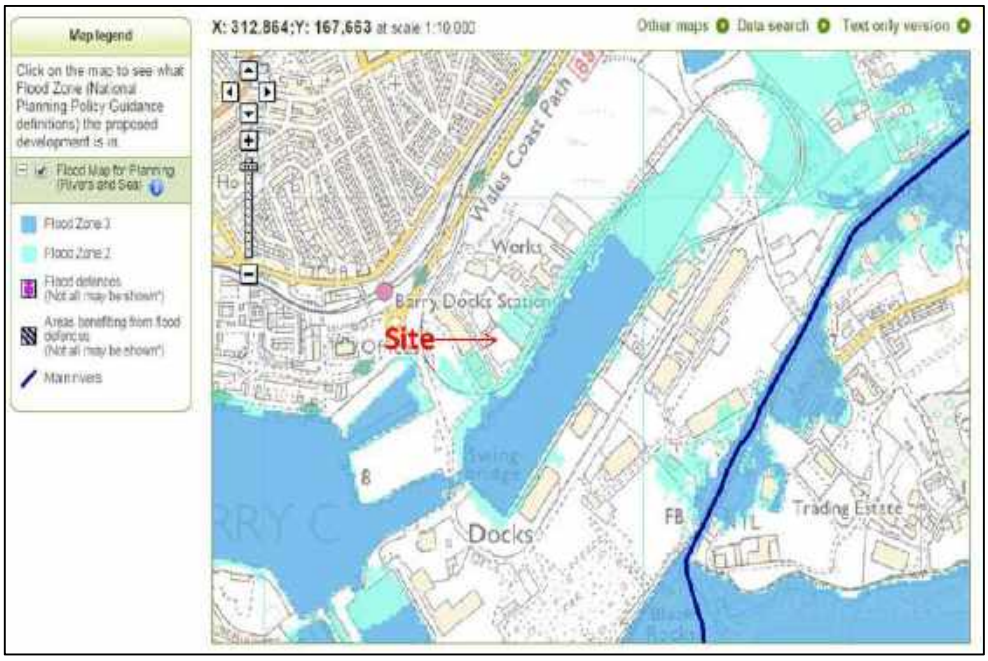
10.2 The current proposals relate to the same area as the previously approved site. A comparison of the approved site layout plan with the current proposals confirms that there would be a very limited change in the overall footprint of the buildings within the site. As with the currently approved scheme sustainable drainage techniques (SUDs) would be used to attenuate site run-off to agreed rates.

10.3 Conditions requiring details of surface drainage measures (Conditions 10 and 11) were imposed on the 2010 Permission:

> *"10) The building hereby permitted shall not be occupied until surface water drainage works have been implemented in accordance with details that have been submitted to and approved in writing by the local planning authority. Before these details are submitted an assessment shall be carried out of the potential for disposing of surface water by means of a sustainable drainage system and the results of the assessment provided to the local planning authority. Where a sustainable drainage scheme is to be provided, the submitted details shall: i) provide information about the design storm period and intensity, the method employed to delay and control the surface water discharged from the site and the measures taken to prevent pollution of the receiving groundwater and/or surface waters; ii) include a timetable for its implementation; and provide a management and maintenance plan for the lifetime of the development which shall include the arrangements for adoption by any public authority or statutory undertaker and any other arrangements to secure the operation of the scheme throughout its lifetime.*
>
> *11) The building hereby permitted shall not be occupied until the sustainable drainage scheme for the site has been completed in accordance with the submitted details. The sustainable drainage scheme shall be managed and maintained thereafter in accordance with the agreed management and maintenance plan."*

Imposing in respect of the present application would cover the points made in the Flood Risk Assessment.

10.4 At the date of the present application the Environment Agency's Flood Map for the Project site is as shown below. The Project is not located in either Zone 2 or Zone 3 (under the present regime for categorising flood risk):



11. ECOLOGY

11.1 **Ecology – the application site:** The site comprises a roughly rectangular parcel of derelict land on the north side of Barry Docks bordered by Woodham Road and David Davies Road to the west and south, and areas of derelict land to the east and north (containing hard standing and rough grassland with scattered scrub). There are no designated wildlife sites within 500m of the site.

A strip of grassland and a railway line separate the site from the wet dock to the south and there is a row of commercial buildings to the west. The wider landscape features a mixture of industrial and post-industrial habitats including an expanse of colonising grassland on derelict land to the west.

An ecological survey of the site was conducted in December 2008 by RSK Carter Ecological Limited in support of the original planning application. This was updated for the purposes of the present application in November 2014 by PCML (refer to Appendix 8) following informal discussions with the Planning Authority's ecology officer. The current proposals do not affect any land outside the development footprint of the previous permission.

Photographs of the site were taken in December 2008 for the 2009 Ecological Report (Plates 1 and 2). More recent photographs taken in July 2014 (Plates 3 and 4) are also shown below for comparison. There is little change except that summer growth of vegetation can be seen in the 2014 pictures.

Plate 1. Looking from west to east across the site.

Plate 2. Open semi-ruderal grassland colonising the southern corner of the site.

Site Photos from 2009 Ecological Report

Plate 3: looking west across the central area of the site

Plate 4: looking north from the south area of the site

Site Photos from July 2014

11.2 **Landscaping Scheme:** A landscaping scheme (a reserved matter under the present application) will be required and this will have the potential to increase the quality of new habitats overall within the site. The technical changes proposed under the present application will not have an impact on the conclusions from the Ecology Report.

11.3 **Ecology – air emissions:** The Applicant has commissioned an updated Air Emissions Assessment (including a dispersion analysis) to take account of the proposed change in technology and feedstock consumption levels described in this application and this is attached as Appendix 3.

Natural Resources Wales is the appropriate technical body for determining air quality with respect to plant regulated under the Waste Incineration Directive/Industrial Emissions Directive. Air emissions from the site will therefore be tightly regulated under this agency's environmental permitting system. Comprehensive emission abatement will be imposed as part of this process. The stack height will be increased by up to 43m to ensure

adequate dispersion of emissions for the proposed facility is compliant with the Waste Incineration Directive/Industrial Emissions Directive.

12. CONCLUSIONS

12.1 The benefits from the Project remain essentially the same as for the 2010 Permission, namely:

12.1.1 **Renewable electricity**: Utilising established biomass energy technology in order to contribute to national targets for renewable energy provision. The facility will supply electricity via the electricity grid which is equivalent to the annual energy usage of approximately 23,600 households (increased from the previous level of 22,000) based on an average UK household consumption of 3,300kWh.

12.1.2 **Climate change**: Contributing to creating "A resilient and sustainable economy for Wales that is able to develop whilst reducing its use of natural resources and reducing its contribution to climate change." (Planning Policy Wales Edition 7, Para 4.1.5).

12.1.3 **Reduced landfilling**: Reducing the need to dispose of wood to landfill, thereby conserving finite landfill capacity and facilitating a more sustainable end use for waste wood as a renewable energy resource in accordance with the waste hierarchy (Planning Policy Statement 10). There remains an over-supply of waste wood in the UK and consequently, large volumes of wood continue to be directed to landfill or other less sustainable uses.

12.1.4 **Assisting wood recycling**: Providing an additional outlet for recycled wood to enhance the commercial viability of wood recycling, both locally and nationally.

12.1.5 **Traffic**: Achieving a reduction in the number of vehicle movements carrying waste wood to local and national landfill sites.

12.1.6 **Economy/employment**: Utilising a vacant industrial plot in order to provide skilled employment opportunities and investment in local goods and services. Up to 12 full-time equivalent jobs based at the site plus 2 office staff will be provided.

12.2 To summarise the Applicant's views in respect of the present application compared to the 2010 Permission:

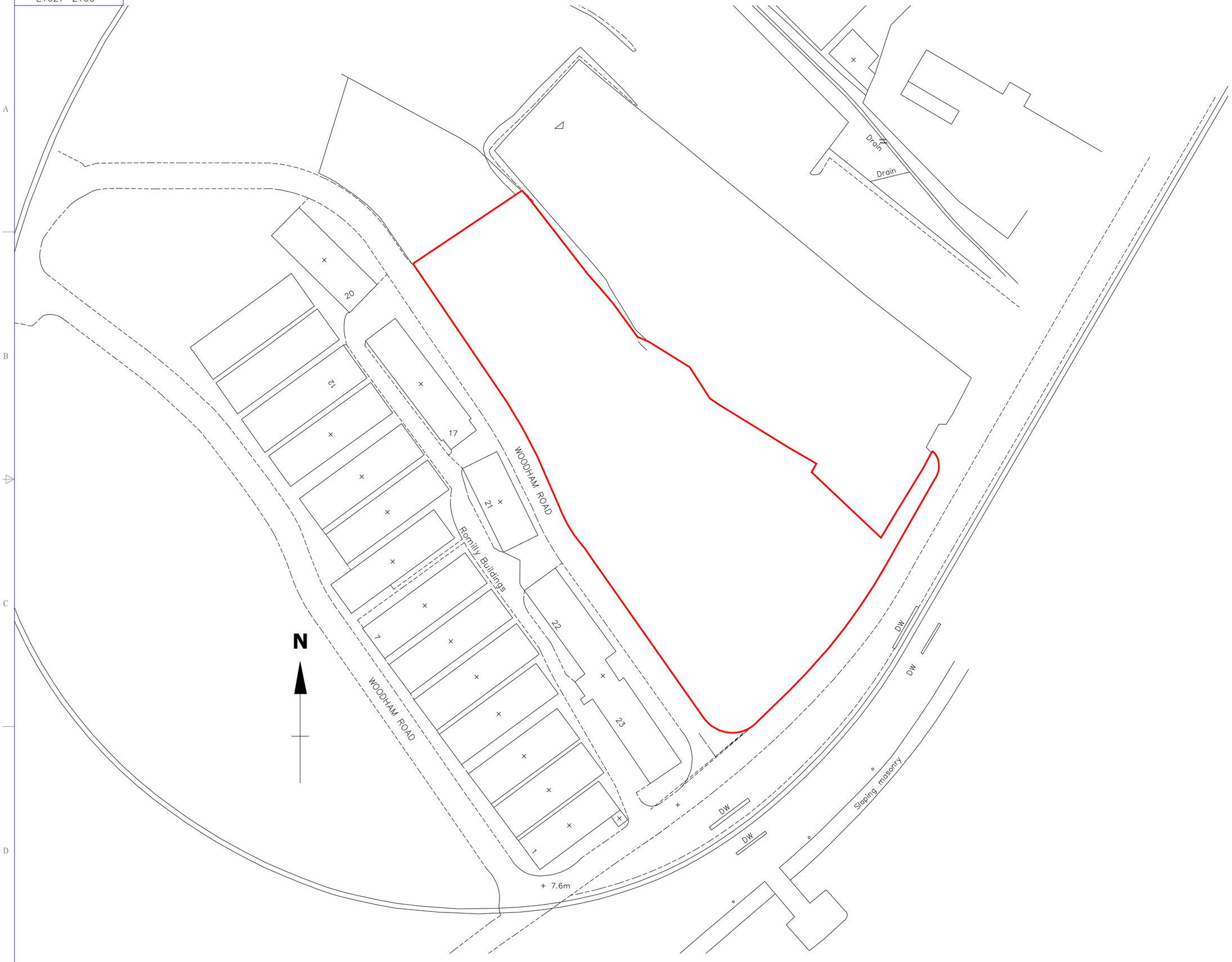
Change	**Comment**
Technology	• Gasification by pyrolysis and fluidised-bed are inter-changeable as advanced conversion technologies
Plant Output	• 11% "invisible" increase = increased contribution to renewable policy targets
Layout	• 7.5% Reduction in total Building Footprint
Building Height	• Non-material (2m) average increase in height
Stack Height	• Below that approved for the neighbouring plant sited at Atlantic Way
Emissions	• WID/IED compliant
Traffic	• No change in weekly traffic movements by road

12.3 The Applicant therefore requests the Planning Authority to approve the present application under the TCPA 1990.

Appendix 1(1): 2015 Application - Location Plan (2014)

Drawing number
E1627–2100

ORIGINAL SHEET SIZE A1 - DO NOT SCALE



General notes

Legend

APPLICATION SITE BOUNDARY

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1:500

Rev	Revision details	Drn	Chk	App	Date
C					
B					
A	REDRAWN ISSUED FOR DISCUSSION	JW	MVG	KC	20.03.15

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Customer
SUNRISE RENEWABLES

Project
BARRY ACT

Title
LOCATION PLAN

Drawn by:	JW	20.03.15	Checked:	KC	20.03.15	Scale 1:500
Designed:	KDAM	20.03.15	Approved:	KC	20.03.15	

Drawing number
E1627–2100

Rev.
A

DISCUSSION/COMMENT

Appendix 1(2): 2015 Application - Air Emissions Assessment (2014)

Stack Height Assessment for a 10 MWe Wood Gasification Facility at Barry Docks, Barry Island

for

Sunrise Renewables (Barry)

Project Number 6270

11/09/2014

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Issue P1

Document Number: R6270-PM-0001

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Revision History

Issue	Reviewed by (date)	Approved by (date)	Comments
P01	MJW (26/09/2014)	MJW (26/09/2014)	Draft for Comment

Executive Summary

Sunrise Renewables is proposing to install a wood gasification, energy recovery facility (ERF) at Barry Docks, Barry Island, and has asked Stopford Energy and Environment to undertake a stack height assessment to support their planning application. The results for the stack height assessment will be used in subsequent dispersion modelling to support Sunrise Renewables' application to the Environment Agency for an environmental permit under the Environmental Permitting Regulations 2013.

A stack height assessment for Sunrise Renewables' proposed ERF has been completed following industry guidelines that have been prepared by the Environment Agency, EPUK and IAQM and following consultation with the Vale of Glamorgan Council.

The stack height assessment was conducted for a range of stack heights between 30 m and 55 m using ADMS, an industry standard dispersion modelling tool. Worst case emission limits for NO_2, as defined in the Industrial Emissions Directive (IED), were assumed and five years of meteorological data were used to take account of inter-annual variability in local weather conditions. It was assumed that for long term impacts, all NO_x emissions have been converted to NO_2, whereas for short term emissions, a worst case assumption was made whereby 50% of NO_x emissions have been converted to NO_2.

The impact of Sunrise Renewables' proposed ERF was assessed across a 2 km x 2 km modelling domain from which the highest modelled ground level pollutant concentrations have been extracted and used to calculate a stack height for which the impact of emissions can be described as 'NEGLIGIBLE'.

It is the conclusion of this assessment that a stack height of 43 m will be sufficient for adequate dilution and dispersion of residual emissions from the plant and it is shown that there would only be very minor appreciable benefits gained by increasing the stack height further.

1 Introduction

1.1 Background

Sunrise Renewables is proposing to install a wood gasification, energy recovery facility (ERF) at Barry Docks, Barry Island. The facility will use approximately 86,000 tonnes of recycled/recovered wood, with the syngas generated during the gasification process combusted in a boiler to generate steam. The combustion process will be fully compliant with the operational requirements specified in the Industrial Emissions Directive (IED). The operation of the ERF will be regulated by the Environment Agency in line with the requirements of the Environmental Permitting Regulations (England and Wales) 2013.

The steam generated from the combustion process will drive a turbine capable of generating approximately 10 MW_e of renewable power, sufficient to supply ca. 18,000 homes. Flue gas exiting the boiler is discharged to air via a stack, the height of which has been determined using industry best practice guidance.

This report describes the data used in the stack height assessment, the methodology applied, the assumptions that have been made and the results generated by the model. The assessment was based upon the process data supplied by Outotech (technology provider), site drawings provided by Sunrise Renewables and worst-case emission limits as defined in the IED. The site drawings are provided in Appendix I.

The objective of the assessment was to determine the stack height required to ensure that emissions to air from Sunrise Renewables' ERF do not significantly impact local air quality.

1.2 Site location

Sunrise Renewables' ERF is to be located on land at Barry Docks in Barry Island. The area is predominantly industrial with the site located at grid reference: 312617,167667. The proposed facility will be bounded to the north by a railway and residential areas; and to the east, south and west by industrial land and docks. The nearest residential properties are directly northwest of the facility across the railway and Ffordd Y Mileniwm and are approximately 300 metres from the site perimeter. The nearest school to the ERF is approximately 1 km to the north. There are several

ecological receptors in proximity to the ERF, including sites with Ramsar and SSSI status. Figure 1 shows the location of the ERF relative to its surroundings.

Figure 1 Location of the Energy Recovery Facility shown by the red cross

2 Stack Height Assessment

Even with the comprehensive flue gas treatment that will be in place at the proposed ERF, there will still be residual emissions which need to be discharged via an elevated stack to ensure resulting pollutant concentrations are acceptable by the time they reach ground level at sensitive receptor locations. Additionally, the stack should also be sufficiently high to ensure that the exhaust flow at stack exit is not within the aerodynamic influence of nearby buildings because downwash effects from buildings can cause poor dispersion with pollutants grounding quicker than anticipated, resulting in elevated ground level concentrations.

2.1 Stack Height Assessment Methodology

The stack height assessment was undertaken using an iterative approach for a range of stack heights between 30 m and 55 m. Impacts were quantified using ADMS, which is a "new generation" Gaussian plume dispersion model that was developed and licensed by Cambridge Environmental Research Consultants (CERC). ADMS is an industry standard tool for assessing the impact of emissions to air on human health and the wider environment. The aim of this stack height assessment was two-fold:

- To establish the minimum stack height above which emissions will have negligible impacts on local receptors; and
- To establish the height above which there will be minimal additional environmental benefit associated with the cost of increasing the stack height further.

This in accordance with Annex K of EA H1 guidance which states the following:

*"The principal consideration in whether an option represents an acceptable environmental risk is that **the costs of its implementation should not be disproportionate to the environmental benefit it realises**. Thus it may not be reasonable to implement an option of significantly higher cost which achieves only a marginal environmental improvement compared with another option."*

Two criteria have been used as a basis for determining a suitable minimum stack height as follows:

- Achieving negligible impacts on short and long term NO_2 concentrations; and
- Ensuring no ground level exceedances of short- and long-term air quality limit values for NO_2 anywhere within the modelling domain.

2.1.1 Process and Emission Data

Process data for the ERF was supplied by Outotech, Sunrise Renewables' technology supplier and is summarised in Table 1. In the absence of actual emissions data "worst case" IED emission limits have been assumed (Table 2). IED emission rates have been corrected from IED reference conditions to actual conditions of 9.7% O_2, 15% water, and 411K. In order to calculate emission rates, the IED limit values have been converted to the equivalent concentration at flue gas conditions and then multiplied by the stack exhaust volumetric flow rate at flue gas conditions (Table 3).

Table 1 Emission source parameters for Sunrise Renewables' energy recovery facility

Parameter	Value
Stack Diameter (m)	1.23
Efflux Temperature (K)	411
Efflux Velocity ($m.s^{-1}$)	29.6
Volumetric Flow Rate ($m^3.s^{-1}$)	35.2
Location (X,Y)	312660,167664

Table 2 IED Emission Limits for NO_2

Pollutant	Long-Term ELVs 100% output ($mg.m^{-3}$)	Short-Term ELV 100% output ($mg.m^{-3}$)
NO_x as NO_2	200	400

Table 3 Modelled pollutant emission data (9.7% O_2, 15% water and 411K)

Pollutant	Long-Term ELVs 100% output ($g.s^{-1}$)	Short-Term ELV 100% output ($g.s^{-1}$)
NO_x as NO_2	4.49	8.98

2.1.2 Atmospheric Chemistry

Nitric oxide (NO) and NO_2 are normally measured as oxides of nitrogen (NO_x), but when comparing against health standards, NO_x is usually expressed as its individual components. The principal pathway for the oxidation of nitrogen oxide (NO) to NO_2 is via reaction with ozone. With consideration to the rate of conversion of NO_x to NO_2 and the short distance the pollutant has to travel from the stack before the maximum concentration is reached at ground level, it is unlikely that more than 30% of NO_x is converted to NO_2 at ground level. However, for the purpose of this assessment, and to provide a conservative estimation of impacts, it has been assumed that 50% of NO_x is converted to NO_2 as a short term emission, whilst it has been assumed that 100% of NO_x is converted to NO_2 as a long-term emission. This is in accordance with screening criteria contained in Horizontal Guidance Note H1 Annex (f).

2.1.3 Nearby Buildings and Structures

The proximity of structures to an emission source can adversely impact plume dispersion by entraining the emissions into the turbulent wake which may draw emissions to the surface quicker and in higher concentration than would normally occur in the absence of the structure. The dimensions of the main on-site buildings were obtained following consultation with Sunrise Renewables and their technology provider, and have been included in the model. The location of the main site buildings relative to the emission source are shown in Figure 2 and their dimensions are provided in Table 4.

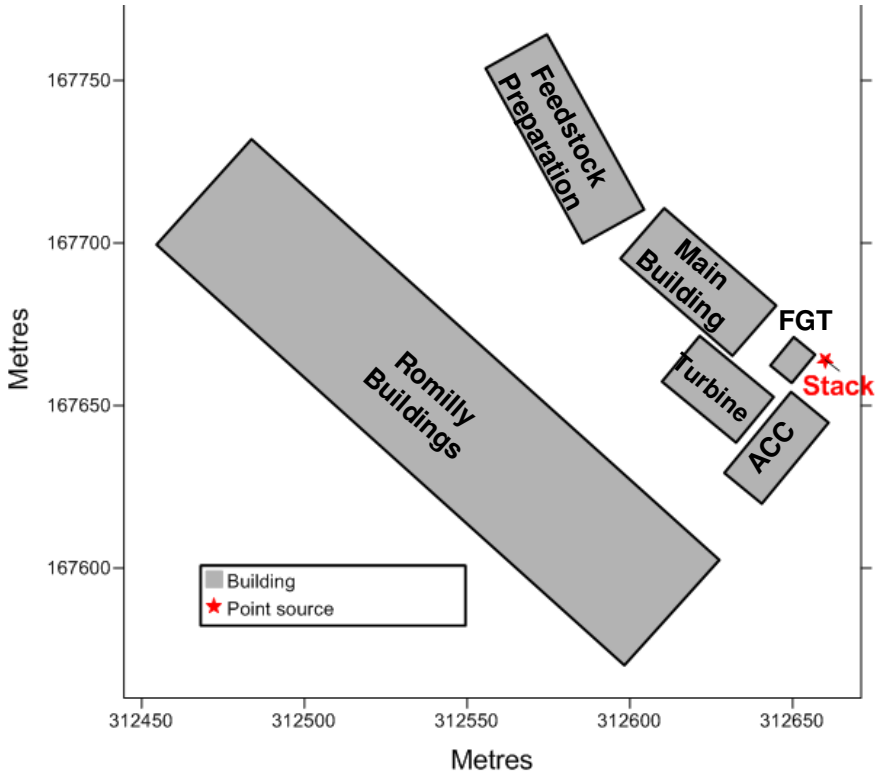

Figure 2 Location of the modelled stack relative to on-site buildings and other structures

Table 4 Modelled building data

Building	Height (m)	Length (m)	Width (m)	Angle (degrees)
Main Plant Building*	22.3	45.6	20.5	131
Feedstock Preparation	19	61.6	21.5	151
FGT	15.6	11.3	8.5	39.4
Turbine	11.3	29.5	18.2	129.5
ACC	18.2	32.3	12.9	39.4
Romilly Buildings	7.0	193.4	43.6	132
* The main plant building is considered as having the greatest affect on plume dispersion				

2.1.4 Modelling Domain

When setting up a receptor grid it is necessary to ensure that there are sufficient receptor points to allow the location and magnitude of the highest ground level pollutant concentration to be

predicted. If the receptor points are too widely spaced, the maximum process contribution may be underestimated. The stack height assessment was undertaken using 40 m grid spacing across a 2 km x 2 km modelling domain with the stack located at the centre of the grid (X,Y: 312660,167664).

2.1.5 Meteorological Data

The meteorological data used in the assessment was obtained from Cardiff Airport which is approximately 5.7 km west of the proposed site. Local Air Quality Management Technical Guidance (LAQM.TG(09); Defra, 2009) states that met stations within 30 km of a study site are suitable for dispersion modelling assessments.

Five years of meteorological data recorded 2009-2013 were provided by Atmospheric Dispersion Modelling Limited, an established distributor of met data within the UK. The five years of met data are summarised in Figure 3 which shows prevailing winds in the area are from the west and east. The wind roses for individual years are provided in Appendix II.

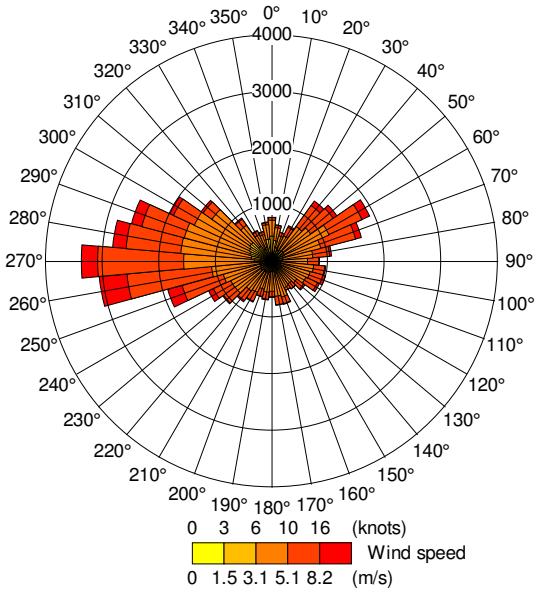

Figure 3 Cardiff Airport wind rose (2009 - 2013)

2.1.5.1 Meteorological Sensitivity Analysis

In order to ensure a worst-case scenario, a sensitivity analysis was conducted to identify which year over the period 2009-2013 produced the highest modelled ground level NO_2 concentration across

the modelling domain. The maximum modelled short- and long-term NO_2 concentrations for each assessment year are presented in Table 5. These are based upon an assumed stack height of 40 m.

Table 5 Maximum Modelled NO_2 Ground Level Process Contribution for Each Assessment Year

	Maximum Modelled NO_2 Concentration ($\mu g.m^{-3}$)				
Year	**2009**	**2010**	**2011**	**2012**	**2013**
NO_2 Annual Mean	4.46	3.36	4.37	**5.07**	3.79
Maximum short-term NO_2	39.91	39.18	**39.92**	39.76	39.62

As shown in Table 5, 2012 meteorological data resulted in the highest long-term NO_2 concentration, whilst 2011 meteorological data resulted in the highest short-term NO_2 concentrations. Therefore all long-term pollutant emissions have been modelled using the 2012 meteorological data set and all short-term modelling was completed using the 2011 meteorological dataset to ensure a worst-case scenario.

2.1.6 Terrain Data

Local terrain can affect wind flow patterns, and hence affect pollutant dispersion. The effects of terrain are not normally considered significant where the gradient is less than 1:10. There is a steep incline approximately 20-30 m northwest of the proposed site boundary with a gradient exceeding 10% and resulting in a change in elevation of 26 m. In order to consider the effects of surrounding terrain, an additional 'complex terrain' file was created using data supplied by Ordnance Survey (OS) which was converted for use in the stack height assessment using ADMS' Terrain Converter facility.

2.1.7 Surface Roughness

The roughness of a surface can significantly affect the movement of air across it. Similarly, pollutant dispersion may be influenced by variations in land surface types that affect turbulence in the lower troposphere. Given that a significant fraction of the modelling domain is open coastal water, it was necessary to generate a surface roughness file to take account of the changes in surface roughness across the modelling domain. ADMS default surface roughness values of 0.5 m were applied to land-based grid points and a default value of 0.0001 m was used for coastal waters.

2.1.8 Background Air Quality

Background pollutant mapping is undertaken on a 1km by 1km grid square basis by NETCEN on behalf of DEFRA. Table 6 also shows the mapped background NO_2 concentration for the grid square containing the proposed plant for the years 2011 - 2014. The forecast annual mean NO_2 concentration for 2014 is 12.66 $\mu g.m^{-3}$.

The Vale of Glamorgan undertakes monitoring of local air quality and has provided background NO_2 concentrations recorded at Cwm Parc, Barry. Cwm Parc is the closest background monitoring site to the proposed ERF at approximately 2.4 km to the northwest of the facility. The most recent complete monitoring annual dataset recorded at Cwm Parc is for 2013 (Table 6).

Table 6 Annual mean NO_2 concentrations

	Background NO_2 ($\mu g.m^{-3}$)			
Source	2011	2012	2013	2014
Cwm Parc	16.42	16.75	16.62	---
DEFRA background maps	13.27	13.07	12.86	12.66

The data collected from the monitoring site at Cwm Parc was used as the background concentration for subsequent calculations as it is higher than that predicted by the DEFRA background maps and provides a conservative estimate of impacts. For the purposes of this assessment, and in accordance with LAQM.TG(09), the short-term background NO_2 concentration has been assumed to be twice the mapped annual mean background.

2.2 Stack Height Assessment Results

Potential impacts have been quantified using matrix tables contained within Environmental Protection UK and Institute of Air Quality Management guidance documents (Table 7 and Table 8). The significance of an impact is defined using an impact descriptor scale which ranges from "Negligible" to "Substantial Adverse". The guidance states that an imperceptible change in air quality would be described as Negligible. The impact descriptor is a function of the change in ambient air quality relative to the annual mean NO_2 air quality limit value (AQLV) of 40 $\mu g.m^{-3}$ (process emissions only - Table 7) and the impact this has on the predicted environmental concentration (PEC - Table 8).

Table 7 Generic Basis of Definition of Impact Magnitude for Changes in Ambient Pollutant Concentrations as Percentage of Objective/Limit Value/Environmental Assessment Level.

Magnitude of Change	Annual Mean
Large	Increase/decrease >10%
Medium	Increase/decrease 5 - 10%
Small	Increase/decrease 1 - 5%
Imperceptible	Increase/decrease <1%

Table 8 Air Quality Impact Descriptors for increases to the Annual Mean Nitrogen Dioxide Concentration at a Receptor

Absolute Concentration in Relation to Objective/Limit Value	Change in Concentration		
	Small	Medium	Large
Increase in NO_2 with Scheme			
Above Objective/Limit Value With Scheme (>40 µg.m^{-3})	Slight Adverse	Moderate Adverse	Substantial Adverse
Just Below Objective/Limit Value With Scheme (36-40 µg.m^{-3})	Slight Adverse	Moderate Adverse	Moderate Adverse
Below Objective/Limit Value With Scheme (30-36 µg.m^{-3})	Negligible	Slight Adverse	Slight Adverse
Well Below Objective/Limit Value With Scheme (<30 µg.m^{-3})	Negligible	Negligible	Slight Adverse

Table 9 contains the maximum predicted annual mean NO_2 concentrations at ground level locations surrounding the proposed plant based upon stacks heights assessed between 30 m and 55 m.

Table 9 Maximum Modelled Annual Mean NO_2 Concentrations and Predicted Impacts

Stack Height (m)	Max predicted Increase in Ground Level Annual Mean NO_2 (µg/m3)	Magnitude of Change	PEC (Process Contribution + Background) with Scheme	Impact on Annual Mean NO_2 Concentration
30	15.88	Large	32.48	Slight Adverse
32	13.33	Large	29.93	Slight Adverse
34	9.73	Large	26.33	Slight Adverse
36	7.82	Large	24.42	Slight Adverse
38	6.19	Large	22.79	Slight Adverse
40	5.07	Large	21.67	Slight Adverse
42	4.24	Large	20.84	Slight Adverse
42.5	4.06	Large	20.66	Slight Adverse
43	3.93	Medium	20.53	Negligible
44	3.93	Medium	19.89	Negligible
46	2.81	Medium	19.41	Negligible
48	2.44	Medium	19.04	Negligible

Stack Height (m)	Max predicted Increase in Ground Level Annual Mean NO_2 (µg/m3)	Magnitude of Change	PEC (Process Contribution + Background) with Scheme	Impact on Annual Mean NO_2 Concentration
50	2.16	Medium	18.76	Negligible
55	1.60	Small	18.20	Negligible

As shown in Table 9, a minimum stack height of 43 m will have "Negligible" impacts on resulting ground level annual mean NO_2 concentrations. Table 9 also shows that the largest benefits in terms of increased dilution and dispersion of emissions occurs as the stack is increased in height to 43 m and that there are no appreciable additional benefits gained above this height.

Table 10 contains the maximum modelled 1-hour mean NO_2 concentrations, based upon stack heights between 30 m and 55 m. In accordance with EA H1 guidance, if the short term process contribution is <10% of the AQLV, impacts can be screened as insignificant.

Table 10 Modelled maximum 1-Hour Mean NO_2 Concentrations and the percentage contribution it makes to the short-term Air Quality Limit Value of 200 µg.m^{-3}

Stack Height (m)	Predicted Process contribution to 1-Hour Mean NO2 Concentrations (99.8th percentile) (micrograms/m3)	Total Concentration (Process Contribution + Background)	Percentage Contribution of Process to AQLV
30	32.30	65.5	16.2
32	28.68	61.9	14.3
34	23.50	56.7	11.7
36	19.97	53.2	10.0
38	16.51	49.7	8.3
40	13.17	46.4	6.6
42	10.79	44.0	5.4
44	9.52	42.7	4.8
46	8.42	41.6	4.2
48	7.50	40.7	3.7
50	6.78	40.0	3.4
55	6.24	39.4	3.1

As indicated by Table 10, for stack heights greater than 36 m the maximum modelled process contribution to the 1-hour mean AQLV for NO_2 is <10% at ground level locations. Therefore, a stack height of 43 m or more will not have a significant impact on the 1-hour mean NO_2 AQLV in accordance with EA H1 guidance.

3 Stack Height Assessment Conclusion

With consideration to the above, the proposed stack height of 43 m has been assessed to be sufficient for adequate dilution and dispersion of residual emissions from the plant and it is shown that there would only be very minor appreciable benefits gained by increasing the stack height further. It should be noted that this assessment is conservative, as worst case assumptions have been made for background pollutant concentrations, NO_x to NO_2 conversion rates, emission rates and worst case meteorology from 5 years of data. Given that the assessment was based on site specific dispersion modelling, confidence in a stack height of 43 m not having a significant impact on local air quality is high.

Appendices

Appendix I. Site drawings

Drawing number
E1627–2002

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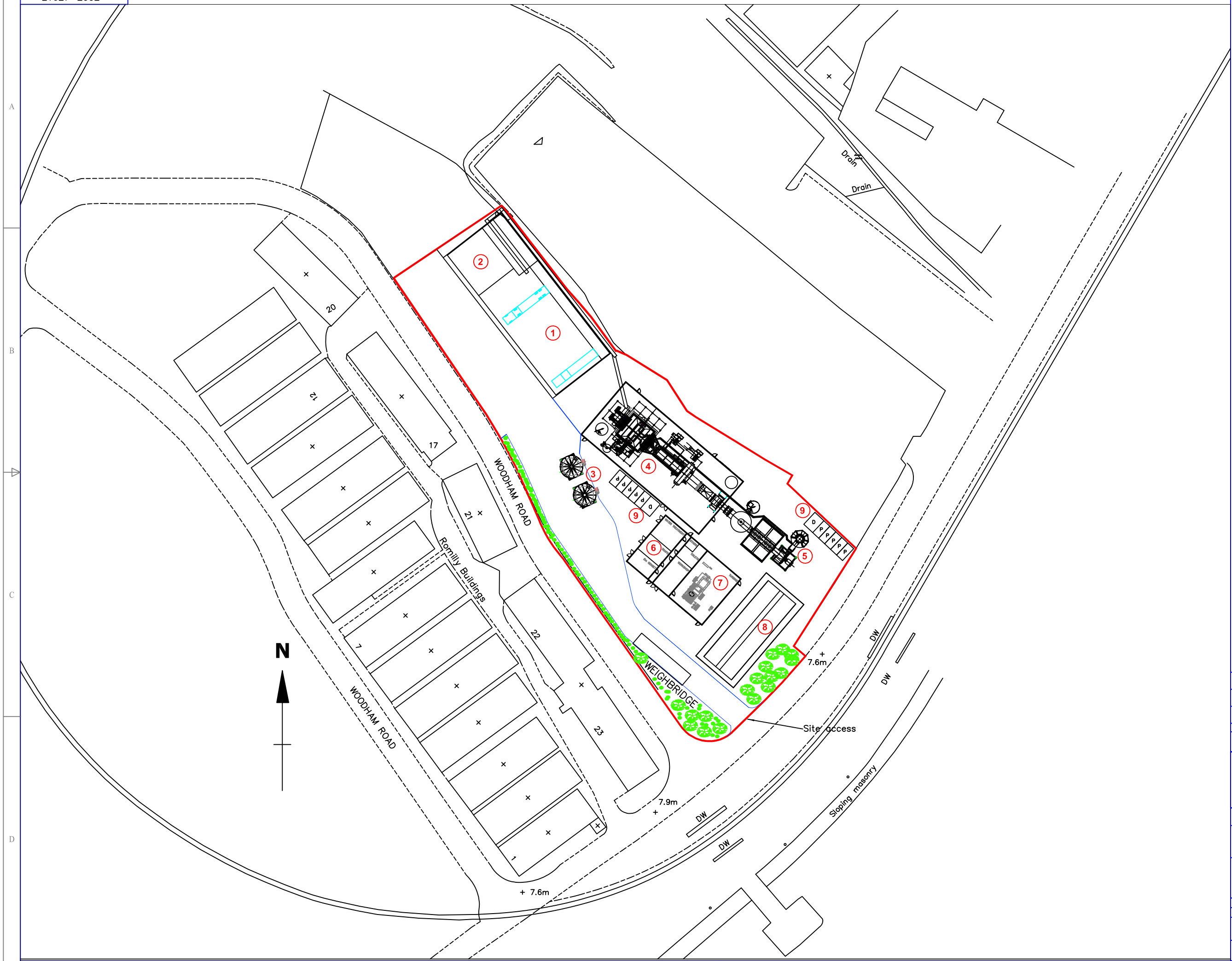

General notes

Legend

1. FEEDSTOCK RECEPTION
2. FEEDSTOCK FEED SYSTEM
3. ASH SILOS
4. MAIN PROCESS BUILDING
5. FGT AND EXHAUST (EXTERNAL)
6. WELFARE & ANCILLIARIES
7. TURBINE
8. ACC
9. CAR PARKING

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Rev	Revision details	Drn	Chk	App	Date
C					
B					
A	ISSUED FOR DISCUSSION	JW	KD	KC	30.07.14

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Project: BARRY ACT

Title: SITE LAYOUT

Drawn by:	JW	30.07.14	Checked:	KC	30.07.14	Scale 1:500
Designed:	KD	29.07.14	Approved:	KC	30.07.14	

Drawing number: E1627–2002 Rev. A

DISCUSSION/COMMENT

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Wind Roses

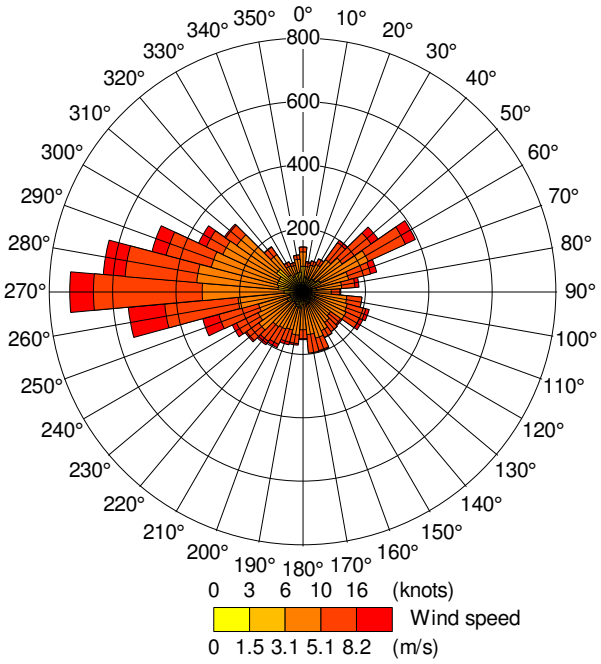

Figure 4: Cardiff Airport Wind Rose - 2009

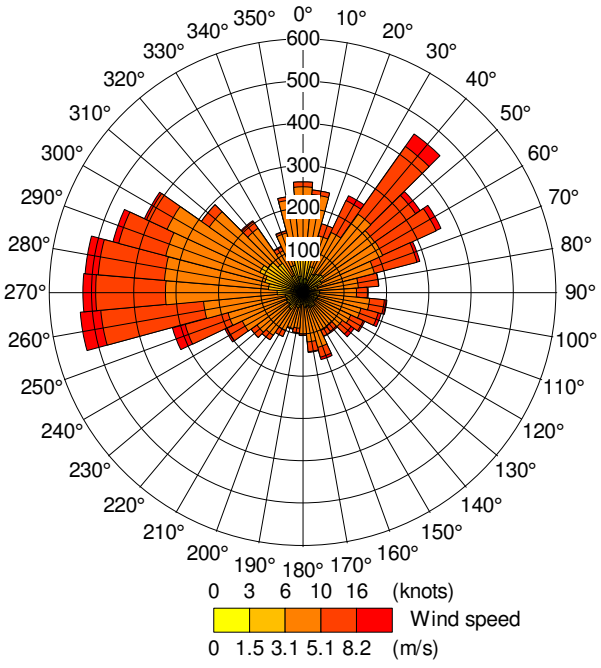

Figure 5: Cardiff Airport Wind Rose - 2010

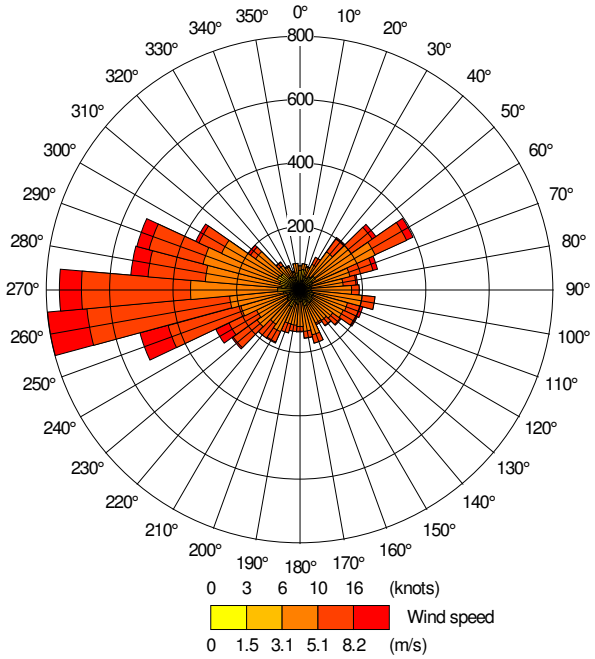

Figure 6: Cardiff Airport Wind Rose - 2011

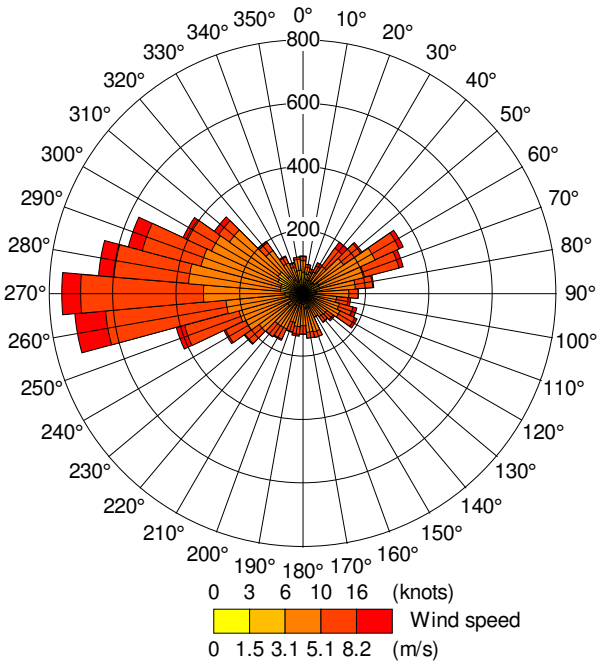

Figure 7: Cardiff Airport Wind Rose - 2012

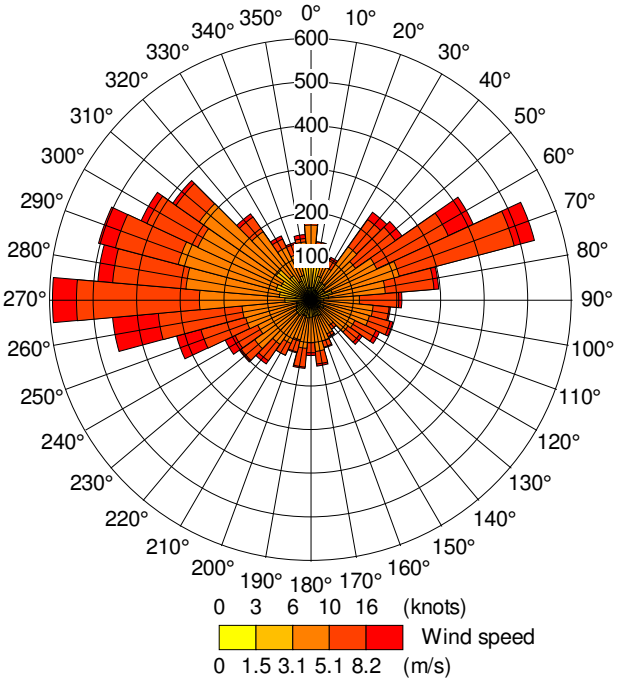

Figure 8: Cardiff Airport Wind Rose - 2013

Stack Height Assessment for a 10 MWe Wood Gasification Facility at Barry Docks, Barry Island
for
Sunrise Renewables (Barry)
11/09/2014
Project 6270
Document Number: R6270-PM-0001

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Proposed Wood Gasification Facility
Woodham Road, Barry

Air Quality Assessment

Proposed Wood Gasification Facility
Woodham Road, Barry

Air Quality Assessment

Revision	Date	Notes	Author	Checked	Approved
1	05/05/15		SD	ND	Dr N Davey
2	12/06/15		SD	ND	Dr N Davey

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CONTENTS **PAGE**

1 INTRODUCTION

1.1 Entran Limited was commissioned by Power Consulting Midlands Ltd to undertake an air quality assessment in support of the environmental permit application for a proposed wood gasification facility at Woodham Road, Barry. The Site location and layout are identified in Figures 1 and 2 respectively.

1.2 The proposed plant would consist of a gas boiler utilising synthetic gas (Syngas) generated from the gasification of waste wood. The high-pressure steam generated by the boiler would be directed to a steam turbine and used to generate electricity for supply to the National Grid. The facility is designed to operate 24 hours a day, 365 days per year. Emissions to air would be via a single 43m stack.

1.3 Emissions to air from the facility will be governed by the Industrial Emissions Directive (IED)[1], which requires adherence to emission limits for the following pollutants:

- nitrogen oxides (NOx as NO_2)
- carbon monoxide
- total dust (as PM_{10} and $PM_{2.5}$)
- gaseous and vaporous organic substances, expressed as total organic carbon;
- sulphur dioxide;
- hydrogen chloride;
- hydrogen fluoride;
- twelve trace metals; and
- dioxins and furans.

1.4 The assessment has also considered emissions of Polycyclic aromatic hydrocarbons (PAH, as Benzo[a]pyrene) and polychlorinated biphenyls (PCBs).

1.5 Predicted ground level concentrations of these pollutants are compared with relevant air quality standards and guidelines for the protection of health and sensitive habitat sites.

1.6 A glossary of common air quality terminology is provided in **Appendix A.**

[1] The Industrial Emissions Directive, 2010/75/EU

Figure 1: Site Location Plan

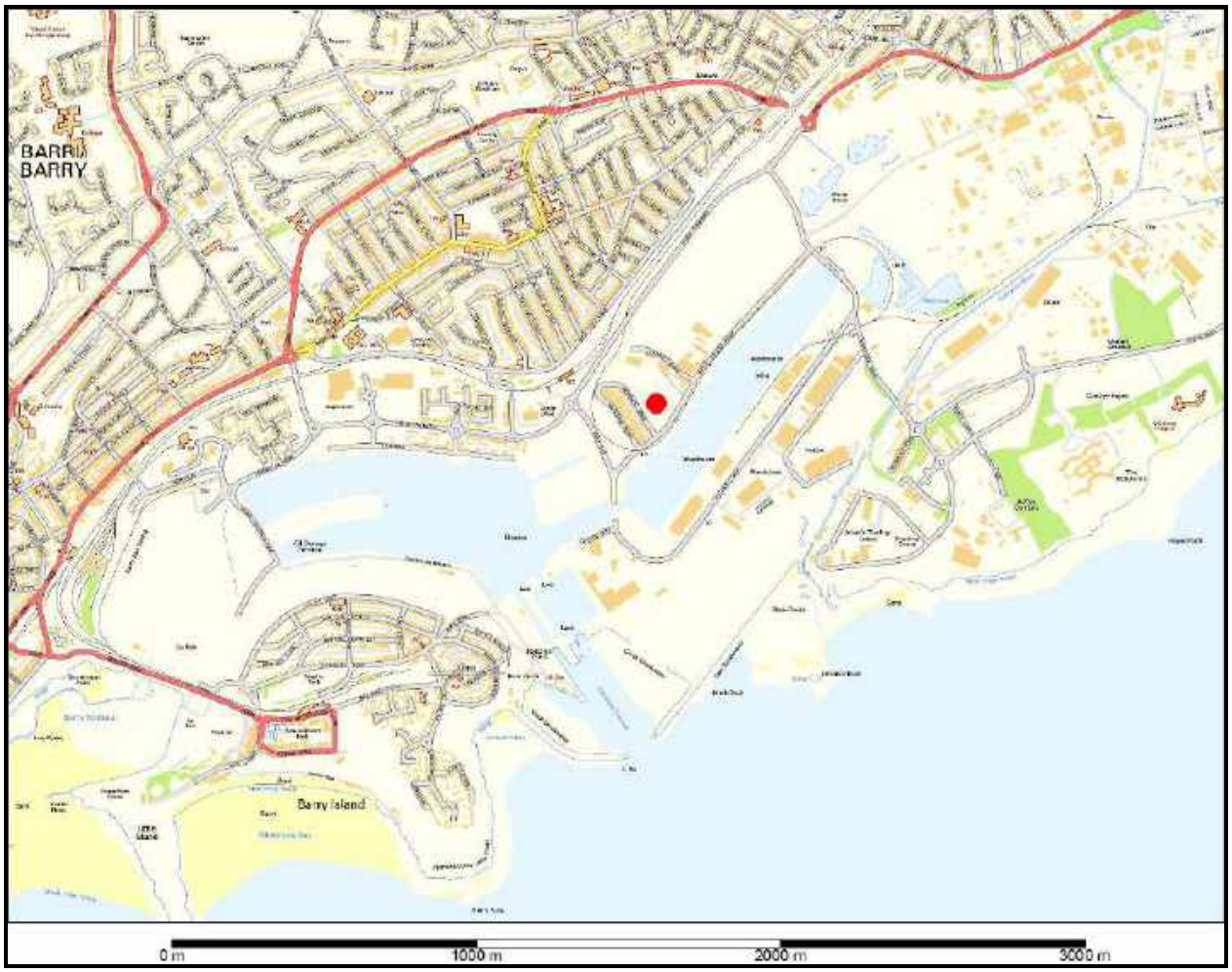
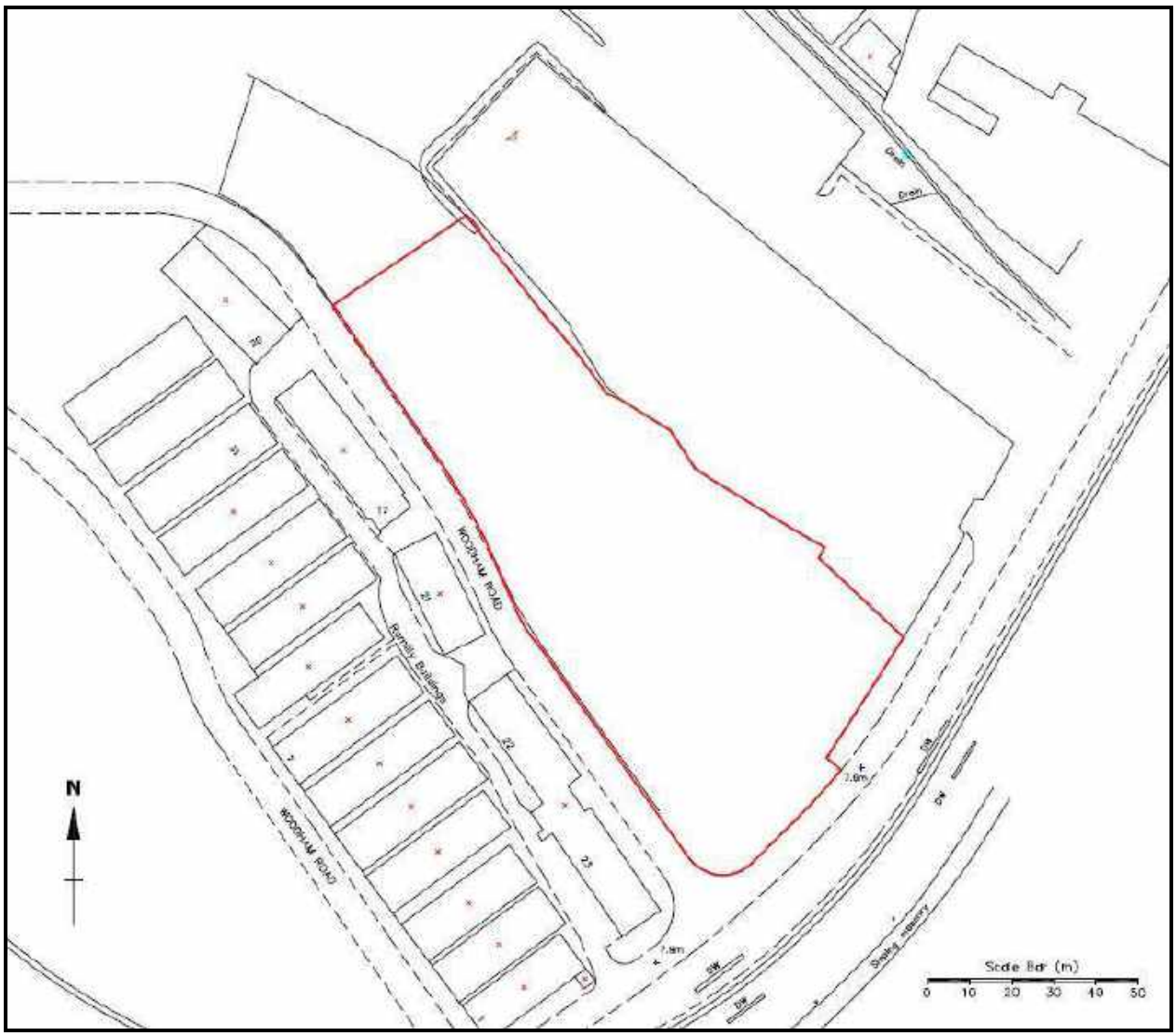


Figure 2: Site Layout



2 LEGISLATION AND POLICY

The European Directive on Ambient Air and Cleaner Air for Europe

2.1 European Directive 2008/50/EC of the European Parliament and of the Council of 21st May 2008, sets legally-binding Europe-wide limit values for the protection of public health and sensitive habitats. The Directive streamlines the European Union's air quality legislation by replacing four of the five existing Air Quality Directives within a single, integrated instrument.

2.2 The pollutants included are sulphur dioxide (SO_2), nitrogen dioxide (NO_2), particulate matter of less than 10 micrometres (μm) in aerodynamic diameter (PM_{10}), particulate matter of less than 2.5 μm in aerodynamic diameter lead ($PM_{2.5}$), lead (Pb), carbon monoxide (CO), benzene (C_6H_6), ozone (O_3), polycyclic aromatic hydrocarbons (PAHs), cadmium (Cd), arsenic (As), nickel (Ni) and mercury (Hg).

Air Quality Strategy for England, Scotland, Wales & Northern Ireland

2.3 The Government's policy on air quality within the UK is set out in the Air Quality Strategy (AQS) for England, Scotland, Wales and Northern Ireland (AQS) published in July 2007[2], pursuant to the requirements of Part IV of the Environment Act 1995. The AQS sets out a framework for reducing hazards to health from air pollution and ensuring that international commitments are met in the UK. The AQS is designed to be an evolving process that is monitored and regularly reviewed.

2.4 The AQS sets standards and objectives for ten main air pollutants to protect health, vegetation and ecosystems.

2.5 The air quality standards are long-term benchmarks for ambient pollutant concentrations which represent negligible or zero risk to health, based on medical and scientific evidence reviewed by the Expert Panel on Air Quality Standards (EPAQS) and the World Health Organisation (WHO). These are general concentration limits, above which sensitive members of the public (e.g. children, the elderly and the unwell) might experience adverse health effects.

2.6 The air quality objectives (AQO) are medium-term policy based targets set by the Government which take into account economic efficiency, practicability, technical feasibility and

[2] Department for Environment, Food and Rural Affairs (2007), The Air Quality Strategy for England, Scotland, Wales and Northern Ireland

timescale. Some objectives are equal to the EPAQS recommended standards or WHO guideline limits, whereas others involve a margin of tolerance, i.e. a limited number of permitted exceedences of the standard over a given period.

2.7 For some pollutants there is both a long-term (annual mean) standard and a short-term standard. In the case of NO_2, the short-term standard is for a 1-hour averaging period, whereas for PM_{10} it is for a 24-hour averaging period. These periods reflect the varying impacts on health of differing exposures to pollutants (e.g. temporary exposure on the pavement adjacent to a busy road, compared with the exposure of residential properties adjacent to a road).

Air Quality (England) Regulations

2.8 Many of the objectives in the AQS were made statutory in England with the *Air Quality (England) Regulations 2000* [3] and the *Air Quality (England) (Amendment) Regulations 2002* (the Regulations)[4] for the purpose of Local Air Quality Management (LAQM).

2.9 The Air Quality Standards Regulations 2010[5] have adopted into UK law the limit values required by EU Directive 2008/50/EC and came into force on the 10th June 2010. These regulations prescribe the 'relevant period' (referred to in Part I2V of the Environment Act 1995) that local authorities must consider in their review of the future quality of air within their area. The regulations also set out the air quality objectives to be achieved by the end of the 'relevant period'.

2.10 Ozone is not included in the Regulations as, due to its trans-boundary nature, mitigation measures must be implemented at a national level rather than at a local authority level.

2.11 The EALs, air quality standards and objectives for the pollutants considered in the assessment are presented in **Appendix B.**

Local Air Quality Management (LAQM)

2.12 Part IV of the Environment Act 1995 also requires local authorities to periodically Review and Assess the quality of air within their administrative area. The Reviews have to consider the present and future air quality and whether any air quality objectives prescribed in Regulations are being achieved or are likely to be achieved in the future.

[3] The Air Quality (England) Regulations 2000 - Statutory Instrument 2000 No.928

[4] The Air Quality (England) (Amendment) Regulations 2002 - Statutory Instrument 2002 No.3043

[5] The Air Quality Standards Regulations 2010 – Statutory Instrument 2010 No. 1001

2.13 Where any of the prescribed air quality objectives are not likely to be achieved the authority concerned must designate that part an Air Quality Management Area (AQMA).

2.14 For each AQMA, the local authority has a duty to draw up an Air Quality Action Plan (AQAP) setting out the measures the authority intends to introduce to deliver improvements in local air quality in pursuit of the air quality objectives. Local authorities are not statutorily obliged to meet the objectives, but they must show that they are working towards them.

2.15 The Department of Environment, Food and Rural Affairs (DEFRA) has published technical guidance for use by local authorities in their Review and Assessment work[6]. This guidance, referred to in this chapter as LAQM.TG(09), has been used where appropriate in the assessment.

Industrial Emissions Directive

2.16 The Industrial Emissions Directive (2010/75/EU) came into force on the 6th January 2011, replacing the seven existing Directives, including the Waste Incineration Directive (WID) and Large Combustion Plant Directive (LDPD), implemented through the Environmental Permitting Regulations (EPR). The aim of the new Directive is to simplify the existing legislation and reduce administrative costs, whilst maintaining a high level of protection for the environment and human health. Permits will still be issued under EPR; however existing and new sites will be required to comply with the requirements of the IED, which places greater emphasis on new plant best available technology (BAT).

2.17 The IED has been transposed into UK law via the Environmental Permitting (England and Wales) (Amendment) Regulations 2013 (SI 2013 No, 390), which came into force on 27 February 2013.

2.18 The design and operation of all new waste incinerations facilities must ensure compliance with emission limit values (ELVs) set out in the IED; these ELVs are summarised in Table 1.

[6] Department for Environment, Food and Rural Affairs (DEFRA), (2009): Part IV The Environment Act 1995 Local Air Quality Management Review and Assessment Technical Guidance LAQM.TG(09).

Table 1: IED Limit Values (mg/Nm^3)

Pollutant	ELV (referenced to 11% O_2)
Daily Average	
Total dust	10
Total organic carbon (TOC)	10
Hydrogen chloride (HCl)	10
Hydrogen fluoride (HF)	1
Sulphur dioxide (SO_2)	50
Oxides of nitrogen (NOx)	200
Carbon monoxide (CO)	50
Half-hourly Average	
Total dust	30
Total organic carbon (TOC)	20
Hydrogen chloride (HCl)	60
Hydrogen fluoride (HF)	4
Sulphur dioxide (SO_2)	200
Oxides of nitrogen (NOx)	400
Carbon monoxide (CO)	100
Average over a sample period between 30 minutes and 8-hours	
Group 1 metals (a)	0.05
Group 2 metals (b)	0.05
Group 3 metals (c)	0.5
Average over a sample period between 6-hours and 8-hours	
Dioxins and furans (d)	1×10^{-7}

(a) Cadmium (Cd) and Thallium (Tl)

(b) Mercury (Hg)

(c) Antimony (Sb), arsenic (As), lead (Pb), chromium (Cr), cobalt (Co), copper (Cu), manganese (Mn), nickel (Ni) and vanadium (V)

(d) I-TEQ

3 METHODOLOGY

Scope of Assessment

3.1 The scope of the assessment has been determined in the following way:

- consultation with the Rebecca Athay Environmental Health Officer at Vale of Glamorgan Council (VGC);
- review of air quality data for the area surrounding the Site, including data from the Defra Air Quality Information Resource (UK-AIR);
- desk study to confirm the location of nearby areas that may be sensitive to changes in local air quality; and
- review of emission parameters for the proposed development and dispersion modelling using the Breeze AERMOD 7 dispersion model) to predict ground-level concentrations of pollutants at sensitive human and habitat receptor locations.

Dispersion Modelling Parameters

Normal Operational Emission Scenario

3.2 IED emission limits have been assumed for the purposes of the modelling assessment and the plant is assumed to be operating at full load, continually throughout the year. Stack emission parameters (flow rate, temperature etc.) have been provided by the technology supplier (Outotech). In the absence of actual emissions data 'worst-case' IED emission limits have been assumed.

3.3 For the Group III trace metal predictions, it has been assumed in accordance with the Environment Agency's (EA) metals guidance[7], that each of the metals is emitted at the maximum IED ELV (0.5 mg/Nm^3) as a worst case. The same approach has also been adopted for the Group I and II metals.

3.4 Where the screening criteria set out in the guidance are not met, an emission concentration equal to half of the ELV for Group I metals and 1/9th of the ELV for Group III metals has been assumed. If the screening criteria are still not met, typical emission concentrations for energy from waste plants have been used, as specified in the guidance.

[7] Guidance to Applicants on Impact Assessment for Group 3 Metals Stack Releases – V.3 September 2012

3.5 It is anticipated that the process will not result in significant emissions of polychlorinated biphenyls (PCBs) or polycyclic aromatic hydrocarbons (PAHs), however emission limits of 0.005 mg/Nm^3 and 0.001 mg/Nm^3 respectively, have been assumed based on measurements at European waste incineration facilities as specified in the IPPC Reference Document on BAT for Waste Incineration[8].

3.6 The input parameters for the boiler exhaust stack are identified in **Appendix C**.

3.7 The proposed stack height of 43m is based on the stack height screening assessment that has been undertaken for the proposed facility[9].

Local Meteorological Data

3.8 The dispersion modelling has been carried out using five years (2009-2013) of hourly sequential meteorological data in order to take account of inter-annual variability and reduce the effect of any atypical conditions. Data from the meteorological station at Cardiff Airport (approximately 6 km west of the proposed facility) have been used for the assessment, which is the most representative data currently available for the area.

3.9 Wind roses for each year of meteorological data are presented in **Appendix D**.

Topography

3.10 The presence of elevated terrain can significantly affect the dispersion of pollutants by increasing turbulence and reducing the distance between the plume centre line and the ground level.

3.11 Information relating to the topography of the area surrounding the proposed facility has been used in the dispersion modelling to assess the impact of terrain features on the dispersion of emissions.

Building Downwash / Entrainment

3.12 The presence of buildings close to emission sources can significantly affect the dispersion of pollutants by leading to a phenomenon called downwash. This occurs when a

[8] European Commission, Integrated Pollution prevention and Control Reference Document on the Best Available Techniques for Waste Incineration, August 2006.

[9] Stack Height Assessment for a 10 MWe Wood Gasification Facility at Barry Docks, Barry Island, Stopford Energy and Environment Document Number: R6270-PM-0001, M. Kett and M. Wilkinson, September 2014.

building distorts the wind flow, creating zones of increased turbulence. Increased turbulence causes the plume to come to ground earlier than otherwise would be the case and result in higher ground level concentrations closer to the stack.

3.13 Downwash effects are only significant where building heights are greater than 30 to 40% of the emission release height. The downwash structures also need to be sufficiently close for their influence to be significant.

3.14 All potential downwash structures have been included in the model.

Nitric Oxide to NO_2 Conversion

3.15 Oxides of nitrogen (NOx) emitted to atmosphere as a result of combustion will consist largely of nitric oxide (NO), a relatively innocuous substance. Once released into the atmosphere, NO is oxidised to NO_2. The proportion of NO converted to NO_2 depends on a number of factors including wind speed, distance from the source, solar irradiation and the availability of oxidants, such as ozone (O_3).

3.16 A conversion ratio of 70% NOx:NO_2 has been assumed for comparison of predicted concentrations with the long-term objectives for NO_2. A conversion ratio of 35% has been utilised for the assessment of short-term impacts, as recommended by Environment Agency guidance[10].

Sensitive Human Health Receptors

3.17 LAQM.TG(09) describes in detail typical locations where consideration should be given to pollutants defined in the Regulations. Generally, the guidance suggests that all locations 'where members of the public are regularly present' should be considered. At such locations, members of the public will be exposed to pollution over the time that they are present, and the most suitable averaging period of the pollutant needs to be used for assessment purposes.

3.18 For instance, on a footpath, where exposure will be transient (for the duration of passage along that path) comparison with short-term standard (i.e. 15-minute mean or 1-hour mean) may be relevant. In a school, or adjacent to a private dwelling, however; where exposure may be for longer periods, comparison with long-term (such as 24-hour mean or annual mean) standards may be most appropriate. In general terms, concentrations associated with long-term standards

[10] Environment Agency AQMAU, Conversion Rates for NOx and NO_2

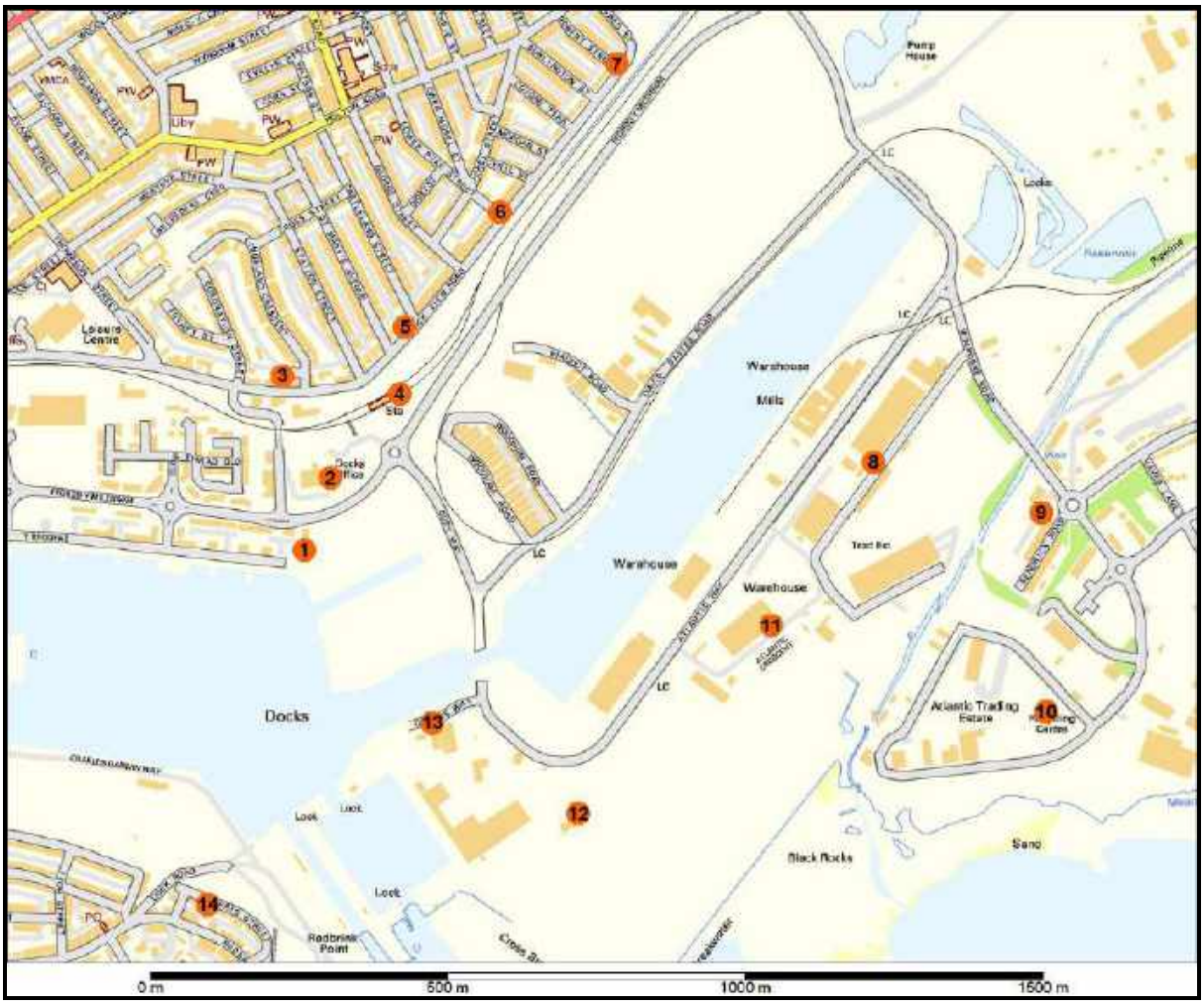
are lower than short-term standards owing to the chronic health effects associated with exposure to low level pollution for longer periods of time.

3.19 The location of the discrete sensitive receptors selected for the assessment is presented in Table 3 and Figure 3.

Table 3: Location of Sensitive Receptors

ID	Receptor	Type	Easting	Northing
1	Vistamar House	Residential	312199	167543
2	Docks Office	Industrial	312243	167664
3	Phillipa Freeth Court	Residential	312162	167836
4	Barry Dock Station	Station	312359	167806
5	54 Dock View Road	Residential	312368	167918
6	89 Dock View Road	Residential	312528	168111
7	131 Dock View Road	Residential	312724	168359
8	Wimbourne Buildings	Industrial	313155	167691
9	Bendrick Road	Residential	313437	167606
10	Public Recycling Facility	Recycling Facility	313445	167271
11	Atlantic Crescent	Industrial	312983	167416
12	Port Office	Industrial	312659	167100
13	Queens Way	Industrial	312414	167253
14	Dyfrig Street	Residential	312037	166947

Figure 3: Sensitive Receptor Locations



3.20 Pollutant concentrations have been predicted at both discrete receptor locations and over a 3 km by 4 km Cartesian grid of 50 m resolution.

3.21 The maximum predicted ground level concentrations are compared with the relevant air quality standards and guidelines for the protection of health.

Habitat Assessment

3.22 The Environment Agency's H1 guidance[11] states that the impact of emissions to air on vegetation and ecosystems should be assessed for the following habitat sites within 10 km of the source:

[11] Environment Agency (August 2010), Horizontal Guidance Note H1, Annex (f) Air Emissions, Version 2.2.

- Special Areas of Conservation (SACs) and candidate SACs (cSACs) designated under the EC Habitats Directive[12];
- Special Protection Areas (SPAs) and potential SPAs designated under the EC Birds Directive[13]; and
- Ramsar Sites designated under the Convention on Wetlands of International Importance[14].

3.23 Within 2 km of the source:

- Sites of Special Scientific Interest (SSSI) established by the 1981 Wildlife and Countryside Act;
- National Nature Reserves (NNR);
- Local Nature Reserves (LNR);
- local wildlife sites (LWS), county wildlife sites (CWS) and potential wildlife sites (PWS);
- Sites of Importance for Nature Conservation (SINC) and
- ancient woodland.

3.24 Habitat receptor designations and locations relevant to the assessment are presented in Table 4. There are two SSSI's within 2 km of the proposed facility (Hayes Point to Bendrick Rock SSSI and Barry Island SSSI) however these sites have been designated for geological interest only and have therefore not been included in the assessment.

[12] Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora.

[13] Council Directive 79/409/EEC on the conservation of wild birds

[14] Ramsar (1971), The Convention of Wetlands of International Importance especially as Waterfowl Habitat

Table 4: Location of Sensitive Habitat Receptors

ID	Receptor	Approximate Location of Nearest Boundary to Boiler Stack
H1	Cadoxton River SINC	690 m east
H2	Cadoxton Wetlands SINC	780 m northeast
H3	Fields at Merthyr Dyfan SINC	1.9 km northwest
H4	Friars Point SINC	1.98 km southwest
H5	Gladstone Road Pond SINC	1.2 km west-northwest
H6	Nells Point East SINC	1.1 km south-southwest
H7	North of North Road SINC	1.98 km northeast
H8	Cadoxton Ponds Wildlife Trust Reserve	780 m northeast
H9	Severn Estuary Ramsar	3.9 km east
H10	Severn Estuary SPA	6.2 km east
H11	Ancient Woodland (Hayes Lane)	1.1 km east

3.25 The habitat sites have been represented in the model by a discrete receptor at the nearest boundary of the designated area.

3.26 The modelled ground level pollutant concentrations are used to predict deposition rates, using typical deposition velocities. A summary of typical NO_2, SO_2 and HCl dry deposition velocities is presented in Table 5.

Table 5: Dry Deposition Velocity (m/s)

Pollutant	Grassland	Woodland
Nitrogen Dioxide (NO_2)	0.0015	0.0030
Sulphur Dioxide (SO_2)	0.012	0.024
Hydrogen Chloride (HCl)	0.025	0.06

3.27 The predicted nitrogen deposition rates assume a 100% NOx: NO_2 conversion. This represents a worst-case for the assessment since nitric oxide (NO) has a lower deposition velocity than NO_2 and consequently results in lower deposition rates.

3.28 A wet deposition rate for HCl has been calculated using a dry to wet deposition ratio, as follows:

HCl wet deposition rate = HCl dry deposition rate x wet-to-dry deposition ratio

3.29 Within a few kilometres of the source, the wet deposition rate is comparable to the dry deposition rate and with increasing distance, the wet deposition fraction becomes a smaller

fraction of the total HCl deposition. As a worst-case, the wet-to-dry deposition ratio is assumed to be 1 at all the identified habitat sites.

3.30 A background HCl deposition rate has been calculated for each of the habitat sites using the UK average annual mean concentration of 0.24 µg/m^3.

3.31 Predicted ground level concentrations and acidification/ deposition rates are compared with relevant air quality standards, critical levels and critical loads for the protection of sensitive ecosystems and vegetation (see **Appendix E**).

Significance Criteria

3.32 The Environment Agency has developed criteria for assessing the significance of an impact compared with relevant air quality standards and background air quality[11]. A process concentration (PC) is considered potentially significant if:

- The long term PC > 1% of the long-term air quality standard
- The short term PC > 10% of the short-term air quality standard

3.33 At 1% of the long term air quality standard, the impact of a development is unlikely to be significant compared with background air quality. Both the short and long term criteria are also designed to ensure that there is a substantial safety margin to protect public health and the environment.

3.34 If the screening criteria are not met, the process contribution should be considered in combination with relevant ambient background pollutant concentrations. The air quality standards are likely to be met if:

- The long term PC + background concentration < 70% of the air quality standard
- The short term PC < 20% of the 'headroom' (air quality standard – short term background concentration), where the short term background concentration is assumed to be twice the long term background concentration.

4 BASELINE CONDITIONS

Local Air Quality Management

VGC carries out frequent review and assessments of air quality within the area and produces Updating and Screening Assessments and Progress Reports in accordance with the requirements of DEFRA.

A number of locations have been identified where concentrations of NO_2 are close to the annual mean air quality objective, however to date no AQMAs have been declared.

Nitrogen Dioxide

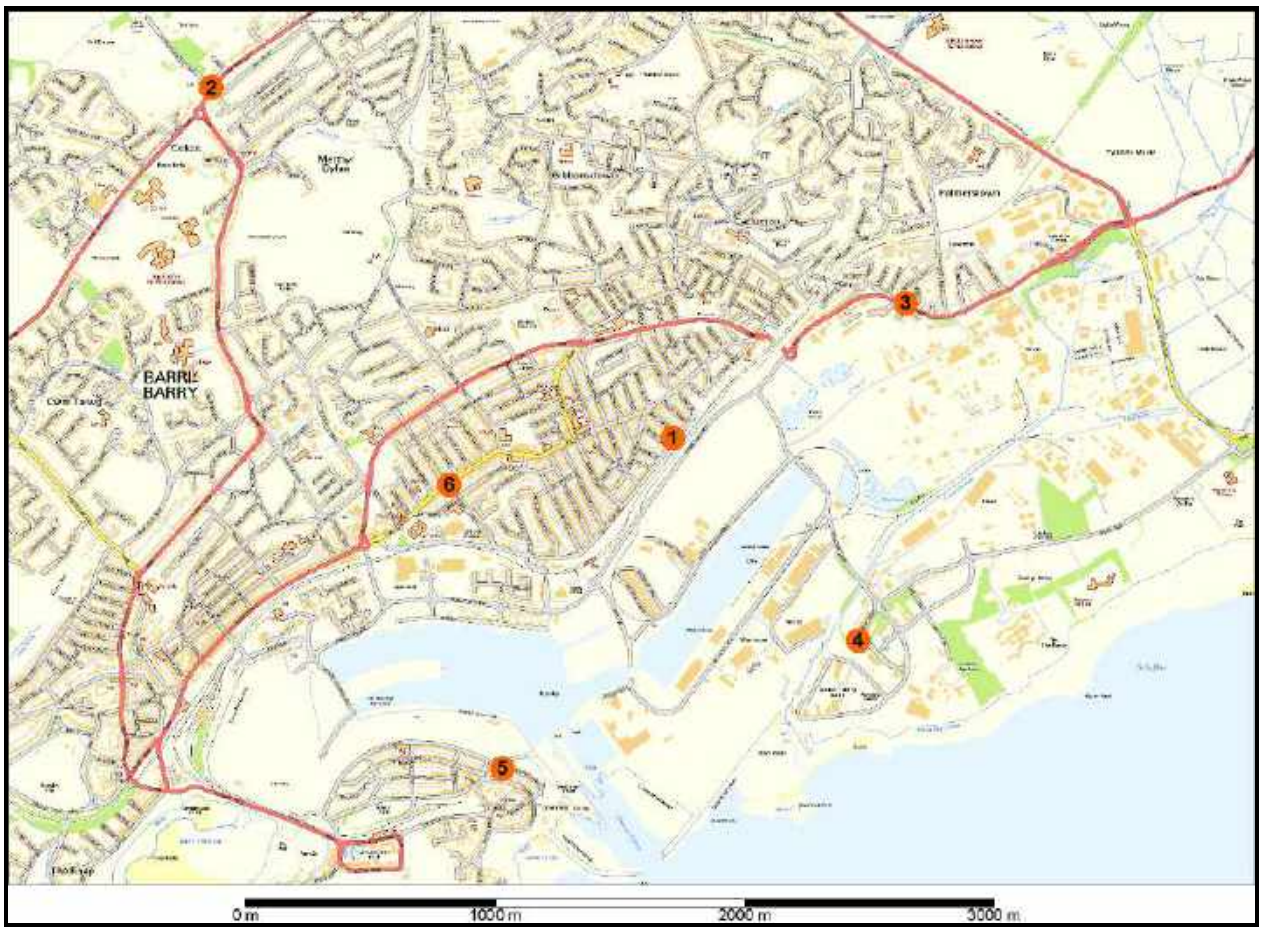
4.1 There are no automatic air quality monitoring stations measuring NO_2 in the vicinity of the proposed facility, however routine monitoring of NO_2 concentrations is undertaken by passive diffusion tube at a number of locations in Barry. A summary of bias adjusted annual mean NO_2 cconcentrations measured between 2009 and 2012 is presented in Table 6**.** The data were extracted from VGCs 2013 Air Quality Progress Report[15]. The locations of the monitoring sites is presented in Figure 4.

Table 6: NO_2 Diffusion Tube Monitoring Data (bias adjusted)

ID	Site Name	Type (a)	OS Grid Reference	2009	2010	2011	2012
1	110 Dock View Road	R	312663, 168289	17	20	19	20
2	Port Road East	R	310813, 169693	23	26	26	27
3	24 Cardiff Road	R	313597, 168829	29	30	28	32
4	Bendrick Road	UB	313407, 167477	14	17	15	15
5	Thalasa, Dyfrig Street	UB	311980, 166965	13	14	14	17
6	Holton Road	R	311768, 168101	26	27	31	37
(a) B = Background, UB = Urban Background							

[15] 2013 Air Quality Progress Report for Vale of Glamorgan, September 2013

Figure 4: Diffusion Tube Monitoring Locations



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4.2 The diffusion tube monitoring data indicate that urban background concentrations of NO_2 in Barry are less than 50% of the air quality objective of 40 µg/m^3.

4.3 The nearest monitoring site to the proposed facility is at 110 Dock View Road, where the maximum concentration measured between 2009 and 2012 was 20 µg/m^3. This concentration is assumed to provide a reasonable estimate of the baseline concentration at the Site and the sensitive receptors on Dock View Road and a worst-case baseline for receptors to the south of the proposed facility (where the urban background monitoring sites indicate that the annual mean concentrations are somewhat lower).

Carbon Monoxide, Particulate Matter, Sulphur Dioxide and Total Organic Carbon (as Benzene)

4.4 Continuous monitoring of PM_{10} concentrations has been undertaken at a roadside site on Cardiff Road in Barry since 2010. Unfortunately data capture at this location has been relatively poor; therefore the data has not been used to inform the baseline for the assessment.

