



The Abergelli Power Gas Fired Generating Station Order

6.2 Environmental Statement Appendices - Volume A Appendices 3.1 – 3.5

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Appendix 3.1

Outline Construction Environmental Management Plan

Outline Construction Environment Management Plan

Abergelli Power Project
Abergelli Power Limited

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CONTENTS

Abbreviations	1
1. Introduction	1
1.1 Overview	1
1.2 Purpose of this Document	1
1.3 Content and Structure	2
1.4 Construction Phase	3
1.5 References	3
2. Environmental Management Framework	4
2.1 Roles and Responsibilities	4
2.2 Communications and Training	7
2.3 Register of Mitigation	9
2.4 Method Statements and Site Environmental Standards	9
2.5 Monitoring and Auditing	10
3. General Environmental Management Measures during Construction Phase	12
3.1 Safety	12
3.2 Security	12
3.3 Construction Site Housekeeping	13
3.4 Storage of Fuels and Chemicals	13
3.5 Welfare Facilities	14
3.6 Public Right of Ways	14
3.7 Timing of Works	14
3.8 Working Hours	15
3.9 References	16
4. Environmental Management Plans	17
4.1 Overview	17
4.2 Emergency Response Plan	17
4.3 Dust Management Plan	19
4.4 Pollution Prevention Management Plan	21
4.5 Waste and Material Management Plan	22
4.6 References	26
Appendix A	1

Abbreviations

APL	Abergelli Power Limited, the Applicant
BPM	Best Practicable Means
CCS	City and County of Swansea
CEMP	Construction Environment Management Plan
CLG	Community Liaison Group
COSHH	Control of Substances Hazardous to Health
DEFRA	Department for Environment, Food and Rural Affairs
DCO	Development Consent Order
ECOW	Ecological Clerk of Works
EHO	Environmental Health Officer
EIA	Environmental Impact Assessment
EMS	Environmental Management System
ES	Environmental Statement
HGV	Heavy Goods Vehicles
HSE	Health and Safety Executive
IAQM	Institute of Air Quality Management
M	Metre
MW	Megawatt
NETS	National Grid Electricity Transmission System
NRW	Natural Resource Wales
OGCT	Open Gas Cycle Turbine
PPE	Personal Protection Equipment
PRoW	Public Right of Way
RAMS	Risk Assessment / Method Statement
SINC	Site of Importance for Nature Conservation
SWCN	Special Waste Consignment Note
SWTRA	South Wales Trunk Road Agency
WFD	Waste Framework Directive
WTN	Waste Transfer Note

1. Introduction

1.1 Overview

- 1.1.1 This Outline Construction Environment Management Plan (CEMP) has been prepared as part of the Environmental Statement (ES) for Abergelli Power Station (hereafter referred to as the 'Project'). This Outline CEMP has been prepared by AECOM on behalf of the applicant, Abergelli Power Limited (APL).
- 1.1.2 The Project comprises of an Open Gas Cycle Turbine (OGCT) peaking power generating station and supporting infrastructure. The Project is described in detail in **Chapter 3: Project and Site Description** and its location provided in Figure 1.1 and Figure 1.2 of the ES.

1.2 Purpose of this Document

- 1.2.1 The purpose of this Outline CEMP is to set out the approach towards, and framework for, environmental management during the construction phase (including site preparation) and to provide mitigation against potentially adverse construction impacts on environmental resources, local residents and businesses. The Outline CEMP will provide assurance to the decision maker and stakeholders that appropriate measures for preventing and reducing environmental effects will be adopted during the construction of the Project and secured via this document. Both standard environmental good practice and project specific mitigation, as committed to within the ES are included within this Outline CEMP.
- 1.2.2 This Outline CEMP covers all elements of the Project as described in **Chapter 3: Project and Site Description** of the ES, although some measures will only be relevant to particular project elements or specific works, and this will be made clear in the text of the document. The principles of this Outline CEMP set out the standards, environmental management and good practice that will also be consistently applied to the construction of the Gas and Electrical Connections.
- 1.2.3 Post-consent, this CEMP will require updating in accordance with a Development Consent Order (DCO) Requirement and will be approved by CCS (in consultation with Natural Resources Wales) prior to any construction commencing on the Project Site. The approved CEMP will be used as an environmental management and monitoring tool for the duration of the construction phase. The CEMP will be kept on site as a live document, being updated as and when required (for example to recognise changes in regulations, good practice guidance, actions from on site audits or a change in situation onsite).
- 1.2.4 The approved CEMP will fall within the scope of the main contractor's externally certified environmental management systems, and as such will be subject to independent audits by the relevant certification bodies.
- 1.2.5 Measures set out in this document and the approved CEMP will have regard to the Welsh Government document '*Construction and Demolition Sector Plan*' (Ref. 1.1)

which seeks to move towards zero waste by detailing outcomes, policies and delivery actions for organisations, companies and individuals involved with the construction and demolition sector in Wales.

a) Decommissioning

1.2.6 It is anticipated that the environmental effects of the decommissioning of the Project will be similar in size and nature to those associated with construction. A detailed decommissioning methodology cannot be finalised until immediately prior to decommissioning. However the measures and procedures are anticipated to be similar to those set out within this Outline CEMP and updated to align with industry good practice guidance at the time of writing.

1.3 Content and Structure

1.3.1 This Outline CEMP includes the following topics:

- Community liaison;
- Complaints procedures;
- Nuisance management including measures to avoid or minimise the impacts of construction activities (covering dust, noise, vibration and lighting);
- Dust management measures;
- Site waste and materials management measures;
- Pollution control measures;
-
- Security measures and use of artificial lighting;
- A protocol in the event that unexpected contaminated land is identified during ground investigation or construction; and
- Environmental training requirements.

1.3.2 In considering these environmental matters, information is provided on:

- A register of environmental aspects (Section 2.3);
- Roles and responsibilities (Section 2.1);
- Communication and co-ordination (Section 2.2);
- Training and awareness (Section 2.2);
- Checking, monitoring, auditing and corrective action (Sections 2.5 and 3);
- Good practice environmental control measures (Section 3); and
- Where embedded mitigation and additional mitigation has been incorporated and secured (Section 3).

1.3.3 This document should be read in conjunction to other mitigation places such at:

- ES Appendix 3.2: Surface Water Management Plan;
- ES Appendix 3.3a Contraction Traffic Management Plan;
- ES Appendix 3.3b Construction Staff Travel Plan; and
- ES Appendix 3.4: Landscape and Ecology Mitigation Strategy.

1.4 Construction Phase

1.4.1 The construction phase of the Project is anticipated to take approximately 22 months with an anticipated starting date in 2020. A detailed description of the site preparation and construction phase is available in **Chapter 3: Project and Site Description** of the ES.

1.4.2 Site preparation will entail:

- Creating temporary bridges over the Water Main and Oil Pipeline for the Access Road;
- Diverting watercourses and ditches around the Generating Equipment Site and Access Road;
- Creating attenuation ponds;
- Excavation of material of the new Access Road;
- Site clearance including vegetation clearance and topsoil stripping/excavations;
- Establishing Laydown Area, site compounds and installing welfare facilities;
- Ecological mitigation works which may be required pre-construction; and
- Conducting geotechnical investigations and any other pre-construction surveys.

1.4.3 The main activities associated with the construction phase will be:

- Excavation and site levelling for new foundations and piling if required. The need for piling will be determined through pre-construction ground investigations;
- Access Road paving;
- Creation of drainage features (not including the attenuation pond);
- Heavy Goods Vehicles (HGVs) Deliveries of materials and equipment;
- Erection and fitting out of buildings;
- Installation of the generating plant on completed foundations including auxiliary equipment such as electrical switchgear and fuel handling equipment;
- Excavation and laying of the Electrical Connection, which will include going under the Oil Pipeline and Water Main and reinstating the excavated material once the Electrical Connection has been laid; and
- Excavation and laying of the Gas Connection; and
- The construction of cable ducts alongside the Access Road.

1.5 References

- Ref. 1.1 Welsh Government. (2012). Construction and Demolition Sector Plan. Towards Zero Waste One Wales: One Planet. [Online]. Available: <http://gov.wales/docs/desh/publications/130301construction-demolition-waste-plan-en.pdf> [Accessed: 25/10/17].

2. Environmental Management Framework

2.1 Roles and Responsibilities

2.1.1 The following sections outline the responsibilities for those parties involved in the construction phase of the Project. These roles and responsibilities are indicative and may interchange between APL and the main contractor(s), and are not exhaustive.

a) APL

2.1.2 In terms of environmental management, APL is responsible for the overall delivery of the Project in compliance with relevant environmental legislation, the mitigation set out in this Outline CEMP and any Requirements to be implemented as part of the DCO.

2.1.3 APL will ensure that there is a dedicated Environmental Manager who will either be employed by APL or a nominated member of the main contractor's staff. The proposed role and responsibilities of the Environmental Manager are described below, starting in paragraph 2.1.8.

2.1.4 APL's role will include (but is not limited to):

- Ensuring the CEMP is finalised, implemented and monitored by the main contractor(s);
- Ensuring all the following factors are considered and appropriately actioned;
 - The most appropriate order and method of working;
 - Allocation of responsibilities between personnel, and other organisations on the Project Site; and
 - The approved CEMP is prepared and issued in a controlled way.
- Communications and Training (Section 2.2):
 - Ensuring that environmental meetings are held regularly and that environmental issues are covered as appropriate;
 - Regular liaison between all parties on the Project Site to ensure adequate precautions are taken to minimise the impact on the environment;
- Monitoring and Auditing (Section 2.5):
 - Ensuring that the main contractor(s) comply with the good practice, mitigation measures, set out in the CEMP and DCO Requirements through review of an Audit Close-Out Schedule;
 - Ensuring that all environmental incidents are reported and investigated where appropriate; and
 - Ensuring environmental inspections of the Project Site are performed and all issues raised are addressed promptly.

b) Main Contractor(s)

2.1.5 The main contractor(s) will be appointed by APL to undertake the construction of the Project. The main contractor(s) are required to comply with the mitigation and provisions within the Outline CEMP along with any Requirements imposed in the

DCO and/or licences and secondary consents associated with the Project. This also applies to any sub-contractors engaged on the Project. The main contractor(s) would also be a member of the Considerate Constructors Scheme.

2.1.6 If not already implemented by APL, the main contractor(s) will have a nominated environmental contact to perform the role of Environmental Manager, a description and list of responsibilities for the role are set out in the section below starting in paragraph 2.1.8.

2.1.7 The responsibilities of the main contractor(s) will also include (but are not limited to):

- Ensuring employees and sub-contractors implement the controls outlined in the finalised and approved CEMP;
- Communications and Training (Section 2.2):
 - Liaising with statutory authorities and APL as required and ensuring records of communication (including verbal communication) are kept;
 - Ensuring employees and sub-contractors receive Site Inductions (that include environmental issues) and toolbox talks, as appropriate;
 - Ensuring environmental management and emergency response training is provided and recorded.
- Monitoring and Auditing (Section 2.5):
 - Ensuring personnel needed for audits are available when required;
 - Verifying actions resulting from Corrective Action Requests (procedure used to originate a corrective action), Non-Conformance notices (notice issued to the main contractor(s) for conflicts with the contract documents) and Observations raised during audits are completed by the deadlines;
 - Verifying actions resulting from Corrective Action Requests, Non-Conformance notices and Observations raised during audits are completed by the deadlines and recorded appropriately.

c) Environmental Manager

2.1.8 APL or the main contractor(s) will appoint a suitably qualified Environmental Manager for the duration of the construction of the Project and during any restoration works. The purpose of this appointment is to ensure that the environmental interests of the Project Site are safeguarded. The Environmental Manager will have the authority to review method statements, oversee works and recommend action as appropriate. This includes having the authority to temporarily stop works if required, for example, where poor practices are being applied or mitigation is not being appropriately implemented or adhered to.

2.1.9 The Environmental Manager will work with the main contractor(s) to ensure the implementation of, and compliance with, the provisions of the approved CEMP and licences, consents or other conditions imposed on the Project.

2.1.10 A detailed description of the Environmental Manager's responsibilities will be included in the finalised version of the CEMP however, in summary the Environmental Manager will be responsible for:

- Ensuring any pre-construction environmental surveys are scheduled into the construction programme and conducted prior to works commencing;
- Inspections of works to ensure that environmental mitigation measures and other commitments have been and/or are being implemented;
- Implementation of additional mitigation other than those committed to where unforeseen circumstances arise that could result in a breach of environmental legislation;
- Monitoring and Auditing (Section 2.5):
 - Conducting weekly site inspections and record keeping of environmental sensitivities and requirements;
 - Conducting or coordinating monthly routine audits of the main contractor's compliance with the approved CEMP including construction activities and record keeping;
 - Coordinating and organising any regular monitoring requirement or commitment;
 - Regular reporting to CCS summarising the works undertaken on the Project; and
 - Monitoring or inspection of onsite activities in response to incidents, breaches of the approved CEMP or complaints received from a third party.

d) ECoW

2.1.11 The Environmental Manager may be assisted by an Environmental Clerk of Works (ECoW). The ECoW will perform specific specialist tasks that require expert knowledge, such as observations and watching briefs. The ECoW role may be performed by a suitably qualified individual or a team of individuals with differing expertise.

2.1.12 The responsibilities of the ECoW will be finalised in the approved CEMP, but may include:

- Any pre-construction surveys requiring specialised skills;
- Watching briefs or observations of specific construction activities i.e. vegetation clearance;
- Any auditing or monitoring requiring specialised skills; and
- Input into topic specific toolbox talks and training.

e) All Site Personnel

2.1.13 All site personnel have a responsibility to the environment, which includes, but is not limited to:

- In the case of an incident, stopping work, implementing control procedures and reporting it to the appropriate personnel as identified by the main contractor(s) in the finalised CEMP;
- Reporting when waste needs collecting;
- Passing any queries or correspondence on environmental issues to the appropriate personnel as identified by the main contractor(s) in the finalised CEMP; and
- Working in accordance with the finalised and approved CEMP and associated management plans. Protocol to support adherence is set out in the Communication and Training section (starting paragraph 2.2.2) of this Outline CEMP.

2.2 Communications and Training

a) Community Liaison

2.2.1 The following steps will be taken by APL/the main contractor to make the public aware of the activities onsite and the available lines of communication with the Project:

- Neighbouring residents and occupiers will be notified of the start of construction activities, the likely duration of the construction phase, of any changes to the working hours as agreed with CCS and of periods when higher levels of noise may be expected;
- There will be a community liaison group (CLG) established for facilitation two-way communication between the public and the Project, which will meet on a regular basis.
- A telephone number for environmental complaints will be published local to the Project Site. There will be a dedicated person responsible for dealing with any complaints, which could be the Environmental Manager. This person will have the appropriate authority to resolve complaints. An 'out of hours' telephone number will be made available if required. A Welsh speaker can be available at request;
- Liaison will be maintained with CCS's Environmental Health Officer (EHO) for the duration of the construction phase;
- Should any complaints regarding dust or noise be received the details will be passed to the EHO for verification purposes; and
- Should any unforeseen event occur on the Project Site that has the potential to cause pollution then the relevant regulatory bodies will be notified immediately. As far as possible, notice will be issued to the EHO for dealing with an unforeseen activity that may give rise to a particular nuisance problem.

b) Environmental Site Meetings

2.2.2 To ensure dissemination of environmental information, environmental meetings will be held throughout the duration of the Project construction. The frequency of meetings will be determined by the main contractor(s), but will not be less than

once per month. These meetings will be held for all site personnel and will be attended by the ECoW or similar environmental expert (if required).

- 2.2.3 Any environmental issues or lessons learnt will be reported at these meetings along with any updates or changes to environmental management plans. A “Look Ahead” at relevant environmental management or special requirements linked to specific upcoming tasks or seasonality will also be provided.

c) Site Signage and Notice Boards

- 2.2.4 Working areas will be clearly marked with appropriate signage and warnings to ensure that they are avoided by members of the public.
- 2.2.5 Site notice boards for disseminating information to Site personnel will be positioned either within individual work stations or in a centralised location. Site notice boards will display method statements, emergency contacts, and relevant statutory and non-statutory advice and guidance.

d) Site Inductions

- 2.2.6 The main contractor(s) will ensure all employees, sub-contractors, suppliers, and other visitors to the Project Site receive induction training. The Site Induction will include a summary of environmental risks associated with the Project and the onsite environmental methods and standards. Any environmental methods and standards specifically relevant to the inductee’s role or task will be highlighted.
- 2.2.7 Topics that will be covered in the Site Induction include, but are not limited to;
- Pertinent areas of environmental sensitivity, such as ecological, archaeological, hydrological or geological sensitive areas;
 - Pollution prevention and protection of the water environment (including concrete washout);
 - Waste management; and
 - Environmental incident and near miss reporting.

e) Training in Environmental Requirements

- 2.2.8 The main contractor(s) will ensure all personnel are suitably trained in general site good practice and environmental emergency response procedures, including the use of spill kits, silt mitigation and concrete washing out. Good practice and emergency response training will be provided by a suitably qualified person on a regular basis. The main contractor(s) will keep a record of this training.
- 2.2.9 Toolbox talks will be provided as part of briefings on specific tasks, based on method statements and environmental standards. They will provide on-going reinforcement and awareness of environmental sensitivities and issues on the Project Site. Toolbox talks will be task specific and will identify the sensitive receptors and provide advice on any specific procedures that need to be followed and the mitigation measures that should be implemented. For specialist topics,

toolbox talks may be presented by an ECoW (or equivalent suitably trained specialist).

- 2.2.10 A programme of relevant toolbox talks will be drawn up by the Environmental Manager or main contractor(s) based on upcoming construction activities. Additional toolbox talks may be required outside of this based on circumstances such as unforeseen risks, repeated observation of bad practices, perceived lack of awareness, or a pollution event. A record of all toolbox talks reporting highlights of the meeting and attendees will be maintained.

2.3 Register of Mitigation

- 2.3.1 A register of embedded and additional mitigation measures committed to within the ES has been attached in Appendix A: Mitigation Register to this Outline CEMP. The Register has been updated in response to consultee comments and updated EIA technical assessments. This Register will be used to inform the onsite environmental management and provide a tool for aiding the preparation of method statements or environmental standards. The register covers several environmental topic areas and will be regularly updated to reflect any additional risks resulting from the main contractors selected methods of working, changing site conditions etc. Mitigation measures have been identified under the following general headings:

- General;
- Air Quality;
- Noise and Vibration;
- Ecology;
- Water Quality and Resources;
- Geology, Ground Conditions and Hydrogeology;
- Landscape and Visual;
- Traffic, Transport and Access; and
- Historic Environment.

2.4 Method Statements and Site Environmental Standards

- 2.4.1 The main contractor(s) will prepare Method Statements for specific construction activities and Site Environmental Standards for day-to-day Project Site operations such as housekeeping, material storage and waste management. These will be based on standard good practice measures (as set out within relevant management plans in Section 3 of this Outline CEMP), statutory requirements, environmental sensitivities and any Requirements of the DCO.
- 2.4.2 Site Environmental Standards will be printed on A3 posters, placed on site notice boards and used as a briefing tool onsite. They will also form the basis of toolbox talks on the relevant Project Site operations.
- 2.4.3 The method statement will be communicated to all or task specific personnel ahead of the commencement of the relevant activities using an agreed instruction format (e.g. toolbox talks).

2.5 Monitoring and Auditing

a) Inspections

2.5.1 The Project Site will be inspected at regular intervals to ensure implementation of good practice and compliance with measures set out within the approved CEMP. The inspection and auditing schedule for the Project will be agreed by the main contractor(s) in consultation with the Environmental Manager and ECoW if required prior to commencement of construction. It is anticipated that there will be a programme of:

- Daily inspections;
- Weekly inspections;
- Monthly Audits;
- Monthly Complaint Reporting; and
- Ongoing Environmental Monitoring.

2.5.2 Particular notice will be taken during and following extreme weather events (high rainfall, high winds, snowfall etc.), when working in areas of known contamination, and when particularly hazardous activities are being carried out. Additional Method Statements or Site Environmental Standards will be produced where significant risk to the environment is identified.

2.5.3 An Audit Close-out Schedule will be maintained by the main contractor(s). This is a document to record any observations, corrective action requests or non-compliance notices identified through inspections. Progress against corrective and preventative actions logged in the Schedule will be reported to APL on a regular basis.

i. Daily Inspections

2.5.4 The nominated site personnel or the Environmental Manager will conduct daily checks against environmental requirements. This could be done against a pro forma or similar, based on the measures outlined within method statements and Environmental Standards relevant to activities being conducted on that day.

2.5.5 Daily inspections will include visual inspections of dust emissions as described in Section 4.3.

ii. Weekly Inspections

2.5.6 Weekly Project Site inspections will be carried out by the Environmental Manager, which will assess the effectiveness of the implemented mitigation on the Project Site.

iii. Monthly Audits

2.5.7 Compliance with the approved CEMP, environmental legislation and good practice will be audited on a monthly basis by the Environmental Manager or ECoW. The audit will include details on who is responsible for implementing any action required and the associated timescales.

iv. Monthly Complaints Reporting

- 2.5.8 The main contractor(s) will report to APL regarding any nuisance complaints from the general public and actions on how these have been addressed. The process for receiving and taking action on complaints is set out in the Community Liaison (paragraph 2.2.1).

v. Environmental Monitoring

- 2.5.9 Any requirements for specific monitoring programmes as determined through the DCO or pre-construction surveys (i.e. ground investigations) will be conducted at appropriate intervals by a suitably qualified individual.

b) Incidents and Near Misses

- 2.5.10 An indicative environmental Emergency Response Plan is detailed in Section **Error! Reference source not found.** of this Outline CEMP. This will be finalised by the main contractor(s). The plan in the approved CEMP will follow the stop – contain – notify protocol and will detail responsible personnel and contacts for reporting. All personnel will be briefed on the notification protocol for alerting the main contractor(s) and Environmental Manager of an environmental emergency as part of their Site Induction. Environmental emergency response training and toolbox talks will also be conducted at regular intervals by a suitably qualified person.
- 2.5.11 The main contractor(s) will maintain a register of all environmental incidents, dangerous occurrences and/or near misses, each supported by an Environmental Incident Report Form. This will document the nature, date and time of the incident, corrective action(s) taken, and details of any contact with regulatory agencies. All incidents will be reported to the appropriate regulatory body and APL on the day that they occur or within 24 hours.
- 2.5.12 All environmental incidents, dangerous occurrences and near misses will be reviewed by the Environmental Manager and where necessary changes to working practices/procedures will be implemented. Lessons learnt, along with any updates to method statements, sections of the approved CEMP and toolbox talk will be communicated to all personnel at Environmental Site Meetings.

3. General Environmental Management Measures during Construction Phase

3.1 Safety

3.1.1 The main contractor(s) will have the day to day responsibility for maintaining Health and Safety throughout the construction phase. A risk assessment and method statement (RAMS) will be produced and detail how risk will be minimised through an approved procedure, which will:

- Identify the significant Health and Safety impacts that can be anticipated;
- Assess the risks from these impacts;
- Identify the control measures to be taken and re-calculate the risk; and
- Report where an inappropriate level of residual risk is identified so that action can be taken.

3.1.2 There will be no access to construction areas by the general public. The Project Site will be secured to avoid unauthorised access including where permissive routes cross the construction areas.

3.1.3 Traffic safety should be promoted by all project personnel to prevention and control traffic related injuries. Speed restrictions will be imposed onsite. This will also minimise disturbance of bare surfaces.

