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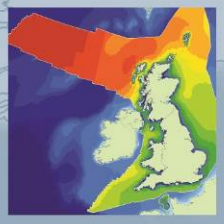
ABP Port of Barry Solar Farm Design and Access Statement

Report R.2305

March 2015

Creating sustainable solutions for the marine environment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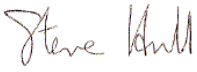
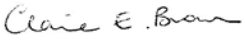
Quality Manager:	Stephen Hull		25.03.2015
Project Director:	Claire Brown		25.03.2015

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ABP Port of Barry Solar Farm Design and Access Statement

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1. Context

This Design and Access Statement (DAS) has been prepared to support the submission of a planning application for the development of a solar photovoltaic (PV) system to generate electricity, which will be fed into the National Grid (NG), known as 'the Port of Barry Solar Farm'. The proposed development will include the installation of up to 500 solar PV tables containing a total of around 25,000 modules.

Energy calculations indicate that the site has a maximum peak power capacity for 10 Megawatts (MW) sufficient to generate an estimated 11,000 MWh/annum.

This DAS will firstly provide an overview of the site history followed by a description of the project need, planning policy context and design principals of the proposed works.

The DAS is a statutory requirement that has to be submitted with a planning application and should be read in conjunction with the supporting documentation as referenced throughout this report which have all been submitted for approval and form part of the planning application for the development.

It should be noted that as part of the planning application process the proposed site area has been refined from an original wider area totalling 75 acres (incorporating site 1 and 2 as in supporting documentation such as the screening report and pre-application response within this planning application) to the current size of 41 acres or 16.5 hectares (predominantly focusing on site 1 only).

1.1 Planning Application History

This Design and Access Statement supports planning application 2015/00173/FUL. However it should be noted that this application follows a previous application 2014/01089/FUL. In addition, however please note the panel dimensions have been reduced from a height of 2.7m to 1.8m. The main difference in this application is an increase in the proposed levelling height by an average of approximately 0.5m. This variation in height is detailed in the enclosed figures. However due to further assessments in panel angle the overall height of the site including panels is now approx. 0.5m lower than stated in previous application. The Landscape and Visual Assessment has also been updated to assess these levels.

1.2 Site History

The application site lies to the south east of Number 2 Dock within of the Port of Barry which is operated by ABP. Barry docks are located to the south east of the town of Barry in South Wales and has direct access to the Bristol Channel. The Port of Barry is a key facility for the region's chemical industry, handling liquid bulks for major companies including Dow Corning. As well as chemicals, Barry also has considerable expertise in the handling of steel, scrap metal, containers, dry bulks, coal, and aggregates. The port has direct rail connections and a link road connects the port to Junction 33 of the M4.

The location is a brownfield site on the port estate which has lain underutilised for a number of years. Figure 1 shows the proposed redline boundary for the proposed works and provides details of the existing site layout.

The majority of the site is surrounded by bunds as shown in Image 1 which will be retained as part of the works. The northern perimeters of the redline boundary are based on the inside extent of the bunding within the disused coal yard and the perimeter to the east, south and west of the site are based on the outside extent of the bunds.

Image 1. An example of bunding on the perimeter of the redline boundary

1.3 Project Need

The Port of Barry and its various activities and tenants is a large scale consumer of electricity. This project has the potential to generate green energy that can provide a significant portion of this requirement from a renewable source, thus reducing the carbon footprint of the Port and reducing local environmental impacts.

The proposed development is considered to present a substantial investment opportunity for the Port of Barry, with the prospect of secure and long term energy supplied at a local level. The development has the potential to create a more sustainable and highly energy efficient operation within the Port and offering the opportunity for further energy supply to the local network. In the long term the development also has the potential to create further inward investment at the Port and thus additional employment opportunities.

2. Planning Policy Context

Consideration has been given to both national planning policy and local development plan policies in assessing the acceptability of the proposal in planning and environmental terms. Reference should also be made to a separate planning statement as part of this planning application which provides further details on planning policy. This section refers to some of the key policy considerations.

2.1 National Policy Advice

2.1.1 Government of Wales Act 2006

The Welsh Assembly Government has a duty under the Government of Wales Act 2006 (Section 79) to commit to the principles of sustainability and sustainable development.

2.1.2 Planning Policy Wales (Welsh Government, 2014)

The Planning Policy Wales (Edition 7, July 2014), hereafter referred to as PPW7, notes that the planning system will play an important role in reducing greenhouse gas emissions and dealing with the consequences of climate change. It supports the need to tackle the causes of climate change by moving towards a low carbon economy. This includes facilitating development that reduces emissions of greenhouse gases in a sustainable manner, provides for renewable and low carbon energy sources at all scales and facilitates low and zero carbon developments.

PPW7 confirms that the planning system has a fundamental role in delivering sustainable development in Wales. In particular, the planning system, through both development plans and the development control process, must provide for homes, infrastructure, investment and jobs in a way which is consistent with sustainability principles and the urgent need to tackle climate change.

Sections 4.3 and 4.4 of PPW7 set out the principles and objectives which underpin the Welsh Government's approach to planning policy for sustainable development. The most relevant to the proposed development being:

Principles:

- Respect for environmental limits, so that resources are not irrecoverably depleted or the environment irreversibly damaged. This means, for example, mitigating climate change, protecting and enhancing biodiversity, minimising harmful emissions, and promoting sustainable use of natural resources; and
- Tackling climate change by reducing the greenhouse gas emissions that cause climate change and ensuring that places are resilient to the consequences of climate change.

Objectives:

- Preference for the re-use of suitable previously developed land and buildings, wherever possible avoiding development on greenfield sites;
- Support the need to tackle the causes of climate change by moving towards a low carbon economy. This includes facilitating development that reduces emissions of greenhouse gases in a sustainable manner, provides for renewable and low carbon energy sources at all scales and facilitates low and zero carbon developments; and
- Promote a greener economy and social enterprises.

In addition, PPW7 encourages a strong preference for the re-use of land, confirming that previously developed land should, wherever possible, be used in preference to greenfield sites.

2.1.3 Technical Advice Note (TAN) 8: Planning for Renewable Energy (Welsh Assembly Government, 2005)

A series of 21 Technical Advice Notes (TANs) supplement PPW7, which sets out Welsh land use planning policies (outlined above), and should be taken into account by local planning authorities when they are preparing development plans.

The provision of electricity from renewable sources is an important component of the UK energy policy. The UK has an established target of producing 10% of electricity from renewable energy sources by 2010 (DTI, 2003). The Welsh Assembly Government has a target of 4TWh (terawatt-hour) of electricity per annum to be produced by renewable energy by 2010 and 7TWh by 2020. Therefore, TAN8 recognises that other than in circumstances where visual impact is critically damaging to a listed building, ancient monument or a conservation area view, proposals for appropriately designed solar thermal and PV systems should be supported. Local planning authorities should also consider ways in which further encouragement can be given to these technologies.