4.5 In the absence of local monitoring data background concentrations of CO, PM_{10}, $PM_{2.5}$, SO_2 and benzene have been obtained from the DEFRA UK Background Air Pollution maps[16] for use in the assessment. These 1 km grid resolution maps are derived from a complex modelling exercise that takes into account emissions inventories and measurements of ambient air pollution from both automated and non-automated sites.

4.6 The latest background maps for NO_{10} and $PM_{2.5}$ were issued in June 2014 and are based on 2011 monitoring data. DEFRA guidance issued in conjunction with the new background maps[17] suggests that unusually high particulate concentrations were measured in 2011. A scaling factor of 0.91 is provided to adjust the mapped concentrations to more typical levels.

4.7 The CO, SO_2 and benzene mapped concentrations are based on 2001 monitoring data. For CO, factors are available to project the concentrations to future years[18]. The 2013 SO_2 concentrations are assumed to be 75% of the 2001 estimates, in accordance with the 2003 Local

[16] http://uk-air.defra.gov.uk/data/laqm-background-home

[17] http://laqm.defra.gov.uk/documents/Background-maps-user-guide-v1.0.pdf

[18] http://laqm.defra.gov.uk/tools-monitoring-data/year-adjustment.html

Air Quality Management Technical Guidance[19]. The 2001 mapping includes projected benzene concentrations for 2010 and these are assumed to be representative of the existing concentrations for the purposes of the assessment.

4.8 A summary of the mapped annual mean background concentrations assumed for the assessment is presented in Table 7. The concentrations were derived from contour plots of the mapped data to determine the maximum at sensitive receptor locations. These concentrations are assumed to provide a reasonable representation of the existing and future air quality in the vicinity of the proposed facility.

Table 7: Mapped Annual Mean Background Concentrations for PM_{10}, $PM_{2.5}$, CO, SO_2 and Benzene (µg/m^3)

Pollutant	Annual Mean	AQO/EAL
Particles (PM_{10})	13.5	40
Particles ($PM_{2.5}$)	9.4	25
Sulphur Dioxide (SO_2)	2.2	n/a
Carbon Monoxide (CO)	140	n/a
Benzene (C_8)	0.35	5

Hydrogen Chloride

4.9 Ambient monitoring of Hydrogen Chloride is carried out as part of the Defra Acid Gases and Aerosols Network (AGANET) at a number of locations around the UK.

4.10 The closest monitoring sites to the proposed facility are at at Narbeth in Pembrokeshire and Rosemaund in Herefordshire. Over the period 2010 to 2012, the average annual mean HCl concentration at these sites was the same as the UK average at 0.24 µg/m^3. This concentration is assumed to provide a reasonable estimate of the background concentration of HCl at the Site.

Hydrogen Fluoride

4.11 Monitoring of ambient levels of hydrogen fluoride is not currently carried out in the UK, however the Expert Panel on Air Quality Standards (EPAQS) report on halogen and hydrogen halides in ambient air[20] cites a modelling study which suggests that the typical natural

[19] Department for Environment, Food and Rural Affairs (2003): Part IV The Environment Act 1995 Local Air Quality Management Review and Assessment Technical Guidance, LAQM.TG(03).

background HF concentration is 0.5 µg/m^3, with an elevated background of 3 µg/m^3 where there are local anthropogenic emission sources.

4.12 The natural background HF concentration of 0.5 µg/m^3 is assumed to be applicable at sensitive human health and habitat receptors in the vicinity of the Site.

Trace Metals

4.13 DEFRA has undertaken monitoring of trace elements at a number of locations in the UK since 1976 as part of the UK Urban and Rural Heavy Metals Monitoring Networks.

4.14 To provide an indication of the range of trace metal concentrations that occur in the UK the average concentrations measured at rural and urban sites between 2008 and 2011 are summarised in Table 8.

4.15 With the exception of Cr(VI), all the measured concentrations are well below their respective EAL's. Guidance issued by the Environment Agency[7] for the assessment of Group 3 metals, states that for screening purposes it should be assumed that Cr(VI) comprises 20% of the total background chromium). On this basis the urban average Cr(VI) concentration substantially exceeds the EAL.

4.16 For the purposes of the assessment, the UK average urban concentrations are assumed to be reasonably representative of the baseline trace metal concentrations at the Site.

[20] EPAQS (February 2006), Guidelines for Halogen and Hydrogen Halides in Ambient Air for Protecting Human Health Against Acute Irritancy Effects.

Table 8: Average UK Trace Metal Concentrations (ng/m^3)

Metal	Rural	Urban	EAL
Antimony (Sb)	Not measured	Not measured	5,000
Arsenic (As)	0.47	0.68	3
Cadmium (Cd)	0.10	0.30	5
Chromium (Cr)	0.76	4.2	n/a
Trivalent Chromium (Cr(III))	0.61 (a)	3.4 (a)	5,000
Hexavalent Chromium (Cr(VI))	0.15 (b)	0.85 (b)	0.2
Cobalt (Co)	0.047	0.21	1,000
Copper (Cu)	2.8	16.8	10,000
Lead (Pb)	4.4	13.9	250 – 500
Manganese (Mn)	2.2	13.2	150
Mercury (Hg) (c)	1.2	2.0	250
Nickel (Ni)	0.83	3.8	20
Thallium (Tl)	Not measured	Not measured	1,000
Vanadium (V)	1.1	1.7	5,000

(a) 80% of total chromium
(b) 20% of total chromium
(c) Total particulate and vapour

Dioxins and Furans

4.17 Monitoring of PCDD/Fs is currently carried out by Defra at six locations in the UK (Hazelrigg, High Muffles, London, Manchester, Auchencorth Moss and Weybourne) as part of the Toxic Organic Micropollutants (TOMPs) Network.

4.18 To provide an indication of the range of PCDD/F concentrations that occur in the UK, a summary of the annual mean concentrations measured between 2008 and 2010 is presented in Table 9.

Table 9: UK PCDD/Fs Concentrations (fg TEQ/m^3)

Metal	Type	2008	2009	2010
London	Urban background	10.9	41.4	38.6
Manchester	Urban background	19.0	14.2	48.7
Auchencorth Moss	Rural background	6.4	0.56	5.0
High Muffles	Rural background	1.7	9.38	2.8
Hazelrigg	Rural background	3.7	13.5	8.0
Weybourne	Rural background	-	22.82	2.5

4.19 In general, the concentration of dioxins and furans at rural locations is considerably lower than at urban locations.

4.20 The average concentration measured at the two urban background monitoring sites from 2008 to 2010 is 28.8 fg/m^3 and is assumed to be reasonably representative of the baseline dioxin and furan concentration at the proposed facility and nearby sensitive receptors.

Polycyclic Aromatic Hydrocarbons (as benzo[a]pyrene)

4.21 Monitoring of benzo(a)pyrene (B[a]P) is currently carried out by DEFRA at a number of locations in the UK as part of the TOMPS and PAH monitoring and analysis network. A summary of concentrations measured in the UK is issued by the National Physical Laboratory (NPL) on behalf of Defra on an annual basis. The most recent report was published in January 2014 and provides annual mean B[a]P concentrations measured by the network in 2012[21].

4.22 The average urban and rural background concentrations measured in the UK between 2010 and 2012 were 0.33 ng/m^3 and 0.062 respectively.

4.23 The average urban background concentration is assumed to provide a reasonable estimate of the background concentration in the vicinity of the Site.

Polychlorinated Biphenyls

4.24 Monitoring of PCBs is currently carried out by DEFRA at six locations in the UK as part of the TOMPs Network. The average PCB concentration measured at the urban background monitoring sites (London and Manchester) from 2008 to 2010 is 0.00044 µg/m3 and is assumed

[21] Annual Report for 2012 on the UK PAH Monitoring and Analysis Network, NPL Report AS 84, January 2014.

to be reasonably representative of the baseline PCB concentration at the Site and nearby sensitive receptors.

Summary of Background Concentrations

4.25 A summary of the annual mean and short-term background concentrations assumed for the assessment is presented in Table 10.

Table 10: Summary of Assessment Background Concentrations (a)

Pollutant	Annual Mean	Short-term
Particles (PM_{10})	13.5 µg/m^3	15.9 µg/m^3 (d)(e)
Particles ($PM_{2.5}$)	9.4 µg/m^3	n/a
Nitrogen Dioxide (NO_2)	20.0 µg/m^3	40.0 µg/m^3 (d)
Sulphur Dioxide (SO_2)	2.2 µg/m^3	2.6 µg/m^3 (d)(e) 4.4 µg/m^3 (d) 5.9 µg/m^3 (d)(g)
Carbon Monoxide (CO)	140 µg/m^3	196 µg/m^3 (d)(f) 280 µg/m^3 (d)
Hydrogen Fluoride (HF)	0.50 µg/m^3	1.0 µg/m^3 (d)
Hydrogen Chloride (HCl)	0.24 µg/m^3	0.48 µg/m^3 (d)
Benzene (C_8)	0.35 µg/m^3	n/a
Dioxins and Furans (PCDD/Fs)	28.8 fg/m^3 (b)	n/a
Antimony (Sb)	No data available	n/a
Arsenic (As)	0.68 ng/m^3	n/a
Cadmium (Cd)	0.30 ng/m^3	n/a
Total Cr	4.2 ng/m^3	8.4 ng/m^3 (a)
Cobalt (Co)	0.21 ng/m^3	0.42 ng/m^3 (a)
Copper (Cu)	16.8 ng/m^3	33.6 ng/m^3
Lead (Pb)	13.9 ng/m^3	n/a
Manganese (Mn)	13.2 ng/m^3	26.4 ng/m^3 (a)
Mercury (Hg)	2.0 ng/m^3	4.0 ng/m^3
Nickel (Ni)	3.8 ng/m^3	n/a
Thallium (Tl)	No data available	n/a
Vanadium (V)	1.7 ng/m^3	3.4 ng/m^3 (a)
Polycyclic Aromatic Hydrocarbons (PAH, as BaP)	0.33 ng/m^3	n/a
Polychlorinated biphenyls (PCBs)	0.00044 µg/m^3	0.00088 µg/m^3 (a)

(a) Where background concentrations are expressed as range (e.g. trace metals) the average concentration has been used.

(b) Units are fg/m^3 (femtogram per cubic metre) equivalent to 1 x 10^{-15} grams per cubic metre

(c) Units are ng/m^3 (nanogram per cubic metre) equivalent to 1 x 10^{-9} grams per cubic metre

(d) 1-hour mean background concentration estimated by multiplying the annual mean by a factor of 2 in accordance with the H1 Guidance.

(e) 24-hour mean background concentration estimated by multiplying the 1-hour mean by a factor of 0.59 in accordance with the H1 Guidance.

(f) 8-hour mean background concentration estimated by multiplying the 1-hour mean by a factor of 0.70 in accordance with the H1 Guidance.

(g) 15-minute mean background concentration estimated by multiplying the 1-hour mean by a factor of 1.34 in accordance with the H1 Guidance.

5 ASSESSMENT OF IMPACT

Human Health Impacts

Introduction

5.1 Predicted process concentrations (PC) for the five years of meteorological data are presented as the maximum arising off-site and at each of the discrete receptors identified in Table 3.

5.2 The maximum PC is compared with the relevant air quality standard to determine the significance of the impact, in accordance with the EA H1 guidance. Where a potentially significant impact is identified, the total; predicted environmental concentration (process + background) is compared with the air quality standard to assess the likelihood of an exceedence.

Nitrogen Dioxide

5.3 The predicted annual mean and 99.8th percentile of 1-hour mean ground level NO_2 process concentrations are presented in Table 11.

Table 11: Predicted NO_2 Concentrations ($\mu g/m^3$)

Receptor	Annual Mean		99.8th Percentile of 1-Hour Means	
	PC	PC (% AQO)	PC	PC (% AQO)
Maximum Off-Site	0.78	2.0%	23.9	11.9%
Vistamar House	0.35	0.88%	6.13	3.1%
Docks Office	0.23	0.57%	6.64	3.3%
Phillipa Freeth Court	0.28	0.71%	7.08	3.5%
Barry Dock Station	0.24	0.60%	7.59	3.8%
54 Dock View Road	0.26	0.65%	8.12	4.1%
89 Dock View Road	0.26	0.65%	7.67	3.8%
131 Dock View Road	0.16	0.40%	5.96	3.0%
Wimbourne Buildings	0.54	1.4%	8.75	4.4%
Bendrick Road	0.49	1.2%	7.43	3.7%
Public Recycling Facility	0.34	0.85%	6.9	3.4%
Atlantic Crescent	0.49	1.2%	10.9	5.4%
Port Office	0.26	0.66%	8.6	4.3%
Queens Way	0.67	1.7%	10.3	5.2%
Dyfrig Street	0.44	1.1%	6.9	3.5%
AQO	**40.0**		**200**	
Background	**20.0**		**40.0**	

5.4 The maximum off-site annual mean process concentration is 0.78 $\mu g/m^3$, which is potentially significant at 2.0% of the AQO. However, the total predicted concentration, PEC (process plus background) is just 52% of the AQO, therefore the risk of an exceedence of the annual mean air quality objective is considered to be negligible at any off-site location.

5.5 For the short-term predictions, the maximum off-site PC is 11.4 $\mu g/m^3$, which is potential significant at 11.9% of the AQO, however the PC is <20% of the 'headroom' and therefore the risk of an exceedence of the hourly mean AQO off-site is considered to be negligible. The predicted short-term impacts are of negligible significance (<10% of the AQO) at all of the identified sensitive receptors.

5.6 Predicted annual and 99.8th percentile of hourly mean NO_2 concentrations for 2011 (the year in which the highest off-site annual mean concentrations are predicted) are presented as contour plots in Figures 5 and 6 respectively.

5.7 The influence of locally elevated terrain is clearly seen in the short-term concentrations, with the maximum impact occurring approximately 1.5 km northwest of the proposed facility.

Figure 5: Predicted Annual Mean NO_2 Process Concentration ($\mu g/m^3$)

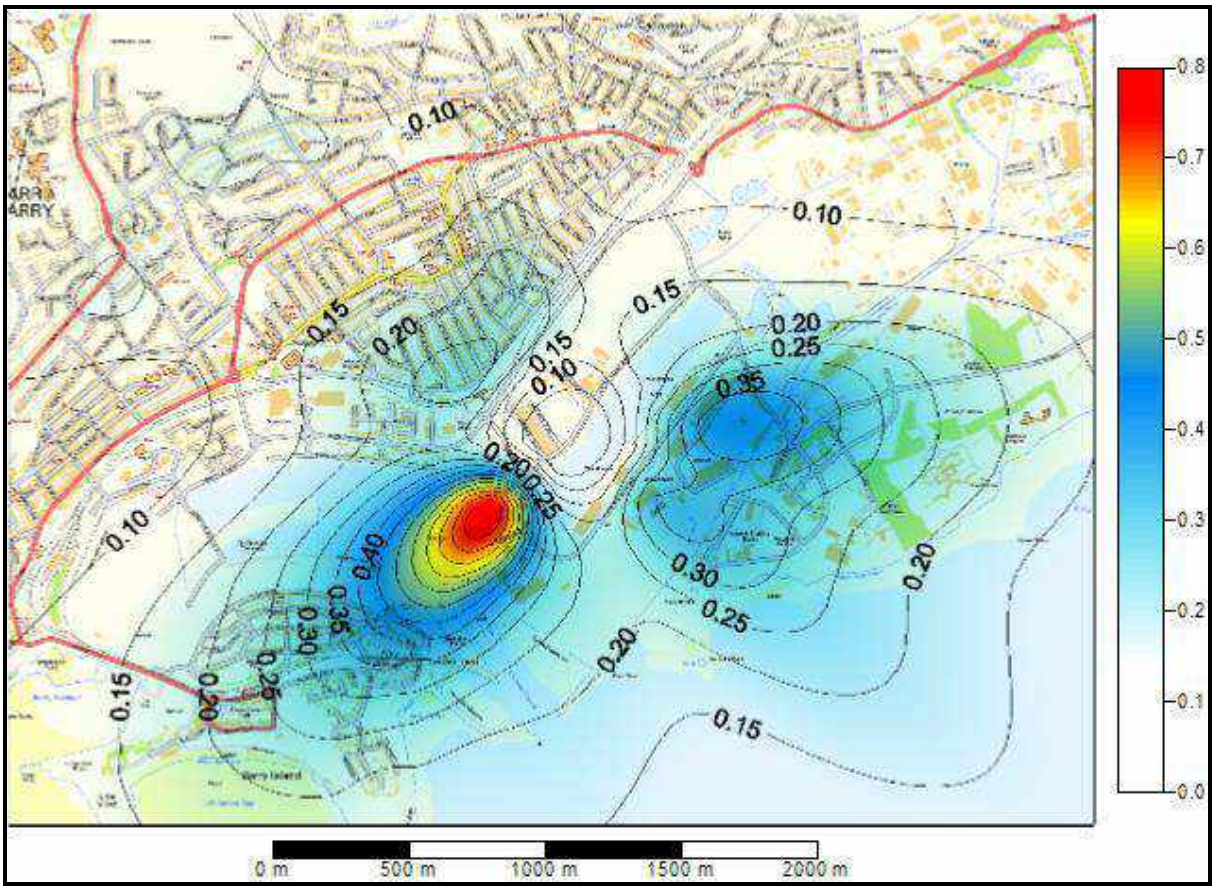
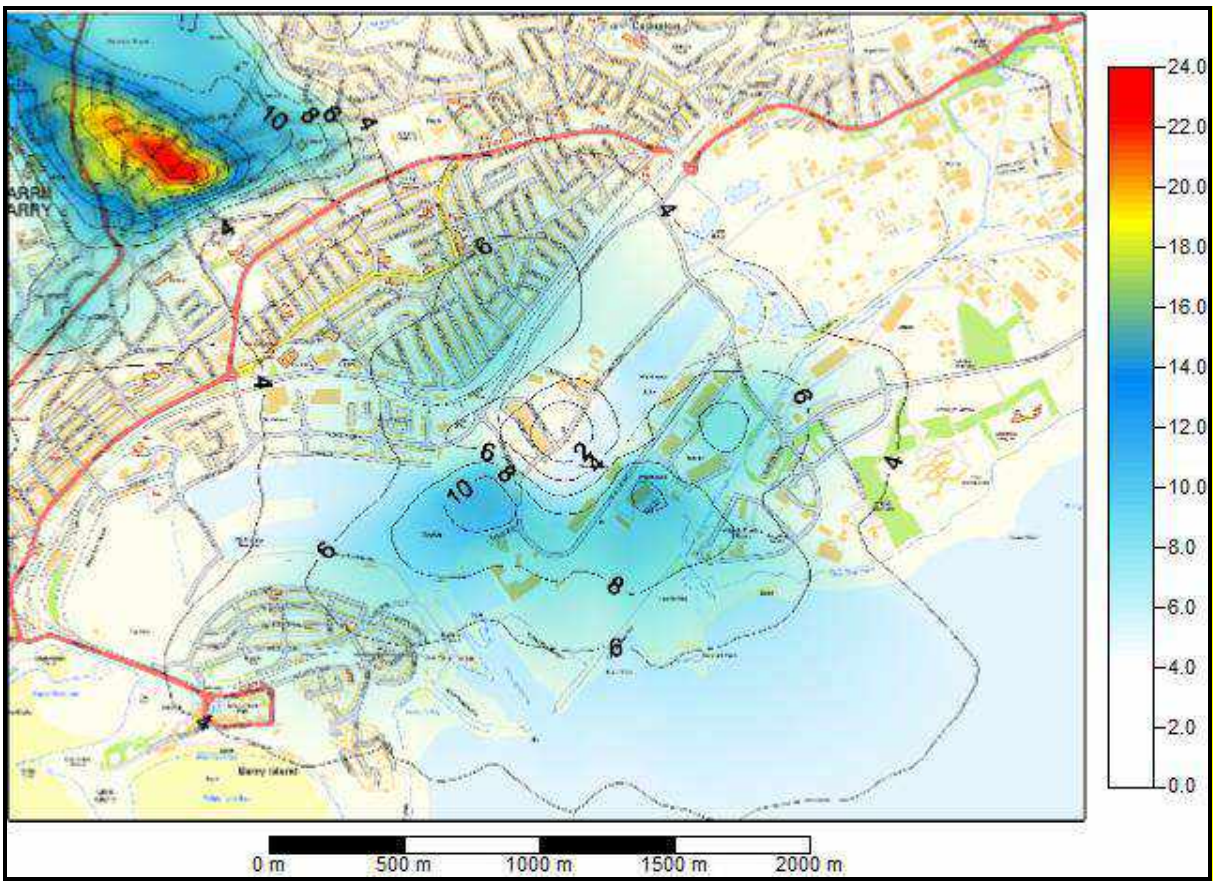


Figure 5: Predicted 99.8th Percentile of 1-Hour Mean NO_2 Process Concentrations (µg/m^3)



Carbon Monoxide (CO)

5.8 The predicted maximum 1-hour and 8-hour mean ground level CO process concentrations are presented in Table 12.

Table 12: Predicted CO Concentrations (μg/m^3)

Receptor	Maximum 8-Hour Mean		Maximum 1-Hour Mean	
	PC	PC (% AQO)	PC	PC (% EAL)
Maximum Off-Site	12.9	0.13%	51.3	0.17%
Vistamar House	3.9	0.039%	5.3	0.018%
Docks Office	3.9	0.039%	5.7	0.019%
Phillipa Freeth Court	4.6	0.046%	6.7	0.022%
Barry Dock Station	4.8	0.048%	6.5	0.022%
54 Dock View Road	4.7	0.047%	6.7	0.022%
89 Dock View Road	4.8	0.048%	6.3	0.021%
131 Dock View Road	3.5	0.035%	4.7	0.016%
Wimbourne Buildings	5.4	0.054%	7.9	0.026%
Bendrick Road	4.1	0.041%	7.9	0.026%
Public Recycling Facility	2.8	0.028%	6.0	0.020%
Atlantic Crescent	5.7	0.057%	8.3	0.028%
Port Office	5.0	0.050%	7.1	0.024%
Queens Way	6.6	0.066%	7.9	0.026%
Dyfrig Street	4.0	0.040%	5.2	0.017%
AQO/ EAL	**10,000**		**30,000**	
Background	**196**		**280**	

5.9 The maximum predicted 8-hour and 1-hour PCs are less than 10% of the relevant air quality objectives, therefore according to the Environment Agency's criteria the significance of the impact is *negligible*.

Sulphur Dioxide (SO_2)

5.10 Predicted SO_2 process concentrations are presented in Table 13.

Table 13: Predicted SO_2 Concentrations ($\mu g/m^3$)

Receptor	99.2nd Percentile of 24-Hour Means		99.7th Percentile of 1-Hour Means		99.9th Percentile of 15-Minute Means	
	PC	PC (% AQO)	PC	PC (% AQO)	PC	PC (% AQO)
Maximum Off-Site	2.7	2.1%	23.6	6.7%	93.2	35.0%
Vistamar House	0.91	0.73%	8.4	2.4%	12.5	4.7%
Docks Office	0.71	0.57%	9.0	2.6%	13.5	5.1%
Phillipa Freeth Court	1.1	0.89%	9.9	2.8%	14.3	5.4%
Barry Dock Station	0.81	0.65%	10.4	3.0%	15.5	5.8%
54 Dock View Road	0.91	0.73%	11.1	3.2%	16.3	6.1%
89 Dock View Road	0.97	0.78%	10.8	3.1%	15.4	5.8%
131 Dock View Road	0.68	0.54%	8.1	2.3%	11.9	4.5%
Wimbourne Buildings	1.1	0.89%	12.0	3.4%	17.7	6.7%
Bendrick Road	0.92	0.74%	10.4	3.0%	14.9	5.6%
Public Recycling Facility	0.87	0.69%	9.4	2.7%	13.7	5.1%
Atlantic Crescent	1.5	1.2%	15.1	4.3%	21.2	8.0%
Port Office	1.1	0.87%	11.5	3.3%	17.7	6.6%
Queens Way	2.3	1.9%	14.6	4.2%	20.1	7.5%
Dyfrig Street	1.2	0.98%	9.7	2.8%	13.5	5.1%
AQO	**125**		**350**		**266**	
Background	**2.6**		**4.4**		**5.9**	

5.11 The maximum predicted ground level 24-hour and 1-hour mean SO_2 process concentrations are less than 10% of the relevant AQOs and are therefore of *negligible* significance.

5.12 The maximum off-site 15-minite mean concentration is potentially significant, however background SO_2 concentration is low and it is considered unlikely that an exceedence will occur at any location. The maximum 15-minute mean concentrations are of negligible significance at all the identified receptor locations.

Particulate Matter (as PM_{10})

5.13 Predicted annual mean and 90.4th percentile of 24-hour mean ground level PM_{10} process concentrations are presented in Table 14. The predictions assume that 100% of the particulate matter is emitted from the stack is PM_{10}.

Table 14: Predicted PM_{10} Concentrations ($\mu g/m^3$)

Receptor	Annual Mean		90.4th Percentile of 24-Hour Means	
	PC	PC (% AQO)	PC	PC (% AQO)
Maximum Off-Site	0.056	0.14%	0.20	0.40%
Vistamar House	0.025	0.063%	0.10	0.20%
Docks Office	0.016	0.040%	0.061	0.12%
Phillipa Freeth Court	0.020	0.050%	0.083	0.17%
Barry Dock Station	0.017	0.043%	0.062	0.12%
54 Dock View Road	0.019	0.046%	0.073	0.15%
89 Dock View Road	0.019	0.047%	0.066	0.13%
131 Dock View Road	0.011	0.029%	0.037	0.073%
Wimbourne Buildings	0.039	0.097%	0.11	0.23%
Bendrick Road	0.035	0.088%	0.11	0.22%
Public Recycling Facility	0.024	0.061%	0.077	0.15%
Atlantic Crescent	0.035	0.087%	0.12	0.23%
Port Office	0.019	0.047%	0.068	0.14%
Queens Way	0.048	0.12%	0.18	0.37%
Dyfrig Street	0.031	0.078%	0.12	0.25%
AQO	**40**		**50**	
Background	**13.5**		**15.9**	

5.14 The predicted maximum ground level PM_{10} concentrations are less than 1% and 10% of the long and short-term AQOs respectively and are therefore of *negligible* significance.

Particulate Matter (as $PM_{2.5}$)

5.15 Predicted annual mean ground-level $PM_{2.5}$ process concentrations are presented in Table 15. The predictions assume that 100% of the particulate matter emitted from the stack is $PM_{2.5}$.

Table 15: Predicted $PM_{2.5}$ Concentrations ($\mu g/m^3$)

Receptor	Annual Mean	
	PC	PC (% LV)
Maximum Off-Site	0.056	0.22%
Vistamar House	0.025	0.10%
Docks Office	0.016	0.065%
Phillipa Freeth Court	0.020	0.081%
Barry Dock Station	0.017	0.069%
54 Dock View Road	0.019	0.074%
89 Dock View Road	0.019	0.074%
131 Dock View Road	0.011	0.046%
Wimbourne Buildings	0.039	0.15%
Bendrick Road	0.035	0.14%
Public Recycling Facility	0.024	0.10%
Atlantic Crescent	0.035	0.14%
Port Office	0.019	0.076%
Queens Way	0.048	0.19%
Dyfrig Street	0.031	0.12%
Limit Value	**25**	
Background	**9.5**	

5.16 Maximum predicted annual mean $PM_{2.5}$ concentrations are less than 1% of the EU limit value are therefore of *negligible* significance.

Total Organic Carbon (as Benzene)

5.17 Predicted annual mean ground-level benzene process concentrations are presented in Table 16.

Table 16: Predicted Benzene Concentrations (μg/m^3)

Receptor	Annual Mean	
	PC	PC (% AQO)
Maximum Off-Site	0.056	1.1%
Vistamar House	0.025	0.50%
Docks Office	0.016	0.32%
Phillipa Freeth Court	0.020	0.40%
Barry Dock Station	0.017	0.34%
54 Dock View Road	0.019	0.37%
89 Dock View Road	0.019	0.37%
131 Dock View Road	0.011	0.23%
Wimbourne Buildings	0.039	0.77%
Bendrick Road	0.035	0.71%
Public Recycling Facility	0.024	0.49%
Atlantic Crescent	0.035	0.69%
Port Office	0.019	0.38%
Queens Way	0.048	0.96%
Dyfrig Street	0.031	0.62%
AQO	**5**	
Background	**0.35**	

5.18 The predicted impact on annual mean benzene concentration is of negligible significance at all of the identified sensitive receptors,

5.19 The maximum off-site annual mean process concentration is 0.056 μg/m^3, which is potentially significant at 1.1% of the AQO. However, the total predicted concentration, PEC (process plus background) is just 8.1% of the AQO, therefore the facility is unlikely to result an exceedence of the annual mean air quality objective at any off-site location.

Hydrogen Chloride (HCl)

5.20 The maximum predicted 1-hour mean ground-level HCl process concentrations are presented in Table 17.

Table 17: Predicted HCl Concentrations (μg/m^3)

Receptor	1-Hour Mean	
	PC	PC (% GV)
Maximum Off-Site	30.8	4.1%
Vistamar House	3.2	0.42%
Docks Office	3.4	0.45%
Phillipa Freeth Court	4.0	0.54%
Barry Dock Station	3.9	0.52%
54 Dock View Road	4.0	0.53%
89 Dock View Road	3.8	0.51%
131 Dock View Road	2.8	0.37%
Wimbourne Buildings	4.8	0.63%
Bendrick Road	4.7	0.63%
Public Recycling Facility	3.6	0.48%
Atlantic Crescent	5.0	0.67%
Port Office	4.3	0.57%
Queens Way	4.7	0.63%
Dyfrig Street	3.1	0.42%
Guideline Value	**750**	
Background	**0.24**	

5.21 Predicted maximum 1-hour mean ground level HCl concentrations are less than 1% of EPAQS guideline value for protection from irritant and respiratory effect at all of the identified receptor locations, therefore the significance of the impact is *negligible.*

5.22 The maximum off-site 1-hour mean process concentration is 30.8 μg/m^3, which is potentially significant at 4.1% of the AQO. However, the total predicted concentration, PEC (process plus background) is just 4.1% of the AQO, therefore the facility is unlikely to result an exceedence of the 1-hour mean air quality objective at any off-site location.

Hydrogen Fluoride (HF)

5.23 The predicted annual and maximum 1-hour mean ground-level HF process concentrations are presented in Table 18.

Table 18: Predicted HF Concentrations (μg/m^3)

Receptor	Annual Mean		1-Hour Mean	
	PC	PC (% GV)	PC	PC (% GV)
Maximum Off-Site	0.0056	0.035%	0.21	1.3%
Vistamar House	0.0025	0.016%	0.23	0.13%
Docks Office	0.0016	0.010%	0.27	0.14%
Phillipa Freeth Court	0.0020	0.013%	0.26	0.17%
Barry Dock Station	0.0017	0.011%	0.27	0.16%
54 Dock View Road	0.0019	0.012%	0.25	0.17%
89 Dock View Road	0.0019	0.012%	0.19	0.16%
131 Dock View Road	0.0011	0.0072%	0.32	0.12%
Wimbourne Buildings	0.0039	0.024%	0.32	0.20%
Bendrick Road	0.0035	0.022%	0.24	0.20%
Public Recycling Facility	0.0024	0.015%	0.33	0.15%
Atlantic Crescent	0.0035	0.022%	0.29	0.21%
Port Office	0.0019	0.012%	0.31	0.18%
Queens Way	0.0048	0.030%	0.21	0.20%
Dyfrig Street	0.0031	0.019%	0.21	0.13%
Guideline Value	**16**		**160**	
Background	**0.5**		**1.0**	

5.24 Maximum predicted ground level annual mean and 1-hour mean hydrogen fluoride concentrations are less than 1% and 10% of the long and short-term EPAQS guideline values, therefore the significance of the impact is *negligible.*

Dioxins and Furans

5.25 The predicted annual mean ground-level dioxin and furan process concentrations at identified sensitive receptor locations are presented in Table 19. The results are presented in femtograms (fg) per cubic metre (10^{-15} g/m^3).

Table 19: Predicted Dioxin and Furan Concentrations (fg/m^3)

Receptor	Annual Mean
	PC
Maximum Off-Site	0.56
Vistamar House	0.25
Docks Office	0.16
Phillipa Freeth Court	0.20
Barry Dock Station	0.17
54 Dock View Road	0.19
89 Dock View Road	0.19
131 Dock View Road	0.11
Wimbourne Buildings	0.39
Bendrick Road	0.35
Public Recycling Facility	0.24
Atlantic Crescent	0.35
Port Office	0.19
Queens Way	0.48
Dyfrig Street	0.31
Background	**28.8**

5.26 There are no assessment criteria for dioxins and furans. The predicted maximum contribution from the proposed development is 1.9% of the average background concentration measured at urban monitoring sites in the UK.

PAH (as Benzo[a]pyrene)

5.27 The maximum predicted 1-hour mean ground-level B[a]P process concentrations are presented in Table 20. The results are presented in nanograms (ng) per cubic metre (10^{-9} g/m^3).

Table 20: Predicted B[a]P Concentrations (ng/m^3)

Receptor	Annual Mean	
	PC	PC (% LV)
Maximum Off-Site	0.0056	0.56%
Vistamar House	0.0025	0.25%
Docks Office	0.0016	0.16%
Phillipa Freeth Court	0.0020	0.20%
Barry Dock Station	0.0017	0.17%
54 Dock View Road	0.0019	0.19%
89 Dock View Road	0.0019	0.19%
131 Dock View Road	0.0011	0.11%
Wimbourne Buildings	0.0039	0.39%
Bendrick Road	0.0035	0.35%
Public Recycling Facility	0.0024	0.24%
Atlantic Crescent	0.0035	0.35%
Port Office	0.0019	0.19%
Queens Way	0.0048	0.48%
Dyfrig Street	0.0031	0.31%
EU Limit Value	**1.0**	
Background	**0.33**	

5.28 The maximum predicted off-site annual mean ground level B[a]P concentration is less than 1% of the EU limit value, therefore the impact of the proposed facility is of *negligible* significance.

Polychlorinated Biphenyls (PCBs)

5.29 The predicted annual and maximum 1-hour mean ground-level PCB process concentrations are presented in Table 21. The results are presented in nanograms (ng) per cubic metre (10^{-9} g/m^3).

Table 21: Predicted PCB Concentrations (ng/m^3)

Receptor	Annual Mean		1-Hour Mean	
	PC	PC (% EAL)	PC	PC (% EAL)
Maximum Off-Site	0.028	0.014%	2.6	0.043%
Vistamar House	0.013	0.0063%	0.27	0.0044%
Docks Office	0.0081	0.0040%	0.28	0.0047%
Phillipa Freeth Court	0.010	0.0050%	0.33	0.0056%
Barry Dock Station	0.0086	0.0043%	0.32	0.0054%
54 Dock View Road	0.0093	0.0046%	0.33	0.0056%
89 Dock View Road	0.0093	0.0047%	0.32	0.0053%
131 Dock View Road	0.0057	0.0029%	0.23	0.0039%
Wimbourne Buildings	0.019	0.0097%	0.40	0.0066%
Bendrick Road	0.018	0.0088%	0.40	0.0066%
Public Recycling Facility	0.012	0.0061%	0.30	0.0050%
Atlantic Crescent	0.017	0.0087%	0.42	0.0069%
Port Office	0.0095	0.0047%	0.36	0.0060%
Queens Way	0.024	0.012%	0.39	0.0066%
Dyfrig Street	0.016	0.0078%	0.26	0.0044%
EAL	**200**		**6000**	
Background	**0.44**		**0.88**	

5.30 Maximum predicted ground level annual mean and 1-hour mean PCB concentrations are less than 1% and 10% of the long and short-term EALs, therefore the significance of the impact is *negligible.*

Trace Metals

Step 1: Screening

5.31 The predicted maximum long and short-term trace metal impacts at sensitive receptors for emissions at maximum IED limits are presented in Tables 22 and 23 respectively.

5.32 For the group 3 metals (Sb, As, Pb, Cr, Co, Cu, Mn, Ni and V), if both the long and short term PCs are within the relevant EALs, then the impact is considered insignificant, in accordance with the Environment Agency's metals guidance[7].

5.33 The Step 1 screening has assumed that the background concentration is equal to the average measured at urban sites for each pollutant. The predicted and background concentrations are apportioned 80% Cr (III): 20% Cr(VI).

Table 22: Long-Term Trace Metal Predictions - Step 1

Pollutant	EAL ($\mu g/m^3$)	Max. PC ($\mu g/m^3$)	Background ($\mu g/m^3$)	PC (% EAL)	PEC (% of EAL)	Further Assessment Required?
Cd	0.005	0.00024	0.00030	4.8%	10.8%	No
Tl	1	0.00024	n/a	0.024%	0.024%	No
Hg	0.25	0.00024	0.0020	0.096%	0.90%	No
Sb	5	0.0024	n/a	0.048%	0.048%	No
As	**0.003**	**0.0024**	**0.00068**	**79.9%**	**103%**	**Yes**
Cr (III)	5	0.0019	0.0034	0.038%	0.106%	No
Cr (VI)	**0.0002**	**0.00048**	**0.00085**	**240%**	**665%**	**Yes**
Co	1	0.0024	0.00021	0.24%	0.26%	No
Cu	10	0.0024	0.017	0.024%	0.19%	No
Pb	0.25	0.0024	0.014	0.96%	6.5%	No
Mn	0.15	0.0024	0.013	1.6%	10.4%	No
Ni	0.02	0.0024	0.0038	12.0%	31.0%	No
V	5	0.0024	0.0017	0.048%	0.082%	No

Table 23: Short-Term Trace Metal Predictions - Step 1

Pollutant	EAL ($\mu g/m^3$)	Max. PC ($\mu g/m^3$)	Background ($\mu g/m^3$)	Max PC (% EAL)	Further Assessment Required?
Tl	30	0.0042	n/a	0.014%	No
Hg	7.5	0.0042	0.0040	0.055%	No
Sb	150	0.042	n/a	0.028%	No
Cr (III)	150	0.033	0.0068	0.022%	No
Cr (VI)	3	0.0083	0.0017	0.28%	No
Co	30	0.042	0.00042	0.14%	No
Cu	200	0.042	0.034	0.021%	No
Mn	150	0.042	0.026	0.028%	No
V	1	0.028	0.0034	2.8%	No

5.34 On the basis of the Step 1 screening, further assessment is required for long-term arsenic and chromium (VI) only. The maximum predicted short-term impacts are *negligible* for all trace metals.

Step 2: Emissions at 11% of IED Limits

5.35 Maximum predicted concentrations of arsenic and chromium (VI) are presented in Table 24 for emissions at 11% of the maximum IED limits (1/9th of ELV). No Cr(III):Cr(VI) apportionment has been applied to either the emissions or background concentration. The results show that the EAL for Cr(VI) continues to be substantially exceeded and further assessment is required.

Table 24: Long-Term As and Cr(VI) Predictions - Step 2

Pollutant	EAL ($\mu g/m^3$)	Max. PC ($\mu g/m^3$)	Background ($\mu g/m^3$)	PC (%EAL)	Further Assessment Required?
As	0.003	0.00027	0.00068	31.5%	No
Cr (VI)	**0.0002**	**0.00027**	**0.0042**	**133%**	**Yes**

Step 3: Typical Operational Emissions

5.36 The EA metals guidance provides a range of emission concentrations (corresponding fractions of the total Group III emission) measured at twenty municipal waste incineration (MWI) facilities in the UK. These data suggest that, on average, chromium comprises 2.2% of the total Group III emission. The guidance also provides a maximum chromium Cr(VI) emission based on the analysis of total chromium residues at the plant of 1.3×10^{-4} mg/Nm^3.

5.37 Predicted annual mean Cr(VI) concentrations at this maximum operational emission rate are presented as a percentage of the EAL in Table 25.

Table 25: Predicted Annual Mean Chromium (VI) Concentration (ng/m^3)

Receptor	Annual Mean	
	Maximum	Average
Maximum Off-Site	0.00073	0.36%
Vistamar House	0.00033	0.16%
Docks Office	0.00021	0.11%
Phillipa Freeth Court	0.00026	0.13%
Barry Dock Station	0.00022	0.11%
54 Dock View Road	0.00024	0.12%
89 Dock View Road	0.00024	0.12%
131 Dock View Road	0.00015	0.07%
Wimbourne Buildings	0.00050	0.25%
Bendrick Road	0.00046	0.23%
Public Recycling Facility	0.00032	0.16%
Atlantic Crescent	0.00045	0.23%
Port Office	0.00025	0.12%
Queens Way	0.00062	0.31%
Dyfrig Street	0.00040	0.36%
EAL	**0.2**	
Background	**4.2**	

5.38 For maximum typical operational emissions, the maximum predicted annual mean Cr(VI) concentrations off-site and at the identified receptors are *negligible* (<1%) compared with the EAL.

Summary of Stack Emissions Impact

5.39 A summary of the significance of the predicted significance of the impact on pollutant concentrations at receptor locations is presented in Table 26.

Table 26: Summary of Impact Significance for Maximum Off-Site Concentrations

Pollutant	Significance
Particles (PM_{10})	Negligible
Particles ($PM_{2.5}$)	Negligible
Nitrogen Dioxide (NO_2)	Negligible
Sulphur Dioxide (SO_2)	Negligible
Carbon Monoxide (CO)	Negligible
Hydrogen Fluoride (HF)	Negligible
Hydrogen Chloride (HCl)	Negligible
Benzene (C_8)	Negligible
Dioxins and Furans (PCDD/Fs)	Negligible
Cadmium (Cd)	Negligible
Thallium (Tl)	Negligible
Mercury (Hg)	Negligible
Arsenic (As)	Negligible
Chromium (CrIII)	Negligible
Chromium (CrIV)	Negligible
Cobalt (Co)	Negligible
Copper (Cu)	Negligible
Lead (Pb)	Negligible
Manganese (Mn)	Negligible
Nickel (Ni)	Negligible
Antimony (Sb)	Negligible
Vanadium (V)	Negligible
PAHs (as B[a]P)	Negligible
PCBs	Negligible

Habitat Impacts

Airborne Concentrations of NOx, SO_2 and HF

5.40 Predicted maximum ground level concentrations of NOx, SO_2 and HF at the sensitive habitat sites are compared with the relevant critical level (CL) and background concentrations obtained from APIS in Tables 27 to 29.

Table 27: Predicted Airborne NOx, Concentrations as a Percentage of the Critical Level ($\mu g/m^3$)

Habitat Site	Annual Mean		Daily Mean	
	PC	PEC (a)	PC	PEC (b)
Cadoxton River SINC	2.6%	48.1%	7.0%	29.6%
Cadoxton Wetlands SINC	0.65%	48.0%	2.2%	24.9%
Fields at Merthyr Dyfan SINC	0.57%	48.0%	4.7%	27.3%
Friars Point SINC	0.79%	48.0%	2.9%	25.5%
Gladstone Road Pond SINC	0.62%	48.0%	3.8%	26.4%
Nells Point East SINC	1.5%	48.0%	6.9%	29.5%
North of North Road SINC	0.24%	48.0%	0.89%	23.5%
Cadoxton Ponds Wildlife Trust Reserve	0.65%	48.0%	2.2%	24.9%
Severn Estuary Ramsar	0.27%	39.7%	0.71%	19.5%
Severn Estuary SPA	0.19%	39.7%	0.89%	19.6%
Ancient Woodland (Hayes Lane)	1.8%	48.0%	3.9%	26.6%
Critical Level	**30**		**75**	

(a) Includes annual mean NOx backgrounds obtained from APIS
(b) Includes 24-hour mean NOx background concentration (annual mean x 2 x 0.59, in accordance with the EA H1 guidance).

Table 28: Predicted Annual Mean SO_2 Concentrations as a Percentage of the Critical Level ($\mu g/m^3$)

Habitat Site	PC	PEC
Cadoxton River SINC	0.96%	12.0%
Cadoxton Wetlands SINC	0.24%	11.3%
Fields at Merthyr Dyfan SINC	0.22%	11.3%
Friars Point SINC	0.30%	11.3%
Gladstone Road Pond SINC	0.23%	11.3%
Nells Point East SINC	0.55%	11.6%
North of North Road SINC	0.091%	11.1%
Cadoxton Ponds Wildlife Trust Reserve	0.24%	11.3%
Severn Estuary Ramsar	0.10%	9.6%
Severn Estuary SPA	0.071%	9.5%
Ancient Woodland (Hayes Lane)	0.66%	11.7%
Critical Level	**20**	

Table 29: Predicted HF Concentrations as a Percentage of the Critical Level (μg/m^3)

Habitat Site	Daily Mean		Weekly Mean	
	PC	PEC (a)	PC (b)	PEC (c)
Cadoxton River SINC	0.52%	12.3%	0.77%	n/a
Cadoxton Wetlands SINC	0.20%	12.0%	0.19%	n/a
Fields at Merthyr Dyfan SINC	0.47%	12.3%	0.17%	n/a
Friars Point SINC	0.26%	12.1%	0.24%	n/a
Gladstone Road Pond SINC	0.34%	12.1%	0.19%	n/a
Nells Point East SINC	0.52%	12.3%	0.44%	n/a
North of North Road SINC	0.10%	11.9%	0.073%	n/a
Cadoxton Ponds Wildlife Trust Reserve	0.20%	12.0%	0.19%	n/a
Severn Estuary Ramsar	0.068%	11.9%	0.082%	n/a
Severn Estuary SPA	0.078%	11.9%	0.057%	n/a
Ancient Woodland (Hayes Lane)	0.31%	12.1%	0.53%	n/a
Critical Level	**5**		**0.5**	

(a) Includes 24-hour mean HF background concentration (annual mean x 2 x 0.59, in accordance with the EA H1 guidance).
(b) It is not possible to predict weekly concentrations using the dispersion model, therefore the annual mean concentrations have been compared with the CL.
(c) There is no current guidance available with regard to calculating a weekly mean background concentration from the annual mean.

5.41 There are no predicted exceedences of the critical levels for NOx, SO_2 or HF any of the identified sensitive habitat sites. At the statutory habitat sites, the process impacts are less than 1% of the critical level and therefore of *negligible* significance.

5.42 Potentially significant long-term impacts (>1% of the critical level) occur at Nells Point East SINC and the ancient woodland at Hayes Lane, however the PECs (process + background) are less than 70% of the critical load, therefore the risk of an exceedence is considered to be *negligible*.

5.43 The short-term NOx process concentrations are of *negligible* significance at all of the identified habitat sites.

Eutrophication

5.44 Predicted maximum nutrient nitrogen deposition rates are compared with the critical load for eutrophication in Table 30.

Table 30: Predicted Eutrophication Rates (kg N/ha/yr)

Habitat Site	Critical Load (CL)	PC (as a %age of CL)	PEC (as a %age of CL)
Cadoxton River SINC	15	0.74%	81.0%
Cadoxton Wetlands SINC	15	0.19%	80.5%
Fields at Merthyr Dyfan SINC	20	0.12%	60.3%
Friars Point SINC	20	0.17%	60.4%
Gladstone Road Pond SINC	n/a	n/a	n/a
Nells Point East SINC	20	0.32%	60.5%
North of North Road SINC	15	0.070%	80.3%
Cadoxton Ponds Wildlife Trust Reserve	15	0.19%	80.5%
Severn Estuary Ramsar	10	0.12%	104%
Severn Estuary SPA	10	0.082%	104%
Ancient Woodland (Hayes Lane)	10	1.5%	216%

5.45 With the exception of the ancient woodland at Hayes Lane, the maximum predicted nutrient nitrogen deposition rates are <1% of the lower critical load and are therefore of *negligible* significance.

Acidification

5.46 Predicted nitrogen and sulphur acidification rates are compared with the relevant critical loads and background acidification rates in Table 31.

Table 31: Predicted Acidification Rates (keq/ha/yr)

Habitat Site	PC (as a %age of the CLF)	PEC (as a %age of the CLF)
Fields at Merthyr Dyfan SINC	0.19%	22.5%
Friars Point SINC	0.26%	22.6%
Nells Point East SINC	0.48%	22.8%
Ancient Woodland (Hayes Lane)	1.8%	60.3%

5.47 With the exception of the ancient woodland at Hayes Lane, maximum predicted acidification rates (PC) are less than 1% of the CLFs and therefore of *negligible* significance.

5.48 At the ancient woodland the process impacts are potentially significant, however the total predicted acidification rates (including the background) are less than 70% of the CLF, therefore the risk of an exceedence is considered to be *negligible*.

6 CONCLUSIONS

6.1 An assessment has been carried out to determine the local air quality impacts associated with the operation of the proposed wood gasification facility.

6.2 Detailed air quality modelling using the AERMOD 7 dispersion model has been undertaken to predict the impacts associated with stack emissions from the Site. As a worst-case, emissions from the site have been assumed to occur at the IED limits. Actual emissions from the site are anticipated to be significantly lower.

6.3 For a proposed stack height of 43m, predicted maximum off-site process concentrations are well within the relevant air quality standards for all pollutants considered. The significance of the impacts has been assessed as negligible, in accordance with the Environment Agency's H1 guidance.

6.4 The predicted process contributions are also negligible compared with the critical levels and critical loads for nutrient nitrogen deposition and acidification at nearby statutory sensitive habitat sites. However, a potentially significant impact occurs at ancient woodland adjacent at Hayes Lane.

6.5 Based on the above information, it is considered that air quality does not pose a constraint to development of the site as proposed.

APPENDIX A - AIR QUALITY TERMINOLOGY

Term	Definition
Accuracy	A measure of how well a set of data fits the true value.
Air quality objective	Policy target generally expressed as a maximum ambient concentration to be achieved, either without exception or with a permitted number of exceedences within a specific timescale (see also air quality standard).
Air quality standard	The concentrations of pollutants in the atmosphere which can broadly be taken to achieve a certain level of environmental quality. The standards are based on the assessment of the effects of each pollutant on human health including the effects on sensitive sub groups (see also air quality objective).
Ambient air	Outdoor air in the troposphere, excluding workplace air.
Annual mean	The average (mean) of the concentrations measured for each pollutant for one year. Usually this is for a calendar year, but some species are reported for the period April to March, known as a pollution year. This period avoids splitting winter season between 2 years, which is useful for pollutants that have higher concentrations during the winter months.
AQMA	Air Quality Management Area.
DEFRA	Department for Environment, Food and Rural Affairs.
Exceedence	A period of time where the concentrations of a pollutant is greater than, or equal to, the appropriate air quality standard.
Fugitive emissions	Emissions arising from the passage of vehicles that do not arise from the exhaust system.
LAQM	Local Air Quality Management.
NO	Nitrogen monoxide, a.k.a. nitric oxide.
NO_2	Nitrogen dioxide.
NO_x	Nitrogen oxides.
O_3	Ozone.
Percentile	The percentage of results below a given value.
PM_{10}	Particulate matter with an aerodynamic diameter of less than 10 micrometres.
ppb parts per billion	The concentration of a pollutant in the air in terms of volume ratio. A concentration of 1 ppb means that for every billion (10^9) units of air, there is one unit of pollutant present.
ppm parts per million	The concentration of a pollutant in the air in terms of volume ratio. A concentration of 1 ppm means that for every billion (10^6) units of air, there is one unit of pollutant present.
Ratification (Monitoring)	Involves a critical review of all information relating to a data set, in order to amend or reject the data. When the data have been ratified they represent the final data to be used (see also validation).
µg/m^3 micrograms per cubic metre	A measure of concentration in terms of mass per unit volume. A concentration of 1µg/m^3 means that one cubic metre of air contains one microgram (millionth of a gram) of pollutant.
UKAS	United Kingdom Accreditation Service.
Uncertainty	A measure, associated with the result of a measurement, which characterizes the range of values within which the true value is expected to lie. Uncertainty is usually expressed as the range within which the true value is expected to lie with a 95% probability, where standard statistical and other procedures have been used to evaluate this figure. Uncertainty is more clearly defined than the closely related parameter 'accuracy', and has replaced it on recent European legislation.
USA	Updating and Screening Assessment.
Validation (modelling)	Refers to the general comparison of modelled results against

Term	Definition
	monitoring data carried out by model developers.
Validation (monitoring)	Screening monitoring data by visual examination to check for spurious and unusual measurements (see also ratification).
Verification (modelling)	Comparison of modelled results versus any local monitoring data at relevant locations.

APPENDIX B - AIR QUALITY STANDARDS AND OBJECTIVES

Table B1: Air Quality Standards and Environmental Assessment Levels

Pollutant	Averaging Period	EAL / AQS ($\mu g/m^3$)	Comments
Nitrogen Dioxide (NO_2)	annual	40	UK AQO
	1-hour	200	UK AQO, not to be exceeded more than 18 times per annum, equivalent to the 99.8th percentile of 1-hour means
Sulphur Dioxide (SO_2)	24-hour	125	UK AQO, not to be exceeded more than 3 times per annum, equivalent to the 99.2nd percentile of 24-hour means
	1-hour	350	UK AQO, not to be exceeded more than 24 times per annum, equivalent to the 99.7th percentile of 1-hour means
	15-minute	266	UK AQO, not to be exceeded more than 35 times per annum, equivalent to the 99.9th percentile of 15-minute means
Carbon Monoxide (CO)	8-hour	10,000	AQO
	1-hour	30,000	EAL, H1
Particulate Matter (as PM_{10})	annual	40	AQO
	24-hour	50	UK AQO, not to be exceeded more than 35 times per annum, equivalent to the 90.4th percentile of 24-hour means
Particulate Matter (as $PM_{2.5}$)	annual	25	EU Limit Value
Benzene (C_8)	annual	5	AQO (England and Wales)
Hydrogen Chloride (HCl)	1-hour	750	EPAQS Guideline Value
Hydrogen Fluoride (HF)	1-hour	160	EPAQS Guideline Values
	annual	16	
Antimony (Sb)	annual	5	EAL derived from long-term occupational exposure limits
	1-hour	150	EAL derived from long-term occupational exposure limits as no short-term limit exists
Arsenic (As)	annual	0.003	EPAQS Guideline Value
Cadmium (Cd)	annual	0.005	WHO Guideline Value
Chromium III (CrIII)	annual	5	EAL derived from long-term occupational exposure limits
	1-hour	150	EAL derived from long-term occupational exposure limits as no short-term limit

			exists
Chromium VI (CrVI)	annual	0.0002	EPAQS Guideline Value
	1-hour	3	EAL derived from long-term occupational exposure limits
Cobalt (Co)	annual	1	EAL derived from long-term occupational exposure limits
	1-hour	30	EAL derived from long-term occupational exposure limits as no short-term limit exists
Copper (Cu)	Annual	10	Copper as dusts and mists. EAL derived from long-term occupational exposure limits
	1-hour	200	EAL derived from short-term occupational exposure limits
Manganese (Mn)	annual	0.15	WHO Guideline Value
	1-hour	150	EAL derived from long-term occupational exposure limits as no short-term limit exists
Lead (Pb)	annual	0.25	UK AQO
Mercury (Hg)	annual	0.25	EAL derived from long-term occupational exposure limits
	1-hour	7.5	EAL derived from long-term occupational exposure limits as no short-term limit exists
Nickel (Ni)	annual	0.02	EPAQS Guideline Value
Thallium (Tl)	annual	1	EAL derived from long-term occupational exposure limits
	1-hour	30	EAL derived from long-term occupational exposure limits as no short-term limit exists
Vanadium (V)	annual	5	EAL derived from long-term occupational exposure limits
	24-hour	1	WHO Guideline Value
Polycyclic Aromatic Hydrocarbons (PAH) as Benzo(a)Pyrene	annual	0.00025	UK AQO
	annual	0.001	EU Limit Value
Polychlorinated Biphenyls (PCBs)	annual	0.2	EAL derived from long-term occupational exposure limits
	1-hour	6	EAL derived from long-term occupational exposure limits as no short-term limit exists

APPENDIX C – BOILER EMISSION PARAMETERS

Table C1: Emission Parameters

Source ID	**ATT Stack**	
Stack Height (m)	43.0	
Stack diameter (m)	1.23	
Temperature of release (K)	411	
Actual flow rate (Am^3/s)	35.2 (a)	
Emission velocity at stack exit (m/s)	29.6	
Normalised flow rate (Nm^3/s)	22.5 (b)	
Emission Concentration (mg/Nm^3)	**Long-Term**	**Short-Term**
PM_{10}	10	30
TOC	10	20
HCl	10	60
HF	1	4
CO	50	100
SO_2	50	200
NOx	200	400
Group I (Cd, Tl)	0.05	
Group II (Hg)	0.05	
Group III (Sb, As, Pb, Cr, Co, Cu, Mn, Ni, V)	0.50	
Dioxins and Furans	1.0×10^{-7}	
PAHs (as B[a]P)	0.001	
PCBs	0.005	
Emission Rate (g/s)	**Long-Term**	**Short-Term**
PM_{10}	0.22	0.67
TOC	0.22	0.45
HCl	0.22	1.3
HF	0.02	0.090
CO	1.1	2.2
SO_2	1.1	4.5
NOx	4.5	9.0
Group I (Cd, Tl)	0.0011	
Group II (Hg)	0.011	
Group III (Sb, As, Pb, Cr, Co, Cu, Mn, Ni, V)	2.2×10^{-9}	
Dioxins and Furans	2.2×10^{-5}	
PAHs (as B[a]P)	1.1×10^{-4}	
PCBs	2.9×10^{-6}	
(a) Actual flow rate at 411 K and 9.7% O_2, 101.3 kPa, 15% H_2O (b) Reference conditions: 273 K and 11% O_2, 101.3 kPa, dry gas		

APPENDIX D – WIND ROSES

Figure D1: 2009

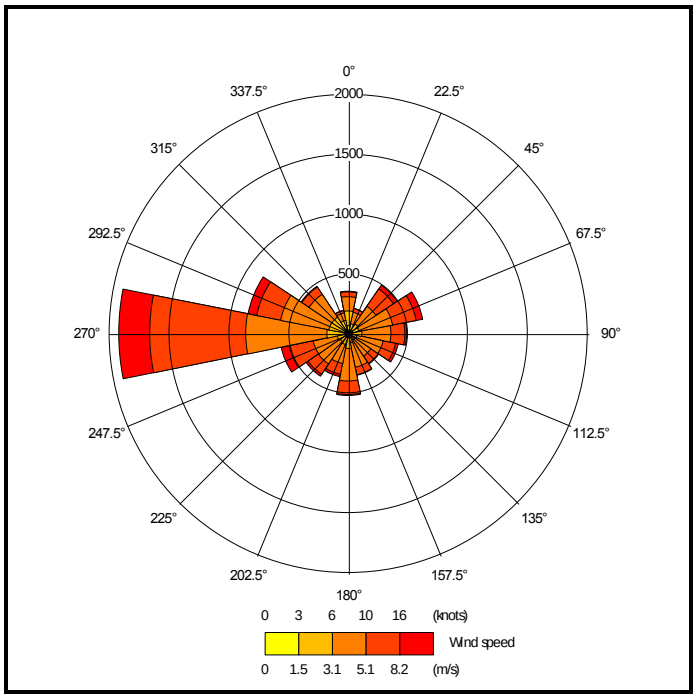


Figure D2: 2010

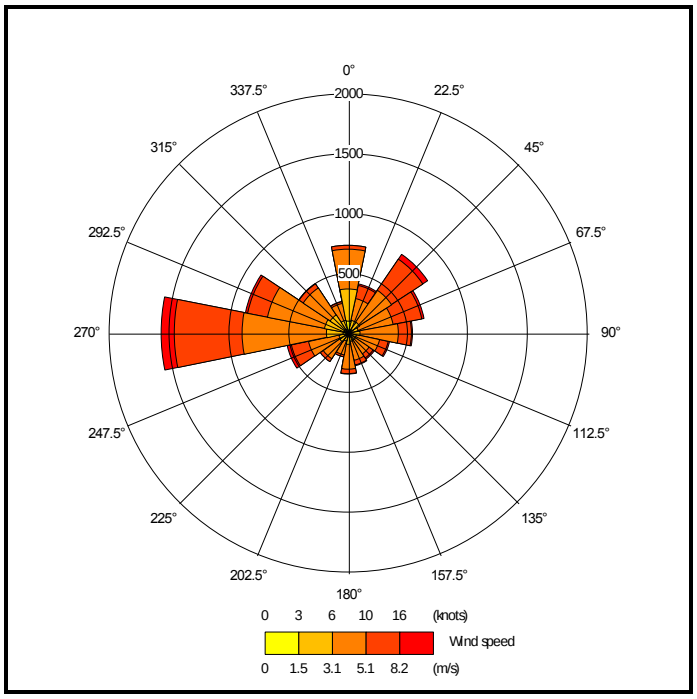


Figure D3: 2011

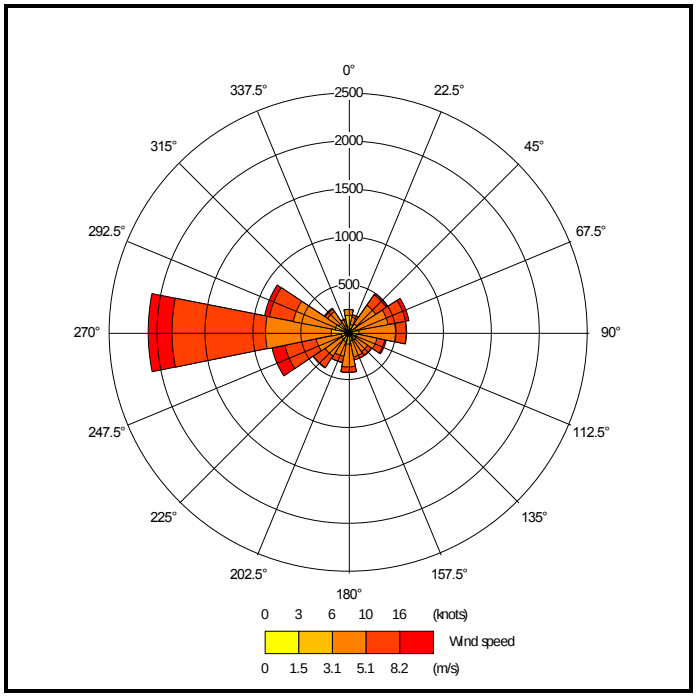


Figure D4: 2012

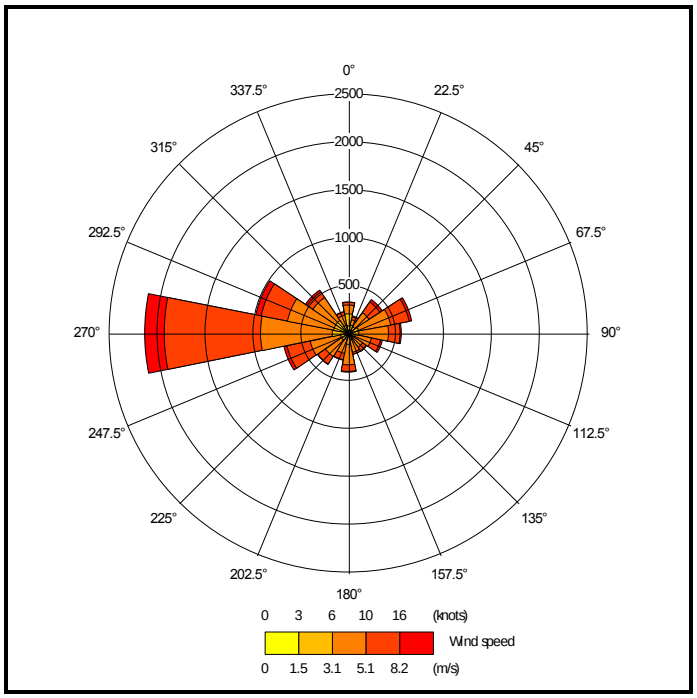
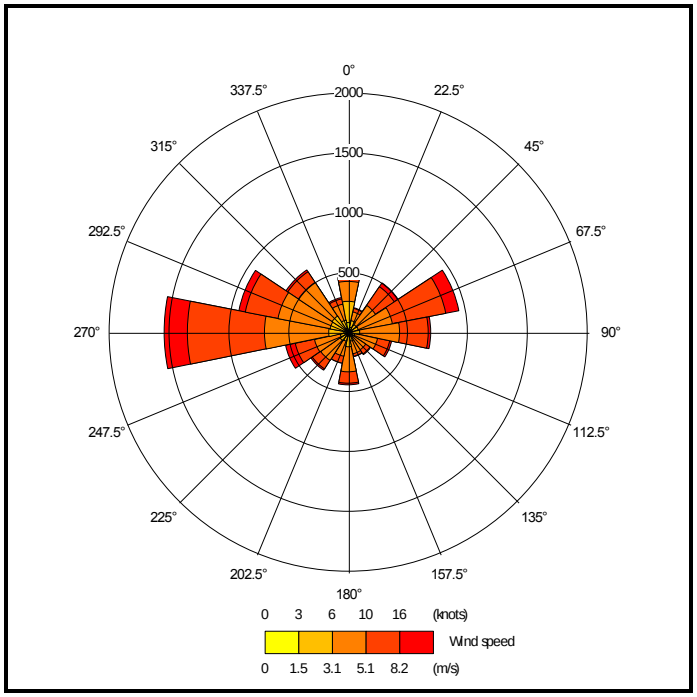


Figure D5: 2013



APPENDIX E - ENVIRONMENTAL ASSESSMENT LEVELS FOR THE PROTECTION OF VEGETATION AND ECOSYSTEMS

Critical Levels

Critical levels are thresholds of airborne pollutant concentrations above which damage may be sustained to sensitive plants and animals.

The critical levels for the protection of vegetation and ecosystems as defined by the EU Directive 2008/50/EC and the 2010 UK Air Quality Standards Regulations are summarised in Table E1.

Table E1: Critical Levels for the Protection of Vegetation and Ecosystems

Pollutant	Averaging Period	Concentration (μg/m^3)
Oxides of Nitrogen (NOx)	Annual Mean	30
	Daily Mean	75
Sulphur Dioxide (SO_2)	Annual Mean	10 (sensitive habitats with lichen and bryophytes)
		20 (all other habitats)
Hydrogen Fluoride (HF)	Weekly Mean	0.5
	Daily Mean	5

The critical levels are based on monitoring criteria and only apply in the following areas:

- more than 20 km from agglomerations; and
- more than 5 km away from other built up areas, industrial installations motorways and major roads with a traffic count of more than 50,000 vehicles per day.

Nationally, around 37% of designated sites currently do not fall within the above criteria and are therefore excluded from the objectives. None of the habitat sites within 10 km of the proposed development are sufficiently rural for the objectives to apply; however, the Environment Agency's H1 guidance states that

"the critical levels should be applied at all locations as a matter of policy, as they represent a standard against which to judge ecological harm".

Background NOx and SO_2 concentrations for the identified habitat sites have been obtained from Air Pollution Information System (APIS) and are summarised in Table E2. In the absence of site specific data, the rural background HF concentration of 0.5 μg/m^3 is assumed to provide a reasonable estimate of the background concentration at the designated sites.

Table E2: Annual Mean Background NOx and SO_2 Concentrations (µg/m^3)

Habitat Site	NOx	SO_2
Cadoxton River SINC	14.4	2.2
Cadoxton Wetlands SINC	14.4	2.2
Fields at Merthyr Dyfan SINC	14.4	2.2
Friars Point SINC	14.4	2.2
Gladstone Road Pond SINC	14.4	2.2
Nells Point East SINC	14.4	2.2
North of North Road SINC	14.4	2.2
Cadoxton Ponds Wildlife Trust Reserve	14.4	2.2
Severn Estuary Ramsar	11.9	1.9
Severn Estuary SPA	11.9	1.9
Ancient Woodland (Hayes Lane)	14.4	2.2

Critical Loads

Critical loads refer to the threshold beyond which deposition of pollutants to water or land results in measurable damage to vegetation and habitats. This takes the form of either gravitational settling of particulate matter (dry deposition) or wet deposition, where atmospheric pollutants dissolve in water vapour and then precipitate to the ground (e.g. as rain, snow, fog etc.).

Critical loads for eutrophication (nutrient nitrogen deposition) and background nutrient nitrogen deposition rates have been obtained from APIS and are summarised in Table E3 for the identified habitat sites.

Table E3: Critical Loads (Eutrophication) and Background Nutrient Nitrogen Deposition

Habitat Site	Primary Sensitive Habitat	Critical Load (kg N/ha/a)	Background N Deposition (kg N/ha/a)
Cadoxton River SINC	Reedbeds	15	12.0
Cadoxton Wetlands SINC	Reedbeds	15	12.0
Fields at Merthyr Dyfan SINC	Lowland meadow	20	12.0
Friars Point SINC	Lowland meadow	20	12.0
Gladstone Road Pond SINC	Pond	n/a	12.0
Nells Point East SINC	Lowland meadow	20	12.0
North of North Road SINC	Reedbeds	15	12.0
Cadoxton Ponds Wildlife Trust Reserve	Reedbeds	15	12.0
Severn Estuary Ramsar	Improved grassland	10	10.4
Severn Estuary SPA	Improved grassland	10	10.4
Ancient Woodland (Hayes Lane)	Broadleaved Woodland	10	21.4

The background nutrient nitrogen deposition rates are within the critical loads at the majority of the identified habitat sites.

For acidic deposition, the critical load of a habitat site is largely determined by the underlying geology and soils. The critical load of acidification is defined by a critical load function (CLF), which describes the relationship between the relative contributions of sulphur (S) and nitrogen (N) to the total acidification.

The critical load function is defined by the following parameters:

- CLmaxS, the maximum critical load of acidity for S, assuming there is no N deposition;
- CLminN, is the critical load of acidity due to nitrogen removal processes in the soil only (i.e. independent of deposition); and
- CLmaxN, is the maximum critical load of acidity for N, assuming there is no S deposition.

Where available from APIS, the critical loads for acidification for the identified habitat sites are presented in Table E4. For comparison with the critical load function (CLF), the HCl acidification rate is combined with the S acidification rate.

Table E4: Critical Loads (Acidification) and Background Nitrogen and Sulphur Acidification Rates

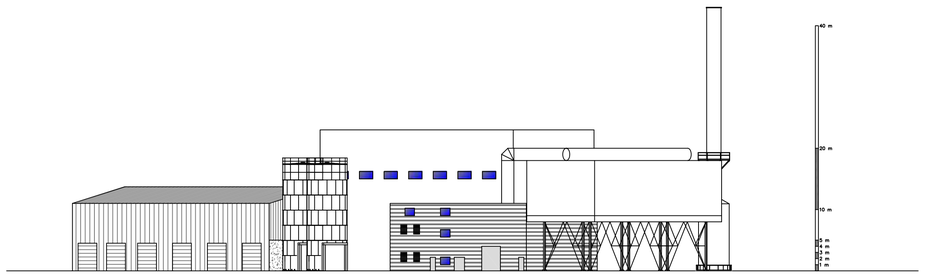
Habitat Site	Critical Load (keq/ha/a)			Background Acidification (keq/ha/a)			Background (as a %age of CLF)
	Max S	Min N	Max N	N	S	HCl (a)	
Cadoxton River SINC	n/a	n/a	n/a	0.86	0.14	0.053	n/a
Cadoxton Wetlands SINC	n/a	n/a	n/a	0.86	0.14	0.053	n/a
Fields at Merthyr Dyfan SINC	3.9	0.85	4.7	0.86	0.14	0.053	22.3%
Friars Point SINC	3.9	0.85	4.7	0.86	0.14	0.053	22.3%
Gladstone Road Pond SINC	n/a	n/a	n/a	0.86	0.14	0.053	n/a
Nells Point East SINC	3.9	0.85	4.7	0.86	0.14	0.053	22.3%
North of North Road SINC	n/a	n/a	n/a	0.86	0.14	0.053	n/a
Cadoxton Ponds Wildlife Trust Reserve	n/a	n/a	n/a	0.86	0.14	0.053	n/a
Severn Estuary Ramsar	n/a	n/a	n/a	0.74	0.14	0.053	n/a
Severn Estuary SPA	n/a	n/a	n/a	0.74	0.14	0.053	n/a
Ancient Woodland (Hayes Lane)	2.8	0.36	3.1	1.5	0.17	0.13	58.5%
(a) Based on background HCl concentration of 0.24µg/m^3							

The majority of the habitat sites are insensitive to acidification according to APIS, however where CLFs exist the background acidification rates are well within the relevant levels.