3.1.4 The following good practice measures will be implemented by the main contractor(s) to ensure the safety of site personnel:

- The provision of appropriate Personal Protective Equipment (PPE), including footwear, masks, protective clothing and goggles where required;
- Eating, drinking and smoking will be limited to a designated 'clean' area of the Project Site;
- Welfare facilities will be made available;
- All site personnel will be required to wash their hands and remove overalls/boots when moving from 'dirty' to 'clean' areas of the Project Site;
- Any soils excavated that are considered by the main contractor(s) to be potentially contaminated will be reported, left in situ and fenced off until their appropriate treatment (in line with Section **Error! Reference source not found.**: Emergency Response Plan); and
- Water inflows to excavated areas will be minimised by the use of lining materials, good housekeeping techniques and by the control of drainage and construction materials in order to prevent the contamination of ground water.

3.1.5 The main contractor(s) will ensure that qualified first-aid can be provided at all times. Appropriately equipped first-aid stations will be easily accessible throughout the Project Site.

3.2 Security

3.2.1 During site preparation the perimeter of the Generating Equipment Site will be cleared of undergrowth and a permanent or temporary security fence placed with

locked gates for main and emergency exits (capable of being opened in an emergency).

3.3 Construction Site Housekeeping

3.3.1 Good construction site housekeeping practice will be applied at all times. As far as reasonably practicable the construction working areas for the Project Site will be designed using the following principles:

- All work areas will be secured;
- Any fuels or liquid materials will be stored and bunded in compliance with the relevant regulation;
- Signage and boundary fences will be regularly inspected, repaired and replaced as necessary;
- All working areas will be kept in a clean and tidy condition;
- Wheel washing and dust suppression facilities will be provided when and where required;
- Waste will be removed at frequent intervals; and
- Construction waste susceptible to spreading by wind or liable to cause litter will be stored in secure containers.

3.4 Storage of Fuels and Chemicals

3.4.1 The main contractor(s) will ensure that fuels and chemicals are stored appropriately and the measures are in place to prevent pollution of ground and water. Fuel will be stored:

- In areas where potential for contamination of water bodies is low i.e. outside 50 m of a spring, well or borehole and 10 m of an open watercourse;
- In areas that are low risk of flooding;
- In tanks that meet the manufacturing standards appropriate for the type of oil stored and comply with BS EN ISO 9001;
- With contents clearly marked on the storage containers;
- With secure and appropriately sized bunds being suitable to contain 110% of the contents (single tank). If there is more than one storage container, the bund will be capable of containing 110% of the largest tank, or 25% of the total aggregate capacity, whichever is the greatest;
- Tanks/ storage containers will be protected against vehicle collision; and
- All deliveries will be overseen by site personnel with emergency response training.

3.4.2 A Control of Substances Hazardous to Health (COSHH) store will be set up in the site compound. COSHH assessments and Material Safety Data Sheets will be held with the COSHH materials. A COSHH register will be created and maintained onsite.

3.4.3 All site personnel and sub-contractors will be made aware of the COSHH requirements through site inductions and specific toolbox talks. Daily site inspections will be used to review and monitor the storage and issue of COSHH materials.

3.5 Welfare Facilities

- 3.5.1 Welfare cabins, toilets and drying facilities, in line with The Construction (Design and Management) Regulations 2015 (Ref. 3.1) will be provided within the Project Site for the use of site personnel. Grey and foul water from welfare facilities will not be discharged directly into ditches or watercourse, but will be collected through a foul water drainage system that will either drain to a septic tank or a package treatment plant within the Project Site. It is likely that the latter will be the preferred option for ease of maintenance and environmental criteria. The processed water will then discharge onsite or to a nearby watercourse.
- 3.5.2 Where portable generators are used, industry good practice will be followed to minimise noise and pollution from such generators.
- 3.5.3 The risk of infestation by pests or vermin will be minimised by the appropriate collection, storage and regular collection of waste, the prompt treatment of any pest infestation and effective preventative pest control measures.

3.6 Public Right of Ways

- 3.6.1 There are three Public Right of Ways (PRoW) that cross the Project Site. Specific mitigation measures for the management of these PRoWs is contained within the Outline Construction Traffic Management Plan, which will be finalised post-consent, in consultation with the PRoW officer at CCS.
- 3.6.2 It is not proposed to permanently divert any PRoWs although measures will be implemented during the construction phase to maintain safety to users from construction traffic and also from any excavations which may be present. Any temporary closures, required for public safety, will be advertised in advance and diversions or directions to alternate routes will be provided where practicable.
- 3.6.3 Appropriate signage will be placed prior to the construction area to ensure users are aware of the works prior to arriving. Should works be undertaken in the immediate location of the crossing, banksman will be employed to avoid any potential adverse effects from construction traffic. In addition, suitable fencing will be implemented to ensure users of the permissive routes are segregated from construction traffic appropriately and safely if required.

3.7 Timing of Works

- 3.7.1 Construction will be programmed in such a way as to ensure that construction activities are undertaken in a timely manner while minimising environmental risk as far as possible, e.g. seasonal sensitivities or inclement weather will be considered. Construction activities may be undertaken simultaneously at more than one area of the Project Site. The work programme will be agreed with CCS prior to construction commencing onsite. In the event that the programme changes significantly, the changes will be communicated to CCS.
- 3.7.2 Construction activities will be scheduled so that works that have the potential to impact upon ecological receptors are conducted outside key periods of seasonal

activity, for instance, vegetation clearance will be conducted outside of the breeding bird season.

3.7.3 Construction activities will also be scheduled, where possible to reduce the risk of pollution. Measures include:

- Minimising the periods for which soils are exposed and stockpiled thereby reducing the risk of generating silt laden runoff;
- Avoiding, where possible, undertaking specific activities such as earthworks during prolonged and heavy rainfall thereby reducing the risk of sediment or pollutants becoming entrained in excess runoff; and
- Avoiding, where possible, undertaking activities in closer proximity to watercourses when water levels are higher and adjacent land is at risk of flooding.

3.8 Working Hours

3.8.1 Construction activities will not take place outside the hours of 08:00-18:00 Monday to Friday and 08.00-13.00 on Saturday and public holidays, unless otherwise agreed with CCS. These limits will not apply during commissioning and completion of the Project, as defined in **Chapter 3: Project and Site Description** of the ES. Local residents will be notified, as detailed in Section 2.2 Community Liaison, of any agreed changes to the working hours. Lighting

3.8.2 The Project Site will require artificial lighting during construction to provide a safe working environment during hours of darkness. Artificial lighting can be a nuisance to any nearby residence and can disrupt nocturnal species.

3.8.3 All artificial lighting used at the Project Site will be in accordance with the Institute of Lighting Professionals (ILP) Guidelines (Ref. 3.2) and the Bat Conservation Trust's (BCT) interim guidance on artificial lighting and wildlife (Ref. 3.3).

3.8.4 In order to minimise light disturbance to ecological receptors:

- There will be no more than 1 lux beyond the boundary of the proposed Project Site, particularly within the Lletty-Morfil Site of Importance for Nature Conservation (SINC) to the north and east of the Generating Equipment Site, which is a habitat that supports bats; and

3.8.5 The general design objectives that will be used to ensure that adverse effects of lighting (through adding light to a darker rural landscape) associated with construction of the Project are minimised are listed below:

- Luminaires will be appropriately designed for the required task;
- Louvres and shields will be used to prevent undesirable light break-out;
- Construction lighting will be directed away from all sensitive receptors;
- For the illumination of large areas, in order to limit light trespass, glare and sky glow from the plant, preference will be given to several, lower lighting units rather than tall, wide beam lighting units;
- Vehicle lights will be properly directed (conforming to MOT requirements) and lenses will be intact to prevent un-necessary glare and light intrusion;

- Lighting will be reduced or switched off when not required for safety purposes;
- Security lighting will be kept at the minimum level needed for visual and security protection;
- Dark corridors will be maintained along hedgerows and watercourses and any other linear features by avoiding light encroaching on these areas. This will avoid the fragmentation of habitat used by species such as bats and also otters that use these features to move at night-time; and
- If appropriate, the use of infra-red floodlighting and CCTV systems will be considered for security to reduce the need for visible lighting outside working hours.

3.9 References

- Ref. 3.1 The Construction (Design and Management) Regulations 2015. S.I. 2015/51.
- Ref. 3.2 ILP. (2011). Guidance Notes for the Reduction of Obtrusive Light. [Online].
Available: <https://www.theilp.org.uk/resources/free-resources/ilp-guidance-notes/>
[Accessed: 30/11/17]
- Ref. 3.3 BCT. (2014). Artificial Lighting and Wildlife. Interim Guidance: Recommendations to Help Minimise the Impact Artificial Lighting. [Online].
Available: http://www.bats.org.uk/pages/bats_and_lighting.html
[Accessed 07/12/17].

4. Environmental Management Plans

4.1 Overview

- 4.1.1 The following sections outline the likely contents of the topic specific Management Plans that will be developed to be submitted to discharge a DCO Requirement post-consent.
- 4.1.2 Other than the Emergency Response Plan which is integral to the CEMP, these plans will be subject to their own separate Requirement in the DCO and finalised as required via standalone documents.

4.2 Emergency Response Plan

- 4.2.1 This plan provides response measures for potential environmental emergencies that could arise during the construction of the Project. These include; discovery of unknown contaminated ‘hotspots’; spills of contaminants such as chemicals, fuels or waste materials; and entry of contaminants into watercourses during flood events.
- 4.2.2 This Emergency Response Plan will be reviewed by the main contractor(s) and finalised in the approved CEMP. The main contractor(s) will also supply emergency contact details for nominated site personnel, relevant regulatory bodies and emergency services. These details will be available on site notice boards (paragraph 2.2.5) and will be displayed along with a plan of the Project Site that displays safe storage areas and the location of response equipment, such as spill kits.
- 4.2.3 The emergency plan and contact details will be shown to all site personnel as part of the Site Induction. Nominated site personnel will be provided with emergency response training. There will be regular toolbox talks on emergency response procedures and all site personnel will be informed of the notification procedure in the event of discovering contamination or a spill as part of the Site Induction.
- 4.2.4 All incidents where the Emergency Response Plan is implemented will be reported in line with the Incident Response Procedure detailed in Section 2.5: Monitoring and Auditing (starting paragraph 2.5.10).

a) Contaminated Hotspots Plan

- 4.2.5 Ground investigations will be conducted to identify any potentially existing contaminated land within the Project Site. In the case where a contaminant is identified, a contaminant specific management plan will be produced.
- 4.2.6 As such, the procedure below is proposed to be followed in the eventuality that an unidentified contaminant “hotspot” showing visual or olfactory evidence of contamination is discovered during construction:
- Relevant construction activities will be stopped immediately;

- The discovery will be reported to the Environmental Manager or appropriate personnel as identified by the main contractor(s);
- The area will be sealed off in order to contain the spread of contaminants;
- The area will be cleared to ensure there is nothing that could cause fire or explosion;
- The relevant regulator and/or CCS will be contacted once it is confirmed that contamination has been found;
- Testing will be arranged; and
- Details of the incident will be recorded, including photos and relevant information on the Environmental Incident Report Form.

b) Emergency Spill Response Plan

4.2.7 Appropriate spill response materials for the chemicals, fuels and oils stored onsite will be provided throughout the Project Site. Spill kits will be made available at fuel storage and refuelling locations and in individual plant and vehicles. Use of plant and hazardous materials will be done in the presence of at least one operative trained in emergency response.

4.2.8 The main contractor(s) will produce an emergency response plan that will follow the STOP – CONTAIN – NOTIFY – CLEAN UP – REPORT procedure. An indicative procedure is set out below:

- STOP
 - Relevant Construction activities will be stopped immediately;
 - Spilt substance will be identified and any information available (i.e. COSHH material sheet) obtained along with the correct PPE;
 - If safe to do so, the spill will be stopped to prevent more material spilling, e.g. oil drums will be righted or valves closed; and
 - Sources of ignition will be switched off.
- CONTAIN
 - The spillage will be immediately contained using bunds of earth or sand, drip trays, boom and or spill materials;
 - Drains and watercourses will be checked to see if the spill has reached them. Where possible, spills will be diverted and drains will be bunded to stop the spill entering the drainage network;
 - Spillage and runoff will not be washed into the drainage system.
- NOTIFY
 - The Environmental Manager will be notified;
 - The Environmental manager will then notify the relevant regulator, CCS and APL.
- CLEAN UP
 - The spill will be cleaned up using appropriate spill materials OR by an expert/ specialist clean-up contractor;
 - Contaminated soil, ground and water will be disposed of as hazardous waste (Section 4.5.11).
- REPORT
 - An Environmental Incident Report will be completed in line with the Incident Response Procedure (Section 2.5.10).

c) Flood Risk Management Plan

4.2.9 The following provides an outline of the measures to be implemented to minimise flood risk:

- The main contractor(s) will sign up to receive NRW flood warnings or flood alerts for the Afon Llan and Afon Lliw;
- The main contractor(s) will sign up to receive high rainfall alerts provided by the MET office as flood warning for the Project Site;
- Weather forecasts will be checked regularly;
- Plant, machinery and stockpiles will be stored away from watercourses, ditches and low lying areas that could flood;
- If flooding of the Project Site is expected, vehicles and plant machinery that pose a hazard will be moved to higher ground or off-site if appropriate;
- If flooding of the Project Site occurs, plant machinery and vehicles will be checked to ensure they are safe before use; and

4.2.10 Where possible, temporary works (including stockpiles and drains) will be set to direct overland flows away from the main Project Site and access routes.

4.3 Dust Management Plan

4.3.1 This plan contains a proposed dust monitoring plan and standard good practice measures for reducing dust and emissions from vehicles.

4.3.2 Guidance relevant to the implementation of air quality measures include;

- BS 6031: 2009: Code of Practice for Earth Works (Ref. 4.1);
- HSE Vehicle at Work Guidance (Ref. 4.2); and
- Institute of Air Quality Management (IAQM) Guidance on Air Quality Monitoring in the Vicinity of Demolition and Construction Sites (Ref. 4.3).

a) Contents of Plan

4.3.3 In line with IAQM guidance (Ref. 4.3) on monitoring air quality at construction sites; daily visual inspections of dust emissions (and weekly recording) will be made in conjunction with dust emissions monitoring at locations to be agreed with NRW. This data will be used to ensure that mitigation measures are appropriate and being applied rigorously and to provide early warning of increased dust emissions to inform the cessation or modification of activities prior to impacts occurring.

4.3.4 Monitoring will be undertaken in the vicinity of the Lletty-Morfil SINC. Since the risk for ecosystems relates to dust deposition, a real time monitor for total suspended particulate matter will be installed. Trigger levels for the instrument, which would suggest increasing risk/emissions, will be agreed with NRW prior to the commencement of construction. The monitoring stations will be mobile and will be moved around the Project Site as the principal activities move.

4.3.5 The following are general good practice measures that will be implemented onsite to control dust and vehicle emissions. If inspections and monitoring find that plumes

of dust are visible, behind moving vehicles for example, or dust was visibly deposited on roads outside of the Project Site, more vigorous control measures may be required.

i. Site Management

- All personnel will be made aware of nuisance dust and will be trained in dust management; and
- Project Site plant will be maintained so as to reduce emissions.

ii. Earthworks

- Disturbance of the ground will be kept to a minimum wherever possible;
- Necessary vegetation/ topsoil removal will be carried out in discrete sections with progressive restoration of exposed areas to minimise wind erosion;
- Earthworks and excavation areas will be kept damp, and will be avoided during periods of exceptionally dry weather; and
- Earthworks will be undertaken following BS 6031:2009 (Ref. 4.1).

iii. Material Handling

- The number of handling operations will be kept to a minimum to ensure that dusty material isn't moved or handled unnecessarily;
- Soil handling will be restricted during adverse weather conditions such as high winds or exceptionally dry spells;
- Drop heights will be kept to a minimum and will be enclosed where possible;
- Transportation of aggregates and fine materials will be conducted in enclosed or sheeted vehicles;
- Dampening methods will be used where necessary; and
- Methods and equipment will be in place for immediate clean-up of spillages of dusty or potentially dusty materials.

iv. Stockpiles

- Stockpiles will be located away from sensitive receptors where dust nuisance is likely to result;
- During exceptionally dry and windy periods stockpiles will be kept damp;
- Soils will, where appropriate be landscaped into suitable shapes for secondary functions e.g. visual screening; and
- Appropriate shrouding/ wind shielding measures dependent on particulate size will be put in place to prevent dust generation from stockpiled materials. Long-term stockpiles may be capped or grassed over.

v. Traffic Measures

- Unsurfaced roads will be graded regularly to remove loose gravel and kept in a clean and compacted condition;
- A mechanical road sweeper will be made available if required for the cleaning of public roads (in agreement with CCS and South Wales Trunk Road Agent (SWTRA));
- Wheel/ vehicle wash facilities will be provided at Project Site entrance/exit; and

vi. Emissions Management

- Plant and equipment will be operated as far as possible away from residential areas or sensitive receptors near to the Project Site;
- An onsite speed limit will be implemented by the main contractor(s) that will be appropriate to the types of construction plant utilised and the Project Site hazards in line with Vehicles at Work guidance from the Health and Safety Executive (HSE) (Ref. 4.2);
- Onsite vehicle movement will be kept to a minimum and restricted to adequately compacted internal roads;
- All plant utilised on Project Site should be regularly inspected. Monitoring of plant will include:
 - Ensuring no black smoke is emitted other than during ignition;
 - Ensuring exhaust emissions are maintained to comply with the appropriate limits;
- Vehicle exhausts will be directed away from the ground and other surfaces and preferably upwards to avoid road dust being re-suspended to the air; and
- Exhausts will be positioned at a sufficient height to ensure adequate dispersal of emissions.

4.4 Pollution Prevention Management Plan

- 4.4.1 This plan covers measures to minimise the risk of pollution to ground and water from the storage and use of potentially polluting materials onsite. The sections below detail the storage of fuels and oil, management of non-oil chemicals, potential pollution from construction vehicles, plant and machinery and the use of cement and concrete.
- 4.4.2 An Emergency Spill Response Plan is set out within Section **Error! Reference source not found.**
- 4.4.3 All fuel storage will comply with the Water Resources (Control of Pollution) (Oil Storage) (Wales) Regulations 2016 (Ref. 4.4).
- 4.4.4 Further water specific management measures can be found in ES Appendix 3.2: Surface Water Management Plan.

a) Contents of Plan

i. Movement, Parking and Re-fuelling of Vehicles and Plant

- 4.4.5 Vehicles and plant will comply with the following:
- In order to prevent compaction and erosion of undeveloped ground, movement of construction plant and vehicles will be limited to clearly defined access tracks and construction areas only.
 - Where possible, all construction plant and vehicles will be parked/stored at least 50 m away from surface waterbodies and springs.
 - All construction plant and vehicles will be checked daily for oil and fuel leaks and record of such checks kept by the Environmental Manager (or ECoW).

- Mobile plant will be in good working order, kept clean and fitted with drip trays where appropriate.
- Refuelling of construction plant and vehicles will be undertaken on an impermeable surface at a temporary construction compound only.
- All refuelling activities will be supervised by site personnel with emergency response training.

ii. Cement and Concrete

4.4.6 Concrete and cement are alkaline and corrosive, and can have a highly polluting impact in water and on land and are harmful to human flesh.

4.4.7 Due to the size of the Project Site it is likely that concrete batching will occur onsite. The equipment used for concrete batching should be operated in accordance with Process Guidance Note 3/01(12) (Ref. 4.5).

4.4.8 Mixing and washing of concrete will not take place within 10 m of any watercourse or swale and waste waters will not be discharged into the water environment. All site personnel will receive training on concrete washout as part of their Site Induction.

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4.5 Waste and Material Management Plan

4.5.1 To ensure efficiency of resource use, prevention of litter nuisance and compliance with waste legislation, this sections sets out good practice waste and material management measures.

4.5.2 Construction activities associated with materials and/or waste generation include:

- Site clearance will remove vegetation and undergrowth in work areas generating organic materials and waste;
- Excavation; it is estimated that the overall quantity of excavated material (solid) from the construction is to be approximately 19,000 m³m³. This figure is a measure of excavated material in the ground and bulk material. The worst case scenario assessed in **Chapter 12: Traffic, Transport and Access** of the ES assumes that none of this excavated material can be reused within the Project Site. However the worst case is not anticipated; and
- General day-to-day construction operations such as use of welfare facilities and deliveries generating packaging, domestic waste and sewage.

4.5.3 Waste likely to be generated during construction includes:

- Topsoil and subsoil;
- Excess concrete, mortar and grout;
- Wood off cuts and used wood (crates and concrete formwork);
- Bricks, pavers and concrete block off cuts;
- Roofing materials;
- Metal including steel reinforcement off cuts;
- Plastic wrapping and packaging;

- Paper;
- Delivered material bags, wrappings and coverings; and
- Miscellaneous materials

4.5.4 The EU Waste Framework Directive (WFD) (Ref. 4.6) provides the overarching legislative framework for the collection, transport, recovery and disposal of waste, and includes a common definition of waste. The Project will operate in accordance with the WFD, together with the Environmental Permitting (England and Wales) Regulations 2016 (Ref.4.7) and the Hazardous Waste (England and Wales) Regulations 2005 (as amended by the Hazardous Waste (England and Wales) Amendment Regulations 2009 and 2016) (Ref. 4.8).

4.5.5 Other guidance referred to within the CEMP includes:

- The Waste Classification Technical Guidance WM3 (Ref. 4.9), which sets out a standardised classification of waste based on material properties;
- Welsh Government Guidance on Applying the Waste Hierarchy (Ref. 4.10); and
- The Department for Environment, Food and Rural Affairs (DEFRA) Waste Duty of Care Code of Practice (Ref. 4.11).

a) Contents of Plan

i. Waste Hierarchy

4.5.6 Onsite waste management will align with the Waste Hierarchy, which promotes efficient resource use and minimisation of waste through the priority ordering of the following measures:

- Prevention;
- Preparing for re-use;
- Recycle;
- Other recovery; and
- Dispose (Ref. 4.11).

4.5.7 The priority order may be deviated from if a better overall environmental outcome is recognised for a particular resource or waste.

ii. Waste Prevention

4.5.8 The following preventative measures will be adopted:

- Building materials ordered will be the correct size so as not to be wasted due to being obsolete;
- The appropriate volume of material will be ordered to avoid excess;
- Ordering of new materials will be avoided if there are existing materials available or able to be adapted to the task within the Project Site;
- Deliveries will be timely and directly placed in secure storage areas, double handling will be kept to a minimum;
- Re-usable materials will be identified onsite and removed for storage and re-sale;
- Excess materials will be returned to the supplier if possible; and

- General information on site waste management will be provided in Site Inductions and toolbox talks with feedback welcomed.

iii. Classification of Waste

4.5.9 APL and/ or the main contractor(s) will identify and classify all Project Site waste streams in line with the categories and methods set out in the Waste Classification Technical Guidance WM3 (Ref. 4.9).

iv. Storing Waste

4.5.10 Where resources are earmarked for recycling, recovery or disposal the following method of storage will be implemented to minimise the risk of waste escaping, litter and/ or pollution:

- All waste will be stored at the location in which it is generated, or within a designated central waste storage area;
- These designated waste storage areas will be isolated from surface water drains and areas that discharge directly to the water environment;
- Waste will be stored in suitable containers of sufficient capacity to avoid loss, overflow or spillage;
- Storage of liquid wastes will be on impermeable bunds that hold the capacity of the container;
- Waste will be segregated by waste stream and storage containers will be clearly signed with the waste that they will hold e.g. wood, metal, plastics or other appropriate waste stream;
- Storage containers will be secure, covered or enclosed;
- There will be separate containers for hazardous waste (see Paragraph 4.5.11);
- Skips will be monitored and action taken if waste levels are too high; and
- Burning of waste is prohibited.

v. Hazardous Waste

4.5.11 “Hazardous waste” is any waste which contains properties that might make it harmful to human health or the environment (Ref. 4.8).