2.1.4 Energy Policy Statement (Welsh Assembly Government, 2010a)

The Energy Policy Statement (A Low Carbon Revolution) explains the plans and ambitions of the Welsh Assembly Government for low carbon energy. In particular, it promotes 'further use of brownfield or local sites for smaller-scale projects appropriate to their locations'.

2.1.5 Generating Your Own Energy

Renewable energy systems can offer householders a sustainable solution to reducing their energy dependency and carbon footprint. Recommendations for solar projects are set out in various leaflets within this series: 'A Planning Guide for Householders, Communities and Businesses' and 'Solar Electricity'.

2.1.6 Planning for Renewable and Low Carbon Energy - A Toolkit for Planners (Welsh Assembly Government, 2010b)

The Welsh Assembly Government has made a commitment to tackling climate change, resolving that the Government and the people of Wales will play the fullest possible part in reducing its carbon footprint and meeting statutory UK and EU targets on greenhouse gas emission reduction. AECOM prepared this toolkit to set out how a Local Authority can prepare a robust evidence base to underpin a number of local development plan policies that can support and facilitate the deployment of renewable and low carbon energy systems. It also notes that in changes were made to 'permitted development' rights in September 2009 to make provision for the installation of certain types of micro-generation by householders without the need for planning permission, including solar photovoltaic panels.

2.2 Local Policy Advice

2.2.1 Vale of Glamorgan Local Development Plan (LDP)

In 2013, the Vale of Glamorgan Council published a Local Development Plan (LDP), aiming to foster a sustainable future which manages the natural and built resources of the Vale of Glamorgan, whilst making a positive contribution towards reducing the impact of climate change by promoting sustainable development and transport, energy conservation and renewable energy generation. In particular, one objective is 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. New development will be located in sustainable locations that incorporate sustainable design and building solutions, promote energy conservation and local renewable energy generation and avoid areas susceptible to flooding.

The Managing Development Policy 19 (MD 19) suggests that proposal which provide low carbon and renewable energy generation will be permitted where it can be demonstrated that there will be no unacceptable impact on the interests of the following receptors (including cumulative impacts):

- Agriculture;
- Electrical, radio or other communication systems;
- Landscape important;
- Natural and cultural heritage;
- Nature conservation;
- Residential amenity;
- Soil conservation; and
- Wildlife.

The Council's Renewable Energy Assessment which supported the LDP assessed the potential renewable energy capacity within the Vale of Glamorgan and identified significant opportunities for a range of small scale renewable energy proposals, particularly from micro generation schemes including Building Integrated Renewables (BIR) and biomass schemes.

These generally relate to schemes within the 'micro' (up to 50kw) and 'sub local authority' (up to 5MW) scales defined under national planning policy.

The LDP also notes that, although there are significant opportunities for small scale renewables within the Vale of Glamorgan, there may be occasions where larger scale schemes are technically viable and appropriate in planning terms. These are likely to relate to 'local authority-wide' scale schemes (i.e. schemes from 5MW to 25MW for onshore wind and from 5MW to 50MW for all other technologies). Other larger scale schemes where there is potential and a high level of interest includes proposals for standalone solar farms arrays. Within the Vale, individual solar farm proposals have generally ranged from 5 to 10MW. In assessing 'local-authority wide' scale schemes, the cumulative impact of proposals (when compared with other existing and proposed developments) is likely to be a particularly important consideration.

2.3 Other Considerations

The development of a PV system at the Port of Barry fits with ABP's policy for sustainable development and aspiration to obtain energy from renewable sources. Objectives in ABP's current Sustainable Development Policy (ABP, 2010) include using natural resources in an efficient and responsible manner and ensuring all new developments and business growth prospects have regard for the environment and look for opportunities of environmental improvement. In particular, ABP aims to measure, set targets and reduce carbon, energy usage, water, and waste across the entire business and to formally consider sustainability criteria and best available technology in all business growth opportunities, whilst ensuring that new developments are designed with regard to future climate change impacts.

One of our ABP values is to act as a good neighbour, the purpose of this project is to produce green energy and reduce electricity bills the benefits of which ABP want to share with the local community. ABP therefore also propose to put together a fund alongside this scheme to support the local community.

3. Site Selection and Character

When selecting a suitable site for the solar farm the primary criteria for site selection was the availability of underutilised, brownfield land. As outlined in Section 1 as part of this planning application the site has been refined from an original wider area (e.g. as considered within the screening report and pre application response) to the current size of 16.5 hectares. As part of the planning application process the redline area was refined based on environmental factors such as to avoid potential impacts on a Scheduled Ancient Monument located within the wider area and further archaeological features noted during the assessment work (see Section 4.3 and the Archaeological desk based assessment accompanying this application).

The proposed location of the development is to the east of Dock No 2 and north of Dock No 3. The development is split into two. The south of the site (approximately 5 acres) is an operational inert waste recycling operation that ceased operation in December 2014. The north of the site is a disused coal yard which finished operation in 2013. The middle of the site

contains a strip of predominantly scrub vegetation. The southwest boundary backs onto the entrance channel and east breakwater of the outer harbour of the Port of Barry. In addition, the south east boundary is adjacent to the Bristol Channel and the Hayes Point to Bendrick Rock Site of Special Scientific Interest (SSSI). The Cadoxton River runs alongside the northern boundary of Site where it then flows into the Bristol Channel.

4. Design Principles

4.1 Scheme Design

The proposed development is for a ground mounted solar Photovoltaic (PV) system with an output of approximately up to 10MW, located on a brownfield site within the port estate over an area of approximately 16.5 hectares. The site is an industrial area and not within any statutory or local area designated for landscape quality and nature conservation, making this an appropriate site to consider development of a solar PV system. The life of the proposed PV system will be 25 years.

4.1.1 Ground levelling

A 3D model of the proposed development has been created using LSS Modelling software. As part of the proposed development some levelling of the land is required. A flat development plateau will be created to the south, lying at approximately 12m AOD. The plateau will then gradually slope down to the northeast and to the northwest until the slope converges with the existing level of the old coal yard and Atlantic Way respectively. Cross and long sections have been developed from the 3D model to illustrate the existing and proposed levels within the site boundary; these are shown in the enclosed figures together with a figure showing the location of the sections within the development model and the variation since the previous planning application.

The proposed levelling works will create a development area of approximately 6.1 hectares within the redline boundary, upon which the solar panels will be constructed.