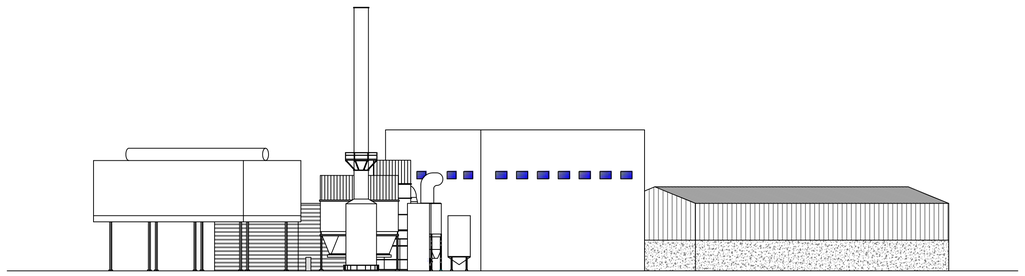
Appendix 1(3): 2015 Application - Layout (2014)

Drawing number
E1627–2116

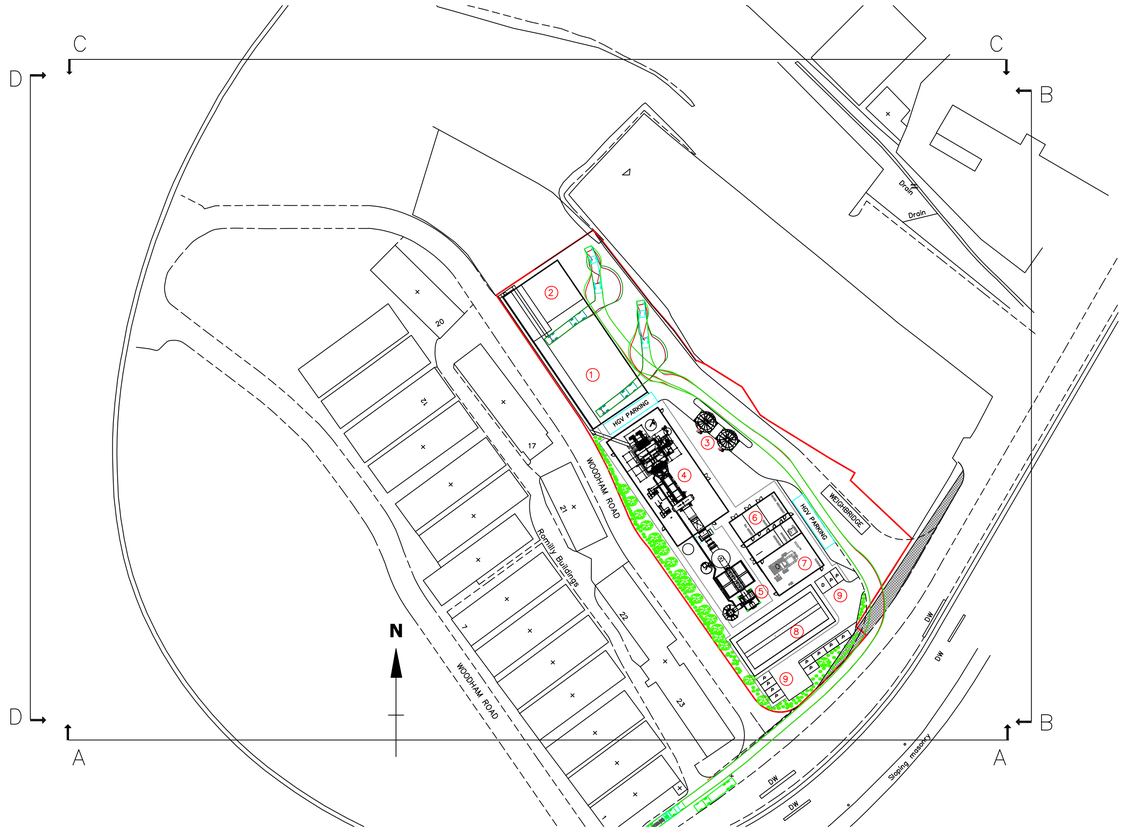
General notes

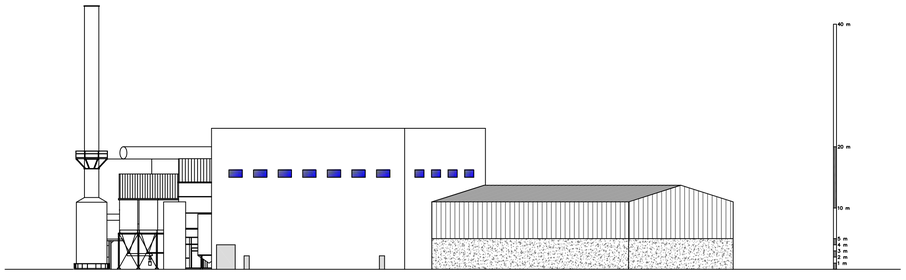


SECTION A-A

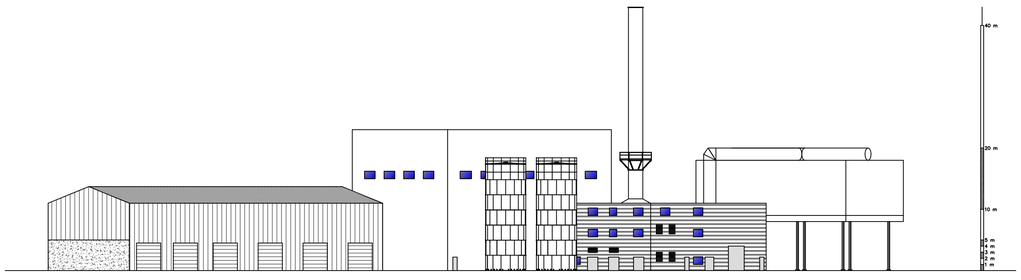


SECTION B-B





SECTION C-C



SECTION D-D

1:500 10 0 10 20m

Rev	Revision details	Drn	Chk	App	Date
C					
B	STACK HEIGHT CORRECTED TO 43m	JW	JW	KC	20.07.15
A	REDRAWN ISSUED FOR PLANNING APPLICATION	KDAM	KDAM	KC	20.03.15

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Fax: 01543 496601

Customer
SUNRISE RENEWABLES

Project
BARRY ACT

Title
SITE ELEVATIONS
A–A , B–B, C–C ,D–D

Drawn by:	KDAM	20.03.15	Checked:	KC	20.03.15	Scale 1:500
Designed:	KDAM	20.03.15	Approved:	KC	20.03.15	

Drawing number
E1627–2116

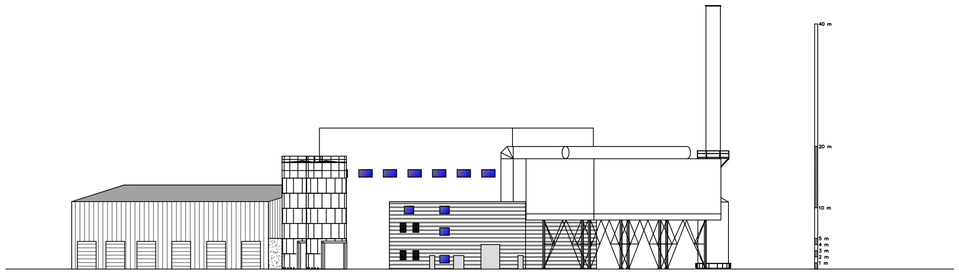
Rev.
B

DISCUSSION/COMMENT

Appendix 1(4): 2015 Application - Elevations (2014)

Drawing number
E1627–2117

General notes



SECTION A-A

10 0 10 20m
1:500

C					
B	STACK HEIGHT CORRECTED TO 43m	JW	JW	KC	20.07.15
A	REDRAWN ISSUED FOR PLANNING APPLICATION	KDAM	KDAM	KC	20.03.15
Rev	Revision details	Drn	Chk	App	Date

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Customer
SUNRISE RENEWABLES

Project
BARRY ACT

Title
SITE ELEVATIONS
A–A

Drawn by:	KDAM	20.03.15	Checked:	KC	20.03.15	Scale 1:500
Designed:	KDAM	20.03.15	Approved:	KC	20.03.15	

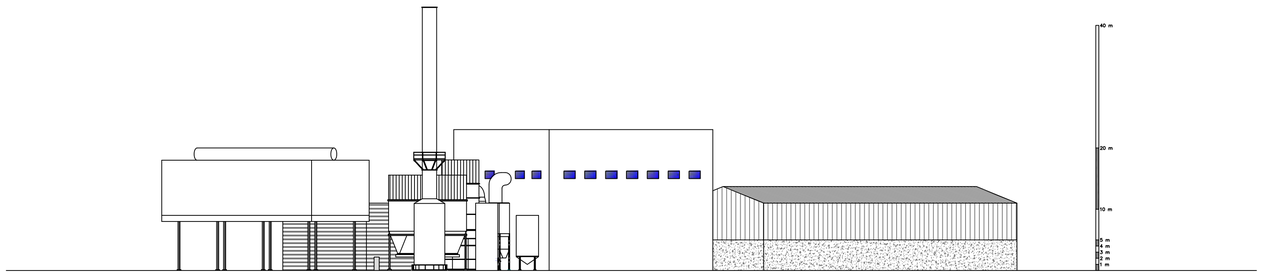
Drawing number
E1627–2117

Rev.
B

DISCUSSION/COMMENT

Drawing number
E1627–2118

General notes



SECTION B-B

10 0 10 20m
1:500

Rev	Revision details	Drn	Chk	App	Date
C					
B	STACK HEIGHT CORRECTED TO 43m	JW	JW	KC	20.07.15
A	REDRAWN ISSUED FOR PLANNING APPLICATION	KDAM	KDAM	KC	22.08.14

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Customer
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Project
BARRY ACT

Title
SITE ELEVATIONS
B–B

Drawn by:	KDAM	20.03.15	Checked:	KC	20.03.15	Scale 1:500
Designed:	KDAM	20.03.15	Approved:	KC	20.03.15	

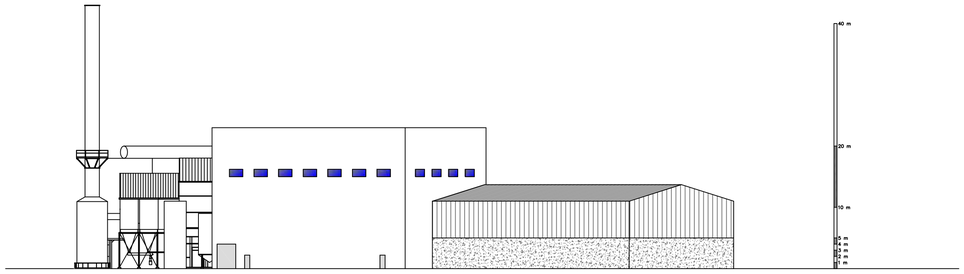
Drawing number
E1627–2118

Rev.
B

DISCUSSION/COMMENT

Drawing number
E1627–2119

General notes



SECTION C-C

10 0 10 20m
1: 500

Rev	Revision details	Drn	Chk	App	Date
C					
B	STACK HEIGHT CORRECTED TO 43m	JW	JW	KC	20.07.15
A	REDRAWN ISSUED FOR PLANNING APPLICATION	KDAM	KDAM	KC	20.03.15

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Customer
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Project
BARRY ACT

Title
SITE ELEVATIONS
C–C

Drawn by:	KDAM	20.03.15	Checked:	KC	20.03.15	Scale 1:500
Designed:	KDAM	20.03.15	Approved:	KC	20.03.15	

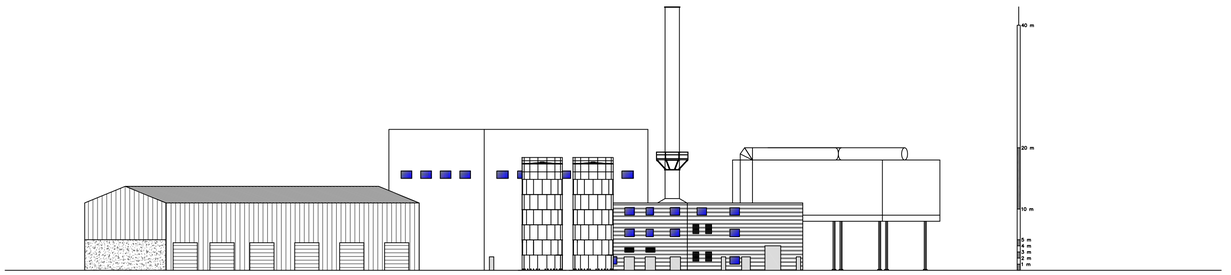
Drawing number
E1627–2119

Rev.
B

DISCUSSION/COMMENT

Drawing number
E1627–2120

General notes



SECTION D-D

10 0 10 20m
1:500

Rev	Revision details	Drn	Chk	App	Date
C					
B	STACK HEIGHT CORRECTED TO 43m	JW	JW	KC	20.07.15
A	REDRAWN ISSUED FOR PLANNING APPLICATION	KDAM	KDAM	KC	20.03.15

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Customer
SUNRISE RENEWABLES

Project
BARRY ACT

Title
SITE ELEVATIONS
D–D

Drawn by:	KDAM	20.03.15	Checked:	KC	20.05.15	Scale 1:500
Designed:	KDAM	20.03.15	Approved:	KC	20.03.15	

Drawing number
E1627–2120

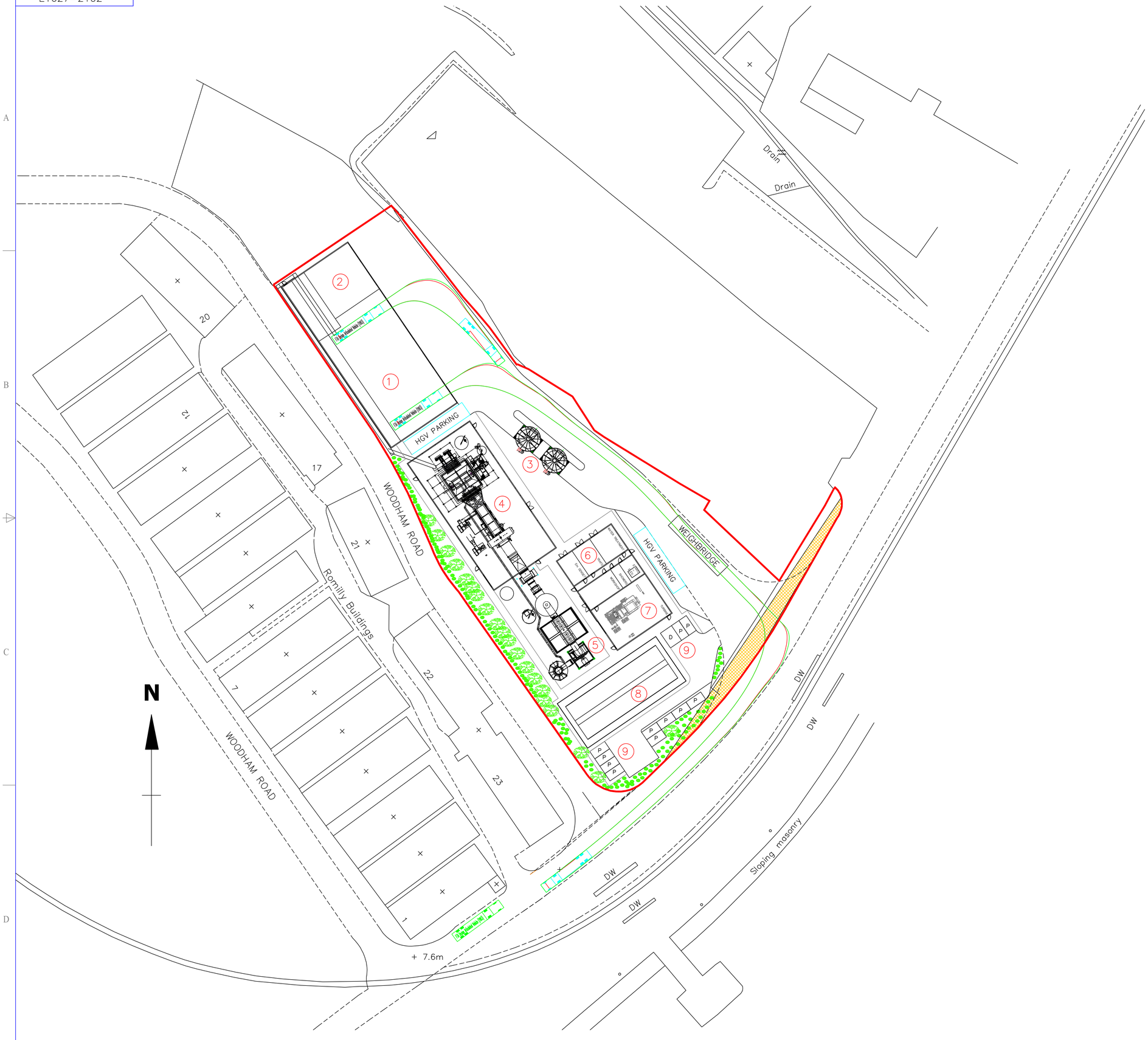
Rev.
B

DISCUSSION/COMMENT

Appendix 1(5): 2015 Application - Traffic Movement Plan (2014)

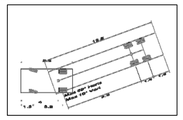
Drawing number
E1627–2102

ORIGINAL SHEET SIZE A1 - DO NOT SCALE



Vehicle Name: FTA Design Articulated Vehicle (1983)

Type:	Articulated Vehicle
Category	Savoy
Classification	Savoy
Source:	Designing for deliveries, FTA 1983
Description:	Design vehicle
Notes:	
Unit 1 Name	FTA Design Articulated Vehicle Tractor
Unit 1 Name	FTA Design Articulated Vehicle Semi-Trailer



FTA Design Articulated Vehicle (1983)

Overall Length	15.500m
Overall Width	2.500m
Overall Body Height	3.695m
Min Body Ground Clearance	0.427m
Track Width	2.500m
Lock to Lock Time	6.00s
Kerb to Kerb Turning Radius	6.750m

Vehicle Tracking Vehicle Details Ref: 100042

Unit Name: Tractor	**FTA Design Articulated Vehicle**
Type:	Tractor (with driver controlled steering)
Body style: (Small)	Articulated Vehicle Tractor
Classification	Savoy
Source:	Designing for deliveries, FTA 1983
Description:	Design vehicle
Notes:	
Datum:	Front Primary Axle
Front Axle(s): wheels turn)	1 Ackerman (axles fixed,
Primary Front Axle Offset:	0.000m
Effective Front Axle Offset:	0.000m (Auto Calculated)
Maximum Wheel Angle:	Unlimited
Status:	Active Non Self-Steered
Track Width:	2.500m
Total Wheels: of the axle)	2 (positioned at the ends
Tyre Width: - proportion of Track Width)	0.250m (Auto Calculated
Tyre Diameter: - proportion of Track Width)	0.875m (Auto Calculated
Rear Axle(s):	1 Fixed
Primary Rear Axle Offset: behind Front Primary Axle)	3.200m (Innermost Axle
Effective Rear Axle Offset: Calculated)	3.200m (Auto
Maximum Wheel Angle:	Unlimited
Status:	Active Non Self-Steered
Track Width:	2.500m
Total Wheels: ends of the axle)	4 (positioned at the
Tyre Width: Calculated - proportion of Track Width)	0.250m (Auto
Tyre Diameter: Calculated - proportion of Track Width)	0.875m (Auto
Steering:	Front Axle(s):
Min. Kerb / Kerb Turning Radius: upon all axles)	6.750m (based
Calculated Maximum Wheel Angle:	42.000deg
Lock to Lock Time (Fwd/Rev):	6.0sec / 6.0sec
Driver / Pilot	
Driver Offset Longitudinally: of Front Primary Axle)	-0.200m (in front
Driver / Pilot Offset Laterally: Centreline)	-0.600m (Right of
Driver Height: ground level)	2.200m (Above
Front coupling:	None
Rear coupling:	Generic
Coupling Offset: Front Primary Axle)	2.700m (behind
Coupling Height: Calculated - proportion of Tyre Diameter)	0.875m (Auto
Capability: towed	Can tow or be
Max. Horizontal Articulation Angle:	90.000deg
Max. Vertical Articulation Angle:	10.000deg
Body outline (plan):	
Outline Type:	Rectangle
Offset (X,Y): 0.000m	-1.300m,
Length / Width: 2.500m	5.500m /
Outline Type:	Line
Offset (X,Y):	3.200m, 0.000m
Vertices...	
1	0.000, 0.000

Unit Name: Semi-Trailer	**FTA Design Articulated Vehicle**
Type: steering)	Trailer (no driver controlled
Body style:	Articulated Vehicle Semi-Trailer
Classification	Savoy
Source: 1983	Designing for deliveries, FTA
Description:	Design vehicle
Notes:	
Datum:	Front coupling
Maximum Articulation Angle:	90deg (to previous unit)
Front Axle(s):	None
Rear Axle(s):	2 Fixed (All axles identical)
Primary Rear Axle Offset: Front coupling)	8.300m (Innermost Axle behind
Effective Rear Axle Offset:	9.000m (Auto Calculated)
Maximum Wheel Angle:	Unlimited
Rear Axle Spacing:	1.400m
Status:	Active Non Self-Steered
Track Width:	2.500m
Total Wheels: axle)	4 (positioned at the ends of the
Tyre Width: proportion of Track Width)	0.250m (Auto Calculated -
Tyre Diameter: proportion of Track Width)	0.875m (Auto Calculated -
Front coupling:	Generic
Coupling Offset: coupling)	0.000m (In front of Front
Coupling Height: proportion of Tyre Diameter)	0.438m (Auto Calculated -
Capability:	Can tow or be towed
Max. Horizontal Articulation Angle:	90.000deg
Max. Vertical Articulation Angle:	10.000deg
Rear coupling:	Generic
Coupling Offset:	8.300m (behind Front coupling)
Coupling Height: proportion of Tyre Diameter)	0.875m (Auto Calculated -
Capability:	Can tow or be towed
Max. Horizontal Articulation Angle:	90.000deg
Max. Vertical Articulation Angle:	10.000deg
Body outline (plan):	
Outline Type:	Rectangle
Offset (X,Y):	-0.700m, 0.000m
Length / Width:	12.200m / 2.500m
Outline Type:	Line
Offset (X,Y):	8.300m, 0.000m
Vertices...	
1	0.000, 0.000

General notes

Legend

1. FEEDSTOCK RECEPTION
2. FEEDSTOCK FEED SYSTEM
3. ASH SILOS
4. MAIN PROCESS BUILDING
5. FGT AND EXHAUST (EXTERNAL)
6. WELFARE & ANCILLIARIES
7. TURBINE
8. ACC
9. CAR PARKING

SITE ENTRANCE/EXIT VISIBILITY SPLAY

1: 500 — 10 0 10 20m

Rev	Revision details	Drn	Chk	App	Date
C					
B					
A	REDRAWN FROM E1627–2002 ISSUED FOR DISCUSSION	JW	MVG	KC	20.03.15

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Customer
SUNRISE RENEWABLES

Project
BARRY ACT

Title
TRAFFIC MOVEMENTS
EXIT MOVEMENT FROM
RECEPTION HALL

Drawn by:	JW	20.03.15	Checked:	KC	20.03.05	Scale 1:500
Designed:	KDAM	20.03.15	Approved:	KC	20.03.15	

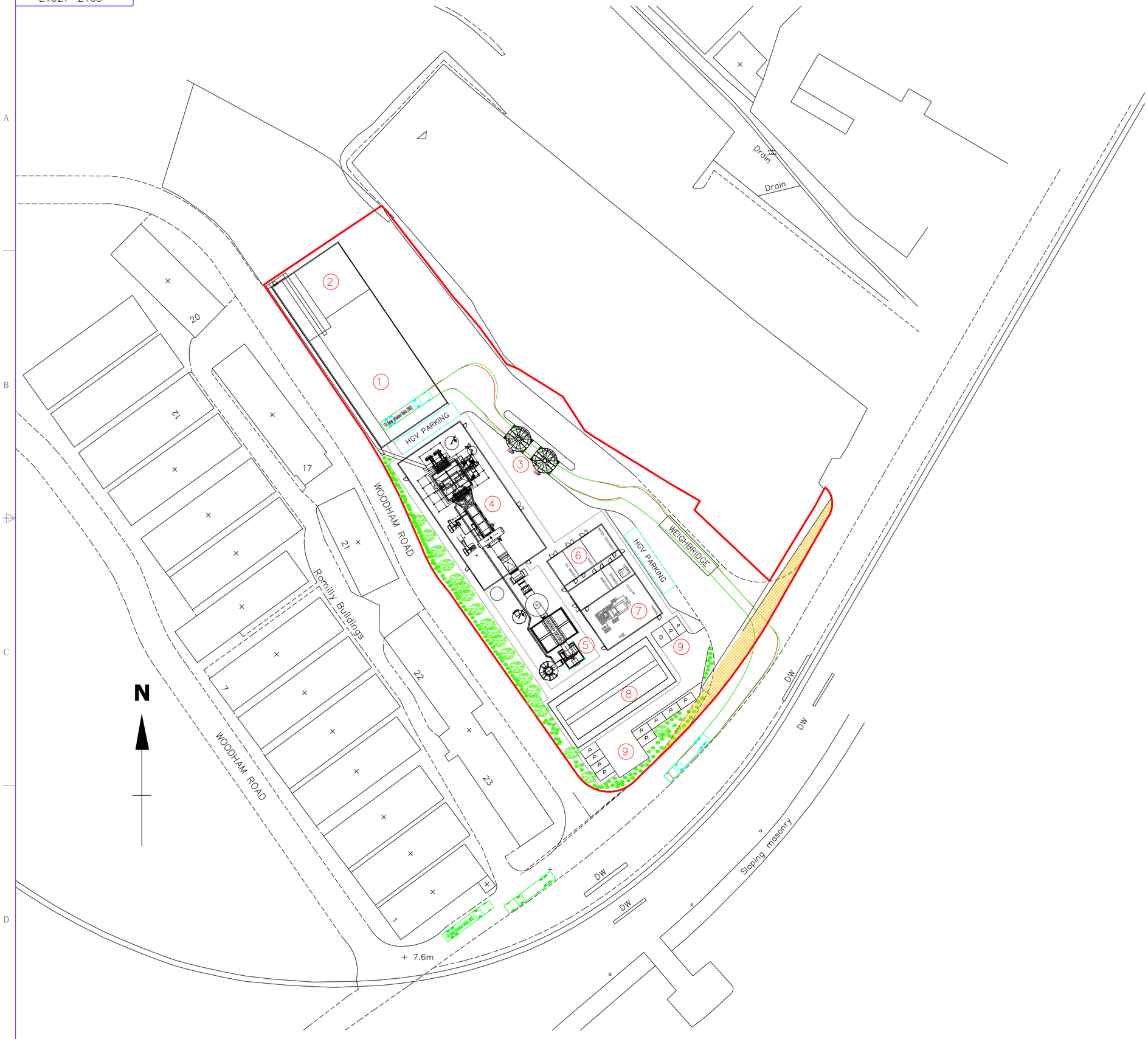
Drawing number
E1627–2102

Rev.
A

DISCUSSION/COMMENT

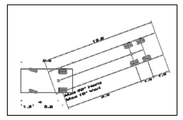
Drawing number
E1627–2103

ORIGINAL SHEET SIZE A1 - DO NOT SCALE



Vehicle Name: FTA Design Articulated Vehicle (1983)

Type:	Articulated Vehicle
Category	Savoy
Classification	Savoy
Source:	Designing for deliveries, FTA 1983
Description:	Design vehicle
Notes:	
Unit 1 Name	FTA Design Articulated Vehicle Tractor
Unit 1 Name	FTA Design Articulated Vehicle Semi-Trailer



FTA Design Articulated Vehicle (1983)

Overall Length	15.500m
Overall Width	2.500m
Overall Body Height	3.695m
Min Body Ground Clearance	0.427m
Track Width	2.500m
Lock to Lock Time	6.00s
Kerb to Kerb Turning Radius	6.750m

Vehicle Tracking Vehicle Details Ref: 100042

Unit Name:	**FTA Design Articulated Vehicle Tractor**
Type:	Tractor (with driver controlled steering)
Body style:	Articulated Vehicle Tractor (Small)
Classification	Savoy
Source:	Designing for deliveries, FTA 1983
Description:	Design vehicle
Notes:	
Datum:	Front Primary Axle
Front Axle(s):	1 Ackerman (axles fixed, wheels turn)
Primary Front Axle Offset:	0.000m
Effective Front Axle Offset:	0.000m (Auto Calculated)
Maximum Wheel Angle:	Unlimited
Status:	Active Non Self-Steered
Track Width:	2.500m
Total Wheels:	2 (positioned at the ends of the axle)
Tyre Width: - proportion of Track Width)	0.250m (Auto Calculated
Tyre Diameter: - proportion of Track Width)	0.875m (Auto Calculated
Rear Axle(s):	1 Fixed
Primary Rear Axle Offset:	3.200m (Innermost Axle behind Front Primary Axle)
Effective Rear Axle Offset:	3.200m (Auto Calculated)
Maximum Wheel Angle:	Unlimited
Status:	Active Non Self-Steered
Track Width:	2.500m
Total Wheels:	4 (positioned at the ends of the axle)
Tyre Width:	0.250m (Auto Calculated - proportion of Track Width)
Tyre Diameter:	0.875m (Auto Calculated - proportion of Track Width)
Steering:	Front Axle(s):
Min. Kerb / Kerb Turning Radius:	6.750m (based upon all axles)
Calculated Maximum Wheel Angle:	42.000deg
Lock to Lock Time (Fwd/Rev):	6.0sec / 6.0sec
Driver / Pilot	
Driver Offset Longitudinally:	-0.200m (in front of Front Primary Axle)
Driver / Pilot Offset Laterally:	-0.600m (Right of Centreline)
Driver Height:	2.200m (Above ground level)
Front coupling:	None
Rear coupling:	Generic
Coupling Offset:	2.700m (behind Front Primary Axle)
Coupling Height:	0.875m (Auto Calculated - proportion of Tyre Diameter)
Capability:	Can tow or be towed
Max. Horizontal Articulation Angle:	90.000deg
Max. Vertical Articulation Angle:	10.000deg
Body outline (plan):	
Outline Type:	Rectangle
Offset (X,Y):	-1.300m, 0.000m
Length / Width:	5.500m / 2.500m
Outline Type:	Line
Offset (X,Y):	3.200m, 0.000m
Vertices...	
1	0.000, 0.000

Unit Name:	**FTA Design Articulated Vehicle Semi-Trailer**
Type:	Trailer (no driver controlled steering)
Body style:	Articulated Vehicle Semi-Trailer
Classification	Savoy
Source:	Designing for deliveries, FTA 1983
Description:	Design vehicle
Notes:	
Datum:	Front coupling
Maximum Articulation Angle:	90deg (to previous unit)
Front Axle(s):	None
Rear Axle(s):	2 Fixed (All axles identical)
Primary Rear Axle Offset:	8.300m (Innermost Axle behind Front coupling)
Effective Rear Axle Offset:	9.000m (Auto Calculated)
Maximum Wheel Angle:	Unlimited
Rear Axle Spacing:	1.400m
Status:	Active Non Self-Steered
Track Width:	2.500m
Total Wheels:	4 (positioned at the ends of the axle)
Tyre Width:	0.250m (Auto Calculated - proportion of Track Width)
Tyre Diameter:	0.875m (Auto Calculated - proportion of Track Width)
Front coupling:	Generic
Coupling Offset:	0.000m (in front of Front coupling)
Coupling Height:	0.438m (Auto Calculated - proportion of Tyre Diameter)
Capability:	Can tow or be towed
Max. Horizontal Articulation Angle:	90.000deg
Max. Vertical Articulation Angle:	10.000deg
Rear coupling:	Generic
Coupling Offset:	8.300m (behind Front coupling)
Coupling Height:	0.875m (Auto Calculated - proportion of Tyre Diameter)
Capability:	Can tow or be towed
Max. Horizontal Articulation Angle:	90.000deg
Max. Vertical Articulation Angle:	10.000deg
Body outline (plan):	
Outline Type:	Rectangle
Offset (X,Y):	-0.700m, 0.000m
Length / Width:	12.200m / 2.500m
Outline Type:	Line
Offset (X,Y):	8.300m, 0.000m
Vertices...	
1	0.000, 0.000

General notes

Legend

1. FEEDSTOCK RECEPTION
2. FEEDSTOCK FEED SYSTEM
3. ASH SILOS
4. MAIN PROCESS BUILDING
5. FGT AND EXHAUST (EXTERNAL)
6. WELFARE & ANCILLIARIES
7. TURBINE
8. ACC
9. CAR PARKING

SITE ENTRANCE/EXIT VISIBILITY SPLAY

10 0 10 20m
1: 500

Rev	Revision details	Drn	Chk	App	Date
C					
B					
A	REDRAWN FROM E1426–2003 ISSUED FOR DISCUSSION	JW	MVG	KC	20.03.15

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Customer
SUNRISE RENEWABLES

Project
BARRY ACT

Title
TRAFFIC MOVEMENTS
EXIT MOVEMENT FROM
RECEPTION HALL VIA ASH SILOS

Drawn by:	JW	20.03.15	Checked:	KC	20.03.15	Scale 1:500
Designed:	KDAM	20.03.15	Approved:	KC	20.03.15	

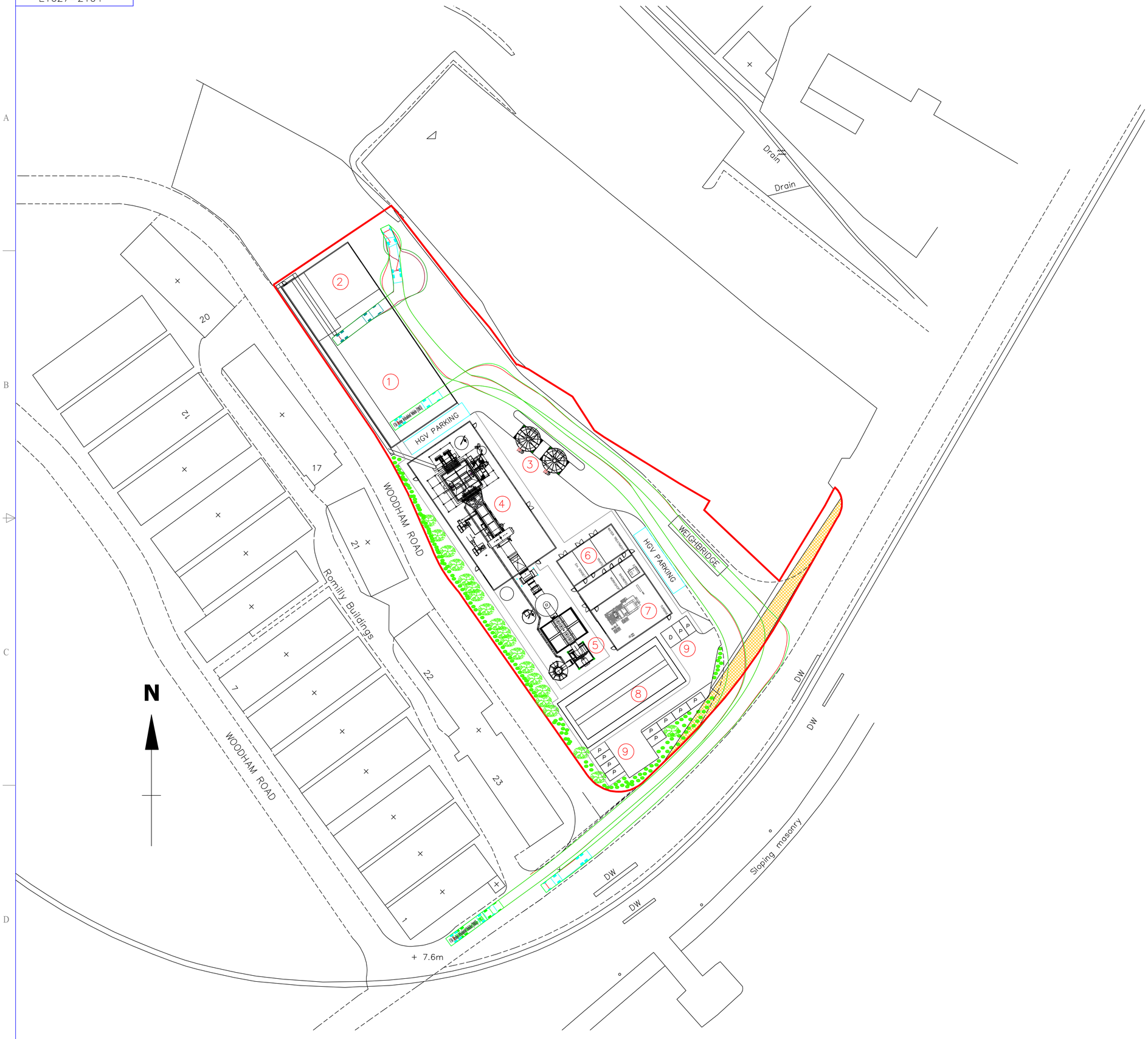
Drawing number
E1627–2103

Rev.
A

DISCUSSION/COMMENT

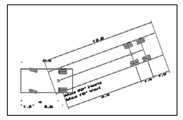
Drawing number
E1627–2104

ORIGINAL SHEET SIZE A1 - DO NOT SCALE



Vehicle Name: FTA Design Articulated Vehicle (1983)

Type:	Articulated Vehicle
Category	Savoy
Classification	Savoy
Source:	Designing for deliveries, FTA 1983
Description:	Design vehicle
Notes:	
Unit 1 Name	FTA Design Articulated Vehicle Tractor
Unit 1 Name	FTA Design Articulated Vehicle Semi-Trailer



FTA Design Articulated Vehicle (1983)

Overall Length	15.500m
Overall Width	2.500m
Overall Body Height	3.695m
Min Body Ground Clearance	0.427m
Track Width	2.500m
Lock to Lock Time	6.00s
Kerb to Kerb Turning Radius	6.750m

Vehicle Tracking Vehicle Details Ref: 100042

Unit Name:	**FTA Design Articulated Vehicle Tractor**
Type:	Tractor (with driver controlled steering)
Body style:	Articulated Vehicle Tractor (Small)
Classification	Savoy
Source:	Designing for deliveries, FTA 1983
Description:	Design vehicle
Notes:	
Datum:	Front Primary Axle
Front Axle(s):	1 Ackerman (axles fixed, wheels turn)
Primary Front Axle Offset:	0.000m
Effective Front Axle Offset:	0.000m (Auto Calculated)
Maximum Wheel Angle:	Unlimited
Status:	Active Non Self-Steered
Track Width:	2.500m
Total Wheels:	2 (positioned at the ends of the axle)
Tyre Width:	0.250m (Auto Calculated - proportion of Track Width)
Tyre Diameter:	0.875m (Auto Calculated - proportion of Track Width)
Rear Axle(s):	1 Fixed
Primary Rear Axle Offset:	3.200m (Innermost Axle behind Front Primary Axle)
Effective Rear Axle Offset:	3.200m (Auto Calculated)
Maximum Wheel Angle:	Unlimited
Status:	Active Non Self-Steered
Track Width:	2.500m
Total Wheels:	4 (positioned at the ends of the axle)
Tyre Width:	0.250m (Auto Calculated - proportion of Track Width)
Tyre Diameter:	0.875m (Auto Calculated - proportion of Track Width)
Steering:	Front Axle(s):
Min. Kerb / Kerb Turning Radius:	6.750m (based upon all axles)
Calculated Maximum Wheel Angle:	42.000deg
Lock to Lock Time (Fwd/Rev):	6.0sec / 6.0sec
Driver / Pilot	
Driver Offset Longitudinally:	-0.200m (in front of Front Primary Axle)
Driver / Pilot Offset Laterally:	-0.600m (Right of Centreline)
Driver Height:	2.200m (Above ground level)
Front coupling:	None
Rear coupling:	Generic
Coupling Offset:	2.700m (behind Front Primary Axle)
Coupling Height:	0.875m (Auto Calculated - proportion of Tyre Diameter)
Capability:	Can tow or be towed
Max. Horizontal Articulation Angle:	90.000deg
Max. Vertical Articulation Angle:	10.000deg
Body outline (plan):	
Outline Type:	Rectangle
Offset (X,Y):	-1.300m, 0.000m
Length / Width:	5.500m / 2.500m
Outline Type:	Line
Offset (X,Y):	3.200m, 0.000m
Vertices...	
1	0.000, 0.000

Unit Name:	**FTA Design Articulated Vehicle Semi-Trailer**
Type:	Trailer (no driver controlled steering)
Body style:	Articulated Vehicle Semi-Trailer
Classification	Savoy
Source:	Designing for deliveries, FTA 1983
Description:	Design vehicle
Notes:	
Datum:	Front coupling
Maximum Articulation Angle:	90deg (to previous unit)
Front Axle(s):	None
Rear Axle(s):	2 Fixed (All axles identical)
Primary Rear Axle Offset:	8.300m (Innermost Axle behind Front coupling)
Effective Rear Axle Offset:	9.000m (Auto Calculated)
Maximum Wheel Angle:	Unlimited
Rear Axle Spacing:	1.400m
Status:	Active Non Self-Steered
Track Width:	2.500m
Total Wheels:	4 (positioned at the ends of the axle)
Tyre Width:	0.250m (Auto Calculated - proportion of Track Width)
Tyre Diameter:	0.875m (Auto Calculated - proportion of Track Width)
Front coupling:	Generic
Coupling Offset:	0.000m (in front of Front coupling)
Coupling Height:	0.438m (Auto Calculated - proportion of Tyre Diameter)
Capability:	Can tow or be towed
Max. Horizontal Articulation Angle:	90.000deg
Max. Vertical Articulation Angle:	10.000deg
Rear coupling:	Generic
Coupling Offset:	8.300m (behind Front coupling)
Coupling Height:	0.875m (Auto Calculated - proportion of Tyre Diameter)
Capability:	Can tow or be towed
Max. Horizontal Articulation Angle:	90.000deg
Max. Vertical Articulation Angle:	10.000deg
Body outline (plan):	
Outline Type:	Rectangle
Offset (X,Y):	-0.700m, 0.000m
Length / Width:	12.200m / 2.500m
Outline Type:	Line
Offset (X,Y):	8.300m, 0.000m
Vertices...	
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General notes

Legend

1. FEEDSTOCK RECEPTION
2. FEEDSTOCK FEED SYSTEM
3. ASH SILOS
4. MAIN PROCESS BUILDING
5. FGT AND EXHAUST (EXTERNAL)
6. WELFARE & ANCILLIARIES
7. TURBINE
8. ACC
9. CAR PARKING

SITE ENTRANCE/EXIT VISIBILITY SPLAY

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1:500

Rev	Revision details	Drn	Chk	App	Date
C					
B					
A	REDRAWN FROM E1627–2001 ISSUED FOR DISCUSSION	JW	MVG	KC	20.03.15

Imtech
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Fax: 01543 496601

Customer
SUNRISE RENEWABLES

Project
BARRY ACT

Title
TRAFFIC MOVEMENTS
ENTRY AND EXIT FROM SITE

Drawn by:	JW	20.13.15	Checked:	KC	20.03.15	Scale 1:500
Designed:	KDAM	20.13.15	Approved:	KC	20.03.15	

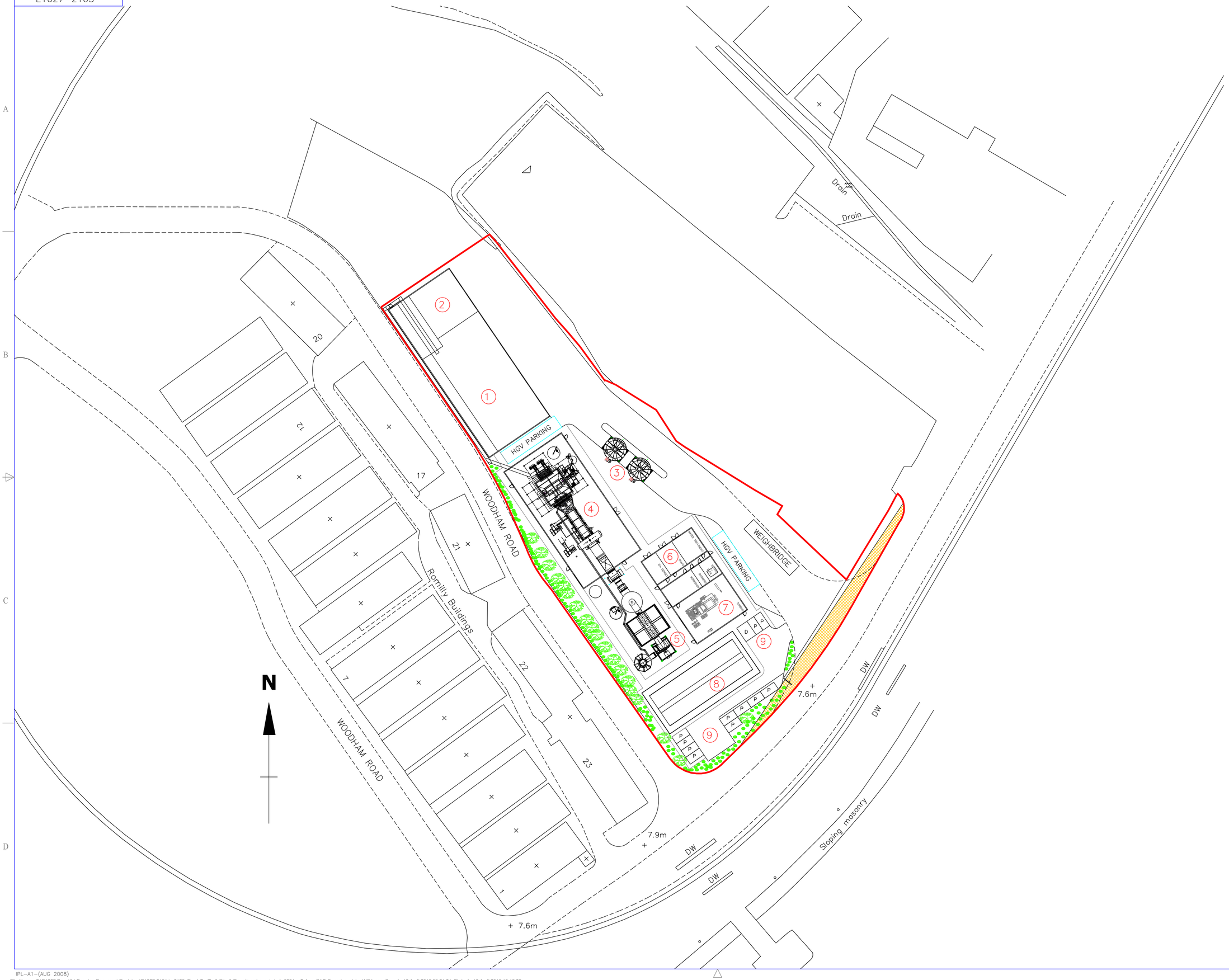
Drawing number
E1627–2104

Rev.
A

DISCUSSION/COMMENT

Drawing number
E1627–2105

ORIGINAL SHEET SIZE A1 - DO NOT SCALE



General notes

Legend

1. FEEDSTOCK RECEPTION
2. FEEDSTOCK FEED SYSTEM
3. ASH SILOS
4. MAIN PROCESS BUILDING
5. FGT AND EXHAUST (EXTERNAL)
6. WELFARE & ANCILLIARIES
7. TURBINE
8. ACC
9. CAR PARKING

SITE ENTRANCE/EXIT VISIBILITY SPLAY

10 0 10 20m
1:500

Rev	Revision details	Drn	Chk	App	Date
C					
B					
A	REDRAWN ISSUED FOR DISCUSSION	JW	MVG	KC	20.03.15

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Customer
SUNRISE RENEWABLES

Project
BARRY ACT

Title
SITE LAYOUT

Drawn by:	JW	20.03.15	Checked:	KC	20.03.15	Scale 1:500
Designed:	KDAM	20.03.15	Approved:	KC	20.03.15	

Drawing number
E1627–2105

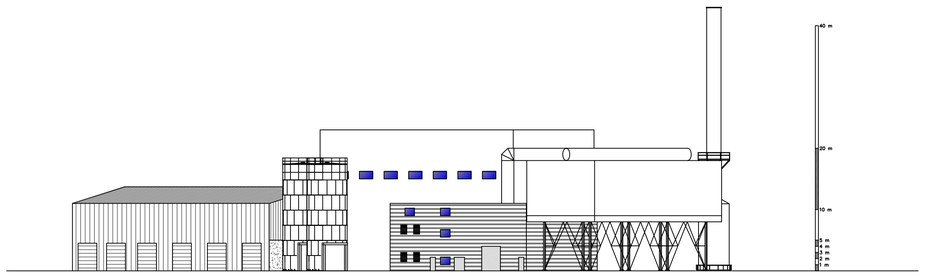
Rev.
A

DISCUSSION/COMMENT

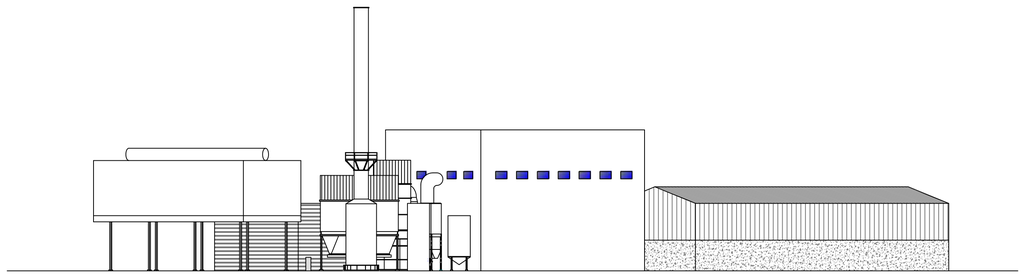
IPL–A1–(AUG 2008)

Drawing number
E1627–2116

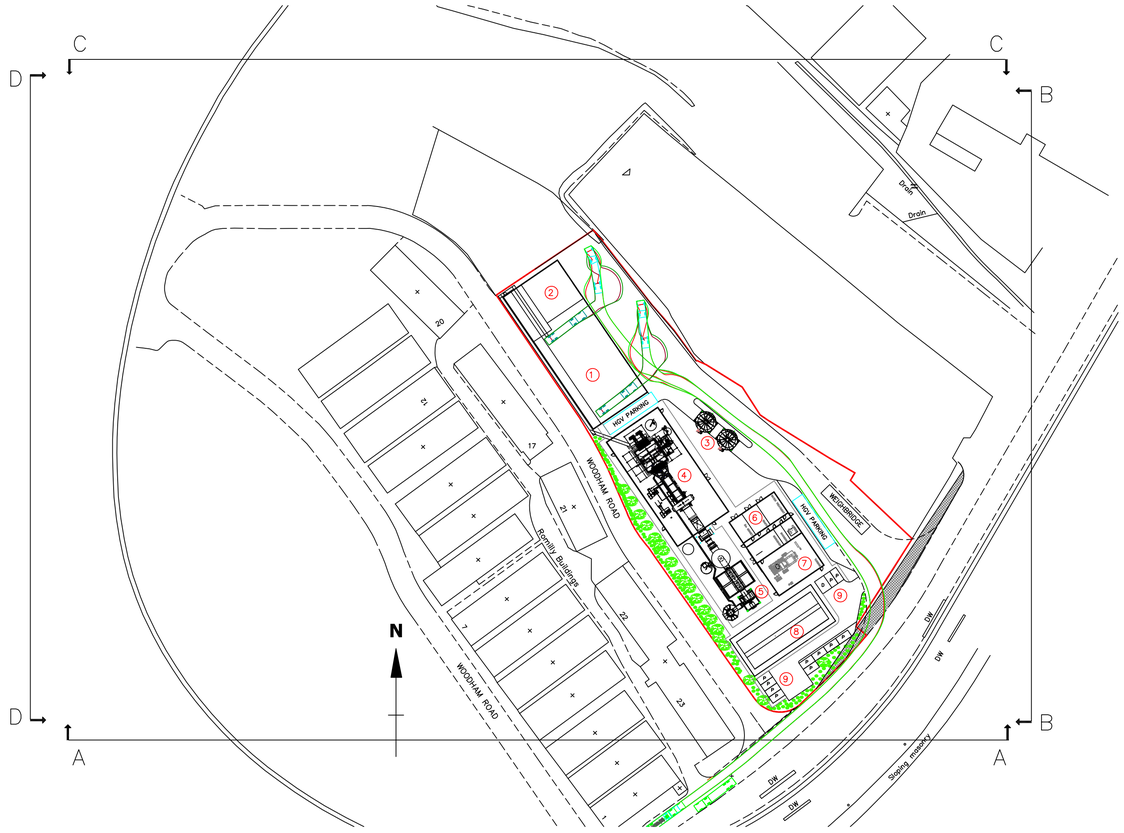
General notes

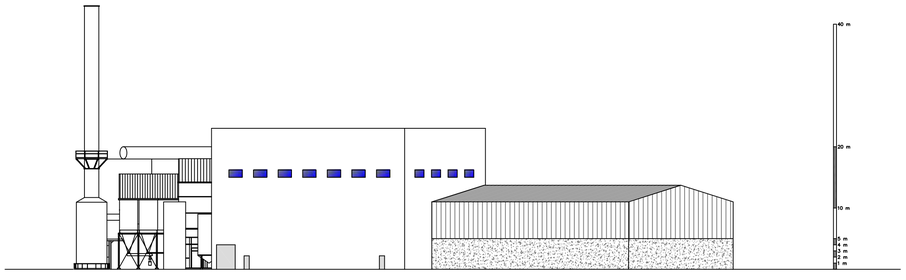


SECTION A-A

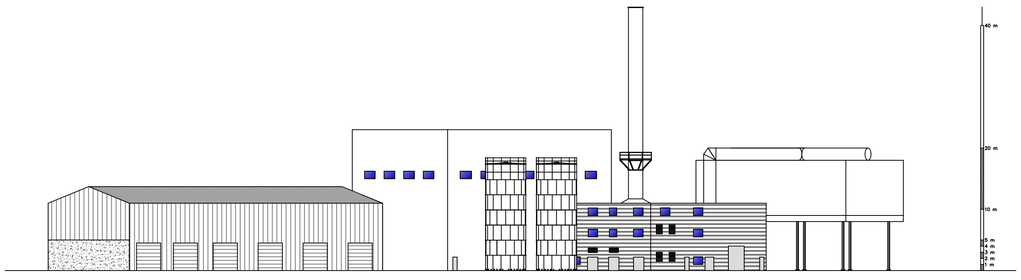


SECTION B-B





SECTION C-C



SECTION D-D

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Rev	Revision details	Drn	Chk	App	Date
C					
B	STACK HEIGHT CORRECTED TO 43m	JW	JW	KC	20.07.15
A	REDRAWN ISSUED FOR PLANNING APPLICATION	KDAM	KDAM	KC	20.03.15

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Customer
SUNRISE RENEWABLES

Project
BARRY ACT

Title
SITE ELEVATIONS
A–A , B–B, C–C ,D–D

Drawn by:	KDAM	20.03.15	Checked:	KC	20.03.15	Scale 1:500
Designed:	KDAM	20.03.15	Approved:	KC	20.03.15	

Drawing number
E1627–2116

Rev.
B

DISCUSSION/COMMENT

Appendix 1(6): 2015 Application - Policy Review (2014)

Policy Appraisal

in support of an application for
Outline Planning

by

Sunrise Renewables (Barry) Limited

under

the Town and Country Planning Act 1990

Sunrise Renewables
67 Bewsey Street,
Warrington,
WA2 7JQ, United Kingdom

1. Introduction

1.1 The Applicant, Sunrise Renewables (Barry) Limited, is developing a renewable energy plant based on an advanced conversion technology (ACT) at Woodham Road, Barry, CF63 4JE within the Port of Barry (the "**Project**").

1.2 The principle of establishing a wood fuelled power plant at the Project site was established by planning permission reference 2008/01203/FUL, as approved by appeal reference APP/Z6950/A/09/2114605 on 2nd July 2010 (the "**2010 Permission**").

1.3 The Applicant has prepared the present report into changes to policy considerations since the 2010 Permission, drawing on published sources. In particular, credit is given to Dow Corning and their consultants whose 2014 policy appraisal for a similar project in the Barry dockland area has been especially helpful.

2. National Energy Policy

2.1 Climate Change Act (2008)

2.1.1 The Climate Change Act 2008 makes it the duty of the Secretary of State to ensure that the net UK carbon account for all six Kyoto greenhouse gases for the year 2050 is at least 80% lower than the 1990 baseline, toward avoiding dangerous climate change. 5.20 The Act aims to enable the United Kingdom to become a low-carbon economy and gives ministers powers to introduce the measures necessary to achieve a range of greenhouse gas reduction targets. An independent Committee on Climate Change has been created under the Act to provide advice to UK Government on these targets and related policies. In the act Secretary of State refers to the Secretary of State for Energy and Climate Change.

2.1.2 The proposed Project would be a secure low carbon energy development and would therefore make a direct contribution towards the Government's Climate Change objectives.

2.1.3 It is considered that the principle of the Project is in accordance with European policy as it is an established technology which will successfully direct waste wood away from landfill and generate a renewable source of energy and heat, without significant adverse effects on the environment and human health.

2.2 UK Bioenergy Strategy (April 2012)

2.2.1 It is widely recognised that bioenergy has an important role to play if the UK is to meet its low carbon objectives by 2050. The strategy sets out the Coalition Government's approach to securing the benefits of bioenergy.

2.2.2 The UK Government has a responsibility to ensure that its policies only support bioenergy use in the right circumstances. This strategy is based on a statement of four principles which will act as a framework for future government policy on bioenergy. The four principles state that:

- *Policies that support bioenergy should deliver genuine carbon reductions that help meet UK carbon emissions objectives to 2050 and beyond;*
- *Support for bioenergy should make a cost effective contribution to UK carbon emission objectives in the context of overall energy goals: and*
- *Support for bioenergy should aim to maximise the overall benefits and minimise costs (quantifiable and non-quantifiable) across the economy.*

2.3 2020 Renewables Target

The 2009 Renewable Energy Directive sets a target for the UK to achieve 15% of its energy consumption from renewable sources by 2020. This compares to 3.3% in 2010. The scale of the increase over the next 8 years represents a huge challenge and will require strong contributions from all sectors of electricity, heat and transport.

2.4 2050 Carbon Reduction Target

2.4.1 The Climate Change Act 2008 establishes a long-term framework to tackle climate change.

2.4.2 The Act aims to encourage the transition to a low-carbon economy in the UK through unilateral legally binding emissions reduction targets. This means a reduction of emissions of at least 34% by 2020 and a

domestic greenhouse gas emissions reduction of at least 80 percent by 2050. Both targets are against a 1990 baseline.

2.4.3 It is clear there is a need for renewable energy developments in relation to both demand and the achievement of the Government's climate change objectives. On this basis substantial weights should be given to the contributions made by renewable energy developments such as the proposed Project.

2.5 UK Biomass Strategy (2007)

2.5.1 This strategy, published with the Government's Energy White Paper, meets the commitment made in the Energy Review (2006) and in the Government's response to the 2005 Biomass Task Force Report and brings together current UK Government policies in biomass for energy, transport and industry.

2.5.2 The Biomass Strategy acknowledges the importance of fuels sourced from biomass in tackling climate change. Biomass will have a central role to play in meeting the EU target of 20% renewable energy by 2020. The Climate Change Bill, published in draft in March 2007, sets out a proposed UK target of at least 60% cuts in carbon dioxide emissions by 2050 and a strong new system of carbon budgeting. We need to explore every avenue for achieving these cuts in emissions in sustainable ways over the decades ahead.

2.5.3 Biomass is renewable and generally has low carbon characteristics. Where biomass is produced and processed with due regard to sustainability and carbon savings, it can be carbon-neutral (the CO2 released when it is used to create energy can be offset by the CO2 it consumes when growing).

2.5.4 Biomass is also very versatile and can be used as fuel across the energy spectrum for electricity, heat and transport as well as the production of industrial material. At current usage levels biomass can be considered as an untapped resource.

2.5.5 The Government's strategy for biomass is intended to:

- *"realise a major expansion in the supply and use of biomass in the UK*
- *Facilitate the development of a competitive and sustainable market and supply chain*
- *Promote innovation and low-carbon technology development so biomass can deliver relatively higher energy yields contribute to overall environmental benefits and the health of ecosystems through the achievements of multiple benefits from land use*
- *Facilitate a shift towards to bio-economy through sustainable growth and development of biomass use of fuels and renewable materials*
- *Maximise the potential of biomass to contribute to the delivery of our climate change and energy policy goals: to reduce CO2 emissions, and achieve a secure, competitive and affordable supply of fuel"*

2.5.6 Paragraph 2.1 of the strategy states:

"Biomass is an important tool for tackling climate change, as well as offering new commercial opportunities. For the purposes of this strategy, we are taking biomass to mean any biological material, derived from plant and animal matter, which can be used for producing heat and/or power, fuels including transport fuels, or as a substitute for fossil fuel-based materials and products"

2.5.7 The proposed development will contribute to a more diverse and secure energy generation, and in turn contributes to the security of the UK's renewable energy supply at a time when energy demand is increasing and the impacts of climate change are gaining prominence in Government policy agendas.

2.5.8 National waste and energy policy contains a clear message: positive planning which facilitates renewable energy developments is essential if the government commitments to climate change and renewable energy are to be met. The role of Biomass is helping to meet these commitments is widely recognised and its use is encouraged.

2.6 The 2007 White Paper: Meeting the Energy Challenge

2.6.1 UK Energy policy is set out in the Energy White Paper of May 2007 and Low Carbon Transition Plan of July 2009.

2.6.2 The 2007 White Paper: "Meeting the Energy Challenge" sets out the Government's international and domestic energy strategy to address the long term energy challenges faced by the UK, and to deliver four key policy goals:

1. "To put the UK on a path to cut carbon dioxide emissions by some 60% by about 2050, with real progress by 2020;

2. To maintain reliable energy supplies;

3. To promote competitive markets in the UK and beyond, helping to raise the rate of sustainable economic growth and to improve productivity; and

4. To ensure that every home is adequately and affordably heated"

5. To ensure that every home is adequately and affordably heated"

2.6.3 The Government has set national targets for electricity generated from renewable sources and expects 10% of total electricity generation by 2010, 15% by 2013 and 20% by 2020.

2.6.4 The Government recognises the importance of recovering energy from biomass. Facilities should be sized and contracts designed in accordance with the local availability of fuel. The Government's targets on renewable energy generation, power generation processes such as energy from biomass must be considered.

2.6.5 There are a number of benefits of recovering energy from biomass, as follows:

- Improved energy security;
- Meeting UK energy demand in more sustainable way;
- Biomass heat generation can provide a cheap sustainable heat source;
- Biomass heat generation can replace coal for industrial sites, industrial processes and off grid locations; and
- Energy is recovered from material that may otherwise be landfilled or exported.

2.6.6 In particular, the White Paper confirms that applicants for energy development do not need to demonstrate either the overall need for renewable energy or its distribution, nor question the energy justification for why a proposal for such development must be sited in a particular location.

3. National Planning Policy

3.1 Wales Spatial Plan, update 2008

3.1.1 The Wales Spatial Plan sets out the national spatial planning framework for Wales, adopted by the Welsh Assembly. Key sections of the spatial plan provide significant encouragement of new developments as proposed in this application.

- Paragraph 11.6 of the spatial plan calls for a joint approach between local authorities and others to the delivery of regional energy and waste infrastructure to support the development of a sustainable economy
- Paragraph 12.3 calls for rethink of how energy and other resources are used in order to minimise future climate change.
- Paragraph 19.3 describes a low carbon city region that reduces its resource use, energy and travel footprints, and greenhouse gas emissions as an important measure of success for the South East Wales Capital City Region.
- Paragraph 19.22 calls for the economy of South East Wales to seize opportunities to create jobs in renewable energy, recycling and waste.
- Paragraph 19.28 says that the projected growth of housing and employment across the Capital Region (South East Wales) means that access to sustainable forms of energy generation will be crucial to the long term viability of the City Region. Local energy generation approaches will also have an increasingly important role to play.

3.1.2 The Wales Spatial Plan provides ample strategic policy support. The proposed Project will provide a source of local renewable energy to directly support the local economy, improve the sustainability of waste management in the South East Wales Region and reduce the contribution made to the emission of greenhouse gases from local economic growth. The proposals will directly create local jobs in construction and operation of the facility. Overall, the proposed Project will make a strong contribution to

long term viability of the Capital City Region through the provision of sustainable and local renewable energy generation.

3.2 Planning Policy Wales (March 2002)

3.2.1 Planning Policy Wales (**PPW**) sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes (**TANs**). Procedural advice is given in circulars and policy clarification letters. It translates the commitment to sustainable development into the planning system so that it can play an appropriate role in moving towards sustainability.

3.2.2 Paragraph 4.9.1 states:

> *"Previously developed (or brownfield) land should, wherever possible, be used in preference to Greenfield sites, particularly those of high agricultural or ecological value. If the Welsh Governments objectives for the more sustainable use of land and buildings and the re-use of previously developed sites are to be achieved, local authorities and other stakeholders will need to be more proactive".*

The proposed Project will be constructed on brownfield land and is entirely contained within the Project site. It is therefore considered that the proposed development is consistent with the intent of Planning Policy Wales.

3.2.3 Paragraph 12.8.8 states:

> *"The Welsh Government is committed to using the planning system to:*
>
> - *Optimise renewable energy generation;*
> - *Optimise low carbon energy generation;*
> - *Facilitate combined heat and power systems (combined cooling, heat and power) where feasible; and*
> - *Recognise that the benefits of renewable energy are part of the overall commitment to tackle climate change by reducing greenhouse gas emissions as well as increasing energy security"….local planning authorities should facilitate the development of all forms of renewable and low carbon energy to move towards a low carbon economy to help tackle the causes of climate change"*

The proposed Project will accommodate technologies which will successfully direct waste wood away from landfill to generate a renewable source of energy with all heat being used within the plant to maximise efficency. The proposed location is on previously developed land, consistent with the locational policies and criteria set out in local plans.

3.2.4 Paragraph 12.10.1 states:

"In determining applications for renewable and low carbon energy development and associated infrastructure local planning authorities should take into account:

- *the contribution a proposal will play in meeting identified national, UK and European targets and potential for renewable energy, including the contribution to cutting greenhouse gas emissions;*
- *The wider environmental, social and economic benefits and opportunities from renewable and low carbon energy development;*
- *The impact on the natural heritage (see 5.5), the Coast (see 5.6) and the Historic Environment (see 6.5);*
- *The need to minimise impacts on local communities to safeguard quality of life for existing and future generations;*
- *Ways to avoid, mitigate or compensate identified adverse impacts;*
- *The impacts of climate change on the location, design, build and operation of renewable and low carbon energy development. In doing so consider whether measures to adapt to climate change impacts give rise to additional impacts (see 4.5);*
- *Grid connection issues where renewable (electricity) energy developments are proposed; and the capacity of and effects on the transportation network relating to the construction and operation of the proposal"*

The proposed development comprises a sustainable development in this context, by increasing the use and supply of renewable and low carbon energy and providing the potential for the supply of energy to local users.

3.3 Technical Advice Notes

National planning policy and advice in respect of spatial and land-use planning is contained in a range of policy documents, statements, circulars and TANs.

3.3.1 **Technical Advice Note 8: Planning for Renewable Energy (2005):** This TAN relates to the land use planning considerations of renewable energy, however UK and national energy policy provide its context. Energy policy is a reserved function that is not devolved to the Assembly Government. Nevertheless, all decisions relating to renewable energy in Wales must take account of the Assembly Government's policy. A summary statement on Assembly Government energy policy is contained in Annex A to this TAN. A number of other annexes to this TAN also provide background to the development of planning policy for renewable energy in Wales.

3.3.2 Paragraph 2.15 states:

> *"Developers, in consultation with local planning authorities, should take an active role in engaging with the local community on renewable energy proposals. This should include pre-application discussion and provision of background information on the renewable energy technology that is proposed"*

The proposal for a renewable energy project using advanced conversion technology processing waste wood was consulted extensively with interested stakeholders in connection with the 2010 Permission. In connection with the present application, the Applicant has discussed the proposed changes with Associated British Ports as owner of the Port of Barry site within which the Project will be located and has obtained their support (refer to letter attached to this Policy Appraisal).

3.3.3 Paragraph 14.1 states:

> *"The Renewables Obligation 2002 states that only electricity derived from "biomass" will be eligible for Renewable Obligation Certificates (ROCs). "Biomass" is defined here as a fuel of which at least 98% of the energy content is derived from plant or animal matter or substances derived directly or indirectly therefrom (whether or not such matter or substances are waste) and includes agricultural, forestry or wood wastes or residues, sewage and energy crops"*

The proposed Project will utilise biomass for 100% of fuel input and should be eligible for ROCs.

3.3.4 **Technical Advice Note 21: Waste (2001):** This guidance note provides advice about how the land use planning system should contribute to sustainable waste resource management. It is intended to facilitate the introduction of a comprehensive, integrated and sustainable land use planning framework for waste management in Wales.

<u>Sustainable Waste Management</u>

Achieving sustainable development is an integral part of the Assembly's policies. The movement towards sustainable development in relation to planning for waste should be guided by principles on which any framework for waste management should be founded. The land use planning system has an important role to play in facilitating sustainable waste management and should:

- *"Provide a planning framework which enables adequate provision to be made for waste resource management facilities to meet the needs of society for the re-use, recovery and disposal of waste;*
- *Help meet the needs of businesses and encourage competitiveness;*
- *Encourage sensitive waste management, enhance the overall quality of the environment and avoid risks to human health;*
- *Have regard to the need to protect areas of designated landscape and nature conservation value from inappropriate development;*
- *Have regard to the need to protect the amenity of the community and of land uses and users affected by existing or proposed waste management facilities;*

- *Minimise adverse environmental impacts resulting from the handling, processing, transport and disposal of waste;*
- *Consider what new facilities may be needed, in the light of waste forecasts; and, ensure that opportunities for incorporating re-use/recycling facilities in new developments are properly considered"*

Paragraph 6.1 of the TAN states that;

> *"When considering development proposals for waste management facilities, local planning authorities should take into account their potential contributions to the objectives and principles set out in the Waste Strategy, the Regional Waste Plan, the UDP and the network of waste management facilities (when these are available).*

A number of technical assessments have been produced to support the Project, both for the purposes of the 2010 Permission and for the present application, and confirms that the proposed Project will have no unacceptable environmental or social impacts in the local or wider area that cannot be satisfactorily mitigated through the incorporated measures put forward in the development proposals.

Location of waste management facilities

Annex C: Specific Planning Considerations (C35) states:

> *"Locations should be considered within the context of the aims of the Wales Waste Strategy, the regional area of search process, and the provisions of the development plan for the area. In general, the most appropriate locations will be those with the least adverse impacts on the local population and the environment, and with the best potential contribution to a facilities framework.*

C36 states:

> *"There are numerous factors that may influence the type of location of new waste management facilities. New sites might for instance, be located, if appropriate, within or adjacent to:*
>
> - *industrial areas, especially those containing other heavy or specialised industrial uses;*
> - *Active or worked out quarries - landfill is commonly used in quarry restoration but there may be opportunities for other types of waste management facilities at some quarried sites. It should be noted that quarry depth and the nature of the local water table will affect the feasibility of using such sites;*
> - *degraded, contaminated or derelict land - well-located, planned, designed and operated waste management facilities may provide good opportunities for remediating and enhancing sites which are damaged or otherwise of poor quality, or bringing derelict or degraded land back into productive use;*
> - *existing or redundant sites or buildings - which could be used, or adapted, to house materials recycling facilities, or composting operations;*
> - *sites previously or currently occupied by other types of waste management facilities"*

The site is located on vacant brownfield land within the existing Project site owned by Associated British Ports. It is therefore considered that the proposed Project is located within a suitable location and is compliant with the above statement.

3.4 The Environment Strategy for Wales (2006)

3.4.1 The Environment Strategy for Wales (2006) outlines the Welsh Government's long-term strategy for the environment of Wales, setting out the strategic direction for the next 20 years. The purpose of the strategy is to provide a framework within which to achieve an environment that is clean, healthy, biologically diverse and valued to people of Wales.

3.4.2 The results of the technical assessments undertaken to the support the planning application for the show that the proposed Project will not undermine the overarching objectives of the Environment Strategy for Wales and is considered to be entirely consistent with its relevant purposes.

3.5 Regional Planning Policy

3.5.1 Regional Waste Plan 1st Review (2008)

The Regional Waste Plan (**RWP**) provides a long-term strategic waste management strategy and land-use planning framework for the sustainable management of waste and recovery of resources in South East Wales. The aims of the RWP 1st Review are:

- *To minimise adverse impacts on the environment and human health;*
- *To minimise adverse social and economic impacts and maximise social and economic opportunities;*
- *To meet the needs of communities and businesses; and*
- *To accord with the legislative requirements, targets, principles and policies set by the European and National legislation and policy framework.*
- 5.69 *The RWP 1st Review comprises two main elements:*
- *The RWP Technology Strategy which provides strategic information on the types of waste management/resource recovery facilities required In the South East Wales; and*
- *The RWP Spatial Strategy, which provides strategic information on the types of locations likely to be acceptable.*

The proposed development comprises a sustainable development in this context, by increasing the use and supply of renewable and low carbon energy and providing the potential for the supply of energy to local users.

3.5.2 Regional Transport Plan (2010): The South East Wales Transport Alliance (**SEWTA**) is an alliance of 10 South-East Wales local authorities working with others to deliver better transport in the South East Wales region. It is constituted as a joint local government committee.

SEWTA's vision for the Regional Transport Plan (**RTP**) is to provide a modern, integrated and sustainable transport system for South East Wales that increases opportunity, promotes prosperity and protects the environment, where public transport, walking, cycling and sustainable freight provide real travel alternatives. The priorities of the RTP are to:

- *"Improve access to services, facilities and employment, particularly by public transport, walking and cycling;*
- *Provide a transport system that increases the use of sustainable modes of travel;*
- *Reduce the demand for travel;*
- *Develop an efficient and reliable transport system with reduced levels of congestion and improved transport links within the Sewta region and to the rest of Wales, the UK and Europe;*
- *Provide a transport system that encourages healthy and active life styles, is safer and supports local communities;*
- *Reduce significantly the emission of greenhouse gases and air pollution from transportation;*
- *Ensure that land use development is south east Wales is supported by sustainable transport measures; and*
- *Make better use of the transport system"*

3.5.3 The Transport Statement for the Application confirms that the traffic impacts of the proposal are acceptable. In terms of sustainable transport, there are a number of bus services on Ffordd Y Mileniwm (which staff can use) in close proximity to the site's main entrance on David Davies Road and that the nearest railway station (Barry Docks) is located less than 0.5 km away.

4. Local Planning Policy

4.1 The Vale of Glamorgan Adopted Unitary Development Plan 1996-2011

As a result of the provisions in the Local Government (Wales) Act 1994 each Local Planning Authority in Wales is now required to prepare a Unitary Development Plan (**UDP**) for its administrative area. This UDP provides the strategic and detailed policy framework within which provision will be made for development and conservation needs. It guides development for 15 years.

4.1.1 Policy ENV 16: Protected Species

"Permission will only be given for development that would cause harm to or threaten the continued viability of a protected species if it can be clearly demonstrated that:

i) There are exceptional circumstances that justify the proposals;

ii) There is no satisfactory alternative; and

iii) Effective mitigation measures are provided by the developer"

There are no known protected species within the site boundary of the proposed development (refer to the Ecology Report update (November 2014). It is therefore considered that the proposed development is consistent with policy ENV16.

4.1.2 Policy ENV 18: Archaeological Field Evaluation

"Where development is likely to affect a known or suspected site of archaeological significance, an archaeological evaluation should be carried out at the earliest opportunity and may be required before the proposal is determined. Detailed plans would need to reflect the conclusions of the evaluation"

There are no known archaeological features within the site boundary. It is therefore considered that the proposed development is consistent with the principles set out in Policy ENV 18.

4.1.3 Policy ENV 26: Contaminated Land and Unstable Land

"Proposals for the redevelopment of contaminated land and unstable land will be permitted where the contamination and/or instability will be removed or reduced to a level where there is no unacceptable risk to the health and safety of those living or working on the site or nearby, to flora and fauna on the site or nearby, and to the quality of air and water on these sites or nearby"

The site is located within Barry Port owned by Associated British Ports. The Environmental Report (see Appendix 12) produced for the Project to assess the implications of any potential environmental risks associated with constructing and operating a renewable energy plant on the site concluded

- the site is partially vacant and occupied by a container storage and refurbishment operation;
- the site is within an area affected by flooding and is within the indicative Zone 3 floodplain;
- the site is not located over a groundwater Source Protection Zone (SPZ). In any event the site will not impact upon groundwater as any potentially polluting outputs will be discharged to foul sewer in accordance with the requirements of a trade effluent consent or removed from the site by vehicle;
- an ecological survey is not required [although one was carried out] as the site is previously developed and consists only of a compacted hard standing surface which is not vegetated. There are no sites with sensitive flora or fauna having a statutory or local nature conservation designation within 500 metres of the site. The nearest designated site is the SSSI named "Hayes Point to Bendrick Rock" at a distance of 616 metres from the site (SSSI 510 administered by the Countryside Council for Wales) and covering an area of 29 hectares;
- the site has no clearly defined planning history but historical maps indicate that the following uses have occurred on the site:

  1879: Undeveloped estuarine land and river bed of Cadoxton River

  1898 to 1900: Land reclaimed to rail head, coal tip/loading dock

  1920 to 1973: Railway engineering works/rail head

  1989: Builder's yard

It is therefore considered that there is a low risk from potential contamination.

4.1.4 Policy ENV 27: Design of New Developments

"Proposals for new development must have full regard to the context of the local natural and built environment and its special features. New development will be permitted where it:

i) Complements or enhances the enhances the local character of buildings and open spaces;

ii) Meets the councils approved standards of amenity and open space, access, car parking and servicing;

iii) Ensures adequacy or availability of utility services and adequate provision for waste management;

iv) Minimises any detrimental impact on adjacent areas;

v) Ensures existing soft and hard landscaping features are protected and complemented by new planting, surface or boundary features;

vi) Ensures clear distinction between public and private spaces;

vii) Provides a high level of accessibility, particularly for public transport, cyclists, pedestrians and people with impaired mobility;

viii) Has regard to energy efficiency in design, layout, materials and technology; and

ix) Has regard to measures to reduce the risk and fear of crime"

A Design and Access Statement (DAS) has been produced in support of this Project. The DAS demonstrates that an appropriate design approach has been adopted and will be followed throughout the process, to result in a development that can integrate successfully with the surrounding environment. The proposed Project is industrial in nature and the main components of the development will be industrial in appearance.

4.1.5 Policy ENV27 sets out criteria of the design, siting and external appearance of proposals. These have been taken into account in the design of the Project. This is further explained in the D&AS accompanying this planning application.

The design and layout of the proposals have been designed to make best use of the land available and to fit into the local context and topography.

The proposed development is considered to be entirely appropriate to the proposed location. The development is located within an existing industrial site and is therefore consistent with the policy ENV27.

4.1.6 Policy ENV 29: Protection of Environmental Quality

"Development will not be permitted if it would be liable to have an unacceptable effect in either people's health and safety or the environment:

i) By releasing pollutants into water, soil or air, either on or off site; or

ii) From smoke, fumes, gases, dust, smell, noise, vibration, light or other polluting emissions"

Technical assessments which support this application confirm the proposal will not have an unacceptable impact on the environment and is therefore consistent with Policy ENV 29.

4.1.7 Policy EMP 2: New Businesses and Industrial Development

"Proposals for new businesses and industrial development including agricultural service industries and the extension, conversion and replacement of existing premises for such purposes, will be permitted if all of the following criteria are met:

i) The proposal does not lie within the countryside except for those proposals acceptable under the terms of ENV 8 (Rural Buildings) or COMM 2 (Redundant Hospitals);

ii) The proposal minimises the loss of good quality agricultural land (grades 1, 2 and 3a) and does not have an unacceptable impact on areas of attractive landscape and high quality townscape or on areas of historical, archaeological or ecological importance;

iii) The size and relationship of any new building and/or alteration or extension is not disproportionate to its size and setting;

iv) Access and parking arrangements are in accordance with the councils approved standards;

v) Adequate landscaping is provided;

vi) The proposal does not have an unacceptable effect on residential amenity by virtue of traffic congestion, noise, smell, safety, health impacts and emissions;

vii) Adequate utility and infrastructure services exist or are reasonably accessible or capable of being readily and economically provided;

viii) Does not present additional risk to the health or safety of users of the site and does not unacceptable pollute air, water, or land; and

ix) Does not unacceptably affect the use of the adjoining land by virtue of the risk and impact of potential pollution"

The criteria of policy EMP2 covers a wide range of environmental and amenity issues that have been identified and it is considered that the proposed development will not pose any detrimental impacts to the environment.

4.1.8 Policy EMP 4: Protection of land for Employment Uses

"On existing employment sites and sites identified in policy EMP 1 Development of uses that are not contained in classes B1, B2 and B8 of the Town and Country Planning (Use Classes) order 1987 (as amended) will not be permitted". *B1 Businesses, B2 General Industry and B8 Storage or Distribution use as defined by Town and Country Planning (Use Classes) Order 1987 (as amended).*

The proposed Project will be an employment generating use which will continue to provide employment opportunities within the Barry Port zone.

4.1.9 Policy TRAN 1: Strategic Highways

"Land will be protected and provision made for the development of the strategic highway network, including:

iv) The airport access road, and

v) The Barry Waterfront to Cardiff Link"

The access arrangements for proposed Project will utilise existing access into the proposed site from David Davies Road within the Port of Barry complex. A Transport Statement has been prepared and is submitted in support of this application, which assesses the traffic impacts of the proposed Project. The Transport Statement concludes that traffic impacts arising will be insignificant. It is therefore considered that the proposed development is consistent with policy TRAN 1.

4.1.10 Policy TRAN 6: Rail Freight

"Development which would attract a significant amount of freight movement will be favoured where existing or potential rail facilities are available"

At this present time Sunrise Renewables Ltd is not proposing to consider the utilise rail-freight. The additional road trips generated by the Project in terms of the existing traffic movements of the Sunrise Renewables site are considered to have a negligible impact of the local highway network. Feedstock may also be imported to the site via the port itself.

4.1.11 Policy TRAN 10: Parking

"The provision of parking facilities will be in accordance with the approved parking guidelines, and will be related to the type of land use, its density and location: accessibility to existing and potential public transport facilities: and the capacity of the highway network"

Internal parking provision under the 2010 Permission comprises 5 spaces plus 1 disabled space and 4 cycle parking spaces. It is considered that the proposed level of parking provision remains appropriate for the number of staff and visitors likely to be using the facility. This is given that staff can share vehicles in accordance with the requirements of the current planning permission.

4.1.12 Policy TRAN 11: Road Freight

"In order to reduce the unacceptable environmental effects of heavy goods vehicles:

i) Developments which generate HGV movements which would unacceptably affect the amenity and character of the existing or neighbouring environments by virtue of noise, traffic congestion, or parking problems will not be permitted;

ii) Sufficient operational parking within the curtilage of HGV operating centres will be required; and

iii) Traffic management measures will be used where appropriate"

The proposed Project will generate only 30 additional HGV movements (in and out) per normal week-day, within normal working hours. The proposed development is located in close proximity to the highway network and therefore reduces the impact of HGVs on the local road network. In addition, HGV traffic will utilise existing junction access points which work well. Therefore the proposed development is consistent with policy TRAN 11.

4.1.13 Policy COMM 8: Other Renewable Energy Schemes

"Proposal for other renewable energy schemes will be permitted if all of the following criteria are met:

i) The proposal has no unacceptable effect on the immediate and surrounding countryside;

ii) The proposal has no unacceptable effect upon the sites of conservation, archaeological, historical, ecological and wildlife importance;

iii) Adequate measures are taken, both during and after construction, to minimise the impact of the development on local land use and residential amenity"

The site is located within an existing industrial estate and the technical assessments which accompany this application demonstrate that the proposed development would not adversely impact any sites of conservation, archaeological, historical, ecological and wildlife importance.

4.2 The Vale of Glamorgan Deposit Local Development Plan 2011-2026

4.2.1 The Local Development Plan (**LDP**), once adopted, will provide a framework for sustainable development within the Vale of Glamorgan up to 2026. It is an extremely important policy document that will guide the growth of the Vale of Glamorgan over a fifteen year period and also identify the infrastructure needs of our communities in terms of employment, facilities and services needed to support that development.

Wherever possible the plan's emphasis is on re-using previously developed land and minimising the need to develop on green fields.

The Local Development Plan objectives are as follows:

"Objective 2: To ensure that development within the Vale of Glamorgan makes a positive contribution towards reducing the impact of and mitigating the adverse effects of climate change"

"Objective 4: To protect and enhance the Vale of Glamorgan's historic, built and natural environment"

Objective 10: To ensure that development within the Vale of Glamorgan uses land effectively and efficiently and to promote the sustainable use and management of natural resources".

4.2.2 **Policy SP8-Sustainable Waste Management**

The capacity requirements of 291,600 tonnes identified in the Regional Waste Plan will be met through a combination of in building waste management solutions.

The following locations are considered suitable for the development of in-building waste management solutions:

- *Atlantic trading estate;*
- **The operational port of Barry Docks***;*
- *Llandow Industrial Estate; and*
- *On suitable existing and allocated class B2 Employment sites*

The provision of open air facilities such as civic amenity sites, composting and recycling of commercial and demolition waste will also be permitted in existing class B2 employment sites, operational mineral

working sites or within or adjoining existing farm complexes where they do not conflict with existing or proposed neighbouring uses.

The site is located within the operational port of Barry Docks. It is therefore considered that the proposed development is compliant with policy SP8.

4.2.3 Policy SP 10- Built and Natural Environment

"Development proposals must preserve and where appropriate enhance the rich and diverse built and natural environment and heritage of the Vale of Glamorgan including:

1. The architectural and/ or historic qualities of individual buildings or conservation areas;

2. Historic Landscapes, parks and gardens;

3. Special Landscape Areas;

4. The Glamorgan Heritage Coast;

5. Sites designated for their local, national and European nature conservation importance; and

6. Important Archaeological and Geological features"

The site is located within the operational port of Barry Docks and does not have any known sites of architectural or historic value in close proximity to the proposed development site. It is therefore considered that the proposed development is consistent with policy SP10.

4.2.4 **Policy MD1- Location of New Development**

"To ensure that new development on unallocated sites assists in delivering the strategy, development will be favoured where it:

1. Has no unacceptable impact on the countryside ;

2. Reinforces the role and function of the key settlement of Barry, the service centres settlements, primary settlements and minor rural settlements as key providers of commercial, community and healthcare facilities;

3. Promotes new enterprises, tourism, leisure and community facilities in the rural Vale of Glamorgan;

4. In the case of residential development, supports the delivery of affordable housing in areas of identified need;

5. Has access to or will promote the use of sustainable modes of transport;

6. Will benefit from existing infrastructure provision or where new infrastructure can be provided without any unacceptable effect on the natural or built environment;

7. Promotes sustainable construction and makes beneficial use of previously developed land and buildings;

8. Provides a positive context for the management of the water environment by minimising or avoiding areas of flood risk and safeguards resources; and

9. Does not have an unacceptable impact on green wedges, sites of importance for nature conservation, special landscape areas and/ or the Glamorgan Heritage Coast"

The proposed Project is located within an existing industrial site on previously developed land. The Flood Risk Assessment prepared in support of the Project (Appendix 13) concluded that:

- the proposed development is located within Zone B but outside Zone C2, as identified by Technical Advice Note 15: Development & Flood Risk (July 2004) (TAN15). Zone B can be defined as "*areas known to have been flooded in the past evidenced by sedimentary deposits*" and Zone C2 as "*areas of floodplain without significant flood defence infrastructure*". Any development within Zone C would require a full Flood Consequences Assessment (FCA);

- the proposed development is also located outside the Environment Agency Wales (EAW) extreme (0.1%) Flood Map, which would normally underlay Zone B;

A topographic survey of the site (prepared on a precautionary basis, in line with EAW recommendations) produced three cross sections from north of the site through to the direction of the dock to confirm that the development is above the adjacent extreme flood outline and corresponding Zone C2;

Following submission of this information to the EAW, the Development Control Officer of the EAW confirmed that the site was not at risk of flooding and the cross sections were acceptable.

Policy changes within the EAW at the time meant that applications in Zone B were taken on a risk-based approach and since the zone is outside the Q1000 Flood Map, there is no perceived risk to the development.

4.2.5 **Policy MD2-Place Making**

"Development will be favoured where it contributes to creating high quality, healthy, sustainable and locally distinct places, in particular proposals should:

1. Be of a high standard of design that positively contributes to the context and character of the surrounding natural and built environment;

2. Respond appropriately to the local context and character of neighbouring buildings in terms of type, form, scale, mix, and density;

3. Identify opportunities to provide new or enhanced areas of public realm particularly in key locations such as town centres, major routes and junctions;

4. In the case of retail centres, provide active street frontages to create attractive and safe urban environments;

5. Provide a safe and accessible environment, giving priority to pedestrians, cyclists and public transport users;

6. Where appropriate, conserve and enhance the quality of, and access to, existing open sources and community facilities;

7. Safeguard existing public and residential amenity, particularly with regard to privacy, overlooking security, noise and disturbance;

8. Incorporate sensitive landscaping including the retention and enhancement of existing features and biodiversity interest; and

9. Make a positive contribution towards tackling the causes of and adapting to the impacts of climate change by promoting renewable and low carbon energy use"

As already detailed, the site is contained within the operational port of Barry Docks and has been designed with regard to the context and character of the site. The proposed Project will provide an effective and sustainable means by which to reduce waste sent to landfill within Barry, and will make a direct contribution towards the Welsh Assembly's and the UK Government's Climate Change objectives.

4.2.6 **Policy MD 3: Design of New Development**

"Development proposals will be permitted where:

1. They are of a high standard of design that positively contributes to the context and character of the surrounding natural and built environment;

2. They respond appropriately to the local context and character of neighbouring buildings in terms of type, form, scale, mix and density;

3. Existing features of townscape or biodiversity interest are preserved or enhanced;

4. There would be no unacceptable impact on the amenities of neighbouring occupiers;

5. The development would be compatible with other uses in the locality;

6. They promote the creation of healthy and active environments and reduce the opportunity for crime and anti-social behaviour;

7. They provide a safe and accessible"

The proposed development is located in an existing industrial site. As detailed in the landscape and visual impact assessment, the proposed design of the facility is considered to be functional in nature and therefore suitable for the application site.

4.3 Compliance with the Development Plan

This planning statement demonstrates that the development proposal is consistent with the Development Plan and represents sustainable development. It is therefore considered that the development as proposed is afforded a high level of support by the Wales Spatial Plan and Planning Policy Wales.

The proposed development will make a direct contribution to achieving renewable energy generation and renewable heat targets thereby implementing Government policy at the European and UK levels which encourages more electricity generation from renewable sources.

The proposed development is relation to the relevant policies concludes that the proposed development is in accordance with the objectives of renewable energy policy at the EU, UK and Local Government levels. There is a strong policy drive at a European and UK level to continue to develop renewable energy. These latest European and UK Government policies establish a strategic need for renewable energy provision in the UK to assist in tackling Climate Change.

5. Policy Conclusions

Policies set out in the national, regional and local level all place emphasis on a reduction in the quantities of waste being directed towards landfill, and an increase in recycling levels. The general theme within the planning policy statements is the encouragement of renewable sources of energy, the use of brownfield land and sustainable development. The proposed development is supported by the aims and objectives set out in the planning policy guidance documents described above. It is considered that there are no overriding planning constraints specific to the site, and the proposed development would not conflict with development plan policies set out in local and national policy documents.

There have been no material changes to the policy context of the application site since the 2010 Permission was granted for the facility. National guidance remains supportive of well-conceived renewable energy schemes. Regional and local policy also remains supportive of industrial / employment development in the docklands area, provided there are no unacceptably adverse environmental impacts. The information submitted in support of the application demonstrates that the proposed amendments are primarily focused on implementing the previously approved scheme in an efficient and economic fashion and would not result in any such impacts. Consequently, the proposals remain compliant with relevant policies and guidance.

Appendix 1(7): 2015 Application - Visual Impact Analysis (2015)

Application to modify the Elevations

for the

Port of Barry Renewable Power Plant

VISUAL IMPACT ANALYSIS

in support of an application under

the Town and Country Planning Act 1990

9th January 2015

UK Power Development Partners

Stoketon House
Windmill Hill
East Sussex
BN27 4RS
Tel 01323 833824

1. UK Power Development Partners is representing the Applicant, Sunrise Renewables (Barry) Limited, which is developing a renewable energy plant based on an advanced conversion technology.

2. The principle of establishing a wood fuelled power plant on land at Woodham Road, Barry, CF63 4JE within the Port of Barry was established by planning permission reference 2008/01203/FUL as approved by appeal reference APP/Z6950/A/09/2114605, subject to conditions, on 2nd July 2010 (the "**2010 Permission**").