4.5.12 Hazardous waste could arise during construction from the following sources:

- Maintenance of plant and machinery;
- Oily water waste;
- Oily rags;
- Oil absorbent pads etc.; and
- Environmental Spill recovery (small amounts only; larger volumes taken away directly for disposal).

4.5.13 All Hazardous waste will be segregated by type and from other waste streams. All waste oil will be stored in a bunded facility until such times that it is collected. Used filters, rags and absorbents will be stowed in the hazardous waste container in drums or waste oil bags.

vi. Organic Matter

- 4.5.14 The waste wood and foliage material resulting from site clearance will be managed in-line with the Waste Hierarchy (as detailed within paragraph 4.5.6), thus helping to minimise potential environmental issues pertaining to this process.
- 4.5.15 Wherever feasible, the generation of tree and foliage waste will be prevented and these features will be retained in-situ. However, the retention of trees and foliage will not always be possible; therefore the reuse of material onsite will be explored wherever practicable, with wood material either reused in construction, or within landscaping aspects such as the use of wood chippings, or as mulch to enhance soil quality to aid the reinstatement of the Project Site.
- 4.5.16 Should this not prove to be a viable option for all generated material, then excess wood waste will be stored under cover, such as tarpaulin, to protect wood from the weather so that it may be re-used wherever possible off-site e.g. as carpentry material or offered to the local community for fire wood and biomass.
- 4.5.17 Attention will also be paid to the proximity principle, with local uses for waste materials considered where this represents the best practicable environmental option. For all material that cannot be re-used on- or off- site, or recycled, then elements of the wood and foliage material can be converted into wood-chip. By following this process, it will be possible to limit the volume of tree and foliage waste sent for disposal as far as practicably possible.
- 4.5.18 Any topsoil or subsoil generated will remain onsite to be reused for any landscaping.

vii. Transporting Waste

- Waste contractors will be checked periodically (bi-annually) to ensure they have valid licences; and
- All waste leaving the Project Site will be accompanied by a Waste Transfer Note (WTN) for non-hazardous waste or a Special Waste Consignment Note (SWCN) for hazardous waste. A copy of which will be retained for 2 (WTN) or 3 years (SWCN).

4.6 References

- Ref. 4.1 BSI. (2009). BS 6031:2009 Code of Practice for Earthworks.
- Ref. 4.2 HSE. (n.d.) Speed Limits. [Online]. Available:
<http://www.hse.gov.uk/workplacetransport/factsheets/speed.htm>
[Accessed 20/11/17].
- Ref. 4.3 IAQM. (2012). Guidance on Air Quality Monitoring in the Vicinity of Demolition and Construction Sites. [Online].
Available: http://www.iaqm.co.uk/wp-content/uploads/guidance/monitoring_construction_sites_2012.pdf
[Accessed: 30/11/17]
- Ref. 4.4 Water Resources (Control of Pollution) (Oil Storage) (Wales) Regulations 2016. W.S.I. 206/359/W112.
- Ref. 4.5 DEFRA. (2012). Process Guidance Note 3/01(12): Statutory Guidance for Blending, Packing, Loading, Unloading and Use of Cement. [Online].
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https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/573004/blending-packing-loading-unloading-and-use-of-cement-process-guidance-note-3-01_12_.pdf
[Accessed 21/11/17].
- Ref. 4.6 Directive 2008/98/EC The Waste Framework Directive L312/3.
- Ref. 4.7 The Environmental Permitting (England and Wales) Regulations 2016. S.I. 2016/1154. Environmental Protection, England and Wales.
- Ref. 4.8 HSE. (n.d.) Hazardous Waste. Available:
<http://www.hse.gov.uk/waste/hazardouswaste.htm>.
[Accessed 20/11/17]. BSI. (2012). BS 5837. Trees in Relation to Design, Demolition and Construction – Recommendations.
- Ref. 4.9 NRW, SEPA, NIEA and EA. (2015). Waste Classification. Guidance on the Classification and Assessment of Waste (1st Edition 2015). Technical Guidance WM3. [Online]. Available:
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/427077/LIT_10121.pdf The Waste (England and Wales) Regulations 2011. S.I. 2011/988. Environmental Protection, England and Wales. [Accessed 20/11/17].
- Ref. 4.10 Welsh Government. (2012). Guidance on Applying the Waste Hierarchy. [Online]. Available:
<http://gov.wales/docs/desh/publications/120119wastehierarchyguideen.pdf>
[Accessed 01/12/17].
- Ref. 4.11 DEFRA. (2016). Waste Duty of Care Code of Practice. [Online].
Available:
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/506917/waste-duty-care-code-practice-2016.pdf
[Accessed 01/12/17].



Appendix A

Appendix A: Mitigation Register

A.1 Introduction

- A.1.1 This Appendix provides a register of mitigation for all mitigation measures that have been identified in the ES for the Project, and are incorporated within the Outline CEMP and all other topic-specific Management Plans.
- A.1.2 Table A.1 – Table A. 2 collate the mitigation measures outlined in the ES and have been separated into construction, operation and phases. Decommissioning measures will be similar to that of construction. These tables show the corresponding reference to the ES, the relevant Management Plan(s) and their document reference, and also cross-referencing the responsibility for the preparation, approval and delivery as set out in the CEMP.

Table A.1 Construction Mitigation Register

Ref No	Is Measure Embedded or Additional?	Construction Mitigation Measure	ES Ref	Relevant Management Plan	Responsibility		
					Preparation	Approval	Delivery
General Environmental Management Principles and Responsibility							
GEN01	Embedded	<p>A CEMP will be prepared and then implemented during construction to mitigate any adverse environmental effects. An Outline CEMP for the Project is provided in Appendix 3.1 of the ES. It includes measures relating to the environmental topics assessed in this ES which will mitigate the effects of construction. The CEMP will be finalised and followed by the Contractor on site, once the content has been agreed with CCS. The Outline CEMP includes the following information:</p> <ul style="list-style-type: none"> • Community liaison; • Complaints procedures; • Nuisance management including measures to avoid or minimise the impacts of construction works (covering dust, noise, vibration and lighting); • Dust management measures; • Site waste and materials management measures; • Surface and ground water protection measures; • Pollution control measures; • Security measures and use of artificial lighting; and <p>A protocol in the event that unexpected contaminated land is identified during ground investigation or construction.</p>	3.11.3	CEMP	APL/ Main contractor	CCS	Main contractor
GEN02	Embedded	<p>Water courses and ditches will be diverted around the Generating Equipment Site in line with the Landscape and Ecology Mitigation Strategy (Appendix 3.4). These diversions will be undertaken using silt traps, straw bale filters / sedimats and an attenuation pond formed for any surface water outlet from the Generating Equipment Site. Water from the attenuation pond will be discharged in a controlled manner to the Afon Llan.</p>	3.7.8	CEMP	APL/ Main contractor	CCS	Main contractor
GEN03	Embedded	<p>Piling will be carried out using rotary driven piles in high load areas of the Generating Equipment Site such as plant and building column foundations. This technique will minimise disturbance of nearby sensitive ecological receptors. Shallow foundations for lighter buildings</p>	3.7.17	CEMP	APL/ Main contractor	CCS	Main contractor

Ref No	Is Measure Embedded or Additional?	Construction Mitigation Measure	ES Ref	Relevant Management Plan	Responsibility		
					Preparation	Approval	Delivery
		will be excavated.					
Air Quality							
AQ01	Embedded	The CEMP will include the standard good practice dust mitigation measures, as set out in the Outline CEMP in Appendix 3.1 of the ES.	3.11.14	CEMP	APL/ Main contractor	CCS	Main contractor
AQ02	Embedded	Daily visual inspections of dust emissions will be made in conjunction with dust emissions monitoring at locations to be agreed with NRW. If plumes of dust are visible, behind moving vehicles for example, or dust was visibly deposited on roads outside of the Project Site, additional control measures may be required.	3.11.15	CEMP	APL/ Main contractor	CCS	Main contractor
AQ03	Embedded	Institute of Air Quality Managers (IAQM) guidance on monitoring air quality at construction sites (Ref A.1) recommends that, in addition to visual inspections, ambient air monitoring is undertaken in the vicinity of high risk sites. This data is required for two reasons: the first relates to ensuring that mitigation measures are appropriate and being applied rigorously; the second is to provide early warning of increased dust emissions which allows for the cessation or modification of activities prior to impacts occurring.	3.11.16	CEMP	APL/ Main contractor	CCS	Main contractor
AQ04	Embedded	Monitoring will be undertaken in the vicinity of the Lletty-Morfil SINC. Since the risk for ecosystems relates to dust deposition, a real time monitor for total suspended particulate matter will be installed but this needs to be an 'indicative instrument' only. Trigger levels for the instrument, which would suggest increasing risk/emissions, should be agreed with NRW prior to the commencement of construction. The monitoring stations will be mobile and would be moved around the Project Site as the principal activities move.	3.11.17	CEMP	APL/ Main contractor	CCS	Main contractor
Noise							
N01	Embedded	It is anticipated that core working hours and boundary noise will be limited during construction by a Requirement in the DCO. Working hours are likely to be between 08.00 and 18.00 on weekdays, and between 08.00 and 13.00 hours on Saturdays and public holidays. Some works may be allowed to take place outside of normal working hours provided they do not cause any noise disturbance. Should it be necessary to conduct work with the potential to generate noise, outside	3.11.21	CEMP	APL/ Main contractor	CCS	Main contractor

Ref No	Is Measure Embedded or Additional?	Construction Mitigation Measure	ES Ref	Relevant Management Plan	Responsibility		
					Preparation	Approval	Delivery
		these core hours, this would be with the prior written agreement of CCS. These limits will not apply during commissioning and testing of the Project.					
N02	Embedded	Measures to mitigate noise and ensure compliance with any imposed maximum boundary noise limits will be implemented during the construction phase of the Project in order to minimise impacts at local residential Noise Sensitive Receptors (NSRs), particularly with respect to activities required outside of normal working hours.	3.11.22	CEMP	APL/ Main contractor	CCS	Main contractor
N03	Embedded	Construction noise mitigation measures are included in the Outline CEMP (Appendix 3.1 of the ES). In order to keep noise effects from the construction phase to a minimum, all construction activities relating to the Power Generation Plant, Gas Connection, and Electrical Connection would be carried out in accordance with the recommendations of British Standard (BS) 5228 'Noise and Vibration Control on Construction and Open Sites' (Ref A.2) as explained in Chapter 7: Noise and Vibration of the ES.	3.11.23	CEMP	APL/ Main contractor	CCS	Main contractor
N05	Embedded	Method statements regarding construction management, traffic management, and overall site management would be prepared in accordance with best practice and relevant British Standards, to help to minimise impacts of construction works. One of the key aims of such method statements would be to minimise noise disruption to local residents during the construction period.	3.11.25	CEMP	APL/ Main contractor	CCS	Main contractor
N06	Embedded	Consultation and communication with the local community throughout the construction period would also serve to publicise the works schedule, giving notification to residents regarding periods when higher levels of noise may occur during specific operations, and providing lines of communication where complaints can be addressed.	3.11.26	CEMP	APL/ Main contractor	CCS	Main contractor
N07	Embedded	A detailed noise assessment would be carried out once the contractor is appointed and further details of construction methods are known, in order to identify specific mitigation measures for the Project.	3.11.27	CEMP	APL/ Main contractor	CCS	Main contractor

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					Preparation	Approval	Delivery
N08	Embedded	In addition, it is proposed that the contractor would be a member of the 'Considerate Constructors Scheme' which is an initiative open to all contractors undertaking building work.	3.11.28	CEMP	APL/ Main contractor	CCS	Main contractor

Ref No	Is Measure Embedded or Additional?	Construction Mitigation Measure	ES Ref	Relevant Management Plan	Responsibility		
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N04	Embedded	<p>Mitigation measures for inclusion within the CEMP may contain, but are not limited to:</p> <ul style="list-style-type: none"> • Abiding by any construction noise limits at nearby NSRs; • Ensuring that all processes are in place to minimise noise before works begin and ensuring that best practicable measures (BPM) are being achieved throughout the construction programme, including the use of localised screening around significant noise producing plant and activities; • Ensuring that modern plant is used, complying with the latest European noise emission requirements. Selection of inherently quiet plant where possible; • Hydraulic techniques for breaking to be used in preference to percussive techniques where practical; • Use of lower noise piling (such as rotary bored or hydraulic jacking) rather than the driven piling techniques (if required), where possible; • Off-site pre-fabrication, where practical; • All plant and equipment being used for the works to be properly maintained, silenced where appropriate, operated to prevent excessive noise, and switched off when not in use; • All contractors to be made familiar with current legislation and the guidance in BS 5228 (Parts 1 and 2), which should form a prerequisite of their appointment; • Loading and unloading of vehicles, dismantling of site equipment such as scaffolding or moving equipment or materials around the Project Site, to be conducted in such a manner as to minimise noise generation; • Appropriate routing of construction traffic on public roads and along access tracks; • Consultation with CCC and local residents to advise of potential noisy works that are due to take place; and • Monitoring of noise complaints, and reporting to the main contractor for immediate investigation. 	3.11.24	CEMP	APL/ Main contractor	CCS	Main contractor

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N09	Additional	The preferred approach for controlling construction noise and vibration is to reduce levels at source where possible, but with due regard to practicality. Sometimes a greater noise or vibration level may be acceptable if the overall construction time, and therefore length of disruption, is reduced.	7.6.3	CEMP	APL/ Main contractor	CCS	Main contractor
N10	Additional – Monitoring	During operation, monitoring is considered appropriate in order to track the success of delivery of proposed mitigation. Ideally this monitoring would be based on regular or fixed measurements close to the Project Site boundary to give consistency by minimising the impact of weather and extraneous sources. The measured levels at these locations must be calibrated against the levels at the receptors as part of the plant commissioning sound test procedure. Any change in Project Site boundary levels can then be related directly to changes at the receptors.	7.6.4	CEMP	APL/ Main contractor	CCS	Main contractor/ Environmental Manager/ ECoW
Ecology							
E01	Embedded	Local habitats and protected species would be protected during the construction works through measures included within the Outline CEMP (Appendix 3.1 of the ES) such as fencing to prevent access of species to working areas and translocation of protected species (e.g. reptiles).	3.11.35	CEMP	APL/ Main contractor	CCS	Main contractor
E02	Embedded	Sensitive ecology features such as the Ancient Woodland, trees and habitats have been avoided during the Project design development.	3.11.36	CEMP	APL/ Main contractor	CCS	Main contractor
E03	Embedded	An area has been allocated within the Project Site Boundary as mitigation for any habitat loss from permanent land take resulting from the construction and operation of the Project. This Ecological Mitigation Area is commensurate with the extent of mitigation required and the Landscape and Ecology Mitigation Strategy (Appendix 3.4) outlines the methods to be employed in enhancing its natural capital. The Landscape and Ecology Mitigation Plan illustrates the mitigation proposed (Figure 3.6).	3.4.27	Landscape and Ecology Mitigation Strategy and Landscape and Ecology Mitigation Plan	APL/ Main contractor	CCS and NRW	Main contractor
E04	Additional	<i>Lletty-Morfil SINC</i> Mitigation for the loss of SINC habitat (broadleaved semi-natural woodland, dense/continuous scrub and marshy grassland) will include	8.8.5	Landscape and Ecology Mitigation Strategy and	APL/ Main contractor	CCS and NRW	Main contractor

Ref No	Is Measure Embedded or Additional?	Construction Mitigation Measure	ES Ref	Relevant Management Plan	Responsibility		
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		the provision of replacement habitats. Indicative areas, based on the previous layout are as follows: Indicative areas, based on the plan are as follows: <ul style="list-style-type: none"> • 1.07 ha of woodland/scrub; • 2.50 ha of grassland (acid grassland/marshy grassland mosaic); • 900 m of hedgerow; and, • Two wildlife ponds and 180 m² of attenuation pond. 		Landscape and Ecology Mitigation Plan			
E06	Additional	<p><i>Row of Trees – Broadleaved and Hedgerows – Species-Poor</i></p> Loss of rows of trees and hedgerows utilised by wildlife such as commuting and foraging bats, and commuting badgers will be mitigated for through the introduction of hedgerows and linear woodland features as shown on the LEMP and Strategy presented in Figure 3.6 and Appendix 3.4. Mitigation measures include that habitats temporarily removed will be reinstated and that mature trees removed may be replaced by standards of the same species or transplanted to a suitable location elsewhere within the Project Site Boundary	8.8.7	Landscape and Ecology Mitigation Strategy and Landscape and Ecology Mitigation Plan	APL/ Main contractor	CCS and NRW	Main contractor
E07	Additional	<p><i>Marshy Grassland</i></p> Temporarily removed habitats will be reinstated. Mitigation for the loss of marshy grassland habitat will include the provision of replacement habitat, as shown on the LEMP and Strategy, presented in Figure 3.6 and Appendix 3.4. The indicative area, based on the previous layout of the landscaping plans is 2.5 ha of grassland (acid grassland/marshy grassland mosaic); however, this area is subject to change.	8.8.9	Landscape and Ecology Mitigation Strategy and Landscape and Ecology Mitigation Plan	APL/ Main contractor	CCS and NRW	Main contractor
E08	Additional	<p><i>Standing Water</i></p> Mitigation for the loss of standing water habitat will include the provision of replacement habitat, as shown on the LEMP and Strategy, presented in Figure 3.6 and Appendix 3.4. Provisionally, it has been suggested that two attenuation ponds will be provided and function as wildlife ponds as well as two wildlife ponds within the acid grassland/marshy grassland mosaic replacement habitat. . The attenuation ponds will be planted with native wetland species and where possible maintained as	8.8.10	Landscape and Ecology Mitigation Strategy and Landscape and Ecology Mitigation Plan	APL/ Main contractor	CCS and NRW	Main contractor

Ref No	Is Measure Embedded or Additional?	Construction Mitigation Measure	ES Ref	Relevant Management Plan	Responsibility		
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		wetland features. The wildlife ponds will be planted with native wetland species and maintained as wetland features.					
E09	Additional	<i>Amphibians</i> Recommendations for reptiles will help to limit the injury or killing of amphibians.	8.8.11	Landscape and Ecology Mitigation Strategy	APL/ Main contractor	CCS and NRW	Main contractor
E10	Additional	<i>Reptiles</i> Mitigation for the loss of habitat suitable for supporting reptiles (dense/continuous scrub and grassland) will include the provision of replacement habitats, as shown on the LEMP and Strategy, presented in Figure 3.6 and Appendix 3.4.	8.8.12	Landscape and Ecology Mitigation Strategy and Landscape and Ecology Mitigation Plan	APL/ Main contractor	CCS and NRW	Main contractor
E13	Additional	To reduce the risk of individual reptiles being injured or killed, all works will proceed under a Method Statement agreed with the Local Biodiversity Officer/Council Ecologist prior to works commencing. The risk of reptiles and the mitigation measures will be included in the Project Site induction package and prior to any site clearance and construction tasks. Full details are provided in the LEMP and Strategy in Figure 3.6 and Appendix 3.4.	8.8.19	Landscape and Ecology Mitigation Strategy	APL/ Main contractor	CCS and NRW	Main contractor
E14	Additional	The risk of reptiles and the mitigation measures will be included in the site induction package and prior to any site clearance and construction tasks.	8.8.20	Landscape and Ecology Mitigation Strategy	APL/ Main contractor	CCS	Main contractor
E11	Additional	Due to the 'Good' population of common lizard and the presence of low numbers of grass snakes within the survey area it is recommended that a trapping and translocation programme is undertaken to help protect any reptiles from being injured or killed. Due to the presence of suitable habitat for adder, the programme will include measures for this species. The actions involved in the proposed trapping and translocation are outlined below: <ul style="list-style-type: none"> Any construction areas suitable or known to support reptiles, including any routes in and out, areas for site compounds, offices or storage of materials/waste, will be fenced off using suitable fencing 	8.8.16	Landscape and Ecology Mitigation Strategy	APL/ Main contractor	CCS and NRW	Main contractor

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		<p>(drift or semi-permanent) to limit individuals attempting to enter the Project Site from the adjacent land;</p> <ul style="list-style-type: none"> No construction activities, including pedestrian access will be allowed outside of the fencing in areas of habitat suitable for supporting reptiles. A number of refugia (at a density of 50/ha) will be placed within the fenced area to attract reptiles; Each day, up to twice a day for a minimum of 60 days an ecologist will check the refugia for the presence of reptiles; Any reptiles or amphibians found will be captured for relocation to suitable habitat outside of the fenced areas. After 60 days the trapping can cease once there have been five consecutive days where no reptiles have been found; After the fenced area has been cleared of reptiles and prior to soil stripping the vegetation can undergo a process of habitat management and hand searches for reptiles; Supervision of the soil strip during construction work by a suitably qualified ecologist will be required to help protect injury or killing of reptiles; and, Any litter or rubble piles will be removed by hand under the supervision of an ecologist to avoid injuring or killing any reptiles. If the material is too heavy to be removed by hand it can be done so using a mini excavator carefully and slowly removing the material, under the supervision of an ecologist. 					
E15	Additional	<p><i>Breeding Birds</i> Habitat creation measures relating to the loss of the SINC, broadleaved woodland, marshy grassland, hedgerows and lines of trees will provide additional areas for breeding birds post construction. Embedded landscape planting will also provide additional habitat for the species assemblage recorded.</p>	8.8.22	Landscape and Ecology Mitigation Strategy	APL/ Main contractor	CCS and NRW	Main contractor
E16	Additional	<p><i>Bats</i> To allow the most appropriate and effective mitigation measures to be determined and to be included in a subsequent CEMP or LEMP, the</p>	8.8.23	Landscape and Ecology Mitigation	APL/ Main contractor	CCS	Main contractor

Ref No	Is Measure Embedded or Additional?	Construction Mitigation Measure	ES Ref	Relevant Management Plan	Responsibility		
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		<p>following surveys will be undertaken:</p> <ul style="list-style-type: none"> • Building assessments and further bat surveys on Buildings 7 and 8 within the Abergelli Farm between May and July 2018; and • Pre-construction checks on trees scheduled for removal for their current bat roost potential with consideration of the seasonal survey timings (May-September). 		Strategy			
E17	Additional	Based on the current Project design a European Protected Species Licence (EPSL) is not a requirement. However, should the scope of the Project change and/or if further bat roosts are identified an EPSL may be required.	8.8.24	Landscape and Ecology Mitigation Strategy	APL/ Main contractor	CCS	Main contractor
E18	Additional	Maintain connectivity of foraging and commuting habitats by the retention of trees and hedgerows wherever possible and utilising 'brown hedgerows' of brash, to maintain connectivity during construction. For linear features identified as key foraging or commuting habitat, where possible the Gas Connection should be installed using drilling to retain feature and connectivity across the Project Site. Embedded mitigation includes the provision of replacement habitats that will benefit foraging and commuting bats.	8.8.26	Landscape and Ecology Mitigation Strategy	APL/ Main contractor	CCS	Main contractor
E19	Additional	Night time working with its associated need for additional lighting should be avoided as far as possible within areas near to known roosts. There should be no night time illumination of the hedgerows, woodland or mature tree lines.	8.8.27	Landscape and Ecology Mitigation Strategy / Lighting Strategy	APL/ Main contractor	CCS	Main contractor
E20	Additional	<p><i>Water Vole and Otter</i></p> <p>A pre-construction check for water vole burrows, otter holts/couches and activity of both species will be undertaken where construction is present within 100 m of watercourses as identified as suitable for supporting the species during the 2017 field surveys. The check should be undertaken the year before works are due to commence and if the area declared clear, habitat management undertaken to help reduce the quality of the habitats for burrow and holt/couch creation for the period leading up to and for the duration of construction in that area. Additional mitigation may be required as a result of the survey.</p>	8.8.28	Landscape and Ecology Mitigation Strategy	APL/ Main contractor	CCS	Main contractor