4.1.2 How the scheme will be constructed

The Solar panels will be installed using screw ground anchors as previously discussed with the Vale of Glamorgan Council Planner. Fixed solar panels are proposed approximately 6m apart and angled southwards to maximise power generation. It is anticipated the panels will be up to 1.8m in height. The frame structures consist of steel uprights and aluminium cross bars. Screw anchors are proposed as detailed in Appendix A. The screw ground anchors require no excavation and are also considered to keep construction noise to a minimum, ground anchor length will vary depending on soil conditions from 1m-1.5m max. Image 2 provides an example of how the arrays are expected to look.

Image 2. Image of the likely design of the array and how the panels will be mounted

Fixed solar panels are proposed that can be installed within a few months and removed from the site with minimal effects on the environment. It is anticipated the panels will be up to 1.8 m in height and ground mounted to a shallow depth dependant on ground conditions. An indicative side elevation is shown in Image 3. The frame structures consist of steel uprights and aluminium cross bars. Once the frame is constructed and put into place, the panels will be mounted to the frames, with an expected front height of 0.6 m and back panel height of 1.8m. Please note this is a change from the original application which was up to 2.7m

An indicative site or block plan is provided in Figure 2. The rows of panels will be set back from current bunds on the site to prevent overshadowing. There will also be a separation gap of approximately 3 m between each row of panels to ensure that the panels are not overshadowed and that access can be gained between each row (Image 3).

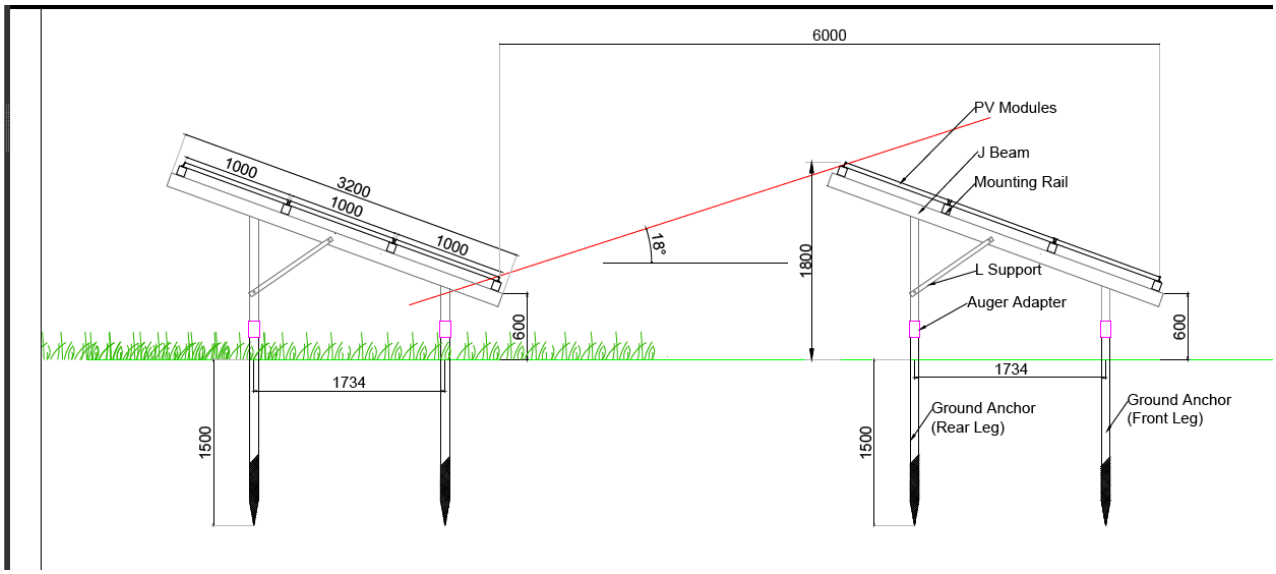

Image 3. Preliminary side elevation and dimensions of the proposed PV scheme at ABP Barry (please note values in the figure are in millimetres)

Details of the proposed development are to be confirmed, however it is likely to include the construction of a security fence and associated infrastructure such as switch gear containers. Green weld mesh fencing approximately 2.9m high is to be utilised to border the perimeter of the site. Appendix B provides further detail. These containers will house the inverters and transformers.

The surface of the panels are made from toughed glass, beneath which is a non-reflective layer, electrical connections, silicon and a backing layer, all fixed within an aluminium frame. Utilising screw anchors means decommissioning will be quick and more visually favourable than utilising concrete ballast feet across the site.

4.2 Grid Connection and cabling

The array will be connected to the grid via two existing sub-stations (Sully Moors Road substation, and Cross Berth Substation). Access to both existing substations is across land owned by ABP.

4.3 Environmental Sustainability

The environmental reports which accompany this planning application provide details of the environmental investigations which were undertaken to determine the potential environmental effects of the proposed solar PV system and to technically underpin the original planning application submitted by ABP. ABPmer produced an environmental screening report (submitted 22nd May 2014) and received a screening opinion from the Vale of Glamorgan

Council (dated 11th June 2014) which confirmed that an Environmental Impact Assessment (EIA) was not required under the Town and Country Planning (EIA) regulation 1999. In addition pre application advice was received from the Vale of Glamorgan Council (letter dated 19th August 2014) for the wider area as originally considered. A copy of these documents is provided separately.

Particular focus in this section has been given to visual impact, flood risk, contaminated land and waste, heritage and archaeology and ecology in response to the formal advice in the form of the screening opinion and pre application advice given by the Vale of Glamorgan Council. The supporting documents forms part of this application and are summarised in this section.

4.3.1 Water Quality and Flood risk

A Flood Consequences Assessment has been carried out by PFA consulting for the proposed redline boundary as part of this planning application and has concluded that the majority of the site is at a very low to low risk of flooding. The northern sector of site has been accessed as an acceptable level of flood risk through ground raising. The Flood Consequences Assessment reports that the proposed site will have adequate flood protection for extreme events over the lifetime of the development and that the risk and consequences of flooding can be acceptably managed. It is also reported that the development will not increase flood risk elsewhere.

4.3.2 Landscape and Visual effects

As discussed in Section 1.1, an updated landscape and visual impact assessment was undertaken by ACLA ltd which considers the site is brownfield, set within an existing industrial context and consequently is considered to have good potential to accommodate change. Overall it concludes that the proposed works as part of this planning application may not be considered greatly adverse or cause unacceptable landscape or visual impacts, subject to proposed mitigation measures.

4.3.3 Geo Environmental risk assessment

A soil and groundwater assessment has been undertaken by ExCAL limited for the original wider area (encompassing site 1 and 2) the site. Historical use of the sites, (specifically site 1 which is within the redline boundary as part of this application), indicate it could potentially have residual contamination of the soils and groundwater beneath it. However a detailed inspection as part of this assessment shows that the majority of the site surface is capped. The construction of the proposed development requires no significant excavations. Therefore based on the data collected, it is considered that the potential risk that may be caused by residual contamination in deeper soils is reduced to an acceptable level by the presence of competent capping layers.