3. The Applicant has submitted an outline planning application to amend the layout and elevations in order to accommodate a change in technology for the project. This Document addresses issues relating to the Visual impact of the proposed changes by way of update of the previous Visual Impact Assessment for the Project prepared for the 2010 Permission, a copy of which is annexed to this report.

4. The 2010 Permission was for a Renewable Power Plant fuelled by waste wood. In this regard it contributes to the Vale of Glamorgan meeting its renewable energy obligations, set out in the (current) Unitary Development Plan, notably those required in response to the National Planning Guidance in respect of renewable energy (contained within Chapter 12 of Planning Policy Wales 2002, supplemented by Planning Policy Wales Technical Advice Note (Wales) 8: Planning for Renewable Energy (2005)). In particular TAN 8 highlights the environmental implications and seeks to promote the use of renewable energy technologies.

5. A further contextual consideration is that, as required by Planning Policy Wales Edition 7 – July 2014 (at para 2.1.2), "*LDPs should provide a firm basis for rational and consistent decisions on planning applications and appeals*". In this connection the Applicant requests the Planning Authority to proceed in its review of the present application in a manner that is consistent with its past decisions on such matters.

6. The Sunrise Renewables project itself is located within Barry Port at the centre of an industrial and commercial area (see Photos 1 to 3 below). To the east of the site are large modern warehouse/industrial buildings and a scrap yard. Further east is a large chemical factory and on the opposite side of the Dock an 8 storey grain store. Immediately to the west is a series of large Nissen Huts which house a range of uses.

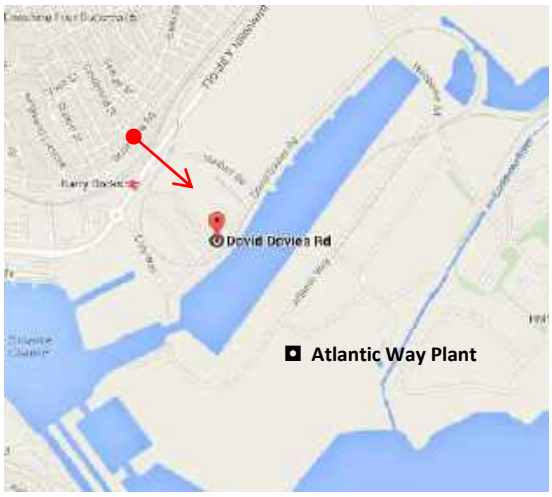
7. To the south, the site is bordered by David Davies Road and a railway track which serves the Docks. 300 metres to the south-west lies the site for the renewable energy plant at Atlantic Way, previously approved under Planning Reference 2009/00021/FUL.

8. As was observed by Planning Inspector Thickett during the planning appeal in respect of the 2010 Permission:

> *"8. Local residents may wish otherwise but the site lies in an industrial area. The Council conceded at the Inquiry that it had no objection to the appearance of the proposed building. Looking down from Dock View Road the new building would be seen in the context of the development within the Docks and, in my view, would sit comfortably in its industrial surroundings."*

While Planning Inspector Thickett was not considering the layouts and elevations which are the subject of the present application his comments, underlined above, apply equally to such proposal. The view he was referring to is that in Photo 2 below.

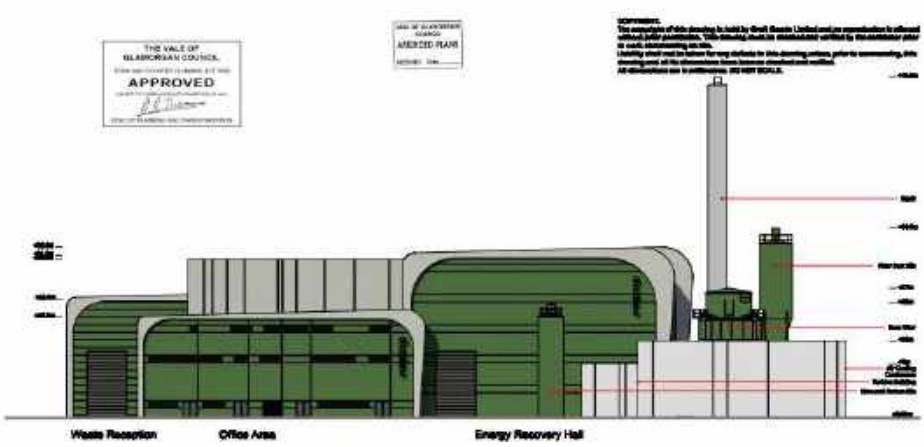
Plan 1 showing view opposite



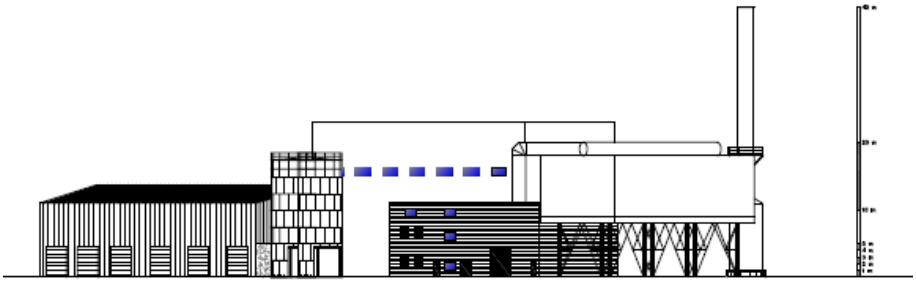
9. The plant in which the proposed chimney stack will be incorporated, located at David Davies Road, is less than 300 metres from the site proposed for the Atlantic Way Plant which was also to form part of the industrial landscape seen by any onlookers in Photo 2.

10. In respect of what is considered by relevant stakeholders including the Vale of Glamorgan Council as being acceptable for a renewable power plant adjacent to the Barry Dockyards, the decisions taken in respect of the Atlantic Way Power plant are determinative and can be seen from the elevations filed

by the developers of that plant, extracted below (Elevation A) and compared to the plant within which the proposed chimney stack will be incorporated (Elevation B).



Elevation A: Atlantic Way Renewable Power Plant



Elevation B: Sunrise Renewables Renewable Power Plant (Proposed Chimney Stack)

11. The Schematic reproduced on the next page is taken from the submissions under Planning Reference 2009/00021/FUL in support of the approved application for planning consent for the Atlantic Way gasification power plant. Superimposed on this is the Sunrise Renewables Plant since this falls on the same sightline A-A. This shows that in all material respects the Sunrise Renewables plant is within the envelope established by the approved Atlantic Way application including as to sightlines.

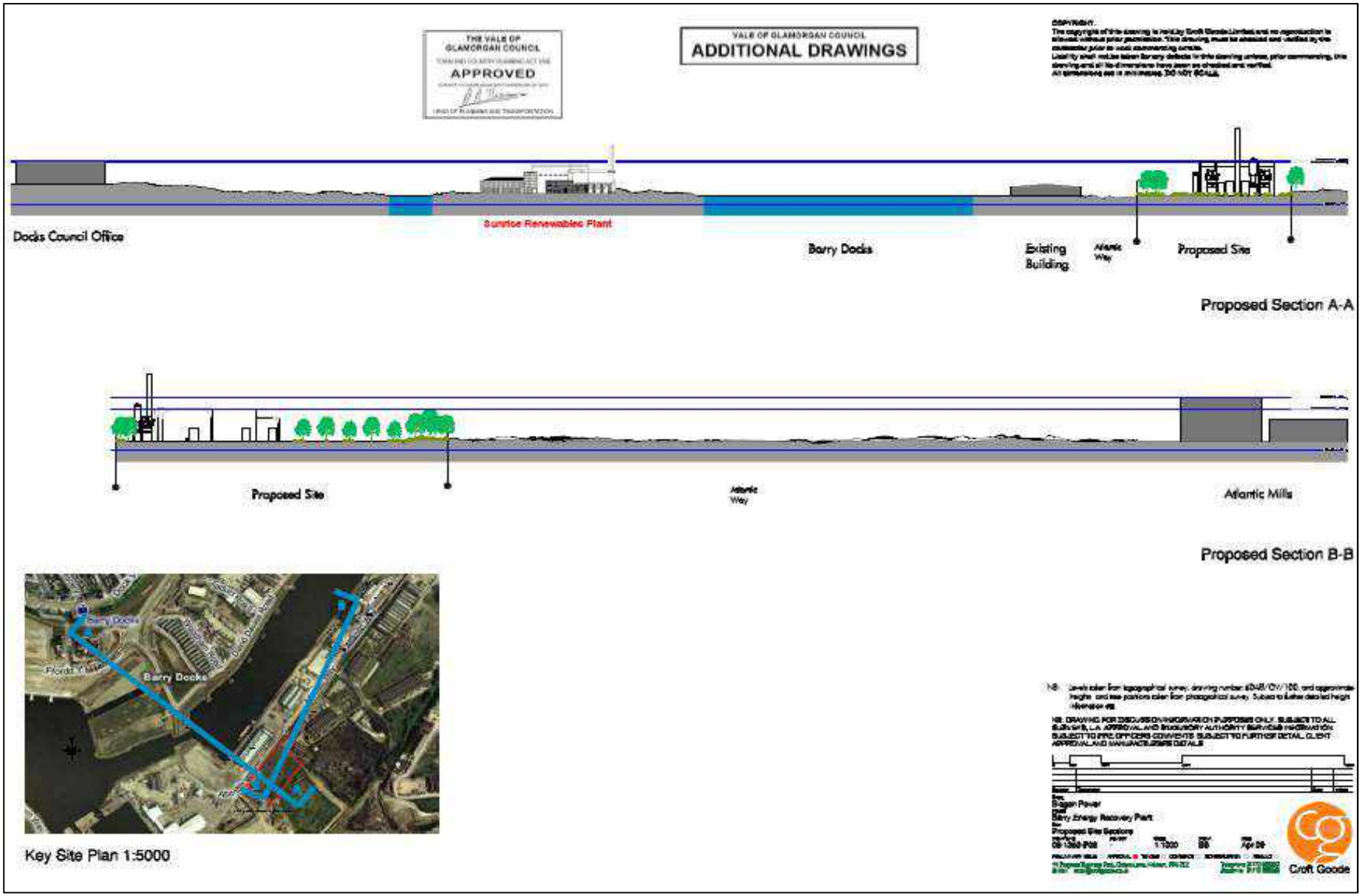
12. As is clear from this, the layout, elevations and sightlines for the present outline application are remarkably similar to those which were considered acceptable and approved for the dock-side area in the case of the Atlantic Way Renewable Energy Plant. In particular, it should be noted that the Energy Recovery Hall, at 24 metres, is slightly higher.

13. It is therefore submitted that implementing the Applicant's renewable power plant using a layout and elevations similar to those previously approved for Atlantic Way would have been considered acceptable in the dockside context at the time of the original application and related appeal and that this remains the case.

14. It is therefore reasonable to assume that the Council would have *"conceded at the Inquiry that it had no objection to the appearance of the proposed building"* had it been presented with the currently proposed layouts and elevations since they are not materially different from those approved separately by the Council for the Atlantic Way project.

15. In conclusion, the visual amenity afforded by the changes now proposed to the project layouts and elevations are consistent with decisions taken and views expressed both during the Appeal relating to the 2010 Permission and the granting of planning permission for the Atlantic Way plant.

5th December 2014



Schematic taken from the submissions under Planning Reference 2009/00021/FUL

TOWN AND COUNTRY PLANNING ACT 1990

Appeal by
SUNRISE RENEWABLES LTD

PROPOSED RENEWABLE ENERGY PLANT AT WOODHAM ROAD, BARRY

PROOF OF EVIDENCE OF DAVID APPLETON NDH MA MLI CHARTERED LANDSCAPE ARCHITECT

APRIL 2010

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CONTENTS

1.0 INTRODUCTION AND TERMS OF REFERENCE

1.1 *Qualifications and Experience*

My name is David Appleton. I am a Chartered Landscape Architect and horticulturist with 34 years professional experience of working in both the public and private sectors. I have gained a college diploma in horticulture from the former Essex Institute of Agriculture (now Writtle College), a National Diploma in Horticulture from the Royal Horticultural Society and a Masters Degree in Landscape Design from the University of Sheffield. I am a Chartered Member of the Landscape Institute, which is the professional body in the UK for landscape design, management and science. I am a Director of a firm known as The Appleton Group, which has offices in England and Northern Ireland.

1.2 I have considerable experience of environmental and landscape assessment, both in relation to industrial developments, housing, leisure and major infrastructure projects including major highway projects. I have recently been involved with the landscape issues relating to a regional energy from waste project in Staffordshire. My firm is a member of The Institute of Environmental Management and Assessment and I have given evidence as an expert witness at numerous public inquiries.

1.3 My company was commissioned by Sunrise Renewables Ltd in October 2009 to prepare a landscape and visual impact assessment of a proposed renewable energy plant to be located at Woodham Road, Barry. The need for the assessment arose from the preparation of a voluntary Environmental Statement of which the assessment formed a part.

1.4 My evidence addresses the landscape and townscape reason for refusal 1 in respect of the alleged 'general adverse impact on the character of the area' of the proposals and the alleged non compliance with related

planning policies, and also the assertion in reason for refusal 2 that 'the siting of the proposed energy plant in its proposed location would represent a retrograde step for the Council's aspirations for the Waterfront, adversely affecting the amenities of the area and the future attraction of the development.' Given that context my evidence is largely based on the findings of the assessment which has already been submitted to the Local Authority. In addition, however, I make reference to a proposed development also located in Barry Docks which is similar in nature, being an energy from waste plant, but of a much greater scale, that was granted full planning permission by The Vale of Glamorgan Council on 23rd of December 2010.

1.5 **Methodology**

The landscape and visual impact assessment on which much of this evidence is based was prepared in accordance with the Guidelines for Landscape and Visual Impact Assessment prepared jointly with IEMA and The Landscape Institute (2002). The site was visited and an assessment was made of baseline conditions in terms of the landscape quality and character of the site and its surroundings. Potential viewpoints were established and photographs were taken. A desk top review of National and Local Planning policies related to landscape issues was undertaken. An assessment of the potential impact of the development was made of both the construction and operational phases, covering landscape effects, visual impact and landscape character.

1.6 Landscape effects or impacts are those which as the result of the development might alter the vegetation structure, topography, land use or soils. Visual impacts are those perceived by human receptors as the result in a change of appearance of land as the result of development impacts on character refer to the external visual influence of the development on adjacent landscape and land use.

1.7 Proposals for mitigation were made and any residual impacts assessed. The criteria used for evaluating the impact are set out in **Appendix 1** to this document. The predictions and assessments of effects were made in the context of the proposed development as set out on drawing number SRB/03 Revision A and SRB/04 Revision A, prepared by Oaktree Environmental Ltd and dated September 2008. In preparing this evidence I have also referred to the Local Authority committee report which recommended approval for the appeal proposal and various technical documents and the local authority committee report related to the application submitted by BioGen Power. I have also referred to the Barry Development Guidelines which forms supplementary planning guidance to the Vale of Glamorgan Adopted Unitary Development plan.

2.0 THE APPEAL SITE, BASELINE ENVIRONMENT

2.1 Location and Context

The location and context of the site is shown on **Plan TAG 1** appended to this evidence. The site is located within the Barry Dock complex within an area of existing employment uses and disused industrial sites. The town centre is located to the northwest at higher level. The site itself is 8 metres above sea level. Access to the site is gained from a network of industrial estate roads accessed from Millennium Way, a new road to the north of the site serving the docks and new development further west. The Cardiff to Bridgend railway line is located to the north of that road, and between the road and the site is disused and overgrown land and the dock railway spur line. Immediately adjacent to the site to the site to the west of Woodham Road are a row of Nissen type industrial buildings accessed from Woodham Road that are in active use. Woodham Road itself is used for lorry parking **(Photograph 1)**. To the immediate east of the site is open, unused land and a number of fairly modern warehouse or industrial buildings, a scrap metal yard and a haulage depot **(Photographs 2 and 3).** To the south of the site beyond David Davies Road, a railway line and a grassed area is located adjacent to the Dock. Across the dock itself is an 8 storey high grain mill building operated by Rank Hovis, other substantial industrial buildings and open storage of containers and pallets **(Photograph 4)**. A large chemical works complex is present to the north east, within a distance of 1 km. The nearest residential development is located on Dock View Road to the north and at a distance of 370 metres. The road lies at approximately 30 metres A.O.D at that point, beyond Millennium Way and the railway line.

2.2 Site Characteristics

The site extends in area to 0.77 ha (1.86 acres). It is flat and open with no formal boundary enclosures other than some mounding to prevent vehicular access to the west and south, and steel palisade fencing to the east. There are no buildings present on the site. The characteristics of the site in terms of vegetation and ecology are described in a specialist report prepared by RSK Carter Ecological Ltd. In summary the site consists of either bare ground or ruderal (colonising) grassland, with some scrub vegetation. In landscape terms it is derelict and strewn with litter and fly tipping. **Photograph 1** shows the nature of the site itself and a plan showing the site as existing is attached to the report as **TAG 2.**

2.3 Landscape Policy and Designations

Neither the site nor adjacent land is subject to any National or Local designation in landscape terms. It does not fall within an AONB or an Area of Special Landscape. An Area of Special Landscape is located to the north of Barry (The Dyffryn Basin & Ridge Slopes SLA), but there is no intervisibility between the two as Barry town is set on a ridge and lies between the two areas. The location of the Area of Special Landscape is shown on a plan within the Vale of Glamorgan Unitary Development Plan Supplementary Planning Guidance '*Design in the Landscape'.* An extract from the SPG is attached to my evidence as **Appendix 2.** The site does not either fall within or adjacent to a designated urban conservation area.

2.4 Landscape Character Assessments

The Special Landscape Area described above, together with others within the Vale of Glamorgan was designated as the result of a landscape assessment prepared as part of the UDP process. The assessment was based on data known as 'Landmap', a GIS system developed by the Countryside Council for Wales in conjunction with other partners. The

system covers the whole of Wales and allows a location based evaluation of land in terms of a variety of factors including visual and sensory geology, history, cultural landscape, and landscape habitat.

2.5 The Appeal site falls within the 'Barry' landscape area. The Landmap classification for the site and its surroundings for visual and sensory factors is rated as **'Urban'** and the evaluation is '**Low'.**

2.6 Visual Amenity and Prominence

The site is open to view from the immediately adjacent road network **(Photograph 1)**. Scrub vegetation adjacent to the eastern boundary gives some low level screening from that direction **(Photograph 2)**. Distant views are possible from higher ground to the north along Dock View Road **(Photographs 5, 6, 7 and 8).** These views are all gained in the context of the Dockland as a whole with large buildings and open storage and the chemical works to the south east. For context I have marked the approximate location of the approved BioGen energy recovery plant on relevant photographs. The guide lines on the photographs are indicative of location only and not of comparative scale or massing. The views of the Appeal Site from the north are not constant. Vegetation adjacent to the railway line gives some screening, and progressing along the road to the north east the views become oblique and the site is difficult to identify. Views may be possible from the upper storey of the Dock office, which being a substantial building and located at a higher level obscures views from further west in that direction. Lower level views from the west are obscured by adjacent industrial buildings. Views from Barry Town further north are obscured by the buildings located on Dock View Road itself. Views cannot be gained from the new Millennium Way port access road due to intervening vegetation. Views cannot be gained from the railway or from Barry Dock Railway Station for the same reason **(Photograph 9)**. Longer distant views can be gained from a residential road (Dyfrig Street)

located on the eastern edge of Barry Island at a distance of 0.7 km. These views are gained in the context of existing industrial buildings to the west and east of the site, and the chemical works in the distance **(Photograph 10)**. Views from this direction will also be gained of the approved BioGen Energy Recovery Plant, seen in the foreground. Views of the site from the east/south east are not possible due to intervening dockside development.

2.7 Zone of Visual influence

Figure TAG 3, attached to this evidence shows the photograph viewpoints described above together with a zone of visual influence (ZVI) within which views of the site may be gained. The map does not imply that views will be possible from all points within the zone due to localised screening, but it sets the outer limits of potential views within a 1 kilometre distance. Longer distance views may be gained from higher ground in the location of Victoria Park to the north east but this is at a distance of nearly 1.5 kilometres and over a foreground dominated with other port uses.

2.8 Sensitivity of Receptors

From the baseline studies the following sensitive receptors are identified.

Landscape

The quality of the site itself in terms of ecology and visual appearance is such that it is not considered to be sensitive in respect of any change that might take place.

Visual Impact

Views from within industrial areas are not considered to be sensitive. Views from dwellings are normally considered to be sensitive though this has to be tempered with the understanding that there is no right to a view in planning law. Views from roads are not normally considered to be sensitive as they are transient in nature. Views from public footpaths are

considered to be sensitive if they are used for recreational purposes or are part of the civic realm.

2.9 Baseline Projection

If the site were not to be developed it is likely to remain either in its present condition (i.e. derelict and unused) or it would be redeveloped for some form of acceptable use within the use classes order. Air photograph coverage for the site shows that it was previously used for the storage of large vehicles and containers. The Unitary Development plan shows the site within an existing employment site and within land designated as 'Developed Coast'. The site does not fall within the area known as The Barry Waterfront which is located to the west of the site at a distance of 0.3 km. The location of this development area is identified on plan **TAG 3.** If the site remains un-used it will gradually colonise with maritime scrub vegetation.

3.0 THE APPEAL SITE, IMPACT ASSESSMENT AND EVALUATION

3.1 Construction Phase

3.1.1 The construction phase of development would involve the clearance of the site of existing vegetation, levelling, the excavation of ground for foundations, and the construction of an industrial building with flue stack and external parking areas. It is understood that there will be no external storage. The building size is proposed to be 60x45 metres in plant and 14.08 metres to the ridge. The flue stack indicated on the application plans is 20 metres high though it is understood that this will be lower. The colour of cladding and means of enclosure of the site are as yet undetermined.

3.1.2 Landscape Impacts

In landscape terms it is not anticipated that any impacts of significance will arise. This assessment is based upon the lack of any landscape features on the site worthy of retention, and its current derelict appearance. During the application process a consultation response from the Economic Development and Leisure Department of Vale of Glamorgan Council drew attention to the potential presence of a protected plant species (Rough Marsh Mallow, *Althea hirsuta).* An ecological survey of the site was undertaken by specialist consultants in January 2009 to establish presence or absence of the species. No specimens were found on site and the consultants considered that the habitat was not in general suitable for the establishment of the species though it was acknowledged that the survey was seasonally constrained. The Countryside Council for Wales having studied the report, were also of the view that the timing of the survey was such that the presence of the species could not be ruled out, but were of the view that the presence of the plant on the site would not prevent the development going ahead. They recommended that the site should be searched at the appropriate season and that if plants were

discovered that they could be relocated to a receptor area within the site. The council's view over the matter was that there was no ecological objection to the proposal and that it could be dealt with by condition.

3.1.3 Visual Impact

In terms of visual impact, views of the construction activity including on site plant and possibly cranes will be present for a period of 12 months. Such activity might be seen from properties located on Dock View Road, but mainly from the upper floors of properties. Longer distance views would be gained from residential properties located on Barry Island. These views will be gained in the context of adjacent industrial and dock activity. My assessment of this impact is that it will be negligible.

3.2 Operational Phase

3.2.1 The operational phase refers to the period after the plant has been commissioned and is actively working.

3.2.2 *Landscape Impacts*

In my opinion there will be no adverse landscape impacts during the operational phase since there are no natural site assets of significance that will be removed. Should the protected species described in my paragraph 3.1.2 above be discovered on the site during the construction phase it would be relocated within the site and managed appropriately.

3.2.3 *Visual Impacts*

In my opinion the only significant views of the site will be views from domestic property located on Dock View Road and Dyfrid Street. I do not agree that the site is prominent in views from the Waterfront since screening is afforded from views to the west by the ridge of higher ground on which the Dock office is sited, and also by the Nissen huts on Woodham Road itself. In any event the change in visual impact would

amount to the introduction of a new industrial building into a highly industrialised setting. The scale of the new building would be no greater than industrial units constructed to the east of the site. This observation is endorsed by the opinion of the case officer who in preparing the report to Planning Committee stated that

:*'as a consequence, the proposed industrial building, while some 14 metres tall would nevertheless relate to the character of nearby use and buildings and have no adverse visual impact on the amenity of the locality. Indeed the only element of the proposal which distinguishes it from any other large industrial building is the proposed 20m (possibly 16 m) high stack. Within its industrial context, however this would similarly have no adverse impact, appearing neither unacceptably prominent or out of character'.* An extract from the officer's report is attached to my evidence as **Appendix 3.**

3.2.4 The flue stack would be a maximum of 20 metres high, which is only 6 metres higher than the building itself. Views gained from the properties described above would be gained in the context of substantial structures located on the dockside **(Photographs 5, 6 and 7)**, and a major chemical complex with numerous tall and prominent chimneys **(Photograph 10)**. The overriding element of the view is however the sea and on clear days the distant coastline of North Somerset. Even without mitigation I would assess any visual impact as negligible (i.e. imperceptible) assuming that the colour of the building and flue stack is appropriate to its surroundings. The flue will not emit any plume of smoke or water vapour and will cause no visual impact as the result.

3.2.5 *Impact on Landscape Character*

The existing character of the site and its surroundings is that of an industrial dockside landscape. It is described within the Unitary Development Plan as being within the 'developed coast'. The proposed development is considered therefore to be appropriate within its setting and I consider that there will be no adverse impact on landscape character. The site is not located within the Waterfront Regeneration area which is located to the west, and there is no inter-visibility between the two. In support of my assessment of the impact of the development on local character was the conclusion formed by the planning officer in his report to committee where he states:

'*It is thus considered that the physical impact of the use and building would neither appear out of character or (be) unacceptably overbearing to the extent that it would cause demonstrable harm to the amenities of those residential properties living near the area'.*

3.3 Mitigation

The planning application drawings show the building elevations to be coloured green though it is understood that the choice was indicative. In my opinion, given the location of the building, a palette of mid to dark grey would be more appropriate and we would recommend that the flue stack colour be graded from dark adjacent to the building to light grey above the roof line. Boundary treatments should be simple and be coloured black. On-site soft landscape is not considered necessary for screening purposes, but if required to satisfy bio-diversity objectives could be achieved by simple blocks of salt tolerant native shrubs located immediately adjacent to the boundaries of the site. This matter could be dealt with a standard planning condition.

3.4 Residual Impact of the Development Proposals.

In my opinion the residual landscape and visual impact of the development assuming appropriate attention to building and flue stack colour would be described as 'major beneficial'**.** It would bring about the development of what is at present an unused and unattractive parcel of land.

4.0 COMPARISON OF IMPACT, APPEAL PROPOSALS AND BIOGEN PROPOSALS

4.1 In December 2009, Vale of Glamorgan Council approved a planning application for a gasification waste to energy plant to be accessed from Atlantic Way within the Barry Docks complex. The proposal is relevant to this inquiry in as much as it would be a similar land use though at a much larger scale, and the Local Authority's handling of the application covered similar issues to the Appeal Site in terms of analysing potential visual impact and assessing the impact of the proposal on the character of the area and in particular the Barry Waterfront. The BioGen site is located to the south east of the Appeal Site at a distance of approximately 400 metres across the number 2 dock and immediately adjacent to an Associated British Ports building occupied by Scott Timber. The location of that site in relation to the Appeal Site and The Waterfront is indicated on my figure **TAG 1** which is a 1:10,000 scale extract from an Ordnance Survey plan.

4.2 The BioGen site incorporates four main elements consolidated into a structure with a maximum height of 27.6 metres high to the ridge of the energy recovery hall. In addition dust filters and 2 silos for dust and lime/carbon will be constructed with heights varying from 15 to 23.8 metres. Turbine and air cooler condenser units will be located outside the main building in an area 26x17 metres and with a height of approximately 10 metres. There will also be an emissions stack 45 metres high and 2.45 metres in diameter. The main building will be 76 metres long and 52 metres wide and have a footprint (excluding condenser units) of approximately 3952 square metres. By contrast the Appeal proposal will be 9.97 metres to the eaves, 14.08 metres high to its ridge, have a chimney of 20 metres height and 0.96 metres diameter, be 60 metres long and 45 metres wide and have a footprint of 2700 square metres. There will

be no external structures within the site. In summary the Appeal proposal has a volume of 47,522 cubic metres and the BioGen main building has an estimated volume of 84,500 cubic metres.

4.3 In reporting the proposal to planning committee the planning officer assessed the impact of the BioGen development on the regeneration of the Waterfront. An extract of the report forms **Appendix 4** to my evidence. The report states that:

''the development is considered to be a clean and high quality development which, while significant in terms of its size and scale, would respect its existing industrial context. Moreover the application is located approx 310m at its closest point from the Waterfront development (East Quay adjacent to Cory Way) and some 650m from 'South Quay' adjacent to the docks entrance with the site viewed against its industrial background in the majority of views from the waterfront development area'.

4.4 For comparison the Appeal Site is located 250 metres from East Quay and 440 metres from South Quay, but whereas there will be clear and uninterrupted views of the upper superstructure and chimney of the BioGen plant from these directions, (and from future phases of Waterside development), views of the building on the Appeal Site will be largely screened by the existing industrial units located on Woodham Road. Any views gained of the Appeal Site will also be seen in the context of an adjacent industrial background. The planning officer's reports were supportive in both cases, but given the context of a ground for refusal on the basis of adverse impact on the Barry Waterfront in respect of this Appeal it is surely an unsustainable premise that a building of nearly twice the bulk and greater prominence can be considered to be acceptable whereas the Appeal site proposals cannot.

4.5 The greater visual impact of the BioGen proposals, acknowledged as such by the Council, will be south facing views from higher ground to the north including Dock View Road. From that location the building and chimney will be seen silhouetted against the skyline. This will not be the case with the Appeal proposals, however, with only the roof being visible from certain viewpoints and in the context of adjacent industrial buildings of similar stature. Again the refusal of planning permission for one development on the basis of impact on the amenity of local residents cannot surely be sustained when set against the approval of another development that will cause (albeit acceptable) greater impact.

4.6 Cumulative Impacts of the Appeal Proposal and the BioGen proposal

It might be considered that whereas the development of the BioGen site on its own would be acceptable, the additional development brought forward on the Appeal Site would be such to lead to adverse cumulative impacts in landscape terms. I do not agree with that premise for the following reasons.

4.7 *Visual Impact and impact on character in relation to residential development to the north*

The views from the north are panoramic and take in a matrix of existing industrial buildings within an area of land allocated for industrial and port related uses. The character of the landscape is that of industrial development, the landscape classification is that of 'Developed Coast'. In planning terms the expectation of residents has to be that any vacant site will at some time be developed for a use compatible with its land use designation. The entire area of land between the dock and Millennium way has an employment allocation. The scale of any other development that could take place is unlikely to be less than proposed for the appeal site. The BioGen and Appeal sites are not, in any event physically related.

They are separated by the dock itself and other existing industrial buildings. The larger BioGen site will be seen in the context of the Atlantic Mills building, which is similar in scale to the that proposal, the Appeal site will be seen in the foreground again related to buildings of a similar and much smaller scale. There is no obvious visual linkage and association between the two sites, both lie within an industrial setting though the BioGen site is, as I have already stated, much larger in scale. It is not feasible therefore that any cumulative impacts could arise.

4.8 Cumulative Impact on perceptions and confidence in the aspirations for the waterfront

The same parameters exist in predicting the cumulative impact on the developments on the 'Waterfront' as on residential development to the north. Both developments sit within a land use framework of industrial and dock related development and adjacent to employment allocations. The Waterfront is identified, however, as a separate discrete allocation on the UDP map. (My **Appendix 5**) and the allocation was presumably made in the expectation that the two separate areas could co-exist in land use planning terms. Within the UDP policy framework the visual impact of new industrial development on its surroundings is a material consideration and in the case of the BioGen site the particular scale of that development on the Waterfront was an issue considered by the Local Authority when approving that development. The Local Authority were content that no such impact would arise and had no reservations in that respect about the Appeal Site until formulating the reason for refusal. Taking the two sites together again, in views from the Waterfront the two developments do not sit side by side and there is no visual linkage between the two. Both will be seen in the context of their immediate adjacent surroundings, not as directly associated development.

It would be possible of course for the Waterfront scheme to take account of its location next to the dock area by the introduction of landscaped buffer zones between the two or indeed by the location of employment uses in that area to act as a transition.

5.0 PLANNING POLICY MATTERS – LANDSCAPE ISSUES

5.1 In their refusal notice The Local Authority refer to various Local Planning Policies with which they consider the Appeal Proposals do not comply. Planning policy matters in general are dealt with in a comprehensive manner in the evidence of my colleague Mr Sedgwick. Several of these policies refer to landscape related issues, however, and I set out below my observations on this alleged non-compliance from the viewpoint of my discipline.

5.2 Reason for Refusal 1 – Adverse Impact on the character of the Area

The Local Authority refer to 6 UDP policies in support of their refusal of which 4 have landscape or character related elements.

5.2.1 WAST 2 – Criteria for assessing waste management facilities

Among the criteria is one (vi) that requires a high standard of layout, landscaping and design. The council did not however identify any shortcoming in this respect in their assessment of the application as presented to the planning committee. The proposed building is similar in design to a unit recently constructed to the north east of the site as identified on my figure TAG 3 and my photograph 3. The colour of the cladding and boundary treatments can all be subject to planning condition. My own opinion is that the context of the site is such that a landscape scheme is unnecessary in a predominantly hard dockside environment but again this could be conditioned if thought appropriate.

5.2.2 ENV 27 Design of New Developments

Within this policy is a requirement (i) that new development complements the local character of buildings and open space. Clearly this would be the case as the site is located within an existing industrial area and indeed the redevelopment of the site would lead to an enhancement of character in

replacing a previous open storage use and removing fly tipping and dereliction. Criterion iv) requires that development should minimise any detrimental impact on adjacent areas. As I have demonstrated in my evidence, in respect of potential visual impact, such impact would be minimal. Criterion v) require new development to ensure that existing soft and hard landscape features are protected and complemented by new planting, surface or boundary features. The only soft landscape feature that may be present is the Mallow. A survey at the appropriate season in advance of development commencing would allow the relocation and protection of any species identified and this could be dealt with by a planning condition. If thought appropriate native species shrub vegetation could be established on the boundaries of the site. There are no hard landscape features worthy of retention, but it is proposed to establish new secure boundaries that would be appropriate to the context of the site.

5.2.3 EMP 2 Proposals for New Business and Industrial Development

This policy sets out the criteria that need to be met for new business and industrial developments to be permitted. Criterion iii) requires the size and relationship of any new building and/or alteration or extension to be in proportion to its size and setting. As discussed earlier in this evidence, however, the proposed building is similar in scale to adjacent industrial buildings. Criterion v) requires adequate landscape to be provided. A suitable planning condition could deal with this issue though as previously noted the need for landscape treatment in this particular location is debateable.

5.2.4 EMP 3 – General Industry

Policy EMP 3 deals with General Industry. Criterion i) requires the proposal to be compatible with existing business/industrial/warehousing uses. In terms of visual impact and design the officer's report to committee states that: '*in terms of its wider context it clearly relates primarily to the*

wider industrialised area of Barry Docks'. And 'the area is indisputably industrialised in character and the addition of a new industrial building would, in this context, not appear out of place.' Criteria iii) requires that the nature and scale of the proposed development should not unacceptably affect surrounding uses. Since the surrounding uses are all industrial, with the exception of disused land and a railway to the north, this criterion does not apply.

5.3 Reason for Refusal 2, - Adverse Impact on the Waterfront Developments

5.3.1 The Council refer to Policies ENV 25, ENV 27 and the Barry Waterfront Development Principles, Supplementary Planning Guidance in this reason for refusal.

5.3.2 Policy ENV 25- Regeneration of Urban Areas

This policy seeks to improve the quality of the urban fabric, particularly within the former dockland of Barry and Penarth. Paragraph 3.9.4 of the reasons and explanation for the policy states that:

'*Special attention has been paid to the regeneration of the former dockland at Penarth and Barry for residential, retail, leisure and business use. Schemes for the regeneration of both docklands have commenced and it is envisaged will be completed during the plan period.'*

The location of the Barry Waterfront in relation to the Appeal site is shown on my Figure TAG 1 which is included within my appendices. It can be seen that the Appeal Site does not fall within the Barry Waterfront. The Appeal Site is located within an area designated within the adopted Unitary Development Plan as 'Developed Coast', and as an existing Industrial development Site. I attach as **Appendix 5** an extract from the Vale of Glamorgan UDP map annotated to show the Appeal Site Location. It can be seen that the Appeal Site is separated from the Waterfront by

existing industrial units. It is difficult to understand how the Appeal proposal can conflict with this policy. The site was previously used for the storage of containers and this use could be continued without the need for planning permission. The Appeal proposals will lead to enhancement of the site which will benefit the Waterfront rather than detract from it.

5.3.3 ENV 27 Design Of New Developments

The relevant criteria in respect of this policy are discussed in paragraph 5.2.2 above.

5.3.4 The Barry Waterfront Development Principles

I have studied this document which is a design brief for the Waterside itself. It does not refer to the adjacent working docks other than in terms of general context, nor does it even suggest the need for buffer landscape between the two elements, though of course given the large extent of the Waterside development this would be entirely possible. I note also that the current proposals for the Waterfront include areas closer to the existing industrial dock side uses than indicated on the adopted Unitary Development Plan and presumably the selection of the areas concerned was made in the knowledge and understanding that the existing uses would be compatible with those proposed.

6.0 SUMMARY AND CONCLUSIONS

6.1 Location and Context

The location and context of the site is shown on **Plan TAG 1** appended to this evidence. The site is located within the Barry Dock complex The town centre is located to the northwest at higher level. Adjacent to the site to the site to the west are a row of Nissen type industrial buildings. To the east of the site is open, unused land and a number of fairly modern warehouse or industrial buildings, a scrap metal yard and a haulage depot. To the south of the site is the number 2 dock and beyond the dock is a grain mill, substantial industrial buildings and open storage of containers and pallets. A large chemical works complex is present to the north east, The nearest residential development is located on Dock View Road to the north and at a distance of 370 metres..

6.3 Site Characteristics

The site extends in area to 0.77 ha. It is flat and open with formal boundary enclosure only to the east. There are no buildings present on the site. An ecological survey of the site was undertaken by specialists. In landscape terms it is derelict and strewn with litter and fly tipping. **Photograph 1** shows the nature of the site itself and a plan showing the site as existing is attached to this evidence as **TAG 2.**

6.4 Landscape Policy and Designations

Neither the site nor adjacent land is subject to any National or Local designation in landscape terms. An Area of Special Landscape is located to the north of Barry, but there is no intervisibility between the two. The location of the ASL is shown on **Appendix 2**. The Appeal site falls within the 'Barry' landscape area. The classification for the site and its surroundings for visual and sensory factors is rated as **'Urban'** and the evaluation is '**Low'.**

6.5 Visual Amenity and Prominence

The site is open to view from the immediately adjacent road network Distant views are possible from higher ground to the north along Dock View Road **(Photographs 5, 6, 7 and 8).** . The views of the Appeal Site from the north are not constant. and are in the context of existing industrial buildings. Views from Barry Town further north are obscured by the buildings located on Dock View Road itself. Longer distant views can be gained from a residential road (Dyfrig Street) located on the eastern edge of Barry Island at a distance of 0.7 km. These views are gained in the context of existing industrial buildings to the west and east of the site, and the chemical works in the distance **(Photograph 10)**. Views from this direction will also be gained of the approved BioGen Energy Recovery Plant, seen in the foreground. Views of the site from the east/south east are not possible due to intervening dockside development. **Figure TAG 3,** shows the photograph viewpoints described above together with a zone of visual influence within which views of the site may be gained.

6.6 If the site were not to be developed it is likely to remain either in its present condition (i.e. derelict and unused) or it would be redeveloped for some form of acceptable use within the use classes order. The Unitary Development plan shows the site within an existing employment site and within land designated as 'Developed Coast'. The site does not fall within the area known as The Barry Waterfront which is located to the west of the site at a distance of 0.3 km.

6.7 Impact Assessment and Evaluation- Construction Phase

6.7.1 The construction phase of development would involve the clearance of the site of existing vegetation, levelling, the excavation of ground for foundations, and the construction of an industrial building with flue stack and external parking areas. It is understood that there will be no external storage. The building size is proposed to be 60x45 metres in plan and

14.08 metres to the ridge. The flue stack indicated on the application plans is 20 metres high though it is understood that this will be lower. The colour of cladding and means of enclosure of the site are as yet undetermined.

6.7.2 In landscape terms it is not anticipated that any impacts of significance will arise. This is based upon the lack of any landscape features on the site worthy of retention, and its current derelict appearance. The ecological survey of the site was undertaken to establish presence or absence of a protected species. Neither the Countryside Council for Wales, nor the Council considered that if the species were present that it would prevent the development proceeding.

6.7.3 Visual Impact

Views of the construction activity including on site plant and possibly cranes will be present for a period of 12 months. Such activity might be seen from properties located on Dock View Road, Longer distance views would be gained from residential properties located on Barry Island. These views will be gained in the context of adjacent industrial and dock activity. My assessment of this impact is that it will be negligible.

6.7.4 Operational Phase

In my opinion there will be no adverse landscape impacts during the operational phase since there are no natural site assets of significance that will be removed. In terms of visual impact the only significant views of the site will be views from domestic property located on Dock View Road and Dyfrid Street. My assessment of impact is shared by the Local Authority planning officer who stated in his report to committee that the only element which distinguished it from any other large industrial building was the stack and that within its industrial context there would be no adverse impact. An extract from the officer's report is attached to my

evidence as **Appendix 3.** Even without mitigation I would assess any visual impact as negligible.

6.7.5 *Impact on Landscape Character*

The existing character of the site and its surroundings is that of an industrial dockside landscape. The proposed development is considered therefore to be appropriate within its setting and I consider that there will be no adverse impact on landscape character.

6.7.6 Mitigation

The planning application drawings show the building elevations to be coloured green. In my opinion, a palette of mid to dark grey would be more appropriate and we would recommend that the flue stack colour be graded from dark adjacent to the building to light grey above the roof line. In my opinion the residual landscape and visual impact of the development would be described as 'major beneficial'**.** It would bring about the development of what is at present an unused and unattractive parcel of land.

6.8 Comparison of impact, appeal proposals and BioGen proposals

6.8.1 In December 2009, Vale of Glamorgan Council approved a planning application for a waste to energy plant within the Barry Docks complex. The BioGen site is located to the south east of the Appeal Site across the number 2 dock. The BioGen site has a structure with a maximum height of 27.6 metres high, There will also be an emissions stack 45 metres high. By contrast the Appeal proposal will be 14.08 metres high, and have a chimney of 20 metres height. It will have a building footprint and mass much smaller than the BioGen proposal.

6.8.2 In reporting the proposal to planning committee the planning officer considered that the BioGen development would have no adverse impact on the regeneration of the Waterfront. An extract of the report forms **Appendix 4** to my evidence. In comparing the location and scale of the BioGen site with the Appeal site it is my opinion that the Appeal site proposals would also have no adverse impact. In my opinion it is an unsustainable premise that a building of nearly twice the bulk and greater prominence can be considered to be acceptable whereas the Appeal site proposals cannot.

6.8.3 **Cumulative Impacts**

It might be considered that whereas the BioGen proposal would be acceptable on its own, the Appeal Site proposals would in some way 'tip the balance' and lead to an unacceptable impact, both on the amenity and character of local residential areas and also on the setting and perception of the Waterfront. I have addressed both issues in my evidence and I conclude that such cumulative impact will not arise, in particular because the two developments will not be viewed in any associative way, but as separate developments in an industrial context. I attach a relevant abstract from the UDP map on **Appendix 5**.

6.9 Planning Policy Matters- Landscape Issues

6.9.1 In their refusal notice The Local Authority refer to various Local Planning Policies with which they consider the Appeal Proposals do not comply. Several of these policies refer to landscape related issues, however, and I set out in my evidence my observations on this alleged non-compliance. It is my opinion that none of the 4 landscape related UDP policies cited by the Local Authority in support of their reason for refusal 1 are actually breached. All the issues raised can be dealt with by planning condition if necessary. In terms of Reason for refusal 2, the Local Authority refer to

Policies ENV 25, ENV 27 and the Barry Waterfront Development Principles.. Again I set out in my evidence an analysis of those policies in relation to the Appeal site and conclude that no breach of policy would occur. In particular I highlight the lack of inter-visibility between the Appeal Site and the Waterfront development.

6.10 Conclusion

In conclusion I consider that there will be no adverse visual or landscape character impacts on either the adjacent residential areas or the Waterfront development arising from the Appeal site proposals and a refusal of planning permission on those grounds cannot be sustained.

TOWN AND COUNTRY PLANNING ACT 1990

Appeal by
SUNRISE RENEWABLES LTD

PROPOSED RENEWABLE ENERGY PLANT
AT WOODHAM ROAD, BARRY

APPENDICES TO PROOF OF EVIDENCE

OF
DAVID APPLETON NDH MA MLI
CHARTERED LANDSCAPE ARCHITECT

APRIL 2010

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CONTENTS

Plans and appendices

APPENDIX 1

Criteria used for determining the significance of impacts

Significance of Impacts

Landscape Criteria

The following criteria were used to determine the impacts on the landscape:

1. The quality and value of existing features.
2. The ability of the landscape to absorb new features.
3. The scale and degree of change.

The significance of landscape impacts is defined as follows:

Major (positive) The proposed scheme would improve the quality of the landscape through the removal of damage caused by existing land-use and the introduction of new appropriate landscape features. It would strengthen the landscape character.

Moderate (positive) The proposed scheme would improve the quality and character and fit in well with the scale, land-form and pattern of the landscape. It would enable the restoration of valued characteristics partially lost through current and previous land uses.

Minor (positive) The proposed scheme would improve the quality of the landscape through removal of damage caused by current and previous land-use. It would fit well with the landscape character.

Negligible An imperceptible change in landscape character the proposed scheme would be absorbed into the wider landscape type and the existing landscape quality would be maintained.

Minor (adverse) The loss of only a limited amount of valuable natural features. Changes in character of very local significance. The proposed scheme would not be easily absorbed into the land-form and the scale of the landscape impacts could be fully mitigated.

Moderate (adverse) The loss of vegetation/natural features considered to be over mature or lacking visual diversity. The proposed scheme would be out of scale and not fit into local landscape patterns and land-forms. Mitigation possible.

Major (adverse) The loss of valuable mature vegetation with a life span or other natural features that cannot be replaced within a time-scale of 25 years. Proposals would be a complete variance with the land-form, scale and pattern of landscape. They would permanently degrade, diminish or destroy the integrity of valued, characteristic features, elements and/or their setting. Impacts would cause a very high quality landscape to be permanently changed and its quality diminished. The proposed scheme could not be fully mitigated and may cumulatively amount to a severe effect.

Visual Amenity Criteria

An assessment was made in terms of the significance of perceived impact by the following criteria:

1. The receptor's sensitivity and activity type. Receptors that have a greater awareness of the view such as residential occupiers and walkers will notice the introduction of new features more than those who are not absorbing the view.
2. The distance of the viewpoint from the proposed site. The greater the distance of the viewpoint from the feature the less detail is observable and it becomes more difficult to distinguish the feature from the background.
3. The duration of the perceived impact. The number of potential receptors will increase as the duration of the impact increases.
4. The scale and degree of the proposed scheme. The greater the proportion of the view that is taken up by the proposed feature the greater the impact.
5. The elevation of the proposed feature from the viewpoint. If the proposed feature is viewed against the sky then the impact will be greater than if the feature is viewed against a background.

The significance of the visual amenity impacts is defined as follows:

Major (positive) Improving visual amenity of highly sensitive receptors. Improvement of a view from recognised and important viewpoints, several public views and at close quarters.

Moderate (positive) Improvement of visual amenity of sensitive receptors at some distance.

Minor (positive) Improvement of visual amenity to a limited number of receptors or inconsequential viewpoints. A view that would be transient in nature or the proposed

scheme would only be partially seen from viewpoints.

Negligible Only a very small part of the proposed scheme would be discernable and/or at such distance that it would scarcely appreciated.

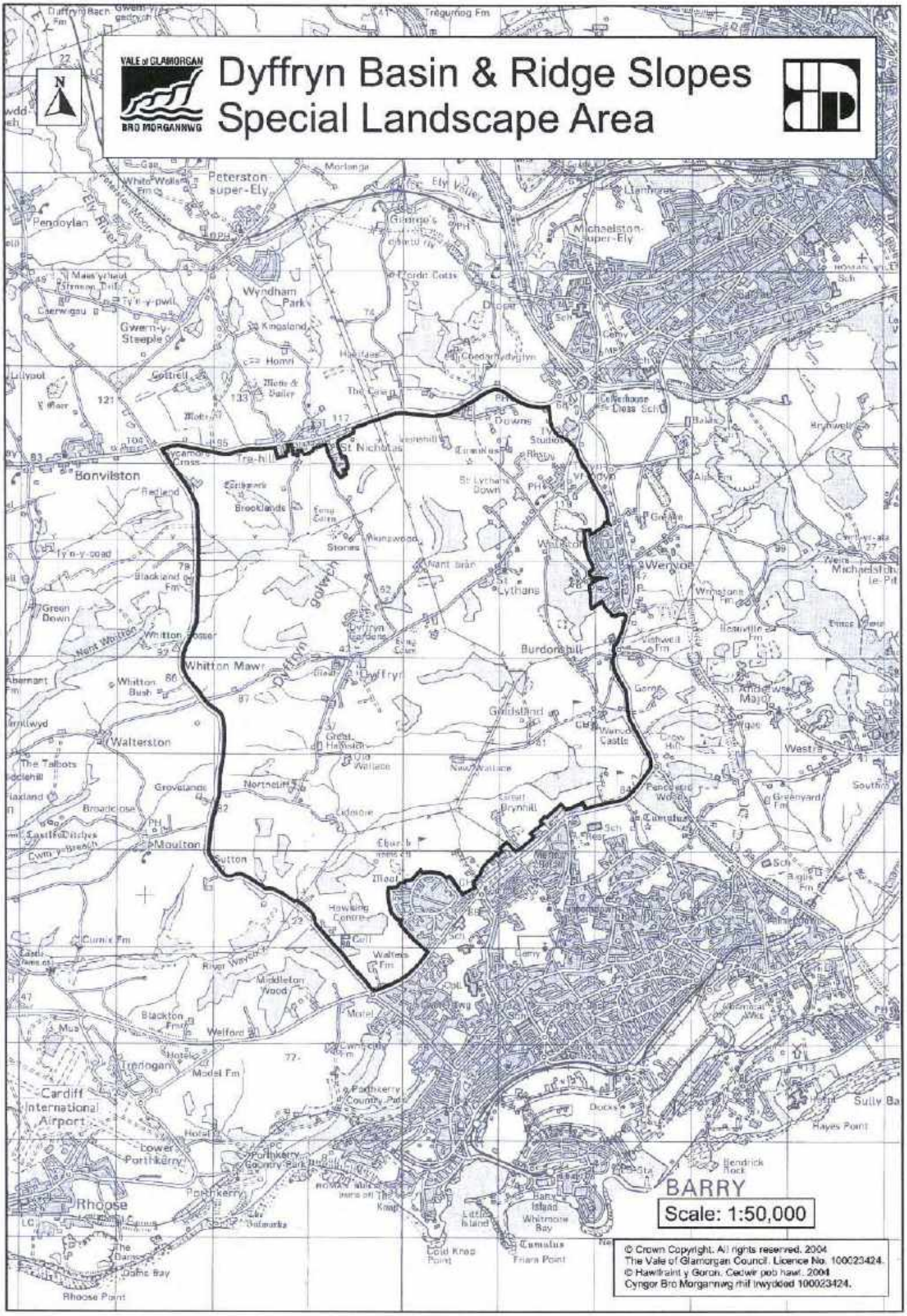
Minor (adverse) The proposed scheme constitutes only a minor component of the wider view, which might be missed by the receptor. Awareness of the proposed scheme would not have a marked effect on the overall quality of the view.

Moderate (adverse) Proposals may form a visible and recognisable new intrusive element within the overall scene and be readily noticed by receptor. Deterioration of the visual amenity to a limited number of receptors, or inconsequential viewpoints. View that would be transient in nature or only partly seen from viewpoints.

Major (adverse) The proposed scheme would form an intrusive and immediately apparent part of the scene which changes and affects the entire view. Significant deterioration of visual amenity of highly sensitive receptors or deterioration to views from recognised and important viewpoints.

APPENDIX 2

Extract from ‘Design in the Landscape’ SPG


VALE of GLAMORGAN
BRO MORGANNWG
Dyffryn Basin & Ridge Slopes
Special Landscape Area
N
Peterston super-Ely
Pendoylan
Wyndham Park
Gwern-y-Steeple
Bonvilston
St Nicholas
Michaelston-super-Ely
Llanmaes
St Lythans
Wenvoe
Burdonshill
Whitton Mawr
Dyffryn
Walterston
Moulton
Sutton
Cardiff International Airport
Rhoose
Lower Porthkerry
Porthkerry Country Park
BARRY
Scale: 1:50,000
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Cyngor Bro Morgannwg rhif trwydded 100023424.

APPENDIX 3

Extract from Officer's Report to Committee

4. Visual Impact / Design.

The application site is located to the immediate east of the industrial/ commercial units within the old Nissen huts on Woodham Road, and has most recently been occupied by an industrial use with storage containers etc. (such use having recently been cleared).

The site is clearly visible from Fford y Milleniwm and higher ground (Dock View Road etc) to the north, and (up close and at a distance) from Barry Island and the Waterfront in general to the west, as well as generally from the Docks. Nevertheless, in terms of its wider context, it clearly relates primarily to the wider industrialised area of Barry Docks.

As a consequence, the proposed industrial building, while some 14 metres tall, would nevertheless relate to the character of nearby use and buildings, and have no adverse visual impact on the amenity of the locality. Indeed, the only element of the proposal which distinguishes it from any other large industrial building is the proposed 20m (possibly, 16m) high stack. Within its industrial context, however, this would similarly have no adverse impact, appearing neither unacceptably prominent or out of character.

While it is appreciated that the Docks are overlooked by houses from an elevated height in and around Dock View Road – with the visual impact of the proposal on residential amenity having been raised in local representations, including matters relating to the impact on or loss of view - the area is indisputably industrialised in character and the addition of a new industrial building would, within this context, not appear out of place.

In addition, the industrial process would take place entirely within the building, other than the delivery/ off loading of timber (which would be to the southern side of the building, and therefore primarily screened from views from the north) and the majority of the site would be open/ landscaped.

Conditions would be required on matters including materials, landscaping, no open storage, and external lighting (of site and building).

For those reasons discussed in greater detail above, it is thus considered that the physical impact of the use and building would neither appear out of character or unacceptably overbearing to the extent that it would cause demonstrable harm to the amenities of those residential properties living near the area. Accordingly, it is concluded that the proposal would not have any unacceptable visual impact, and would accord with the objectives of the policies listed in the policy section above, including WAST2, ENV27, COMM8, EMP2 and EMP3.

5. Traffic Management / Access.

The application has been accompanied by a Transport Assessment and a Green Travel Plan (GTP), with the Transport assessment (and accompanying Planning Statement) advising as follows:

APPENDIX 4

BioGen Energy Recovery Proposals

In response to the above concerns, the overall heights of the building have been reduced, and a more 'curved' solution offered to the fins on the building, which have somewhat softened the impact of the building, if not providing a wholly new or outstanding example of industrial architecture. Nevertheless, although the building's design is not dramatically contemporary or unique, it is considered to satisfactorily respect its prominent location and relationship between the light/heavy industrials areas and the predominantly residential areas nearby (including the waterfront development area).

In considering the physical impact of the development, on request, the applicants have also provided figures and cross-sections demonstrating the height of the buildings compared to local landmarks, in order to contribute to an assessment of such landscape impact. In this respect it is notable that the ridge height to the proposed Energy Recovery Hall is 27.6m AOD, compared to 29.2m to the ridge of the Council's Dock Office, and 34.9m to the ridge of the Atlantic Mills building. This is considered to demonstrate that the building will undoubtedly become a landmark insofar as it would exceed all but the Dock Office and Atlantic Mills buildings in the immediate area, while its 45m stack would clearly exceed all but the stacks on the chemical works to the east. This in itself, however, does not make the development unacceptable.

Impact on Regeneration of Waterfront

A number of representations have raised concerns about the impact of allowing such substantial (and in their eyes harmful) development so close to the waterfront redevelopment area, considering that this would have an adverse effect on its regeneration and general visual amenity.

These views are acknowledged, and clearly the impact of such a substantial new development in the area upon the waterfront is a material consideration.

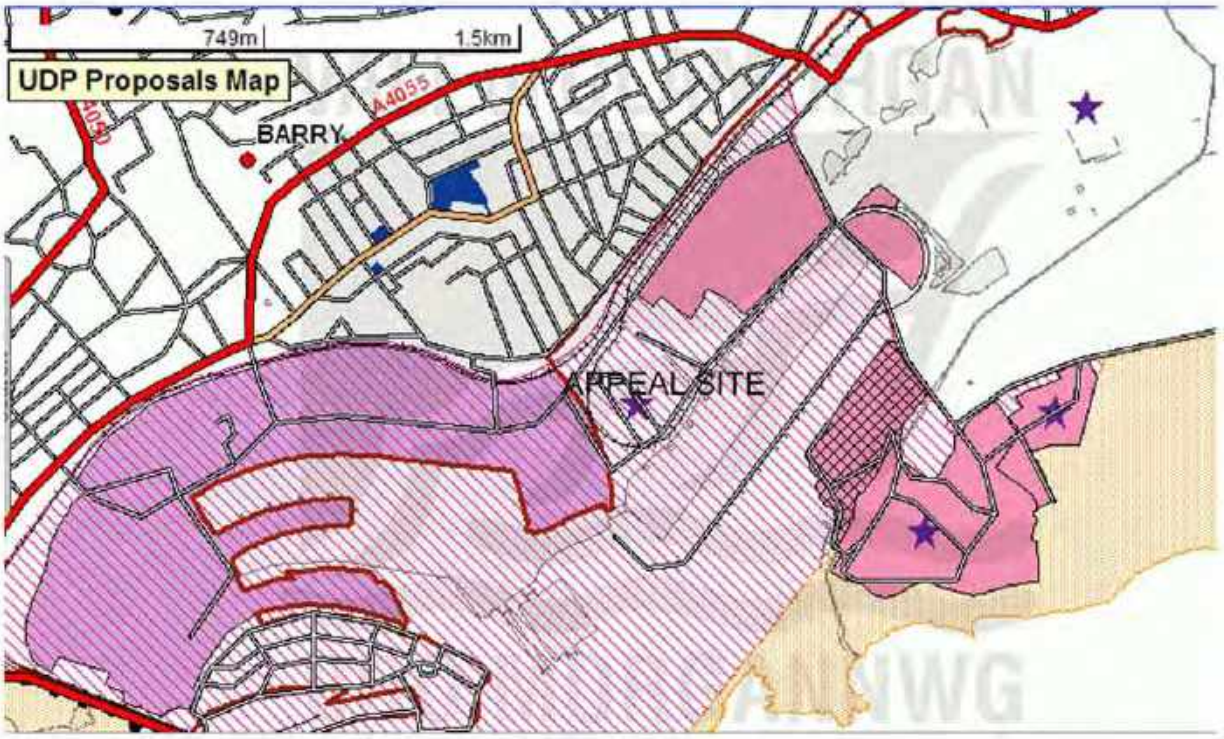
Nevertheless, for the reasons given above, the development is considered to be a clean and high quality development which, while significant in terms of its size and scale, would respect its existing industrial context. Moreover, the application site is located approx 310m at its closest point from the Waterfront development (East Quay adjacent to Cory Way) and some 650m from 'South Quay' adjacent to the docks entrance, with the site viewed against its industrial background in the majority of views form the waterfront development area.

Accordingly, although the proposed development would undoubtedly stand out in local views, it is considered that the relationship of the site and development to the Waterfront as a whole is such that it would not unacceptably detract from either the prospects of such regeneration going ahead (an application for outline consent for mixed use is due to be submitted shortly), nor would it detract form the high quality mixed use development the Council will be actively requiring through such submissions. In this respect, it is also noted that the applicant has submitted a letter of support from the consortium developing the Waterfront

Furthermore, the development has the potential to make a positive contribution to the regeneration of Atlantic Way and the Atlantic Trading Estate as a whole, given the investment in a high quality, visually-appealing development, which may also attract other higher quality developments to the locale.

APPENDIX 5

Extract from Vale of Glamorgan UDP

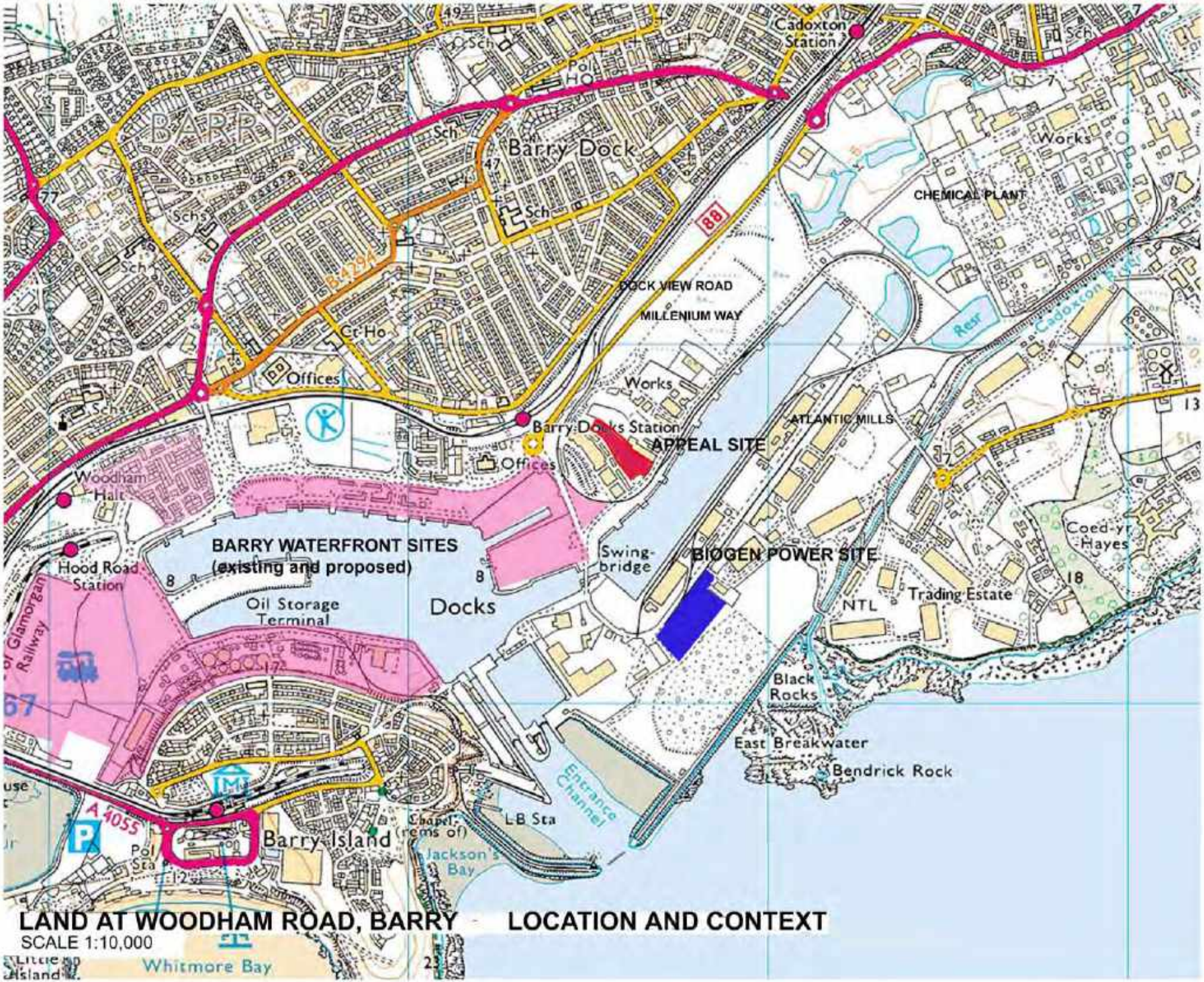


★	Existing Employment Site
	Employment Allocation
	Non Conforming Uses
	RAF St. Athan
[-] Environment	
	Developed Coast
	Undeveloped Coast
[-] General	
	Comprehensive Redevelopment Area
[-] Housing	
	Residential Allocation
	Residential Settlement Boundary

KEY

WOODHAM ROAD, BARRY
EXTRACT FROM UDP MAP

APPENDIX 5



LAND AT WOODHAM ROAD, BARRY - **LOCATION AND CONTEXT**

SCALE 1:10,000

THE Appleton GROUP

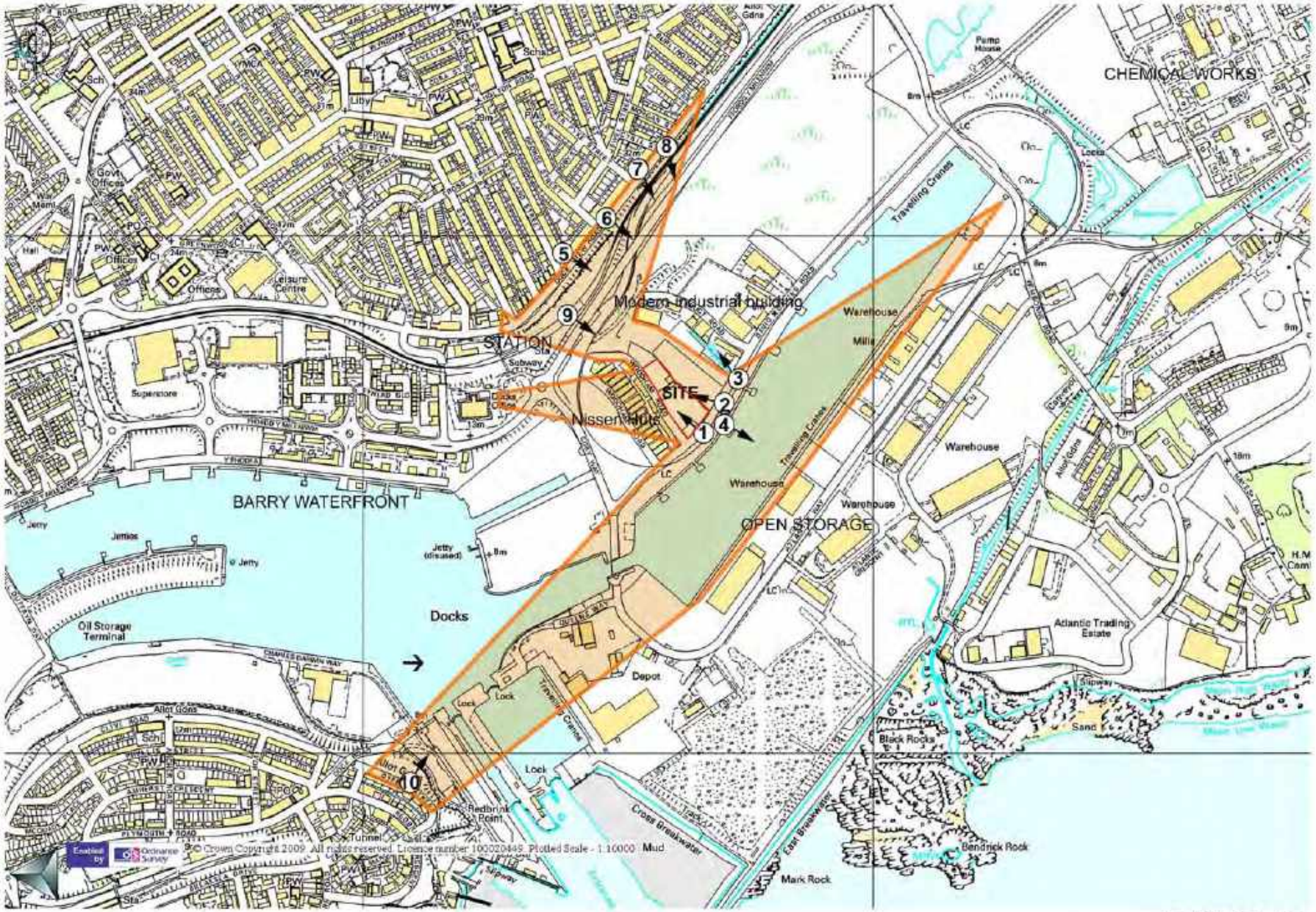
TAG 1

TAG 2

Land at Woodham Road, Barry

Site characteristics

THE Appleton GROUP



Land at Woodham Road, Barry Photograph locations

THE Appleton GROUP

Photograph 1, Panorama of site from southern boundary

Photograph 2, Looking towards eastern boundary from adjacent site

Photograph 3, Adjacent site to east and new industrial building

Photograph 4, Panorama of dockside south of site

Land at Woodham Road, Barry Photographs sheet 1

Photograph 5, View of site from Dock View Road/ Castleland Street Junction

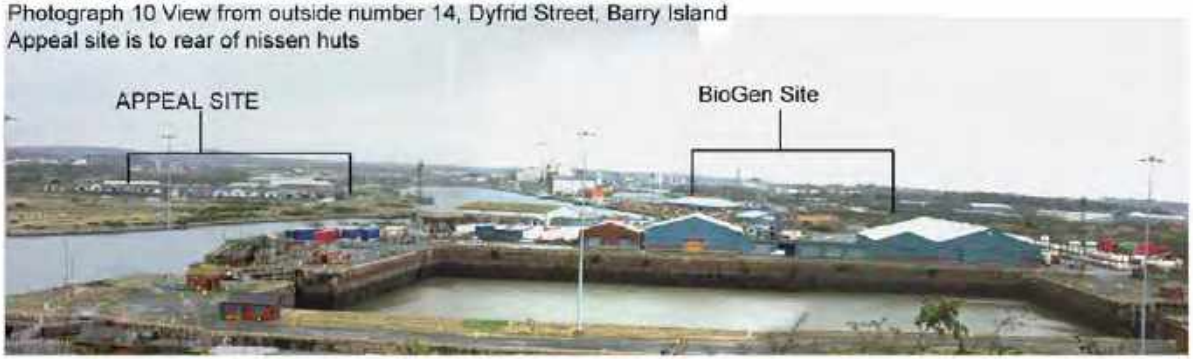
Photograph 6. View from Dock View Road near Sea View Labour Club,

Photograph 7, View from Dock View Road, Lower Pyke Street Junction

Photograph 8 View from Dock View Road, Opposite no 162

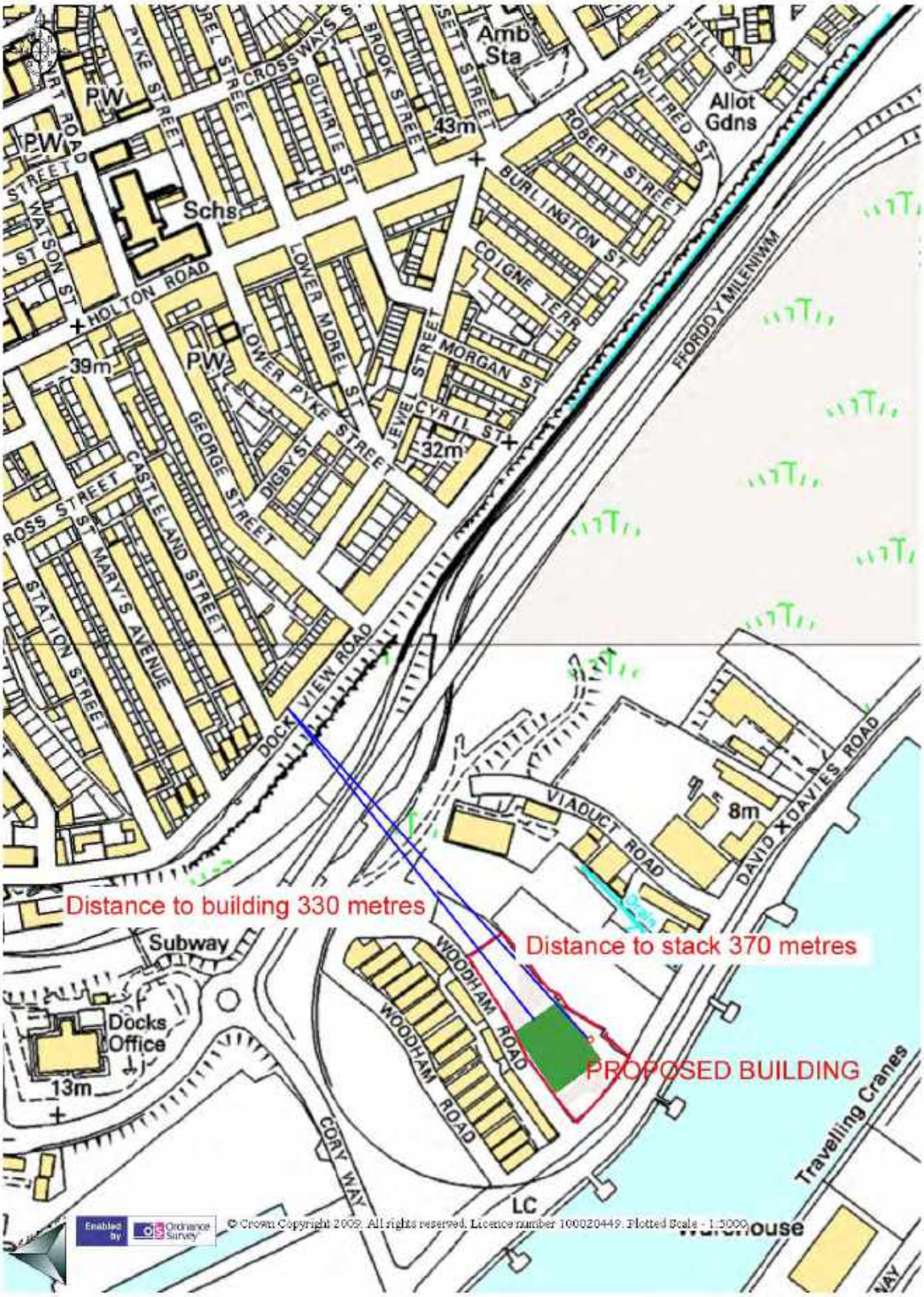
Photograph 9 View from Dock Railway Station (site not visible)

Photograph 10 View from outside number 14, Dyfrid Street, Barry Island
Appeal site is to rear of nissen huts



NOTE; SITE INDICATOR LINES ARE INDICATIVE OF LOCATION AND NOT COMPARITIVE SCALE OR MASSING

Land at Woodham Road Barry Photographs sheet 2



WOODHAM ROAD, BARRY SITE MEASUREMENTS

Scale 1:5000

TAG 4

Appendix 1(8): 2015 Application - Ecology Report (2014)

Power Consulting Midlands Ltd

Renewable Energy Plant at Woodham Rd. Barry
Ecological Assessment Prepared for
Sunrise Renewables (Barry) Ltd

November 2014

1. Introduction

1.1 The Applicant, Sunrise Renewables (Barry) Limited, is developing a renewable energy plant based on an advanced conversion technology (ACT) at Woodham Road, Barry, CF63 4JE within the Port of Barry (the "**Project**").

1.2 The principle of establishing a wood fuelled power plant at the Project site was established by planning permission reference 2008/01203/FUL, as approved by appeal reference APP/Z6950/A/09/2114605 on 2nd July 2010 (the "**2010 Permission**").

1.3 Power Consulting Midlands Ltd (**PCML**) has been commissioned by the Applicant to review the ecological considerations pertaining to the site and consider the applicability of the RSK Carter Ecological Survey for Althaea Hirsiuta (Rough Marsh Mallow) submitted in support of the 2010 Permission in the context of their re-application for a similar plant to be submitted in November 2014.

1.4 The RSK Carter Ecological Survey dated from 2009 (the "**2009 Report**") is attached to the present report.

1.5 PCML considers that this review must address two fundamental issues :-

(1) Have conditions at the site changed materially in a way that would alter the ecology and consequently invalidate the conclusions in the 2009 Report?
(2) Is their currently any evidence of the presence of Althaea Hirsuta at the site.

2. Original Report Conclusions

2.1 The survey issued by RSK Carter dated 23rd January 2009 considers the suitability of the site as a habitat for a legally protected plant species, *viz*. *Althaea hirsuta* (Rough Marsh-mallow), which has been recorded in the ten-kilometre grid-square. It provides background information on the species (hereafter generally referred to as *Althaea*), describes the site and its vegetation, and evaluates the likelihood of *Althaea* being present.

2.2 Prior to the site visit, a brief desk-based data-search of published sources was carried out to obtain information on *Althaea hirsuta* (Rough Marsh-mallow).

2.3 The site was thoroughly searched for evidence of *Althaea* and the habitat and vegetation types were described.

2.4 The report concludes that the absence of *Althaea* cannot absolutely be ruled out from a January survey, and it is always possible that there might be dormant seeds that could germinate in the future. However, the failure to find *Althaea* or similar malvaceous species, considered together with the strongly ruderal character of the site and the lack of previous records, make it very unlikely that *Althaea hirsuta* (Rough Marsh-mallow) is present.

3. 2014 Site Visit and Further Search for Evidence of Althaea

3.1 Below two photographs taken during the 2008 survey are set out alongside recent photographs taken from approximately the same position during the site visit on 21st Nov 2014.

2014 2008

3.2 It can be seen that no material changes have taken place to the topography of the site and that the current ecology is visually consistent with that which existed at the site in 2008.

3.3 A thorough and systematic search of the site on 21st November 2014 was carried out and, consistent with the 2008 result, no evidence of the existence if Alhaea Hirsuta was found. The search also revealed that the various species currently present at the site are consistent with those species recorded during the 2008 survey.

3.4 PCML can therefore confirm the findings of the 2009 report ie. that the failure to find *Althaea* or similar malvaceous species, considered together with the strongly ruderal character of the site and the lack of previous records, make it very unlikely that *Althaea hirsuta* (Rough Marsh-mallow) is present.

24 November 20

4. Photographs taken during the Survey on 21st November

PROPOSED BIOMASS POWER PLANT, BARRY, SOUTH WALES

SURVEY FOR ALTHAEA HIRSUTA (ROUGH MARSH-MALLOW)

Prepared for Sunrise Renewables

January 2009

RSK GENERAL NOTES

Project No:	**P660003**
Title:	**Proposed Biomass Power Plant, Barry, South Wales Survey for Althaea Hirsuta (Rough Marsh-mallow)**
Client:	**Sunrise Renewables**
Issue Date:	**23rd January 2009**
Issuing Office:	**Manchester**

Authorised by:	**Rob Domeney**	**Project Manager**	**Date:**	**23/12/08**
Authorised by:	**Sarah Harmer**	**Project QA Rep**	**Date:**	**23/12/08**

TABLE OF CONTENTS

1 INTRODUCTION

1.1 Purpose of the Report

This report details a survey of a land-parcel at Barry Docks (OS Grid Reference ST 126 676) to assess its suitability for a legally protected plant species, *viz*. *Althaea hirsuta* (Rough Marsh-mallow), which has been recorded in the ten-kilometre grid-square. It provides background information on the species (hereafter generally referred to as *Althaea*), describes the site and its vegetation, and evaluates the likelihood of *Althaea* being present.

The survey was commissioned by Sunrise Renewables Ltd and carried out by a botanist from RSK Carter Ecological Ltd on 12th January 2009.

1.2 Site Context

The site comprises a roughly rectangular parcel of derelict land on the north side of Barry Docks bordered by Woodham Road and David Davies Road to the west and south, and areas of derelict land to the east and north (containing hard standing and rough grassland with scattered scrub). A strip of grassland and a railway line separate the site from the wet dock to the south and there is a row of commercial buildings to the west. The wider landscape features a mixture of industrial and post-industrial habitats including a large expanse of newly colonising grassland on derelict land to the west.

1.3 Contents of the Report

This report is set out as follows:

- *Section 1* provides introductory material;
- *Section 2* describes the desk-study and survey methods;
- *Section 3* presents and discusses the results;
- *Section 4* gives references;
- *Section 5* (*Appendix A*) gives a plant species list; and
- *Section 6* (*Appendix B*) contains plates.

Plant nomenclature in this report follows Stace (1997). Plant names in the text are given with scientific names first, followed by the English name in brackets. Doubtful identifications are preceded by 'cf.' placed before the specific epithet where the plant is very probably the species indicated, but it is impossible to distinguish it from similar members of the genus with certainty.

2 METHODS

2.1 Background Data Search and Site Visit

Prior to the site visit, a brief desk-based data-search of published sources was carried out to obtain information on *Althaea hirsuta* (Rough Marsh-mallow).

The site was thoroughly searched for evidence of *Althaea* and the habitat and vegetation types were described. Vascular plant species were listed (*Appendix A*). Subjective estimates of their relative abundance were added using a modified DAFOR scale, which ranks species according to their relative abundance in a given parcel of land as follows: d – dominant, a – abundant, f – frequent, o – occasional, r – rare. In addition, the following prefixes are used: l – locally, v – very. The terms 'abundant' and 'rare' are used by convention, and apply only to relative-abundance within the recorded area. It does not mean that species are 'rare' in the general sense.

January is a poor time of year for most botanical recording purposes. Some species are minimally in evidence as leaves only, and some can be identified from the previous year's dead remains. But - leaving aside trees, shrubs and large winter-green perennials - many species are not in evidence at all, and whether leaves and dead remains adequate for identification are to be found at a given location is for many species a matter of serendipity. Where these signs are to be found, the presence of a species can often be confirmed, but absence is generally impossible to prove. In January 2009 all this was to some extent exacerbated by cold and frosty weather in the preceding six weeks (as it hastens deterioration of remains and delays development of leaves).

This means that the species list (*Appendix A*) cannot be regarded as exhaustive; many more species would be found in a summer survey. It does, however, adequately indicate the character of the vegetation. The *Althaea* itself normally behaves as a summer- or autumn-germinating winter-annual (*Section 3*), and it is therefore reasonable to expect that leaves would be in evidence in mid-winter. A January survey cannot absolutely prove absence of the *Althaea*, but the likelihood is that it if it were present then it could in fact be found.

3 RESULTS AND EVALUATION

3.1 Background information on **Althaea hirsuta** *(Rough Marsh-mallow)*

Althaea hirsuta (Rough Marsh-mallow) is listed on *Schedule 8* of the *Wildlife and Countryside Act 1981* giving it legal protection in England and Wales against intentional picking, uprooting and destruction. It was listed as 'Endangered' in Wiggingon (1999), but it is not listed as threatened in the most recent IUCN Red List (Cheffings & Farrell 2005).