Ref No	Is Measure Embedded or Additional?	Construction Mitigation Measure	ES Ref	Relevant Management Plan	Responsibility		
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E21	Additional	<i>Badger</i> A pre-construction check for badger setts and activity will be undertaken where construction works are within 30 m of suitable habitats for badger sett creation.	8.8.29	Landscape and Ecology Mitigation Strategy	APL/ Main contractor	CCS	Main contractor
E22	Additional	Works likely to damage or destroy a badger sett will require a license to close the sett prior to works commencing. The terms of the license may stipulate the requirement for compensatory setts to be created should any main setts be destroyed and/or temporarily closed.	8.8.30	Landscape and Ecology Mitigation Strategy	APL/ Main contractor	CCS	Main contractor
E23	Additional	Excavations, if left unfilled overnight, should be covered to avoid badgers and other animals becoming trapped. Sloping escape ramps for badgers should be created by edge profiling trenches/excavations and/or excavations should be fitted with a scaffolding board ramp to allow any trapped animals to exit. Crossing places will be provided across open excavations for the duration of the works on the sections where known badger paths have been identified. Open pipework greater than 150 mm diameter that is left over night will be made secure by either filling in the end of the pipe or covering the end with a solid timber panel or similar.	8.8.31	Landscape and Ecology Mitigation Strategy	APL/ Main contractor	CCS	Main contractor
E24	Additional	Night time working with its associated need for additional lighting should be avoided as far as possible within areas near to setts and areas of known activity to reduce disturbance to badger when they are out of their setts and foraging. There should be no night time illumination of the hedgerows, woodland or setts.	8.8.32	Landscape and Ecology Mitigation Strategy	APL/ Main contractor	CCS	Main contractor
E25	Additional	The introduction of new woodland, scrub, species-rich grassland and hedgerows will increase opportunities for resting, breeding and foraging badger.	8.8.33	Landscape and Ecology Mitigation Strategy and Landscape and Ecology Mitigation Plan	APL/ Main contractor	CCS and NRW	Main contractor

Ref No	Is Measure Embedded or Additional?	Construction Mitigation Measure	ES Ref	Relevant Management Plan	Responsibility		
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E26	Additional	<p><i>Invasive Species</i></p> <p>An invasive species management plan will be produced to control and eradicate the invasive species within the Project Site Boundary. An updated invasive species survey should be undertaken to accurately assess invasive species and extents within the Project Site Boundary prior to the implementation of control measures.</p>	8.8.34	Landscape and Ecology Mitigation Strategy	APL/ Main contractor	CCS and NRW	Main contractor
Water Quality and Resources							
WQ01	Embedded	Hydrological protection measures have been included in the Outline Surface Water Management Plan (Appendix 3.2) to prevent pollution events, with particular reference to the Gas Connection and section of new Access Road. The Surface Water Management Plan includes details of silt traps and / or sedimats to reduce flow of suspended solids, suitable phasing to reduce the need for unprotected slopes and avoidance of stockpiled materials.	3.11.39	Surface Water Management Plan	APL/ Main contractor	CCS	Main contractor
WQ02	Embedded	The Project incorporates welfare facilities which will require a site foul water drainage system. The Project Site is remote and it is believed it will be unfeasible to connect to a public sewer. Therefore, a foul water drainage system will either drain to a septic tank or a package treatment plant within the Project Site but outside any area at risk of flooding. It is likely that the latter would be the preferred option for ease of maintenance and environmental criteria. The processed water would then discharge on site or to a nearby watercourse in accordance with Environmental Permit conditions, if required.	3.11.5	Drainage Strategy	APL	CCS and NRW	Main contractor
WQ03	Embedded	An oily water drainage system will be required to receive surface water from potentially contaminated oil retaining areas and prevent contaminated water discharging from site. Oily water drainage shall be designed in accordance with National Grid Technical Specification 2.20 'Oil Containment at Electricity Substations and Other Operational Sites' or similar approved guidelines.	3.11.6	Drainage Strategy	APL	CCS and NRW	Main contractor
WQ04	Embedded	The surface water drainage system will be required to adequately drain the site and prevent ponding. The surface water drainage system will adopt the principles of the SuDS Manual – Ciria C753. – Updated SuDS Manual reference 2015.	3.11.7	Drainage Strategy	APL	CCS and NRW	Main contractor

Ref No	Is Measure Embedded or Additional?	Construction Mitigation Measure	ES Ref	Relevant Management Plan	Responsibility		
					Preparation	Approval	Delivery
WQ05	Embedded	To prevent inundation of the Project Site from surface runoff cut off drainage ditches will be placed around the uphill site perimeter. These new drainage ditches will be designed to carry the surface runoff around the Project Site and downstream back to the original drainage ditches/watercourses. This is detailed in the Outline Surface Water Management Plan (Appendix 3.2).	3.11.8	Surface Water Management Plan	APL	CCS and NRW	Main contractor
WQ06	Embedded	Where possible, the new levels and surfacing will be designed so they naturally drain by infiltration into the surrounding ground. Where this is not economically possible or presents an unsatisfactory risk of flooding, infiltration drains will be installed. All infiltration drains will connect to the surface water drainage system.	3.11.9	Drainage Strategy	APL	CCS and NRW	Main contractor
WQ07	Embedded	It is not expected that it will be possible to connect the surface water drainage system to an infiltration basin due to the presumed predominantly clayey ground and high groundwater level in places. This will be confirmed when the Ground Investigation surveys are carried out post-consent. Instead the discharged flow of water at the Generating Equipment Site boundary from the surface water drainage system will be attenuated in order to maintain the equivalent greenfield runoff flow for a range of events up to the 1 in 100 year event (with climate change allowance). The flow will be attenuated using suitably sized attenuation ponds with restricted discharge pipes to the existing greenfield runoff rates. An emergency overflow will be provided to the attenuation ponds to prevent site flooding in the event of an extreme rainfall event with suitable pollution prevention measures installed if possible to avoid a pollution event, although priority must be given to site security and resilience.	3.11.10	Drainage Strategy	APL	CCS and NRW	Main contractor
WQ08	Embedded	Where possible, roadside swales and infiltration drains will be used to remove and convey any standing water into the surface water drainage system from internal roads within the Project Site including the new Access Road. Where there are space constraints, or there is an elevated risk of contamination, the new site roads will be kerbed and drain via road gullies with pollution control measures. It is expected that roadside swales will discharge to nearby local watercourses at the existing greenfield runoff rate.	3.11.11	Drainage Strategy	APL	CCS and NRW	Main contractor

Ref No	Is Measure Embedded or Additional?	Construction Mitigation Measure	ES Ref	Relevant Management Plan	Responsibility		
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WQ09	Embedded	Existing field drainage that will cross the new Access Road will be culverted or bridged for a short length to allow flow up to the 1 in 100 year return period.	3.11.12	Drainage Strategy	APL	CCS and NRW	Main contractor
Geology, Ground Conditions and Hydrogeology							
G01	Embedded	The CEMP will be implemented during construction to mitigate any adverse environmental effects and includes working in accordance with best practices, such as the completion of all necessary ground investigation and risk assessments, maintaining safe working practices and the use of correct and appropriate Personal Protective Equipment (PPE).	3.11.47	CEMP	APL/ Main contractor	CCS	Main contractor
G02	Embedded	The following information which relates specifically to geology, ground conditions and hydrogeology will be included within the CEMP: <ul style="list-style-type: none"> • Surface and groundwater protection measures; • Peat management measures as required; and • Security measures; a protocol in the event that unexpected contaminated land is identified during ground investigation or construction. 	3.11.48	CEMP	APL/ Main contractor	CCS	Main contractor
G03	Embedded	Intrusive ground investigation will be conducted to identify ground conditions and potential contaminants, as will risk assessments including gas, control waters and human health.	3.11.49	<i>Secured through DCO Requirement</i>	APL	CCS and NRW	Main contractor
G04	Embedded	A detailed mining risk assessment will be required to establish the risk of untreated shallow underground workings beneath the Project Site. There is potential for mine workings and entries requiring stabilisation treatment so ground stability will be improved.	3.11.50	<i>Secured through DCO Requirement</i>	APL	CCS and NRW	Main contractor
G05	Embedded	A mineral resources survey will be undertaken to establish the value of the sand, gravel and coal reserves.	3.11.51	<i>Secured through DCO Requirement</i>	APL	CCS and NRW	Main contractor
G06	Embedded	A foundations risk assessment is likely to be required to assess the risk of piling foundations to controlled waters; however this will be confirmed by the ground investigation.	3.11.52	<i>Secured through DCO Requirement</i>	APL	CCS and NRW	Main contractor

Ref No	Is Measure Embedded or Additional?	Construction Mitigation Measure	ES Ref	Relevant Management Plan	Responsibility		
					Preparation	Approval	Delivery
Landscape and Visual							
LV01	Embedded	<p>Mitigation measures will be implemented during the construction phase as set out in the Outline CEMP (Appendix 3.1 of the ES) in order to limit impacts on the landscape and visual resource. These measures will include:</p> <ul style="list-style-type: none"> • The use of tall hoardings to screen views of ground level construction activities in relation to sensitive receptors such as residential views and views from nearby PRoW; • Materials and machinery will be stored tidily during the construction works in order to minimise impacts on views; • Lighting of compounds and work sites will be restricted to agreed working hours and those which are necessary for security in accordance with the Institution of Lighting Professionals guidelines. • The unnecessary removal of vegetation will be avoided; • The retention and protection of existing trees in accordance with BS5837:2012 Trees in Design, Demolition and Construction, Recommendations; • Public roads providing access to construction site will be maintained free of dust and mud; • The Contractor will clear and clean all working areas and accesses as work proceeds and when no longer required for the works; • On completion of construction works, all structures, equipment, surplus materials, waste, notice boards and temporary fences used during construction will be removed from the Project Site with minimum damage to the surrounding area; and • Prompt reinstatement of areas that are no longer required following construction. 	3.11.53	CEMP / Landscape and Ecology Mitigation Strategy	APL/ Main contractor	CCS	Main contractor
Traffic, Transport and Access							
T01	Embedded	Modifications to the B4489/Access Road junction to facilitate movements by abnormal loads;	3.11.60	<i>Secured through DCO Requirement</i>	APL	CCS and NRW	Main contractor
T02	Embedded	Widening and extension of the Access Road to facilitate access by	3.11.60	<i>Secured</i>	APL	CCS and	Main

Ref No	Is Measure Embedded or Additional?	Construction Mitigation Measure	ES Ref	Relevant Management Plan	Responsibility		
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		construction traffic;		<i>through DCO Requirement</i>		NRW	contractor
T03	Embedded	Physical management of the Access Road to ensure the security and safety of all staff;	3.11.60	CEMP	APL/ Main contractor	CCS	Main contractor
T04	Embedded	A Construction Traffic Management Plan (CTMP) including details of the management of construction traffic and Public Right of Way (PROW); and	3.11.60	CTMP	APL	Highway Authority, CCS and NRW	Main contractor
T05	Embedded	A Construction Staff Travel Plan (CSTP) to minimise the level of single occupancy car use by construction staff travelling to/from the site.	3.11.60	CSTP	APL	Highway Authority, CCS and NRW	Main contractor
Historic Environment							
CH01	Embedded	A Written Scheme of Investigation (WSI) will be prepared in advance of construction commencing. A watching brief will then be implemented in accordance with WSI during construction for any works associated with ground disturbance.	3.11.61	WSI	APL	CCS and NRW	Main contractor
CH02	Additional	In the event that the watching brief reveals archaeological remains, sufficient time and resources will be allowed to ensure that these are adequately excavated, recorded and removed, and for samples to be taken if appropriate. Provision will also be made for post-excavation analysis and, if appropriate, publication of the results.	13.8.10	WSI	APL	CCS and NRW	Main contractor
Other Effects Considered							
OE01	Embedded	The Outline CEMP includes a section on Site Waste Management, which will encourage reuse and recycling of waste before disposal in accordance with the waste hierarchy.	3.11.62	CEMP	APL/ Main contractor	CCS	Main contractor

Table A. 2 Operation Mitigation Register

Ref No	Is Measure Embedded or Additional?	Operational Mitigation Measure	ES Reference	Relevant Management Plan	Responsibility		
					Preparation	Approval	Delivery
Air Quality							
AQ05	Embedded	The Generating Equipment will be designed to comply with Industrial Emissions Directive (IED) emission limits. In addition the stack sensitivity assessment (Appendix 6.2 of the ES) has demonstrated that a minimum stack height of 35 m is appropriate to ensure the adequate dispersal of pollutants to ensure that no harm is caused.	3.11.18	<i>Secured through Environmental Permit</i>	APL	CCS and NRW	Main contractor
AQ06	Embedded	The Project will require an Environmental Permit to operate, and monitoring the performance of the Generating Equipment against the permit conditions will be the responsibility of NRW. The performance of the emissions control will require monitoring by stack emissions testing throughout operation and the Generating Equipment will be 'fine-tuned' so as to ensure that limits are not exceeded.	3.11.19	Environmental Management System (EMS)	The operator	NRW	The operator
Noise							
N11	Embedded	The selection of the Project Site and development of the indicative concept layout have already included consideration of potential noise effects and proximity to NSRs, with Generating Equipment being located as close to the existing electrical infrastructure as possible and as far from the NSRs as practicable.	3.11.29	<i>Secured through DCO Requirement</i>	APL	CCS and NRW	Main contractor

Ref No	Is Measure Embedded or Additional?	Operational Mitigation Measure	ES Reference	Relevant Management Plan	Responsibility		
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N12	Embedded	<p>Other measures with regards to noise and vibration during operation, to be incorporated into the design include:</p> <ul style="list-style-type: none"> The Gas Turbine Generator and major compressors are to be housed in acoustic enclosures. In addition, these will be housed within secondary acoustic enclosures specified at 75 dB(A) Sound Pressure Level at 1 m. Gas turbine air inlet filter and ventilation apertures are to be fitted with silencers, and designed such that all sensitive noise receptors benefit from screening and/or directivity corrections. Silencers are to be fitted in the exhaust stack. Due to the impracticality of screening stack noise, discharge noise will be controlled using these silencers, which will be tuned to attenuate low frequencies from the Gas Turbine Generator exhausts. All plant items will be controlled to minimise noise of an impulsive or tonal nature. Noise breakout from the stack will be controlled using silencers. To achieve the predicted noise levels used in this assessment, noise from the top of the stacks should not exceed the maximum octave band sound power levels identified in Table 7-8 of Chapter 7 of ES. 	3.11.30	<i>Secured through Environmental Permit</i>	APL	CCS and NRW	Main contractor
N13	Embedded	During the detailed design stage, options to mitigate potential significant residual noise effects by design will be further explored.	3.11.31	<i>Secured through DCO Requirement</i>	APL	CCS and NRW	Main contractor
N14	Embedded	Several options for configuration and suppliers of the Generation Equipment are under consideration. Preliminary modelling has shown that options are available that are capable of meeting the threshold noise levels.	3.11.32	<i>Secured through DCO Requirement</i>	APL	CCS and NRW	Main contractor

Ref No	Is Measure Embedded or Additional?	Operational Mitigation Measure	ES Reference	Relevant Management Plan	Responsibility		
					Preparation	Approval	Delivery
N15	Embedded	The Project would operate in accordance with an Environmental Permit issued and regulated by the NRW. This would require operational noise from the Generating Equipment to be controlled through the use of BAT, which would be determined through the Environmental Permit application.	3.11.33	EMS	The operator	Relevant certification bodies	The operator
N16	Embedded	If any non-normal and/or emergency operations were to lead to noise levels in excess of the agreed limits specified in the DCO Requirements, the operator will inform the local authority and local residents of the reasons for these operations, the anticipated emergency period and the steps to be taken to bring it back to compliance.	3.11.34	EMS	The operator	Relevant certification bodies	The operator
Ecology							
E27	Embedded	The stack has been designed to minimise impacts from emissions during operation, which includes minimising deposition which that could affect ecological receptors.	3.11.38	<i>Secured through DCO Requirement</i>	APL	CCS and NRW	Main contractor
E28	Additional	<p><i>Protected Species</i></p> <p>The mitigation for partial underground cable or pipework replacement or repairs will follow best practice and any intrusive works will only commence after consultation with an ecologist to assess whether there are any impacts associated with the work.</p> <p>Management of newly created habitats or compensatory features will be detailed in the Landscape and Ecology Mitigation Strategy (Appendix 3.4) and will be designed to minimise disturbance or adverse effects on protected and/or priority species, such as avoiding vegetation management during nesting bird season, and cutting grass and scrub within the reptile receptor area to a height of no less than 150 mm.</p>	8.8.36	Landscape and Ecology Mitigation Strategy	APL/ Main contractor	CCS and NRW	Main contractor

Ref No	Is Measure Embedded or Additional?	Operational Mitigation Measure	ES Reference	Relevant Management Plan	Responsibility		
					Preparation	Approval	Delivery
E29	Additional	<p><i>Bats</i></p> <p>The lighting should utilise warm light luminaire such as yellow or amber LED. White LED lamps have a broad spectrum of light with whilst yellow and amber LED lamps each have a specific, narrower spectrum and have peak wavelengths between 590 and 660 nm, which is less attractive to invertebrates. This in turn will reduce the number of bats that will be attracted to feed and be open to predation through increased visibility.</p>	8.8.38	Lighting Strategy	APL	CCS and NRW	Main contractor
Water Quality and Resources							
WQ10	Embedded	Adaptation of different platform levels at the locations of key elements of the Project development. In line with this, the ground level of the Welsh Water main easement area will be retained at the existing level in order to provide a path for any flood water to pass through the Project Site, thereby avoiding the elevated Power Generation Plant (PGP) areas – with the PGP finished floor level to be raised by approximately 150 millimetres (mm) above the site road crown level while keeping the plant plinths at 300 mm above the site level.	3.11.41	<i>Secured through DCO Requirement</i>	APL	-	Main contractor
WQ11	Embedded	Provision for all process water (i.e. gas turbine compressor wash water) to be collected in a drain tank removed by road tanker and disposed by an accredited company to a designated treatment facility off-site.	3.11.42	Drainage Strategy	APL	-	Main contractor
WQ12	Embedded	Rainwater will be removed from oil retaining areas by an automatic pump to the oily water drainage system. The automatic pumps will be designed to shut down in the event that a major oil spillage is detected. This will help prevent large quantities of oil entering the oily water drainage system.	3.11.43	Drainage Strategy	APL	CCS and NRW	Main contractor
WQ13	Embedded	The oily water drainage system will ultimately pass through a Class 1 Full Retention Oil Separator (As defined in BS EN 858) before discharging into surface water bodies or drainage systems.	3.11.44	Drainage Strategy	APL	CCS and NRW	Main contractor

Ref No	Is Measure Embedded or Additional?	Operational Mitigation Measure	ES Reference	Relevant Management Plan	Responsibility		
					Preparation	Approval	Delivery
WQ14	Embedded	All oil unloading areas on site have been designed to include containment for accidental spillage of fuel during unloading with the loading system equipped such that drainage is isolated during filling and any spillage goes to the dedicated interceptor.	3.11.45	Drainage Strategy	APL	CCS and NRW	Main contractor
WQ15	Embedded	The oil separator will be fitted with an alarm to indicate when the oil coalesce requires emptying. All oil separators will be sized to suit the oily water catchment area.	3.11.46	Drainage Strategy	APL	CCS and NRW	Main contractor
Landscape and Visual							
LV02	Embedded	Utilising technology (OCGT) will allow a significant reduction in stack height compared to other technology types. As a result of selecting OCGT technology, there will be no visible plume arising from the stack. The high temperature of the exhaust gases means that water vapour is well above the condensation point which would give rise to a visible plume.	3.11.55	<i>Secured through DCO Requirement</i>	APL	-	Main contractor
LV03	Embedded	The architectural design of the buildings and structures on the Project Site has been designed to reduce glare and to assimilate the Project into the surrounding landscape as much as possible by using neutral recessive colours to lessen the contrast with the surrounding landscape and break up the overall massing of the large scale structures.	3.11.56	<i>Secured through DCO Requirement</i>	APL	-	Main contractor
LV04	Embedded	External lighting has been designed to reduce trespass and configured to avoid glare and spillage. Details will be provided in the Outline Lighting Strategy to be submitted as part of the DCO Application and undertaken in accordance with the Institution of Lighting Professionals Guidelines (Ref. A.9).	3.11.57	Lighting Strategy	APL	-	Main contractor
LV05	Embedded	The Landscape and Ecology Mitigation Strategy and Landscape and Ecology Mitigation Plan (LEMP) has been developed to both provide reinstatement planting as well as to integrate the Project into the landscape and its wider setting. The planting proposals will be developed in accordance with the various utility and service constraints within the site.	3.11.58	Lighting Strategy	APL	-	Main contractor

Ref No	Is Measure Embedded or Additional?	Operational Mitigation Measure	ES Reference	Relevant Management Plan	Responsibility		
					Preparation	Approval	Delivery
LV05	Embedded	The landscape proposals will cover a minimum period of five years of monitoring, management and maintenance to ensure the landscape objectives are successfully achieved.	3.11.59	Lighting Strategy	APL	-	Main contractor

A.2 References

- Ref A.1 IAQM. (2012). Guidance on Air Quality Monitoring in the Vicinity of Demolition and Construction Sites. [Online]. Available: http://www.iaqm.co.uk/wp-content/uploads/guidance/monitoring_construction_sites_2012.pdf [Accessed: 30/11/17]
- Ref A.2 British Standards Institute (BSI). (2014). BS 5228 -1: 2009+ A1:2014. Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise.
- Ref A.3 Herpetofauna Groups of Britain and Ireland (HGBI) (1998). Evaluating local mitigation/translocation programmes: Maintaining Best Practice and lawful standards. HGBI advisory notes for Amphibian and Reptile Groups (ARGs). HGBI, c/o Froglife, Halesworth. Unpubl.
- Ref A.4 National Grid. (2014). NGTS 2.20: Oil Containment at Electricity Substations and Other Operational Sites.
- Ref A.5 CIRIA. (2015). C753: The SUDS [Sustainable Urban Drainage] Manual. BSI. (2012). BS 5837. Trees in Relation to Design, Demolition and Construction – Recommendations.
- Ref A.6 ILP. (2011). Guidance Notes for the Reduction of Obtrusive Light. [Online]. Available: <https://www.theilp.org.uk/resources/free-resources/ilp-guidance-notes/> [Accessed: 30/11/17]

Appendix 3.2: Outline Surface Water Management Plan

CONTENTS

1.	Outline Surface Water Management Plan.....	1
1.1	Introduction	1
1.2	Project Site Surface Water Features	1
1.3	Guidance.....	2
1.4	Water Management Measures	2
1.5	Protection of Private Water Supplies	5
1.6	References.....	5

1. Outline Surface Water Management Plan

1.1 Introduction

- 1.1.1 The objective of the Surface Water Management Plan (SWMP) is to detail the water management principles and procedures to be implemented throughout the construction period of the Abergelli Power Project (the 'Project'). The SWMP is designed to ensure compliance with surface water protection legislative requirements, Environmental Statement (ES) commitments and environmental permits conditions during construction.
- 1.1.2 This Outline SWMP has been developed by the applicant, Abergelli Power Limited (APL), and will be adopted and implemented by the main contractor upon appointment. It will be the responsibility of APL to ensure the Project is executed in a manner that demonstrates commitment to the care and protection of the aquatic environment.
- 1.1.3 After appointment of the main contractor, this Outline SWMP will be reviewed to include any additional requirements of the main contractor's own environmental policies. The measures and procedures set out in the SWMP will feed-in to the detailed design process and the development of Construction Method Statements (CMS). This will include the selection and design of surface water drainage for the construction phase. The CMS will be submitted to the City and County of Swansea Council (CCS) and Natural Resource Wales (NRW) for approval as part of applications for temporary works environmental permits. On approval of the CMS, the SWMP will then be updated to include the finalised details for the construction surface water drainage.
- 1.1.4 The SWMP will be a 'live' document, which will be kept under continuous review by the main contractor. This is to take into account any additional environmental information obtained during the detailed design and construction phases, changes in legislation, policy and best practice, and any lessons learned on the Project. It will also allow for the inclusion of any further conditions and amendments that arise from the granting of any temporary works environmental permits, a review of environmental monitoring results or the legitimate concerns of Third Parties.
- 1.1.5 In implementing this plan, the main contractor will ensure that the measures and procedures are followed in accordance with the Outline Construction Environment Management Plan (CEMP) (Appendix 3.1).