In addition, water samples have been taken as part of this assessment from water that passes through the site and no detectable deterioration in surface water quality was observed. Overall there is no evidence that groundwater is having any adverse impact upon the surface

water receptors in the vicinity of the site. Monitoring is proposed and will be discussed with the regulators and undertaken where necessary.

4.3.4 Heritage and Archaeology

A desk based study including site visit of the wider study area (site 1 and 2) was undertaken by Glamorgan-Gwent Archaeological Trust and is included in the supporting documentation to this planning application. As part of the planning application process the redline area was refined due to factors including to avoid potential impacts on a Scheduled Ancient Monument located within the wider area and further archaeological features noted during desk based study. Consequently a supporting addendum focusing of the refined site for this planning application has also been produced. Based on the redline area in this planning application mitigation is recommended such as a general watching brief with contingencies to record unknown sites or features has been recommended on any ground intrusion works, with particular regard to the area closest to the Scheduled Ancient Monument (SAM GM 310), i.e. the area of the coal yard.

4.3.5 Transport Assessment

A transport assessment has been undertaken by PFA consulting. During the construction period it has been anticipated that there will be approximately 205 HGV deliveries to the site for all equipment and materials. These 205 deliveries will be spread throughout the construction period of the project which is expected to last a minimum of 12 weeks. This equates to the proposed project typically generating no more than 4 deliveries per day. In addition there will be staff trips to the site. It is estimated that there will be no more than 30 staff on site during the construction period. It is expected that the majority of staff will travel to site in crew buses. During the operational stage the proposed project will have negligible trip generation, with trips being made to the site associated only with maintenance or cleaning of the site. Such work is estimated to require 10-20 visits per year.

4.3.6 Ecology

The closest designated site to the proposed works is Hayes Point to Bendrick Point SSSI which is adjacent to the site. Designated in 1986, the SSSI is approximately 29.5 hectares in area and located over a 1.8 km stretch of coastline to the south east of Barry on the northern shore of the Bristol Channel. The two key features of the SSSI are of geological significance, specifically rock exposures and “dinosaur” footprints/tracks. Considering the nature of the significant features of this site and the distance from the proposed developments, no effects on this or any other designated site are anticipated, however consideration will be given to this sensitive area where necessary including as part of the Flood Consequences Assessment.

A Phase 1 ecology survey was undertaken and the results accompany this planning application. Results suggest that there are breeding birds in all areas of dense scrub and scattered trees or woodland.

As a result of the Phase 1 habitat survey, the Environmental Monitoring Plan suggests the following surveys should be conducted bi-annually for 3 years to monitor the ecology of the development:

- All site clearance to be undertaken outside of the breeding bird season, between September to February, inclusive; and
- Remediation of Japanese knotweed from the site.

Detailed mitigation measures have been discussed with the Vale of Glamorgan County ecologist and as a condition of the application an Environmental Management Plan has been produced. Please note this is currently with the Vale of Glamorgan County Planning team.

4.3.6.1 Bats

A bat potential survey was undertaken by Thomson Ecology May 2014 for the original wider area (site 1 and 2) and included the two buildings proposed for demolition as part of the works. No bat potential has been identified for the building proposed for demolition as part of this application (Image 5 referenced as 'B7' and Image 6 'B4' in the associated report). Separate bat activity surveys for buildings identified as having bat potential but outside this planning application have been completed by ABP.

4.3.6.2 Reptiles

Reptile surveys were undertaken by Thomson Ecology (August 2014) the results of which identified a small population of slow worms within the redline boundary. As a consequence a programme of reptile translocation at the site was undertaken in September/October 2014. Herptile fencing was also erected along the translocation site boundary to prevent slow worms from re-entering the site. Following the completion of the translocation works, a destructive search of the area was conducted and no further captures were made.

4.3.6.3 Inverts

The extended Phase 1 habitat survey identified the potential for the site to support assemblages of terrestrial invertebrate species. Therefore invertebrate surveys were carried out which identified one Lauxaniid Fly. Following consultation with the county ecologist, it has been agreed that a 10m wide strip of land, which includes primary habitat where the fly was identified, would be retained along the eastern boundary of the site. To date, no scarce invertebrates have been recorded on site and a report has been submitted separately as part of the planning process.

4.3.6.4 Scarce Plants

As outlined in the extended Phase 1 habitat survey report enclosed, further surveys were recommended to establish if the site qualifies as open mosaic habitat and to record the location of protected plant species if present. A separate priority habitat assessment and scarce plan survey was therefore undertaken including additional surveys undertaken July 2014 (Thomson Ecology, 2014).

In summary no scarce plants were been recorded on site, however open mosaic habitat was identified. Mitigation is to be agreed with the Vale of Glamorgan County Ecologist as part of the proposed works.

4.4 Community safety

The proposed development will be located within the Port of Barry which is privately owned estate with restricted access via a 24 hour controlled gatehouse. The safety of ABP employees, as well as subcontractors, will be maintained during construction works with any potentially hazardous areas, such as cable installation works, being fenced off. The construction process will fall under the Construction Design and Management Regulations and health and safety will therefore be managed through these procedures. The area will be fully segregated by the contractor during the construction process. During operation, the area will be fenced and will be subject to frequent patrols, Close Circuit Television and other security measures. Access to the site will therefore be restricted to ABP employees and authorised contractors.

5. Access Arrangements

All deliveries to the site will come by road transport via the port's main access gate on Atlantic Way. A contractor's compound will be allocated within the Port boundary.

5.1 Public and Disabled Access

The development is located on the Port estate, which is privately owned land that is not accessible to the public, and so there are no formal rights of way crossing the Port of Barry. Access to the port is therefore restricted to ABP employees and authorised tenants and visitors. The site is accessible by road vehicle for construction, operation and maintenance purposes. There are no special access requirements for the site. ABP is committed to the principles of equal opportunity for all and will ensure that access complies with its Equal Opportunities Policy.

6. Summary and Conclusions

This report has assessed the site's full context including physical, social and economic characteristics. The proposal is considered to be compliant with all relevant planning policies, and will not have an adverse environmental impact. The site has been carefully selected and the proposed works are considered to have positive benefits arising from a renewable energy. We hope therefore that the scheme will receive the support of the Council.