Althaea is an annual, or rarely biennial, herb with erect to decumbent stems up to 60 cm; it is coarsely hairy (hispid) and has shallowly lobed (palmate) lower leaves, and deeply divided upper leaves, all with 3-5 lobes (Stace 1997). The flowers are lilac in colour and have five petals 12 to 16 mm in length. In general appearance, it resembles other British species of the Malvaceae such as *Malva moschata* (Musk Mallow).

Althaea behaves mainly as a winter annual in Britain (rarely as a summer annual in wet seasons), flowering from May to early July and setting seed in July and August (Wiggington 1999). It is a poor competitor and requires bare soil for germination and seedling establishment. If conditions are right, germination may follow shortly after seed-set so that identifiable plants are likely to be in evidence by January.

Althaea is considered by many to be an introduced species in Britain, *e.g.* Stace (1997), Pearman *et al* (2002). However, in Oxfordshire, Somerset and especially in Kent (where it has been known since 1792) it occurs in open, semi-natural vegetation on dry calcareous soils (especially on south-facing slopes), which suggests that it may be native there. From Wigginton (1999) it seems that it usually occurs with at least some distinctly calcicolous associates, either grassland plants or arable weeds, and not with species typical of strongly ruderal or brown-field sites. However, this author does not really discuss the more casual occurrences of *Althaea*.

It also occurs as a casual on waste ground, and as such has been recorded from scattered localities, mostly in southern England and Wales. The most recent county Flora for Glamorgan (Wade *et al.* 1994) listed no recent records, but it has since been recorded from the 10 km square covering Barry Docks (Pearman *et al* 2002).

3.2 Field Survey Results

No evidence of *Althaea hirsuta* (Rough Marsh-mallow) was recorded. Species recorded from the site are listed in *Table 1* in *Appendix A.*

The site largely comprises bare soil or concrete without vegetation. Much of the ground is heavily rutted by vehicles and there is an abundance of fly-tipped rubbish throughout (*Plate 1* in *Appendix B*). Vegetation is confined to scattered, semi-ruderal scrub and grassland along the boundary fences, in the north-east corner, and more particularly at the southern end of the site.

The scattered scrub along the boundary fences mainly consists of *Buddleja davidii* (Butterfly-bush), although there are smaller amounts of *Rosa* species (a Rose) and *Rubus fruticosus* agg. (Bramble). There are small patches of rough grassland with a more or less closed sward alongside scrub in the north-eastern corner of the site and on the verge of David Davies Road. These are dominated by coarse grasses such as *Elytrigia repens* (Common Couch) and also feature the tall umbellifer *Pastinaca sativa* (Wild Parsnip).

The only substantial area of vegetation is at the southern end of the site, where it consists of open, semi-ruderal grassland colonising a substrate of spoil, gravel and concrete (*Plate 2* in *Appendix B*). The sparse sward includes the grasses *Agrostis stolonifera* (Creeping Bent) and *Festuca rubra* (Red Fescue) together with a range of herbs typical of disturbed sites such as *Daucus carota* (Wild Carrot), *Medicago lupulina* (Black Medick), *Senecio erucifolius* (Hoary Ragwort) and *Tripleurospermum inodorum* (Scentless Mayweed). Tall ruderals and garden escapes are also frequent, especially on piles of spoil, and include *Conyza* species (a Fleabane), *Hirschfeldia incana* (Hoary Mustard) and a species of *Salvia* or *Teucrium*.

3.3 Discussion

The strongly ruderal character of this site makes it an unlikely place for *Althaea hirsuta* (Rough Marsh-mallow). If it were present then it could only be so as a passing casual. It is generally accepted that little nature conservation value attaches to such casual occurrences of rare species in atypically ruderal sites (as compared to that attaching to them in semi-natural sites). However, to the best of our understanding, that does not derogate from the legal protection attaching to *Althaea*, which would be just as protected as a casual in this site as it would be as a permanent denizen in a semi-natural site, except in so far as mitigation for development, *e.g.* transplantation, might be much easier to agree with planning authorities and Countryside Council for Wales.

The species list for the site is typical for a disturbed, more-or-less eutrophic, and neutral to perhaps marginally calcareous ruderal site. Though the substrates contain some calcareous materials, *e.g.* concrete, mortar from building rubble, this is not very distinctly reflected in the species list, there being no strong calcicoles except for the woody climber *Clematis vitalba* (Traveller's Joy). Species such as *Centranthus ruber* (Red Valerian), *Daucus carota* ssp. *carota* (Wild Carrot), *Foeniculum vulgare* (Fennel), *Fragaria vesca* (Wild Strawberry) and *Pastinaca sativa* (Wild Parsnip) are suggestive of very mildly calcicolous tendencies in the flora, but the great majority of the species listed are widespread on normal ruderal sites across lowland Britain. For vegetation suitable for *Althaea* the species list is not encouraging, but neither is it prohibitive; the species named above could just be congeners of *Althaea*.

The greater part of the site has been so disturbed by vehicles (or by some other previous use) that it supports no vegetation at all, while the rather limited areas of scrub and rough grassland can be discounted as potential habitat for *Althaea* because it would not persist amongst the closed vegetation.

By contrast, the area at the southern end of the site appears to provide good conditions for the germination and establishment of *Althaea*. The vegetation is open and the substrate is free-draining, relatively infertile and perhaps mildly calcareous. Furthermore, similar early-successional grassland not surveyed in surrounding sites could perhaps support *Althaea*, and in that case might act as a seed-source for *Althaea*.

Althaea mainly behaves as a winter annual, and on the balance of probabilities it ought to be in evidence in January, though spring germination (and thence summer annual behaviour) is not unknown in Britain. No *Althaea* or superficially similar species of the Malvaceae were recorded in this survey. Because of the limited area of suitable habitat, it is very unlikely that even poorly-developed specimens would have been missed if they were present.

For the reasons explained above, the absence of *Althaea* cannot absolutely be ruled out from a January survey, and it is always possible that there might be dormant seeds that could germinate in the future. But the failure to find *Althaea* or similar malvaceous species, considered together with the strongly ruderal character of the site and the lack of previous records, make it very unlikely that *Althaea hirsuta* (Rough Marsh-mallow) is present.

4 REFERENCES

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5 APPENDIX A – SPECIES LIST

Table 1. Vascular plant species recorded from the site on 12/01/2009.

a) Shrubs and woody climbers	
Buddleja davidii (Butterfly-bush)	f
Clematis vitalba (Traveller's-joy)	r
Rosa species (a Rose)	r
Rubus fruticosus agg. (Bramble)	lf
Salix cinerea (Grey Willow)	vr
Sambucus nigra (Elder)	vr
b) Herbaceous species	
Agrostis stolonifera (Creeping Bent)	la
Anagallis arvensis (Scarlet Pimpernel)	vr
Arrhenatherum elatius (False Oat-grass)	r
Artemisia vulgaris (Mugwort)	r
Bromus hordeaceus (Soft-brome)	r
Cardamine hirsuta (Hairy Bitter-cress)	r
Centranthus ruber (Red Valerian)	r
Chamerion angustifolium (Rosebay Willowherb)	vr
Cirsium arvense (Creeping Thistle)	r
Cirsium vulgare (Spear Thistle)	vr
Conyza species (a Fleabane)	o
Dactylis glomerata (Cock's-foot)	vr
Daucus carota (Wild Carrot)	o
Dipsacus fullonum (Teasel)	vr
Dryopteris filix-mas (Male-fern)	vr
Elytrigia repens (Common Couch)	la
Epilobium ciliatum (American Willowherb)	r
Epilobium parviflorum (Hoary Willowherb)	vr
Eupatorium cannabinum (Hemp-agrimony)	r
Festuca rubra (Red Fescue)	o
Foeniculum vulgare (Fennel)	vr
Fragaria vesca (Wild Strawberry)	vr
Galium aparine (Cleavers)	vr
Galium mollugo (Hedge Bedstraw)	r
Geranium dissectum (Cut-leaved Crane's-bill)	vr
Geranium lucidum (Shining Crane's-bill)	vr
Geranium robertianum (Herb-Robert)	r
Geranium rotundifolium (Round-leaved Crane's-bill)	r
Hirschfeldia incana (Hoary Mustard)	f
Hypericum humifusum (Trailing St John's-wort)	r
Leucanthemum vulgare (Oxeye Daisy)	r
Linaria vulgaris (Common Toadflax)	r
Lotus corniculatus (Common Bird's-foot-trefoil)	r
Medicago lupulina (Black Medick)	o
Melilotus species (a Melilot)	r
Myosotis sylvatica (Wood Forget-me-not)	vr
Oenothera species (an Evening-primrose)	r

Pastinaca sativa (Wild Parsnip)	vlf
Picris echioides (Bristly Oxtongue)	r
Picris hieracioides (Hawkweed Oxtongue)	r
Plantago lanceolata (Ribwort Plantain)	r
Poa annua (Annual Meadow-grass)	r
Potentilla reptans (Creeping Cinquefoil)	vr
Prunella vulgaris (Selfheal)	vr
Pulicaria dysenterica (Common Fleabane)	vr
Ranunculus repens (Creeping Buttercup)	vlf
Reseda luteola (Weld)	r
Rumex crispus (Curled Dock)	r
Rumex obtusifolius (Broad-leaved Dock)	r
Salvia or *Teucrim* species (a Clary or Sage)	lf
Senecio erucifolius (Hoary Ragwort)	o
Senecio jacobaea (Common Ragwort)	r
Senecio vulgaris (Groundsel)	vr
Sonchus oleraceus (Smooth Sow-thistle)	vr
Sisymbrium officinale (Hedge Mustard)	r
Taraxacum sect. *Ruderalia* (Common Dandelion)	r
Trifolium medium (Zigzag Clover)	vr
Trifolium pratense (Red Clover)	vr
Trifolium repens (White Clover)	r
Tripleurospermum inodorum (Scentless Mayweed)	o
Vicia sativa (Common Vetch)	r

6 APPENDIX B – PHOTOGRAPHS

Plate 1. Looking from west to east across the site.

Plate 2. Open semi-ruderal grassland colonising the southern corner of the site.

Appendix 1(9): 2015 Application - Noise Assessment (2014)

Power Consulting Midlands Ltd

Renewable Energy Plant at Woodham Rd. Barry
Noise Assessment Prepared for
Sunrise Renewables (Barry) Ltd

December 2015

1. Introduction

1.1 The Applicant, Sunrise Renewables (Barry) Limited, is developing a renewable energy plant based on an advanced conversion technology (ACT) at Woodham Road, Barry, CF63 4JE within the Port of Barry (the "**Project**").

1.2 The principle of establishing a wood fuelled power plant at the Project site was established by planning permission reference 2008/01203/FUL, as approved by appeal reference APP/Z6950/A/09/2114605 on 2nd July 2010 (the "**2010 Permission**").

1.3 Power Consulting Midlands Ltd (**PCML**) has been commissioned by the Applicant to review the applicability of the noise assessment reports and letters submitted in support of the 2010 Permission in the context of their re-application for a similar plant to be submitted in November 2014.

1.4 The noise studies and reports dated from 2009 (the "**2009 Reports**") are to be found annexed to this report.

1.5 PCML considers that this review must address two fundamental issues :-

(1) Have the background noise levels changed in a way that would invalidate the conclusions in the 2009 Reports?

(2) Does the new plant expect to operate within the noise emissions constraints that were envisaged for the original design approved under the 2010 Permission?

2. Original Report Conclusions

2.1 The report issued by AB acoustics dated 23 December 2008 considers background noise levels measured at three locations:

Location 1: Dock View Road / Castleland Street

Location 2: Cory Way and

Location 3: Cei Dafydd (Y Rhodfa)

2.2 The results of such calculations produced predicted Specific Noise Levels for the various locations as follows:

Location 1 = 37 dBA

Location 2 = 40 dBA

Location 3 = 22 dBA

These calculations took into account a +5 dBA correction factor added to account for the tonal character etc of the noise having regard to with respect to BS 4142.

2.3 The AB Acoustics letter dated 18th March 2009 considered the additional effect of the proposed Atlantic Way facility by analysing the combination of expected noise levels from both plants at two locations where background noise readings

coincide. Data collected by Parsons Brinckerhoff Ltd for the Atlantic Way Project was used.

Location 1 = 37 + 24 = 37 dBA

Location 3 = 32 + 28 = 33 (33.4) dBA

These calculations also took into account a +5 dBA correction factor added to account for the tonal character etc of the noise having regard to with respect to BS 4142.

3. 2014 Site Visit and Noise Measurements

3.1 Below is a plan of the site and the location of the nearest residential properties at which the existing background noise levels were measured (Locations 1, 2 and 3 above):

3.2 During a survey on 21st November 2014 the background noise levels at all three locations were re-checked and found to be consistent with those measurements used in the previous calculations performed by AB Acoustics and Parsons Brinckerhoff Ltd:

3.3 PCML therefore conclude that the calculations performed by AB Acoustics with respect to the combined impact of the original Sunrise design and the Atlantic Way Project are remain valid.

3.4 Therefore if the specified internal level of 90 dBA is achieved then the external level from the proposed plant at the various locations will be equal to or less than the measured background level – this is an indication that complaints about noise will not be received.

3.5 It is also reasonable to conclude that the noise attenuation measures proposed by AB Acoustics for the original Sunrise design also remain valid.

4. 2014 Project

4.1 PCML has also studied the design proposals and contractual arrangements proposed for the Project which is the subject of the current application. The conclusion is that even in the absence of additional compensating noise attenuation measures being incorporated into the design, no item of plant within the power plant buildings will exceed the noise level of 85db recommended by AB Acoustics.

4.2 It is understood that the Atlantic Way project will not now proceed and the planning permission expired on 23rd December 2014. As a result, the conclusions of the original report dated 23rd December 2008 apply with not further consideration required to be given to the impact of the Atlantic Way project.

4.3 PCML can therefore confirm that the new configuration is not likely to result in complaints.

29 December 2014

Attachments: The 2009 Reports

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Environmental Noise Survey
Proposed Biomass Plant
Woodham Road
Barry

AB Acoustics
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23 December 2008.

Introduction

AB Acoustics were commissioned by Oaktree Environmental Ltd to undertake an environmental noise assessment the proposed site of the installation of a Biomass Gasification Plant to generate electricity from reclaimed wood (Woodham Road Barry CF63 4JE)

At the present time the site operates as a storage yard - - it is proposed to locate the proposed plant within a building on the existing site – it is understood the generator plant will operate on a 24 hour basis.

However this 24 hr operation will consist only of the operation of the generator plant and it is understood that no other equipment will be operated on a 24 hr basis – effectively the plant will be loaded with material for processing during the 'normal' hours that the plant operates and this material is then fed by means of a conveyor into the proposing plant.

.

The site is part of a well established industrial estate the proposed plant being housed within a purpose designed building.

Below is a plan of the site and the location of the nearest residential properties at which the existing background noise levels were measured:

Location 1 was on Dock View Road opposite the junction with Castleland Street.

Location 2 was at the entrance to the waste ground – which it is proposed to develop at some future date - on Cory Way

Location 3 was on the residential estate at Cei Dafydd

The noise level generate by the proposals is predicted for the residential properties at the three locations..

All calculated levels are FREE FIELD.

Noise Assessment Criteria

The likelihood of complaints about noise from industrial plant can be assessed where the standard is appropriate using BS 4142 – 1997. Within the standard, another standard, BS 8233- 1987 is introduced for general guidance on acceptable noise levels within buildings.

Guidance in BS 8233 –1987 (Sound Insulation and Noise Reduction in Buildings) provides design criteria for noise inside dwellings. These are:

Bedrooms	Laeq,T = 30 dB
Living Areas	Laeq,T = 35 to 40 dB

The 30 dB to 40dB Laeq,t level in BS 8233 – 1987 is in line with the night time internal noise criteria in PPG 24 of 30 dBA. This level is acceptable as avoiding disturbance to sleep.

An internal criteria of 35 - 40 dB Laeq,T 5 mins. Would translate to an outdoor limit of 50 - 55 dB Laeq,T 5 mins. where, by convention, an open window would provide an attenuation of 15 dBA, however an attenuation of 12 dBA is a more realistic figure.

The BS 4142 assessment method considers the likelihood of noise from specific noise sources provoking complaints from residents of nearby sensitive properties.

The Specific Noise Level is the noise level of the source or collection of sources under investigation and should exclude any other noise sources which may otherwise contribute.

The likelihood of complaints is assessed by comparing the noise level from the specific noise source(s) under investigation, against the typical prevailing background noise levels. The audible characteristics of the specific noise source(s) are also taken into account ie. If the noise contains any distinct hums, whines or bangs etc. then a correction of +5 dBA should be added to the measured level. This then becomes the Rating Level.

The margin by which the noise level due to the specific noise source under investigation exceeds the background noise level enables the likelihood of complaints to be assessed.

The greater this distance the greater the likelihood of complaints.

A difference of around +10 dB or more indicates that complaints are likely.

A difference of around +5 dB is of marginal significance.

If the rating level is more than 10 dB below the background level this is a positive indication that complaints are unlikely.

Equipment Used and Measurement Method

The noise levels were measured using a :

Norsonic Type 114 real Time Octave Band Analyser (Type 1 instrument)

Calibration was carried out prior to the measurements – and checked afterwards using a ;

Norsonic Acoustic Calibrator.

The measurements were carried out at the locations described at a height of 1500mm above the ground and away from reflecting surfaces.

The measurements were undertaken at the times stated in the results.

Results

These are tabulated below for the three locations :

Location 1 Dock View Road

The main noise sources at the time of the measurements were ;

Traffic movement along Dock View Road and Ffordd y Mileniwm together with a contribution from both passenger and freight traffic on the railway

Time	L_{Aeq}	L_{90}
18.12.08 15.30 – 16.30	62.1	55.6

Dry – westerly wind 4.3 – 5.2 m/sec – dry roads

18.12.08 22.00 – 22.30	55.8	43.1

Dry – westerly wind 3.5 – 4.4 m/sec – damp road (Measurement time reduced due to weather conditions)

18.12.08 23.10 – 23.20	48.0	44.9

Dry – westerly wind 2.7 m/sec – damp roads

19.12.08 – 00.25 – 00.35	44.4	41.6

Distance from proposed site scaled at 294 m (reference Google Earth)

Location 2 Cei Dafydd

The main noise source at the time of the measurement was traffic movement along Ffordd y Mileniwm

Time	L_{Aeq}	L_{90}
19.12.08 - 09.20 – 10.20	53.1	46.5

Dry – westerly wind 0.5m/sec – dry roads

18.12.08 21.20 – 21.50	47.1	43.4

Dry – westerly wind 3.5 – 4.4 m/sec – damp road (Measurement time reduced due to weather conditions)

18.12.08 23.25 – 23.35	41.4	41.2

Dry – westerly wind 2.7 m/sec – damp roads

19.12.08 – 00.40 – 00.50	40.5	40.1

Distance from proposed site scaled at 182 m (reference Google Earth

Location 3 Cory Way

The main noise source at the time of the measurement was traffic movement along Cory Way with cars and lorries accessing the industrial estate together with a contribution from traffic on Ffordd y Mileniwm

Time	L_{Aeq}	L_{90}
18.12.08 - 14.15 – 15.15	60.8	53.1

Dry – westerly wind 0.5m/sec – dry roads

18.12.08 20.45 – 21.15	47.1	43.4

Dry – westerly wind 3.5 – 4.4 m/sec – damp road (Measurement time reduced due to weather conditions)

18.12.08 23.45 – 23.55	41.4	41.2

Dry – westerly wind 2.7 m/sec – damp roads

19.12.08 – 00.55 – 01.05	40.5	40.1

Distance from proposed site scaled at 450 m (reference Google Earth)

Discussion of Results

These are discussed on a Location by Location basis

Internal Noise

All the proposed plant will be located internally to the proposed building – no actual measurements have as yet been undertaken on the type of plant that it is proposed to operate within the proposed building.

However the following noise levels of the various plant items are believed to be :

Engines : 85 dBA – as there are 6 of these the level will increase to 85 + 10log6 = 93 dBA

Coolers : 73 dBA

Roller Mill : 90 dBA

Grinder : 120 dBA

These levels are as yet to be confirmed by the various supplies – when more detailed information is available this will be forwarded.

However the client (Sunrise Renewables Ltd) has stipulated that the general internal level in the plant must not exceed 90 dBA (this will of course mean that internal acoustic treatments etc will be required) though this may not be the case at all locations.

This is therefore the internal level that is used in the following discussion

The internal noise from the process will be radiated by the structure of the building itself.

Location 1

The residential properties at Location 1 (Dock View Road) will look down onto the proposed plant as they are elevated above the proposed site – therefore they will have a view of both the rear facade of the building and the roof.

The area of the building that faces the residential properties = 45 * 14.08 = 633.6 sq m (rear facade)

Roof area = 60.6 * 45 = 2727 sq m

The attenuation of the building envelope would be an R_w = 25 dBA (ref : www.kingspanpanels.com) for a typical trapezoidal panel – this is the figure that is used in the following calculations.

Therefore the Specific Noise Level radiated by the building can be calculated using :

Rear Facade

$L_2 = L_1 – 6 – R + 10 \log S –11 – 20 \log r + DI$

Where

L_2 = Calculated level at distance r metres

L_1 = Measured Level – 90 dBA

R = the sound reduction index of the building element which in this case is **25 dBA** – see above

S = surface Area of building facing the residential property = **633.6 sq m**

.r= distance to houses = **294m**

DI= Directivity Index = 3

$L_2 = 90 – 6 – 25 + 10 \log 633.6 – 11 – 20 \log 294 + 3$

L_2 = 30 (29.6) dBA

Roof

$L_2 = L_1 – 6 – R + 10 \log S –11 – 20 \log r + DI$

Where

L_2 = Calculated level at distance r metres

L_1 = Measured Level – 90 dBA

R = the sound reduction index of the building element which in this case is **25 dBA** – see above

S = surface Area of building facing the residential property = **2727sq m**

.r= distance to houses = **294m**

DI= Directivity Index = 3

$L_2 = 90 – 6 – 25 + 10 \log 2727 – 11 – 20 \log 294 + 3$

L_2 = 36 (35.9) dBA

However the residential properties are at an angle of approximately 30^0 to the proposed plant therefore the attenuation can be calculated from A = 10 log angle / 180 = 10 log 30 / 180 = - 8 (7.77) – reducing the noise level radiated from the roof at Dock View Road to 36 – 8 = **28 dBA**

The obtain the total level these two calculated levels need to be summed – 30 + 28 = **32 (32.1) dBA**

Location 2

At the present time there is NO residential development on this site – however it is understood that there is a proposal to develop the site for residential properties – the time scale for this is unknown – if the proposed plant is installed prior to the residential development then it would seem reasonable that the possible residential development should cater for any noise that is radiated from the proposed industrial plant.

The residential properties at Location 2 (Cory Way) could only see the side facade of the proposed plant

The area of the building that faces the potential residential properties is 853.2 sq m

The attenuation of the building envelope would be an R_w = 25 dBA (ref : www.kingspanpanels.com) for a typical trapezoidal panel – this is the figure that is used in the following calculations.

Therefore the Specific Noise Level radiated by the building can be calculated using :

$L_2 = L_1 – 6 – R + 10 \log S –11 – 20 \log r + DI$

Where

L_2 = Calculated level at distance r metres

L_1 = Specified Level – 90 dBA

R = the sound reduction index of the building element which in this case is **25 dBA** – see above

S = surface Area of building facing the residential property = **853.2**

.r= distance to houses = **182m**

DI= Directivity Index = 3

L_2 = 90 – 6 – 25 + 10 log 853.2 – 11 – 20 log 182 + 3

L_2 = 35 (35.1) dBA

Location 3

At the present time there is NO residential development between this location and the proposed site – however if the possible residential development does go ahead then it may be that this location will be acoustically screened from the proposed industrial site thereby attenuating the following calculated noise level.

The residential properties at Location 3 (Cie Dafydd)) at the present time see the side facade of the proposed plant

The area of the building that faces the potential residential properties 853.2sq m

The attenuation of the building envelope would be an R_w = 25 dBA (ref : www.kingspanpanels.com) for a typical trapezoidal panel – this is the figure that is used in the following calculations.

Therefore the Specific Noise Level radiated by the building can be calculated using :

$L_2 = L_1 – 6 – R + 10 \log S – 11 – 20 \log r + DI$

Where

L_2 = Calculated level at distance r metres

L_1 = Specified Level – 90 dBA

R = the sound reduction index of the building element which in this case is **25 dBA** – see above

S = surface Area of building facing the residential property = **853.2 sq m**

.r= distance to houses = **450m**

DI= Directivity Index = 3

L_2 = 90 – 6 – 25 + 10 log 853.2 – 11 – 20 log 450 + 3

L_2 = 27 (27.2) dBA

Overall Level

The predicted noise level at the various residential properties are summarised below

Location 1 = 32 dBA

Location 2 = 35 dBA

Location 3 = 27 dBA

These levels are the calculated Specific Noise Level for the various locations – with respect to BS 4142 a +5 dBA correction factor should be added to the above figures to account for the tonal character etc of the noise – therefore the resulting Rating Levels are :

Location 1 : 37 dBA

Location 2 : 40 dBA

Location 3 : 32 dBA

These are the levels that are compared to the lowest measured background (L_{90}) at the various locations :

	Difference to Rating Level
Location1 : 41.6 dBA (00.25 / 00.35)	**- 4.6 dBA**
Location 2 : 40.1 dBA (00.55 / 01.05)	**- 0.1 dBA**
Location 3 : 40.1dBA (00.40 / 00.50)	**- 8.1 dBA**

Therefore if the specified internal level of 90 dBA is achieved then the external level from the proposed plant at the various locations will be equal to or less than the measured background level – this is an indication that complaints about noise will not be received.

The following should be noted :

No roof lights should be fitted into the roof as these do not have as high an attenuation as the 'normal' roof panels.

If the internal level within the proposed plant is in excess of the specified 90 dBA (or is projected to be) then the attenuation of the panels forming the skin of the building must be increased to account for the increase in internal noise level – further details www.kingspanpanels.com

Roger Leach AMIOA

Dated : 23.12.08

AB acoustics

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Oaktree Environmental Ltd
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18 March 2009.

For the attention of Mr M Muia

Dear Sirs

Reference : Proposed Biomass Plant Barry South Wales

It is understood that in addition to the proposed Biomass Plant on Woodham Road there is a proposal to operate an Energy Recovery Facility on Atlantic Road in the Dock Area (the proposed site is approximately 350 / 400m to the south of the proposed Biomass site across the dock.

As both plants will have an impact on the environment this note considers the combined effect for a noise point of view should both plants be approved.

From the report issued by AB acoustics dated 23 December 2008 background noise levels were measured at three locations – 1 Dock View Road / Castleland Street – 2 Cory Way and 3 Cei Dafydd (Y Rhodfa) with the following results (copied from our report dated 23 December 2009).

These levels are the calculated Specific Noise Level for the various locations – with respect to BS 4142 a +5 dBA correction factor should be added to the above figures to account for the tonal character etc of the noise – therefore the resulting Rating Levels are :

Location 1 : 37 dBA

Location 2 : 40 dBA

Location 3 : 32 dBA

These are the levels that are compared to the lowest measured background (L_{90}) at the various locations :

	Difference to Rating Level
Location1 : 41.6 dBA *(00.25 / 00.35)*	***- 4.6 dBA***
Location 2 : 40.1 dBA *(00.55 / 01.05)*	***- 0.1 dBA***
Location 3 : 40.1dBA *(00.40 / 00.50)*	***- 8.1 dBA***

Therefore if the specified internal level of 90 dBA is achieved then the external level from the proposed plant at the various locations will be equal to or less than the measured background level – this is an indication that complaints about noise will not be received.

The following should be noted :

No roof lights should be fitted into the roof as these do not have as high an attenuation as the 'normal' roof panels.

If the internal level within the proposed plant is in excess of the specified 90 dBA (or is projected to be) then the attenuation of the panels forming the skin of the building must be increased to account for the increase in internal noise level – further details *www.kingspanpanels.com*

With respect to the predicted levels for the Biogen Plant (taken from Table 9.5 – page 128 - of The Environmental Statement for the Barry Energy Recovery Facility prepared by Parsons Brinckerhoff Ltd) it is seen that the predicted Rating Level at the two common locations is calculated to be :

1) St Mary's Avenue / Dock View Road) = 24 dBA
4Y Rhodfa = 28 dBA.

Therefore to calculate the overall level of noise should both plants be approved then both these calculated Rating Levels need to be added together :

Location 1 = 37 + 24 = **37 dBA**

Location 3 = 32 + 28 = **33 (33.4) dBA**

If these new calculated Rating Levels are then compared to the lowest measured background levels above the following results :

Location 1 = - 4.6 dBA

Location 3 = - 7.1 dBA

Therefore if the specified internal level of 90 dBA is achieved for the Biomass Plant then the external level from the proposed plant and the additional Biogen Plant at the two locations will be less than the measured background level – this is an indication that complaints about noise will not be received.

However in the acoustic report for the Biogen Plant a lower background level (measured at approximately 01.40 – Y Rhodfa and at approximately 03.40 – Dock View Road) was recorded : these are quoted as 29 (28.5) dBA and 30 (29.7) dBA respectively.

If these background levels are used then the combined effect of both plants operating with respect to background levels is :

Location 1 = +8 dBA

Location 2 = + 3 dBA

Location 1 therefore results in an increase in noise level that is between that which is considered of *marginal significance* and that which *could result in complaints* with respect to BS 4142.

Therefore the external level could be reduced by either reducing the internal level within the plant to 85 dBA (rather than the 90 dBA suggested in the report dated 23 December 2009) or by increasing the attenuation offered by the building envelope.

If a 5 dBA increase in attenuation is achieved then the increase in noise level from both plants will be below that which is considered to be of *marginal significant* with respect to BS 4142.

I hope the above is sufficient for your present needs, if however you require any additional information please do not hesitate to contact us.

Yours faithfully

Roger Leach AMIOA

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DE13 9HE

Sunrise Renewables (Barry) Ltd
Gilbert Wakefield House
Bewsey Street
Warrington
WA2 7JQ

Ref: BARRY_Noise Background Survey Letter 13.03.15

Friday 13 March 2015

Dear Sirs,

Noise Background Survey – Woodham Road, Barry

Please find the attached Noise Background Survey for the proposed Woodham Road Renewable Energy Plant in Barry, as requested by the Vale of Glamorgan Council in support of our Noise Assessment dated December 2015.

Also attached is a letter from AB Acoustics, which refers to the above and confirms that their original findings are still valid.

Yours truly,

Samantha Frearson
Operations Director

AB acoustics

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UK Power Development Partners 11 March 2015.

For the attention of Mr R Frearson

Dear Sirs

Reference ; Woodham Road Barry

With reference to the above proposed plant and our original report dated 23 December 2008 – it is understood that the permission relating to the application for which the above report was prepared has expired.

Due to this an additional background noise survey has been u8ndertaken by Hurter Acoustics to re measured the background noise levels at the locations used in the original report – a copy of this report (Environmental Noise Survey 3679/ENS1) is available .

It is assumed in the following that the proposed operation of the Biomass Plant has not changed in any way from that detailed in the December 2008 report and subsequently approval was granted.

The purpose of this letter is to determine how the calculated noise levels in the 2008 report now compare to the present measured background levels.

It is worth noting that since the original approval was granted the main British Standard used in assessment (BS 4142:1999) has been superseded by BS 4142 : 2014 brief details of which are given below:

Noise Assessment Criteria

The likelihood of complaints about noise from industrial plant can be assessed where the standard is appropriate using BS 4142 – 2014 – this has recently replaced the earlier standard BS 4142 : 1997

This standard describes methods for rating and assessing sound of an industrial / commercial nature. The methods described use outdoor sound levels to assess the likely effects of sound on people who might be inside / outside residential premises.

The significance of sound of an industrial / commercial nature depends upon the margin by which the rating level of the source exceeds the background sound level and the context in which the sound occurs.

The Standard is intended to be used for :

Investigating complaints regarding noise.

Assessing sound from proposed / new / modified or additional noise sources of an industrial / commercial nature.

Assessing sound at proposed new dwellings or premises used for residential purposes.

The sound level from a source when determined as a discrete entity distinct and free of other influences contributing to the ambient sound is referred to as the 'specific sound level'.

The specific sound level is evaluated at an identified location over the appropriate reference time interval which are : 1 hours during the daytime – 07.00 to 23.00 hrs and 15 minutes during the night time – 23.00 to 07.00 hrs.

The specific noise may be subject to acoustic feature correction if the noise level at the measurement location is subjectively considered to contain certain acoustic features that may increase the significance of the impact of the noise over the background level.

If these features are present at the measurement location then the character correction is added to the specific sound level to arrive at the rating level.

The Standard requires the assessor the consider the subjective prominence of the character of the specific noise source at the measurement location / noise sensitive receptors and the extent to which the character of the noise will attract attention to it – such features are taken into account by applying the following corrections :

	Tonality	Impulsivity	Other Characteristics
Just Perceptible	+ 2 dB	+ 3dB	-
Clearly Perceptible	+ 4dB	+ 6 dB	-
Highly Perceptible	+ 6dB	+9 dB	-
Readily Distinctive against Residual Environment			+ 3 dB

If both tonal and impulsive characteristics are both present then two corrections can be made – however if only one is dominant then only one correction need to applied.

If no corrections are deemed appropriate then the Rating Level equals the Specific Noise Level.

An initial estimate of the impact of the specific sound is obtained by subtracting the measured background level from the rating level and considering the following :

A) Typically the greater the difference the greater the impact.

B) A difference of around + 10 dB or more is likely to be an indication of a significant adverse impact – depending on context.

C) A difference of around + 5 dB or more is likely to be an indication of a significant adverse impact – depending on context.

D) The lower the rating level is to the measured background level the less likely it is that the sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the measured background level this is an indication that the sound source will have a low impact depending upon context.

Where the initial estimate of the impact needs to be modified due to the context then all pertinent factors need to be taken into consideration – these include the following :

The absolute level of the sound.

The character and level of the residual sound compared to the character and level of the specific sound.

The sensitivity of the receptor and whether residential dwellings already incorporate design measures that secure good internal and outdoor conditions eg facade insulation – ventilation / cooling that reduces the need to open windows – acoustic screening.

The standard recognises that the response to sound can be subjective as well as to the local attitudes to the source of the sound and the character of the neighbourhood.

Also relevant are the World Health Organisation (WHO) Guidelines for Community Noise – these identify that sleep may be disturbed by short term noise events and the level associated with this is 45 dB LAmax inside the bedroom – this relates to 60 dB LAmax external to the bedroom.

In brief an 'Outdoor Living Area' should be subject to a noise level less than 55 dBA in order to prevent serious annoyance during the daytime and evening - a level less than 50 dBA is desirable to prevent moderate annoyance : reference World Health Organisation.

Noise Levels

The calculated Specific Noise levels at the three locations from the 2008report are detailed below :

Location 1.....32 dBA
Location 2.....35 dBA
Location 3.....27 dBA.

However in the original report (in line with BS 4142:1999) a +5 dBA correction factor was added to the above calculated Specific Noise Levels to determine the Rating Levels which were :

Location 1.....37 dBA
Location 2.....40 dBA
Location 3.....32 dBA.

The requirement in BS 4142 : 2014 is difference in that more account is taken for the actual noise character – whether it is tonal or contains impulsive noise and how the level will be perceived by the receptor.

From previous discussions it has been indicated that there could be a tonal element to the noise from the plant but that it is very unlikely that there will be any impulsive noises – particularly between the hours 23.00 and 07.00.

Therefore adding the required + 2 dB correction then the above Specific Noise Levels are increased to :

Location 1.....39 dBA
Location 2.....42 dBA
Location 3.....34 dBA

The recently measured background noise levels were determines as :

Location 1 39.6 / 40.9 dBA – which shows that the Rating Level could be 1 or 2 dBA in excess of the measured background level – this shows that the noise from the plant will have a LOW impact depending upon context.

Location 2 38.5 / 37.6 dBA – which shows that the Rating Level could be 3 or 4 dBA is excess of the measured background level – again indicating that the plant will have a LOW impact depending upon context.

Location 3 37.6 / 38.5 – which shows that the Rating Level could be4 or 5 dBA below the measured background level – which shows that the plant will have a LOW impact depending upon context.

It is important to note that the proposed plant is to be located in an old established and existing industrial area.

The residential properties around the plant are very likely to have double glazed units to there windows which could result in attenuations of the order of 25 dB to the external noise,

In addition even with the window open and assuming an attenuation for an open window of the order of 13 dB (the World Health Organisation actually assumes 15 dB) then the internal levels within the nearby residential properties will be within the requirements of BS 8233 : 2014.

I hope the above is sufficient for your present needs, if however you require any additional information please do not hesitate to contact us.

Yours faithfully

Roger Leach AMIOA.

Biomass Plant at Woodham Road Barry CF63 4JE

Environmental Noise Survey 3679/ENS1

5th March 2015

For: **Richard Frearson**
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Contents

1.0 Introduction

A Biomass Plant is proposed at Woodham Road, Barry, CF63 4JE.

This report has been commissioned to determine existing ambient and background noise levels at three pre-determined locations for comparison with the AB Acoustics noise survey report dated 23/12/2008.

Appendix A explains acoustic terminology used in this report.

2.0 Environmental Noise Survey

2.1 Procedures

1-hour sample measurements were carried out from 1300hrs to 1630hrs on 04/03/2015 and 15-minute sample measurements were carried out from 0000hrs to 0140hrs on 05/03/2015. Data including L_{Aeq} and L_{A90} were logged. All measurements were taken approximately 1.2m above local ground height.

Site plan 3679/SP1 shows the development site and sample measurement positions used, namely:

Position 1	Located on Dock View Road opposite the junction with Castleland Street and 57 Dock View Road.
Position 2	Located at the entrance to the waste ground on Cory Way. Approximately 4m from kerbside.
Position 3	Located at the residential estate at Cei Dafydd, at the south-eastern-most corner of the car park.

These are in line with measurement positions used in the 2008 AB Acoustics report.

3679/SP1 – Site Plan Showing Monitoring Positions

2.2 Equipment Used

The following equipment was used:

3679/T1 – Equipment List

Make	Description	Model	Serial Number	Last Calibrated	Certificate No.	Calibration Due
Norsonic AS	Type 1 - Integrating - averaging Sound Level Meter	140	1403003	16-Sep-13	U14448	16-Sep-15
Norsonic AS	Preamplifier	1209	12403	16-Sep-13	U14448	16-Sep-15
Norsonic AS	Microphone	1225	91797	16-Sep-13	11927	16-Sep-15
Norsonic AS	Calibrator (114.11dB @ 1001.90Hz)	1251	31826	11-Sep-14	U17057	11-Sep-15
Skywatch	Anemometer and Thermometer	JDC X2	-	-	-	-

The measurement systems were calibrated before and after the surveys, no variation occurred.

3.0 Results

Position 1 Dock View Road

Main noise sources during the day were from road traffic on Dock View Road and Ffordd y Mileniwm with occasional sprinter train activity and freight movements along the railway lines.

Main noise sources at night were from the Dow Corning Plant, humming from Barry Docks Railway Station and contributions from water running in a nearby drain. Occasional vehicle pass-bys on Dock View Road and Ffordd y Mileniwm were also recorded.

3679/T2 –Sample Measurements at Position 1

Position	Time	Duration (mins)	L_{Aeq} (dB)	L_{A90} (dB)	Weather conditions
1	13:00	60	64.5	58.8	Dry, northerly wind 2.4-5.7m/s.
1	00:01	15	55.7	39.6	Dry, calm.
1	01:02	15	52.1	40.9	Dry, calm.

Position 2 Cory Way

Main noise sources during the day were from road traffic on Cory Way and Ffordd y Mileniwm. Regular HGV movements were recorded along Cory Way accessing the industrial estate. Occasional sprinter and freight activity were also noted.

Main noise sources during the night were humming from Barry Docks Railway Station and the occasional vehicle pass-by on Ffordd y Mileniwm. There were no HGV movements noted on Cory Way during the night-time monitoring period.

3679/T3 – Sample Measurements at Position 2

Position	Time	Duration (mins)	L_{Aeq} (dB)	L_{A90} (dB)	Weather conditions
2	14:04	60	66.7	53.0	Dry, northwesterly wind 1.7-4.9m/s.
2	00:20	15	48.6	38.5	Dry, calm.
2	01:43	15	48.6	37.6	Dry, calm.

Position 3 Cei Dafydd

Main noise sources during the day were from road traffic on Ffordd y Mileniwm.

At night, an audible hum was noted coming from the west along with occasional vehicle pass-bys on Ffordd y Mileniwm.

3679/T4 – Sample Measurements at Position 3

Position	Time	Duration (mins)	L_{Aeq} (dB)	L_{A90} (dB)	Weather conditions
3	15:20	60	52.7	47.8	Dry, northerly wind 2.0-4.0m/s.
3	00:38	15	42.3	37.3	Dry, westerly wind 0.0-1.0m/s.
3	01:23	15	40.8	35.1	Dry, calm.

4.0 Discussion

Daytime ambient (L_{Aeq}) and background (L_{A90}) noise levels measured during our survey appear to be in line with those measured in the AB Acoustics 2008 survey, with the exception of position 2 (Cory Way).

Our measured ambient noise level is around 6dB higher due to HGV movements on Cory Way (67dB L_{Aeq} compared with 61dB L_{Aeq}), however the daytime background is indicated to be the same (53dB L_{A90}).

Night-time ambient noise levels appear to be higher at positions 1 & 2 during our survey, with position 3 ambient falling in line with the previous 2008 survey result. However, night-time background noise levels in our report appear to be lower than those measured during the AB Acoustics 2008 survey (35-41dB L_{A90} compared with 40-45dB L_{A90}).

Prepared by:

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Appendix A – Acoustic Terminology

Human response to noise depends on a number of factors including; loudness, frequency content, and variations in level with time. Various frequency weightings and statistical indices have been developed in order to objectively quantify 'annoyance'.

The following units have been used in this report:

dB(A): The sound pressure level weighted to correspond with the frequency response of the human ear, and therefore a person's subjective response to frequency content.

L_{eq}: The equivalent continuous sound level is a notional steady state level which over a quoted time period would have the same acoustic energy content as the actual fluctuating noise measured over that period.

L_{90}: The sound level which is exceeded for 90% of the measurement period. i.e. The level exceeded for 54-minutes of a 1-hour measurement. It is often used to define the background noise level.

L_{10}: The sound level which is exceeded for 10% of the measurement period. i.e. The level exceeded for 6-minutes of a 1-hour measurement.

L_{max}: The highest instantaneous noise level recorded over the measurement period.

Position	Time	Duration (mins)	LAeq (dB)	LA90 (dB)
1	13:00	60	64.5	58.8
2	14:04	60	66.7	53.0
3	15:20	60	52.7	47.8
1	00:01	15	55.7	39.6
2	00:20	15	48.6	38.5
3	00:38	15	42.3	37.3
1	01:02	15	52.1	40.9
2	01:43	15	48.6	37.6
3	01:23	15	40.8	35.1

Position	Time	Duration (mins)	L_{Aeq} (dB)	L_{A90} (dB)	Weather conditions
1	13:00	60	64.5	58.8	Dry, northerly wind 2.4-5.7m/s.
1	00:01	15	55.7	39.6	Dry, calm.
1	01:02	15	52.1	40.9	Dry, calm.

Position	Time	Duration (mins)	L_{Aeq} (dB)	L_{A90} (dB)	Weather conditions
2	14:04	60	66.7	53.0	Dry, northwesterly wind 1.7-4.9m/s.
2	00:20	15	48.6	38.5	Dry, calm.
2	01:43	15	48.6	37.6	Dry, calm.

Position	Time	Duration (mins)	L_{Aeq} (dB)	L_{A90} (dB)	Weather conditions
3	15:20	60	52.7	47.8	Dry, northerly wind 2.0-4.0m/s.
3	00:38	15	42.3	37.3	Dry, westerly wind 0.0-1.0m/s.
3	01:23	15	40.8	35.1	Dry, calm.

Appendix 1(10): 2015 Application - Transport Statement (2014)

Transport Statement

in support of an application for
Outline Planning
by

Sunrise Renewables (Barry) Limited

under

the Town and Country Planning Act 1990

UK Power Development Partners

Stoketon House
Windmill Hill
East Sussex
BN27 4RS
Tel 01323 833824

Transport Statement

1. Introduction

1.1 The Applicant, Sunrise Renewables (Barry) Limited, is developing a renewable energy plant based on an advanced conversion technology (ACT) at Woodham Road, Barry, CF63 4JE within the Port of Barry (the "**Project**"). The Applicant has retained UK Power Development Partners (**UKPDP**) to prepare the present report into changes to on-site access and traffic considerations external to the Project site.

1.2 The principle of establishing a wood fuelled power plant at the Project site was established by planning permission reference 2008/01203/FUL, as approved by appeal reference APP/Z6950/A/09/2114605 on 2nd July 2010 (the "**2010 Permission**").

1.3 With regard to principle of establishing a biomass powered renewable energy plant at the site it should be recognised that the site is located on an existing allocated industrial site which is well served by links to the primary road network. It should also be recognised that the levels of traffic generated by the original proposals are similar to or potentially less than the levels which would be expected if an equivalent business use such as warehousing and distribution were to become established at the site instead. This is having regard to the size of the site and its well-connected location in an industrial setting between the primary road network and a major port facility.

1.4 A comprehensive suite of traffic and access conditions was imposed under the 2010 Permission:

> *15) No development shall take place until there has been submitted to and approved in writing by the local planning authority details of secure parking on site for bicycles. The bicycle parking spaces shall remain available for their designated use for as long as the development hereby permitted remains in existence.*
>
> *19) The measures incorporated into the Green Travel Plan accompanying the application shall be implemented when the development is brought into use and thereafter monitored and reviewed in accordance with the Green Travel Plan.*
>
> *20) Deliveries to the site, and all other external operations, shall not take place outside the hours of 07.00 to 19.00 Monday to Saturday and 08.00 to 16.00 on Sundays, Bank and Public Holidays."*

This demonstrates the level of control available to the Local Planning Authority in seeking to ensure that the Project continues to comply fully with relevant planning policies and guidance regarding traffic and access issues.

1.5 This Transport Statement is being submitted as a consequence of the final choice on technologies for the Project and the requirement to effect such selection by resubmitting the planning application. It is appropriate therefore to assess the implications of this change in terms of highway and access considerations. In this regard it is to be considered an update of the Transport Assessment prepared for the purposes of the 2010 Permission, a copy of which is annexed to this report.

2. The Site

The application site is located on a vacant brownfield plot at David Davies Road, Port of Barry and forms part of a property owned by Associated British Ports. The site access (from David Davies Road) is unchanged relative to the 2010 Permission. The site will be occupied by the Applicant under the terms of a lease with the landowner, Associated British Ports.

3. Transport Assessment at the Site

Operational times and material volumes

3.1 The details of plant operation for the revised scheme will remain the same as for the previous approval. The plant will operate continuously in order to generate electricity with the exception of routine maintenance and other downtime. The following time limits will however continue to apply for the receipt of fuel and general access:

- Weekdays 07 00 - 19 00;
- Saturdays 07 00 - 19 00;

- Sundays and Bank/Public holidays 08 00 - 16 00.

The entrance gates will be closed outside of these hours to prevent unauthorised access.

3.2 Output calculations/projections are based on:

- delivery of waste wood at a frequency sufficient to enable the Plant to operate with a processing capacity of 72,000 dry tonnes of wood biomass;
- 52 weeks' operation as a 24 hour process, subject to planned/unplanned outages (8,000 operational hours out of 8,760 hours per year.
- Feedstock is expected to be delivered to site by road and/or sea according to source.

3.3 The proposed scheme continues to involve off-site pre-processing of wood waste by the feedstock supplier for delivery in a chipped state ready for processing by the plant. This in turn removes the need to store and remove large volumes of contamination such as ferrous, non-ferrous metals, plastics and fines on-site.

3.4 Ash is a by-product of the gasification process and the majority of it can be used for building products such as block manufacture. It will be removed from site in separate contained loads by the feedstock supplier for recycling. Backloading is not possible due to the need to avoid contamination of incoming feedstock. However, there is a substantial reduction (over 94%) between the weight of wood fuel processed and the weight of ash requiring removal from the site. Therefore the total amount of ash removed from the site per annum will not exceed 2200 tonnes.

3.5 The filter/abatement process designed to control emissions also produces a low volume of waste residues (fly-ash) which will be transported to specialist landfill in sealed containers by the feedstock supplier. The exact tonnage will depend on the abatement technology which the Environment Agency requires, but is unlikely to exceed 1500 tonnes per annum.

Internal parking, manoeuvring and surfaces

3.6 The Planning Statement submitted in support of the application for the 2010 Permission identified that when the plant became operational it would employ the equivalent of 8 full time employees and have a small number of visitors to the plant - approximately 4 cars (8 movements through the working day). The revised scheme will increase the level of full time employees to 12, with 10 at site and two clerical workers located off site. This in turn equates to approximately 5 visits by staff cars (10 movements) through the working day and is not a material change.

3.7 Proposed internal parking provision would be agreed with the Local Planning Authority in accordance with the 2010 Permission: the current layout plan shows the number of formal spaces as remaining unchanged at 5 spaces plus 1 disabled space and 4 cycle parking spaces. It is considered that the proposed level of parking provision remains appropriate for the number of staff and visitors likely to be using the facility. This is given that staff can share vehicles in accordance with the requirements of the current planning permission.

3.8 Vehicular access to the outline site from David Davies Road is gained over the existing property. HGV movements at the site are illustrated in Appendix 1.5. The amendment to the layout of buildings and structures under the present application has necessitated some changes to internal circulation space within the wider site. Most notably, access to the wood fuel storage building would now be obtained from the western elevation rather than the eastern elevation as previously.

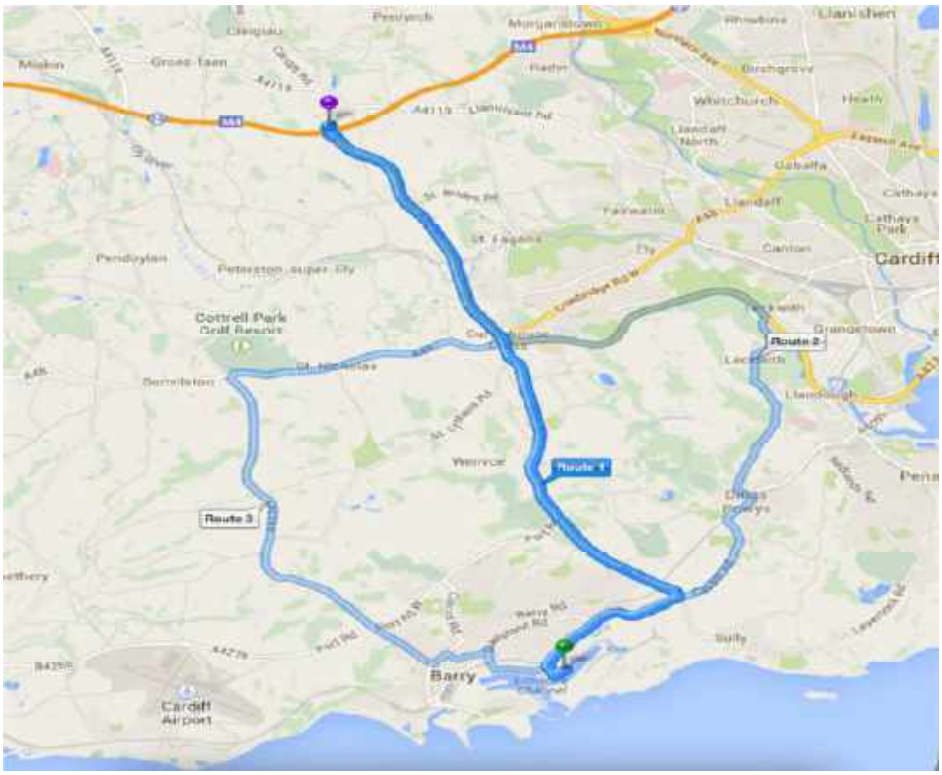
3.9 Access would be maintained to all areas of the site for fire-fighting purposes, but the main fuel store and feed hoppers would remain readily accessible, close to the entrance to the site. Detailed circulation and parking provisions within the site will also be controlled by the Health and Safety Executive.

3.10 Internal surfaces will continue to drain to a sealed sump or foul sewer. External surfaces will drain to a sustainable surface water system. Roof water will drain to a soakaway or be reused in the process.

3.11 Measures will be put in place to prevent any deposit of debris on the highway. There will be regular visual inspection and a road sweeper will be deployed as necessary, including during the construction phase.

4. Transport Assessment external to the Site

4.1 Deliveries of feedstock by road are expected to follow the course of Route 1 shown in the plan below:



4.2 In connection with the 2010 Permission, the Applicant commissioned a Transport Assessment and this is attached as Appendix 2.12. This incorporated traffic count analysis carried out by Vale of Glamorgan in 2008 and the principal conclusions were as follows:

> *4.1 The application proposals are to import fuel by road between the hours of 07:00 and 22:00, which is a 15 hour day. 11 deliveries per 15 hour day would average out at one every 82 minutes. If the deliveries were restricted to the times during which the survey was carried out deliveries would average out at one every 65 minutes.*
>
> *4.2 The overall impact in terms of additional traffic is low and the increase in heavy vehicle traffic on the 3 routes presented in the table above range from 2.91 to an 8.08 % increase in movements. The 8.08% increase would not occur as most traffic arriving at the site would arrive from the Cardiff Road direction (route B) with the impact being an increase in HCVs of 3.8%. The increase in HCVs entering/leaving the Dock would be 4.69%. These figures are reduced further if buses are added to the heavy vehicle count.*
>
> *4.3 The majority of HCV traffic coming from Cardiff Road towards Millennium Way (route B) enters the Dock so 22 additional movements added to the existing 469 is not considered significant."*

4.3 The present application envisages that the maximum average weekly deliveries by road will remain unchanged from the 2010 Permission at 77. However, the Applicant is considering restricting deliveries to weekdays in normal operation which will improving the impact for the local community at weekends so that the number of deliveries on a single weekday will increase from 11 to 15 or one every 48 minutes during site opening times of 07:00 to 19:00.

4.4 In 2013 the Vale of Glamorgan conducted updated traffic surveys including on the principal arterial roads coming in to Barry Docks (including the routing from the M4 along the A4231):

4.5 The 2013 survey results showed average daily traffic flows (single direction) for Heavy Goods Vehicles (HGVs) through the three counter points on the above map into the Barry Docks area (which encompass Cardiff Road) as follows:

Year	2 Axle (rigid HGV)	3 Axle (rigid HGV)	4/5 Axle (rigid HGV)	3/4 Axle (Artic HGV)	5 Axle (Artic HGV)	6+ Axle (Artic HGV)	All HGVs	All Traffic
1: A4050 to A4055								
2000	337	64	61	33	314	224	1033	14,627
2001	333	74	61	30	279	260	1037	15,093
2002	342	82	67	28	249	293	1061	15,493
2003	355	90	76	27	223	326	1097	15,979
2004	308	72	53	36	137	354	960	17,753
2005	310	70	56	32	121	379	968	17,722
2006	319	70	61	29	109	411	999	18,092
2007	311	93	86	25	104	401	1020	17,928
2008	302	102	89	23	98	422	1036	17,840
2009	318	58	49	38	89	181	733	16,114
2010	333	58	42	45	85	183	746	15,843
2011	327	62	47	34	83	190	743	15,802
2012	324	66	53	26	82	200	751	15,791
2013	258	48	45	36	163	148	698	15,589
2: A4231 to Cross-Common Rd								
2000	161	34	16	28	18	1	258	17,756
2001	248	30	37	12	38	23	388	16,068
2002	254	33	42	12	34	26	401	16,496
2003	264	36	48	12	30	29	419	17,032
2004	250	63	53	21	33	59	479	19,144
2005	250	61	56	19	29	63	478	19,099
2006	129	302	63	32	6	15	547	17,979
2007	131	307	70	28	6	16	558	18,079
2008	127	338	73	27	6	17	588	18,008
2009	118	340	71	25	6	17	577	17,889
2010	254	45	37	14	25	32	407	17,276
2011	249	48	41	11	25	33	407	17,230
2012	247	51	46	8	25	35	412	17,205

Year	2 Axle (rigid HGV)	3 Axle (rigid HGV)	4/5 Axle (rigid HGV)	3/4 Axle (Artic HGV)	5 Axle (Artic HGV)	6+ Axle (Artic HGV)	All HGVs	All Traffic
2013	252	56	53	7	24	37	429	17,175
3: Park Ave/Harbour Rd/St Nicholas Rd triangle to A4231								
2000	224	16	5	1	21	4	271	12,395
2001	101	2	2	2	3	2	112	10,065
2002	96	2	2	2	3	2	107	10,273
2003	59	4	0	1	1	0	65	10,147
2004	71	5	0	1	1	0	78	10,353
2005	50	5	3	2	1	7	68	10,639
2006	48	5	3	1	1	7	65	10,455
2007	192	69	2	0	1	0	264	8,723
2008	192	78	2	0	1	0	273	8,564
2009	175	78	2	0	1	0	256	8,725
2010	186	80	2	0	1	0	269	8,750
2011	189	88	2	0	1	0	280	8,811
2012	191	96	2	0	1	0	290	8,719
2013	193	104	3	0	1	0	301	8,705

4.6 The survey results above demonstrate that daily traffic flows through the Barry Docks area/Cardiff Road conduit remain significant relative to the 15 deliveries per day envisaged by the Applicant and UKPDP is of the view that the findings of the Planning inspector during the appeal prior to the 2010 Permission continue to be applicable today:

> *"16. The transport assessment submitted by the appellant (accepted by the Highway Authority) records around 469 HGV movements on Cardiff Road each day. The Highway Authority is satisfied that the road network has the capacity to accommodate the proposed development and no technical evidence is submitted to lead me to a different view. With regard to the impact of these additional movements on residents of Cardiff Road, I can put it no better than officer's did in their report to committee; 'The amount of traffic generated by this process, in comparison with the existing local and industrial traffic on the network (particularly Ffordd Y Milleniwm) is not considered to be great, and in this respect there are not considered to be any substantive reasons to object to the proposal on the grounds that there would be an unacceptable increase in noise or activities from lorry movements, not least because the site is located in an industrial area (notwithstanding proximity to dwellings) where such activities are not uncommon."*

4.7 The preferred fuel supplier for the Project has confirmed that for road haulage it uses vehicles with a delivery load of 22 tonnes for all its deliveries. It is noted that the Transport Assessment supporting the application for the 2010 Permission and reviewed by the Highways Agency contemplated vehicle loads in the range 20 to 25 tonnes and therefore the current proposal, at 22 tonnes per load, is slightly less than the previous average and should not therefore have a material impact on the road infrastructure, wear and tear etc.

4.8 A suite of planning conditions covering highway and access matters was imposed under the 2010 Permission. This includes amongst other matters:

> *"15) No development shall take place until there has been submitted to and approved in writing by the local planning authority details of secure parking on site for bicycles. The bicycle parking spaces shall remain available for their designated use for as long as the development hereby permitted remains in existence.*
>
> *19) The measures incorporated into the Green Travel Plan accompanying the application shall be implemented when the development is brought into use and thereafter monitored and reviewed in accordance with the Green Travel Plan.*
>
> *20) Deliveries to the site, and all other external operations, shall not take place outside the hours of 07.00 to 19.00 Monday to Saturday and 08.00 to 16.00 on Sundays, Bank and Public Holidays."*

If permission is granted for the current proposals it is assumed that these conditions would be re-imposed.

5. Conclusions

5.1 The principle of establishing a waste wood powered renewable energy plant at the site has been established by the previous planning consent. The current proposals represent material amendments to the approved scheme but the application area and the nature of the process would remain essentially the same. The site is on allocated industrial land and can be accessed by an approach route from the primary road system which is appropriate for the type of traffic proposed. An alternative business / industrial use would have the potential to generate equivalent or greater traffic levels than that currently proposed.

6.2 There would be no increase in the maximum number of traffic movements relative to the 2010 Permission. Consequently, it is concluded that there would be no adverse impact on the local highway relative to the currently approved scheme.

6.3 There have been no new developments since the 2010 permission which would materially affect highway capacity on the access route to this allocated industrial site. Nor have there been any changes to the policy context relating to highway matters.

6.4 Detailed planning controls covering access and highway matters have been imposed on previous planning permissions and the applicant is happy for equivalent controls to be imposed with respect to the current amendment proposals. This would give an appropriate level of reassurance regarding the ability to manage traffic movements from the site in accordance with relevant national guidance and local policies relating to highway matters.

Attachment: Transport Assessment for the 2010 Permission

1.0 INTRODUCTION

1.1 Sunrise Renewables Limited ("Sunrise") has applied to the Vale of Glamorgan Council for planning consent to install a 9MW wood fuelled biomass plant, which will generate electricity from gas produced from reclaimed wood, for export to the national grid.

1.2 Eight new local employees will be based at the plant at Woodham Road, Barry Docks, within an established industrial area. The plant has adequate parking on site for vehicles and cycles and will potentially receive up to 20 HGV loads of fuel per working day, during the hours specified below, depending upon the payload of the delivery vehicles.

1.3 The site will operate on a 24 hours basis to produce electricity but it will only receive deliveries of fuel and visits from third parties and the public during the following hours:

Monday to Friday	07:00 - 22:00
Saturday	07:00 - 20:00
Sunday / Bank / Public Holidays	07:00 - 16:00

1.4 Facts relating to this document:

i. The plant has a maximum fuel requirement of 216 tonnes per day.

ii. The bulk density of waste wood varies from approximately 240 to 520 kg/m^3.

iii. Vehicle payloads range from 30 to 96 m^3.

iv. The maximum gross vehicle weight permitted is 44 tonnes for an articulated vehicle, with a maximum payload of 28 tonnes. 28 tonnes equates to a volume of between 53 and 116 m^3.

v. The applicant favours the use of walking floor trailers to deliver fuel, which reduce double handling and maximise delivery payloads. The likely payload of the walking floor trailers, taking into account varying densities, is between 20 and 25 tonnes.

vi. The payload stated in the application statement used a worst case scenario of 15 tonnes per load but that has been superceded by the figures above. At 20 to 25 tonnes per load the likely deliveries to the plant will be between 9 and 11 loads per day.

vii. 11 loads per day as the daily HGV deliveries, generating a total of 22 movements is used in this document as a worst case scenario.

1.5 Some fuel will be delivered by boat but it is likely that there will be periods when dockside deliveries do not occur, leaving the figures above unchanged. When deliveries by boat take place it is likely that the delivery will contain 3 days' fuel. The number of loads quoted also include the removal of materials off site as return loads, to maximise haulage efficiency.

1.6 Vehicle movements during the construction phase are likely to be lower than the maximum stated above. The planning application states that 8 other vehicles (employees and visitors) will arrive at/depart from the site each day, generating 16 movements. The construction phase is expected to be less than this level of usage as HGV movements will be restricted to delivery of materials and some removal of soil from the site.

1.7 The site is located off Woodham Road, with vehicular access from David Davies Road. Access on to the surrounding road network is gained via Cory Way onto Millenium Way. The proposed site location is within the area known as the Waterfront Strip. It is served by the A4050, A 4055 and A4231 local roads, providing links to the national network and Cardiff. These roads are identified as the Southern Corridor and Airport/M4 Corridor in the Vale of Glamorgan Local Transport Plan.

2.0 POLICY SUMMARY

2.1 The Vale of Glamorgan Local Transport Plan

2.1.1 The Local Transport Plan (2001-2006) outlines various key aims of delivering safer, less congested and less polluted roads. It also states that the development of the local economy is crucial to the continuing vitality and viability of the communities in the Vale of Glamorgan. The threats and weaknesses identified for the area include peak congestion on key routes, high (growing) car ownership and low public transport patronage. The applicant is aiming to tackle private car usage and comply with other policies in the plan by implementing a Green Travel Plan for the site (Document SRB-T). This assessment primarily considers the impact of HGV movements. The applicant has also agreed to provide funding for sustainable transport as a planning obligation.

2.1.2 The application proposals are consistent with the parking policies in the plan.

2.1.3 Policy 23 supports the transport of freight by rail and sea, where appropriate, which is relevant to the applicant's expectation that 20% of fuel will be delivered by boat. Policy 26 states that the continued use and consolidation of port facilities at Barry for freight distribution will be favoured.

2.2 UDP

2.2.1 The Councils UDP makes numerous references to the need for developments to be located where there is good existing or potential public transport. A specific policy on Strategic Public Transport adds that "Land will be protected and provision made for the development of facilities for bus operations including between

- Barry, Dinas Powys and Cardiff
- Cardiff International Airport, Barry, Wenvoe and Culverhouse Cross
- Penarth and Cardiff, and
- The Vale of Glamorgan and Bridgend"

2.2.2 The applicant supports this policy and as stated above will enter into a planning obligation to provide financial support for the local bus network. The applicant has also produce a Green Travel Plan which aims to reduce staff vehicle usage in favour of more sustainable forms of transport.

2.3 PLANNING POLICY WALES TECHNICAL ADVICE NOTE (TAN) 18: TRANSPORT

2.3.1 TAN 18 states that developments which attract substantial movements of freight should be located away from congested inner areas and residential neighbourhoods. The site will only attract an maximum of 2 loads or 4 movements per hour in any working day and is not therefore classed as substantial. The site has been chosen because of the proximity to the dock facility, the grid connection, potential fuel providers and the re-use of a brownfield site.

2.3.2 This assessment has been prepared to compliment the planning application. TAN18 suggests that the threshold for a transport assessment for industry is a gross floor area of >5,000 m^2, which is larger than the application building. The site in its current state is used for repair and refurbishment of containers and has no restriction on vehicle movements.

2.4 REGIONAL TRANSPORT PLAN

2.4.1 The regional transport plan contains the following priorities and objectives:

i. To improve access to services, facilities and employment, particularly by public transport, walking and cycling.
ii. To provide a transport system that increases the use of sustainable modes of travel.
iii. To develop an efficient and reliable transport system with reduced levels of congestion and improved transport links
iv. To reduce significantly the emission of greenhouse gases and air pollution from transport.
v. To ensure that land use development in south east Wales is supported by sustainable transport measures.
vi. To play a full role in regenerating South East Wales.
vii. To improve access to services and facilities, particularly by public transport, walking and cycling.
viii. To regenerate town centres, brown-field sites and local communities through appropriate transport provision.

2.4.2 The regional transport plan emphasizes and encourages the use of public transport, cycling and car sharing schemes. This emphasis is consistent with the applicant's Green Travel Plan.

3.0 TRAFFIC SURVEY

3.1 Traffic information for the local road network was obtained from The Vale of Glamorgan. The data arose from a traffic survey carried out on 30th September 2008 and is attached as Appendix 1.

3.2 The 12 hour (07:00 - 19:00) total value and the HCV (Heavy Commercial Vehicle) count focusing on both directions of travel for the 2 roundabouts near the site was used to compare and determine the vehicular movement impact for the proposed development.

3.3 Summary of results from 5 traffic counts

3.3.1 Millennium Way - Dock Entrance (Wimbourne Road-A):
The traffic flow that contained the highest vehicular movement was in the Cardiff Rd to Millennium Way direction with a total of 4,942 vehicular movements of which 91 were HCV/HGVs. The count for Atlantic Way is still relevant despite the road being closed as it reveals the vehicle numbers traveling to the docks.

3.3.2 Millennium Way - Dock Entrance (B):
The traffic flow that contained the highest vehicular movement was in the Millennium Way to Cardiff Rd direction with a total of 5,605 vehicular movements of which 100 were HCVs.

3.3.3 Millennium Way - Dock Entrance (Wimbourne Road 2way):
The two way leg on the Millennium Way road was counted at 12,541 vehicle movements in the 12 hour period of which 272 were HCVs.

3.3.4 Millennium Way - Dock Entrance (Cardiff Road 2way):
The two way leg on the Cardiff Road was counted at 12,711 vehicle movements in the 12 hour period of which 579 were HCVs.

3.3.5 Millennium Way - Dock Entrance (Wimbourne Road):
The two way leg on the Docks entrance was counted at 4,158 vehicle movements in the 12 hour period of which 469 were HCVs.

3.3.6 The results of most significance are presented in the table below, with the % increase calculations using 11 vehicles i.e. 22 movements [routes labeled A-C for ease of reference]:

Route & Direction	12 hour total vehicles	increase in total vehicle nos from HCVs	increase in HCV nos	increase in HCVs & buses
A: Millenium Way - Dock Entrance (Wimbourne Road) Millennium Way leg 2 way	12,541 vehicles 272 HCVs 459 HCVs & buses	0.18%	8.08%	4.79%
B: Millenium Way - Dock Entrance (Wimbourne Road) Cardiff Road leg 2 way	12,711 vehicles 579 HCVs 757 HCVs & buses	0.17%	3.80%	2.91%
C: Millenium Way - Dock Entrance (Wimbourne Road) Docks Entrance leg 2 way	4,158 vehicles 469 HCVs 552 HCVs & buses	0.53%	4.69%	3.99%

4.0 IMPACT OF THE DEVELOPMENT

4.1 The application proposals are to import fuel by road between the hours of 07:00 and 22:00, which is a 15 hour day. 11 deliveries per 15 hour day would average out at one every 82 minutes. If the deliveries were restricted to the times during which the survey was carried out deliveries would average out at one every 65 minutes.

4.2 The overall impact in terms of additional traffic is low and the increase in heavy vehicle traffic on the 3 routes presented in the table above range from 2.91 to an 8.08 % increase in movements. The 8.08% increase would not occur as most traffic arriving at the site would arrive from the Cardiff Road direction (route B) with the impact being an increase in HCVs of 3.8%. The increase in HCVs entering/leaving the Dock would be 4.69%. These figures are reduced further if buses are added to the heavy vehicle count.

4.3 The majority of HCV traffic coming from Cardiff Road towards Millennium Way (route B) enters the Dock so 22 additional movements added to the existing 469 is not considered significant.

4.4 A Green Travel Plan has none-the-less been developed for the site and has been submitted with the planning application.

4.5 The applicant has already indicated that a unilateral undertaking will be signed in relation to sustainable transport contributions and would also be willing to include a traffic routing agreement to ensure vehicles adhere to agreed routes.

Millennium Way - DockEntrance (Wimbourne Road-A)

30th September, 2008

Cardiff Rd to Millennium Way(2to1)
Dock Entrance to Millennium Way(3to1)
Millennium Way to Dock Entrance(1to3)

VALE of GLAMORGAN
BRO MORGANNWG

CARS	cars
LCV	light commercial vehicles
MCV	medium commercial vehicles
HCV 2 AXLE	heavy commercial vehicles - 2 axle
HCV 3 AXLE	heavy commercial vehicles - 3 axle
HCV 4+ AXLE	heavy commercial vehicles - 4 plus axles
BUSES	buses
MOTOR CYCLES	motor cycles
CYCLES	cycles - count NOT included in vehicle TOTALS

SITE Millennium Way - DockEntrance (Wimbourne Road-A) DATE: 30/09/08
DIR Cardiff Rd to Millennium Way(2to1) DAY Tuesday

START PERIOD	CARS	LCV	MCV	HCV 2 AXLE	HCV 3 AXLE	HCV 4+ AXLE	BUSES	MOTOR CYCLES	CYCLES	TOTAL
7.00	47	7	1	1	0	0	5	0	0	61
/ 7.30	31	6	1	0	0	2	1	0	0	41
A| 7.45	51	6	0	0	0	1	1	1	0	60
M| 8.00	74	13	0	1	0	0	0	0	0	88
P| 8.15	84	21	1	3	1	0	0	1	1	111
E| 8.30	115	17	3	1	0	2	1	2	0	141
A| 8.45	103	7	2	0	0	1	7	1	0	121
K| 9.00	96	16	2	1	0	0	6	0	0	121
\ 9.15	93	9	2	1	0	1	4	0	0	110
9.30	137	17	3	2	0	2	5	0	1	166
10.00	165	13	2	2	0	2	3	0	0	187
10.30	144	21	6	0	1	0	3	0	0	175
11.00	143	10	3	1	0	2	0	1	0	160
11.30	162	11	5	1	2	4	0	0	0	185
12.00	142	10	5	5	0	4	3	1	0	170
12.30	173	10	8	2	2	3	4	1	0	203
13.00	187	24	0	3	0	3	0	0	0	217
13.30	186	23	1	4	0	0	3	1	0	218
14.00	171	25	1	2	1	3	0	1	0	204
14.30	162	27	0	3	0	1	2	0	2	195
15.00	171	16	2	1	0	1	1	0	0	192
15.30	209	19	5	1	1	3	3	0	0	241
/ 16.00	112	13	4	1	0	2	5	1	1	138
P| 16.15	115	10	1	0	0	0	5	4	1	135
M| 16.30	110	8	1	0	0	0	1	3	1	123
P| 16.45	142	6	1	1	0	1	3	2	0	156
E| 17.00	161	6	0	0	0	1	3	0	2	171
A| 17.15	128	4	1	1	1	0	2	0	0	137
K| 17.30	138	3	0	1	1	1	0	1	0	145
\ 17.45	128	3	1	0	0	0	0	0	0	132
18.00	231	14	1	0	0	1	3	2	1	252
18.30	177	6	1	0	0	1	1	0	3	186
PK 800 - 0900	**376**	**58**	**6**	**5**	**1**	**3**	**8**	**4**	**0**	**461**
PK 1630-1730	**541**	**24**	**3**	**2**	**1**	**2**	**9**	**5**	**3**	**587**
2 HR AM PK	**647**	**95**	**11**	**7**	**1**	**7**	**20**	**5**	**1**	**793**
2 HR PM PK	**1034**	**53**	**9**	**4**	**2**	**5**	**19**	**11**	**5**	**1137**
12 HOUR TOTAL	**4288**	**401**	**64**	**39**	**10**	**42**	**75**	**23**	**13**	**4942**
% OF TOTAL	**86.77**	**8.11**	**1.30**	**0.79**	**0.20**	**0.85**	**1.52**	**0.47**	**---**	**100**

SITE Millennium Way - DockEntrance (Wimbourne Road-A) DATE: 30/09/08
DIR Dock Entrance to Millennium Way(3to1) DAY Tuesday

CARS	LCV	MCV	HCV 2 AXLE	HCV 3 AXLE	HCV 4+ AXLE	BUSES	MOTOR CYCLES	CYCLES	TOTAL
7	0	0	0	0	0	0	1	0	8
7	0	0	0	0	0	1	0	0	8
12	1	1	1	0	0	0	0	0	15
13	2	1	1	0	0	0	0	0	17
7	7	0	0	0	0	1	0	0	15
12	5	0	0	0	2	0	0	0	19
14	5	2	1	0	0	0	1	0	23
14	3	0	0	0	0	1	0	0	18
10	8	1	0	0	1	3	0	0	23
18	7	1	1	0	3	1	0	0	31
31	6	0	2	0	0	0	0	0	39
19	5	1	2	0	1	0	0	0	28
12	11	1	0	0	2	1	0	0	27
18	4	3	0	0	0	0	0	0	25
27	3	2	1	0	0	0	0	0	33
32	7	1	1	1	2	0	0	0	44
24	7	0	1	0	0	0	0	0	32
29	10	0	2	1	1	1	0	0	44
22	5	2	0	0	3	1	0	0	33
28	6	1	0	1	0	0	2	0	38
50	11	1	0	0	0	0	2	0	64
31	10	1	0	0	1	1	0	0	44
30	2	0	0	0	1	0	0	0	33
30	4	1	0	0	0	1	0	1	36
38	3	1	0	0	1	1	0	0	44
23	3	0	0	0	0	0	1	0	27
47	3	1	1	0	0	0	0	1	52
33	4	0	0	0	0	1	1	0	39
17	1	1	0	0	0	0	0	0	19
27	0	1	0	0	0	0	0	1	28
11	1	1	0	0	0	0	0	1	13
9	0	0	0	0	0	0	0	0	9
46	**19**	**3**	**2**	**0**	**2**	**1**	**1**	**0**	**74**
141	**13**	**2**	**1**	**0**	**1**	**2**	**2**	**1**	**162**
89	**31**	**5**	**3**	**0**	**3**	**6**	**1**	**0**	**138**
245	**20**	**5**	**1**	**0**	**2**	**3**	**2**	**3**	**278**
702	**144**	**25**	**14**	**3**	**18**	**14**	**8**	**4**	**928**
75.65	**15.52**	**2.69**	**1.51**	**0.32**	**1.94**	**1.51**	**0.86**	**---**	**100**

SITE Millennium Way - DockEntrance (Wimbourne Road-A) DATE: 30/09/08
DIR Millennium Way to Dock Entrance(1to3) DAY Tuesday

CARS	LCV	MCV	HCV 2 AXLE	HCV 3 AXLE	HCV 4+ AXLE	BUSES	MOTOR CYCLES	CYCLES	TOTAL
38	7	3	0	0	0	1	0	2	49
40	10	1	0	0	0	1	0	1	52
53	9	2	0	0	1	7	1	0	73
47	9	6	0	0	1	0	0	0	63
55	12	0	1	0	0	0	0	0	68
43	4	0	0	0	0	1	0	0	48
29	2	0	1	0	1	1	0	0	34
21	9	0	0	0	0	1	0	0	31
17	8	1	0	1	0	2	0	0	29
22	15	1	0	0	1	0	0	0	39
18	5	1	1	0	1	0	0	0	26
23	8	1	0	0	0	1	0	0	33
25	2	3	1	1	0	0	0	0	32
16	10	1	0	0	1	0	0	0	28
25	4	2	1	0	2	0	0	1	34
28	2	0	3	0	1	0	1	0	35
30	8	0	3	1	4	1	0	0	47
22	10	2	2	0	2	1	2	0	41
22	12	1	0	1	0	1	1	0	38
17	5	0	0	1	3	1	0	0	27
23	8	1	1	0	1	1	2	0	37
37	10	3	1	0	0	0	2	0	53
11	1	1	2	0	0	0	0	0	15
13	4	0	1	0	1	0	0	0	19
12	2	1	0	0	1	0	0	0	16
14	2	1	0	0	0	1	0	0	18
16	1	0	0	0	0	1	0	0	18
12	2	0	0	0	1	0	0	0	15
16	3	0	0	0	0	0	0	0	19
4	3	0	1	0	0	0	0	0	8
7	2	0	0	0	0	0	0	0	9
11	1	0	0	0	0	0	0	0	12
174	**27**	**6**	**2**	**0**	**2**	**2**	**0**	**0**	**213**
54	**7**	**2**	**0**	**0**	**2**	**2**	**0**	**0**	**67**
305	**63**	**10**	**2**	**1**	**3**	**13**	**1**	**1**	**398**
98	**18**	**3**	**4**	**0**	**3**	**2**	**0**	**0**	**128**
767	**190**	**32**	**19**	**5**	**22**	**22**	**9**	**4**	**1066**
71.95	**17.82**	**3.00**	**1.78**	**0.47**	**2.06**	**2.06**	**0.84**	**---**	**100**

Millennium Way - Dock Entrance (B)

30th September, 2008

Dock Entrance to Cardiff Road(3to2)
Cardiff Road to Dock Entrance(2to3)
Millennium Way to Cardiff Road(1to2)

VALE of GLAMORGAN
BRO MORGANNWG

CARS	cars
LCV	light commercial vehicles
MCV	medium commercial vehicles
HCV 2 AXLE	heavy commercial vehicles - 2 axle
HCV 3 AXLE	heavy commercial vehicles - 3 axle
HCV 4+ AXLE	heavy commercial vehicles - 4 plus axles
BUSES	buses
MOTOR CYCLES	motor cycles
CYCLES	cycles - count NOT included in vehicle TOTALS

SITE Millennium Way - Dock Entrance (B) DATE: 30/09/08
DIR Dock Entrance to Cardiff Road(3to2) DAY Tuesday

START PERIOD	CARS	LCV	MCV	HCV 2 AXLE	HCV 3 AXLE	HCV 4+ AXLE	BUSES	MOTOR CYCLES	CYCLES	TOTAL
7.00	12	4	0	2	0	9	2	0	2	29
/ 7.30	3	2	0	0	0	2	1	0	1	8
A| 7.45	9	3	0	4	0	2	1	0	0	19
M| 8.00	6	0	0	2	0	3	0	0	0	11
P| 8.15	6	4	1	2	1	1	0	0	0	15
E| 8.30	3	4	1	0	0	3	0	0	0	11
A| 8.45	4	2	1	2	2	4	0	0	1	15
K| 9.00	9	11	0	2	0	5	0	0	0	27
\ 9.15	7	7	3	2	1	6	0	0	0	26
9.30	15	14	3	1	0	6	0	0	0	39
10.00	19	17	2	4	2	8	1	0	0	53
10.30	22	19	6	1	0	7	0	0	0	55
11.00	21	4	5	2	1	3	0	0	0	36
11.30	30	8	5	2	3	5	1	0	0	54
12.00	18	7	3	2	0	5	2	0	0	37
12.30	31	6	5	1	2	7	0	0	0	52
13.00	26	17	1	2	1	8	0	0	1	55
13.30	15	6	0	1	1	11	2	0	0	36
14.00	15	12	4	3	1	7	0	0	0	42
14.30	23	9	0	2	1	8	4	0	0	47
15.00	32	9	2	0	0	7	0	1	0	51
15.30	30	20	1	1	3	8	1	0	1	64
/ 16.00	24	4	0	0	0	1	0	0	0	29
P| 16.15	45	6	0	1	0	6	0	0	0	58
M| 16.30	36	8	1	0	0	2	0	0	0	47
P| 16.45	23	6	0	1	0	1	0	1	0	32
E| 17.00	34	2	0	1	0	4	0	0	2	41
A| 17.15	32	9	2	0	0	1	1	0	1	45
K| 17.30	21	4	0	0	1	0	0	1	0	27
\ 17.45	27	5	0	0	1	1	0	1	0	35
18.00	23	0	1	0	0	0	0	0	2	24
18.30	17	1	1	0	0	0	1	0	2	20
PK 800 - 0900	**19**	**10**	**3**	**6**	**3**	**11**	**0**	**0**	**0**	**52**
PK 1630-1730	**125**	**25**	**3**	**2**	**0**	**8**	**1**	**1**	**3**	**165**
2 HR AM PK	**47**	**33**	**6**	**14**	**4**	**26**	**2**	**0**	**2**	**132**
2 HR PM PK	**242**	**44**	**3**	**3**	**2**	**16**	**1**	**3**	**3**	**314**
12 HOUR TOTAL	**638**	**230**	**48**	**41**	**21**	**141**	**17**	**4**	**13**	**1140**
% OF TOTAL	**55.96**	**20.18**	**4.21**	**3.60**	**1.84**	**12.37**	**1.49**	**0.35**	**---**	**100**

SITE Millennium Way - Dock Entrance (B) DATE: 30/09/08
DIR Cardiff Road to Dock Entrance(2to3) DAY Tuesday