1.2 Project Site Surface Water Features

- 1.2.1 The Project Site lies within the Afon Llan River catchment. The Afon Llan flows in a south-westerly direction past the southern boundary of the Project Site and links with the Afon Lliw and the River Loughor, before discharging into Carmarthen Bay.

1.2.2 Within the Project Site itself, there are a number of small drainage ditches and land drains, as well as springs and spring-drainage rivulets that drain into the Afon Llan. There are two heavily vegetated ponds located within the Generating Equipment Site. These are of unverified extent owing to vegetation cover but are thought to have a radius of approximately 5 m.

1.3 Guidance

1.3.1 Guidance relevant to this plan includes:

- The BS '*Code of Practice for Earthworks*' BS 6031:2009 (Ref 1.1);
- The BS '*Code of Practice for Foundations*' BS 8004:2015 (Ref 1.2);
- National Grid (NG) Technical Specification (TS) 2.20 '*Oil Containment at Electricity Substations and Other Operational Sites*' (Ref 1.3);
- C753: '*The SUDS [Sustainable Urban Drainage] Manual*' (Ref 1.4);
- SP156: '*Control of Water Pollution from Construction Sites – Guide to Good Practice*' (Ref 1.5); and
- C532: '*Control of Water Pollution from Construction Sites – Guidance for Consultants and Contractors*' (Ref 1.6).

1.4 Water Management Measures

a) Drainage Management

1.4.1 Information on the proposed design of the drainage system for the Project Site during the construction phase is available in **Chapter 3: Project and Site Description** of the ES and the Flood Consequence Assessment in Appendix 9.1 of the ES. Surface water, foul water and water potentially contaminated with oil (oily water) will have separated drainage systems on the Project Site. Foul water and oily water will not be directly discharged into drains or watercourse, but collected and treated. These details will be finalised by the main contractor as part of the detailed design.

1.4.2 Details of the proposed permanent drainage system to be implemented through the operational phase are available in the Outline Drainage Strategy (Appendix E of the Flood Consequences Assessment).

1.4.3 The following measures will be implemented within the design of the construction drainage to safeguard water quality:

- All Project Site drainage measures will be developed in consultation with NRW prior to the commencement of construction;
- Sequencing of work will be such that proposed drainage measures, including flow controls and attenuation storage will be in place prior to erection of buildings and hardstanding;
- The construction oily water drainage will be designed in accordance with NGTS 2.20 '*Oil Containment at Electricity Substations and Other Operational Sites*' (Ref 1.3) Oil Storage Regulations 2016 (Ref 1.7) and Pollution Prevention

Guidance 3: Use and Design of Oil Separators in Surface Water Drainage Systems (Ref 1.8) or similar approved guidelines;

- The construction surface water drainage system will adopt the principles of the SuDs Manual (Ref 1.4) to adequately drain the Project Site and prevent ponding; and
- Any artificial drainage will only be installed where necessary. The individual lengths, depths and gradients of these drains will be minimised to avoid intercepting large volumes of diffuse overland flow and generating high velocity flows during storm events.

b) Control of Runoff

1.4.4 During construction and site preparation, there will be a requirement for temporary measures to ensure controlled management of runoff draining from the Project Site. Runoff from the Project Site will not be allowed to drain directly into any water bodies untreated and will be collected, treated and attenuated using a range of control measures. These will include combinations of:

- Cut off drainage ditches;
- Infiltration drains;
- Suitably sized attenuation ponds with restricted discharge pipes;
- Road side swales; and
- Pollution control measures such as silt fencing, straw bales, sedimats and sediment traps.

1.4.5 The arrangements of such drainage infrastructure will be set out in the detailed design and, where appropriate, agreed with NRW prior to construction in accordance with the requirements of any temporary works discharge environmental permits.

1.4.6 The above measures will ensure that any sediment or other pollutants dissolved or carried in suspension in the surface water runoff from the Project Site will have been treated, filtered or settled out to an acceptable level before being discharged to a water body. Limits on the concentration of relevant physico-chemical parameters will be agreed with NRW as part of the process of determining a temporary works environmental permit from NRW.

1.4.7 All earthworks will be undertaken in accordance with BS6031:1981 Code of Practice for Earth Works (Ref 1.1). Land disturbance will be kept to a minimum and disturbed areas will be stabilised as soon as possible after construction.

c) Proximity to Water

1.4.8 The following good practice measures will be implemented to minimise the potential of direct pollution to water:

- A 10 m buffer will be applied to all Project Site watercourses. Where possible, this buffer will not be entered by plant and machinery;

- Stockpiles of excavated soils/peat will be located away from surface watercourses and away from known surface drainage pathways as much as possible;
- Laydown areas and plant and machinery will be stored at least 10 m from watercourses and where possible, in low flood risk areas; and
- Oil storage will comply with the measures set out in the Pollution Prevention Plan within the Outline CEMP (Appendix 3.1) including, where possible being located at least 50 m from an open watercourse.

d) Silt and Sediment

1.4.9 The following measures will be implemented in order to reduce the potential generation of silt laden runoff:

- The Project Site will be laid out to prevent runoff from stockpiles entering watercourses. Stockpiles of soils and excavated solid material will be surrounded at their bases by silt fencing that will be implemented as per manufacturer guidelines to prevent contaminated run-off being generated during inclement weather and where damping is used to prohibit dust;
- Bare ground exposure will be minimised by only removing vegetation from areas that require to be exposed in the near future and completing reinstatement as soon as practicably possible;
- Project Site roads will be regularly maintained and kept free from sediment deposits in order to reduce the volume of silt becoming entrained in surface runoff and entering any watercourse or drain;
- Mitigation will be implemented as required (silt fencing, placement of straw bales into ditches, sedimats or similar commercially available products and sediment traps) to intercept and collect silt, reduce runoff velocity and encourage deposition of suspended sediment; and
- Care will be taken during felling operations to reduce the risk of sedimentation and erosion into the watercourses.

e) Control of Pumped Water

1.4.10 Water pumped from excavations may contain a moderate level of suspended solids, which if left to drain untreated, could carry sediment into Afon Llan. As noted above, runoff from the Project Site will not be allowed to drain directly into any watercourse and will be filtered and attenuated using a variety of methods including silt traps and settlement lagoons.

1.4.11 If pumping is required, disposal of water pumped from excavations will be in accordance with the following requirements:

- APL and the main contractor will ensure that all necessary consents, permits and licences will be obtained from NRW prior to any pumping; and
- No discharges will be made directly to watercourses or land unless agreed with NRW and a discharge licence will be sought.

1.5 Protection of Private Water Supplies

- 1.5.1 Recent (received on 9 October 2017) data on private groundwater and abstraction licences received from CCS and NRW respectively did not identify any licences within 4 km of the Project Site.

1.6 References

- Ref 1.1 BSI. (2009). BS 6031:2009 Code of Practice for Earthworks.
- Ref 1.2 BSI. (2015). BS 8004:2015. Code of Practice for Foundations.
- Ref 1.3 National Grid. (2014). NGTS 2.20: Oil Containment at Electricity Substations and Other Operational Sites.
- Ref 1.4 CIRIA. (2015). C753: The SUDS [Sustainable Urban Drainage] Manual.
- Ref 1.5 CIRIA. (2002). SP156: Control of Water Pollution from Construction Sites – Guide to Good Practice.
- Ref 1.6 CIRIA. (2001). C532: Control of Water Pollution from Construction Sites – Guidance for Consultants and Contractors.
- Ref 1.7 Water Resources (Control of Pollution) (Oil Storage) (Wales) Regulations 2016. W.S.I. 206/359/W112.
- Ref 1.8 Environment Agency. (withdrawn). Pollution Prevention Guidance 3: Use and Design of Oil Separators in Surface Water Drainage Systems.

Appendix 3.3a

Outline Construction Traffic Management Plan

Abergelli Power Project

Outline Construction Traffic Management Plan

Abergelli Power Limited

Project number: 60542910

May 2018

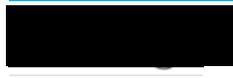
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Revision History

Revision	Revision date	Details	Authorized	Name	Position
V1	23/02/2018	For discussion with National Grid.		Spiro Panagi	Principal Consultant
V2	12/04/2018	Including comments from NG discussion		Spiro Panagi	Principal Consultant
V3	23/04/2018	Final version for discussion with National Grid.		Spiro Panagi	Principal Consultant

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Table of Contents

1. Introduction.....	5
2. Existing Conditions and Site Accessibility	8
3. Access Arrangements and Management Measures	11
4. Traffic Generation and Impacts	20

Figures

Figure 2.1	Pedestrian and Cycle Routes and Public Rights of Way
Figure 3.1	Construction Routeing Arrangements
Figure 3.2	B4489 Layby – HGV Parking Area

1. Introduction

1.1 Overview

- 1.1.1 This Outline Construction Traffic Management Plan (CTMP) has been prepared by AECOM on behalf of Abergelli Power Limited (APL) in respect of the Abergelli Power Project (referred to as 'the Project' from herein).
- 1.1.2 This document supports the Environmental Statement (ES) which is submitted as part of the DCO Application. A Transport Assessment (TA) has also been undertaken and can be found in **ES Chapter 12: Traffic, Transport and Access**.

1.2 The Project

- 1.2.1 The Project is situated on open agricultural land located approximately 2 km north of Junction 46 of the M4 within the administrative area of the City and County of Swansea Council (CCS), approximately 1 km southeast of Felindre and 1.4 km north of Llangyfelach.
- 1.2.2 The land upon which the Project would be developed, or which is required for construction of the Project, is referred to as the 'Project Site'. The approximate centre of the Project Site lies at grid reference 265284, 201431. The Project Site covers an area of up to approximately 30 ha.
- 1.2.3 The current land use is predominantly agricultural, with sheep and horse grazing. The western extent of the Project Site encompasses the existing Access Road leading to the Substation and Felindre Gas Compressor Station from the B4489.
- 1.2.4 The components of the Project are summarised in **Table 1.1**.

Table 1.1: Project Components

Project Component	Description
Power Generation Plant	<ul style="list-style-type: none"> An Open Cycle Gas Turbine (OCGT) peaking power generating station, fuelled by natural gas and capable of providing a rated electrical output of up to 299 Megawatts (MW). The Power Generation Plant comprises: Generating equipment including one Gas Turbine Generator with one exhaust gas flue stack and Balance of Plant (BOP) (together referred to as the 'Generating Equipment') which are located within the 'Generating Equipment Site'; An Access Road to the Project Site from the B4489 which lies to the west, formed by an existing access road between the B4489 junction and the Swansea North Substation (the Substation) and constructing a new section of Access Road from the Substation to the Generating

Project Component	Description
	Equipment Site; <ul style="list-style-type: none"> • A temporary construction compound for the storage of materials, plant and equipment as well as containing site accommodation and welfare facilities, temporary car parking and temporary fencing. A small area within the Laydown Area will be retained permanently (the Maintenance Compound); • Ecological Mitigation Area; and • Permanent parking and drainage.
Gas Connection	<ul style="list-style-type: none"> • The Gas Connection will be in the form of a new above ground installation (AGI) and underground gas pipeline connection (the Pipeline). This is to bring natural gas to the Generating Equipment from the National Gas Transmission System. The Pipeline will follow an approximate north-south route corridor, between the National Gas Transmission System south of Rhyd-y-Pandy Road and the Generating Equipment Site.
Electrical Connection	<ul style="list-style-type: none"> • This is an underground electrical cable to export power from the Generating Equipment to the National Grid Electricity Transmission System (NETS).

1.3 Structure of Construction Traffic Management Plan

1.3.1 The CTMP provides a framework for addressing the transport issues associated with the movement of construction traffic to serve the construction of the Project, including movements to/from the local and strategic highway network, along the existing Access Road (that serves the National Grid premises), the new section of Access Road that will be constructed to serve the Power Generation Plant and the new access to the proposed AGI. These will be considered with regard to routeing, signage, HGVs and Abnormal Indivisible Loads (AILs).

1.3.2 The purpose of this document is to set out the principles that APL and the contractor will follow to manage construction traffic during the construction of the Project.

1.3.3 The CTMP is structured as follows:

- Section 2 - Existing Conditions and Site Accessibility: Sets out the local transport conditions in the vicinity of the site and access to non-car modes of transport;
- Section 3 - Access Arrangements and Management Measures: Details the access arrangements to the Project Site during construction of the Project and the management measures to minimise the disruption on the highway network and internal access roads; and

- Section 4 - Traffic Generation: Sets out the forecast traffic generation during the construction and operational phases of the Project and summarises the impacts on the existing highway network.

2. Existing Conditions and Site Accessibility

2.1 Local Highway Network

- 2.1.1 The Project Site is served by a privately maintained Access Road from the B4489. The Access Road is unlit. The width of the Access Road varies along its length between 3.5 m and 7.5 m, and is generally bordered by trees and intermittent hedgerows. The Access Road connects to the B4489 via a simple priority junction. This is characterised by large radii on the minor arm (the Access Road) to accommodate HGV movements.
- 2.1.2 The B4489 routes between the village of Felindre to the north (approximately 2.3 km from the Access Road) and the M4 Junction 46 to the south (approximately 1.8 km from the Access Road). The B4489 is subject to a 40 mph speed limit at its junction with the Access Road. At this location, the road has a 5.5 m wide carriageway and is unlit. Approximately 330 m to the north of the Access Road, the B4489 becomes subject to the national speed limit. The B4489 continues a further 1.7 km north where it connects to Rhyd-y-Pandy Road at a priority junction. This section of the B4489 is unlit and ranges in width between 4.5 m and 5.5 m, with numerous passing places. The junction with Rhyd-y-Pandy Road and its approaches are subject to a 30 mph speed limit. Rhyd-y-Pandy Road routes east for 1.6 km where it passes the northern extent of the Project Boundary. This section of Rhyd-y-Pandy Road is unlit and ranges in width between 4.5 m and 5.5 m, with numerous passing places. It is subject to a 30 mph speed limit, increasing to the national speed limit around 900 m east of its junction with the B4489. It also serves the Felindre Water Treatment Works.
- 2.1.3 Approximately 475 m to the south of the Access Road, the B4489 is street lit. A further 75 m south from this point, the B4489 forms a three-arm roundabout with the access to the Felindre Park and Share.
- 2.1.4 On an average weekday, the B4489 carries approximately 130 vehicles during the AM peak hour, 90 vehicles during the PM peak hour, and 1,000 vehicles over the 24-hour period. HGVs account for no more than 2% of total traffic.
- 2.1.5 The B4489 forms a dumbbell roundabout with the M4 Junction 46. The northern dumbbell roundabout junction comprises three arms; the B4489 and the eastbound on/off-slips of the M4. The southern dumbbell roundabout junction comprises six arms; the A48 (three arms), the B4489 Swansea Road, and the westbound on/off-slips of the M4. The south-eastern arm of the A48 forms a mini-roundabout junction with Pant Lasau Road approximately 90 m southeast of the southern dumbbell roundabout. These junctions are subject to a 40 mph speed limit and are lit.

2.2 Walking and Cycling

- 2.2.1 The walking and cycling facilities and Public Rights of Way (PROW) are shown on **Figure 2.1**.
- 2.2.2 There are no footways that serve the Project Site. The nearest footways are on the B4489, approximately 475m south of the Access Road (on the approach to the junction with the Felindre Park and Share). This footway continues to the M4 Junction 46. The 500 m section of the footway to the north of the M4 Junction 46 is separated from the carriageway edge by a barrier. At the M4 Junction 46 the footways continues south along the east side of the carriageway, serving the southern arms of the southern dumbbell roundabout, with dropped kerbs and tactile paving to facilitate crossing movements across entry arms.
- 2.2.3 There are no formal cycling routes in the vicinity of the Project Site. Part of the B4489 is identified as an 'advisory cycling route' on the CCS's cycle map. This covers the section of the B4489 that routes north from the Access Road to Felindre and to a point approximately 475 m south of the Access Road.
- 2.2.4 There are numerous PROW crossing/in the vicinity of the Project Site. Footpaths LC34 and LC117 cross the Access Road (and the new section of Access Road) at points approximately 350 m and 1.3 km from the B4489. Footpath LC35B passes through the northern part of the Project Site, connecting to Rhyd-y-Pandy Road in the vicinity of the AGI Access.

2.3 Public Transport

- 2.3.1 The nearest bus stop to the Project Site is the 'Lliw Reservoirs' stop located on Rhyd-y-Pandy Road. This is situated to the east of Felindre and approximately 500 m to the northwest of the northern extent of the Project Site boundary. There is no footway between the Project Site and this bus stop. It provides access to Service 142, which routes between Morryston and Garnswllt. This service is operated by DANSA, a community transport organisation. There are three to four services per day in each direction, although these can generally only be pre-booked.
- 2.3.2 Service 141 passes to the south of the Project Site, routing between Gorseinon and Morryston. The nearest stop that provides access to this service is the 'Pant Lasau Cross' stop located on Mynydd Gelli Wastad Road. It is situated approximately 750 m to the southeast of the southern extent of the Project Site boundary and can be accessed via Footpath LC117.

- 2.3.3 There are no railway stations in the vicinity of the Project Site. Llansamlet railway station is situated approximately 5.5 km southeast of the Project Site, accessible by car via the A48 (from M4 Junction 44 and 46). Swansea railway station is a further 7 km from the Project Site; this is a key local transport hub and is more easily accessible by public transport. Swansea railway station is managed by Arriva Trains Wales. There are four services daily from Swansea to Shrewsbury; an hourly service from Swansea to Manchester Piccadilly, which calls at Cardiff Central; and a total of two to three services hourly from Swansea to Cardiff Central. Great Western Railway also provides services from Swansea to London Paddington, calling at Bristol Parkway.
- 2.3.4 Overall, the opportunities to access the Project Site by public transport are limited, and it is therefore considered that, for the purposes of this assessment, no trips by construction, maintenance and permanent staff will be undertaken by these modes.

2.4 Parking

- 2.4.1 Felindre Park and Share is accessed from the B4489, approximately 550 m south of the Access Road. It is located on the site of the proposed Felindre Business Park. It has capacity for 480 spaces and its use is encouraged for employees of the DVLA HQ in Clase. A shuttle bus service runs between the Felindre Park and Share and the DVLA. The Felindre Park and Share is understood to be managed by the DVLA and will not be available for use by the Project.
- 2.4.2 A layby is located adjacent to the northbound carriageway of the B4489, approximately 800 m from the M4 Junction 46, and 950 m from the Access Road. The layby measures approximately 50 m in length.

3. Access Arrangements and Management Measures

3.1 Construction Access Routes

3.1.1 The access route to the Project Site comprises four parts. These and the associated management measures along the route are set out under the following sub-headings and shown on **Figure 3.1**.

Local/Strategic Highway Network to Existing Access Road

3.1.2 Access to the Project Site (from the public highway) will be from the B4489. Construction traffic will route to/from the M4 Junction 46, located approximately 1.8 km from the Access Road. This section of the route is approximately 2 km in length. This route would be used during both the construction and operational phases of the Project.

3.1.3 A layby is located adjacent to the northbound carriageway of the B4489, approximately 950 m from the Access Road. The layby measures approximately 50 m in length, which is sufficient storage capacity for two HGVs, as shown on **Figure 3.2**. HGVs travelling to the Project Site will be instructed to enter the layby before proceeding to the Access Road. On arrival at the layby, HGVs will contact a Site Representative (Site Representative A) to be stationed at a holding area located approximately 40 m along the Access Road (east of the gates to the Access Road). Site Representative A will advise whether the holding area has capacity to accommodate HGVs, instructing HGVs to wait at the layby/proceed to the site as appropriate. The layby will be subject to a Temporary Traffic Regulation Order (TTRO) for closure to non-construction traffic during the construction phase to ensure that the layby has capacity to accommodate HGVs.

Existing Access Road (B4489 to National Grid)

3.1.4 The second part of the construction access route is along the existing Access Road which currently serves the National Grid premises. This is approximately 1 km in length between the B4489 at the western extent and the National Grid car park in the east. There are also additional adjoining accesses to National Grid areas along this route. A new section of Access Road will be constructed to serve the Project Site off the existing Access Road (discussed at Paragraph 3.1.6).

- 3.1.5 HGV movements along the existing Access Road will be managed by construction staff so that no two-way traffic movements are undertaken along the affected section of Access Road while an HGV is routeing along the Access Road. This will be managed by Site Representative A and a site representative (Site Representative B) located near the access to the new section of Access Road and in close proximity to the bend immediately after the existing height restricting frame, who will be in contact via radio. Traffic associated with the construction activities will be held at these locations and priority will be given to all National Grid vehicles and employees.

New Section of Access Road

- 3.1.6 A new section of Access Road will be constructed between the existing Access Road and the Laydown Area within the Project Site. This will commence at a point around 850 m along the existing Access Road.
- 3.1.7 HGV movements along the new section of Access Road will be managed by construction staff so that no resultant two-way traffic movements are experienced along the existing Access Road or at the junction of the two routes. This will be managed by Site Representative B and, if found to be required, a further site representative (Site Representative C) will be located within the Project Site (at the Laydown Area), who will be in contact via radio. Any HGV movements will be managed out of the new section of Access Road as appropriate. This will ensure priority is given to National Grid vehicles and employees on the existing Access Road.

AGI Access

- 3.1.8 The construction route to the AGI will result in the use of a section of the B4489 to the north of the existing Access Road. This continues approximately 2.1 km north before continuing east along Rhyd-y-Pandy Road for approximately 1.5 km. Much of the AGI access route is constrained in terms of two-way movement. Construction activities associated with the AGI will be undertaken over two quarterly periods, with up to 30 HGV movements per day.
- 3.1.9 The HGVs associated with the AGI will continue to the site without the need for being held. The AGI access will be managed by the construction team and will not be in use by third parties, as is the case for the existing National Grid access.
- 3.1.10 An alternative route via Rhyd-y-Pandy Road has been considered. This suffers from similar constraints to the route proposed, but would involve routeing via Pant-Lasau. Experience of this route gives us knowledge of the Local Highway Authority's (LHA's) concerns of the local roads being beyond theoretical vehicular capacity in the peak hour periods. In addition to this, the route passes through more residential areas and there could be issues with Morriston Hospital traffic. On this basis, it is considered more appropriate for the AGI construction traffic to access the north of the site using the B4489.