7. References

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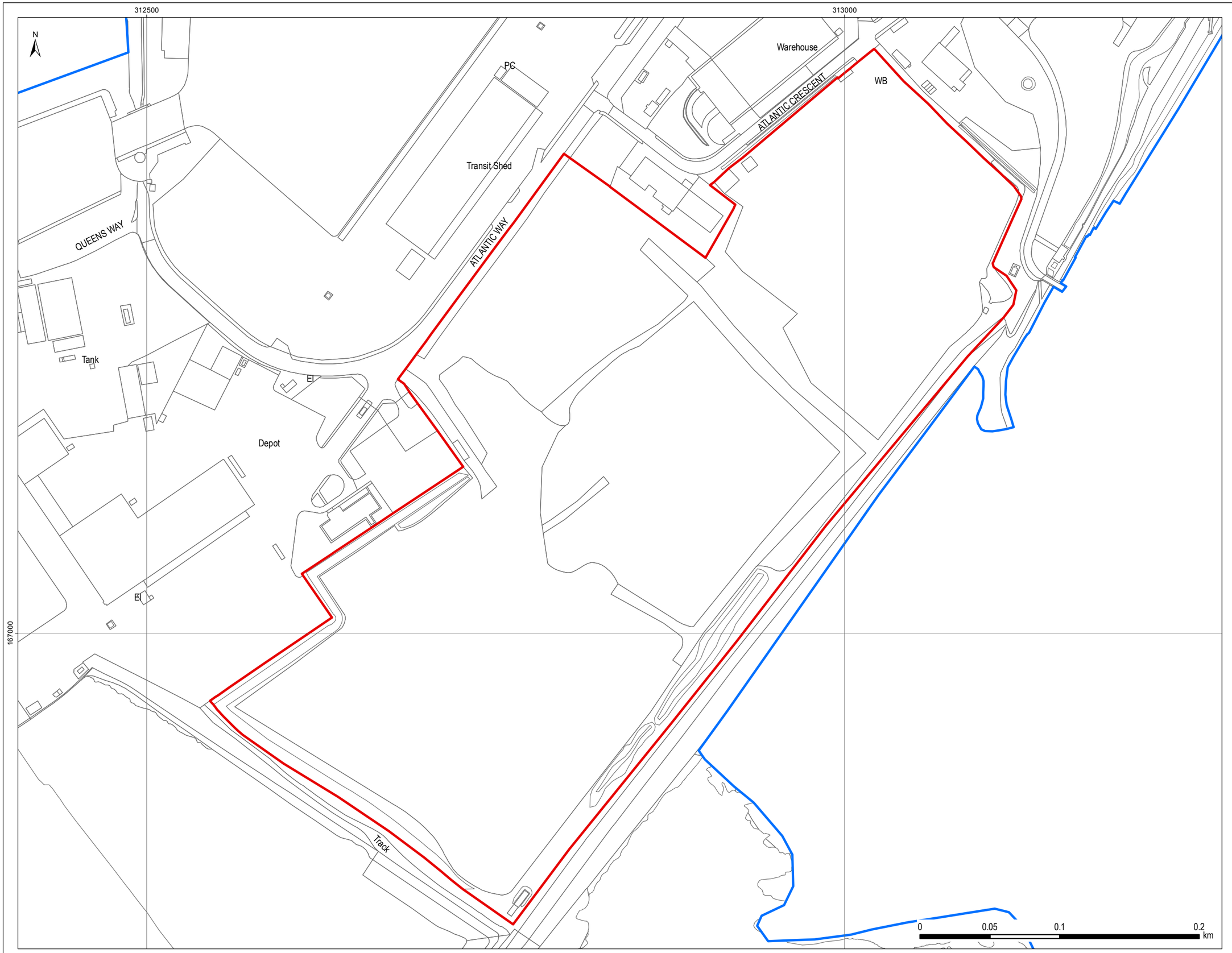
Figures



Blue Line Boundary

Red Line Boundary

Date	By	Size	Version
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Projection		Transverse Mercator	
Scale		1:2,500	
QA		FMM	
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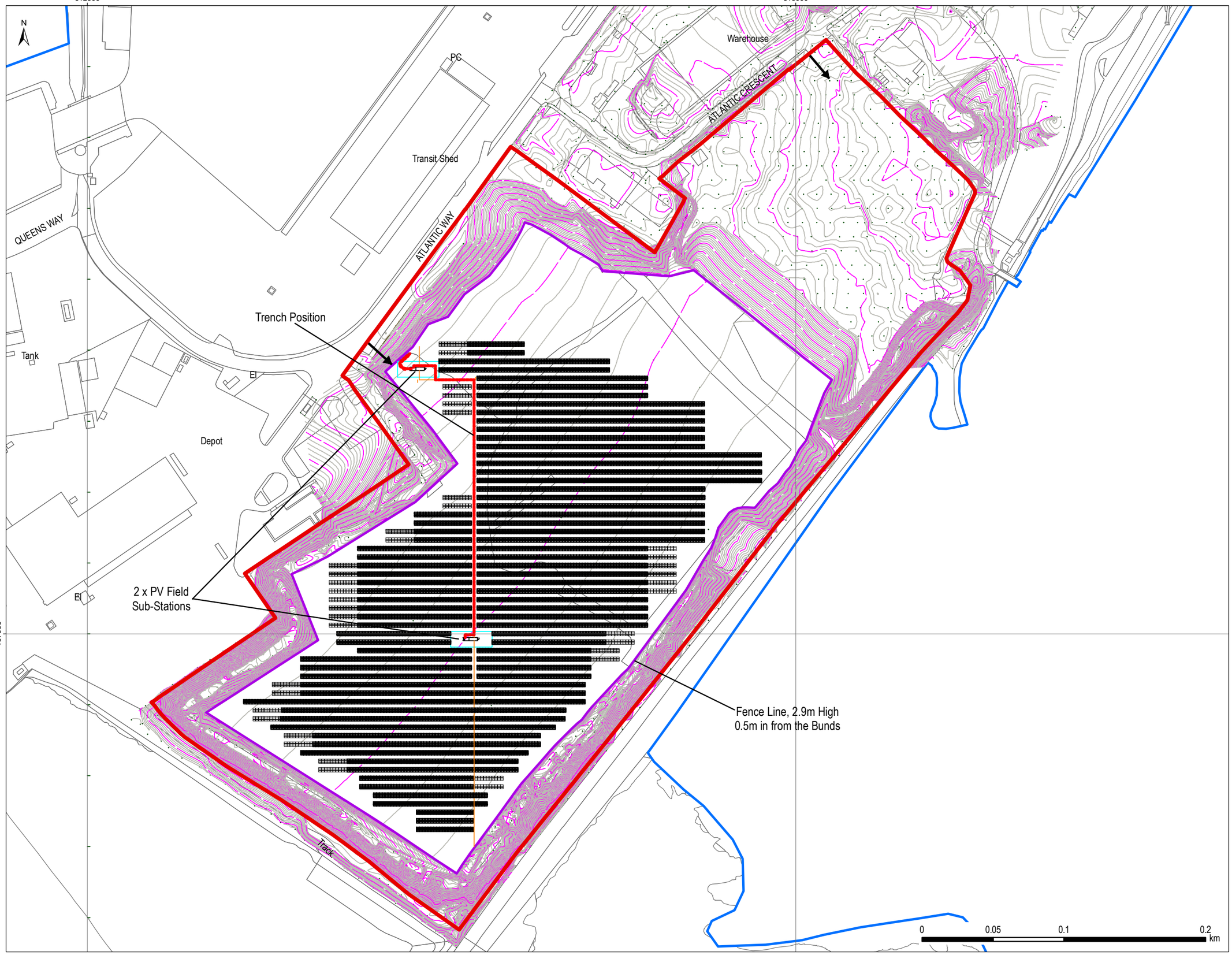
Location Plan

Figure 1



Red Line Boundary
Blue Line Boundary
Solar Array
Site Access Points
Fence Line

Date	By	Size	Version
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Coordinate System	British National Grid		
Projection	Transverse Mercator		
Scale	1:2,500		
QA	FMM		
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Block Plan

Figure 2

Appendices

Appendix A

Screw Anchor Technical Specification

Park Tegra Ground Anchor

TECHNICAL SPECIFICATION

Park Tegra is a range of ground mounted solar solutions suitable for most terrains.