CARS	LCV	MCV	HCV 2 AXLE	HCV 3 AXLE	HCV 4+ AXLE	BUSES	MOTOR CYCLES	CYCLES	TOTAL
61	23	0	1	2	4	1	0	4	92
29	9	2	2	1	2	0	0	3	45
40	18	3	2	1	2	0	1	5	67
30	16	1	1	1	1	1	0	0	51
24	14	1	1	0	1	0	0	0	41
13	8	2	0	0	3	0	0	1	26
20	10	1	2	1	7	0	0	0	41
12	3	4	1	1	8	3	0	0	32
17	9	0	0	0	1	0	0	0	27
15	12	1	2	0	7	1	0	0	38
26	5	1	3	0	4	0	0	0	39
28	7	2	1	0	5	0	0	0	43
22	7	0	0	1	11	0	0	0	41
19	11	5	2	0	6	1	0	0	44
12	7	2	3	0	8	0	0	0	32
18	5	2	1	1	9	0	0	0	36
30	19	1	2	0	7	0	0	0	59
19	11	1	3	1	8	0	0	1	43
17	5	4	2	1	4	1	0	0	34
10	5	4	2	1	6	1	0	0	29
20	7	2	2	0	7	0	0	0	38
17	4	0	1	0	7	0	0	0	29
4	0	0	1	0	3	0	0	0	8
8	0	0	0	0	3	1	0	0	12
4	3	0	0	0	1	0	0	0	8
17	2	0	1	0	1	0	0	0	21
8	1	0	0	0	1	0	0	0	10
2	1	0	1	0	2	0	0	0	6
5	0	0	1	0	1	0	0	0	7
6	0	0	1	0	2	0	0	0	9
4	0	0	0	0	1	0	0	0	5
9	1	0	1	0	0	0	0	0	11
87	**48**	**5**	**4**	**2**	**12**	**1**	**0**	**1**	**159**
31	**7**	**0**	**2**	**0**	**5**	**0**	**0**	**0**	**45**
185	**87**	**14**	**9**	**5**	**25**	**4**	**1**	**9**	**330**
54	**7**	**0**	**5**	**0**	**14**	**1**	**0**	**0**	**81**
566	**223**	**39**	**40**	**12**	**133**	**10**	**1**	**14**	**1024**
55.27	**21.78**	**3.81**	**3.91**	**1.17**	**12.99**	**0.98**	**0.10**	**---**	**100**

SITE Millennium Way - Dock Entrance (B) DATE: 30/09/08
DIR Millennium Way to Cardiff Road(1to2) DAY Tuesday

CARS	LCV	MCV	HCV 2 AXLE	HCV 3 AXLE	HCV 4+ AXLE	BUSES	MOTOR CYCLES	CYCLES	TOTAL
182	30	2	2	0	2	7	1	1	226
104	10	0	1	0	1	4	2	0	122
110	13	1	1	1	0	2	1	1	129
103	13	0	0	0	2	2	1	0	121
116	12	1	0	0	1	2	0	2	132
113	10	2	2	0	1	1	3	0	132
98	8	1	1	0	2	1	0	1	111
114	14	2	1	0	1	0	1	1	133
95	12	1	4	0	2	0	0	0	114
173	13	3	1	3	3	3	0	1	199
188	20	4	1	0	2	3	0	0	218
194	16	3	3	1	0	3	0	0	220
202	15	2	3	1	2	8	1	0	234
204	9	0	1	0	1	2	1	0	218
200	22	3	2	1	3	3	2	1	236
223	10	6	0	0	3	1	1	0	244
204	19	2	6	0	4	3	2	0	240
211	23	5	7	1	0	5	1	0	253
206	24	2	3	0	1	3	0	0	239
228	25	1	2	0	2	12	0	0	270
237	24	3	2	0	0	6	0	1	272
218	21	1	2	0	4	1	0	1	247
121	15	3	4	0	0	0	0	1	143
111	3	1	0	0	0	0	1	0	116
133	3	2	0	0	4	1	0	0	143
123	5	0	0	0	0	2	0	0	130
161	9	2	0	0	0	0	2	2	174
101	2	0	0	0	0	0	0	0	103
117	5	1	0	0	1	0	0	0	124
102	2	0	0	0	1	0	2	1	107
133	2	1	0	0	0	0	0	0	136
112	6	0	0	0	0	1	0	0	119
430	**43**	**4**	**3**	**0**	**6**	**6**	**4**	**3**	**496**
518	**19**	**4**	**0**	**0**	**4**	**3**	**2**	**2**	**550**
853	**92**	**8**	**10**	**1**	**10**	**12**	**8**	**5**	**994**
969	**44**	**9**	**4**	**0**	**6**	**3**	**5**	**4**	**1040**
4937	**415**	**55**	**49**	**8**	**43**	**76**	**22**	**14**	**5605**
88.08	**7.40**	**0.98**	**0.87**	**0.14**	**0.77**	**1.36**	**0.39**	**---**	**100**

Millennium Way - DockEntrance (Wimbourne Road)

30th September, 2008

To Millennium Way
From Millennium Way
Millennium Way leg 2way

VALE of GLAMORGAN
BRO MORGANNWG

CARS	cars
LCV	light commercial vehicles
MCV	medium commercial vehicles
HCV 2 AXLE	heavy commercial vehicles - 2 axle
HCV 3 AXLE	heavy commercial vehicles - 3 axle
HCV 4+ AXLE	heavy commercial vehicles - 4 plus axles
BUSES	buses
MOTOR CYCLES	motor cycles
CYCLES	cycles - count NOT included in vehicle TOTALS

SITE Millennium Way - DockEntrance (Wimbourne Road) DATE: 30/09/08
DIR To Millennium Way DAY Tuesday

START PERIOD	CARS	LCV	MCV	HCV 2 AXLE	HCV 3 AXLE	HCV 4+ AXLE	BUSES	MOTOR CYCLES	CYCLES	TOTAL
7.00	54	7	1	1	0	0	5	1	0	69
/ 7.30	38	6	1	0	0	2	2	0	0	49
A| 7.45	63	7	1	1	0	1	1	1	0	75
M| 8.00	87	15	1	2	0	0	0	0	0	105
P| 8.15	91	28	1	3	1	0	1	1	1	126
E| 8.30	127	22	3	1	0	4	1	2	0	160
A| 8.45	117	12	4	1	0	1	7	2	0	144
K| 9.00	110	19	2	1	0	0	7	0	0	139
\ 9.15	103	17	3	1	0	2	7	0	0	133
9.30	155	24	4	3	0	5	6	0	1	197
10.00	196	19	2	4	0	2	3	0	0	226
10.30	163	26	7	2	1	1	3	0	0	203
11.00	155	21	4	1	0	4	1	1	0	187
11.30	180	15	8	1	2	4	0	0	0	210
12.00	169	13	7	6	0	4	3	1	0	203
12.30	205	17	9	3	3	5	4	1	0	247
13.00	211	31	0	4	0	3	0	0	0	249
13.30	215	33	1	6	1	1	4	1	0	262
14.00	193	30	3	2	1	6	1	1	0	237
14.30	190	33	1	3	1	1	2	2	2	233
15.00	221	27	3	1	0	1	1	2	0	256
15.30	240	29	6	1	1	4	4	0	0	285
/ 16.00	142	15	4	1	0	3	5	1	1	171
P| 16.15	145	14	2	0	0	0	6	4	2	171
M| 16.30	148	11	2	0	0	1	2	3	1	167
P| 16.45	165	9	1	1	0	1	3	3	0	183
E| 17.00	208	9	1	1	0	1	3	0	3	223
A| 17.15	161	8	1	1	1	0	3	1	0	176
K| 17.30	155	4	1	1	1	1	0	1	0	164
\ 17.45	155	3	2	0	0	0	0	0	1	160
18.00	242	15	2	0	0	1	3	2	2	265
18.30	186	6	1	0	0	1	1	0	3	195
PK 800 - 0900	**422**	**77**	**9**	**7**	**1**	**5**	**9**	**5**	**0**	**535**
PK 1630-1730	**682**	**37**	**5**	**3**	**1**	**3**	**11**	**7**	**4**	**749**
2 HR AM PK	**736**	**126**	**16**	**10**	**1**	**10**	**26**	**6**	**1**	**931**
2 HR PM PK	**1279**	**73**	**14**	**5**	**2**	**7**	**22**	**13**	**8**	**1415**
12 HOUR TOTAL	**4990**	**545**	**89**	**53**	**13**	**60**	**89**	**31**	**17**	**5870**
% OF TOTAL	**85.01**	**9.28**	**1.52**	**0.90**	**0.22**	**1.02**	**1.52**	**0.53**	**---**	**100**

SITE Millennium Way - DockEntrance (Wimbourne Road) DATE: 30/09/08
DIR From Millennium Way DAY Tuesday

CARS	LCV	MCV	HCV 2 AXLE	HCV 3 AXLE	HCV 4+ AXLE	BUSES	MOTOR CYCLES	CYCLES	TOTAL
220	37	5	2	0	2	8	1	3	275
144	20	1	1	0	1	5	2	1	174
163	22	3	1	1	1	9	2	1	202
150	22	6	0	0	3	2	1	0	184
171	24	1	1	0	1	2	0	2	200
156	14	2	2	0	1	2	3	0	180
127	10	1	2	0	3	2	0	1	145
135	23	2	1	0	1	1	1	1	164
112	20	2	4	1	2	2	0	0	143
195	28	4	1	3	4	3	0	1	238
206	25	5	2	0	3	3	0	0	244
217	24	4	3	1	0	4	0	0	253
227	17	5	4	2	2	8	1	0	266
220	19	1	1	0	2	2	1	0	246
225	26	5	3	1	5	3	2	2	270
251	12	6	3	0	4	1	2	0	279
234	27	2	9	1	8	4	2	0	287
233	33	7	9	1	2	6	3	0	294
228	36	3	3	1	1	4	1	0	277
245	30	1	2	1	5	13	0	0	297
260	32	4	3	0	1	7	2	1	309
255	31	4	3	0	4	1	2	1	300
132	16	4	6	0	0	0	0	1	158
124	7	1	1	0	1	0	1	0	135
145	5	3	0	0	5	1	0	0	159
137	7	1	0	0	0	3	0	0	148
177	10	2	0	0	0	1	2	2	192
113	4	0	0	0	1	0	0	0	118
133	8	1	0	0	1	0	0	0	143
106	5	0	1	0	1	0	2	1	115
140	4	1	0	0	0	0	0	0	145
123	7	0	0	0	0	1	0	0	131
604	**70**	**10**	**5**	**0**	**8**	**8**	**4**	**3**	**709**
572	**26**	**6**	**0**	**0**	**6**	**5**	**2**	**2**	**617**
1158	**155**	**18**	**12**	**2**	**13**	**25**	**9**	**6**	**1392**
1067	**62**	**12**	**8**	**0**	**9**	**5**	**5**	**4**	**1168**
5704	**605**	**87**	**68**	**13**	**65**	**98**	**31**	**18**	**6671**
85.50	**9.07**	**1.30**	**1.02**	**0.19**	**0.97**	**1.47**	**0.46**	**---**	**100**

SITE Millennium Way - DockEntrance (Wimbourne Road) DATE: 30/09/08
DIR Millennium Way leg 2way DAY Tuesday

CARS	LCV	MCV	HCV 2 AXLE	HCV 3 AXLE	HCV 4+ AXLE	BUSES	MOTOR CYCLES	CYCLES	TOTAL
274	44	6	3	0	2	13	2	3	344
182	26	2	1	0	3	7	2	1	223
226	29	4	2	1	2	10	3	1	277
237	37	7	2	0	3	2	1	0	289
262	52	2	4	1	1	3	1	3	326
283	36	5	3	0	5	3	5	0	340
244	22	5	3	0	4	9	2	1	289
245	42	4	2	0	1	8	1	1	303
215	37	5	5	1	4	9	0	0	276
350	52	8	4	3	9	9	0	2	435
402	44	7	6	0	5	6	0	0	470
380	50	11	5	2	1	7	0	0	456
382	38	9	5	2	6	9	2	0	453
400	34	9	2	2	6	2	1	0	456
394	39	12	9	1	9	6	3	2	473
456	29	15	6	3	9	5	3	0	526
445	58	2	13	1	11	4	2	0	536
448	66	8	15	2	3	10	4	0	556
421	66	6	5	2	7	5	2	0	514
435	63	2	5	2	6	15	2	2	530
481	59	7	4	0	2	8	4	1	565
495	60	10	4	1	8	5	2	1	585
274	31	8	7	0	3	5	1	2	329
269	21	3	1	0	1	6	5	2	306
293	16	5	0	0	6	3	3	1	326
302	16	2	1	0	1	6	3	0	331
385	19	3	1	0	1	4	2	5	415
274	12	1	1	1	1	3	1	0	294
288	12	2	1	1	2	0	1	0	307
261	8	2	1	0	1	0	2	2	275
382	19	3	0	0	1	3	2	2	410
309	13	1	0	0	1	2	0	3	326
1026	**147**	**19**	**12**	**1**	**13**	**17**	**9**	**4**	**1244**
1254	**63**	**11**	**3**	**1**	**9**	**16**	**9**	**6**	**1366**
1894	**281**	**34**	**22**	**3**	**23**	**51**	**15**	**7**	**2323**
2346	**135**	**26**	**13**	**2**	**16**	**27**	**18**	**12**	**2583**
10694	**1150**	**176**	**121**	**26**	**125**	**187**	**62**	**35**	**12541**
85.27	**9.17**	**1.40**	**0.96**	**0.21**	**1.00**	**1.49**	**0.49**	**---**	**100**

Millennium Way - DockEntrance (Wimbourne Road)

30th September, 2008

To Cardiff Road
From Cardiff Road
Cardiff Road leg 2way

VALE of GLAMORGAN
BRO MORGANNWG

CARS	cars
LCV	light commercial vehicles
MCV	medium commercial vehicles
HCV 2 AXLE	heavy commercial vehicles - 2 axle
HCV 3 AXLE	heavy commercial vehicles - 3 axle
HCV 4+ AXLE	heavy commercial vehicles - 4 plus axles
BUSES	buses
MOTOR CYCLES	motor cycles
CYCLES	cycles - count NOT included in vehicle TOTALS

SITE Millennium Way - DockEntrance (Wimbourne Road) DATE: 30/09/08
DIR To Cardiff Road DAY Tuesday

START PERIOD	CARS	LCV	MCV	HCV 2 AXLE	HCV 3 AXLE	HCV 4+ AXLE	BUSES	MOTOR CYCLES	CYCLES	TOTAL
7.00	194	34	2	4	0	11	9	1	3	255
/ 7.30	107	12	0	1	0	3	5	2	1	130
A| 7.45	119	16	1	5	1	2	3	1	1	148
M| 8.00	109	13	0	2	0	5	2	1	0	132
P| 8.15	122	16	2	2	1	2	2	0	2	147
E| 8.30	116	14	3	2	0	4	1	3	0	143
A| 8.45	102	10	2	3	2	6	1	0	2	126
K| 9.00	123	25	2	3	0	6	0	1	1	160
\ 9.15	102	19	4	6	1	8	0	0	0	140
9.30	188	27	6	2	3	9	3	0	1	238
10.00	207	37	6	5	2	10	4	0	0	271
10.30	216	35	9	4	1	7	3	0	0	275
11.00	223	19	7	5	2	5	8	1	0	270
11.30	234	17	5	3	3	6	3	1	0	272
12.00	218	29	6	4	1	8	5	2	1	273
12.30	254	16	11	1	2	10	1	1	0	296
13.00	230	36	3	8	1	12	3	2	1	295
13.30	226	29	5	8	2	11	7	1	0	289
14.00	221	36	6	6	1	8	3	0	0	281
14.30	251	34	1	4	1	10	16	0	0	317
15.00	269	33	5	2	0	7	6	1	1	323
15.30	248	41	2	3	3	12	2	0	2	311
/ 16.00	145	19	3	4	0	1	0	0	1	172
P| 16.15	156	9	1	1	0	6	0	1	0	174
M| 16.30	169	11	3	0	0	6	1	0	0	190
P| 16.45	146	11	0	1	0	1	2	1	0	162
E| 17.00	195	11	2	1	0	4	0	2	4	215
A| 17.15	133	11	2	0	0	1	1	0	1	148
K| 17.30	138	9	1	0	1	1	0	1	0	151
\ 17.45	129	7	0	0	1	2	0	3	1	142
18.00	156	2	2	0	0	0	0	0	2	160
18.30	129	7	1	0	0	0	2	0	2	139
PK 800 - 0900	**449**	**53**	**7**	**9**	**3**	**17**	**6**	**4**	**0**	**548**
PK 1630-1730	**643**	**44**	**7**	**2**	**0**	**12**	**4**	**3**	**5**	**715**
2 HR AM PK	**900**	**125**	**14**	**24**	**5**	**36**	**14**	**8**	**7**	**1126**
2 HR PM PK	**1211**	**88**	**12**	**7**	**2**	**22**	**4**	**8**	**7**	**1354**
12 HOUR TOTAL	**5575**	**645**	**103**	**90**	**29**	**184**	**93**	**26**	**27**	**6745**
% OF TOTAL	**82.65**	**9.56**	**1.53**	**1.33**	**0.43**	**2.73**	**1.38**	**0.39**	**---**	**100**

SITE Millennium Way - DockEntrance (Wimbourne Road) DATE: 30/09/08
DIR From Cardiff Road DAY Tuesday

CARS	LCV	MCV	HCV 2 AXLE	HCV 3 AXLE	HCV 4+ AXLE	BUSES	MOTOR CYCLES	CYCLES	TOTAL
108	30	1	2	2	4	6	0	4	153
60	15	3	2	1	4	1	0	3	86
91	24	3	2	1	3	1	2	5	127
104	29	1	2	1	1	1	0	0	139
108	35	2	4	1	1	0	1	1	152
128	25	5	1	0	5	1	2	1	167
123	17	3	2	1	8	7	1	0	162
108	19	6	2	1	8	9	0	0	153
110	18	2	1	0	2	4	0	0	137
152	29	4	4	0	9	6	0	1	204
191	18	3	5	0	6	3	0	0	226
172	28	8	1	1	5	3	0	0	218
165	17	3	1	1	13	0	1	0	201
181	22	10	3	2	10	1	0	0	229
154	17	7	8	0	12	3	1	0	202
191	15	10	3	3	12	4	1	0	239
217	43	1	5	0	10	0	0	0	276
205	34	2	7	1	8	3	1	1	261
188	30	5	4	2	7	1	1	0	238
172	32	4	5	1	7	3	0	2	224
191	23	4	3	0	8	1	0	0	230
226	23	5	2	1	10	3	0	0	270
116	13	4	2	0	5	5	1	1	146
123	10	1	0	0	3	6	4	1	147
114	11	1	0	0	1	1	3	1	131
159	8	1	2	0	2	3	2	0	177
169	7	0	0	0	2	3	0	2	181
130	5	1	2	1	2	2	0	0	143
143	3	0	2	1	2	0	1	0	152
134	3	1	1	0	2	0	0	0	141
235	14	1	0	0	2	3	2	1	257
186	7	1	1	0	1	1	0	3	197
463	**106**	**11**	**9**	**3**	**15**	**9**	**4**	**2**	**620**
572	**31**	**3**	**4**	**1**	**7**	**9**	**5**	**3**	**632**
832	**182**	**25**	**16**	**6**	**32**	**24**	**6**	**10**	**1123**
1088	**60**	**9**	**9**	**2**	**19**	**20**	**11**	**5**	**1218**
4854	**624**	**103**	**79**	**22**	**175**	**85**	**24**	**27**	**5966**
81.36	**10.46**	**1.73**	**1.32**	**0.37**	**2.93**	**1.42**	**0.40**	**---**	**100**

SITE Millennium Way - DockEntrance (Wimbourne Road) DATE: 30/09/08
DIR Cardiff Road leg 2way DAY Tuesday

CARS	LCV	MCV	HCV 2 AXLE	HCV 3 AXLE	HCV 4+ AXLE	BUSES	MOTOR CYCLES	CYCLES	TOTAL
302	64	3	6	2	15	15	1	7	408
167	27	3	3	1	7	6	2	4	216
210	40	4	7	2	5	4	3	6	275
213	42	1	4	1	6	3	1	0	271
230	51	4	6	2	3	2	1	3	299
244	39	8	3	0	9	2	5	1	310
225	27	5	5	3	14	8	1	2	288
231	44	8	5	1	14	9	1	1	313
212	37	6	7	1	10	4	0	0	277
340	56	10	6	3	18	9	0	2	442
398	55	9	10	2	16	7	0	0	497
388	63	17	5	2	12	6	0	0	493
388	36	10	6	3	18	8	2	0	471
415	39	15	6	5	16	4	1	0	501
372	46	13	12	1	20	8	3	1	475
445	31	21	4	5	22	5	2	0	535
447	79	4	13	1	22	3	2	1	571
431	63	7	15	3	19	10	2	1	550
409	66	11	10	3	15	4	1	0	519
423	66	5	9	2	17	19	0	2	541
460	56	9	5	0	15	7	1	1	553
474	64	7	5	4	22	5	0	2	581
261	32	7	6	0	6	5	1	2	318
279	19	2	1	0	9	6	5	1	321
283	22	4	0	0	7	2	3	1	321
305	19	1	3	0	3	5	3	0	339
364	18	2	1	0	6	3	2	6	396
263	16	3	2	1	3	3	0	1	291
281	12	1	2	2	3	0	2	0	303
263	10	1	1	1	4	0	3	1	283
391	16	3	0	0	2	3	2	3	417
315	14	2	1	0	1	3	0	5	336
912	**159**	**18**	**18**	**6**	**32**	**15**	**8**	**6**	**1168**
1215	**75**	**10**	**6**	**1**	**19**	**13**	**8**	**8**	**1347**
1732	**307**	**39**	**40**	**11**	**68**	**38**	**14**	**17**	**2249**
2299	**148**	**21**	**16**	**4**	**41**	**24**	**19**	**12**	**2572**
10429	**1269**	**206**	**169**	**51**	**359**	**178**	**50**	**54**	**12711**
82.05	**9.98**	**1.62**	**1.33**	**0.40**	**2.82**	**1.40**	**0.39**	**---**	**100**

Millennium Way - DockEntrance (Wimbourne Road)

30th September, 2008

To The Docks
From The Docks
Docks Entrance leg 2way

VALE of GLAMORGAN
BRO MORGANNWG

CARS	cars
LCV	light commercial vehicles
MCV	medium commercial vehicles
HCV 2 AXLE	heavy commercial vehicles - 2 axle
HCV 3 AXLE	heavy commercial vehicles - 3 axle
HCV 4+ AXLE	heavy commercial vehicles - 4 plus axles
BUSES	buses
MOTOR CYCLES	motor cycles
CYCLES	cycles - count NOT included in vehicle TOTALS

SITE Millennium Way - DockEntrance (Wimbourne Road) DATE: 30/09/08
DIR To The Docks DAY Tuesday

START PERIOD	CARS	LCV	MCV	HCV 2 AXLE	HCV 3 AXLE	HCV 4+ AXLE	BUSES	MOTOR CYCLES	CYCLES	TOTAL
7.00	99	30	3	1	2	4	2	0	6	141
/ 7.30	69	19	3	2	1	2	1	0	4	97
A| 7.45	93	27	5	2	1	3	7	2	5	140
M| 8.00	77	25	7	1	1	2	1	0	0	114
P| 8.15	79	26	1	2	0	1	0	0	0	109
E| 8.30	56	12	2	0	0	3	1	0	1	74
A| 8.45	49	12	1	3	1	8	1	0	0	75
K| 9.00	33	12	4	1	1	8	4	0	0	63
\ 9.15	34	17	1	0	1	1	2	0	0	56
9.30	37	27	2	2	0	8	1	0	0	77
10.00	44	10	2	4	0	5	0	0	0	65
10.30	51	15	3	1	0	5	1	0	0	76
11.00	47	9	3	1	2	11	0	0	0	73
11.30	35	21	6	2	0	7	1	0	0	72
12.00	37	11	4	4	0	10	0	0	1	66
12.30	46	7	2	4	1	10	0	1	0	71
13.00	60	27	1	5	1	11	1	0	0	106
13.30	41	21	3	5	1	10	1	2	1	84
14.00	39	17	5	2	2	4	2	1	0	72
14.30	27	10	4	2	2	9	2	0	0	56
15.00	43	15	3	3	0	8	1	2	0	75
15.30	54	14	3	2	0	7	0	2	0	82
/ 16.00	15	1	1	3	0	3	0	0	0	23
P| 16.15	21	4	0	1	0	4	1	0	0	31
M| 16.30	16	5	1	0	0	2	0	0	0	24
P| 16.45	31	4	1	1	0	1	1	0	0	39
E| 17.00	24	2	0	0	0	1	1	0	0	28
A| 17.15	14	3	0	1	0	3	0	0	0	21
K| 17.30	21	3	0	1	0	1	0	0	0	26
\ 17.45	10	3	0	2	0	2	0	0	0	17
18.00	11	2	0	0	0	1	0	0	0	14
18.30	20	2	0	1	0	0	0	0	0	23
PK 800 - 0900	**261**	**75**	**11**	**6**	**2**	**14**	**3**	**0**	**0**	**372**
PK 1630-1730	**85**	**14**	**2**	**2**	**0**	**7**	**2**	**0**	**0**	**112**
2 HR AM PK	**490**	**150**	**24**	**11**	**6**	**28**	**17**	**2**	**10**	**728**
2 HR PM PK	**152**	**25**	**3**	**9**	**0**	**17**	**3**	**0**	**0**	**209**
12 HOUR TOTAL	**1333**	**413**	**71**	**59**	**17**	**155**	**32**	**10**	**18**	**2090**
% OF TOTAL	**63.78**	**19.76**	**3.40**	**2.82**	**0.81**	**7.42**	**1.53**	**0.48**	**---**	**100**

SITE Millennium Way - DockEntrance (Wimbourne Road) DATE: 30/09/08
DIR From The Docks DAY Tuesday

CARS	LCV	MCV	HCV 2 AXLE	HCV 3 AXLE	HCV 4+ AXLE	BUSES	MOTOR CYCLES	CYCLES	TOTAL
19	4	0	2	0	9	2	1	2	37
10	2	0	0	0	2	2	0	1	16
21	4	1	5	0	2	1	0	0	34
19	2	1	3	0	3	0	0	0	28
13	11	1	2	1	1	1	0	0	30
15	9	1	0	0	5	0	0	0	30
18	7	3	3	2	4	0	1	1	38
23	14	0	2	0	5	1	0	0	45
17	15	4	2	1	7	3	0	0	49
33	21	4	2	0	9	1	0	0	70
50	23	2	6	2	8	1	0	0	92
41	24	7	3	0	8	0	0	0	83
33	15	6	2	1	5	1	0	0	63
48	12	8	2	3	5	1	0	0	79
45	10	5	3	0	5	2	0	0	70
63	13	6	2	3	9	0	0	0	96
50	24	1	3	1	8	0	0	1	87
44	16	0	3	2	12	3	0	0	80
37	17	6	3	1	10	1	0	0	75
51	15	1	2	2	8	4	2	0	85
82	20	3	0	0	7	0	3	0	115
61	30	2	1	3	9	2	0	1	108
54	6	0	0	0	2	0	0	0	62
75	10	1	1	0	6	1	0	1	94
74	11	2	0	0	3	1	0	0	91
46	9	0	1	0	1	0	2	0	59
81	5	1	2	0	4	0	0	3	93
65	13	2	0	0	1	2	1	1	84
38	5	1	0	1	0	0	1	0	46
54	5	1	0	1	1	0	1	1	63
34	1	2	0	0	0	0	0	3	37
26	1	1	0	0	0	1	0	2	29
65	**29**	**6**	**8**	**3**	**13**	**1**	**1**	**1**	**126**
266	**38**	**5**	**3**	**0**	**9**	**3**	**3**	**4**	**327**
136	**64**	**11**	**17**	**4**	**29**	**8**	**1**	**2**	**270**
487	**64**	**8**	**4**	**2**	**18**	**4**	**5**	**6**	**592**
1340	**374**	**73**	**55**	**24**	**159**	**31**	**12**	**17**	**2068**
64.80	**18.09**	**3.53**	**2.66**	**1.16**	**7.69**	**1.50**	**0.58**	**---**	**100**

SITE Millennium Way - DockEntrance (Wimbourne Road) DATE: 30/09/08
DIR Docks Entrance leg 2way DAY Tuesday

CARS	LCV	MCV	HCV 2 AXLE	HCV 3 AXLE	HCV 4+ AXLE	BUSES	MOTOR CYCLES	CYCLES	TOTAL
118	34	3	3	2	13	4	1	8	178
79	21	3	2	1	4	3	0	5	113
114	31	6	7	1	5	8	2	5	174
96	27	8	4	1	5	1	0	0	142
92	37	2	4	1	2	1	0	0	139
71	21	3	0	0	8	1	0	1	104
67	19	4	6	3	12	1	1	1	113
56	26	4	3	1	13	5	0	0	108
51	32	5	2	2	8	5	0	0	105
70	48	6	4	0	17	2	0	0	147
94	33	4	10	2	13	1	0	0	157
92	39	10	4	0	13	1	0	0	159
80	24	9	3	3	16	1	0	0	136
83	33	14	4	3	12	2	0	0	151
82	21	9	7	0	15	2	0	1	136
109	20	8	6	4	19	0	1	0	167
110	51	2	8	2	19	1	0	1	193
85	37	3	8	3	22	4	2	1	164
76	34	11	5	3	14	3	1	0	147
78	25	5	4	4	17	6	2	0	141
125	35	6	3	0	15	1	5	0	190
115	44	5	3	3	16	2	2	1	190
69	7	1	3	0	5	0	0	0	85
96	14	1	2	0	10	2	0	1	125
90	16	3	0	0	5	1	0	0	115
77	13	1	2	0	2	1	2	0	98
105	7	1	2	0	5	1	0	3	121
79	16	2	1	0	4	2	1	1	105
59	8	1	1	1	1	0	1	0	72
64	8	1	2	1	3	0	1	1	80
45	3	2	0	0	1	0	0	3	51
46	3	1	1	0	0	1	0	2	52
326	**104**	**17**	**14**	**5**	**27**	**4**	**1**	**2**	**498**
351	**52**	**7**	**5**	**0**	**16**	**5**	**3**	**4**	**439**
626	**214**	**35**	**28**	**10**	**57**	**25**	**3**	**12**	**998**
639	**89**	**11**	**13**	**2**	**35**	**7**	**5**	**6**	**801**
2673	**787**	**144**	**114**	**41**	**314**	**63**	**22**	**35**	**4158**
64.29	**18.93**	**3.46**	**2.74**	**0.99**	**7.55**	**1.52**	**0.53**	**---**	**100**

Appendix 1(11): 2015 Application - Geology and stability report (2009)

Oaktree Environmental
Unit 5 Oasis Park, Road 1,
Winsford Industrial Estate, Winsford,
CW7 3PP

GroundSure Reference:	HMD-188-62961
Your Reference:	Barry
Report Date	Mar 6, 2008
Report Delivery Method:	Email - pdf

GroundSure Geology & Ground Stability Report

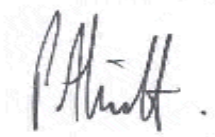
Address: **WOODHAM ROAD, DOCKS, BARRY, CF62**

Dear Sir/Madam,

Thank you for placing your order with GroundSure. Please find enclosed the **GroundSure Geology & Ground Stability Report** as requested.

If you need any further assistance, please do not hesitate to contact our maps and data helpline on 01273 819700 or email maps&data@groundsure.com quoting the above GroundSure reference number.

Yours faithfully,



Managing Director
Groundsure Limited

Enc.
GroundSure Geology & Ground Stability Report

GroundSure Geology & Ground Stability Report

Address: WOODHAM ROAD, DOCKS, BARRY, CF62

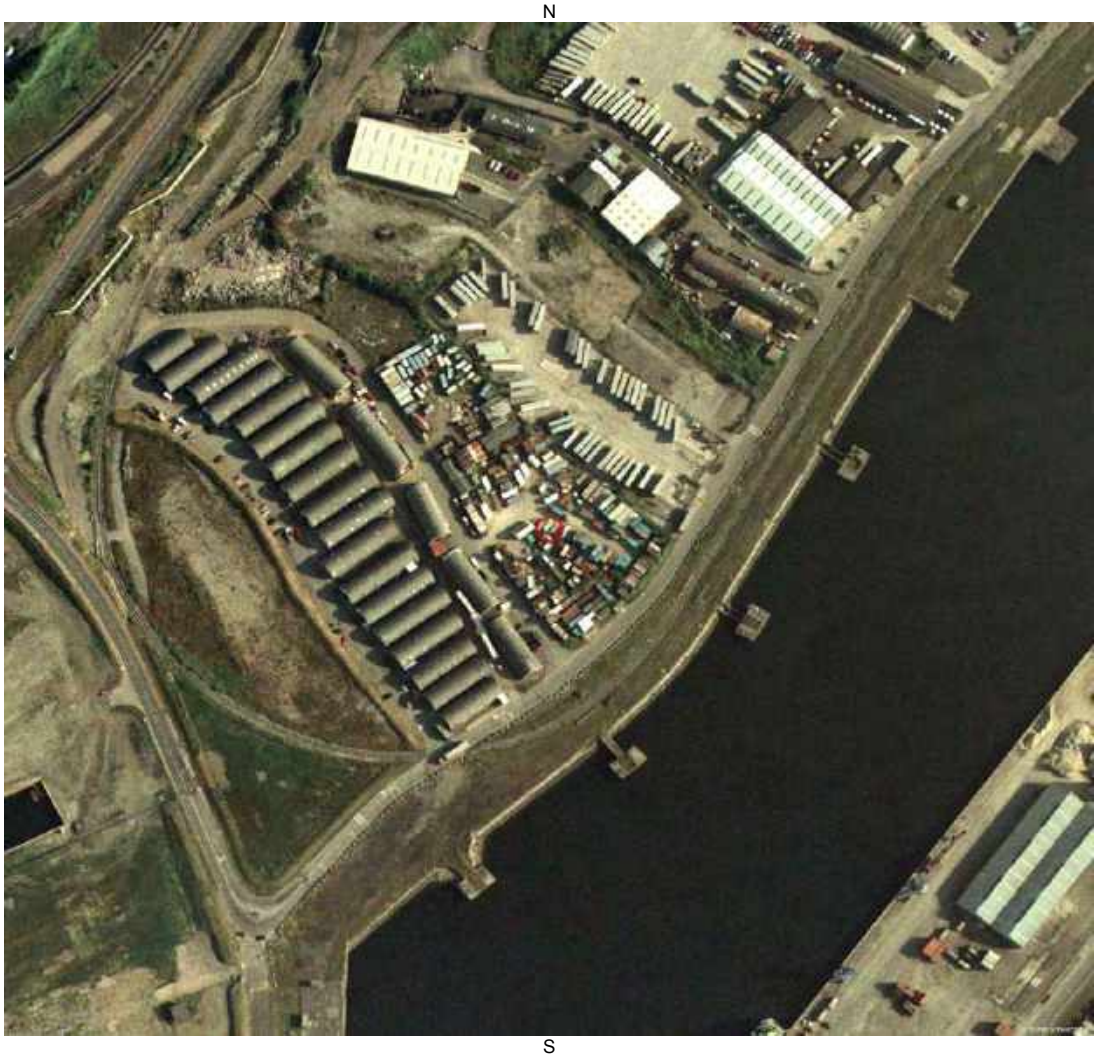
Date: Mar 6, 2008

GroundSure Reference: HMD-188-62961

Your Reference: Barry

Aerial Photograph of Study Site

NW ▲ N NE

◄W  E►

SW S ▼ SE

Site Name:WOODHAM ROAD, DOCKS, BARRY, CF62
Grid Reference: 312620,167670

Overview of Findings

The GroundSure Geology and Ground Stability Report provides high quality geo-environmental information that allows geo-environmental professionals and their clients to make informed decisions and be forewarned of potential ground instability problems that may affect the ground investigation, foundation design and possibly remediation options that could lead to possible additional costs.

The report is based on the BGS 1:50,000 Digital Geological Map of Great Britain, BGS Geosure data; BRITPITS database; Shallow Mining data and Borehole Records, Coal Authority data including brine extraction areas, PBA non-coal mining and natural cavities database and GroundSure's unique database including historical surface ground and underground workings.

For further details on each dataset, please refer to each individual section in the report as listed. Where the database has been searched a numerical result will be recorded. Where the database has not been searched '-' will be recorded.

Report Section	**Number of records found within (X) m of the study site boundary**
1. Geology	Description
1.1 Artificial Ground,	
1.1.1 Is there any Artificial Ground /Made Ground present beneath the study site? *	Yes
1.1.2 Are there any records relating to permeability of artificial ground within the study site* boundary?	Yes
1.2 Superficial Geology & Landslips	
1.2.1 Is there any Superficial Ground /Drift Geology present beneath the study site? *	Yes
1.2.2 Are there any records relating to permeability of superficial geology within the study site* boundary?	Yes
1.2.3 Are there any records of landslip within 500m of the study site boundary?	No
1.2.4 Are there any records relating to permeability of landslips within the study site* boundary?	No
1.3 Bedrock, Solid Geology & Faults	
1.3.1 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section.	
1.3.2 Are there any records relating to permeability of bedrock within the study site* boundary?	Yes
1.3.3 Are there any records of faults within 500m of the study site boundary?	Yes
1.3.4 Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?	The property is not in a radon Affected Area, as less than 1% of properties are above the Action Level
1.3.5 Is the property in an area where Radon Protection Measures are required for new properties or extensions to existing ones as described in publication BR211 by the Building Resea rch Establishment?	No radon protective measures are necessary

*** This includes an automatically generated 50m buffer zone around the site**

Source:Scale 1:50,000 BGS Sheet No:263

2. Ground Workings	on-site	0-50	51-250	251-500	501-1000
2.1 Historical Surface Ground Working Features from Small Scale Mapping	3	9	22	-	-
2.2 Historical Underground Workings Features from Small Scale Mapping	0	0	5	0	9
2.3 Current Ground Workings	0	0	1	2	1

3. Mining, Extraction & Natural Cavities	on-site	0-50	51-250	251-500	501-1000
3.1 Historical Mining	0	4	11	10	23
3.2 Coal Mining	0	0	0	0	0
3.3 Shallow Mining*	1	-	-	-	-
3.4 Non – Coal Mining Cavities	0	0	0	0	0
3.5 Natural Cavities	0	0	0	0	0
3.6 Brine Extraction	0	0	0	0	0
3.7 Gypsum Extraction	0	0	0	0	0
3.8 Tin Mining	0	0	0	0	0
3.9 Clay Mining	0	0	0	0	0

*This includes an automatically generated 150m buffer zone around the site

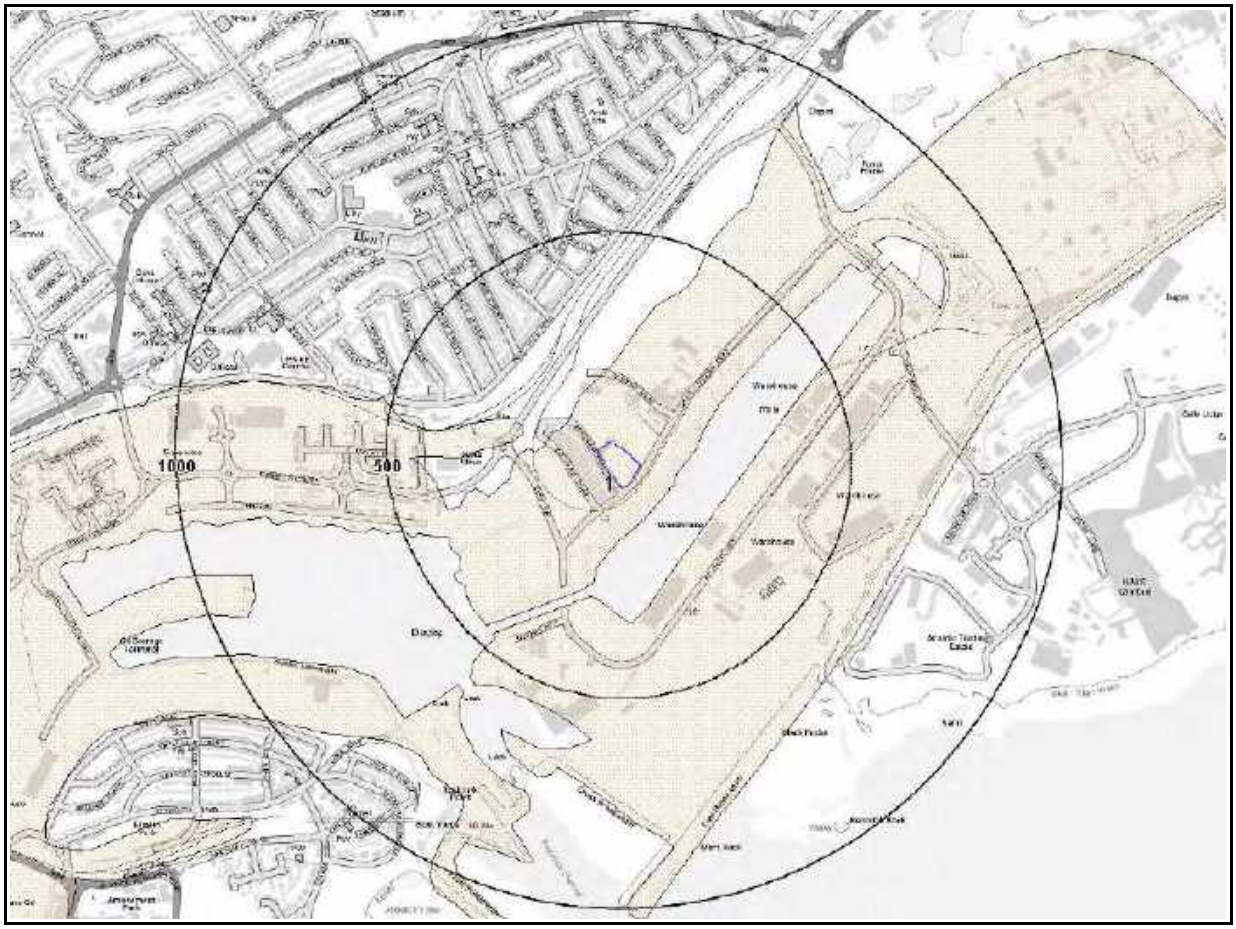
4. Natural Ground Subsidence	on-site*	0-50	51-250	251-500	501-1000
4.1 Shrink-Swell Clay	Very Low	-	-	-	-
4.2 Landslides	Very Low	-	-	-	-
4.3 Ground Dissolution of Soluble Rocks	Negligible	-	-	-	-
4.4 Compressible Deposits	Very Low	-	-	-	-
4.5 Collapsible Deposits	Negligible	-	-	-	-
4.6 Running Sand	Very Low	-	-	-	-

* This includes an automatically generated 50m buffer zone around the site

5. Borehole Records	on-site	0-50	51-250	251-500	501-1000
5.1 BGS Recorded Boreholes	0	0	3	-	-

1.1 Artificial Ground Map

NW N NE



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SW S SE

Artificial Ground Legend

Site Outline

50

250 Search Buffers

Geological information represented on the mapping is derived from the BGS Digital Geological map of Great Britain at 1:50,000 scale.

1.1 Artificial Ground

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No:263

1.1.1 Artificial/Made Ground

Are there any records of Artificial/Made Ground within 500m of the study site boundary: **Yes**

ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	0.0	On Site	MGR-MGRD	MADE GROUND (UNDIVIDED)	MADE GROUND (COMPOSITION UNSPECIFIED)

1.1.2 Permeability of Artificial Ground

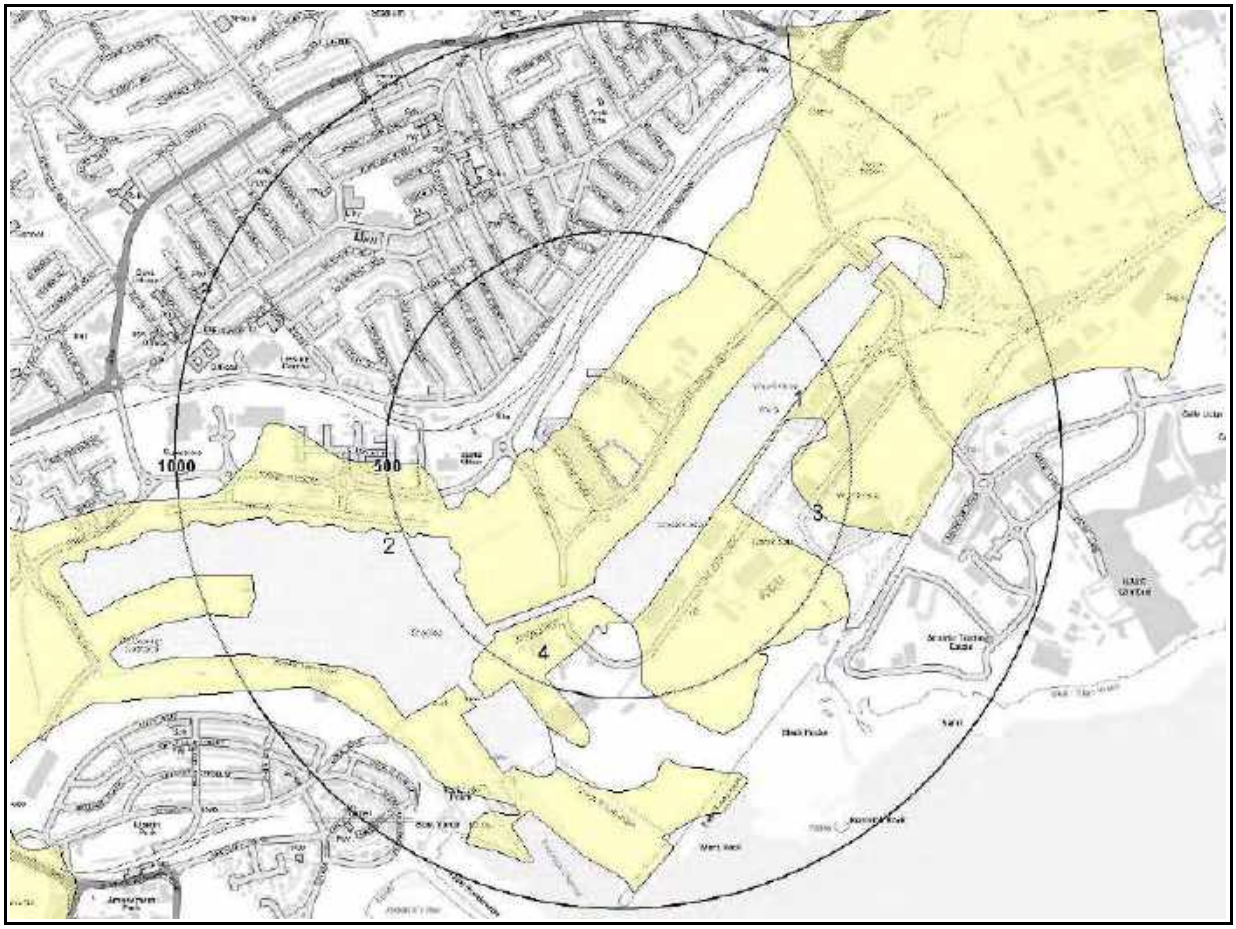
Are there any records relating to permeability of artificial ground within the study site* boundary: **Yes**

Distance (m)	Direction	Flow type	Maximum Permeability	Minimum Permeability
0.0	On Site	Intergranular	Very High	Very Low

* This includes an automatically generated 50m buffer zone around the site.

1.2 Superficial Deposits and Landslips Map

NW ▲ N NE



◄W E►

SW ▼ S SE

Superficial and Landslips Legend

Site Outline

— 50 —

—250— Search Buffers

Geological information represented on the mapping is derived from the BGS Digital Geological map of Great Britain at 1:50,000 scale.

1.2 Superficial Deposits and Landslips

1.2.1 Superficial Deposits/Drift Geology

Are there any records of Superficial Deposits/Drift Geology within 500m of the study site boundary: **Yes**

ID	Distance (m)	Direction	Lex Code	Description	Rock Description
1	0.0	On Site	TFD-CLSS	Tidal Flat Deposits	Clay, Silt And Sand
2	81.0	SE	SUPNM-UNKN	Superficial Deposits Not Mapped [for Digital Map Use Only]	Unknown Lithology
3	233.0	SE	BSA-SAND	Blown Sand	Sand
4	267.0	S	TFD-CLSS	Tidal Flat Deposits	Clay, Silt And Sand

1.2.2 Permeability of Superficial Ground

Are there any records relating to permeability of superficial ground within the study site* boundary: **Yes**

Distance (m)	Direction	Flow type	Maximum Permeability	Minimum Permeability
0.0	On Site	Intergranular	Moderate	Very Low

1.2.3 Landslip

Database searched and no data found.

Are there any records of Landslip within 500m of the study site boundary? **No**

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:50,000 scale.
This Geology shows the main components as discreet layers, these are: Artificial / Made Ground, Superficial / Drift Geology and Landslips. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

1.2.4 Landslip Permeability

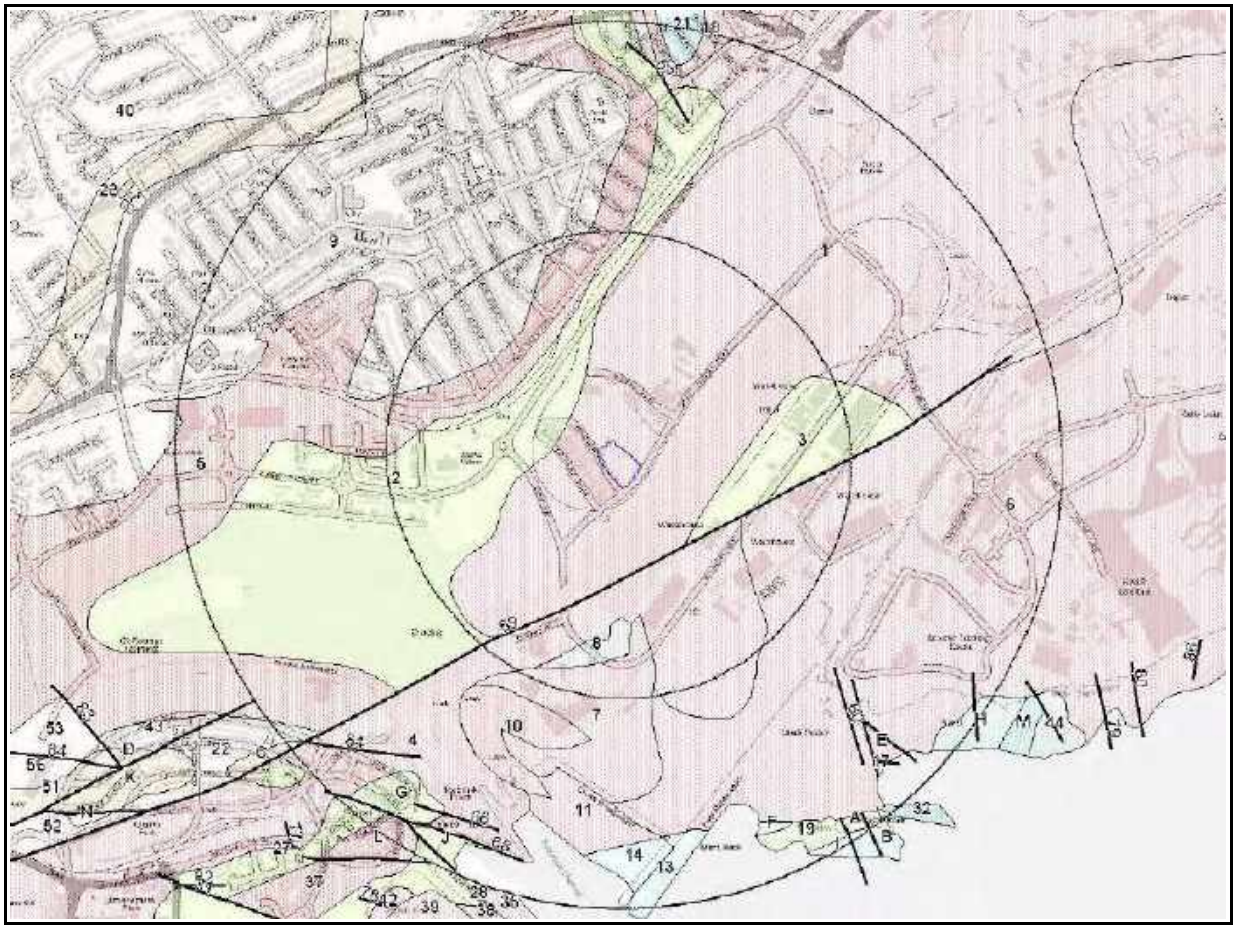
Are there any records relating to permeability of landslips within the study site* boundary: **No**

Database searched and no data found.

* This includes an automatically generated 50m buffer zone around the site.

1.3 Bedrock and Faults Map

NW N NE



W E

SW S SE

Bedrock & Faults Deposits Legend

Site Outline

50

250 Search Buffers

Geological information represented on the mapping is derived from the BGS Digital Geological map of Great Britain at 1:50,000 scale.

1.3 Bedrock, Solid Geology & Faults

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No:263

1.3.1 Bedrock/Solid Geology

Records of Bedrock/Solid Geology within 500m of the study site boundary:

ID	Distance (m)	Direction	LEX Code	Rock Description	Rock Age
1	0.0	On Site	MMG-MDST	Mercia Mudstone Group - Mudstone	Rhaetian / Scythian
2	93.0	NW	BAN-MDST	Blue Anchor Formation - Mudstone	Rhaetian / Norian
3	182.0	SE	BAN-MDST	Blue Anchor Formation - Mudstone	Rhaetian / Norian
4	189.0	SE	MMG-MDST	Mercia Mudstone Group - Mudstone	Rhaetian / Scythian
5	245.0	NW	PNG-MDLM	Penarth Group - Mudstone And Limestone, Interbedded	Rhaetian
6	269.0	SE	MMMF-CONG	Mercia Mudstone Group (marginal Facies) - Conglomerate	Triassic
7	302.0	S	QCG-SCON	Quartz Conglomerate Group (south Wales) - Sandstone And Conglomerate, Interbedded	Famennian
8	305.0	S	AVO-LSMD	Avon Group - Limestone And Mudstone, Interbedded	Courceyan
9	327.0	NW	STM-LSMD	St Mary's Well Bay Member - Limestone And Mudstone, Interbedded	Hettangian / Rhaetian

1.3.2 Permeability of Bedrock Ground

Are there any records relating to permeability of bedrock ground within the study site* boundary: **Yes**

Distance (m)	Direction	Flow type	Maximum Permeability	Minimum Permeability
0.0	On Site	Fracture	Low	Low

1.3.3 Faults

Are there any records of Faults within 500m of the study site boundary? **Yes**

ID	Distance (m)	Direction	Category Description	Feature Description
59	190.0	SE	FAULT	Normal fault, inferred

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:50,000 scale.

This Geology shows the main components as discreet layers, these are: Bedrock/ Solid Geology and linear features such as Faults. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

1.3.4 Radon Affected Areas

Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?

* This includes an automatically generated 50m buffer zone around the site.

The property is not in a radon Affected Area, as less than 1% of properties are above the Action Level

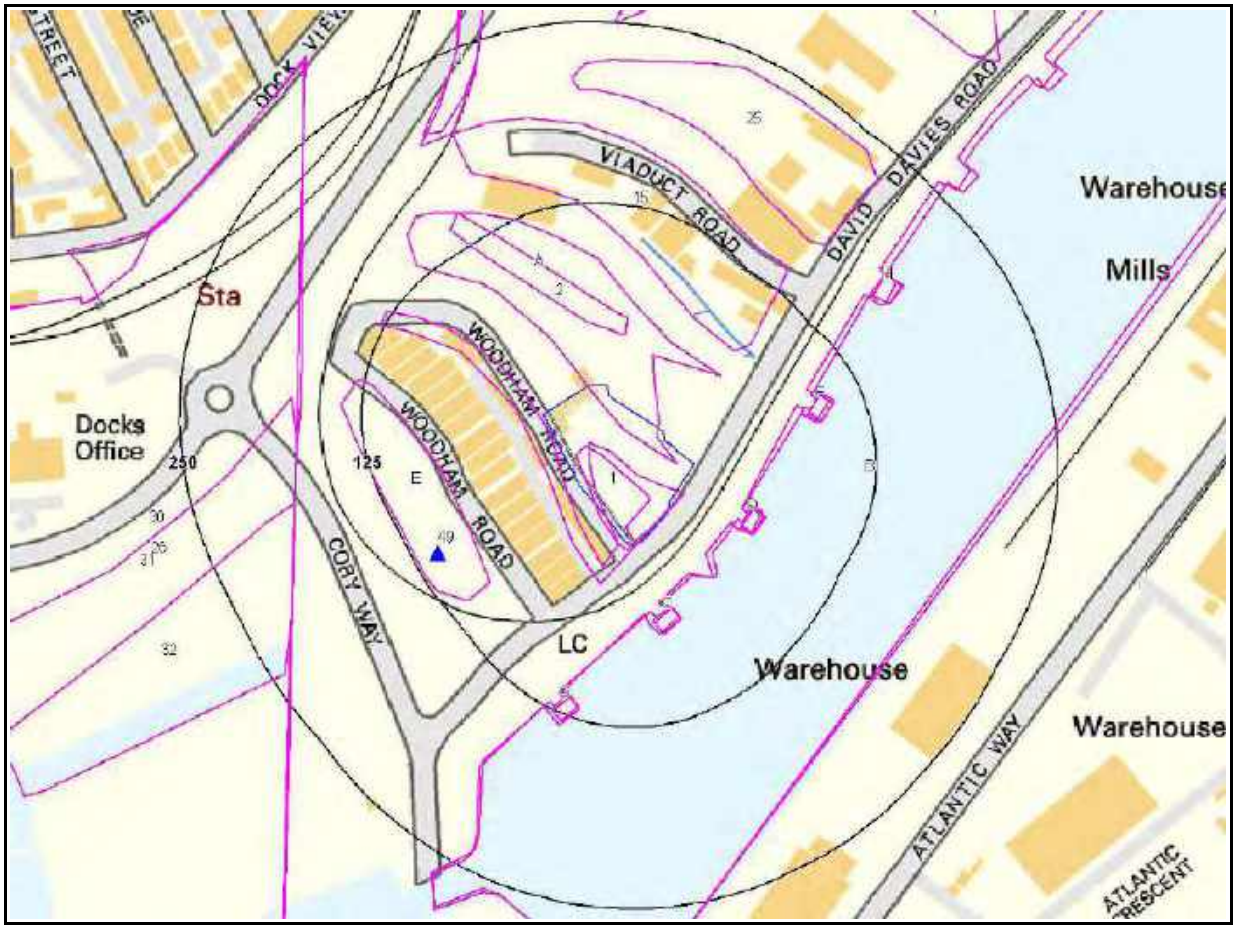
1.3.5 Radon Protection

Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?

No radon protective measures are necessary

2 Ground Workings Map

NW N NE



◄W E►

SW S SE

Ground Workings Legend

Site Outline

Search Buffers (m)

Historic Surface Ground Workings

Historic Underground Workings

Current Ground Workings

2 Ground Workings

2.1 Historical Surface Ground Working Features derived from the Historical Mapping

This dataset is based on GroundSure's unique Historical Land Use Database derived from 1:10,560 and 1:10,000 scale historical mapping.

Are there any Historical Surface Ground Working Features within 250m of the study site boundary? **Yes**

The following Historical Surface Ground Working Features are provided by GroundSure:

ID	Distance (m)	Direction	NGR	Use	Date
1	0.0	On Site	312621,167639	Unspecified Pit	1947
2	0.0	On Site	312588,167749	Unspecified Pit	1973
3	0.0	On Site	312574,167673	Unspecified Pit	1973
4A	37.0	N	312570,167793	Unspecified Ground Workings	1921
5A	37.0	N	312570,167793	Unspecified Ground Workings	1915
6A	37.0	N	312570,167793	Unspecified Ground Workings	1898
7B	38.0	SE	312815,167738	Dock	1898
8B	40.0	SE	312868,167729	Dock	1915
9C	49.0	SE	312658,167554	Coal Tips	1915
10D	49.0	SE	312717,167622	Coal Tips	1915
11C	50.0	SE	312656,167552	Coal Tips	1921
12C	50.0	SE	312656,167552	Coal Tips	1947
13D	51.0	SE	312716,167620	Coal Tips	1921
14D	51.0	SE	312716,167620	Coal Tips	1947
15	74.0	NE	312626,167820	Unspecified Pit	1973
16E	80.0	SW	312485,167644	Unspecified Heap	1973
17E	80.0	SW	312485,167644	Unspecified Heap	1991
18E	80.0	SW	312485,167644	Unspecified Heap	1982
19F	85.0	NE	312764,167700	Coal Tips	1915
20F	87.0	NE	312762,167701	Coal Tips	1921
21F	87.0	NE	312762,167701	Coal Tips	1947
22G	112.0	SW	312588,167494	Coal Tips	1915
23G	112.0	S	312587,167490	Coal Tips	1921
24G	112.0	S	312587,167490	Coal Tips	1947
25	165.0	NE	312748,167877	Unspecified Pit	1973
26	167.0	W	311610,167338	Docks	1915
27H	168.0	NE	312810,167783	Coal Tips	1921
28H	168.0	NE	312810,167783	Coal Tips	1947
29H	168.0	NE	312809,167782	Coal Tips	1915
30	169.0	W	311732,167331	Dock	1921
31	171.0	W	312285,167590	Graving Dock	1921
32	182.0	W	312300,167534	Graving Dock	1921
33I	249.0	N	312804,168020	Unspecified Ground Workings	1973
34I	249.0	N	312804,168020	Unspecified Ground Workings	1982

2.2 Historical Underground Workings Features derived from the Historical Mapping

This data is derived from the GroundSure unique Historical Land Use Database. It contains data derived from 1:10,000 and 1:10,560 historical Ordnance Survey Mapping and includes some natural topographical features (Shake Holes for example) as well as manmade features that may have implications for ground stability. Underground and mining features have been identified from surface features such as shafts. The distance that these extend underground is not shown.

Are there any Historical Underground Working Features within 1000m of the study site boundary? **Yes**

The following Historical Underground Working Features are provided by GroundSure:

ID	Distance (m)	Direction	NGR	Use	Date
35J	197.0	NW	312516,167957	Tunnel	1982

36J	197.0	NW	312516,167957	Tunnel	1991
37J	197.0	NW	312516,167957	Tunnel	1973
38J	197.0	NW	312516,167957	Tunnel	1947
39J	202.0	NW	312514,167960	Tunnel	1898
Not shown	932.0	SW	312007,166813	Tunnel	1921
Not shown	933.0	SW	312016,166814	Tunnel	1898
Not shown	933.0	SW	312016,166814	Tunnel	1938
Not shown	933.0	SW	312016,166814	Tunnel	1936
Not shown	933.0	SW	312016,166814	Tunnel	1915
Not shown	962.0	SW	311980,166815	Tunnel	1982
Not shown	962.0	SW	311980,166815	Tunnel	1991
Not shown	962.0	SW	311980,166815	Tunnel	1973
Not shown	962.0	SW	311980,166815	Tunnel	1947

2.3 Current Ground Workings

This dataset is derived from the BGS BRITPITS database covering active; inactive mines; quarries; oil wells; gas wells and mineral wharves; and rail deposits throughout the British Isles.

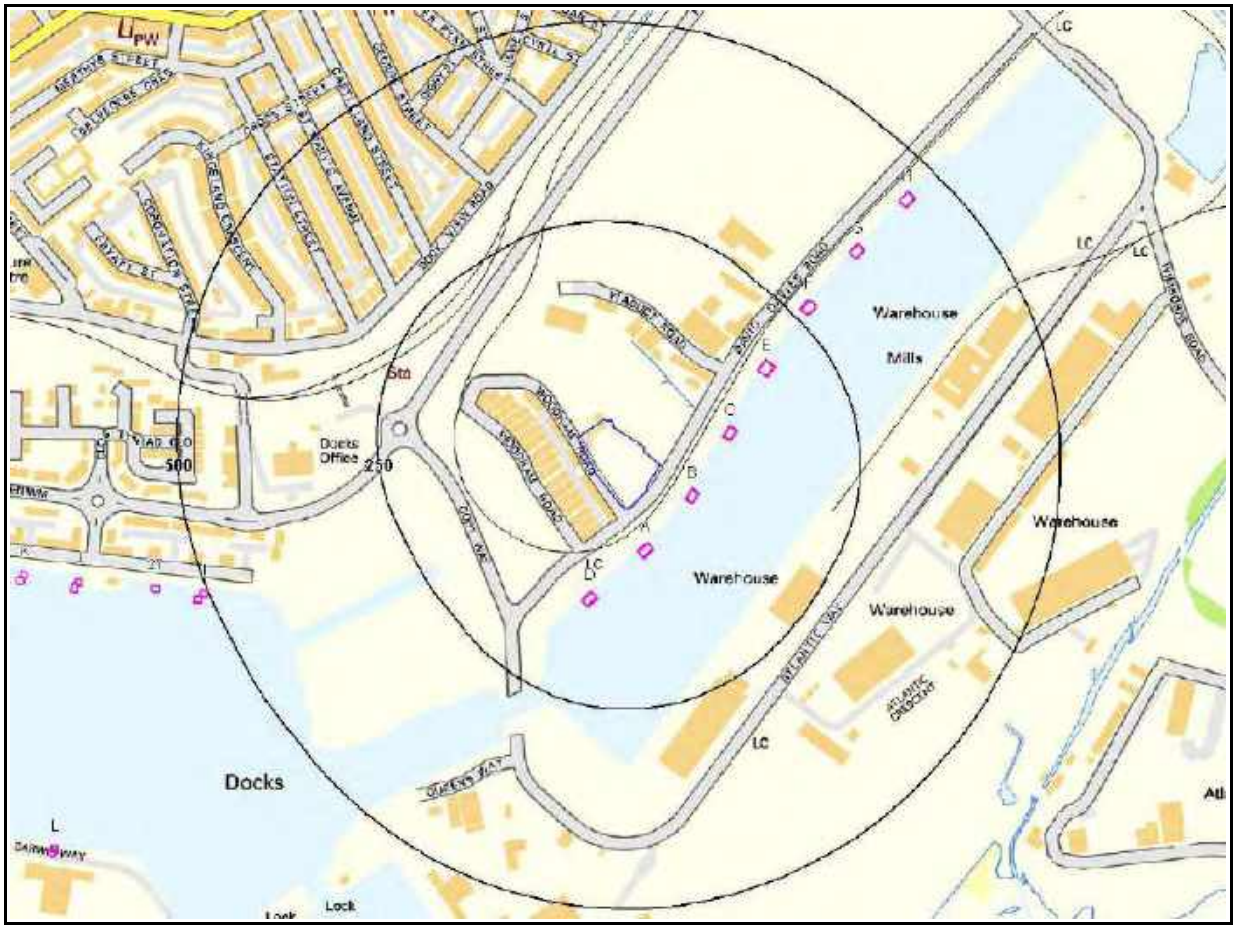
Are there any BGS Current Ground Workings within 1000m of the study site boundary? **Yes**

The following Current Ground Workings information is provided by British Geological Society:

ID	Distance (m)	Direction	NGR	Use	Date Updated
49	109.0	SW	312500.0,167600.0	Secondary	16-Jul-2007
Not shown	326.0	S	312750.0,167300.0	Marine Sand & Gravel	06-Sep-2007
Not shown	326.0	S	312750.0,167300.0	Marine Sand & Gravel	21-Sep-2007
Not shown	847.0	SW	312250.0,166850.0	Marine Sand & Gravel	06-Sep-2007

3 Mining, Extraction & Natural Cavities Map

NW N NE



W E

SW S SE

Mining, Extraction & Natural Cavities Legend

Site Outline

Search Buffers (m)

Historical Mining

Non-Coal Mining Cavities

Natural Cavities

3 Mining, Extraction & Natural Cavities

3.1 Historical Mining

This dataset is derived from GroundSure unique Historical Land-use Database that are indicative of mining or extraction activities.

Are there any Historical Mining areas within 1000m of the study site boundary? **Yes**

The following Historical Mining information is provided by Groundsure :

ID	Distance (m)	Direction	NGR	Details	Date
1A	49.0	SE	312658,167554	Coal Tips	1915
2B	49.0	SE	312717,167622	Coal Tips	1915
3A	50.0	SE	312656,167552	Coal Tips	1921
4A	50.0	SE	312656,167552	Coal Tips	1947
5B	51.0	SE	312716,167620	Coal Tips	1921
6B	51.0	SE	312716,167620	Coal Tips	1947
7C	85.0	NE	312764,167700	Coal Tips	1915
8C	87.0	NE	312762,167701	Coal Tips	1921
9C	87.0	NE	312762,167701	Coal Tips	1947
10D	112.0	SW	312588,167494	Coal Tips	1915
11D	112.0	S	312587,167490	Coal Tips	1921
12D	112.0	S	312587,167490	Coal Tips	1947
13E	168.0	NE	312810,167783	Coal Tips	1921
14E	168.0	NE	312810,167783	Coal Tips	1947
15E	168.0	NE	312809,167782	Coal Tips	1915
16F	260.0	NE	312862,167859	Coal Tips	1915
17F	262.0	NE	312862,167856	Coal Tips	1947
18F	262.0	NE	312862,167856	Coal Tips	1921
19G	353.0	NE	312923,167927	Coal Tips	1947
20G	353.0	NE	312923,167927	Coal Tips	1921
21G	354.0	NE	312923,167929	Coal Tips	1915
22H	443.0	NE	312984,167994	Coal Tips	1921
23H	443.0	NE	312984,167994	Coal Tips	1947
24H	444.0	NE	312984,167995	Coal Tips	1915
25I	500.0	SW	312107,167500	Coal Tips	1915
26I	509.0	SW	312099,167493	Coal Tips	1921
27	554.0	W	312046,167506	Coal Tips	1915
28J	644.0	W	311950,167514	Coal Tips	1915
29J	650.0	W	311945,167508	Coal Tips	1921
30K	707.0	W	311882,167524	Coal Tips	1915
31K	713.0	W	311878,167516	Coal Tips	1921
Not shown	796.0	W	311789,167534	Coal Tips	1915
Not shown	802.0	W	311784,167527	Coal Tips	1921
34L	818.0	SW	311920,167180	Coal Tips	1915
35L	823.0	SW	311918,167175	Coal Tips	1921
Not shown	880.0	W	311702,167538	Coal Tips	1915
Not shown	886.0	W	311696,167531	Coal Tips	1921
Not shown	890.0	W	311733,167367	Coal Tips	1915
Not shown	896.0	W	311736,167364	Coal Tips	1921
Not shown	906.0	SW	311806,167198	Coal Tips	1915
Not shown	915.0	SW	311797,167195	Coal Tips	1921
Not shown	945.0	W	311667,167405	Coal Tips	1915
Not shown	951.0	W	311661,167409	Coal Tips	1921
Not shown	960.0	SW	311679,167312	Coal Tips	1915
Not shown	970.0	W	311613,167532	Coal Tips	1915

Not shown	974.0	SW	311674,167307	Coal Tips	1921
Not shown	976.0	W	311607,167525	Coal Tips	1921
Not shown	997.0	SW	311696,167213	Coal Tips	1915

3.2 Coal Mining

This dataset provides information as to whether the study site lies within a known coal mining affected area as defined by the coal authority.

Are there any Coal Mining areas within 1000m of the study site boundary? **No**

Database searched and no data found.

3.3 Shallow Mining

This dataset refers to the (largely very old) extraction of mineral deposits by means of near surface underground workings.

What is the maximum hazard rating of subsidence relating to shallow mining within the study site* boundary? **Negligible**

*This includes an automatically generated 150m buffer zone around the study site boundary

The following Shallow Mining information provided by the British Geological Survey is not represented on Mapping:

Distance (m)	Direction	Hazard Rating	Details
0.0	On Site	Negligible	Where negligible potential is indicated, this means that the rocks underlying the area are not likely to have been mined at shallow depth. However, you should still find out whether or not a Coal Authority mining search is required in the area, for example, to check for deeper mining.

3.4 Non – Coal Mining Cavities

This dataset provides information from the Peter Brett Associates (PBA)/DEFRA mining cavities database (compiled for the national study entitled "Review of mining instability in Great Britain, 1990" PBA has also continued adding to this database) on mineral extraction by mining.

Are there any Non-Coal Mining cavities within 1000m of the study site boundary? **No**

Database searched and no data found.

3.5 Natural Cavities

This dataset provides information based on Peter Brett Associates/ DEFRA natural cavities database.

Are there any Natural Cavities within 1000m of the study site boundary? **No**

Database searched and no data found.

3.6 Brine Extraction

This dataset provides information from the Brine compensation board which has been discontinued and is now covered by the Coal Authority.

Are there any Brine Extraction areas within 1000m of the study site boundary? **No**

Database searched and no data found.

3.7 Gypsum Extraction

This dataset provides information on Gypsum extraction from British Gypsum records.

Are there any Gypsum Extraction areas within 1000m of the study site boundary? **No**

Database searched and no data found.

3.8 Tin Mining

This dataset provides information on tin mining areas and is derived from tin mining records.

Are there any Tin Mining areas within 1000m of the study site boundary? **No**

Database searched and no data found.

3.9 Clay Mining

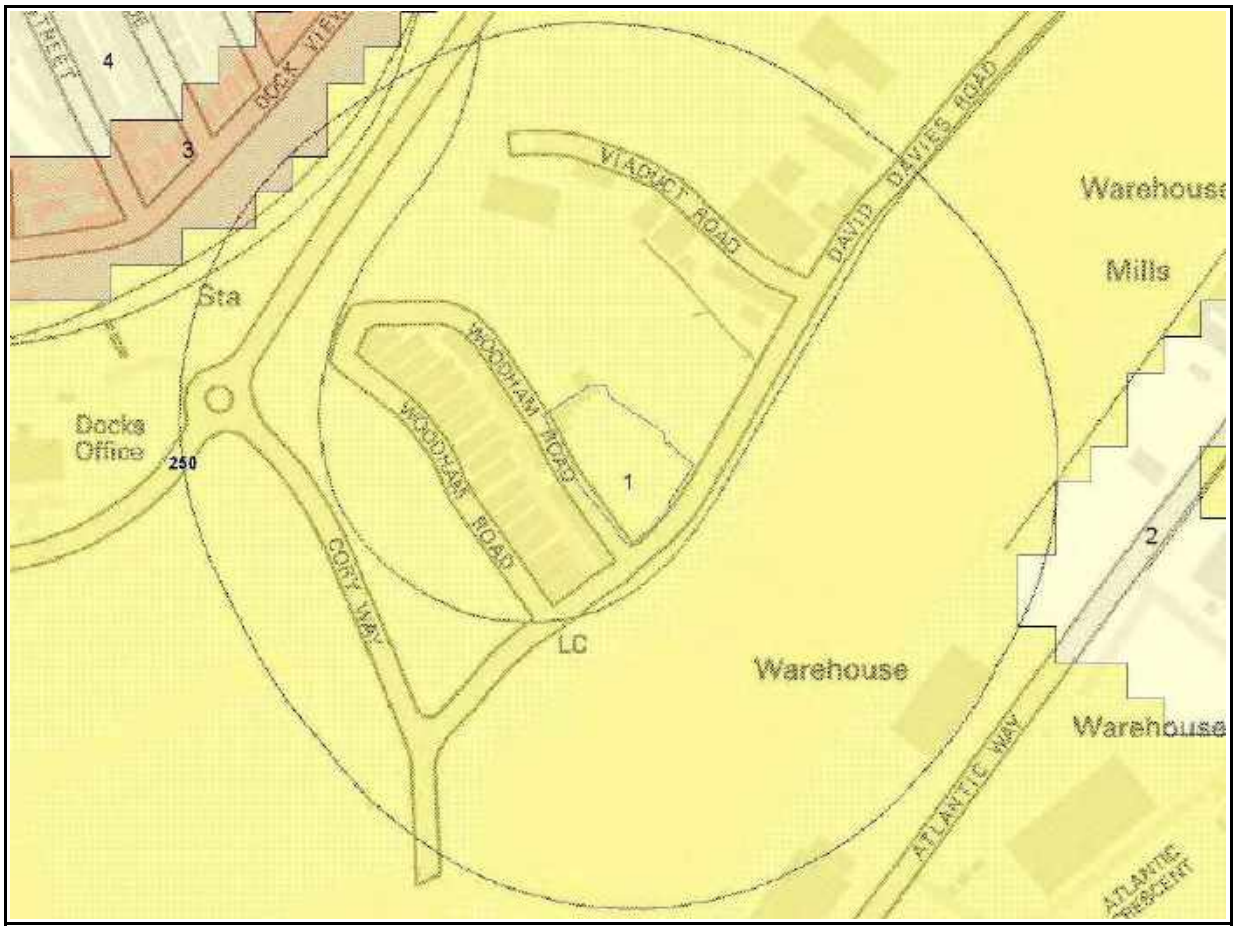
This dataset provides information on Kalin and Ball Clay mining from relevant mining records.

Are there any Clay Mining areas within 1000m of the study site boundary? **No**

Database searched and no data found.