3.2 AIL Routeing

3.2.1 An AIL is a vehicle that has any of the following:

- A weight of more than 44 tonnes;
- An axle load of more than 10 tonnes for a single non-driving axle and 11.5 tonnes for a single driving axle;
- A width of more than 2.9m; and
- A length of more than 18.65m.

3.2.2 The shape and scale of these loads will be refined as the construction process develops in more detail. At this stage, we have taken instruction from the current design and from previous experience from within the Applicant team. There are expected to be two AILs; these are likely to be around 5 m in width, potentially 6.5 m in height and up to around 50 m in length. The total vehicle weight could be up to 400 tonnes per vehicle. The new section of Access Road has been designed to accommodate these vehicles, and provision will be made along the Access Road through widening as appropriate. These loads will be travelling with a full complement of technical operators, mobile safety entourage and police escort. It is assumed that the heavy and large equipment will arrive via water transport to either Swansea or Port Talbot Docks. The route to the Project Site will be confined to the strategic highway network wherever possible and will take as direct a route as available given the local circumstances. The pre-planning and lead up time required for the transportation of such loads will ensure that all appropriate measures are in place and relevant authorities are notified.

3.2.3 Once the Contractor has been appointed, and prior to transportation of the first AIL, an access route survey report will be produced by the haulage company to identify any pinch-points requiring mitigation (such as temporary removal of road traffic signs). The access route survey report will detail:

- Preferred ports of entry;
- Delivery routes;
- Potential pinch-points and any street furniture removal/temporary highway alterations required; and
- Delivery vehicles.

3.3 Haulage Responsibilities for AILs

3.3.1 The following requirements will be the responsibility of the haulage companies during the delivery of AIL components:

- The tendering process for the construction of the site will ensure that AIL drivers and their convoy are fully aware of the access route and do not deviate from this;

- Deliveries should only take place during the hours agreed with the Police, LHA (CCS) and South Wales Trunk Road Agent (SWTRA);
- Peak traffic periods and school run periods will be avoided when timing deliveries to and from the Project Site;
- Deliveries on a Saturday between 08.00 and 13.00 may be undertaken if this is acceptable to the Police, LHA and SWTRA;
- Written notification of the commencement of the delivery period(s) should be given to the Police, LHA and SWTRA, within an agreed timescale, to allow for the safe coordination of the work; and
- Further temporary warning signs may be provided on the AIL delivery route in accordance with the requirements of the various Highway Authorities along the route.

3.3.2 For the delivery of AIL, it will be the responsibility of the haulage company to contact and inform the following stakeholders to inform them of delivery dates and likely impact of delivery.

Emergency Services

3.3.3 The Police, Fire and Ambulance service will be given written notice of the AIL deliveries.

Highway Authorities

3.3.4 The Highway Authorities will be given written notice of the AIL deliveries. The relevant authorities will include the LHA (CCS) and SWTRA.

3.3.5 Authorities can be notified using the Highways England Electronic Service Delivery for Abnormal Loads (ESDAL) system.

3.3.6 Any request for an AIL movement must include an indemnity to ensure that the cost of repairing any damage to the highway causing by transporting the AIL can be recovered.

Local Residents

3.3.7 Local residents affected by AIL deliveries will be notified prior to commencement of the deliveries. The method of communicating information will be agreed with the LHA (CCS), but could include the use of leaflet drops and information in the local media. The timing of the notification will be subject to the appointment of the AIL operator and handler who will be able to provide more information on the time and duration of the expected load delivery. Notification will be made in advance and as part of the consultation process and once the necessary agreements are obtained from the Highway Authorities detailed above. The communication should include the following information:

- Name and number of the Construction Site Manager;
- Commencement date for deliveries;

- Duration of delivery period;
- Estimated time of deliveries;
- Request to keep the highway clear of parked cars during the delivery period; and
- Emergency number of Local Police and LHA Helpdesk.

Local Business

- 3.3.8 Local businesses should be approached directly to ensure the effect on their businesses is minimised. This will be carried out in a similar timeframe and manner to that set out for local residents, detailed above.

Local Services

- 3.3.9 The contractor and haulage company will make all reasonable efforts to work with local service providers to ensure disruption caused by deliveries is avoided. Services of particular relevance include but are not limited to:
- Royal Mail for postal delivery services and distribution vehicles;
 - Local buses;
 - Refuse collection; and
 - Regular good deliveries.

Planned Engineering Works

- 3.3.10 The contractor and haulage company will work with CCS to identify any planned engineering works that could cause conflict with the proposed delivery route times. Discussions will then be made to minimise disruption to the local community and the planned engineering works.

Local Community Events

- 3.3.11 The contractor and haulage company will work with CCS to identify any conflicts with school and nursery drop off and pick up locations and times. Where possible, construction deliveries will be scheduled to avoid these busy periods. The chosen routes have also been selected ensuring that the journey of construction traffic is direct and contained, using higher classification of roads, wherever possible.
- 3.3.12 Planned and notified community events will also be considered by the contractor and haulage company when scheduling deliveries. The Construction Site Manager will contact event organisers to ensure any issues are considered.

Highway Conditions Survey

- 3.3.13 A highway condition survey of the public highway along the access route will be undertaken by the haulage company prior to the first AIL and following the final AIL. Any road maintenance issues directly caused by the AIL will be notified and approved through the normal process by CCS Highway Inspectors.

3.4 Construction Signage

- 3.4.1 Signage will be provided along the construction routes to direct construction traffic to/from the Project Site and to warn other road users construction traffic movements in key locations, e.g. the B4489/Access Road junction. The location and form of signage will be agreed with the LHA. Signage will also be provided within the Project Site to guide construction traffic in and out of the Laydown Area and the Generating Equipment Site, and to the construction parking bays. The location of the signage will be developed as the Project progresses and in discussion with the LHA and National Grid.

3.5 Monitoring of Construction Traffic

- 3.5.1 AIL and HGV deliveries to site will be monitored to check compliance with the proposed routing strategy. The final measures will be agreed with the LHA and the contractor, as either the use of one or a number of measures could be utilised to achieve compliance. An example of a possible monitoring measure is a sticker system whereby all HGVs delivering to the Project Site would be required to display a sticker in the front window. This would allow HGVs to be visually assessed for compliance with the proposed routes.
- 3.5.2 The haulage companies may be able to offer more advanced compliance measures depending on the type of tracking/monitoring system they employ on their vehicles.

3.6 Construction Laydown Area

- 3.6.1 A temporary Laydown Area during construction will be provided for the storage of materials, plant and equipment as well as containing site accommodation and welfare facilities, temporary car parking and temporary fencing. The Laydown Area will be provided adjacent to the Generating Equipment Site. A small permanent area within the Laydown Area is required for maintenance during the operational phase of the Project.
- 3.6.2 Sufficient car parking will be provided within the Laydown Area. During operation car parking for operational and maintenance staff would be provided within the Generating Equipment Site. The Project will take into account CCS's policy on parking standards during the operational phase of the Project and implement sustainable transport methods through travel planning measures, where possible.

3.7 Scheduling of Deliveries

- 3.7.1 A booking system will be used to log vehicles entering and leaving the Project Site. Where possible, deliveries will be spread across the day to minimise the impact of HGV traffic during the peak periods.
- 3.7.2 The transport of AILs will be timed to be undertaken at night or outside of the peak hours on the highway network to minimise disruption. These deliveries will be pre-arranged with local authorities and the police.

3.8 Cleansing of Vehicles Prior to Exiting the Site

- 3.8.1 All vehicles exiting the Project Site will be required to undertake effective vehicle cleaning and wheel-washing to minimise the amount of debris which is transferred to the Access Road and the local highway network. There will be specialised water tanks, hosing equipment, water collection and treatment tanks to undertake the cleaning process. The location of the wheel cleaning facility within the Project Site would be determined by the contractor in agreement with National Grid.

3.9 Highway Conditions Survey

- 3.9.1 A pre-construction condition survey, including road and verge condition at the junction of the Access Road and the B4489 and PROW (where directly affected) within the boundary of the Project Site would be undertaken prior to the commencement of the construction programme.
- 3.9.2 Three PROWs crossing the Project Site will be reinstated to their pre-construction condition upon completion of works (where any damage is attributable to contractors working on behalf of APL) or permanently diverted as appropriate. These PROW will be stopped up or diverted temporarily during construction to ensure public safety.

3.10 PROW

- 3.10.1 Footpaths LC34 and LC117 cross the Access Road (and the new section of Access Road) at points approximately 350 m and 1.3 km from the B4489. Footpath LC35B passes through the northern part of the Project Site. There will be further consultation to develop measures in respect of the PROW. Where possible, connectivity will be maintained by the use of temporary diversions and working methods to allow the PROWs to remain open for the majority of the construction period. Potential measures include fencing to ensure separation between movements along the PROW and construction activities (for PROW within the Project Site), and signage/management of movements where PROW cross construction traffic routes.

3.11 Construction Staff Travel Plan

3.11.1 Staff will be encouraged, where possible, to car share to the Project Site. It is recognised that using sustainable modes of transport may not be suitable due to working hours or the site location. However, car sharing would reduce the total number of trips to the Project Site. The Contractor will also be encouraged to lay on crew vehicles.

3.12 Measures relating to National Grid

3.12.1 The measures set out in this plan largely relate to the public highway network. In this case the Access Road to the construction site will, in part, require use of the existing Access Road which is currently operated by National Grid. Therefore, there will be a number of measures which will relate to National Grid as a business and as a provider of utilities. The measures below have been developed following ongoing discussions with and input from National Grid representatives.

- Works planned by National Grid in relation to the Felindre Gas Compressor Station and the Substation will be taken into consideration when finalising the Project construction plan. At the time of this report it has been determined that any future works planned by National Grid would not occur within the Project's construction period. Liaison will continue prior and during construction with appropriate management measures implemented if needed;
- National Grid operational staff at Felindre currently comprises four site-based staff in attendance 0800 hours to 1600 hours. The site entrance gate is locked outside of these times. There are also instances where weekend work is required. The contractor appointed for the Project construction will manage the gate security if working outside of these hours and ensure the National Grid access is not obstructed;
- To assist with the above and also with the construction communication process, National Grid will be provided with a named APL contact, the construction site manager or an appropriate project manager. Either the nominated construction manager will ensure that key communication is continually fed to National Grid operatives and will be the point of contact for all queries;
- Height clearance for overhead cables has been discussed with National Grid and the project team will ensure that all available information is considered and that HGV loads are able to safely pass below the cable lines;
- The existing height restriction gate will be temporarily removed to accommodate the width of any AILs, and only for these loads, it will be fully reinstated immediately after this work. In the interim period a height safety bunting gateway will be erected to ensure height limits are in place;
- There are a number of cable burials beneath the existing Access Road. The location of these is the subject of discussion at the time of writing this document. Location plans will be provided by National Grid and the

APL construction team will record and manage these appropriately. Liaison will continue through the planning and pre-construction period to understand if further works are required to protect or reroute cables;

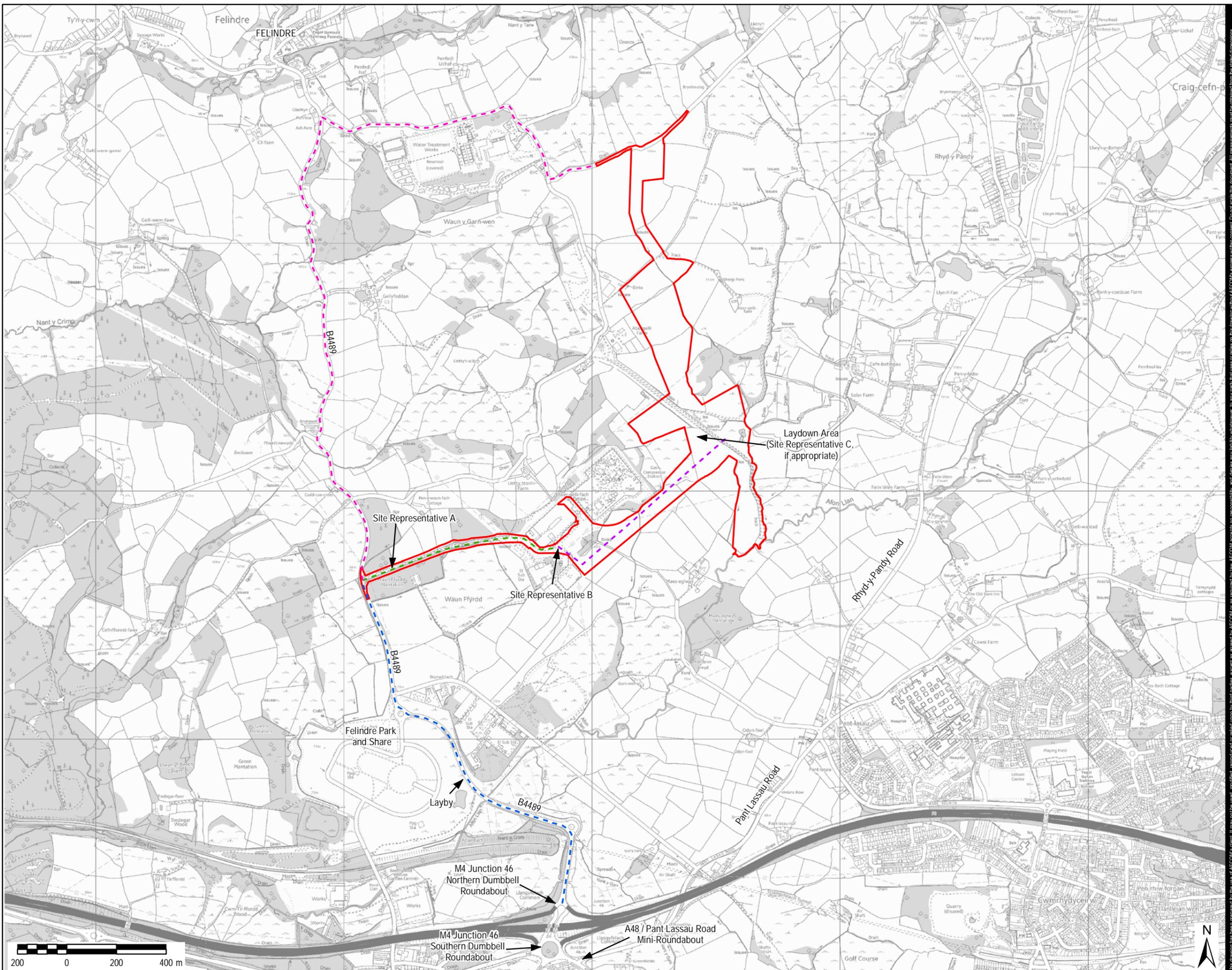
- National Grid will be kept informed of the planning for AILs with measures put into place to use the existing access outside of National Grid's key required access times.
- A highway condition survey of the existing Access Road will be undertaken by the APL construction team and National Grid, recording the condition of the route prior to work commencement. Following completion of the construction period, a final inspection will be carried out and any defects which have occurred since the first inspection will be recorded; and
- A highway condition survey of the existing Access Road will be undertaken by the haulage company prior to the first AIL and following the final AIL as a separate measure and in conjunction with the wider highway inspection.

4. Traffic Generation and Impacts

- 4.1.1 The TA sets out the level of traffic generation of the Project and considered the impacts on the highway network.
- 4.1.2 The peak traffic during construction is expected to result in approximately 270 car or van trips per day and around 130 HGV deliveries per day. This assumes a 22-month construction period, with the peak of HGV deliveries occurring during the first three months of the period and the peak of car and van trips occurring during months 13 to 15. The car or van trips would be limited to the start and end of the working day whilst HGV trips would be spread across the day.
- 4.1.3 Construction traffic generated by both staff and deliveries would arrive at the site from 08:00 and depart the site by 18:00 Mondays to Fridays. On Saturday and public holidays staff and deliveries would arrive at the site from 08:00 and depart the site by 13:00. AILs will be transported outside peak hours.



- Project Site Boundary
- - - Local/Strategic Highway Network to Existing Access Road
- - - Existing Access Road (B4489 to National Grid)
- - - New Section of Access Road
- - - AGI Access



Laydown Area
(Site Representative C,
if appropriate)

Site Representative A

Site Representative B

Felindre Park
and Share

Layby

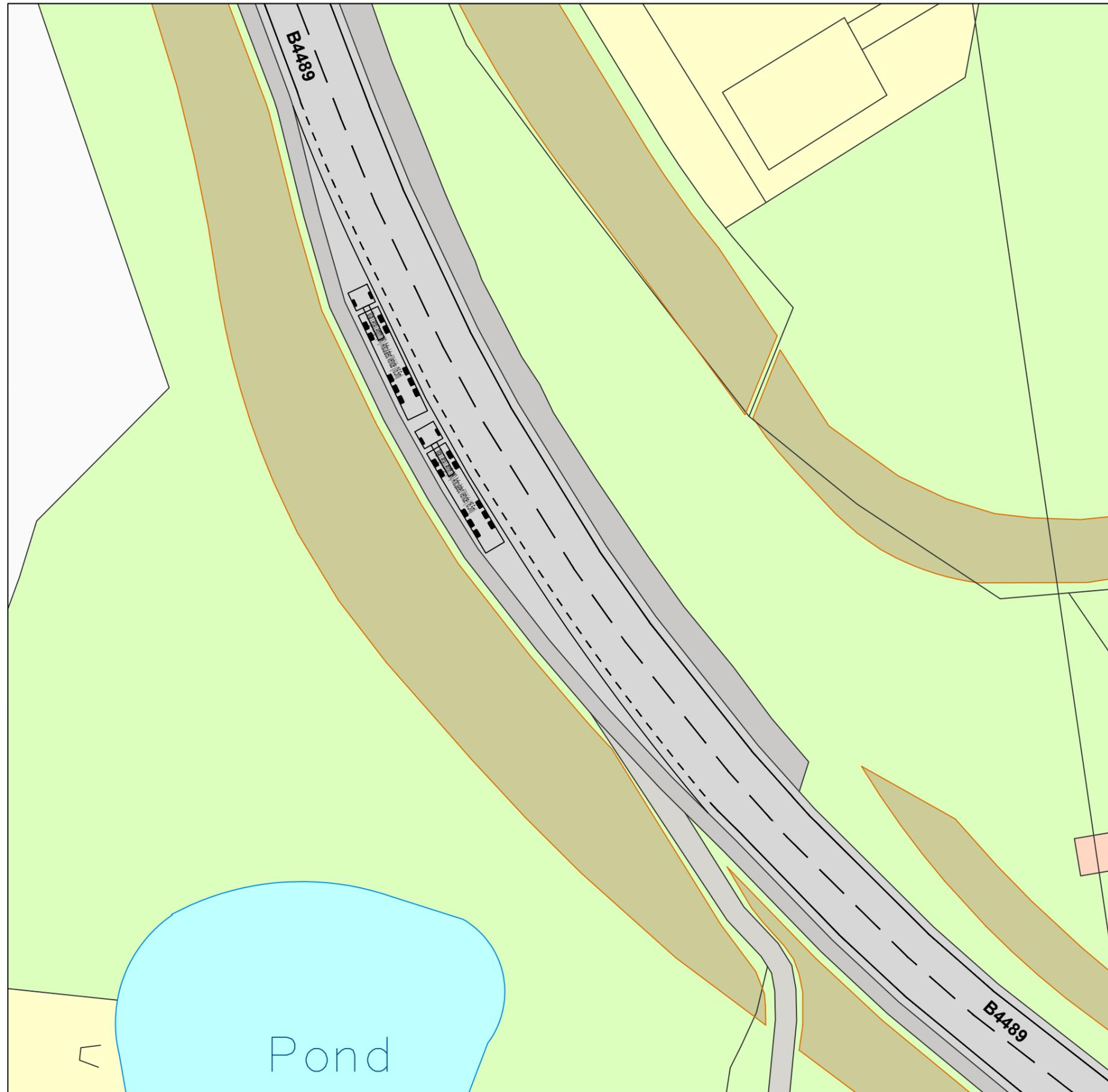
M4 Junction 46
Northern Dumbbell
Roundabout

M4 Junction 46
Southern Dumbbell
Roundabout

A48 / Pant Lassau Road
Mini-Roundabout

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↑ Towards Project Site



↘ Towards M4 Junction 46



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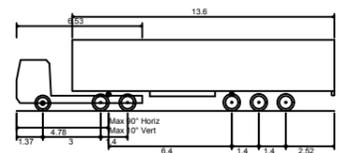
Project Title:

ABERGELLI POWER PROJECT

Client:



LEGEND



Max Legal Length (UK) Articulated Vehicle (16.5m)	
Overall Length	16.500m
Overall Width	2.550m
Overall Body Height	3.681m
Min Body Ground Clearance	0.411m
Max Track Width	2.500m
Lock to lock time	6.00s
Kerb to Kerb Turning Radius	6.530m

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AECOM Internal Project No:

60542910

Drawing Title:

B4489 Layby - HGV Parking Area

Scale at A3: 1:500

Drawing No: **Rev:**

FIGURE 3.2

Drawn:	Chk'd:	App'd:	Date:
MS	MD	SP	24/04/2018



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Appendix 3.3b

Construction Staff Travel Plan

Abergelli Power Project

Construction Staff Travel Plan

Abergelli Power Limited

Project number: 60542910

April 2018

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Revision History

Revision	Revision date	Details	Authorized	Name	Position
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Table of Contents

1. Introduction	1
2. Existing Conditions and Site Accessibility	3
3. Trip Generation	7
4. Travel Plan Measures	8

Figures

Figure 2.1 Pedestrian and Cycle Routes and Public Rights of Way

1. Introduction

1.1 Overview

- 1.1.1 This Construction Staff Travel Plan (CSTP) has been prepared by AECOM on behalf of Abergelli Power Limited (APL) in respect of the Abergelli Power Project (hereafter referred to as 'the Project').
- 1.1.2 This document supports the Environmental Statement (ES) which is submitted as part of the DCO Application.

1.2 The Project

- 1.2.1 The Project is situated on open agricultural land located approximately 2 km north of Junction 46 of the M4 within the administrative area of the City and County of Swansea Council (CCS), approximately 1 km southeast of Felindre and 1.4 km north of Llangyfelach.
- 1.2.2 The land upon which the Project would be developed, or which is required for construction of the Project, is referred to as the 'Project Site'. The approximate centre of the Project Site lies at grid reference 265284, 201431. The Project Site covers an area of up to approximately 30 ha.
- 1.2.3 The current land use is predominantly agricultural, with sheep and horse grazing. The western extent of the Project Site encompasses the existing Access Road leading to the Substation and Felindre Gas Compressor Station from the B4489.
- 1.2.4 A detailed description of the Project and Project components are summarised in **Chapter 3: Project and Site Description**.
- 1.2.5 The core working hours during construction are between 08:00 and 18:00hrs (Monday to Friday) and 08:00 to 13:00hrs (Saturdays and Bank Holidays). For the assessment in the ES, it has been assumed that all construction staff will arrive between 07:45 and 08:45hrs, and depart between 16:30 and 17:30hrs. Temporary parking spaces for staff will be made available within the Laydown Area during construction.
- 1.2.6 The construction of the Power Generation Plant is estimated to take 22 months. The new section of Access Road will be constructed as part of the Power Generation Plant and is expected to take around six months. The construction of the Gas Connection and Electrical Connection is expected to take place alongside and within the period of construction of the Power Generation Plant.