The universal structure has a choice between Ground Anchor (screws into the ground) and Adjustable Feet (connects to ballast). There is up to 0.9m height adjustment between the ground and the bottom of the first module. There is flexibility in the amount of modules in one table. The frames are also suitable for the larger sized modules. The standard issue of frame is suitable for two modules in portrait orientation at 30° module pitch, however bespoke frames are available upon request.

This system is suitable for most framed and unframed module types.

The Park Tegra system can be used with the following Sunfixings accessory range: Sliding Block, Cylinder Head Screw, Ground Anchor, Threaded Rod, Concrete Screw, Middle Clamp, Corner Clamp.

Other suitable Sunfixings' systems include: Park Tegra Ground Anchor, Park Tegra Ballast, Park Tegra Single Structure, Park Tegra Pile Driven (1 or 2 legs).

TECHNICAL DETAILS

Field of Application	Terrain mounted
Suitable Tolerances	Subject to ground conditions
Module Orientation	Portrait (standard), landscape (bespoke)
Connection	Screw into the ground
Material	Aluminium, stainless steel, galvanised steel
Approximate Mass	16 kg/module portrait (excluding mass of module) based on 80x40 MR

R3 Bourton Industrial Park · Bourton on the Water · Cheltenham · Gloucestershire · GL54 2HQ
Tel: +44 1451 824 312 · Fax: +44 1451 824 475 · Web: www.sunfixings.co.uk · Email: info@sunfixings.co.uk

June 2014

Appendix B

Substation Arrangement

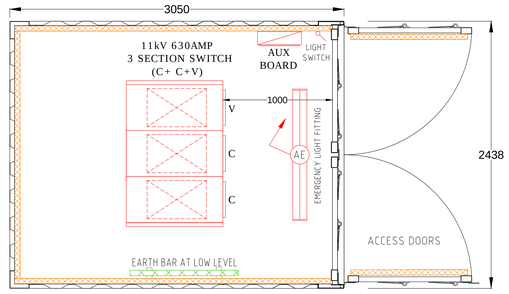
IMPORTANT NOTE.

Patent Pending on the containerised arrangement of all equipment and ancillary items shown upon this drawing.

PACKAGED SUBSTATION ARRANGEMENT

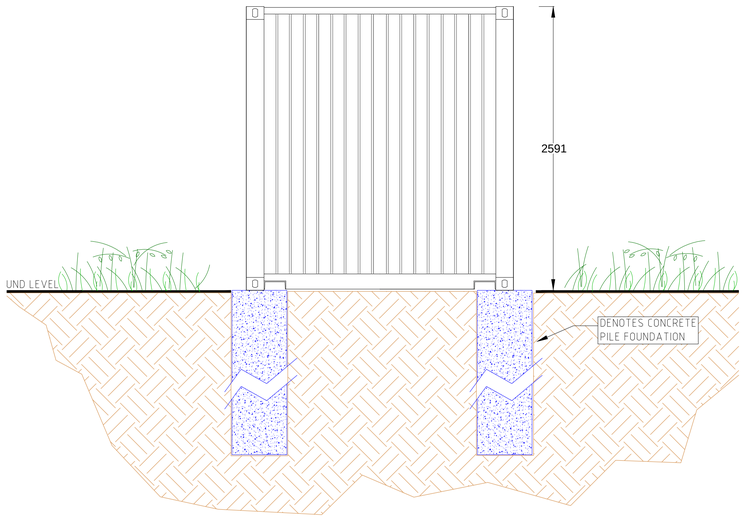
THIS DRAWING IS FOR INDICATIVE PURPOSES ONLY
WE RESERVE THE RIGHT TO CHANGE OR MODIFY AT OUR DISCRETION