4 Natural Ground Subsidence
4.1 Shrink-Swell Clay Map

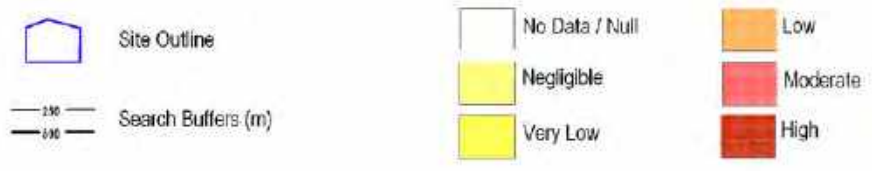
NW ▲ N NE



◄W E►

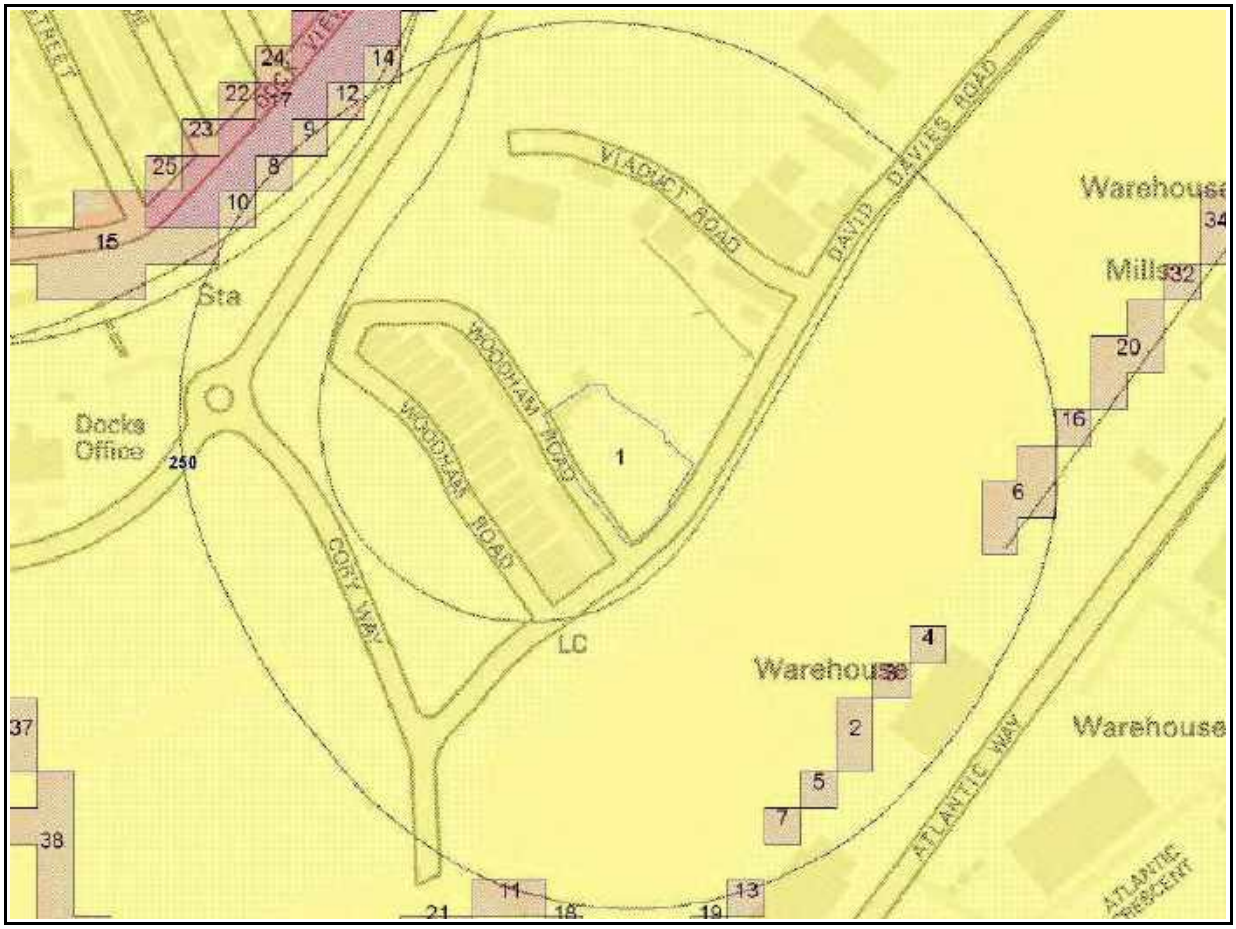
SW ▼ S SE

Shrink-Swell Clay Legend



4.2 Landslides Map

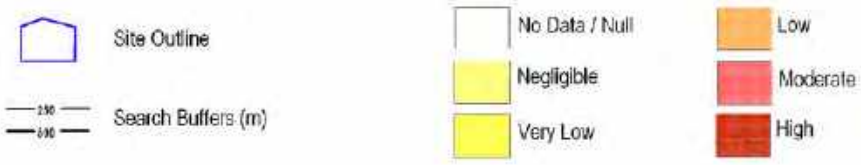
NW N NE



◄W E►

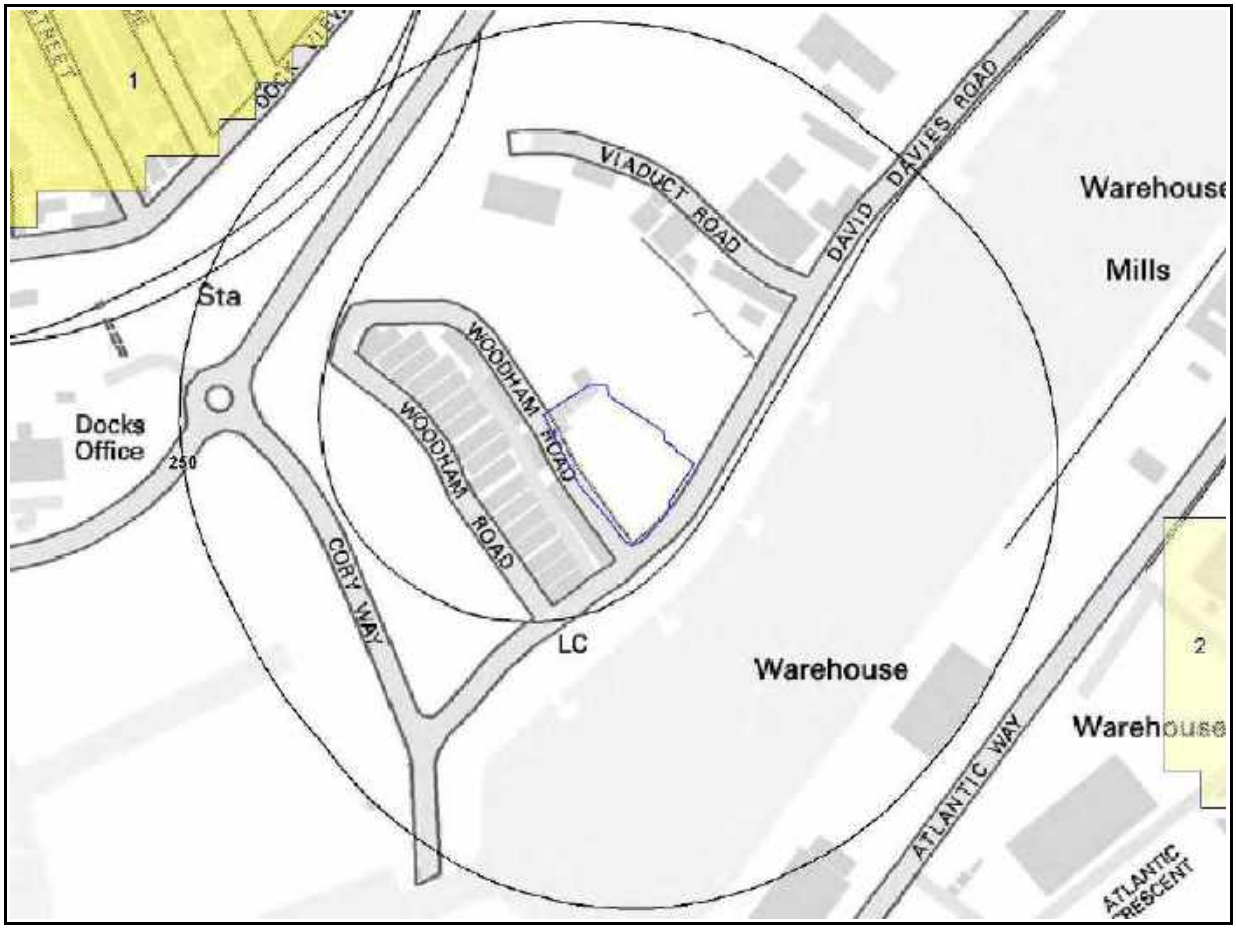
SW S SE

Landslides Legend



4.3 Ground Dissolution Soluble Rocks Map

NW N NE



W E

SW S SE

Ground Dissolution Soluble Rocks Legend

Site Outline

Search Buffers (m)

No Data / Null

Negligible

Very Low

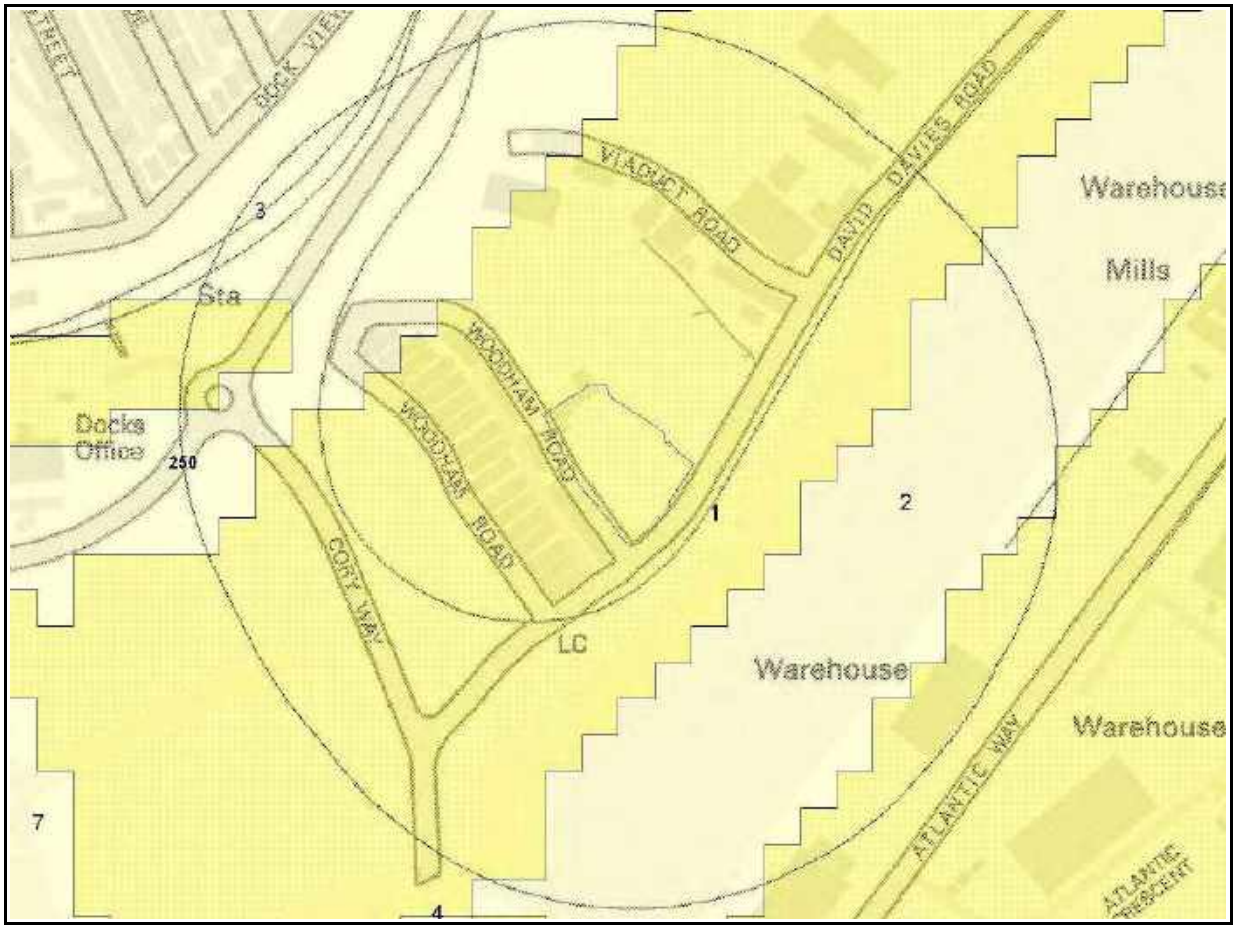
Low

Moderate

High

4.4 Compressible Deposits Map

NW N NE



W E

SW S SE

Compressible Deposits Legend

Site Outline

Search Buffers (m)

No Data / Null

Negligible

Very Low

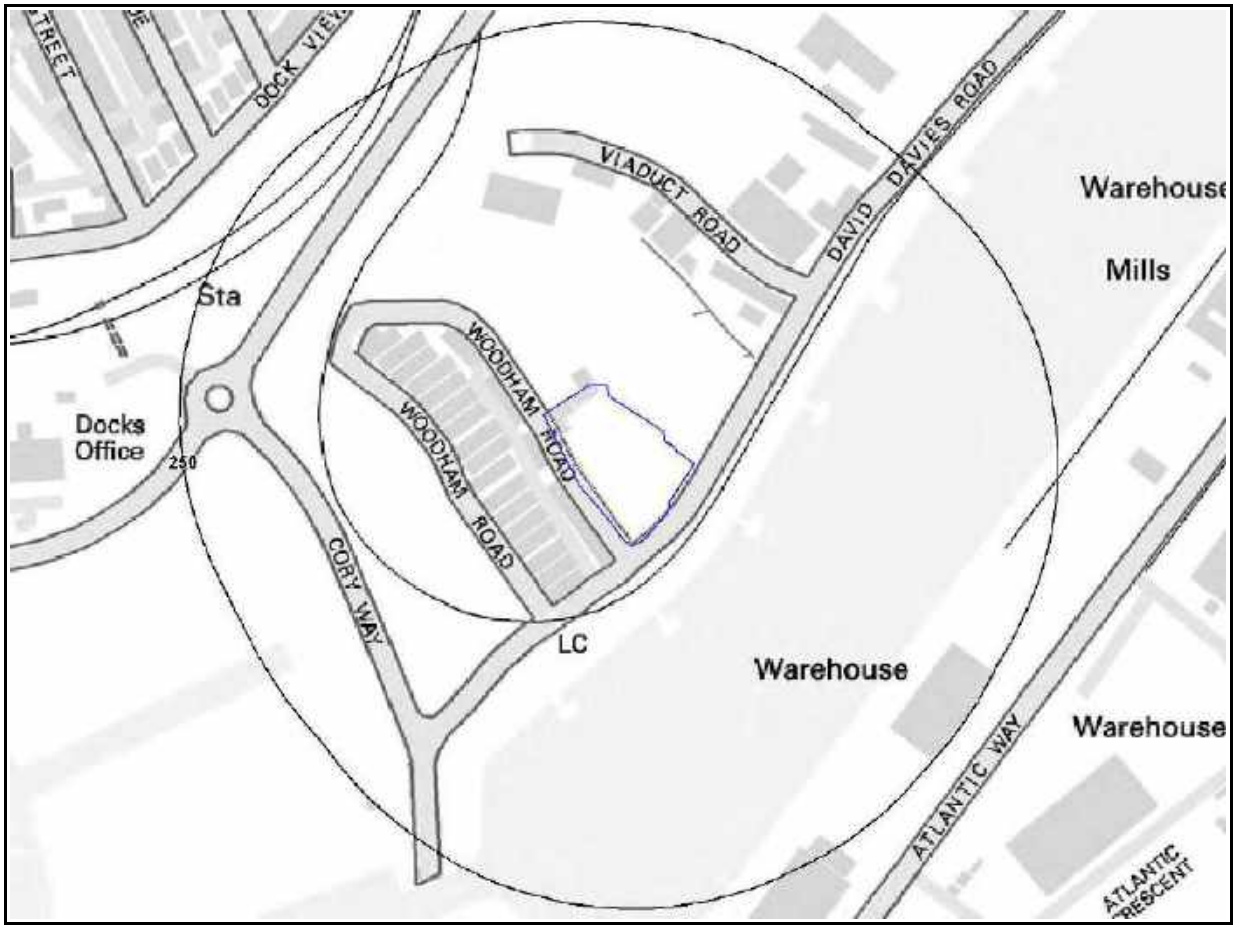
Low

Moderate

High

4.5 Collapsible Deposits Map

NW N NE



W E

SW S SE

Collapsible Deposits Legend

Site Outline

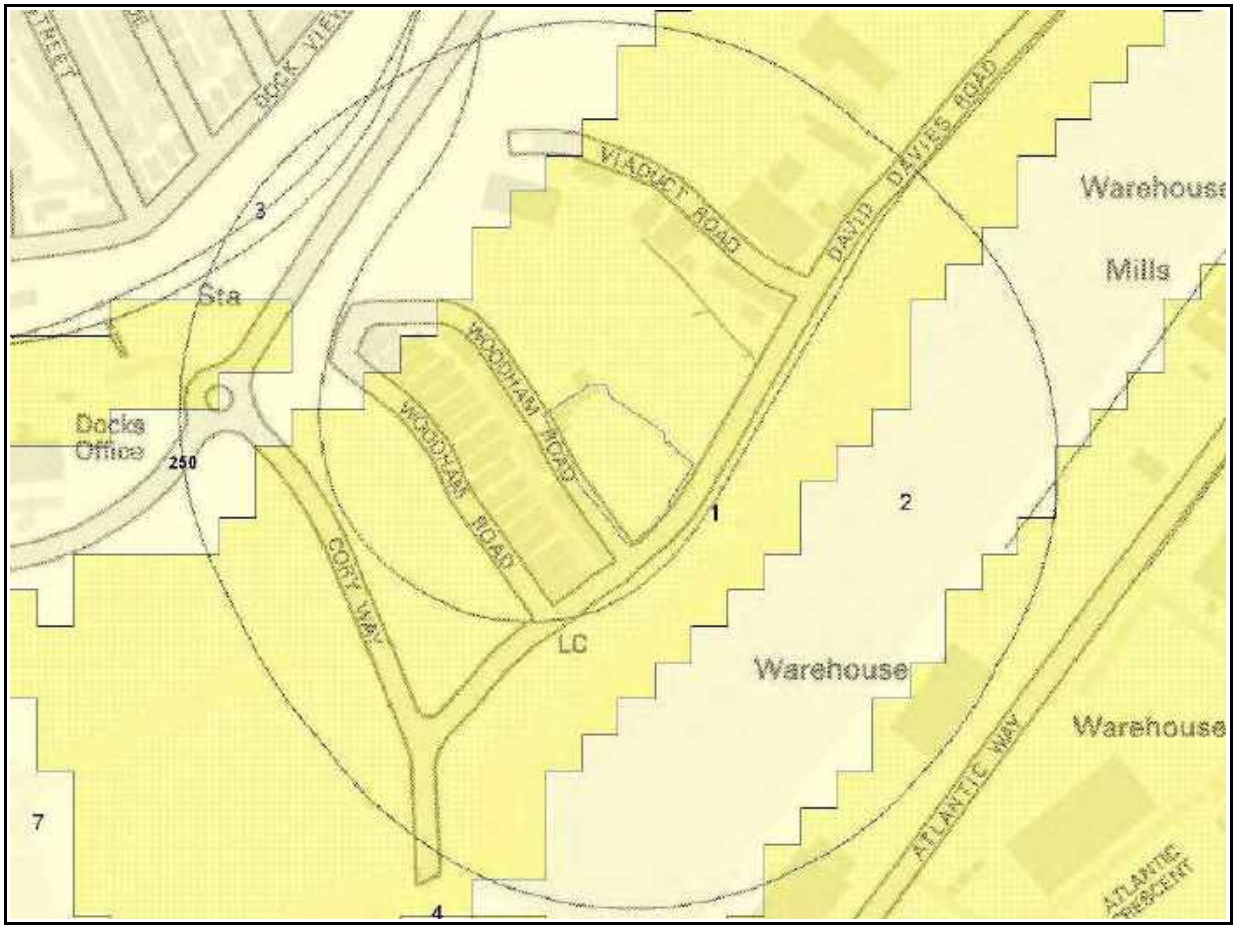
Search Buffers (m)

No Data / Null

Significant

4.6 Running Sand Map

NW N NE



◄W E►

SW S SE

Running Sand Legend

Site Outline

Search Buffers (m)

No Data / Null

Negligible

Very Low

Low

Moderate

High

4. Natural Ground Subsidence

The National Ground Subsidence rating is obtained through the 6 natural ground stability hazard datasets, which are supplied by the British Geological Survey (BGS)
The following GeoSure data represented on the mapping is derived from the BGS Digital Geological map of Great Britain at 1:50,000 scale.

What is the maximum hazard rating of natural subsidence within the study site* boundary? **Very Low**

*This includes an automatically generated 50m buffer zone around the study site boundary.

4.1 Shrink – Swell Clays

The following Shrink Swell information provided by the British Geological Survey:

ID	Distance (m)*	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Ground conditions predominantly low plasticity. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with shrink-swell clays.

4.2 Landslides

The following Landslides information provided by the British Geological Survey:

ID	Distance (m)*	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.

4.3 Ground Dissolution of Soluble Rocks

The following Soluble Rocks information provided by the British Geological Survey:

Distance (m)*	Direction	Hazard Rating	Details
0	On site	Null-Negligible	Soluble rocks are present, but unlikely to cause problems except under exceptional conditions. No special actions required to avoid problems due to soluble rocks. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with soluble rocks.

4.4 Compressible Deposits

The following Compressible Ground information provided by the British Geological Survey:

ID	Distance (m)*	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Very low potential for compressible deposits to be present. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.

4.5 Collapsible Deposits

The following Collapsible Rocks information is provided by the British Geological Survey:

Distance (m)*	Direction	Hazard Rating	Details
0	On site	Null-Negligible	No Indicators for collapsible deposits identified. No Special actions required to avoid problems due to collapsible deposit.

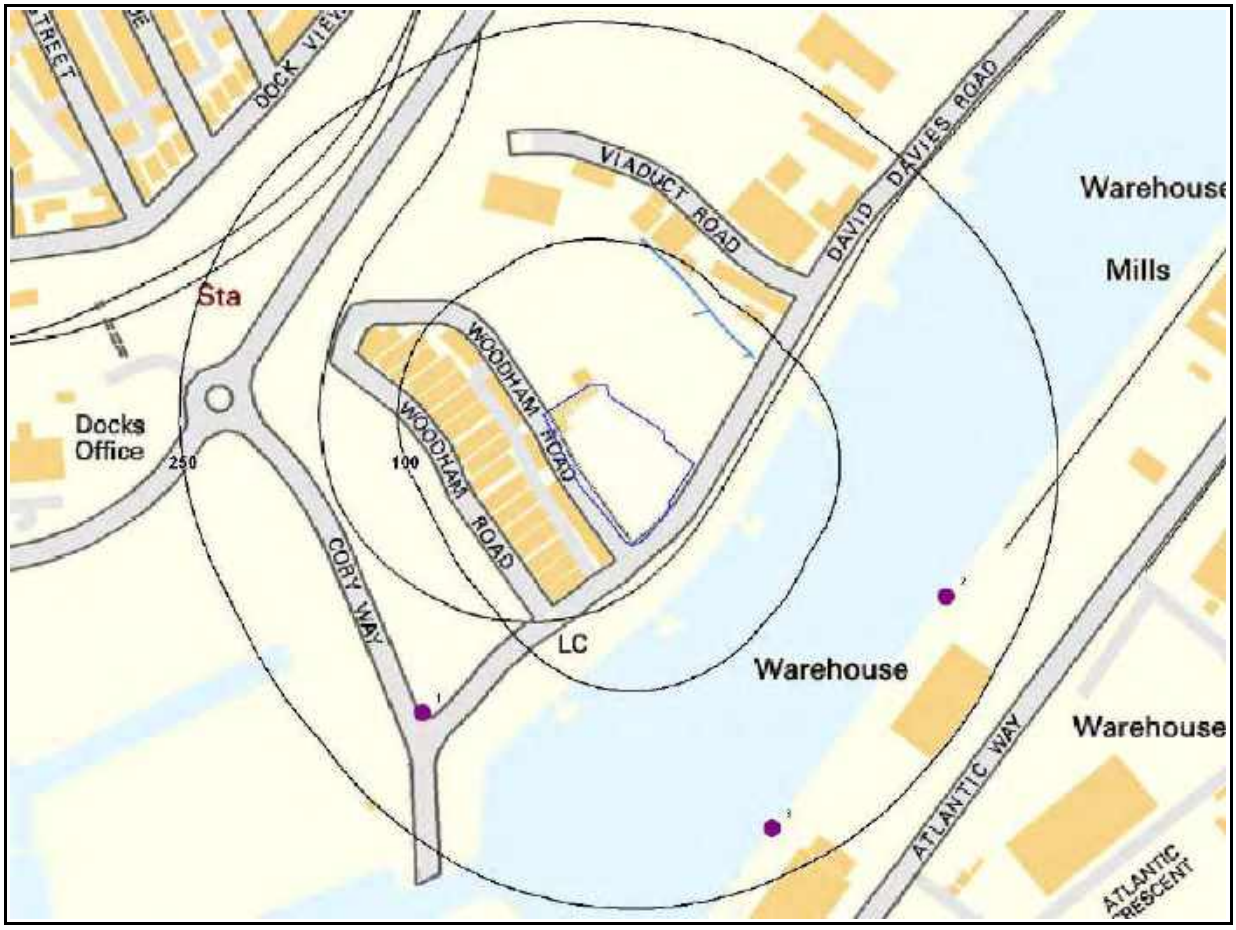
4.6 Running Sands

The following Running Sands information is provided by the British Geological Survey:

ID	Distance (m)*	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required, to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.

5. Borehole Records Map

NW N NE



◄W E►

SW S SE

Borehole Records Legend

Site Outline

Search Buffers (m)

Borehole Locations

5. Borehole Records

The systematic analysis of data extracted from the BGS Borehole Records database provides the following information.

Records of boreholes within 250m of the study site boundary: **3**

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length (m)	Borehole Name
1	183.0	SW	312490,167490	ST16NW109	1.8	BARRY DUCK CUSTOMS & EXICISE BLDG
2	196.0	SE	312850,167570	ST16NW157	14.0	CRANE BEAM, BARRY DOCKS, NO.2
3	217.0	SE	312730,167410	ST16NW158	12.7	CRANE BEAM, BARRY DOCKS, NO.3

Contacts

GroundSure Helpline
Telephone: 01273 819700
maps&data@groundsure.com

British Geological Survey Enquiries
Kingsley Dunham Centre
Keyworth, Nottingham NG12 5GG
Tel: 0115 936 3143 www.bgs.ac.uk

British Gypsum
British Gypsum Ltd, East Leake, Loughborough, Leicestershire, LE12 6HX
Tel: www.british-gypsum.bpb.com

The Coal Authority
200 Lichfield Lane, Mansfield, Notts NG18 4RG
Tel: 0845 762 6848
DX 716176 Mansfield 5 www.coal-authority.co.uk

Ordnance Survey
Romsey Road, Southampton SO16 4GU
Tel: 08456 050505

Getmapping PLC
Virginia Villas, High Street, Hartley Witney,
Hampshire RG27 8NW
Tel: 01252 845444

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Caversham Bridge House, Waterman Place, Reading
Berkshire RG1 8DN
Tel: +44 (0)118 950 0761 E-mail: reading@pba.co.uk

Acknowledgements

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Appendix 1(12): 2015 Application - Environmental data report (2009)

Oaktree Environmental
Unit 5 Oasis Park, Road 1,
Winsford Industrial Estate, Winsford,
CW7 3PP

GroundSure Reference:	HMD-188-62960
Your Reference:	Barry
Report Date:	Mar 6, 2008
Report Delivery Method:	**xml**
Client Email:	marco@oaktree-environmental.co.uk

GroundSure Environmental Data Report

Address: **WOODHAM ROAD, DOCKS, BARRY, CF62**

Dear Sir/Madam,

Thank you for placing your order with GroundSure. Please find enclosed the **GroundSure Environmental Data Report** as requested.

If you need any further assistance, please do not hesitate to contact our maps and data helpline on 01273 819700 or email maps&data@groundsure.com quoting the above GroundSure reference number.

Yours faithfully,

Managing Director
Groundsure Limited

Enc.
GroundSure Environmental Data Report

GroundSure Environmental Data Report

Address: WOODHAM ROAD, DOCKS, BARRY, CF62

Date: Mar 6, 2008

GroundSure Reference: HMD-188-62960

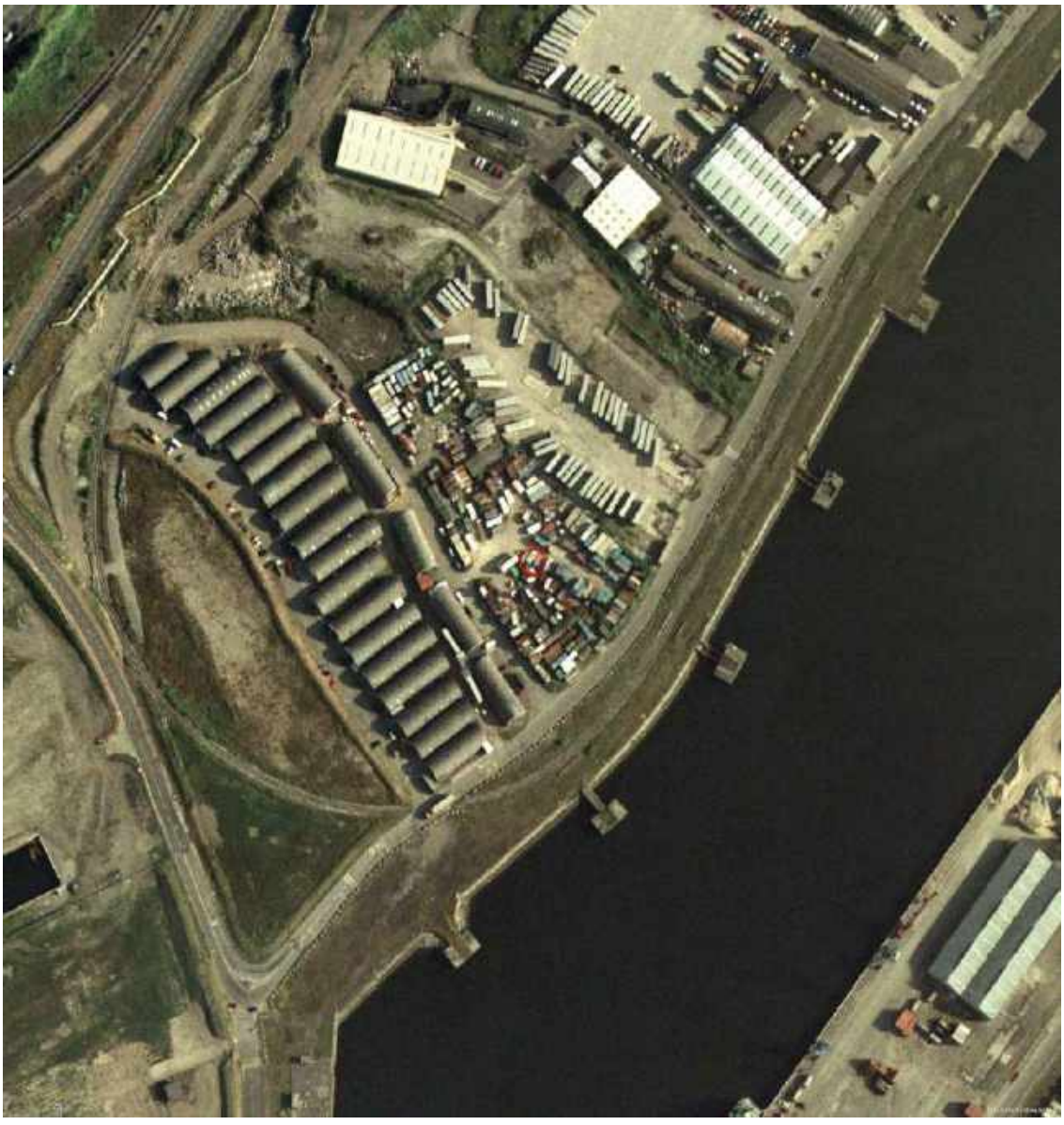
Your Reference: Barry

Client: Oaktree Environmental

Brought to you by GroundSure

Aerial Photograph of Study Site

NW ▲ N NE



◄W E►

SW ▼ S SE

Site Name:WOODHAM ROAD, DOCKS, BARRY, CF62
Grid Reference: 312620,167670

Overview of Findings

For further details on each dataset, please refer to each individual section in the main Report as listed. Where the database has been searched a numerical result will be recorded. Where the database has not been searched '-' will be recorded.

Report Section	Number of records found within (X) m of the study site boundary					
1. Authorisations, Incidents and Registers	on-site	0-50	51-250	251-500	501-1000	1000-1500
1.1 Industrial Sites Holding Licenses and/or Authorisations						
Records of IPC Authorisations	0	0	0	0	0	-
Records of IPPC Authorisations	0	0	0	7	12	-
Records of Water Industry Referrals (potentially harmful discharges to the public sewer)	0	0	0	0	-	-
Records of Red List Discharge Consents (potentially harmful discharges to controlled waters)	0	0	0	0	-	-
Records of List 1 Dangerous Substances Inventory sites	0	0	0	0	-	-
Records of List 2 Dangerous Substances Inventory sites	0	0	0	0	-	-
Records of LAPPC (LAPC) Authorisations	0	0	0	2	-	-
Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	0	0	-	-
Records of Licensed Discharge Consents	0	1	1	1	-	-
1.2 Records of COMAH and NIHHS sites	0	0	0	0	-	-
1.3 Environment Agency Recorded Pollution Incidents						
National Incidents Recording System, List 2	0	0	2	-	-	-
National Incidents Recording System, List 1	0	0	0	-	-	-
1.4 Sites Determined as Contaminated Land under Part IIA EPA 1990	0	0	0	0	-	-
2. Landfill and Other Waste Sites	on-site	0-50	51-250	251-500	501-1000	1000-1500
2.1 Landfill Sites						
Environment Agency Registered landfill Sites	0	0	0	0	1	0
Landfill Data – Operational Landfill Sites	0	0	0	0	1	0
Environment Agency Historic Landfill Sites	0	0	1	3	3	2
Landfill Data – Non-Operational Landfill Sites	0	0	0	1	2	2
BGS/DoE Landfill Site Survey	0	0	0	0	0	0
GroundSure Local Authority Landfill Sites Data	0	0	0	1	0	0
2.2 Landfill and Other Waste Sites Findings						
Operational Waste Treatment, Transfer and Disposal Sites	0	0	0	0	-	-
Non-Operational Waste Treatment, Transfer and Disposal Sites	0	0	0	0	-	-
Environment Agency (REGIS) Waste Sites	0	0	0	9	15	16
3. Current Land Uses	on-site	0-50	51-250	251-500	501-1000	1000-1500
3.1 Current Industrial Sites Data	0	0	21	35	-	-
3.2 Records of Petrol and Fuel Sites	0	0	0	0	-	-
3.3 Underground High Pressure Oil and Gas Pipelines	0	0	0	0	-	-

4. Geology	Description
4.1 Are there any records of Artificial Ground and Made Ground present beneath the study site? *	Yes
4.2 Are there any records of Superficial Ground and Drift Geology present beneath the study site?	Yes
4.3 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section. Source: Scale: 1:50,000 BGS Sheet 263	

* This includes an automatically generated 50m buffer zone around the site.

5. Hydrogeology and Hydrology	on-site	0-50	51-250	251-500	501-1000	1001-2000*
5.1 Environment Agency Groundwater Vulnerability and Soil Classification						
Minor Aquifer (within 200m)	No	No	Yes	-	-	-
Major Aquifer (within 200m)	No	No	No	-	-	-
Soil Classification (within 200m)	No	No	Yes	-	-	-
5.2 Groundwater Abstraction Licences (within 2000m of the study site).	0	0	0	0	0	6
5.3 Surface Water Abstraction Licences (within 1000m of the study site).	0	0	0	0	15	-
5.4 Source Protection Zones						
Source Protection Zones within 500m of the study site.	0	0	0	0	-	-
5.5 Potable Water Abstraction Licences (within 2000m of the study site).	0	0	0	0	0	0
5.6 River Quality						
Is there any Environment Agency information on river quality within 500m of the study site?	No	No	No	No	-	-
5.7 Main Rivers						
Main Rivers within 500m of the study site.	0	0	0	0	-	-

6. Flooding	
6.1 Are there any Environment Agency indicative Zone 2 floodplains within 250m of the study site?	Yes
6.2 Are there any Environment Agency indicative Zone 3 floodplains within 250m of the study site?	Yes
6.3 Are there any Areas benefiting from Flood Defences within 250m of the study site?	No
6.4 Are there any Areas used for Flood Storage within 250m of the study site?	No
6.5 What is the maximum BGS groundwater flooding susceptibility within 50m of the study site?	High
6.6 What is the BGS confidence rating for the groundwater flooding susceptibility areas?	Moderate

7. Ecological Designated Sites	on-site	0-50	51-250	251-500	501-1000	1001-1500
7.1 Records of Sites of Special Scientific Interest (SSSI):	0	0	0	0	1	-
7.2 Records of National Nature Reserves (NNR) :	0	0	0	0	0	-
7.3 Records of Local Nature Reserves (LNR):	0	0	0	0	0	-
7.4 Records of Special Areas of Conservation (SAC):	0	0	0	0	0	-
7.5 Records of Special Protection Areas (SPA):	0	0	0	0	0	-
7.6 Records of Ramsar sites:	0	0	0	0	0	-
7.7 Records of World Heritage Sites:	0	0	0	0	0	-

8. Natural Hazards

8.1 What is the maximum risk of natural ground subsidence?	Very Low

9. Mining

9.1 Are there any coal mining areas within 75m of the study site?	No
9.2 What is the risk of subsidence relating to shallow mining within 150m of the study site?	Negligible

Using this Report

The following report is designed by Environmental Consultants for Environmental Professionals bringing together the most up-to-date market leading environmental data. This report is provided under and subject to the Terms & Conditions agreed between GroundSure and the Client. The document contains the following sections:

1. Authorisations, Incidents and Registers

Provides information on Regulated Industrial Activities and Pollution Incidents as recorded by the Environment Agency, and sites determined as Contaminated Land. This search is conducted using radii up to 1000m.

2. Landfills and Other Waste Sites

Provides information on landfills and other waste sites that may pose a risk to the study site. This search is conducted using radii up to 1500m.

3. Current Land Uses

Provides information on artificial andsuperficial deposits and bedrock beneath the study site. These searches are conducted onsiteand includes a 50m buffer zone.

4. Geology

Provides information on artificial and superficial deposits and bedrock beneath the study site. These searches are conducted using radii of up to 250m and includes a 50m buffer zone.

5. Hydrogeology and Hydrology

Provides information on groundwater vulnerability, soil leaching potential, abstraction licenses, Source Protection Zones (SPZ) and river quality. These searches are conducted using radii of up to 2000m.

6. Flooding

Provides information on surface water flooding, flood defences, flood storage areas and groundwater flood areas. This search is conducted using radii of up to 250m.

7. Ecological Designated Sites

Provides information on the Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, Local Nature Reserves (LNR) and World Heritage Sites. These searches are conducted using radii of up to 1000m.

8. Natural Hazards

Provides information on a range of natural hazards that may pose a risk to the study site. These searches are conducted using radii of up to 75m.

9. Mining

Provides information on areas of coal and shallow mining. These searches are conducted using radii of up to 150m.

10. Contacts

This section of the report provides contact points for statutory bodies and data providers that may be able to provide further information on issues raised within this report. Alternatively, GroundSure provide a free Technical Helpline (01273 819700) for further information and guidance.

Note: Maps

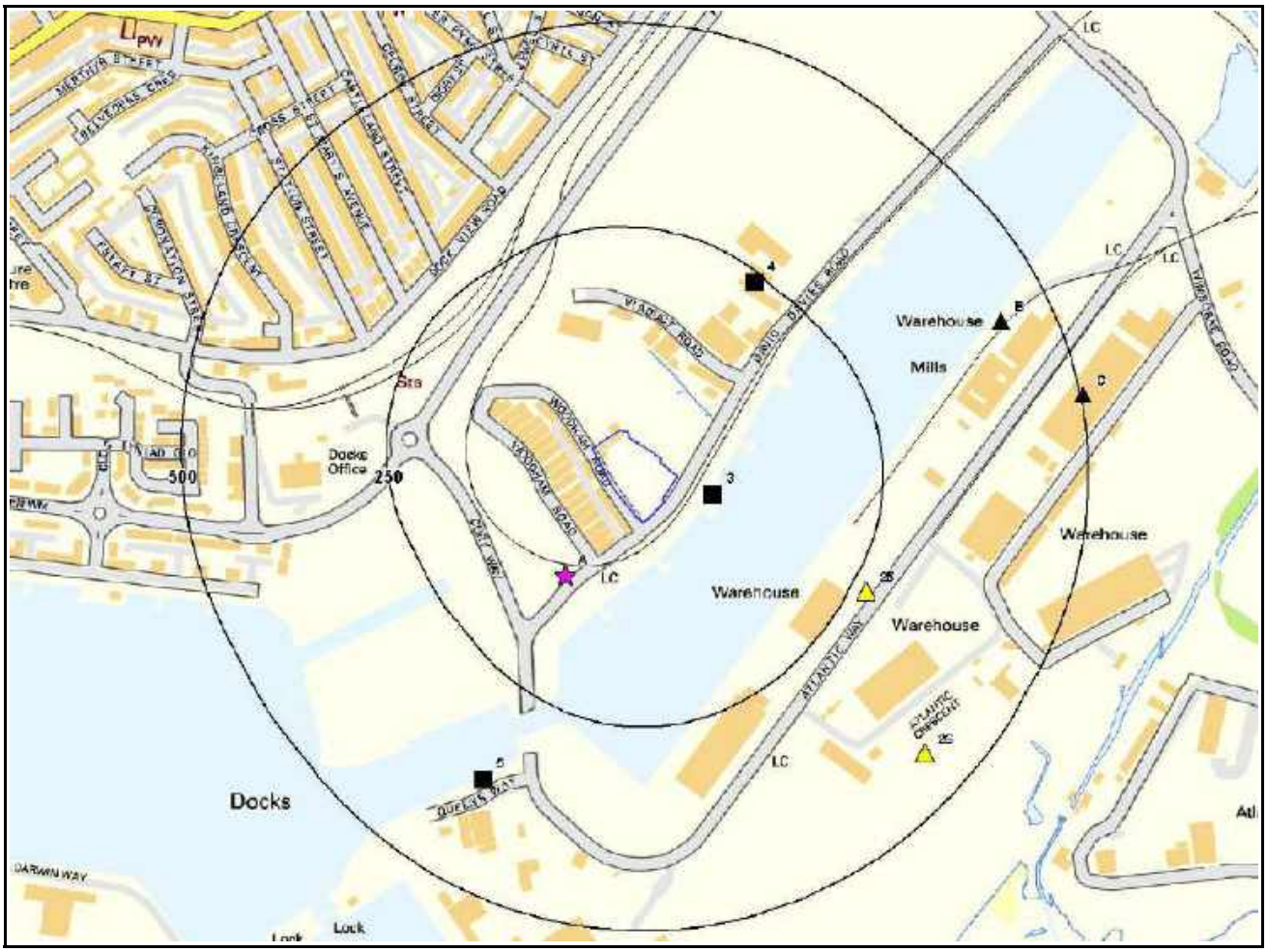
Only certain features are placed on the maps within the report. All features represented on maps found within this search are given an identification number. This number identifies the feature on the mapping and correlates it to the additional information provided below. This identification number precedes all other information and takes the following format -Id: 1, Id: 2, etc. Where numerous features on the same map are in such close proximity that the numbers would obscure each other a letter identifier is used instead to represent the features. (e.g. Three features which overlap may be given the identifier "A" on the map and would be identified separately as features 1A, 3A, 10A on the data tables provided).

Where a feature is reported in the data tables to a distance greater than the map area, it is noted in the data table as "Not Shown".

All distances given in this report are in Metres (m). Directions are given as compass headings such as N: North, E: East, NE: North East from the nearest point of the study site boundary.

1. Authorisations, Incidents and Registers Map

NW N NE



W E

SW S SE

Incidents and Registers Legend

- Site Outline
- Search Buffers (m) 250 500
- Recorded Pollution Incident
- Dangerous Substances (List 1)
- Dangerous Substances (List 2)
- Water Industry Referrals
- Licenced Discharge Consents
- Red List Discharge Consents
- RAS 3 & 4 Authorisations
- IPPC & IPC Authorisations
- LAPPC Authorisations
- COMAH / NIHHS Sites
- Sites Determined as Contaminated Land

1.Authorisations, Incidents and Registers

1.1 Industrial Sites Holding Licences and/or Authorisations

Searches of information provided by the Environment Agency and Local Authorities reveal the following information:

Records of Part A Licences (IPC Processes) within 1000m of the study site: **0**

Database searched and no data found.

Records of Part A Licences (IPPC Processes) within 1000m of the study site: **19**

The following Part A Licences (IPPC Processes) are represented as points on the Authorisations, Incidents and Registers map:

ID	Distance	Direction	NGR	Details	
6B	436.0	NE	313070,167850	Operator: Rank Hovis Limited Installation Name: Barry Flour Mill Status: Effective	Permit Number: BP3376IE Original Permit Number: BP3376IE Issue Date: 17/08/2005 Effective Date: 17/08/2005
7B	436.0	NE	313070,167850	Operator: Rank Hovis Limited Installation Name: Barry Flour Mill Status: Effective	Permit Number: BP3376IE Original Permit Number: BP3376IE Issue Date: 17/08/2005 Effective Date: 17/08/2005
8B	436.0	NE	313070,167850	Operator: Rank Hovis Ltd Installation Name: Rank Hovis Ltd Barry Status: Determination	Permit Number: BP3376IE Original Permit Number: BP3376IE Issue Date: - Effective Date: -
9B	436.0	NE	313070,167850	Operator: Rank Hovis Ltd Installation Name: Barry Flour Mill Status: Effective	Permit Number: BP3376IE Original Permit Number: BP3376IE Issue Date: 17/08/2005 Effective Date: 17/08/2005
10B	436.0	NE	313070,167850	Operator: Rank Hovis Ltd Installation Name: Barry Flour Mill Status: Effective	Permit Number: BP3376IE Original Permit Number: BP3376IE Issue Date: 17/08/2005 Effective Date: 17/08/2005
11B	436.0	NE	313070,167850	Operator: Rank Hovis Limited Installation Name: Barry Flour Mill Status: Effective	Permit Number: BP3376IE Original Permit Number: BP3376IE Issue Date: 20050817 Effective Date: 20050817
12B	436.0	NE	313070,167850	Operator: Rank Hovis Limited Installation Name: Barry Flour Mill Status: Effective	Permit Number: BP3376IE Original Permit Number: BP3376IE Issue Date: 20050817 Effective Date: 20050817
13C	503.0	E	313170,167760	Operator: Alembic Manufacturing Ltd. Installation Name: Barry Aluminium Chlorohydrate Plant Status: Effective	Permit Number: MP3431SP Original Permit Number: MP3431SP Issue Date: 07/11/2005 Effective Date: 07/11/2005
14C	503.0	E	313170,167760	Operator: Alembic Manufacturing Ltd Installation Name: Barry Aluminium Chlorohydrate Plant Status: Effective	Permit Number: MP3431SP Original Permit Number: MP3431SP Issue Date: 07/11/2005 Effective Date: 07/11/2005
15C	503.0	E	313170,167760	Operator: Alembic Manufacturing Ltd Installation Name: Barry Aluminium Chlorohydrate Plant Status: Effective	Permit Number: MP3431SP Original Permit Number: MP3431SP Issue Date: 07/11/2005 Effective Date: 07/11/2005
16C	503.0	E	313170,167760	Operator: Alembic Manufacturing Ltd. Installation Name: Barry Aluminium Chlorohydrate Plant Status: Effective	Permit Number: MP3431SP Original Permit Number: MP3431SP Issue Date: 07/11/2005 Effective Date: 07/11/2005
17C	503.0	E	313170,167760	Operator: Alembic Manufacturing Ltd Installation Name: Barry Aluminium Chlorohydrate Plant Status: Effective	Permit Number: MP3431SP Original Permit Number: MP3431SP Issue Date: 20051107 Effective Date: 20051107
18C	503.0	E	313170,167760	Operator: Alembic Manufacturing Ltd Installation Name: Barry Aluminium Chlorohydrate Plant Status: Effective	Permit Number: MP3431SP Original Permit Number: MP3431SP Issue Date: 20051107 Effective Date: 20051107

19C	503.0	E	313170,167760	Operator: Alembic Manufacturing Ltd Installation Name: Barry Aluminium Chlorohydrate Plant Status: Effective	Permit Number: MP3431SP Original Permit Number: MP3431SP Issue Date: 20051107 Effective Date: 20051107
20C	503.0	E	313170,167760	Operator: Alembic Manufacturing Ltd Installation Name: Barry Aluminium Chlorohydrate Plant Status: Effective	Permit Number: MP3431SP Original Permit Number: MP3431SP Issue Date: 20051107 Effective Date: 20051107
Not shown	991.0	SE	313170,166770	Operator: Alembic Manufacturing Ltd. Installation Name: Barry Aluminium Chlorohydrate Plant Status: Determination	Permit Number: MP3431SP Original Permit Number: MP3431SP Issue Date: - Effective Date: -
Not shown	991.0	SE	313170,166770	Operator: Alembic Manufacturing Ltd. Installation Name: Barry Aluminium Chlorohydrate Plant Status: Determination	Permit Number: MP3431SP Original Permit Number: MP3431SP Issue Date: - Effective Date: -
Not shown	991.0	SE	313170,166770	Operator: Alembic Manufacturing Ltd. Installation Name: Barry Aluminium Chlorohydrate Plant Status: Effective	Permit Number: MP3431SP Original Permit Number: MP3431SP Issue Date: 07/11/2005 Effective Date: 07/11/2005
Not shown	991.0	SE	313170,166770	Operator: Alembic Manufacturing Ltd. Installation Name: Barry Aluminium Chlorohydrate Plant Status: Effective	Permit Number: MP3431SP Original Permit Number: MP3431SP Issue Date: 07/11/2005 Effective Date: 07/11/2005

Records of Water Industry Referrals (potentially harmful discharges to the public sewer) within 500m of the study site: 0

Database searched and no data found.

Records of Red List Discharge Consents (potentially harmful discharges to controlled waters) within 500m of the study site: 0

Database searched and no data found.

Records of List 1 Dangerous Substances Inventory Sites within 500m of the study site: 0

Database searched and no data found.

Records of List 2 Dangerous Substance Inventory Sites within 500m of the study site: 0

Database searched and no data found.

Records of LAPPC (LAPC) Authorisations within 500m of the study site: 2

The following LAPPC (LAPC) Authorisations are represented as points on the Authorisations, Incidents and Registers map:

ID	Distance	Direction	NGR	Details	
25	270.0	SE	312906.0,167519.0	Address: Hanson Building Material Europe Limited, Atlantic Trading Estate, Wimborne Road,Barry Docks,Barry Process: Cement Batching	Status: Date: 20040401
26	443.0	SE	312978.0,167320.0	Address: Apex Coal Ltd., Coal Yard, No. 2 Dock, Off Atlantic Way, Barry Docks, Barry, Process: Coal Handling	Status: Current Date: 2004

Records of Category 3 or 4 Radioactive Substance Licences within 500m of the study site: 0

Database searched and no data found.

Records of Licenced Discharge Consents within 500m of the study site: 3

The following Licenced Discharge Consents records are represented as points on the Authorisations, Incidents and Registers map:

ID	Distance	Direction	NGR	Details	
3	48.0	SE	312720,167640	Address: Fisher Containers David Davies Road, Fisher Containers David Davies R, David Davies Road Barry Dock Bar, Barry Dock Barry ,, Barry , Effluent Type: Unspecified Permit Number: AN0033206 Permit Version: 2	Receiving Water: Barry Docks Status: Lapsed Under Schedule 23 Environment Act 1995 Issue date: 00//1/10/7 Effective Date: - Revocation Date: -
4	239.0	NE	312770,167900	Address: Factory At David Davies Road Barry, Factory At David Davies Road, Barry Docks, Barry, Vale Of Glamorgan Effluent Type: Unspecified Permit Number: AN0238001 Permit Version: 1	Receiving Water: Barry Docks Status: New Consent, By Application (wra 91, Section 88) Issue date: 00/0//27/1 Effective Date: - Revocation Date: -
5	370.0	SW	312440,167290	Address: Brt International Ltd, No3 Dock, Barry Docks, CF63 3RA Effluent Type: Unspecified Permit Number: AN0033237 Permit Version: 2	Receiving Water: Barry Docks Status: Modified - (wra 91 Sched 10 - As Amended By Env Act 1995) Issue date: 00/19/9/7/ Effective Date: - Revocation Date: -

1.2 Dangerous or Hazardous Sites

Records of COMAH & NIHHS sites within 500m of the study site: 0

Database searched and no data found.

1.3 Environment Agency Recorded Pollution Incidents

Records of National Incidents Recording System, List 2 within 250m of the study site: 2

The following NIRS List 2 records are represented as points on the Authorisations, Incidents and Registers Map:

ID	Distance	Direction	NGR	Details	
1A	112.0	SW	312540,167540	Incident Date: 16-Dec-2002 Incident Identification: 126244 Pollutant: - Pollutant Description: -	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
2A	112.0	SW	312540,167540	Incident Date: 16-Dec-2002 Incident Identification: 126244 Pollutant: Inert Materials and Wastes Pollutant Description: Construction and Demolition Materials and Wastes	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)

Records of National Incidents Recording System, List 1 within 250m of the study site: 0

Database searched and no data found.

1.4 Sites Determined as Contaminated Land under Part IIA EPA 1990[1]

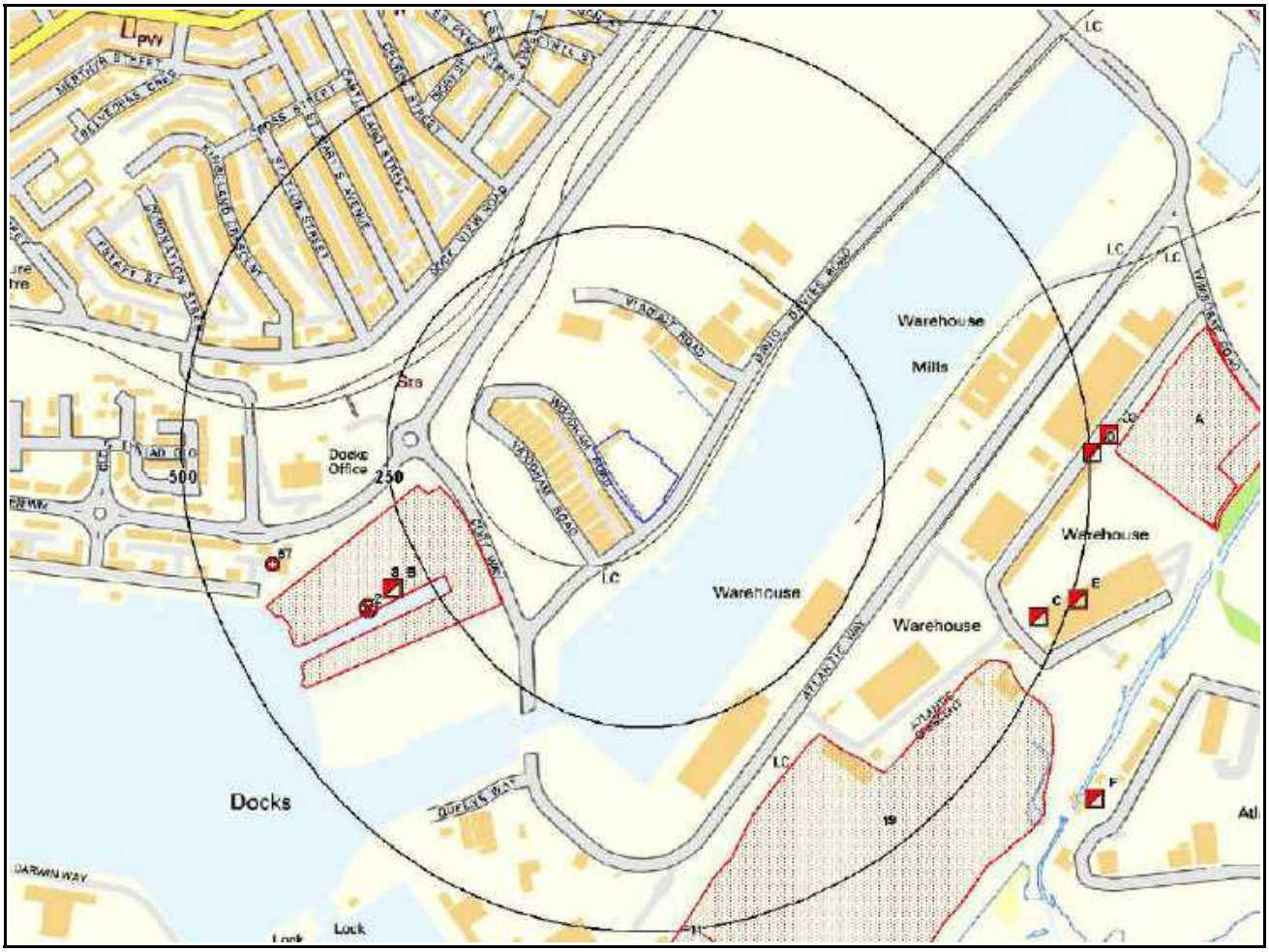
How many records of sites determined as contaminated land under Section 78R of the Environmental Protection Act 1990 are there within 500m of the study site? 0

Database searched and no data found.

[1]Further information on sites that have been determined under the Contaminated Land Regime is maintained by Local Authorities under Section 78R of the Environmental Protection Act 1990. Information should be available on both sites currently determined as Contaminated Land and Special Sites.

2. Landfill and Other Waste Sites Map

NW N NE



W E

SW S SE

Landfill & Other Waste Sites Legend

- Site Outline
- Search Buffers (m) — 250 / 500
- E.A. Active Landfill
- E.A. Historic Landfill (Area Data)
- E.A. Historic Landfill (Point Data)
- BGS / DoE Survey Landfill
- Local Authority Landfill (Area Data)
- Local Authority Landfill (Point Data)
- Operational Waste Treatment Licence
- Closed Waste Treatment Licence
- REGIS Waste Licence
- Operational Landfill
- Closed Landfill

2. Landfill and Other Waste Sites

2.1 Landfill Sites[1]

Records from Environment Agency landfill data within 1000m of the study site: 1

The following Environment Agency landfill records are represented as polygons on the Landfill and Other Waste Sites map:

ID	Distance	Direction	NGR		Details
Not shown	897.0	NE	313462.0,168356.0	Address: Dow Corning Landfill, Cardiff Road, Barry, Vale Of Glam, CF63 2YL Landfill Reference: 30043.0 Regis Reference: DOW001 Landfill Type: A7 - Industrial Waste Landfill (Factory curtilage)	Operator: Dow Corning Ltd Status: Licence issued IPPC Reference:

Records of operational landfill sites sourced from Landmark within 1500m of the study site: 1

The following landfill records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance	Direction	NGR		Details
Not shown	964.0	NE	313400.0,168300.0	Site Address: Dow Corning Factory, East No 2 Dock, BARRY, South Glamorgan, Agency Reference: EAWML30043 Waste Type: Difficult Waste Description: Difficult Landfill Known Restrictions: Waste produced/controlled by licence holder	Record Date: 01-Apr-1991 Transfer Date: Modification Date: 01-Mar-1999 Status: Operational as far as is known Category: LANDFILL Regulator: EA - Welsh Region - South East Area (Cardiff) Size: Undefined

Records of Environment Agency historic landfill sites within 1500m of the study site: 9

The following landfill records are represented as either points or polygons on the Landfill and Other Waste Sites map:

ID	Distance	Direction	NGR	Details	
8	177.0	SW	312300,167500	Site Address: Barry Graving Dock, Off Cory Way, Barry, Vale Of Glamorgan Waste Licence: Yes Site Reference: 61 Waste Type: Industrial, Household, Special Regis Reference: WU1/L/ASS001	Data Type: Polygon Licence Issue: 11-Oct-1994 Licence Surrendered: 16-Jan-2006 Licence Hold Address: 150 Holborn, London Operator: Associated British Ports
9	334.0	SE	312900,167200	Site Address: Barry Docks Area A, Atlantic Trading Estate, Atlantic Crescent, Barry, South Glamorgan Waste Licence: Yes Site Reference: 4 Waste Type: Industrial, Special, Liquid sludge Regis Reference: -	Data Type: Polygon Licence Issue: 26-Oct-1977 Licence Surrendered: 31-Dec-1978 Licence Hold Address: - Operator: BP Chemicals Limited

[1]This information is gathered from a wide range of sources including, the Environment Agency (Agency), The British Geological Survey (BGS) and under licence from Landmark Information Group Limited®. Data supplied by Landmark Information Group Limited® and the Agency refers to waste management licences required (under either the Control of Pollution Act 1974 and/or the Environmental Protection Act 1990) by anyone involved in waste disposal. A survey by the BGS undertaken in 1972/3 provides data on some older landfill sites that were not subject to legislation. Environment Agency data on historic waste / landfill sites is still being updated by the Agency as part of an ongoing project. GroundSure use this data because more accurate data is not yet publicly available and will use enhanced Environment Agency data when it is released.

10	334.0	SE	312800,167100	Site Address: Barry Docks Area A and B, Atlantic Trading Estate, Atlantic Crescent, Barry, South Glamorgan Waste Licence: Yes Site Reference: 16 Waste Type: Inert, Industrial, Commercial, Household, Special Regis Reference: -	Data Type: Polygon Licence Issue: 15-Mar-1979 Licence Surrendered: Licence Hold Address: - Operator: BP Chemicals Limited
11	494.0	S	312700,166900	Site Address: Barry Docks Area B, Atlantic Trading Estate, Atlantic Crescent, Barry, South Glamorgan Waste Licence: Yes Site Reference: 8 Waste Type: Industrial Regis Reference: -	Data Type: Polygon Licence Issue: 27-Feb-1978 Licence Surrendered: 31-Dec-1978 Licence Hold Address: - Operator: BP Chemicals Limited
12A	531.0	E	313300,167700	Site Address: Atlantic Trading Estate, Barry Dock No 2, Wimbourne Road, Barry, South Glamorgan Waste Licence: - Site Reference: 6950/0060 Waste Type: Inert, Industrial, Household, Special Regis Reference: -	Data Type: Polygon Licence Issue: Licence Surrendered: Licence Hold Address: - Operator: Penarth Contractor
13A	531.0	E	313300,167700	Site Address: Barry Dock No.1, Atlantic Trading Estate, Wimbourne Road, Barry, South Glamorgan Waste Licence: Yes Site Reference: 6, 6950/0025 Waste Type: Inert, Industrial, Household Regis Reference: -	Data Type: Polygon Licence Issue: 02-Nov-1977 Licence Surrendered: 31-Dec-1978 Licence Hold Address: - Operator: F J H Brackett
14	793.0	NE	313500,168200	Site Address: Barry Factory Salt Water Pond, Wimbourne Road, Barry, South Glamorgan Waste Licence: Yes Site Reference: 22A Waste Type: Inert, Industrial, Household, Special, Liquid sludge Regis Reference: -	Data Type: Polygon Licence Issue: 19-Dec-1980 Licence Surrendered: Licence Hold Address: - Operator: Dow Corning Limited
Not shown	1097.0	NE	313700,168300	Site Address: Barry Factory Ponds A, B and C, Wimbourne Road, Barry, South Glamorgan Waste Licence: Yes Site Reference: 9 Waste Type: Industrial Regis Reference: -	Data Type: Polygon Licence Issue: 06-Apr-1978 Licence Surrendered: Licence Hold Address: - Operator: Dow Corning Limited
Not shown	1438.0	W	311100,167000	Site Address: West Pond, Barry, South Glamorgan Waste Licence: - Site Reference: - Waste Type: Inert, Industrial, Commercial, Household, Special Regis Reference: -	Data Type: Polygon Licence Issue: Licence Surrendered: Licence Hold Address: - Operator: -

Records of non-operational landfill sites sourced from Landmark within 1500m of the study site: 5

The following landfill records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance	Direction	NGR		Details
2	332.0	SW	312300.0,167500.0	Site Address: Graving Docks 1 & 2 and Barry No.1 Dock, off Cory Way, BARRY, South Glamorgan, Landfill Licence: W7BABWAL Agency Reference: EAWML30147 Waste Type: Difficult Waste Description: Difficult Landfill Known Restrictions: Only waste produced on site	Record Date: 01-Oct-1994 Transfer Date: Modification Date: 01-Nov-1999 Status: Site closed Category: LANDFILL Regulator: EA - Welsh Region - South East Area (Cardiff) Size: Large (← 250,000 tonnes/year)

Not shown	708.0	S	312700.0,166900.0	Site Address: Atlantic Trading Estate, Barry Dock, BARRY, South Glamorgan, Landfill Licence: W7BAATAL Agency Reference: Waste Type: Putrescible Waste Description: Putrescible Landfill Known Restrictions: No known restriction on source of waste	Record Date: 01-Mar-1979 Transfer Date: Modification Date: Status: Licence lapsed/cancelled/defunct/not applicable/surrendered Category: LANDFILL Regulator: EA - Welsh Region - South East Area (Cardiff) Size: Undefined
Not shown	964.0	NE	313400.0,168300.0	Site Address: Dow Corning Factory, East No 2 Dock, BARRY, South Glamorgan, Landfill Licence: W7BAAAAL Agency Reference: Waste Type: Difficult Waste Description: Difficult Landfill Known Restrictions: Only waste produced on site	Record Date: 01-Dec-1980 Transfer Date: Modification Date: Status: Record superseded Category: LANDFILL Regulator: EA - Welsh Region - South East Area (Cardiff) Size: Very Small (←10,000 tonnes/year)
Not shown	1078.0	W	311500.0,167795.0	Site Address: Barry Docks, BARRY, South Glamorgan, Landfill Licence: W7BAALAL Agency Reference: Waste Type: Difficult Waste Description: Difficult Landfill Known Restrictions: No known restriction on source of waste	Record Date: 01-Jun-1985 Transfer Date: Modification Date: Status: Licence lapsed/cancelled/defunct/not applicable/surrendered Category: LANDFILL Regulator: EA - Welsh Region - South East Area (Cardiff) Size: Undefined
Not shown	1078.0	W	311500.0,167800.0	Site Address: Barry Docks, BARRY, South Glamorgan, Landfill Licence: W7BAAEAL Agency Reference: Waste Type: Difficult Waste Description: Difficult Landfill Known Restrictions: No known restriction on source of waste	Record Date: 01-Mar-1979 Transfer Date: Modification Date: Status: Record superseded Category: LANDFILL Regulator: EA - Welsh Region - South East Area (Cardiff) Size: Small (←25,000 tonnes/year)

Records of BGS/DoEnon-operational landfill sites within 1500m of the study site: **0**

Database searched and no data found.

Records of Local Authority landfill sites within 1500m of the study site: **1**

The following landfill records are represented as points or polygons on the Landfill and Other Waste Sites map:

ID	Distance	Direction	Site Address	Source	Data Type
57	415.0	W	Barry Graving Dock, The Waterfront, Barry	Vale of Glamorgan Council	Point

2.2 Other Waste Sites[1]

Records of operational waste treatment, transfer or disposal sites within 500m of the study site: **0**

Database searched and no data found.

Records of non-operational waste treatment, transfer or disposal sites within 500m of the study site: **0**

Database searched and no data found.

[1]This information is gathered from a wide range of sources including, the Environment Agency (Agency), The British Geological Survey (BGS) and under licence from Landmark Information Group Limited®. Data supplied by Landmark Information Group Limited® and the Agency refers to waste management licences required (under either the Control of Pollution Act 1974 and/or the Environmental Protection Act 1990) by anyone involved in waste disposal. A survey by the BGS undertaken in 1972/3 provides data on some older landfill sites that were not subject to legislation. Environment Agency data on historic waste / landfill sites is still being updated by the Agency as part of an ongoing project. GroundSure use this data because more accurate data is not yet publicly available and will use enhanced Environment Agency data when it is released.

Records of Environment Agency (REGIS) waste sites within 1500m of the study site: 40

The following waste treatment, transfer or disposal sites records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance	Direction	NGR	Details	
17B	295.0	SW	312329,167525	Site Address: Graving Docks Landfill, 1 & 2 Dock, Off Cory Way, Barry Docks, Barry, Vale Of Glam, CF1 7QB Type: Other landfill sites taking special waste Size: →= 75000 tonnes Regis Licence Number: ASS001 Operator: Associated British Ports Surrendered Date: - Waste Management licence No: 30147 Annual Tonnage: 0.0	Issue Date: 11/10/1994 Expiry Date: - Effective Date: - Status: Closure Modified: - Site Name: Graving Dock Cancelled Date: - Correspondence Address: 150, Holborn Road, London, , EC1 2LR
18B	295.0	SW	312329,167525	Site Address: Graving Docks Landfill, 1 & 2 Dock, Off Cory Way, Barry Docks, Barry, Vale Of Glam, CF1 7QB Type: - Size: 1 Regis Licence Number: - Operator: Associated British Ports Surrendered Date: - Waste Management licence No: 30147 Annual Tonnage: 0.0	Issue Date: - Expiry Date: - Effective Date: - Status: - Modified: - Site Name: Graving Dock Cancelled Date: - Correspondence Address: , ,
19B	295.0	SW	312329,167525	Site Address: Graving Docks Landfill, 1 & 2 Dock, Off Cory Way, Barry Docks, Barry, Vale Of Glam, CF1 7QB Type: Other landfill sites taking special waste Size: ← 25000 tonnes Regis Licence Number: ASS001 Operator: Associated British Ports Surrendered Date: 16/1/2006 Waste Management licence No: 30147 Annual Tonnage: 300000.0	Issue Date: 11/10/1994 Expiry Date: - Effective Date: - Status: Surrendered Modified: - Site Name: Graving Dock Cancelled Date: 0 Correspondence Address: Arup, 4, Pierhead Street, Capital Waterside, Cardiff, CF10 4QP
20B	295.0	SW	312329,167525	Site Address: Graving Docks Landfill, 1 & 2 Dock, Off Cory Way, Barry Docks, Barry, Vale Of Glam, CF1 7QB Type: Other landfill sites taking special waste Size: →= 75000 tonnes Regis Licence Number: ASS001 Operator: Associated British Ports Surrendered Date: - Waste Management licence No: 30147 Annual Tonnage: 0.0	Issue Date: 11/10/1994 Expiry Date: - Effective Date: - Status: Closure Modified: - Site Name: Graving Dock Cancelled Date: - Correspondence Address: Alan Stark, 150, Holborn Road, , London, , EC1 2LR
21B	295.0	SW	312329,167525	Site Address: Graving Docks Landfill, 1 & 2 Dock, Off Cory Way, Barry Docks, Barry, Vale Of Glam, CF1 7QB Type: Other landfill sites taking special waste Size: →= 75000 tonnes Regis Licence Number: ASS001 Operator: Associated British Ports Surrendered Date: - Waste Management licence No: 30147 Annual Tonnage: 0.0	Issue Date: 11/10/1994 Expiry Date: - Effective Date: - Status: Closure Modified: - Site Name: Graving Dock Cancelled Date: - Correspondence Address: Arup, 4, Pierhead Street, Capital Waterside, Cardiff, CF10 4QP
22C	470.0	E	313114,167490	Site Address: Sub Unit 1, 19, Atlantic Crescent, Barry Docks, Barry, South Glam, CF63 3RF Type: End of Life Vehicles Size: ← 25000 tonnes Regis Licence Number: LEV001 Operator: Levics Len Surrendered Date: - Waste Management licence No: 30362 Annual Tonnage: 2499.0	Issue Date: 14/6/2005 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: Levics Vehicle Dismantlers Cancelled Date: - Correspondence Address: Sub Unit 1, 19, Atlantic Cresent, Barry Docks, Barry, South Glam, CF63 3RF

23C	470.0	E	313114,167490	Site Address: Sub Unit 1, 19, Atlantic Crescent, Barry Docks, Barry, Vale Of Glam, CF63 3RG Type: End of Life Vehicles Size: ← 25000 tonnes Regis Licence Number: LEV001 Operator: Levics Len Surrendered Date: - Waste Management licence No: 30362 Annual Tonnage: 2499.0	Issue Date: 14/6/2005 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: Levics Vehicle Dismantlers Cancelled Date: - Correspondence Address: Sub Unit 1, 19, Atlantic Cresent, Barry Docks, Barry, Vale Of Glam, CF63 3RF
24C	470.0	E	313114,167490	Site Address: Sub Unit 1, 19, Atlantic Crescent, Barry Docks, Barry, Vale Of Glam, CF63 3RG Type: End of Life Vehicles Size: ← 25000 tonnes Regis Licence Number: LEV001 Operator: Levics Len Surrendered Date: - Waste Management licence No: 30362 Annual Tonnage: 2499.0	Issue Date: 14/6/2005 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: Levics Vehicle Dismantlers Cancelled Date: 0 Correspondence Address: Sub Unit 1, 19, Atlantic Cresent, Barry Docks, Barry, Vale Of Glam, CF63 3RF
25C	470.0	E	313114,167490	Site Address: Sub Unit 1, 19, Atlantic Crescent, Barry Docks, Barry, Vale Of Glam, CF63 3RG Type: End of Life Vehicles Size: ← 25000 tonnes Regis Licence Number: LEV001 Operator: Levics Len Surrendered Date: - Waste Management licence No: 30362 Annual Tonnage: 2499.0	Issue Date: 14/6/2005 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: Levics Vehicle Dismantlers Cancelled Date: - Correspondence Address: Sub Unit 1, 19, Atlantic Cresent, Barry Docks, Barry, Vale Of Glam, CF63 3RF
26D	504.0	E	313180,167691	Site Address: Atlantic Salvage Company, 22, Atlantic Business Park, Barry Docks, Barry, Vale Of Glam, CF63 3RF Type: End of Life Vehicles Size: ← 25000 tonnes Regis Licence Number: COM003 Operator: Comerford David John Surrendered Date: - Waste Management licence No: 30354 Annual Tonnage: 2499.0	Issue Date: 29/9/2005 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: Atlantic Salvage Company Cancelled Date: - Correspondence Address: 22, Barry Docks, Atlantic Business Park, Barry, Vale Of Glam, CF63 3RF
27D	504.0	E	313180,167691	Site Address: Atlantic Salvage Company, 22, Atlantic Business Park, Barry Docks, Barry, Vale Of Glam, CF63 3RF Type: End of Life Vehicles Size: ← 25000 tonnes Regis Licence Number: COM003 Operator: Comerford David John Surrendered Date: - Waste Management licence No: 30354 Annual Tonnage: 2499.0	Issue Date: 29/9/2005 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: Atlantic Salvage Company Cancelled Date: - Correspondence Address: 22, Barry Docks, Atlantic Business Park, Barry, Vale Of Glam, CF63 3RF
28D	504.0	E	313180,167691	Site Address: Atlantic Salvage Company, 22, Atlantic Business Park, Barry Docks, Barry, Vale Of Glam, CF63 3RF Type: End of Life Vehicles Size: ← 25000 tonnes Regis Licence Number: COM003 Operator: Comerford David John Surrendered Date: - Waste Management licence No: 30354 Annual Tonnage: 2499.0	Issue Date: 29/9/2005 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: Atlantic Salvage Company Cancelled Date: 0 Correspondence Address: 22, Barry Docks, Atlantic Business Park, Barry, Vale Of Glam, CF63 3RF
29D	504.0	E	313180,167691	Site Address: 22, Atlantic Business Park, Barry Docks, Barry, Vale Of Glam, CF63 3RF Type: End of Life Vehicles Size: ← 25000 tonnes Regis Licence Number: COM003 Operator: Comerford David John Surrendered Date: - Waste Management licence No: 30354 Annual Tonnage: 2499.0	Issue Date: 29/9/2005 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: Atlantic Salvage Company Cancelled Date: - Correspondence Address: 22 Atlantic Business Park, Barry Docks, , Barry, Vale Of Glam, CF63 3RF

30D	504.0	E	313180,167691	Site Address: Atlantic Salvage Company, 22, Atlantic Business Park, Barry Docks, Barry, South Glamorgan, CF63 3RF Type: End of Life Vehicles Size: ← 25000 tonnes Regis Licence Number: COM003 Operator: Comerford David John Surrendered Date: - Waste Management licence No: 30354 Annual Tonnage: 2499.0	Issue Date: 29/9/2005 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: Atlantic Salvage Company Cancelled Date: - Correspondence Address: 22, Barry Docks, Atlantic Business Park, Barry, South Glamorgan, CF63 3RF
31E	508.0	E	313162,167511	Site Address: Sub Unit 1, 19, Atlantic Crescent, Barry Docks, Barry, South Glam, CF63 3RF Type: End of Life Vehicles Size: ← 25000 tonnes Regis Licence Number: LEV001 Operator: Levics Len Surrendered Date: - Waste Management licence No: 30362 Annual Tonnage: 0.0	Issue Date: 14/6/2005 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: Levics Vehicle Dismantlers Cancelled Date: - Correspondence Address: Sub Unit 1, 19, Atlantic Cresent, Barry Docks, Barry, South Glam, CF63 3RF
32E	508.0	E	313162,167511	Site Address: Sub Unit 1, 19, Atlantic Crescent, Barry Docks, Barry, South Glam, CF63 3RF Type: End of Life Vehicles Size: ← 25000 tonnes Regis Licence Number: LEV001 Operator: Levics Len Surrendered Date: - Waste Management licence No: 30362 Annual Tonnage: 0.0	Issue Date: 14/6/2005 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: Levics Vehicle Dismantlers Cancelled Date: - Correspondence Address: Len Levics, Sub Unit 1, 19, Atlantic Cresent, Barry Docks, Barry, South Glam, CF63 3RF
33	525.0	E	313200,167713	Site Address: 22, Atlantic Business Park, Barry Docks, Barry, Vale Of Glam, CF63 3RF Type: End of Life Vehicles Size: ← 25000 tonnes Regis Licence Number: COM003 Operator: Comerford David John Surrendered Date: - Waste Management licence No: 30354 Annual Tonnage: 2499.0	Issue Date: 29/9/2005 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: Atlantic Salvage Company Cancelled Date: - Correspondence Address: 22 Atlantic Business Park, Barry Docks, , Barry, Vale Of Glam, CF63 3RF
34F	636.0	SE	313183,167268	Site Address: Unit 14e, Atlantic Trading Estate, Barry, Vale Of Glam, CF63 3RF Type: End of Life Vehicles Size: ← 25000 tonnes Regis Licence Number: AND003 Operator: Andrew Brown & Lee Walter Peacock Surrendered Date: - Waste Management licence No: 30372 Annual Tonnage: 2499.0	Issue Date: 26/1/2006 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: A & L Scrap Metal Merchants Cancelled Date: - Correspondence Address: Unit 14e, Atlantic Trading Estate, Barry, Vale Of Glam, CF63 3RF
35F	636.0	SE	313183,167268	Site Address: Unit 14e, Atlantic Trading Estate, Barry, Vale Of Glam, CF63 3RF Type: End of Life Vehicles Size: ← 25000 tonnes Regis Licence Number: AND003 Operator: Andrew Brown & Lee Walter Peacock Surrendered Date: - Waste Management licence No: 30372 Annual Tonnage: 2499.0	Issue Date: 26/1/2006 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: A & L Scrap Metal Merchants Cancelled Date: - Correspondence Address: Unit 14e, Atlantic Trading Estate, Barry, Vale Of Glam, CF63 3RF
36F	636.0	SE	313183,167268	Site Address: Unit 14e, Atlantic Trading Estate,Barry, Vale Of Glam, CF63 3RF Type: End of Life Vehicles Size: ← 25000 tonnes Regis Licence Number: AND003 Operator: Andrew Brown & Lee Walter Peacock Surrendered Date: - Waste Management licence No: 30372 Annual Tonnage: 2499.0	Issue Date: 26/1/2006 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: A & L Scrap Metal Merchants Cancelled Date: 0 Correspondence Address: Unit 14e, Atlantic Trading Estate, Barry, Vale Of Glam, CF63 3RF

Not shown	968.0	NE	313398,168308	Site Address: Dow Corning Landfill, Cardiff Road, Barry, Vale Of Glam, CF63 2YL Type: Industrial waste landfills Size: ← 25000 tonnes Regis Licence Number: DOW001 Operator: Dow Corning Ltd Surrendered Date: - Waste Management licence No: 30043 Annual Tonnage: 18250.0	Issue Date: 9/4/1991 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: Dow Corning Ltd Cancelled Date: - Correspondence Address: Cardiff Road, Barry, Vale Of Glam, CF63 2YL
Not shown	968.0	NE	313398,168308	Site Address: Dow Corning Landfill, Cardiff Road, Barry, Vale Of Glam, CF63 2YL Type: - Size: 1 Regis Licence Number: - Operator: Dow Corning Ltd Surrendered Date: - Waste Management licence No: 30043 Annual Tonnage: 0.0	Issue Date: - Expiry Date: - Effective Date: - Status: - Modified: - Site Name: Dow Corning Ltd Cancelled Date: - Correspondence Address: , ,
Not shown	968.0	NE	313398,168308	Site Address: Dow Corning Landfill, Cardiff Road, Barry, Vale Of Glam, CF63 2YL Type: Industrial waste landfills Size: ← 25000 tonnes Regis Licence Number: DOW001 Operator: Dow Corning Ltd Surrendered Date: - Waste Management licence No: 30043 Annual Tonnage: 18250.0	Issue Date: 4/9/1991 0:00:00 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: Dow Corning Ltd Cancelled Date: - Correspondence Address: Cardiff Road, Barry, Vale Of Glam, CF63 2YL
Not shown	968.0	NE	313398,168308	Site Address: Dow Corning Landfill, Cardiff Road, Barry, Vale Of Glam, CF63 2YL Type: Industrial waste landfills Size: ← 25000 tonnes Regis Licence Number: DOW001 Operator: Dow Corning Ltd Surrendered Date: - Waste Management licence No: 30043 Annual Tonnage: 18250.0	Issue Date: 9/4/1991 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: Dow Corning Ltd Cancelled Date: - Correspondence Address: Beth Voice, Cardiff Road, Barry, Vale Of Glam, CF63 2YL
Not shown	1019.0	N	312323,168696	Site Address: Court Road C/ A Site, Court Road, Barry, Vale Of Glam, CF31 3XT Type: Household, Commercial and Industrial transfer stations Size: ← 25000 tonnes Regis Licence Number: ECO002 Operator: Ecovert Ltd Surrendered Date: - Waste Management licence No: 30076 Annual Tonnage: 24999.0	Issue Date: 22/12/1992 Expiry Date: - Effective Date: - Status: Issued Modified: 29/3/1999 Site Name: Court Road Civic Amenity Site Cancelled Date: - Correspondence Address: Stormy West Transfer Station, Stormy Down, Pyle, Bridgend, Vale Of Glam, CF32 0NP
Not shown	1019.0	N	312323,168696	Site Address: Court Road C/ A Site, Court Road, Barry, Vale Of Glam, CF31 3XT Type: - Size: 1 Regis Licence Number: - Operator: Ecovert Ltd Surrendered Date: - Waste Management licence No: 30076 Annual Tonnage: 0.0	Issue Date: - Expiry Date: - Effective Date: - Status: - Modified: - Site Name: Court Road Civic Amenity Site Cancelled Date: - Correspondence Address: , ,
Not shown	1019.0	N	312323,168696	Site Address: Court Road C/ A Site, Court Road, Barry, Vale Of Glam, CF31 3XT Type: Household, Commercial and Industrial transfer stations Size: ← 25000 tonnes Regis Licence Number: ECO002 Operator: Ecovert Ltd Surrendered Date: - Waste Management licence No: 30076 Annual Tonnage: 24999.0	Issue Date: 22/12/1992 Expiry Date: - Effective Date: - Status: Issued Modified: 29/3/1999 Site Name: Court Road Civic Amenity Site Cancelled Date: - Correspondence Address: Zac Shell, Stormy West Transfer Station, Stormy Down, Pyle, Bridgend, Vale Of Glam, CF32 0NP
Not shown	1019.0	N	312323,168696	Site Address: Court Road C/ A Site, Court Road, Barry, Vale Of Glam, CF31 3XT Type: Household, Commercial and Industrial transfer stations Size: ← 25000 tonnes Regis Licence Number: ECO002 Operator: Ecovert Ltd Surrendered Date: - Waste Management licence No: 30076 Annual Tonnage: 24999.0	Issue Date: 22/12/1992 Expiry Date: - Effective Date: - Status: Issued Modified: 29/3/1999 Site Name: Court Road Civic Amenity Site Cancelled Date: - Correspondence Address: Lakeside Pavillion, Chaucer Business Park, Watery Lane, Kemsing, Sevenoaks, TN15 6QY

Not shown	1034.0	N	312290,168702	Site Address: Court Road C/ A Site, Court Road, Barry, Vale Of Glam, CF63 1ET Type: Household, Commercial and Industrial transfer stations Size: ← 25000 tonnes Regis Licence Number: ECO002 Operator: Ecovert Ltd Surrendered Date: - Waste Management licence No: 30076 Annual Tonnage: 24999.0	Issue Date: 22/12/1992 Expiry Date: - Effective Date: - Status: Issued Modified: 29/3/1999 Site Name: Court Road Civic Amenity Site Cancelled Date: - Correspondence Address: Lakeside Pavillion, Chaucer Business Park, Watery Lane, Kemsing, Sevenoaks, Kent, TN15 6QY
Not shown	1034.0	N	312290,168702	Site Address: Court Road C/ A Site, Court Road,Barry, Vale Of Glam, CF63 1ET Type: Household, Commercial and Industrial transfer stations Size: ← 25000 tonnes Regis Licence Number: ECO002 Operator: Ecovert Ltd Surrendered Date: - Waste Management licence No: 30076 Annual Tonnage: 24999.0	Issue Date: 22/12/1992 Expiry Date: - Effective Date: - Status: Issued Modified: 29/3/1999 Site Name: Court Road Civic Amenity Site Cancelled Date: 0 Correspondence Address: Lakeside Pavillion, Chaucer Business Park, Watery Lane, Kemsing, Sevenoaks, Kent, TN15 6QY
Not shown	1034.0	N	312290,168702	Site Address: Aberthaw Power Station, Aberthaw, Barry, Vale Of Glam, CF62 4ZW Type: Industrial waste landfills Size: →= 75000 tonnes Regis Licence Number: INN001 Operator: R W E Innogy Plc Surrendered Date: - Waste Management licence No: 30067 Annual Tonnage: 1100200.0	Issue Date: 22/8/1992 Expiry Date: - Effective Date: 14/7/2001 Status: Modified Modified: 17/7/2003 Site Name: Aberthaw Power Station Cancelled Date: - Correspondence Address: Aberthaw Power Station, Aberthaw, Vale Of Glam, CF62 4ZW
Not shown	1050.0	NE	313595,168171	Site Address: Dow Corning Waste Transfer Station, Cardiff Road, Barry, Vale Of Glam, CF63 2YL Type: Material recycling treatment facilities Size: ← 25000 tonnes Regis Licence Number: DOW003 Operator: Dow Corning Ltd Surrendered Date: - Waste Management licence No: 30376 Annual Tonnage: 4999.0	Issue Date: 29/12/2005 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: Dow Corning Waste Transfer Station Cancelled Date: - Correspondence Address: Dow Corning Ltd, Cardiff Road, Barry, Vale Of Glam, CF63 2YL
Not shown	1050.0	NE	313595,168171	Site Address: Dow Corning Waste Transfer Station, Cardiff Road, Barry, Vale Of Glam, CF63 2YL Type: Material recycling treatment facilities Size: ← 25000 tonnes Regis Licence Number: DOW003 Operator: Dow Corning Ltd Surrendered Date: - Waste Management licence No: 30376 Annual Tonnage: 4999.0	Issue Date: 29/12/2005 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: Dow Corning Waste Transfer Station Cancelled Date: - Correspondence Address: Dow Corning Ltd, Cardiff Road, Barry, , Vale Of Glam, CF63 2YL
Not shown	1050.0	NE	313595,168171	Site Address: Dow Corning Waste Transfer Station, Cardiff Road,Barry, Vale Of Glam, CF63 2YL Type: Material recycling treatment facilities Size: ← 25000 tonnes Regis Licence Number: DOW003 Operator: Dow Corning Ltd Surrendered Date: - Waste Management licence No: 30376 Annual Tonnage: 4999.0	Issue Date: 29/12/2005 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: Dow Corning Waste Transfer Station Cancelled Date: 0 Correspondence Address: Dow Corning Ltd, Cardiff Road, Barry, Vale Of Glam, CF63 2YL
Not shown	1051.0	NE	313591,168181	Site Address: Dow Corning Ltd, Cardiff Road, Barry, Vale Of Glam, CF63 2YL Type: Material recycling treatment facilities Size: ← 25000 tonnes Regis Licence Number: DOW003 Operator: Dow Corning Ltd Surrendered Date: - Waste Management licence No: 30376 Annual Tonnage: 4999.0	Issue Date: 29/12/2005 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: Dow Corning Waste Transfer Station Cancelled Date: - Correspondence Address: Cardiff Road, Barry, , CF63 2YL

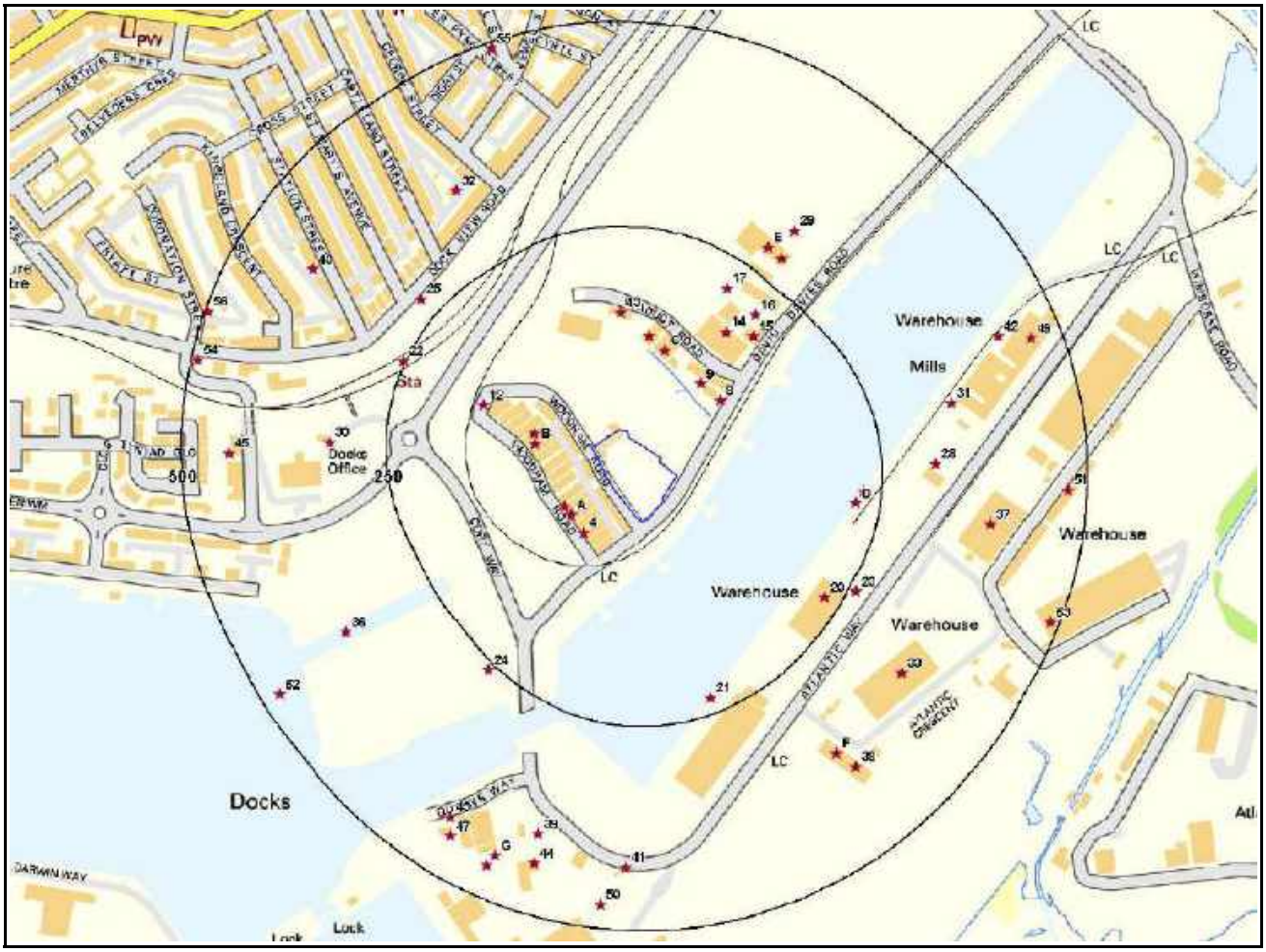
Not shown	1210.0	NE	313530,168521	Site Address: Dow Corning Landfill, Cardiff Road, Barry, Vale Of Glam, CF63 2YL Type: Industrial waste landfills Size: ← 25000 tonnes Regis Licence Number: DOW001 Operator: Dow Corning Ltd Surrendered Date: - Waste Management licence No: 30043 Annual Tonnage: 18250.0	Issue Date: 9/4/1991 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: Dow Corning Ltd Cancelled Date: - Correspondence Address: Dow Corning Ltd, Cardiff Road, , Barry, Vale Of Glam, CF63 2YL
Not shown	1210.0	NE	313530,168521	Site Address: Dow Corning Landfill, Cardiff Road,Barry, Vale Of Glam, CF63 2YL Type: Industrial waste landfills Size: ← 25000 tonnes Regis Licence Number: DOW001 Operator: Dow Corning Ltd Surrendered Date: - Waste Management licence No: 30043 Annual Tonnage: 18250.0	Issue Date: 9/4/1991 Expiry Date: - Effective Date: - Status: Issued Modified: - Site Name: Dow Corning Ltd Cancelled Date: 0 Correspondence Address: Dow Corning Ltd, Cardiff Road, Barry, Vale Of Glam, CF63 2YL
Not shown	1430.0	E	314100,167522	Site Address: Sully Hospital Transfer Stn, Hayes Road, Sully, Vale Of Glam, CF64 5YA Type: Clinical waste transfer stations or A20 or A15 Size: ← 25000 tonnes Regis Licence Number: LLA002 Operator: Cardiff & Vale N H S Trust Surrendered Date: 21/12/2004 Waste Management licence No: 30065 Annual Tonnage: 0.0	Issue Date: 1/7/1992 Expiry Date: - Effective Date: - Status: Surrendered Modified: - Site Name: Sully Hospital Transfer Station Cancelled Date: - Correspondence Address: Llandough Hospital, Penlan Road, , Penarth, Vale Of Glam, CF64 2XX
Not shown	1430.0	E	314100,167522	Site Address: Sully Hospital Transfer Stn, Hayes Road, Sully, Vale Of Glam, CF64 5YA Type: - Size: 1 Regis Licence Number: - Operator: Cardiff & Vale N H S Trust Surrendered Date: - Waste Management licence No: 30065 Annual Tonnage: 0.0	Issue Date: - Expiry Date: - Effective Date: - Status: - Modified: - Site Name: Sully Hospital Transfer Station Cancelled Date: - Correspondence Address: , ,
Not shown	1430.0	E	314100,167522	Site Address: Sully Hospital Transfer Stn, Hayes Road,Sully, Vale Of Glam, CF64 5YA Type: Clinical waste transfer stations or A20 or A15 Size: ← 25000 tonnes Regis Licence Number: LLA002 Operator: Cardiff & Vale N H S Trust Surrendered Date: 21/12/2004 Waste Management licence No: 30065 Annual Tonnage: 1346.0	Issue Date: 1/7/1992 Expiry Date: - Effective Date: - Status: Surrendered Modified: - Site Name: Sully Hospital Transfer Station Cancelled Date: 0 Correspondence Address: Llandough Hospital, Penlan Road, Penarth, Vale Of Glam, CF64 2XX

3. Current Land Use Map

NW N NE

◄W E►

SW S SE



Current Land Use Legend

Site Outline

250
500
Search Buffers (m)

Current Industrial Sites

Petrol & Fuel Sites

Underground High Pressure Oil & Fuel Pipelines

3. Current Land Uses

3.1 Current Industrial Data

Records of potentially contaminative industrial sites within 500m of the study site: 56

The following records are represented as points on the Current Land Uses map.