1.3 Purpose and Scope of Construction Staff Travel Plan

1.3.1 Travel Plans (TPs) are a way of promoting sustainable travel behaviour through a range of mechanisms, initiatives and targets that when combined can help to reduce unnecessary travel and encourage journeys to be undertaken in a more environmentally sustainable way. For new developments, it is important that sustainable travel measures are in place prior to occupation of a new development as travel habits in favour of walking, cycling and public transport are more readily established from the outset.

1.3.2 Benefits of implementing a TP can include:

- Increased travel choice: TPs can increase personal travel choice by promoting existing and providing additional sustainable travel options;
- Health benefits: Many alternative forms of travel involve an element of physical activity that can help improve the physical health and mental wellbeing of users of a development. For employers, this can also reduce the number of days lost to staff illness;
- Public/environmental responsibility: A decrease in the number of vehicle trips results in cleaner air and eases congestion both in the development and on the local highway network;
- Positive publicity: TPs can generate positive publicity and improve the environmental image of an organisation, an area or a development. It demonstrates to residents living in the surrounding areas that the organisation is committed to limiting single occupancy car trips and promoting sustainable travel options; and
- Financial savings: Users of a development can make savings by switching to or encouraging travel by non-car modes. For staff employed on a site, this is primarily related to reduced fuel consumption and vehicle depreciation.

1.3.3 It is recognised that construction staff will exhibit travel behaviours and have certain requirements that differ from staff that would be traditionally targeted by a workplace TP. Factors can include:

- Requirement to carry and transfer of specialist equipment, tools and personal protective equipment;
- Start and finish times that are generally outside of periods when public transport is available or in periods when services are not as frequent;
- Requirement to undertake physically demanding tasks during the working day which makes the use of active modes such as walking/cycling for commuting purposes less attractive;
- Working on sites that are in remote locations where provision for non-car modes is limited; and
- Variation in the workforce due to the construction schedule, making the establishment of standard travel routines more difficult.

1.3.4 These factors have been taken into consideration in identifying measures in this CSTP.

1.4 Policy and Guidance

1.4.1 This CSTP has been prepared with reference to *Technical Advice Note (TAN) 18: Transport*, published by the Welsh Government (WG). TAN 18 sets out technical guidance for the transport related elements of development and also confirms the WG's commitment to sustainable travel via the implementation of TPs for new developments.

1.4.2 TAN 18 states that the WG "wishes to promote the widespread adoption of travel plans by businesses, schools, hospitals, tourist attractions and other significant travel-generating uses". It is also acknowledged that "travel plans may be prepared, individually or jointly, by the owners and operators of existing or proposed developments".

1.5 Report Structure

1.5.1 The TP is structured as follows:

- Section 2 – Existing Conditions and Site Accessibility: Sets out the local transport conditions in the vicinity of the site and access to non-car modes of transport
- Section 3 – Trip Generation: Provides details of the trip generation of staff associated with each of the Project components; and
- Section 4 – Travel Plan Measures: Sets out the key measures and initiatives relating to the reduction in single-occupancy car trips to/from the site.

2. Existing Conditions and Site Accessibility

2.1 Local Highway Network

2.1.1 The Project Site is served by a privately maintained Access Road from the B4489. The Access Road is unlit. The width of the Access Road varies along its length between 3.5 m and 7.5 m, and is generally bordered by trees and intermittent hedgerows. The Access Road connects to the B4489 via a simple priority junction. This is characterised by large radii on the minor arm (the Access Road) to accommodate HGV movements.

- 2.1.2 The B4489 routes between the village of Felindre to the north (approximately 2.3 km from the Access Road) and the M4 Junction 46 to the south (approximately 1.8 km from the Access Road). The B4489 is subject to a 40 mph speed limit at its junction with the Access Road. At this location, the road has a 5.5 m wide carriageway and is unlit. Approximately 330 m to the north of the Access Road, the B4489 becomes subject to the national speed limit. The B4489 continues a further 1.7 km north where it connects to Rhyd-y-Pandy Road at a priority junction. This section of the B4489 is unlit and ranges in width between 4.5 m and 5.5 m, with numerous passing places.
- 2.1.3 The junction with Rhyd-y-Pandy Road and its approaches are subject to a 30 mph speed limit. Rhyd-y-Pandy Road routes east for 1.6 km where it passes the northern extent of the Project Boundary. This section of Rhyd-y-Pandy Road is unlit and ranges in width between 4.5 m and 5.5 m, with numerous passing places. It is subject to a 30 mph speed limit, increasing to the national speed limit around 900 m east of its junction with the B4489. It also serves the Felindre Water Treatment Works.
- 2.1.4 Approximately 475 m to the south of the Access Road, the B4489 is street lit. A further 75 m south from this point, the B4489 forms a three-arm roundabout with the access to the Felindre Park and Share.
- 2.1.5 On an average weekday, the B4489 carries approximately 130 vehicles during the AM peak hour, 90 vehicles during the PM peak hour, and 1,000 vehicles over the 24-hour period. HGVs account for no more than 2% of total traffic.
- 2.1.6 The B4489 forms a dumbbell roundabout with the M4 Junction 46. The northern dumbbell roundabout junction comprises three arms; the B4489 and the eastbound on/off-slips of the M4. The southern dumbbell roundabout junction comprises six arms; the A48 (three arms), the B4489 Swansea Road, and the westbound on/off-slips of the M4. The south-eastern arm of the A48 forms a mini-roundabout junction with Pant Lasau Road approximately 90 m southeast of the southern dumbbell roundabout. These junctions are subject to a 40 mph speed limit and are lit.
- 2.1.7 The walking and cycling facilities and Public Rights of Way (PROW) are shown on **Figure 2.1**.
- 2.1.8 There are no footways that serve the Project Site. The nearest footways are on the B4489, approximately 475 m south of the Access Road (on the approach to the junction with the Felindre Park and Share). This footway continues to the M4 Junction 46. The 500 m section of the footway to the north of the M4 Junction 46 is separated from the carriageway edge by a barrier. At the M4 Junction 46 the footways continues south along the east side of the carriageway, serving the southern arms of the southern dumbbell roundabout, with dropped kerbs and tactile paving to facilitate crossing movements across entry arms.

- 2.1.9 There are no formal cycling routes in the vicinity of the Project Site. Part of the B4489 is identified as an 'advisory cycling route' on the CCS's cycle map. This covers the section of the B4489 that routes north from the Access Road to Felindre and to a point approximately 475 m south of the Access Road.
- 2.1.10 There are numerous PRow crossing/in the vicinity of the Project Site. Footpaths LC34 and LC117 cross the Access Road (and the new section of Access Road) at points approximately 350 m and 1.3 km from the B4489. Footpath LC35B passes through the northern part of the Project Site, connecting to Rhyd-y-Pandy Road in the vicinity of the AGI Access.

2.2 Public Transport

- 2.2.1 The nearest bus stop to the Project Site is the 'Lliw Reservoirs' stop located on Rhyd-y-Pandy Road. This is situated to the east of Felindre and approximately 500 m to the northwest of the northern extent of the Project Site boundary. There is no footway between the Project Site and this bus stop. It provides access to Service 142, which routes between Morryston and Garnswllt. This service is operated by DANSA, a community transport organisation. There are three to four services per day in each direction, although these can generally only be pre-booked.
- 2.2.2 Service 141 passes to the south of the Project Site, routing between Gorseinon and Morryston. The nearest stop that provides access to this service is the 'Pant Lasau Cross' stop located on Mynydd Gelli Wastad Road. It is situated approximately 750 m to the southeast of the southern extent of the Project Site boundary and can be accessed via Footpath LC117.
- 2.2.3 There are no railway stations in the vicinity of the Project Site. Llansamlet railway station is situated approximately 5.5 km southeast of the Project Site, accessible by car via the A48 (from M4 Junction 44 and 46). Swansea railway station is a further 7 km from the Project Site; this is a key local transport hub and is more easily accessible by public transport. Swansea railway station is managed by Arriva Trains Wales. There are four services daily from Swansea to Shrewsbury; an hourly service from Swansea to Manchester Piccadilly, which calls at Cardiff Central; and a total of two to three services hourly from Swansea to Cardiff Central. Great Western Railway also provides services from Swansea to London Paddington, calling at Bristol Parkway.
- 2.2.4 Overall, the opportunities to access the Project Site by public transport are limited, and it is therefore considered that, for the purposes of this assessment, no trips by construction staff will be undertaken by these modes.

2.3 Parking

- 2.3.1 Felindre Park and Share is accessed from the B4489, approximately 550 m south of the Access Road. It is located on the site of the proposed Felindre Business Park. It has capacity for 480 spaces and its use is encouraged for employees of the DVLA HQ in Clase. A shuttle bus service runs between the Felindre Park and Share and the DVLA. The Felindre Park and Share is understood to be managed by the DVLA and will not be available for use by the Project.
- 2.3.2 A layby is located adjacent to the northbound carriageway of the B4489, approximately 800 m from the M4 Junction 46, and 950 m from the Access Road. The layby measures approximately 50 m in length.

3. Trip Generation

- 3.1.1 The traffic generated by staff associated with the Project during the construction period has been quantified using a first principles approach. This assumes that all construction staff will arrive at and depart the Project Site in private cars or vans at average vehicle occupancy of 1.6. Due to the limitations of public transport provision, no staff are expected to arrive or depart by public transport.
- 3.1.2 The forecast vehicle trip generation associated with staff is set out for the individual Project components and full Project in **Table 3.1**.

Table 3.1: Weekday Vehicle Trip Generation – Construction Staff

Project Component	Time Period	Arrivals	Departures	Total
Power Generation Plant	AM Peak Hour	64	0	64
	PM Peak Hour	0	64	64
	24-Hour	123	123	246
Gas Connection	AM Peak Hour	5	0	5
	PM Peak Hour	0	5	5
	24-Hour	10	10	20
Electrical Connection	AM Peak Hour	2	0	2
	PM Peak Hour	0	2	2
	24-Hour	2	2	4
Project	AM Peak Hour	71	0	71
	PM Peak Hour	0	71	71
	24-Hour	135	135	270

4. Travel Plan Measures

4.1 Aims and Objectives

- 4.1.1 The principal aim of this CSTP is to reduce the impact associated with the vehicle trip generation of the Project during the construction phases. In view of the development type, location and limited potential for non-car modes, it is considered appropriate and realistic for efforts to be focused on increasing occupancy levels of vehicles travelling to/from the site.

4.2 Travel Plan Implementation and Monitoring

- 4.2.1 The construction of the Project will be carried out by a contractor who will be responsible for complying with the selected measures described in the CSTP. The contractor will also be responsible for ensuring that all sub-contractors are both aware of, and comply with, the requirements of the CSTP.
- 4.2.2 A member of staff, typically the Site Manager, will be identified to perform the role of Travel Plan Coordinator (TPC). The TPC will be responsible for the management and delivery of the CSTP for the duration of the construction phase, working with senior site management and stakeholders.
- 4.2.3 The TPC will be required to monitor travel on a regular basis (e.g. every six months) throughout the construction period. This will involve car occupancy surveys at the accesses to the Project Site.

4.3 Car Sharing

- 4.3.1 The key measure to increase the occupancy levels of vehicles will be to increase car sharing. This will be achieved through the establishment of a staff car sharing database, which will contain the home postcodes of staff and details of their shift patterns so that staff can be 'matched'. This could be a bespoke database or could make use of online resources such as 'Share Cymru'.
- 4.3.2 Where practically possible, the contractor will lay on crew transport such as minibuses, between their place of business and the Project Site.

4.4 Marketing and Communication

- 4.4.1 This CSTP is exclusively focused on car sharing and all staff will be provided with:
- Details of and access to the car sharing database. As staff will work shift patterns, these timings will be reviewed to see where the optimum opportunities for car sharing can be achieved;
 - Car sharing/site routing policies;

- Information on local traffic-related congestion concerns for the purposes of raising awareness; and
- A map showing the location of the Project in relation to the local area, highlighting the designated routes to use to access the Project Site to reduce congestion/conflict.

4.4.2 Sustained and specific marketing of car sharing will be undertaken during the construction phase to ensure staff are aware of and understand the CSTP. This will include the provision of information to staff during the induction process, and regular communication through staff briefings and the staff notice board. As part of the induction process, all construction staff will be required to register on a car sharing database and encouraged to participate in car sharing to site with other staff members.

Appendix 3.4

Landscape and Ecology Mitigation Strategy

CONTENTS

1.	Introduction	2
1.1	Overview	2
1.2	The Purpose and Structure of this Document	2
2.	Baseline Conditions	3
3.	Construction Mitigation	5
3.1	Landscape Working Methods	5
4.	Landscape and Ecological Mitigation Proposals	6
4.1	Overview	6
4.2	Habitats and Protection	7
4.3	Habitat Replacement	7
4.4	Tree Management and Root Protection	8
4.5	Species-Specific Measures	8
4.6	Planting Proposals	9
4.7	Management and Maintenance	11
4.8	Roles and Responsibilities	12
4.9	Reinstatement	12
5.	References	14
	Appendix A Reptiles	16
	Appendix B Breeding Birds	19
	Appendix C Bats	20
	Appendix D Otter and Water Vole	21
	Appendix E Badger	22
	Appendix F Invasive Non Native Species	23
	Appendix G Hedgerows	27

1. Introduction

1.1 Overview

- 1.1.1 This document describes the landscape and biodiversity impact mitigation measures that will be implemented prior to and during the construction phase of the Project, as well as the mitigation, management and monitoring measures to be implemented once the Project is operational.
- 1.1.2 This document should be read in conjunction with ES **Chapter 8: Ecology, Chapter 11: Landscape and Visual Assessment** and the Landscape and Ecology Mitigation Plan (LEMP) (ES Figure 3.6a-e). This strategy also refers to the following plans: Construction Environmental Management Plan (CEMP), Surface Water Management Plan (SWMP) and an Outline Lighting Strategy to demonstrate a holistic approach.
- 1.1.3 The proposed landscape and biodiversity mitigation measures are summarised below. These proposals have been designed to be delivered within the Project Site Boundary, as well as to retain where possible the existing planting within the Project Site Boundary. New habitat creation and landscaping have been accommodated, alongside the protection and enhancement of existing habitats where feasible.
- 1.1.4 The key measures proposed are:
- biodiversity mitigation by the provision of newly created replacement habitats;
 - woodland structure planting within the Project Site Boundary to partially screen structures; and
 - management of newly created replacement habitats.
- 1.1.5 The proposed landscape and ecological mitigation measures are illustrated in ES Figures 3.6a-e which graphically demonstrate the primary mitigation measures embedded into the project design as well as the new habitat creation. Combined with this document they outline the proposed mitigation measures for the Project in relation to landscape and ecology using a holistic and integrated approach, and have been produced to support the DCO Application.
- 1.1.6 The landscape and ecological mitigation measures described in this document will be subject to a 25 year management period running concurrently with the operational design lifetime of the Project. The execution of these works will be the responsibility of the operator of the Site. The planting operations in association with the Above Ground Installation (AGI) will be undertaken by National Grid.

1.2 The Purpose and Structure of this Document

- 1.2.1 The purpose of this document is to set out the proposed strategy to mitigate potentially adverse effects of the Project on the biodiversity features within the Project Site Boundary and on the landscape and visual resource. It provides a

clear landscape and ecological rationale, which responds to the Project Site and the assessments prepared in **ES Chapter 8: Ecology** and **Chapter 11: Landscape and Visual**.

- 1.2.2 The Project has been designed, as far as is practicable, to avoid or reduce effects on landscape and biodiversity features through design development and impact avoidance. Opportunities to secure net gains for landscape and biodiversity as a consequence of the Project have also been considered.
- 1.2.3 The document has been structured as follows:
- Baseline Conditions;
 - Construction Mitigation;
 - Landscape and Ecological mitigation proposals; and
 - Management and Maintenance.
- 1.2.4 Outline species specific method statements are provided in Appendices A-G.

2. Baseline Conditions

- 2.1.1 The Project Site is located within a valley with ground rising to the north, east and west which provides visual containment. Ground levels vary across the Project Site from approximately 146 m Above Ordinance Datum (AOD) in the north-west corner to 80 m AOD along the southern perimeter. Ground levels generally fall in a southerly and south easterly direction.
- 2.1.2 The Project Site is predominantly covered with pasture which is currently used for sheep and horse grazing as well as a band of broadleaf woodland to the east. A soft surface horse training track, known as 'The Gallops', crosses the Project Site and runs diagonally north-west to south-east. Broadleaf woodland which is classified in part as Ancient Woodland lies to the east of the Project Site as well as around the Access Road to the Substation and Felindre Gas Compressor Station. Fields across the Project Site support a mix of improved grassland, semi-improved grassland (acid/neutral) and wet grassland (marshy grassland) which are subdivided by ditches, post and wire fencing, remnant hedgerows (forming rows of mature trees) and are interspersed with scrub vegetation. The habitats are heavily grazed and as such support a limited range of floristic species.
- 2.1.3 The western part of the Project Site encompasses part of the Substation, adjacent to the Felindre Gas Compressor Station. Both the Substation and the Felindre Gas Compressor Station comprise large scale power infrastructure facilities characterised by tall industrial structures enclosed by security fencing and set within woodland planting. Pylons are prominent across the landscape and converge at the Substation.

Generating Equipment Site

- 2.1.4 Pre-construction, the Generating Equipment Site is dominated by an area of marshy grassland surrounded by broadleaf woodland and semi-improved neutral

grassland. There are five ditches running through the centre of the Generating Equipment Site of which two pairs run parallel to each other and are wooded. Part of the broadleaf woodland and marshy grassland is designated as a Site of Importance for Nature Conservation (SINC) (Lletty-Morfil SINC), the boundary of which extends beyond the Project Site Boundary.

2.1.5 The construction of the Generating Equipment Site will require the creation of a temporary construction compound for the storage of materials, plant and equipment as well as containing site accommodation and welfare facilities, temporary car parking and temporary fencing (the Laydown Area). A small area within the Laydown Area will be retained permanently (the Maintenance Compound). The area is dominated by marshy grassland and a small area of improved grassland and semi-improved neutral grassland.

2.1.6 Habitats within the Generating Equipment Site are known to support or are suitable for supporting the following protected and priority species:

- Priority species of butterfly and moth;
- Common toad (priority species);
- Common lizard and grass snake (protected species);
- Breeding birds (protected species);
- Bats (protected species);
- Water vole (protected species);
- Otter (protected species);
- Brown hare (priority species); and,
- Badger (protected species).

2.1.7 The Generating Equipment Site also supports invasive non-native species (INNS) of plants – Japanese knotweed, Himalayan balsam and floating pennywort.

Access Road

2.1.8 The Access Road runs from the B4489, which lies to the west, to the Generating Equipment Site. The Access Road will be formed by upgrading an existing access road between the B4489 junction and the Substation and constructing a new section of Access Road from the Substation to the Generating Equipment Site.

2.1.9 Pre-construction, the Access Road comprises hard standing, improved grassland, semi-improved neutral grassland, row of trees and marshy grassland. The new section of Access Road crosses two watercourses, and has been rerouted to avoid an area of Ancient Woodland.

2.1.10 Habitats within the Access Road are known to support or are suitable for supporting the following protected and priority species:

- Common toad (priority species);
- Common lizard and grass snake (protected species);
- Breeding birds (protected species);

- Bats (protected species);
- Otter (protected species);
- Brown hare (priority species); and,
- Badger (protected species).

2.1.11 The Access Road also supports INNS plants, namely Japanese knotweed.

Electrical Connection

2.1.12 The Electrical Connection is an underground electrical cable to export power from the Generating Equipment to the National Grid Electricity Transmission System (NETS). For the first 160 m (approx.) the route runs from the NETS through an area of semi-improved neutral grassland, a ditch and row of trees, after which it runs alongside the Access Road.

Gas Connection

2.1.13 The Gas Connection will be in the form of a new AGI and underground Gas Pipeline. This is to bring natural gas to the Generating Equipment from the National Gas Transmission System. The Gas Pipeline will follow an approximate north-south route corridor, between the National Gas Transmission System south of Rhyd-y-pandy Road and the Generating Equipment Site.

2.1.14 The Gas Connection is dominated by improved grassland, with boundary features including one hedgerow, two rows of trees and post and wire fences.

2.1.15 Habitats within the Gas Connection are known to support or are suitable for supporting the following protected and priority species:

- Priority species of butterfly and moth;
- Common toad (priority species);
- Common lizard and grass snake (protected species);
- Breeding birds (protected species);
- Bats (protected species);
- Otter (protected species);
- Brown hare (priority species); and,
- Badger (protected species).

2.1.16 The Gas Connection also supports INNS plants.

3. Construction Mitigation

3.1 Landscape Working Methods

3.1.1 Mitigation measures will be implemented during the construction in order to limit impacts on the landscape and visual resource. These are summarised below:

- Land and vegetation clearance and occupation will be limited to the minimum area necessary for the works;

- Good housekeeping measures will minimise unsightly waste and secure storage will be provided for materials at risk from displacement by wind;
- Temporary stockpiles will be located in defined storage areas, away from sensitive visual receptors;
- No advertisements or fly posting will be permitted on any fence and all graffiti will be removed and made good as soon as reasonably practicable;
- All boundary fences will be maintained in a neat and tidy condition;
- Any temporary fencing will be removed as soon as reasonably practicable after completion of the works; and
- Temporary lighting will be selected and sited so as to minimise visual intrusion to residents, whilst maintaining the safe and efficient operation of the work site. At night and during periods of darkness, directional security lighting will be used where required.

3.1.2 The following good practice measures will be adopted and implemented for the protection of trees retained onsite:

- A Root Protection Area (RPA) will be set up around trees to be retained onsite prior to commencement of construction;
- The RPA will be demarcated by 'Netlon' fluorescent mesh fencing or similar physical barrier. The protective fencing will be maintained for the duration of the construction phase and checked on a regular basis;
- In the event that an RPA cannot be maintained at 12 times the diameter at breast height (DBH) mitigation such as bog matting, flotation tyres and hand digging will be utilised;
- No machinery or material will be stored within the RPA;
- To ensure retained trees do not become hazardous, the condition of trees will be checked by the Environmental Manager or Ecological Clerk of Works (ECoW) at an appropriate frequency and following storm events where there may be damage from wind throw;
- Where a tree is damaged or diseased advice will be sought from an Arboriculturalist (unless the ECoW is appropriately qualified) for appropriate treatment measures;
- Where hazardous branches or trees require to be felled this will be done by a qualified tree surgeon in line with BS 3998: 2010;
- Before felling trees, surveys for potential bird nest or bat roosts will be undertaken by the ECoW; and

4. Landscape and Ecological Mitigation Proposals

4.1 Overview

4.1.1 The primary focus of the landscape and ecology mitigation is habitat creation and landscape planting which will be accommodated within the Project Site Boundary alongside the protection and enhancement of existing habitats. It is anticipated that existing planting within the Project Site would be retained and protected where

possible. ES Figure 3.6 identifies the woodland and trees to be retained and the areas of new habitat and planting.

- 4.1.2 The overall construction working methods to be implemented during the construction phase are outlined in the outline CEMP (Appendix 3.1), outline SWMP (Appendix 3.2) and Outline Lighting Strategy (Appendix 3.5) and are secured via corresponding Requirements in schedule 2 of the DCO (Document Reference 3.1). Therefore these are not repeated here but are referred to where necessary for completeness.