SWITCH ROOM TYPICAL EXTERNAL VIEW

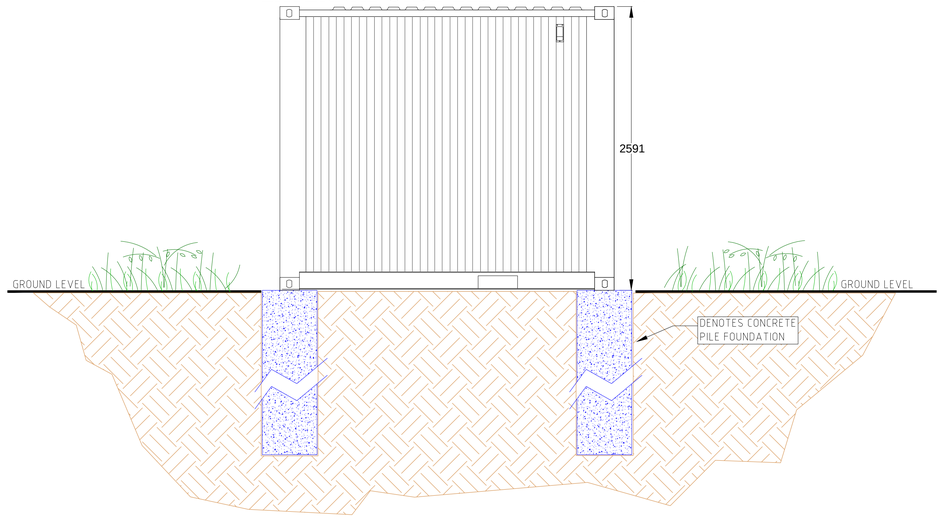


CLIENT EOP HV SWITCH ROOM PLAN LAYOUT

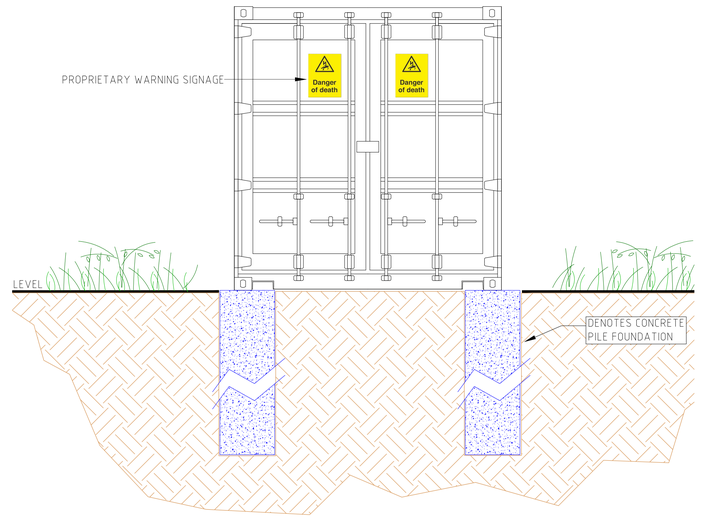
EXTERNAL END VIEW



EXTERNAL SIDE ELEVATION VIEW



EXTERNAL END VIEW



REV	DESCRIPTION	DATE	DRN	CHD	APPD
P1	PROVISIONAL ISSUE	23/02/15	AMc	AM	MJM

STATUS: Provisional

CONTRACT: Barry Island, Wales
4,482kWp Ground Mounted PV Scheme

CLIENT: British Gas Solar

DATE	23/02/15	SCALE	NOT TO SCALE	
DRAWN	A. Counsel	JOB No.	DRG No.	REV
CHECKED	A. McKay	1972	(69) 901	P1
APPROVED	M. J. Middleton			

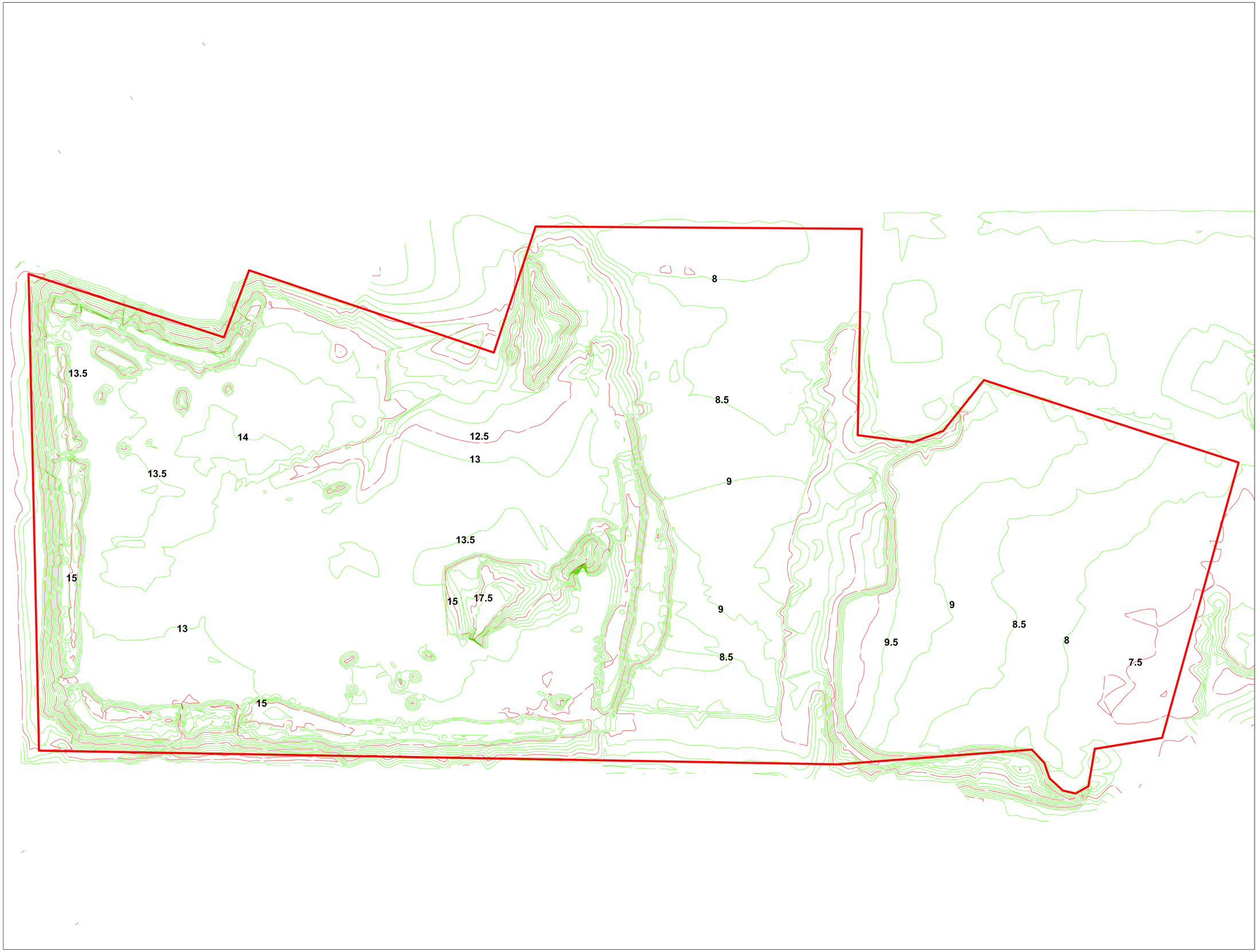
TITLE: Client's EOP HV Switch Room Layout (10Foot Standard)

barratt
CAMELLIA HOUSE, 76 WATER LANE
WILMSLOW, CHESHIRE, SK9 5BB
TEL: 01625 537394

ARCHITECTS BASEPLAN	-	REV	-

Appendix C

Levelling Figures



Notes: **A1**

Job: 234-02-11

Title: December Updated Existing Levels

Date:	January 2015
Scale:	1:750 @A1
Drawn by:	DS
Checked by:	AP

ExCAL Limited

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Website: www.excaluk.com
E-mail: info@excaluk.com