ID	Distance	Direction	Company	Address	Activity	Category
1A	60.0	SW	Cars On Gas	4, Woodham Road, Barry, CF63 4JE	Vehicle Repair and Servicing	Repair and Servicing
2A	60.0	SW	German Car Specialists	5, Woodham Road, Barry, CF63 4JE	Vehicle Repair and Servicing	Repair and Servicing
3A	60.0	SW	Welsh Caravan Specialist	5, Woodham Road, Barry, CF63 4JE	Sports and Leisure Equipment Repair	Repair and Servicing
4	62.0	SW	Ross Garage	3, Woodham Road, Barry, CF63 4JE	Vehicle Repair and Servicing	Repair and Servicing
5A	62.0	SW	Gym Systems & Servicing	6-7, Woodham Road, Barry, CF63 4JE	Hobby, Sports and Pastime Products	Consumer Products
6B	69.0	W	Potter	12, Woodham Road, Barry, CF63 4JE	Vehicle Bodybuilders	Industrial Products
7B	72.0	W	Topend Ltd	13, Woodham Road, Barry, CF63 4JE	Vehicle Repair and Servicing	Repair and Servicing
8	101.0	NE	Electricity Sub Station	-	Electrical Features	Infrastructure and facilities
9	103.0	NE	Works	-	Unspecified Works Or Factories	Industrial Features
10C	109.0	NE	Works	-	Unspecified Works Or Factories	Industrial Features
11C	119.0	N	Works	-	Unspecified Works Or Factories	Industrial Features
12	142.0	W	Church Motors	19, Woodham Road, Barry, CF63 4JE	Vehicle Repair and Servicing	Repair and Servicing
13	144.0	N	Works	-	Unspecified Works Or Factories	Industrial Features
14	170.0	NE	Vaughan Transport Systems	Dock 2, David Davies Road, Barry, CF63 4AB	Distribution and Haulage	Transport, Storage And Deliver
15	187.0	NE	S & K Haulage Ltd	David Davies Road, Barry, CF63 4AB	Distribution and Haulage	Transport, Storage And Deliver
16	209.0	NE	Depot	-	Container and Storage	Transport, Storage And Deliver
17	213.0	NE	Tank	-	Tanks (Generic)	Industrial Features
18D	220.0	E	Travelling Crane	-	Travelling Cranes and Gantries	Industrial Features
19D	228.0	E	Cranes	-	Travelling Cranes and Gantries	Industrial Features
20	230.0	SE	Warehouse	-	Container and Storage	Transport, Storage And Deliver
21	231.0	S	Travelling Cranes	-	Travelling Cranes and Gantries	Industrial Features
22	252.0	NW	Barry Docks Station	-	Railway Stations, Junctions and Halts	Transport Access Points
23	259.0	SE	Tank	-	Tanks (Generic)	Industrial Features
24	260.0	SW	Electricity Sub Station	-	Electrical Features	Infrastructure and facilities
25	276.0	NW	Electricity Sub Station	-	Electrical Features	Infrastructure and facilities
26E	283.0	NE	Works	-	Unspecified Works Or Factories	Industrial Features
27E	283.0	NE	Harris Pye Marine Ltd	David Davies Road, Barry, CF63 4AB	Marine Engineers and Services	Engineering Services

28	315.0	E	Electricity Sub Station	-	Electrical Features	Infrastructure and facilities
29	318.0	NE	Depot	-	Container and Storage	Transport, Storage And Deliver
30	320.0	W	Electricity Sub Station	-	Electrical Features	Infrastructure and facilities
31	345.0	E	Electricity Sub Station	-	Electrical Features	Infrastructure and facilities
32	354.0	NW	Vanguard (Wales) Ltd	Castleland Street, Barry, CF63 4LL	Construction Completion Services	Construction Services
33	358.0	SE	Warehouse	-	Container and Storage	Transport, Storage And Deliver
34F	367.0	SE	D B Engineering Services	Unit 1, Atlantic Crescent, Barry, CF63 3RG	Industrial Engineers	Engineering Services
35F	367.0	SE	Leisure Solutions	Unit 1, Atlantic Crescent, Barry, CF63 3RG	Hobby, Sports and Pastime Products	Consumer Products
36	369.0	SW	Graving Dock (Disused)	-	Marine Equipment Including Boats and Ships	Industrial Products
37	386.0	E	Warehouse	-	Container and Storage	Transport, Storage And Deliver
38	394.0	SE	Tank	-	Tanks (Generic)	Industrial Features
39	402.0	S	Depot	-	Container and Storage	Transport, Storage And Deliver
40	403.0	NW	Mr Fix I.T.	19, Station Street, Barry, CF63 4LW	Electrical Equipment Repair and Servicing	Electrical Equipment Repair and Servicing
41	423.0	S	Electricity Sub Station	-	Electrical Features	Infrastructure and facilities
42	426.0	NE	Silo	-	Hoppers and Silos	Hoppers and Silos
43	430.0	SW	Tank	-	Tanks (Generic)	Industrial Features
44	438.0	S	Groupe Samat UK Ltd	Atlantic Way, Barry, CF63 3RA	Distribution and Haulage	Transport, Storage And Deliver
45	441.0	W	Caterite Ltd	3, Subway Road, Barry, CF63 4QT	Food and Beverage Industry Machinery	Industrial Products
46G	446.0	SW	Tank	-	Tanks (Generic)	Industrial Features
47	449.0	SW	Tank	-	Tanks (Generic)	Industrial Features
48G	460.0	SW	Depot	-	Container and Storage	Transport, Storage And Deliver
49	463.0	E	Warehouse	-	Container and Storage	Transport, Storage And Deliver
50	471.0	S	Depot	-	Container and Storage	Transport, Storage And Deliver
51	476.0	E	Warehouse	-	Container and Storage	Transport, Storage And Deliver
52	478.0	SW	Jetty (Disused)	-	Moorings and Unloading Facilities	Water
53	489.0	E	Sos Salvage Car Breakers	Unit 19, Atlantic Crescent, Barry Docks, Barry, South Glamorgan, CF63 3RF	Vehicle Breakers	Recycling Services
54	492.0	W	Electricity Sub Station	-	Electrical Features	Infrastructure and facilities
55	493.0	N	Electricity Sub Station	-	Electrical Features	Infrastructure and facilities
56	496.0	W	A P C	35, Coronation Street, Barry, CF63 4JW	Construction Completion Services	Construction Services

3.2 Petrol and Fuel Sites

Records of petrol or fuel sites within 500m of the study site: **0**

Database searched and no data found.

3.3 Underground High Pressure Oil and Gas Pipelines

Records of underground pipelines within 500m of the study site: **0**

Database searched and no data found.

4. Geology

4.1 Artificial Ground and Made Ground

The database has been searched on site, this includes a 50m buffer.

Distance (m)	Direction	LEX Code	Description	Rock Type
0.0	On Site	MGR-MGRD	MADE GROUND (UNDIVIDED)	MADE GROUND (COMPOSITION UNSPECIFIED)

(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

4.2 Superficial Ground and Drift Geology

The database has been searched on site, this includes a 50m buffer.

Distance (m)	Direction	Lex Code	Description	Rock Type
0.0	On Site	TFD-CLSS	Tidal Flat Deposits	Clay, Silt And Sand

(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

4.3 Bedrock and Solid Geology

The database has been searched on site, this includes a 50m buffer.

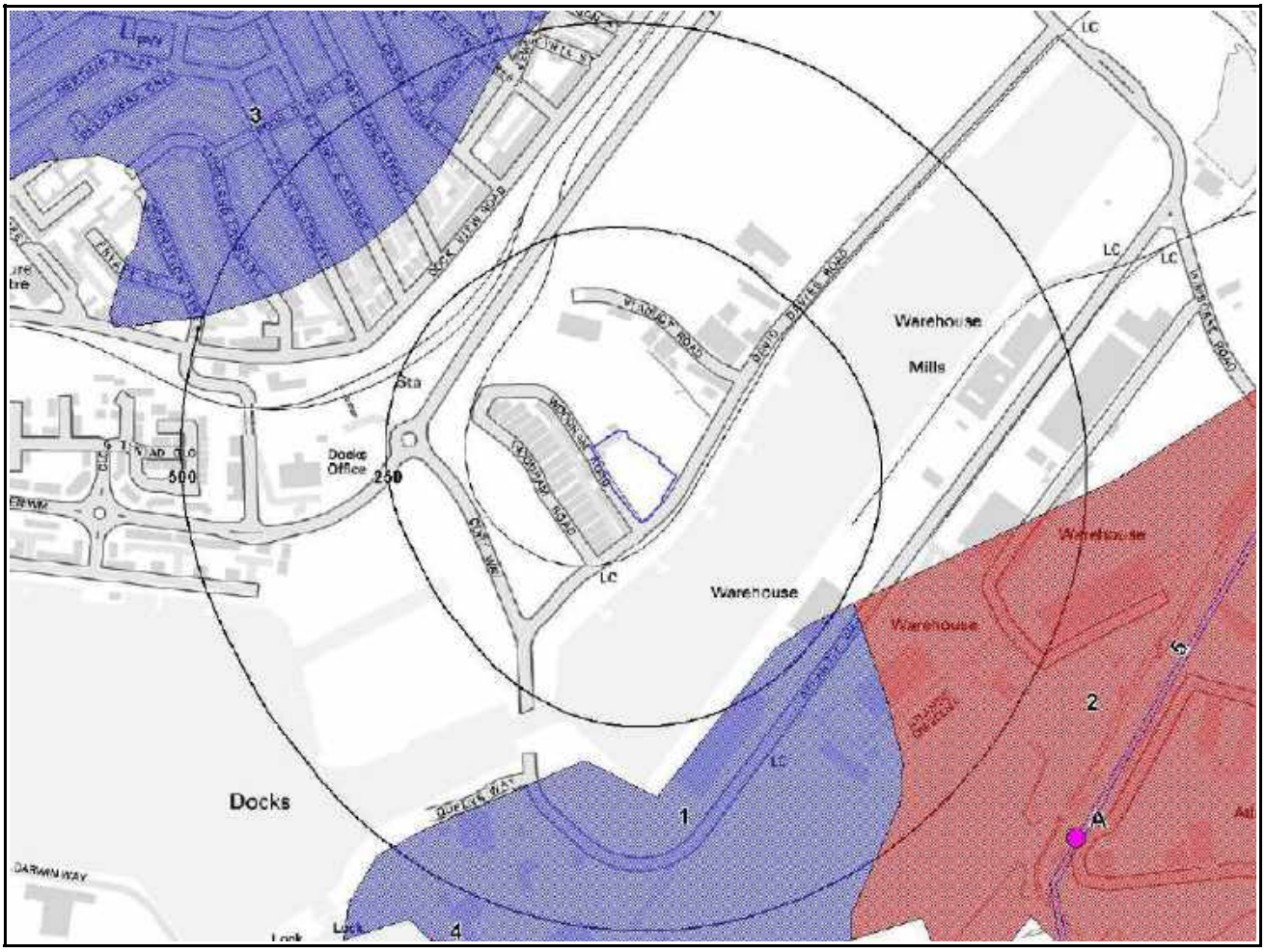
Distance (m)	Direction	LEX Code	Description	Rock Type
0.0	On Site	MMG-MDST	Mercia Mudstone Group	Mudstone

(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

For more detailed geological and ground stability data please refer to the "GroundSure Geology and Ground Stability Report". Available from our website.

5. Hydrogeology and Hydrology: - Aquifer and Abstraction Licence Map

NW ▲ N NE



◄W E►

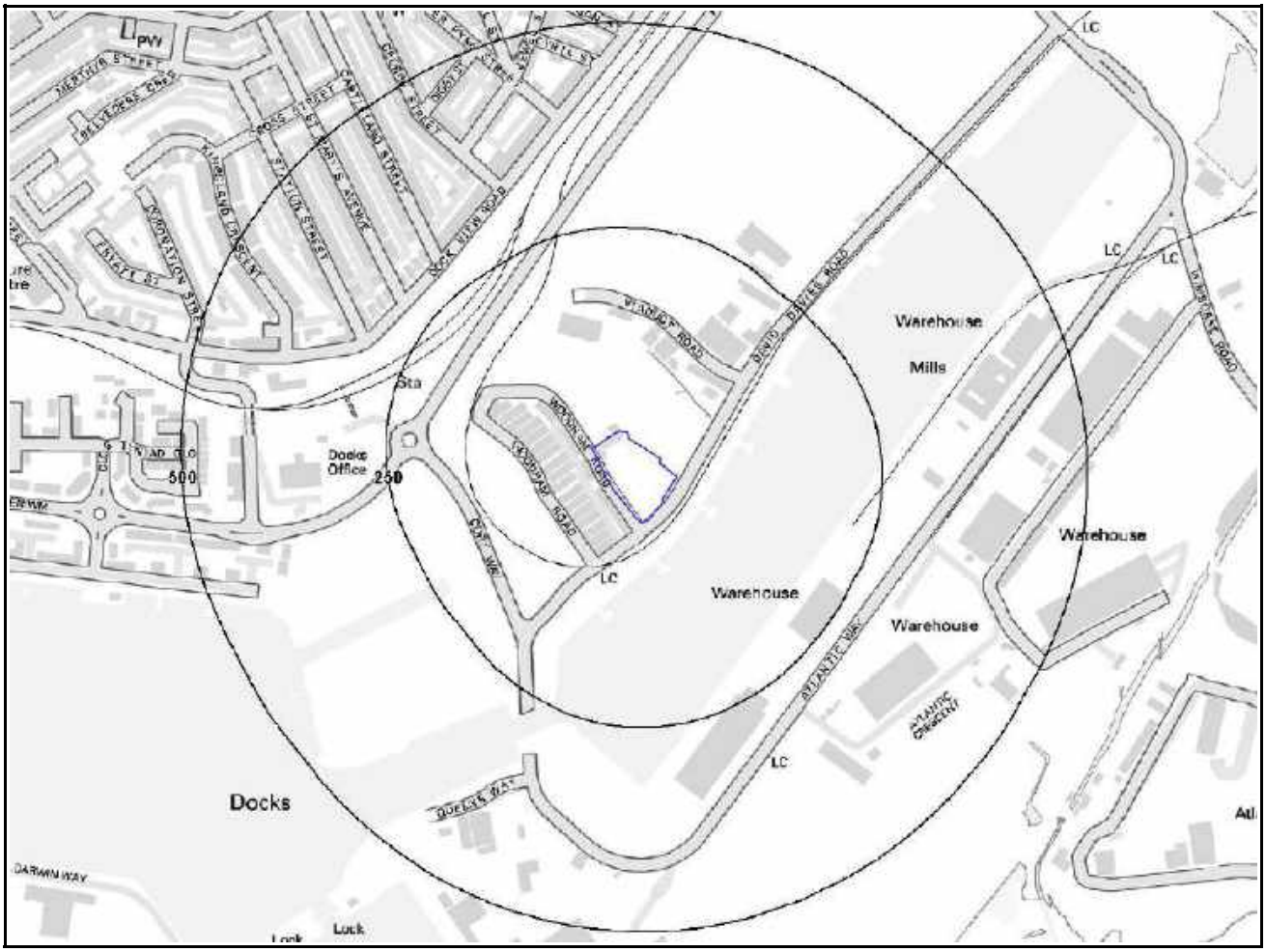
SW ▼ S SE

Hydrogeology and Hydrology Legend

- Site Outline
- Search Buffers (m) 100 250
- Minor Aquifer - Low Leaching Potential
- Minor Aquifer - Intermediate Leaching Potential
- Minor Aquifer - High Leaching Potential
- Major Aquifer - Low Leaching Potential
- Major Aquifer - Intermediate Leaching Potential
- Major Aquifer - High Leaching Potential
- Main River
- Groundwater Abstraction Licence
- Surface Water Abstraction Licence

5b. Hydrogeology and Hydrology: - SPZ and Potable Water Abstraction Map

NW ▲ N NE



◄W E►

SW ▼ S SE

Hydrogeology and Hydrology Legend

- Site Outline
- Search Buffers (m) 100 250
- Source Protection Zone 1 - Inner Catchment
- Source Protection Zone 2 - Outer Catchment
- Source Protection Zone 3 - Total Catchment
- Source Protection Zone 4 - Zone of Special Interest
- Potable Water Abstraction Licence

5. Hydrogeology and Hydrology

5.1 Groundwater Vulnerability and Soil Classification

Records of aquifer and soil classification within 200m of the study site: **No**

Database searched and no data found.

5.2 Groundwater Abstraction Licences

Are there any Groundwater Abstraction Licences within 2000m of the study site? **Yes**

The following Abstraction Licences records are represented as points, lines and regions on the Aquifer and Abstraction Licence Map:

ID	Distance	Direction	NGR	Details	
Not shown	1413.0	SW	311620,166620	Licence No: 21/58/31/0031 Details: General use relating to Secondary Category (Medium Loss) Direct Source: Eaw Groundwater Point: Borehole At Barry Island Pleasure Park Data Type: Point	Original Application No: Original Start Date: 31-May-2002 Expiry Date: 31-May-2002 Issue No: 1 Version Start Date: 31-May-2002 Version End Date: 31-May-2002
Not shown	1413.0	SW	311620,166620	Licence No: 21/58/31/0031 Details: General use relating to Secondary Category (Medium Loss) Direct Source: Eaw Groundwater Point: Borehole At Barry Island Pleasure Park Data Type: Point	Original Application No: Original Start Date: 31-May-2002 Expiry Date: 31-Mar-2018 Issue No: 1 Version Start Date: 31-May-2002 Version End Date: 01-Jan-1900
Not shown	1413.0	SW	311620,166620	Licence No: 21/58/31/0030 Details: General use relating to Secondary Category (Medium Loss) Direct Source: Eaw Groundwater Point: Borehole At Barry Island Pleasure Park Data Type: Point	Original Application No: Original Start Date: 21-Mar-1997 Expiry Date: Issue No: 100 Version Start Date: 21-Mar-1997 Version End Date:
Not shown	1413.0	SW	311620,166620	Licence No: 21/58/31/0031 Details: General Use Relating To Secondary Category (Medium Loss) Direct Source: Eaw Groundwater Point: Borehole At Barry Island Pleasure Park Data Type: Point	Original Application No: Original Start Date: 31-May-2002 Expiry Date: 31-Mar-2018 Issue No: 1 Version Start Date: 21-May-2004 Version End Date:
Not shown	1413.0	SW	311620,166620	Licence No: 21/58/31/0031 Details: General Use Relating To Secondary Category (Medium Loss) Direct Source: Eaw Groundwater Point: Borehole At Barry Island Pleasure Park Data Type: Point	Original Application No: Original Start Date: 31-May-2002 Expiry Date: 31-Mar-2018 Issue No: 1 Version Start Date: 21-May-2004 Version End Date:
Not shown	1413.0	SW	311620,166620	Licence No: 21/58/31/0031 Details: General Use Relating To Secondary Category (Medium Loss) Direct Source: Eaw Groundwater Point: Borehole At Barry Island Pleasure Park Data Type: Point	Original Application No: Original Start Date: 31-May-2002 Expiry Date: 31-Mar-2018 Issue No: 1 Version Start Date: 21-May-2004 Version End Date:

5.3 Surface Water Abstraction Licences

Are there any Surface Water Abstraction Licences within 1000m of the study site? **Yes**

The following Surface Water Abstraction Licences records are represented as points, lines and regions on the Aquifer and Abstraction Licence Map:

ID	Distance	Direction	NGR	Details

12A	651.0	SE	313164,167218	Licence No: 21/58/11/0011 Details: Mineral Washing Direct Source: Eaw Tidalwater Point: Cadoxton River At Barry Data Type: Point	Application No: Original Start Date: 24-Apr-1996 Expiry Date: Issue No: 101 Version Start Date: 25-Jun-2001 Version End Date:
13A	651.0	SE	313164,167218	Licence No: 21/58/11/0011 Details: Make-Up or Top Up Water Direct Source: Eaw Tidalwater Point: Cadoxton River At Barry Data Type: Point	Application No: Original Start Date: 24-Apr-1996 Expiry Date: Issue No: 100 Version Start Date: 24-Apr-1996 Version End Date:
14A	651.0	SE	313164,167218	Licence No: 21/58/11/0011 Details: Make-Up or Top Up Water Direct Source: Eaw Tidalwater Point: Cadoxton River At Barry Data Type: Point	Application No: Original Start Date: 24-Apr-1996 Expiry Date: 30-Dec-1899 Issue No: 101 Version Start Date: 25-Jun-2001 Version End Date: 01-Jan-1900
15A	651.0	SE	313164,167218	Licence No: 21/58/11/0011 Details: Dust Suppression Direct Source: Eaw Tidalwater Point: Cadoxton River At Barry Data Type: Point	Application No: Original Start Date: 24-Apr-1996 Expiry Date: Issue No: 102 Version Start Date: 01-Oct-2005 Version End Date:
16A	651.0	SE	313164,167218	Licence No: 21/58/11/0011 Details: Mineral Washing Direct Source: Eaw Tidalwater Point: Cadoxton River At Barry Data Type: Point	Application No: Original Start Date: 24-Apr-1996 Expiry Date: Issue No: 102 Version Start Date: 01-Oct-2005 Version End Date:
17A	651.0	SE	313164,167218	Licence No: 21/58/11/0011 Details: Dust suppression Direct Source: Eaw Tidalwater Point: Cadoxton River At Barry Data Type: Point	Application No: Original Start Date: 24-Apr-1996 Expiry Date: 24-Apr-1996 Issue No: 101 Version Start Date: 24-Apr-1996 Version End Date: 24-Apr-1996
18A	651.0	SE	313164,167218	Licence No: 21/58/11/0011 Details: Make-Up Or Top Up Water Direct Source: Eaw Tidalwater Point: Cadoxton River At Barry Data Type: Point	Application No: Original Start Date: 24-Apr-1996 Expiry Date: Issue No: 102 Version Start Date: 01-Oct-2005 Version End Date:
19A	651.0	SE	313164,167218	Licence No: 21/58/11/0011 Details: Mineral Washing Direct Source: Eaw Tidalwater Point: Cadoxton River At Barry Data Type: Point	Application No: Original Start Date: 24-Apr-1996 Expiry Date: 24-Apr-1996 Issue No: 101 Version Start Date: 24-Apr-1996 Version End Date: 24-Apr-1996
20A	651.0	SE	313164,167218	Licence No: 21/58/11/0011 Details: Dust suppression Direct Source: Eaw Tidalwater Point: Cadoxton River At Barry Data Type: Point	Application No: Original Start Date: 24-Apr-1996 Expiry Date: Issue No: 100 Version Start Date: 24-Apr-1996 Version End Date:
21A	651.0	SE	313164,167218	Licence No: 21/58/11/0011 Details: Make-Up or Top Up Water Direct Source: Eaw Tidalwater Point: Cadoxton River At Barry Data Type: Point	Application No: Original Start Date: 24-Apr-1996 Expiry Date: Issue No: 101 Version Start Date: 25-Jun-2001 Version End Date:
22A	651.0	SE	313164,167218	Licence No: 21/58/11/0011 Details: Mineral Washing Direct Source: Eaw Tidalwater Point: Cadoxton River At Barry Data Type: Point	Application No: Original Start Date: 24-Apr-1996 Expiry Date: Issue No: 100 Version Start Date: 24-Apr-1996 Version End Date:
23A	651.0	SE	313164,167218	Licence No: 21/58/11/0011 Details: Dust suppression Direct Source: Eaw Tidalwater Point: Cadoxton River At Barry Data Type: Point	Application No: Original Start Date: 24-Apr-1996 Expiry Date: Issue No: 101 Version Start Date: 25-Jun-2001 Version End Date:

24A	651.0	SE	313164,167218	Licence No: 21/58/11/0011 Details: Make-Up or Top Up Water Direct Source: Eaw Tidalwater Point: Cadoxton River At Barry Data Type: Point	Application No: Original Start Date: 24-Apr-1996 Expiry Date: 24-Apr-1996 Issue No: 101 Version Start Date: 24-Apr-1996 Version End Date: 24-Apr-1996
25A	651.0	SE	313164,167218	Licence No: 21/58/11/0011 Details: Mineral Washing Direct Source: Eaw Tidalwater Point: Cadoxton River At Barry Data Type: Point	Application No: Original Start Date: 24-Apr-1996 Expiry Date: 30-Dec-1899 Issue No: 101 Version Start Date: 25-Jun-2001 Version End Date: 01-Jan-1900
26A	651.0	SE	313164,167218	Licence No: 21/58/11/0011 Details: Dust suppression Direct Source: Eaw Tidalwater Point: Cadoxton River At Barry Data Type: Point	Application No: Original Start Date: 24-Apr-1996 Expiry Date: 30-Dec-1899 Issue No: 101 Version Start Date: 25-Jun-2001 Version End Date: 01-Jan-1900

5.4 Source Protection Zones

Are there any Source Protection Zones within 500m of the study site? **No**

Database searched and no data found.

5.5 Potable Water Abstraction Licences

Are there any Potable Water Abstraction Licences within 2000m of the study site? **No**

Database searched and no data found.

5.6 River Quality

Is there any Environment Agency information on river quality within 500m of the study site? **No**

Database searched and no data found.

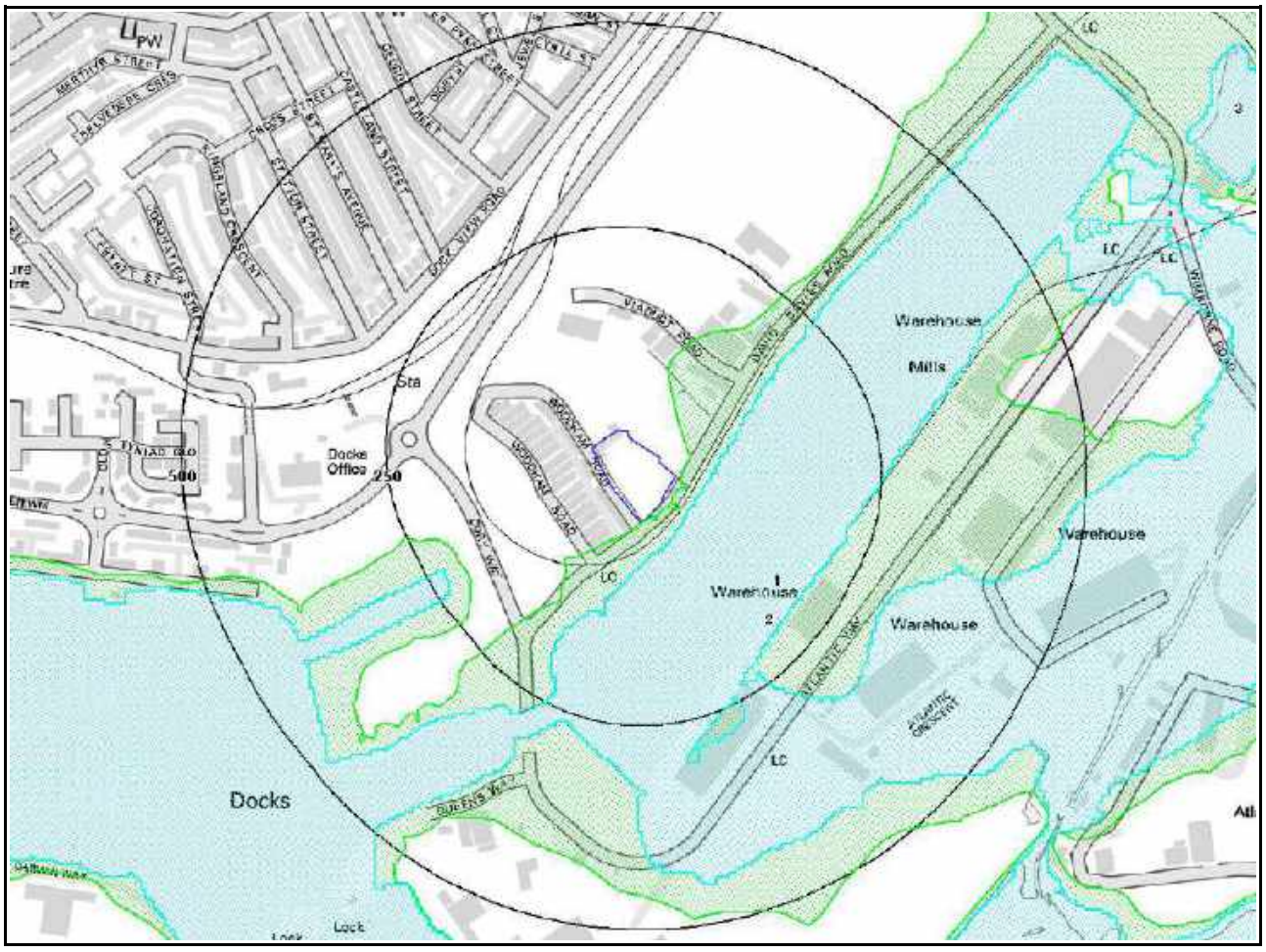
5.7 Main Rivers

Are there any Main Rivers within 500m of the study site? **No**

Database searched and no data found.

6. Surface Water Flood Map

N



S

Flood Legend

Site Outline

100
250
Search Buffers (m)

Zone 2 Floodplain

Zone 3 Floodplain

Flood Storage Area

Area Benefiting from Flood Defences

Flood Defences

6. Flooding

6.1 Zone 2 Flooding

Zone 2 floodplain estimates the annual probability of flooding as one in one thousand (0.1%) or greater from rivers and the sea but less than 1% from rivers or 0.5% from the sea. Alternatively, where information is available they may show the highest known flood level.

Is the site within 250m of an Environment Agency indicative Zone 2 floodplain? **Yes**

Guidance: More detailed information may be available from the Environment Agency through their floodline (0845 988 1188) or by ordering an Environment Agency Flood Report from the local Environment Agency Office.

The following floodplain records are represented as green shading on the Flood Map:

ID	Distance	Direction	Update
1	0.0	SE	07-Feb-2008

6.2 Zone 3 Flooding

Zone 3 estimates the annual probability of flooding as one in one hundred (1%) or greater from rivers and a one in two hundred (0.5%) or greater from the sea. Alternatively, where information is available they may show the highest known flood level.

Is the site within 250m of an Environment Agency indicative Zone 3 floodplain? **Yes**

Guidance: More detailed information may be available from the Environment Agency through their floodline (0845 988 1188) or by ordering an Environment Agency Flood Report from the local Environment Agency Office.

The following floodplain records are represented as blue shading on the Flood Map:

ID	Distance	Direction	Update
2	32.0	E	07-Feb-2008

6.3 Areas benefiting from Flood Defences

Are there any areas benefiting from Flood Defences within 250m of the study site? **No**

Guidance: More detailed information may be available from the Environment Agency through their floodline (0845 988 1188) or by ordering an Environment Agency Flood Report from the local Environment Agency Office.

6.4 Areas used for Storage Areas

Are there any areas used for Flood Storage within 250m of the study site? **No**

Guidance: More detailed information may be available from the Environment Agency through their floodline (0845 988 1188) or by ordering an Environment Agency Flood Report from the local Environment Agency Office.

6.5. Groundwater Flooding Susceptibility Areas

Are there any British Geological Survey groundwater flooding susceptibility flood areas within 50m of the centre of the study site? **Yes**

What is the highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions?	**High**

6.6 Groundwater Flooding Confidence Areas

What is the British Geological Survey confidence rating in this result?	**Moderate**

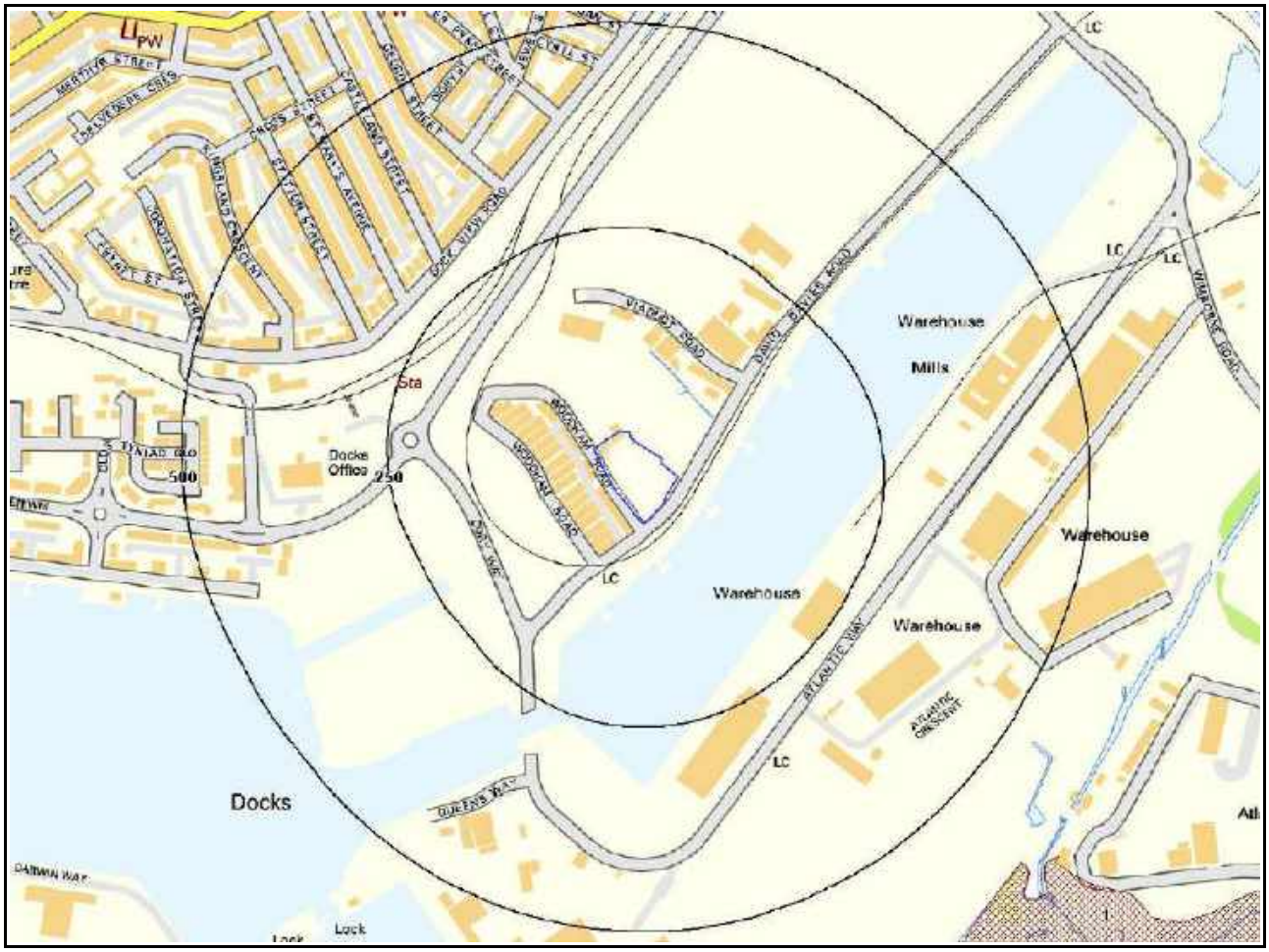
Notes:

Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

The confidence rating is on a fivefold scale - Low, Moderately Low, Moderate, Moderately High and High. This provides a relative indication of the BGS confidence in the accuracy of the susceptibility result for groundwater flooding. This is based on the amount and precision of the information used in the assessment. In areas with a relatively lower level of confidence the susceptibility result should be treated with more caution. In other areas with higher levels of confidence the susceptibility result can be used with more confidence.

7.Ecological Designated Sites Map

N



S

Ecological Designated Sites Legend

Site Outline

Search Buffers (m)
100
250

SAC

SSSI

NNR

World Heritage Sites

SPA

Ramsar

LNR

7 Ecological Designated Sites

Presence of sites of ecological value within 1000m of the study site? **Yes**

Records of Sites of Special Scientific Interest (SSSI) within 1000m of the study site: **1**

The following Sites of Special Scientific Interest (SSSI) records provided by English Nature/Countryside Council for Wales are represented as polygons on the Ecological Designated Sites Map:

ID	Distance	Direction	SSSI Name	Data Source
1	616.0	SE	HAYES POINT TO BENDRICK ROCK	Countryside Council For Wales

Records of National Nature Reserves (NNR) within 1000m of the study site: **0**

Database searched and no data found.

Records of Special Areas of Conservation (SAC) within 1000m of the study site: **0**

Database searched and no data found.

Records of Special Protection Areas (SPA) within 1000m of the study site: **0**

Database searched and no data found.

Records of Ramsar sites within 1000m of the study site: **0**

Database searched and no data found.

Records of Local Nature Reserves (LNR) within 1000m of the study site: **0**

Database searched and no data found.

Records of World Heritage Sites within1000m of the study site: **0**

Database searched and no data found.

8. Natural Hazards Findings

8.1 Detailed BGS GeoSure Data

BGS GeoSure Data has been searched to 50m. The data is included in tabular format. If you require further information, please obtain a GroundSure Geology and Ground Stability Report. Available from our website. The following information has been found:

8.1.1 Shrink Swell

What is the maximum Shrink-Swell* hazard rating identified on the study site?	**Very Low**

8.1.2 Landslides

What is the maximum Landslide* hazard rating identified on the study site?	**Very Low**

8.1.3 Soluble Rocks

What is the maximum Soluble Rocks* hazard rating identified on the study site?	**Null - Negligible**

8.1.4 Compressible Ground

What is the maximum Compressible Ground* hazard rating identified on the study site?	**Very Low**

8.1.5 Collapsible Rocks

What is the maximum Collapsible Rocks* hazard rating identified on the study site?	**Null - Negligible**

8.1.6 Running Sand

What is the maximum Running Sand* hazard rating identified on the study site?	**Very Low**

9.Mining

9.1 Coal Mining

Are there any coal mining areas within 75m of the study site? **No**

Database searched and no data found.

9.2 Shallow Mining

What is the hazard of subsidence relating to shallow mining onsite? (this includes a 150m buffer) **Negligible**

10.Contacts

GroundSure Helpline
Telephone: 01273 819700
mapsandinfo@groundsure.com

British Geological Survey (England & Wales)
Kingsley Dunham Centre
Keyworth, Nottingham NG12 5GG
Tel: 0115 936 3143. Fax: 0115 936 3136. www.bgs.ac.uk
BGS Geological Hazards Reports and general geological enquiries

Environment Agency
South East
Rivers house / Plas Yr Afon - St. Mellons Business Park, Fortran Road, St. Mellons, Cardiff, CF3 0LT Tel: (01222) 770088
EA Wales Tel: (02920) 770 088

The Coal Authority
200 Lichfield Lane, Mansfield, Notts NG18 4RG
Tel: 0845 762 6848. DX 716176 Mansfield 5
www.coal-authority.co.uk
Coal mining reports and related enquiries

Ordnance Survey
Romsey Road
Southampton SO16 4GU
Tel: 08456 050505

Local Authority
Vale of Glamorgan County Borough Council Tel:

Get Mapping PLC
Virginia Villas, High Street, Hartley Witney, Hampshire RG27 8NW
Tel: 01252 845444

Acknowledgements
This product includes map data licensed from Landmark Information Group Limited®.

Appendix 1(13): 2015 Application - Flood risk assessment (2009)

RSK Environment Ltd
West Nash Road
Nash
Newport
NP18 2BZ

Telephone: +44 (0) 1633 272339

www.rsk.co.uk

30 June 2008

Marco Muia
Oaktree Environmental Ltd

Our Ref: RSK/MA/P660003/01/01

Dear Marco,

RE: FLOOD RISK, BARRY SUNRISE CHP PLANT, BARRY DOCKS

As a part of the planning application for the Barry site, RSK Environment Ltd has been commissioned to provide an assessment of flood risk. The following paragraphs explain the work undertaken.

The proposed development is located within Zone B but outside Zone C2, as identified by Technical Advice Note 15: Development & Flood Risk (July 2004) (TAN15). Zone B can be defined as "*areas known to have been flooded in the past evidenced by sedimentary deposits*" and Zone C2 as "*areas of floodplain without significant flood defence infrastructure*". Any development within Zone C would require a full Flood Consequences Assessment (FCA).

The proposed development is also located outside the Environment Agency Wales (EAW) extreme (0.1%) Flood Map, which would normally underlay Zone B. Although a full FCA is not required, the EAW promote a precautionary approach where site levels should be compared against the adjacent extreme outline to determine if the site is at risk of flooding.

We therefore undertook a topographic survey of the site and produced three cross sections from north of the site through to the direction of the dock to confirm that the development is above the adjacent extreme flood outline and corresponding Zone C2. These are attached as Annex A. When flood level data was requested from the EAW, we were notified that the only available data was over 10 years old and not for the location requested. The data would have to be extrapolated from levels in Cardiff and Porthcawl.

This information was submitted via email to the EAW as a pre-planning enquiry on the 25 June 2008 (E-mail to EA attached as Annex B together with previous correspondence). In a subsequent conversation with Matthew Parry, Development Control Officer (and Acting Team Leader) of the EAW on the 26 June 2008, he confirmed that the site was not at risk of flooding and the cross sections were acceptable. A recent policy change within the EAW meant that applications in Zone B were taken on a risk-based approach and if the zone is outside the Q1000 Flood Map, then there is no perceived risk to the development.

A formal response from the Planning Liaison to the pre-planning enquiry is awaited, although Matthew has indicated that there is no objection to the proposed development from the information submitted.

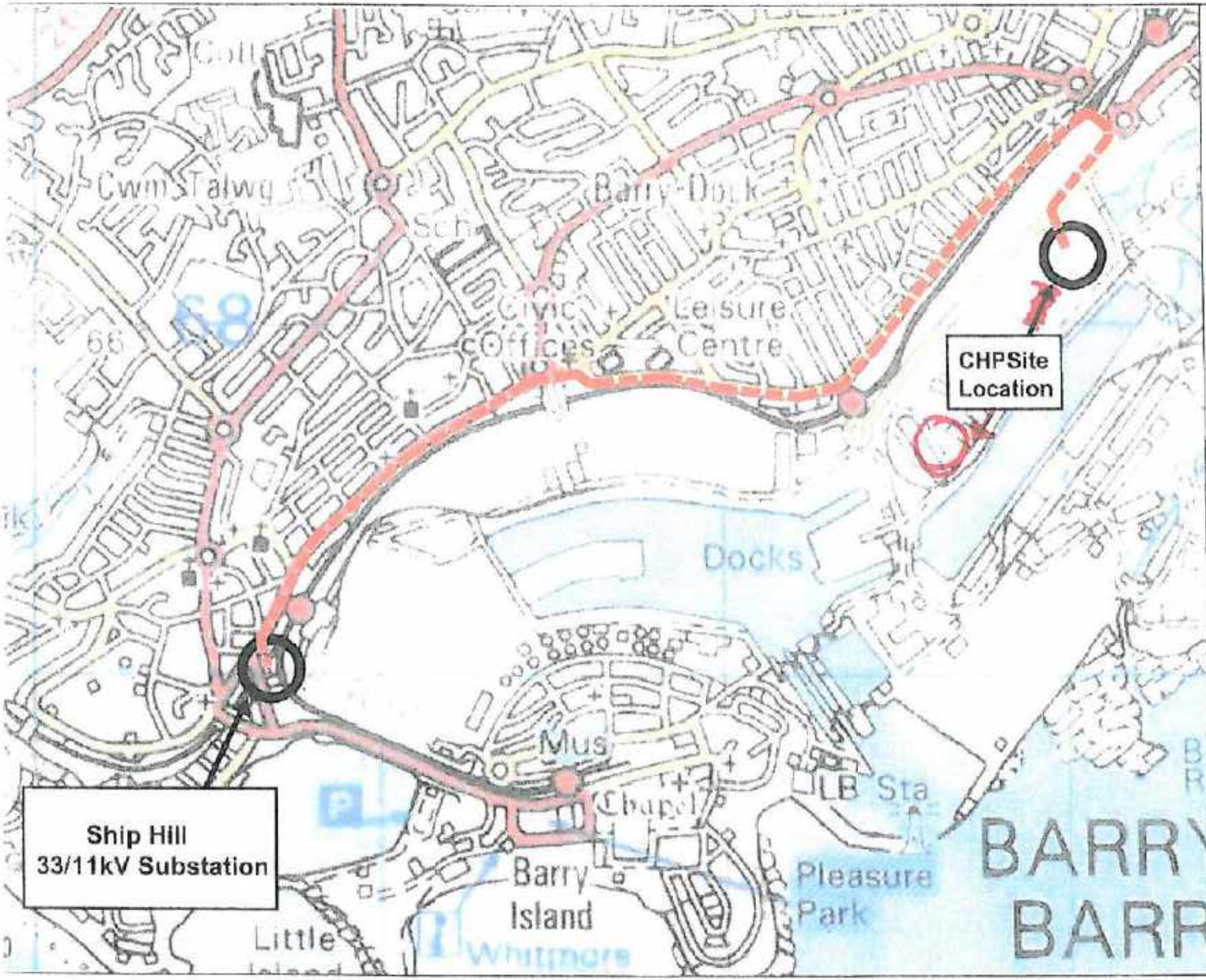
I trust this information is sufficient for the purposes of the planning application and please do not hesitate to contact me should you have any further questions or queries.

We will submit the expected further correspondence from the EA to you when available.

Yours Sincerely,

Catherine Anderson MSc
Environmental Consultant
RSK Environment Ltd
Part of the RSK Group plc
mailto:canderson@rsk.co.uk
Direct Line: 01454 227575

Enc.
Annex A: Topographic Survey and Cross Sections
Annex B: EA Correspondence, including EAW Flood Data and Welsh Assembly Government Development Advice Map (DAM) of TAN15 zones



N

Scale: not to scale

Drawn: J Davies | Date: 09/01/08

Drawing No. 2007-271107-03

Cell Site number: -

Title:
PROPOSED
CABLE ROUTE

Site Name and Address
Barry
South Wales

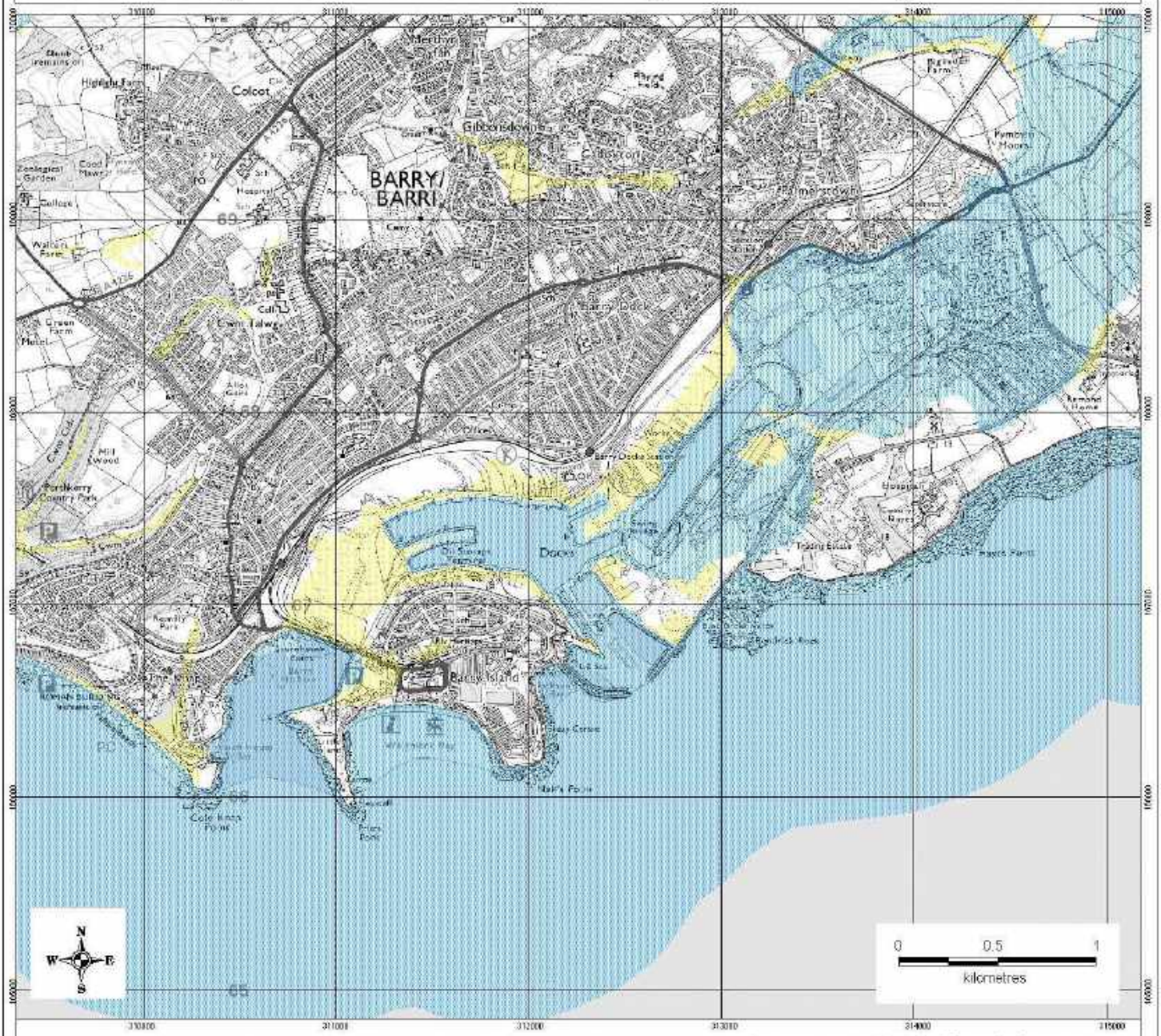
DNO CONSULTING LTD.

2 Chamwood Court
Newport Street
Swindon
tel: 0870 770 7728

LEGEND:

UNDERGROUND CABLE ROUTE

TAN15 Development and Flood Risk:Development Advice Map ST16NW



Cartographics / Cartografeg

- Zone A: Considered to be at little or no risk of fluvial or tidal/coastal flooding
- Zone B: Areas known to have been flooded in the past
- Zone C1: Served by significant infrastructure, including flood defences
- Zone C2: Without significant flood defence infrastructure

Zones C1 & C2 based on Environment Agency's Extreme Flood Outline (>= 0.1% - River, Tidal or Coastal)

Rob Domeney

From: Catherine Anderson
Sent: 24 June 2008 10:30
To: Parry, Matthew; mike.walsh@environment-agency.gov.uk
Subject: Barry Sunrise CHP Plant
Attachments: EA response.pdf; P1580.dwg; P1580_Sections.dwg; barry location.pdf; Barry_ST16NW.jpg

Matthew/Mike

Please find attached the following:

* Location plan
* DAM map;
* Topographic survey and cross sections; and
* EAW food level data.

The application is for a CHP plant in Barry Docks and from the DAM is located within a zone B. However from the EAW flood map there is no underlying Q200 or Q1000. In addition, a letter from Kayna we found on the planning register states that there has been no history of flooding to an adjacent development and the EAW had no objection to the development in relation to flood risk.

We have undertaken a topographic survey of the area which shows levels to be 7.83m AOD nearest the dock rising to 9.4m AOD to the north of the site. Looking at the EAW level data, it is stated that no levels are available for the Barry area, but extrapolating the levels from the Cardiff and Porthcawl data provided would put the Q200 at approximately 7.55m AOD and Q1000 at 7.85m AOD. However this data is now over 10 years old.

This is not an exact science and I would appreciate your view on this especially when other adjacent sites have been identified as being not at risk from flooding. The intention is to raise the site approximately 300-600m to make it more level with the north of the site anyway so would this is adequate mitigation for a site in zone B?

Your comments would be most beneficial to this project so that we can progress the site appraisal.

Kind Regards
Catherine

Catherine Anderson
Environmental Consultant

RSK Environment Ltd
West Nash Road, Nash, Newport, NP18 2BZ.

A member of the **RSK** Group plc

Office: 01633 276051. Mobile: 07917 425260; email: canderson@rsk.co.uk

http://www.rsk.co.uk

creu lle gwell
creating a better place

Asiantaeth yr Amgylchedd Cymru
Environment Agency Wales

Ms Katarzyna Nowak
RSK Ltd
18 Frogmore Road
Hemel Hempstead
Hertfordshire
HP3 9RT

Ein cyf/Our ref: SAF12782

Eich cyf/Your ref: 080506CB027

Dyddiad/Date: 22nd May 2008

Dear Ms Nowak

Re: Flood Risk and Drainage Assessment - Barry, Viaduct Road CF63 4AB

Thank you for your enquiry with regards to obtaining flood level information for a site in Barry. Please find attached and below information that has been provided by our Flood Risk Mapping Team that should answer your enquiry in full.

The Flood Map consists of a combination of detailed localised flood risk mapping studies, supplemented with national generalised modelling. In the absence of any localised study for the area, the flood extents shown in **Figure 1** are from generalised modelling only. These have been derived from two components; a 3D ground level map of England and Wales (referred to as the Digital Terrain Map or 'DTM') and a 2D flow / tidal modelling component.

In **Figure 1**, the risk from flooding is predominantly tidal. These tidal extents have been produced using stillwater tide levels that are based upon Dixon, M.J. and Tawn, J.A. (1997) "Extreme Sea Levels at the UK A Class Sites: Optimal Site by Site Analyses and Spatial Analyses" - Proudman Oceanographic Laboratory, Internal Document No. 112. They do not take into account any wave action or climate change, and are based for the year 1997.

Tide levels are available for Cardiff (approx NGR ST 18030, 74612) and Porthcawl (approx NGR SS 78544, 79401). The predicted levels are as follows:

CARDIFF
0.5% (YEAR 1997) = 8.17mAOD
0.1% (YEAR 1997) = 8.40mAOD

PORTHCAWL
0.5% (YEAR 1997) = 7.03mAOD
0.1% (YEAR 1997) = 7.25mAOD

We are not aware of any historic flooding to the site.

I hope that this information is of use to you. Please feel free to contact me on 029 2024 5236 if you require further information.

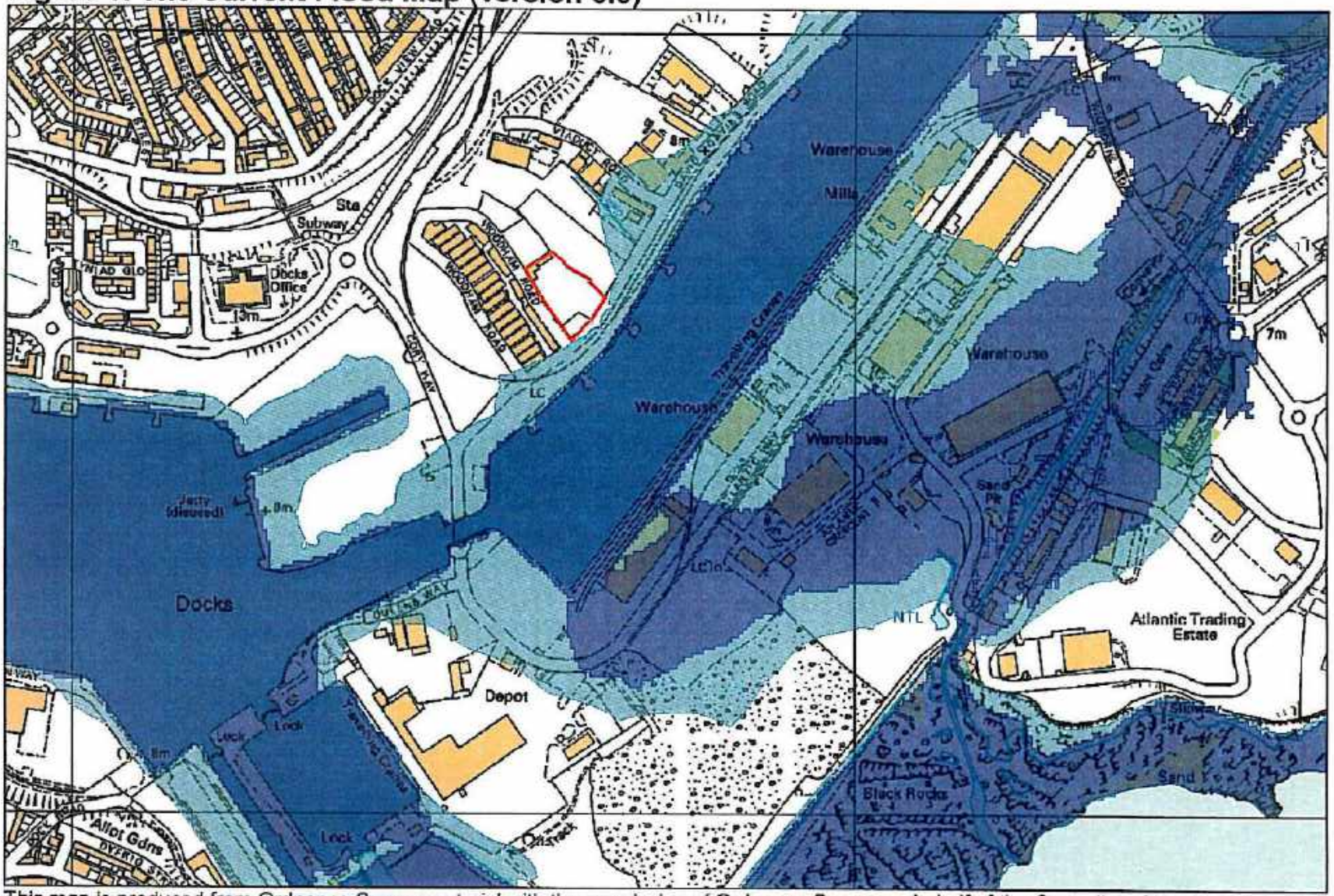
Kindest Regards

Darren Jones
External Relations Officer

Asiantaeth yr Amgylchedd Cymru
Plas-yr-Afon, Parc Busnes Llaneirwg, Llaneirwg, Caerdydd, CF3 0EY
Llinell gwasanaethau cwsmeriaid: 08708 506 506
Ebost: enquiries@environment-agency.gov.uk
www.asiantaeth-amgylchedd.cymru.gov.uk

Environment Agency Wales
Rivers House, St Mellons Business Park, St Mellons, Cardiff, CF3 0EY
Customer services line: 08708 506 506
Email: enquiries@environment-agency.gov.uk
www.environment-agency.wales.gov.uk

Figure 1: The Current Flood Map (version 3.8)



Key:

Dark Blue area : Flooding from rivers or sea without defences

Light Blue area : Extent of extreme flood

Red Boundary : Site of interest (as marked in pen on attached 'Streetmap' printout - dated 6th May 2008)

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10. If you are a professional advisor and you have paid us our internal commercial usage charge (currently £10) you may in addition to the rights in paragraph 9, give copies of Agency Information (exactly as it is) to your client and any other person who reasonably requires a copy (limited professional use), provided that:
    a) any copies you send are in connection with the specific transaction or matter for which you obtained the Information from the Environment Agency;
    b) you make no charge for supplying the Information other than for your actual costs and time incurred;
    c) you attach a copy of this notice and require all recipients to comply with it.

    Recipients of Information under this paragraph do not need to pay any additional fee as long as they use the Information exactly as it is, internally and only for the same specific transaction or matter.
11. Please contact us if you need permission for any other use.

Appendix 2: 2015 Application – Screening Direction VoGC

EIA ANALYSIS AND SCREENING PROFORMA

For guidance see:
http://planningguidance.planningportal.gov.uk/blog/guidance/environmental-impact-assessment/screening-schedule-2-projects/

ANALYSIS

1	Case Details	
a	Applicant/Agent	
	Sunrise Renewables (Barry) Ltd, Gilbert Wakefield House, Bewsey Street, Warrington WA2 7JQ	
b	Vale of Glamorgan reference	Received
	2015/00031/OUT	5 February 2015
c	WG case reference – If Applicable	
d	Site Address	
	David Davies Road, Woodham Road, Barry	
e	Brief description of development	
	Outline application for a wood fired renewable energy plant	
f	Approval of reserved matters?	
	Yes	
	No	No
	Approval of conditions?	
	Yes	
	No	No
	If Yes, enter the description of development subject of the related planning permission	
g	Area of development/works/new floorspace (as appropriate)	
	0.77Ha	
2	**EIA details**	
A	**Schedule 1**	
(i)	Is the proposed development Schedule 1 development as described in Schedule 1 of the EIA Regulations?	
	Yes	
	No	No
(ii)	If YES, under which description of development i.e. Nos. 1-21?	

B	Schedule 2	
(i)	Is the proposed development Schedule 2 development as described in Column 1 of Schedule 2 of the EIA Regulations?	
	Yes	Yes
	No	
(ii)	If YES, under which description of development in Column 1 i.e. Nos. 1-13?	
	11 (b)	
(iii)	Is the development within, partly within, or near a 'sensitive area' as defined by Regulation 2 of the EIA Regulations?	
	Yes	
	No	No
(iv)	If YES, which area?	
(v)	Are the applicable thresholds/criteria in Column 2 exceeded/met?	
	Yes	Exceeded 0.5ha site
	No	
(vi)	If yes, which applicable threshold/criteria?	
3	**LPA / WG Screening**	
	All applications inc reserved matters / conditions	
(i)	Has the VoG issued a Screening Opinion (SO)?	
	Yes	Yes- in 2008 for previous app approval
	No	
(ii)	Has the WG issued a Screening Direction (SD)?	
	Yes	
	No	no
(iii)	If yes, is a copy of the SO/SD on the file?	
	Yes	Yes- 2008 screening on file
	No	
(iv)	If yes, is the SO/SD positive?	
	Yes	No EIA required
	No	

	Reserved matters/conditions applications only	
(i)	Was original PP subject to EIA screening?	
	Yes	
	No	
(ii)	Was a SO/SD issued for the original PP?	
	Yes	
	No	
(iii)	If yes, is a copy of the SO/SD for the original PP on file?	
	Yes	
	No	
4	**Environmental Statement (ES)**	
	Has the applicant supplied an ES for the current or previous (if reserved matters or conditions) application?	
	Yes	One was supplied for 2010 appeal but not issued as requirement by LPA or Welsh Assembly
	No	
Name	Mr. Morgan P. Howell	
Date	11 June 2015	

SCREENING

A. CHECKLIST			
Questions to be considered		**Likely/Unlikely – briefly describe**	**Is this likely to result in a Significant effect?** **Yes/No - why?**
1	Will construction, operation or decommissioning of the Project involve actions which will cause physical changes in the locality (topography, land use, changes in waterbodies, etc)?	No	
2	Will construction or operation of the Project use natural resources such as land, water, materials or energy, especially any resources which are non-renewable or in short supply?	No- Produce electricity energy through gasification of waste wood.	
3	Will the Project involve use, storage, transport, handling or production of substances or materials which could be harmful to human health or the environment or raise concerns about actual or perceived risks to human health?	Yes-	No. No change in level of waste since 2010 appeal approval
4	Will the Project produce solid wastes during construction or	Yes	No- Mostly energy recovery

	operation or decommissioning?		
5	Will the Project release pollutants or any hazardous, toxic or noxious substances to air?	Yes	No- Previous approval identified that the emissions were acceptable. No significant change to the amount of waste to be used.
6	Will the Project cause noise and vibration or release of light, heat energy or electromagnetic radiation?	Yes	No- Previous approval issued no concerns over noise and light
7	Will the Project lead to risks of contamination of land or water from releases of pollutants onto the ground or into surface waters, groundwater, coastal waters or the sea?	Possibly	No- These matters can be regulated by Permits and NRW
8	Are there any areas on or around the location which are already subject to pollution or environmental damage e.g. where existing legal environmental standards are exceeded, which could be affected by the project?	Not sure- Dow corning (Barry Chemical complex) nearby	No knowledge of environ standards being breached.
9	Will there be any risk of accidents during construction or operation of the Project which could affect human health or the environment?	Possibly	Possible effects no greater than other construction projects and industrial sites

10	Will the Project result in social changes, for example, in demography, traditional lifestyles, employment?	No	
11	Are there any areas on or around the location which are protected under international or national or local legislation for their ecological, landscape, cultural or other value, which could be affected by the project?	Severn Estuary (designated as a Special Area of Conservation (SAC), Special Protection Area (SPA) and a RAMSAR site) and is also within proximity of Hayes Point to Bendrick Rock (a Site of Special Scientific Interest (SSSI)) and Barry Island SSSI	No. Previous EIA consulted CCW (now NRW) who outlined that an EIA was not needed provided information on the impacts can be provided
12	Are there any other areas on or around the location which are important or sensitive for reasons of their ecology e.g. wetlands, watercourses or other waterbodies, the coastal zone, mountains, forests or woodlands, which could be affected by the project?	Severn Estuary (designated as a Special Area of Conservation (SAC), Special Protection Area (SPA) and a RAMSAR site) and is also within proximity of Hayes Point to Bendrick Rock (a Site of Special Scientific Interest (SSSI)) and Barry Island SSSI	NO. Previous EIA consulted CCW (now NRW) who outlined that an EIA was not needed provided information on the impacts can be provided
13	Are there any areas on or around the location which are used	No	

	by protected, important or sensitive species of fauna or flora e.g. for breeding, nesting, foraging, resting, overwintering, migration, which could be affected by the project?		
14	Are there any inland, coastal, marine or underground waters on or around the location which could be affected by the project?	Coastal location	No- within industrial dockland location
15	Are there any areas or features of high landscape or scenic value on or around the location which could be affected by the project?	No	
16	Is the project in a location where it is likely to be highly visible to many people?	Yes	Within an existing industrial location
17	Are there any routes on or around the location which are used by the public for access to recreation or other facilities, which could be affected by the project?	No	
18	Are there any transport routes on or around the location which are susceptible to congestion or which cause environmental problems, which could be affected by the project?	Yes	Congestion issues on main roads. But a transport statement is sufficient to consider this impact.
19	Are there any areas or features of historic or cultural importance on or around the location which could be affected by the project?	No	
20	Is the project located in a previously undeveloped area where there will be loss of greenfield land?	No	
21	Are there existing land uses on or around the location e.g. homes, gardens, other private property, industry, commerce, recreation, public open space, community facilities, agriculture, forestry, tourism, mining or quarrying which could be affected by the project?	Other industrial and employment uses on the dock land. Mainly B1, B2 and B8 uses	No
22	Are there any areas on or around the location which are	An industrial location- around 300-500m from nearest	No

	densely populated or built-up, which could be affected by the project?	dwelling on dock view road.	
23	Are there any areas on, or around, the location which are occupied by sensitive land uses e.g. hospitals, schools, places of worship, community facilities, which could be affected by the project?	No- Industrial	
24	Are there any areas on or around the location which contain important, high quality or scarce resources e.g. groundwater, surface waters, forestry, agriculture, fisheries, tourism, minerals, which could be affected by the project?	No	
25	Is the project location susceptible to earthquakes, subsidence, landslides, erosion, flooding or extreme or adverse climatic conditions e.g. temperature inversions, fogs, severe winds, which could cause the project to present environmental problems?	Flood damage from 2001-2002 and just outside flood zone	No. A FCA was submitted within this application and the previous approval and it was not seen as a significant issue.
26	Are there any plans for future land uses on or around the location which could be affected by the project?	Possibly	These factors have been considered previously and have not been considered harmful
27	Are there any other factors which should be considered, such as consequential development which could lead to environmental effects, or the potential for cumulative impacts with other existing or planned activities in the locality?	Yes- Possible previous approvals of energy recovery units within locality and residential development approved within a short distance from the application site.	These factors have been considered previously and have not been considered harmful

B. CONCLUSIONS		
(i)	Schedule and category of development	
	Schedule 2- 11(b)	
(ii)	Summary of features of project and of its location	
	a	Characteristics of development
		Waste disposal- resulting in energy recovery
	b	Location of development
		Docks- Industrial location on employment land
	c	Characteristics of the potential impact
		Visual impact, Highway and transport impacts and air pollution from emissions from the technological process to generate electricity releasing
(iii)	If a SO/SD has been provided do you agree with it?	
	Yes	Yes- Screening opinion issued in 2008- changes to development are not significant to alter opinion on need for EIA
	No	
(iv)	Is it necessary to issue a SO/SD?	
	Yes	
	No	
(v)	Is an ES required?	
	Yes	
	No	No

C. SCREENING DECISION (Indicate below which assessment applies)					
Assessment		**Action (produce model letter 'x')**	☒	**Response due from**	**Date response due**
Sch 1 development	ES required	**Issue positive or negative SO/SD**	☐		
Sch 2 development – threshold exceeded/criterion met/sensitive area and likely to have significant effects on the environment	ES required	**Issue positive or negative SO/SD**	☐		
Sch 2 development – not likely to have significant effects on the environment	ES not required	**Issue positive or negative SO/SD**	X		
Sch 2 development but effects not clear at this stage – file to be reviewed at a later stage	N/K	**Review when appropriate – new info/case progresses**	☐		
Sch 2 but not EIA development – negative screening opinion - SoS agrees	ES not required	**No action required**	☐		
Sch 2 but not EIA development – positive screening opinion - SoS disagrees	ES not required	**Issue negative SO/SD**	☐		

Name	Mr. Morgan P. Howell
Date	11 June 2015

OMDC	Marcus Goldsworthy
Date	11 June 2015

Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999

Screening Opinion

Application No. 15/00031/OUT
Location : DAVID DANIEL, WOODHAM ROAD
Proposal : WOOD FIRED RENEWABLE ENERGY PLANT

Schedule 1 Developments

1. Does the nature and scale of the proposed development fall within Schedule 1 of the EIA Regulations ?

(No) Yes

If yes, an EIA is a mandatory requirement to accompany an application.

If No, an assessment needs to be undertaken as to whether the development fall within Schedule 2 ?

Schedule 2 Developments

2. Is the development of a description mentioned in Schedule 2 of the regulations?

No (Yes)

– Unlike 2008 - it would be 11(b) of EIA installation for disposal of waste

If no, an EIA will not be required.
If yes, go to question 3

3. Is any part of the development to be carried out in a "sensitive area"

In terms of the EIA regulations "sensitive area" means any of the following:

*Sites of Special Scientific Interest

* Land to which sub-section (3) of section 29 (nature conservation orders) of the Wildlife and Countryside Act 1981 applies.

* Areas to which paragraph (u)(ii) in the table in article 10 of the Town and Country Planning (General Development Procedure) Order 1995 applies *(within an area which has been notified to the local planning authority by Countryside Council for Wales, and which is within two kilometres of a site of special scientific interest of which notification has been given or has effect as if given as aforesaid)*

* National Parks

* The Broads

No – INDUSTRIAL LOCATION (EMPLOYMENT DOCK SITE)

* Properties appearing on the World Heritage List

* Scheduled Ancient Monuments

* Areas of Outstanding Natural Beauty

* European sites within the meaning of regulation 10 of the Conservation (Natural Habitats etc) Regulations 1994

No (circled) Yes

- Industrial - Power Station

If yes, go to question 5

If no, go to question 4

4. Is any corresponding applicable threshold or criterion (Schedule 2, column two of the EIA regulations) exceeded or met?

No Yes (circled)

If no, an EIA is not required.
If yes, go to question 5

→ Exceeds 0.5 ha site area ≥ 0.7+

5. Is the development likely to have significant environmental effects due to its characteristics, location and the nature of the potential impact (see Schedule 3 of the regulations for guidance)?

→ Having considered 2008 Screening opinion + development - changes include change in technology from 9MW (2010 permission) to 10 MW. Change in building + stack height. - No increase in tonnage

→ Resolved does on Phase 2 considered under 2008 screening - no additional re development

- TRANSPORT requirements not significantly changed

- Submissions with eff cover sensitive aspects i.e.
  - Noise assessment
  - Transport
  - Ecology
  - Updated D & A
  - Stack height assessment
  - Air quality re-assessment

- All considered at 2010 approval via EIS statement

Appendix 3: 2015 Application – Screening Direction WAG

Yr Adran Cyfoeth Naturiol
Department for Natural Resources

Llywodraeth Cymru
Welsh Government

Max Wallis
Barry & Vale Friends of the Earth

maxkwallis@gmail.com

Ein Cyf/Our ref: TO/CS/01196/15
Dyddiad/Date: 30 July 2014

Dear Mr Wallis

TOWN AND COUNTRY PLANNING (ENVIRONMENTAL IMPACT ASSESSMENT) (ENGLAND AND WALES) REGULATIONS 1999 (AS AMENDED).
PROPOSED WOOD FIRED RENEWABLE ENERGY PLANT AT DAVID DAVIES ROAD, WOODHAM ROAD, BARRY DOCKS, BARRY – PLANNING APPLICATION: 2015/00031/OUT

Thank you for your e-mail of 23 July 2015 to Carl Sargeant, Minister for Natural Resources, asking him to make a screening direction under the Environmental Impact Assessment (EIA) Regulations 1999 (as amended) for the above planning application. I also note the content of your email of 28 July 2015. I have been asked to reply.

The Local Planning Authority (LPA), the Vale of Glamorgan Council, consider that the proposed development falls within the description at paragraph 2.11(b) of the above Regulations and exceeds the threshold in column 2 of the table in Schedule 2 of those Regulations. We agree that this is the most appropriate project category.

In accordance with the provisions of the Regulations, the Council screened the proposals and considered whether they would have significant environmental effects. They concluded that they would not and that EIA was not required.

In response to your request, we have considered the current proposals in the light of the Regulations and current guidance, and taking into account the information provided in your emails, we have concluded that a screening direction by the Welsh Ministers is not required.

BUDDSODDWYR MEWN POBL | INVESTORS IN PEOPLE

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Gwefan • website: www.gov.wales

The fact that a particular proposed development does not require statutory EIA in no way lessens the general responsibility of planning authorities to seek whatever information is necessary and relevant in order to consider the environmental implications of the particular project before deciding whether or not to grant planning permission.

I am sending a copy of this letter to the Vale of Glamorgan Council.

C. Litherland

Ceri Litherland (Mr)
Decisions Branch
Planning Directorate

Appendix 4: Noise Impact Significance Criteria

Noise Level Change dB(A)	Subjective Response	Impact Magnitude
	No change	No change
0.1-2.9	Barely perceptible	Negligible
3.0-4.9	Noticeable	Minor
5.0-9.9	Up to double/half the loudness	Moderate
10+	More than double/half the loudness	Major