Drawing No: 234-02-11.d11

Revision No:	**Date:**

Notes: **A1**

Red line Boundary

Job: 234-02-11

Title: Jan 2015 Proposed Levels

Date:	January 2015
Scale:	1:1000 @A1
Drawn by:	DS
Checked by:	AP

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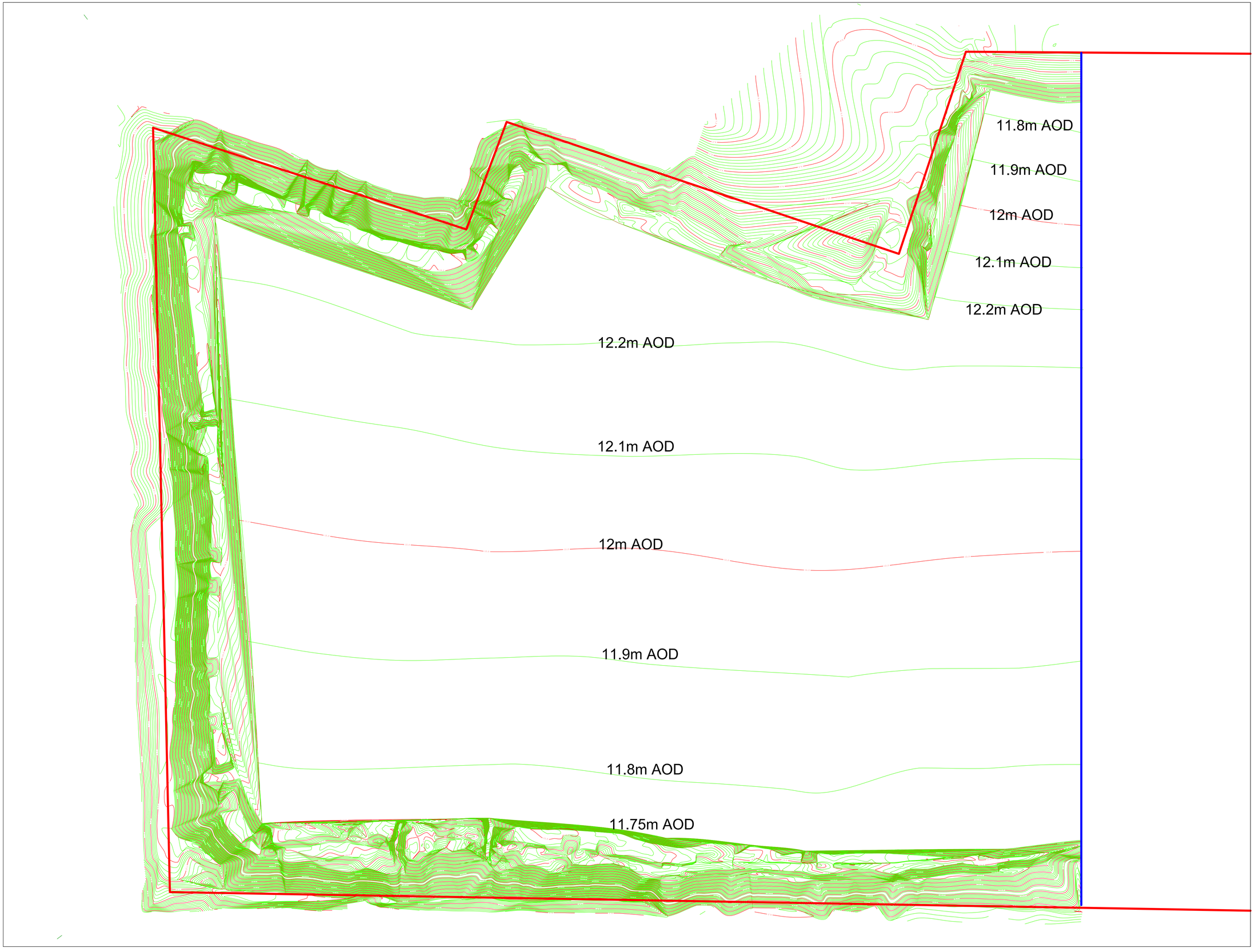
Drawing No: 234-02-11.d12

Revision No:	**Date:**



Notes: A1

Red line Boundary

Approximate Edge of Phase 1 PV Panels

Job: 234-02-11

Title: Jan 2015 Proposed Phase 1Levels

Date:	January 2015
Scale:	NTS
Drawn by:	DS
Checked by:	AP

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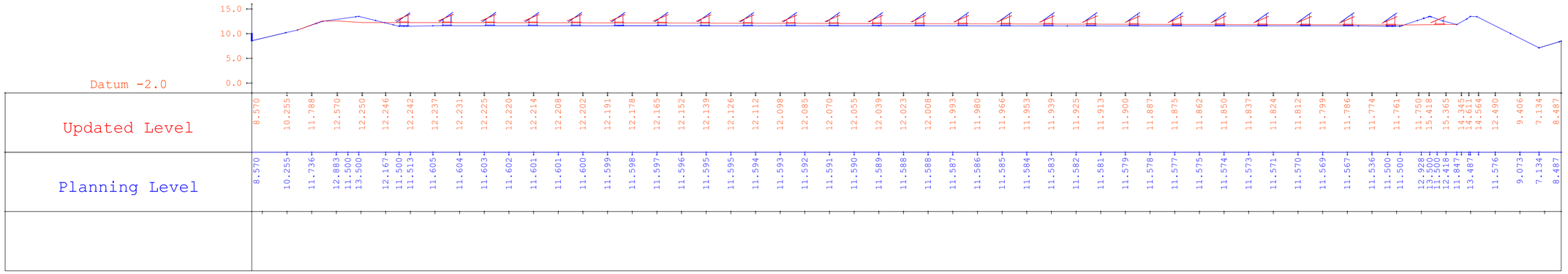
Drawing No: 234-02-11.d13

Revision No:	**Date:**



Section 1 - Inert Recycling Area

Notes: **A1**

Solar Panel

Updated Level and Panel

Planning Level and Panel

Job: 234-02-11

Title: Updated Cross sections with solar panel overlay

Date:	January 2015
Scale:	NTS
Drawn by:	DS
Checked by:	AP

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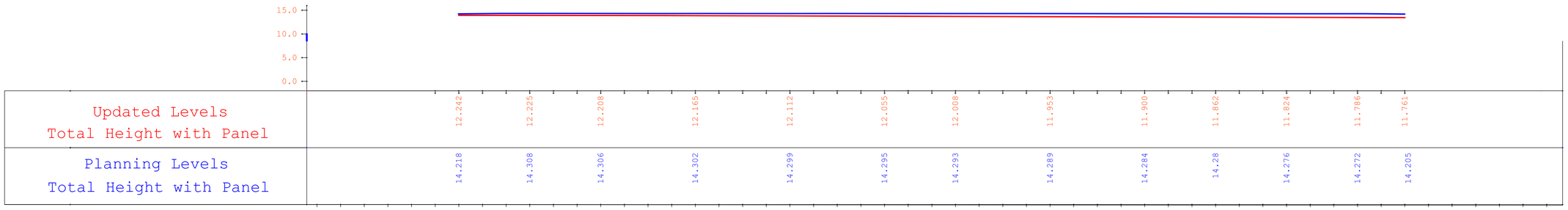
Drawing No: 234-02-11.d14

Revision No:	**Date:**



Section 1 - Inert Recycling Area

Notes: **A1**

Job: 234-02-11

Title: Updated Cross sections showing top of panel

Date:	January 2015
Scale:	NTS
Drawn by:	DS
Checked by:	AP

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Drawing No: 234-02-11.d15

Revision No:	**Date:**

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