4.2 Habitats and Protection

- 4.2.1 Existing habitats will be retained where possible. Where this is not possible those habitats removed with conservation value will be compensated for through the provision of newly created habitats or enhancement of existing habitats. Mitigation to help avoid injury or killing of protected and priority species will be implemented.
- 4.2.2 Newly created habitats will be designed to be of value to those protected and priority species known to be present within the Project Site Boundary.
- 4.2.3 Lighting has been designed to limit the effects on wildlife (refer to outline Lighting Strategy (Appendix 3.5)).

4.3 Habitat Replacement

- 4.3.1 The total area of habitat with conservation value (i.e. not improved grassland or hard standing) permanently removed during construction is estimated to be 2.9 ha. An area of land approximately 3 ha in size within the Project Site boundary has been identified as suitable for habitat enhancement and will mitigate for the loss of habitats including a proportion of Lletty-Morfil SINC. The habitat enhancement measures will also provide valuable habitats for a range of species including invertebrates, amphibians, reptiles, breeding and foraging birds, brown hare and badger, commuting and foraging bats and, once trees mature, roosting bats. This area is known as the Ecological Mitigation Area and will be implemented by the end of construction (ES Figure 3.6c).
- 4.3.2 During construction there will be no night time illumination of hedgerows, woodland or mature tree lines. Operational external lighting has been designed to reduce trespass and configured to avoid glare and spillage, and otherwise in accordance with the Outline Lighting Strategy undertaken in accordance with the Institution of Lighting Professionals guidelines. The strategy will seek to limit effects of lighting on habitats (and therefore species) adjacent to the Project Site. During the hours of darkness, only critical light sources will remain in operation,
- 4.3.3 The sensitivity of the infrared motion detectors will be set so as not to be activated by the movement of large mammals such as badgers and otters. The lighting strategy will ensure that all lighting columns will be fitted with cowls to reduce light spill and will be directed away from boundary features. A 'dark corridor' (as shown

in ES Figure 3.6) has been designed to keep lighting to no more than 1 lux along adjacent woodland edges and watercourses that are likely to be used by nocturnal species such as bats, badgers, water vole and otters. The Gas Connection and Electrical Connection will not be lit.

4.4 Tree Management and Root Protection

4.4.1 The following good practice measures will be adopted and implemented as part of this Strategy for the protection of trees retained onsite, including Ancient Woodland:

- A Root Protection Area (RPA) will be set up around trees to be retained onsite prior to commencement of construction;
- The RPA will be demarcated by 'Netlon' fluorescent mesh fencing or similar physical barrier. The protective fencing will be maintained for the duration of the construction phase and checked on a regular basis;
- In the event that an RPA cannot be maintained at 12 times the diameter at breast height (DBH) mitigation such as bog matting, flotation tyres and hand digging will be utilised;
- No machinery or material will be stored within the RPA;
- To ensure retained trees do not become hazardous, the condition of trees will be checked by the Environmental Manager or Ecological Clerk of Works (ECoW) at an appropriate frequency and following storm events where there may be damage from wind throw;
- Where a tree is damaged or diseased advice will be sought from an Arboriculturalist (unless the ECoW is appropriately qualified) for appropriate treatment measures;
- Where hazardous branches or trees require to be felled this will be done by a qualified tree surgeon in line with BS 3998: 2010;
- Before felling trees, surveys for potential bird nest or bat roosts will be undertaken by the ECoW; and
- The waste hierarchy will be applied to vegetation and biomass arisings and alternate onsite uses will be sought before disposal is considered.

4.5 Species-Specific Measures

4.5.1 Measures have been specified to help avoid injury or killing of protected and priority species, and control the spread of INNS plants and have been incorporated into the management strategy. These are outlined in Appendices A-G.

- Reptile (Appendix A);
- Breeding Birds (Appendix B);
- Bats (Appendix C);
- Otter and Water Vole (Appendix D);
- Badger (Appendix E);
- Invasive Non-Native Species (Appendix F); and
- Hedgerows (Appendix G).

4.6 Planting Proposals

i. Overview

4.6.1 A palette of native tree and shrub planting has been compiled to meet the various planting proposals identified below. The function of the planting is primarily to help integrate the various components of the Project into the local landscape and views whilst providing biodiversity value by enhancing existing habitats and creating new habitats.

ii. Woodland Planting

4.6.2 Woodland structure planting is proposed adjacent to the Generating Equipment Site to assist in screening lower level structures from view and to assist in integrating the Project Site within the immediate landscape (refer to ES Figure 3.6c). Woodland planting is also proposed along the western edge of the Ecological Mitigation Area (refer to ES Figure 3.6c).

4.6.3 The western edge of the Ecological Mitigation Area will be planted with a row of trees native to the local area. The trees will be allowed to mature and will create a linkage between a row of trees in the north and the watercourse in the south (Afon Llan). A mixture of standards and feathered will be used. This area compensates for the loss of the woodland habitat within Lletty-Morfil SINC.

4.6.4 Indicative typical species will include the following:

- *Betula pendula* (silver birch);
- *Betula pubescens* (downy birch);
- *Quercus robur* (pedunculate oak);
- *Salix alba* (white willow);
- *Alnus glutinosa* (Alder)
- *Ilex aquifolium* (holly); and
- *Corylus avellana* (hazel).

iii. Woodland Edge Scrub Planting

4.6.5 The Woodland Planting above will grade into an area of scrub habitat within the Ecological Mitigation Area refer to ES Figure 3.6c). Species will comprise those native to the local area and include species capable of thriving in a wetter environment. The scrub will be allowed to mature and be managed to have a scalloped edge. This area compensates for the loss of the scrub habitat.

4.6.6 Indicative typical species will include the following:

- *Crataegus monogyna* (hawthorn);
- *Prunus spinosa* (blackthorn) and,
- *Sorbus aucuparia* (rowan); and,
- *Eupatorium cannabinum* (hemp agrimony; and
- *Filipendula ulmaria* (meadowsweet).

4.6.7 It is anticipated that willow species and bramble will develop naturally and will not require planting.

iv. Hedgerow and Hedgerow Trees

4.6.8 Hedgerow and hedgerow tree planting is proposed along the Access Road (refer to ES Figure 3.6e) and to the west of the AGI as well as to reinstate any hedgerow planting removed during construction of the Gas Connection (refer to ES Figure 3.6d).

4.6.9 Mixed hedgerow and tree planting will provide vegetation structure and commuting corridors for bats as well as integrating the new Access Road into the immediate landscape structure. Reinstatement hedgerow planting is also proposed along the Gas Connection corridor where hedgerows are removed and also to the west of the AGI along an existing field boundary to provide partial screening of the AGI and local landscape enhancement, providing continuity of hedgerow boundary planting.

4.6.10 Indicative typical species will include the *following*:

- *Acer campestre* (field maple) *Corylus avellana* (hazel);
- *Crataegus monogyna* (hawthorn);
- *Rosa canina* (dog rose);
- *Viburnum opulus* (guelder rose);
- *Prunus spinosa* (blackthorn);
- *Sorbus aucuparia* (rowan);
- *Ilex aquifolium* (holly); and,
- *Lonicera periclymenum* (honeysuckle)

v. Wet Meadow and Acid Grassland

4.6.11 Wet meadow and acid grassland is proposed to the south of the Generating Equipment Site within the Ecological Mitigation Area (refer to **ES Figure 3.6c**).

4.6.12 The Woodland Edge Planting will grade into a mosaic of marshy grassland and acid grassland within the . Ecological Mitigation Area. The area currently supports degraded versions of these habitat types, and a relaxation of the grazing regime (grazed less intensively) and therefore reduction in nutrient inputs will allow a greater botanical species diversity to develop without the need for seeding or plant plugs. The enhancements in this area compensate for the loss of the marshy grassland habitat within Lletty-Morfil SINC within the Generating Equipment Site.

vi. Wetland Habitat and New Drainage Routes

4.6.13 Two new ponds will be created within the Wet Meadow and Acid Grassland of the Ecological Mitigation Area to the south of the Generating Equipment Site. The ponds will be at least 2 m x 2 m and have shallow sides to allow animals to enter/exit the pond freely and should taper to a depth of at least 0.5 m in the centre. The pond will be planted with native plant species and will not be stocked with fish.

This will give native amphibians and invertebrates the best chance of colonising the pond. The creation of two ponds for wildlife compensates for the loss of the ponds within the Project Site.

- 4.6.14 Within the Generating Equipment Site (ES Figure 3.6c), adjacent to the Access Road (ES Figure 3.6c) and AGI (ES Figure 3.6d) the attenuation ponds will be planted with emergent native wetland species and where possible maintained as wetland features.
- 4.6.15 New ditches and rerouted ditches (Generating Equipment Site – ES Figure 3.6b) will be planted with emergent native wetland species and where possible maintained as wetland features.
- 4.6.16 Typical species will be determined at detailed design stage, as the species proposed will likely differ between waterbodies, depending on the aspect of the waterbody, substrate, the profile of the water body and potential water depth.

4.7 Management and Maintenance

vii. Management Aims

- 4.7.1 This section sets out the management and maintenance objectives for the protection and enhancement of the landscape and biodiversity fabric of the Project Site. A detailed landscape management and maintenance plan will be developed alongside the detailed landscape and ecological design. The maintenance and management plan will cover a 25 year period covering the operational design lifetime of the Project. Within the first five years after planting, all plants found to be dead or dying will be replaced within the first available planting season.
- 4.7.2 In general terms the landscape and ecological management aims for the Project Site are to:
 - Secure the long-term future of the landscape;
 - Enhance local landscape character;
 - Integrate the Site into the surrounding landscape and local views;
 - Retain and manage existing woodland/hedgerow and scrub planting and provide additional supplementary planting to provide links for wildlife across the site;
 - Create, maintain and enhance habitats of value to wildlife to provide benefits for the local environment and biodiversity;
 - Create marshy habitats in conjunction with the attenuation areas for amphibians and aquatic invertebrates; and,
 - Establish a flexible management and maintenance regime able to respond to changing needs or objectives.

i. New Tree and Shrub Planting

4.7.3 Tree and shrub planting shall be subject to routine maintenance operations that include pruning, litter picking, prevention of weeds and invasive species. The maintenance regime will seek to:

- To create and maintain a vegetation structure, horticultural interest and to partially screen the built structures and movement within the Project Site; and
- To extend and enhance habitat diversity in a variety of different areas, including corridors for commuter bats.

ii. Management Aims – Grassland

4.7.4 Both wet meadow grassland and acid grassland areas will be subject to a similar maintenance regime. Both areas shall ensure a healthy sward of native wildflowers and grasses which will increase biodiversity as well as create visual interest. The maintenance regime will seek to:

- Maintain the quality and integrity of the ditches, such that they are free of litter, tree roots and invasive species;
- To establish and maintain species-rich swards of wet meadow and species rich swards, including wildflowers that support invertebrate larvae and flowers that attract pollinating bees, butterflies, moths and other invertebrates; and
- Sward management to ensure the sward is longest in the summer and shorter in the spring and autumn will allow flowering species to set seed and germinate.

4.8 Roles and Responsibilities

4.8.1 Roles and responsibilities for implementation of the landscape and ecological mitigation measures during the construction phase are identified in the outline CEMP (Appendix 3.1).

4.8.2 Management of habitat enhancement measures during the operational phase will be secured via landowner agreements. . [APL is currently investigating securing the involvement of the current landowners in the management of ecological areas including via grazing and management agreements].

4.9 Reinstatement

4.9.1 Reinstatement of temporary construction areas and working widths will be undertaken as soon as reasonably practical once construction has ceased. Prompt implementation of reinstatement and restoration measures aim to reduce the effects of:

- Compaction of subsoil, which can lead to inhibited drainage and root growth;
- Exposed ground, which can cause loss of topsoil, dust and water pollution through wind blow and erosion; and
- Visual intrusion.

4.9.2 Planned reinstatement at the Project Site includes the following considerations and measures:

- Land reinstatement should normally take place in the autumn following the construction phase. The length of the Gas Pipeline route will be reinstated to its original condition and returned to its previous use;
- Where compaction may have occurred a 'sub-soiler', which lifts and shatters the subsoil will be used before the topsoil is reinstated;
- Topsoil that has been stored in the Laydown Area will be spread and levelled across the width of the strip, using hydraulic excavators or bulldozers. In areas where stones have been brought to the surface, stone picking will be carried out mechanically;
- The finish in which the soil is left will be agreed with the relevant land occupier. Land to be reinstated as grassland will either be reseeded in the autumn or the following spring. Reptile fences will remain in place until the grass crop is established;
- Temporary construction fences will be removed once agreement has been reached with the landowners that the land over which temporary possession powers have been exercised has been reinstated and can be handed back to the landowner, and no later than three months from completion of construction and
- Hedgerows will be reinstated in the first planting season following the completion of construction and land reinstatement work.

4.9.3 The following general reinstatement good practice measures that will be adopted:

- Reinstatement will be carried out as soon as possible following any vegetation stripping to ensure integrity is maintained;
- The reinstatement of the construction areas will be undertaken to the standard to be agreed with CCS, using the existing soil and vegetation wherever possible;
- Stripped soil will be reinstated as close to where it was removed as possible;
- Subsoil, topsoil and turf will be replaced in the same order as removed;
- Restoration works will be carried out in suitable weather conditions noting that wet ground conditions can be difficult, as can hot, dry and windy spells; and
- Natural regeneration of habitats will be promoted in all appropriate areas as advised by the Environmental Manager or ECoW.

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Appendix A Reptiles

1. These measures will be applicable to the following Project components:
 - Generating Equipment Site;
 - Access Road;
 - Electrical Connection; and
 - Gas Connection.
2. The risk of reptiles and the mitigation measures discussed below will be included in the site induction package and prior to any site clearance and construction tasks.
3. The trapping and translocation programme has been designed following the guidance set out in Herpetofauna Groups of Britain and Ireland 1998 publication (HGBI, 1998).
4. Due to the 'Good' population of common lizard and the presence of low numbers of grass snakes within the survey area a trapping and translocation programme will be undertaken to help protect any reptiles from being injured or killed. Due to the presence of suitable habitat for adder, the programme includes measures for this species. The actions involved in the proposed trapping and translocation are detailed below.

Fencing

5. Any construction areas suitable or known to support reptiles, including any routes in and out, areas for site compounds, offices or storage of materials/waste, will be fenced off using suitable fencing to limit reptiles attempting to enter the site from the adjacent land.
6. Fencing should remain in situ for the duration of construction to help limit the re-colonisation of the Project Site by reptiles. Depending on the construction duration it may be suitable to use recycled HDPE plastic semi-permanent, rigid reptile fencing with a 50 mm return folded and welded into the top edge forming an overlap to comply with EN guidelines and 100 mm underground return. It provides a reptile barrier that is highly resistant to vandalism and general site damage. Drift fencing can be used for construction duration lasting 18 months or less.
7. Fencing will be installed by a suitable contractor under the supervision of an ecologist. Contractors will be given a toolbox talk prior to works commencing, and advised on the identification of reptiles, what reptiles were expected on site, the legal protection afforded by reptiles, and how to safely move reptiles to avoid injury or killing.
8. Any areas subject to machines tracking over or repeated foot traffic, as well as the route of the fence line, will be hand searched by an ecologist for the presence of reptiles. Reptiles encountered will be captured by hand and moved out of the way into suitable habitat (see 'Translocation Area' below). The routes will then be mown

to a height of less than 150 mm and maintained as such for the duration of the fencing installation.

9. No vehicles, machinery or materials will be stored in areas suitable for supporting reptiles without first being checked by an ecologist; preference will be given to those areas not suitable for supporting reptiles.
10. No construction activities, including pedestrian access will be allowed outside of the fenced areas in habitat suitable for supporting reptiles.

Trapping and Translocation

11. Artificial refugia comprising approximately 1 m x 0.5 m square sheets of heavy-duty mineral roofing felt, corrugated iron and carpet tiles will be placed at a density of 50/ha in suitable habitat within the fenced area to attract reptiles.
12. The refugia will be left to 'bed-in' and will remain undisturbed for a period of at least fourteen days. After the 'bedding-in' period, each day, up to twice a day for a minimum of 60 days, an ecologist will check the refugia for the presence of reptiles. Any reptiles or amphibians found will be captured for relocation into suitable habitat outside of the fenced areas. After 60 days, the trapping can cease once there have been five consecutive days where no reptiles have been found.
13. After the fenced area has been cleared of reptiles and prior to soil stripping the vegetation can undergo a process of habitat management and hand searches for reptiles. Supervision of the soil strip during construction work by a suitably qualified ecologist will be required to help protect injury or killing of reptiles.
14. Any litter or rubble piles will be removed by hand under the supervision of an ecologist to avoid injuring or killing any reptiles. If the material is too heavy to be removed by hand it will be done so using a mini excavator carefully and slowly removing the material, under the supervision of an ecologist.
15. Any amphibians captured during the reptile trapping programme will be moved to a suitable location within the Project Site Boundary.

Translocation Area

16. During the reptile survey, very few numbers of reptiles were found within the footprint of the Project; the majority of reptiles were found along the Gallops. Due to the relatively low numbers of reptiles likely to be present within the fenced area it is considered appropriate to move any captured reptiles to the areas of habitat suitable for supporting reptiles that are to be retained outside of the fenced area.

Habitat Manipulation and Destructive Search

17. Once capture rates decrease significantly habitat manipulation will be used to enhance the process. This involves reducing the amount of suitable vegetation cover by strimming the vegetation between the refugia mats (leaving a 10cm buffer around the edge of each refugia mat) to a height of no less than 100mm, after 48

hours the cut will be repeated to ground level, concentrating the remaining reptiles to the retained vegetation and refugia. Naturally occurring refugia (stones, rocks, litter etc) will be hand searched by and ecologist before being removed and located within the receptor area. After which the final remaining areas of vegetation and refugia will be cut to ground level and removed following a final check for reptiles by an ecologist; any reptiles found will be removed and located within the receptor area.

18. Contractors will be given a toolbox talk prior to habitat manipulation works commencing, and will be advised on the identification of reptiles, what reptiles are expected on site, the legal protection afforded by reptiles, and how to safely move reptiles to avoid injury or killing. Any that reptiles identified during the strimming works will be moved by hand into suitable habitat outside of the fenced area. An ecologist will provide ecological support and advice during the works.

Timing

19. A method statement detailing the location and specification of fencing, timing and methodology for the management of reptiles will be submitted to CCS (in conjunction with NRW) for approval.

Appendix B Breeding Birds

1. These measures will be applicable to the following Project components:
 - Generating Equipment Site;
 - Access Road;
 - Electrical Connection; and
 - Gas Connection.

2. To avoid destruction of active bird nests or eggs, vegetation clearance works should be undertaken between September – February inclusive. Should works be required from 1 March – end August then an ecologist should inspect the area to be cleared no more than 48 hours prior to works. Should any active nests be found, works will have to halt in this area until the chicks have fledged and no longer return to the nest, which can take up to eight weeks. Should a nest be found a species-specific buffer should be implemented.

Appendix C Bats

1. These measures will be applicable to the following Project components:

- Generating Equipment Site;
- Access Road;
- Electrical Connection; and
- Gas Connection.

Roosting Bats

2. Pre-construction checks will be undertaken on trees and any hedgerows prior to their removal for their current suitability for supporting roosting bats.
3. Checks will be undertaken to allow time for any follow up (emergence and re-entry) surveys to be undertaken and an application for a European Protected Species License (EPSL) should any works require a confirmed roost to be destroyed.
4. The survey results will be used to inform any further mitigation to seek to avoid impacts on roosting bats.

Commuting and Foraging Bats

5. New planting will include wooded linear features to create new commuting and foraging routes linking existing rows of trees to the Afon Llan.
6. To allow bats to continue to use commuting and foraging routes during construction, the connectivity of tree lines and hedgerows along the Gas Connection, Access Road and Electrical Connection routes will be maintained utilising 'brown hedgerows' of brash. At least one hour before sunset key linear features as identified in ES Figure 3.6e will be reinstated utilising brash.

Access Road

7. To maintain connectivity post-construction, replacement planting of trees removed to facilitate the construction of the Access Road (including the new section of Access Road) should be undertaken. Using standards of the same species as those trees removed, trees will be planted along the existing boundary tree lines up to the edge of the Access Road. Over time the canopies will grow closer together thereby creating a linear feature than can be used by bats to cross the new section of Access Road.

Appendix D Otter and Water Vole

1. These measures will be applicable to the following Project components:
 - Generating Equipment Site;
 - Access Road; and
 - Electrical Connection.

Water Vole

2. A pre-construction check for water vole burrows and activity will be undertaken where construction is present within 100 m of watercourses identified as suitable for supporting the species during the 2017 field surveys, as identified in ES Appendix 8.10 Figure 1.
3. Should the pre-construction check return a negative result, habitat management will be undertaken to help reduce the quality of the habitats for burrow creation in the period leading up to, and for the duration of construction in that area.
4. Should water vole be confirmed as present on watercourses within 100 m of construction works during the pre-construction check, a Water Vole Conservation License from Natural Resources Wales (NRW) may be required to allow works to proceed and additional mitigation may be required.

Otter

- 5.1.1 A pre-construction check for otter holts/couches and activity will be undertaken where construction is present within 100 m of watercourses identified as suitable for supporting the species during the 2017 field surveys, as identified in ES Appendix 8.10 Figure 1. A pre-construction check for otter holts/couches and activity will be undertaken where construction is present within 100 m of watercourses identified as suitable for supporting the species during the 2017 field surveys, as identified in ES Appendix 8.10 Figure 1.
- 5.1.2 Should the pre-construction check return a negative result, habitat management will be undertaken to help reduce the quality of the habitats for holt/couch creation for the period leading up to, and for the duration of construction in that area. Should otter be confirmed as present on watercourses within 100 m of construction works during the pre-construction check, a European Protected Species License from NRW may be required to allow works to proceed and additional mitigation may be required.

Appendix E Badger

1. These measures will be applicable to the following Project components:
 - Generating Equipment Site;
 - Access Road;
 - Electrical Connection; and
 - Gas Connection.
2. A pre-construction check for badger setts and activity will be undertaken where construction is present within 30 m of habitats identified as suitable for supporting the sett creation.
3. Should badger setts be confirmed as present in habitat within 30 m of construction works during the pre-construction check, a licence from Natural Resources Wales (NRW) may be required to for the temporary/permanent closure of the sett to allow works to proceed, and additional mitigation may be required.

Appendix F Invasive Non Native Species

1. These measures will be applicable to the following Project components:
 - Generating Equipment Site;
 - Access Road;
 - Electrical Connection; and
 - Gas Connection.
2. An updated INNS survey (Invasive Species Assessment – ISA) will be undertaken to accurately assess INNS and extents within the Project Site boundary prior to the implementation of control measures and a site specific Invasive Non Native Species Protocol will be produced that elaborates on the outline recommendations provided below.
3. Many remediation options are available for the management of invasive species. All control options will be considered to identify appropriate management actions relevant in the context of controlling Schedule 9 species on land impacted by the proposed works.
4. The optimal control measures for the proposed works will involve a combination of biosecurity precautions (i.e. good site hygiene) and mechanical and/or chemical treatment.

Biosecurity Precautions

5. At a minimum, the following biosecurity measures will be implemented when working within the Project Site:
 - All appropriate staff members will be made aware of the locations of INNS and will be informed of the necessary precautions required to prevent spread. This will include informing personnel who might come into contact with any of the species of the requirements to prevent spread (e.g. during vegetation clearance, and vegetation management).
 - A toolbox talk will be provided by a suitably qualified Ecological Clerk of Works (ECoW) at the onset of works, providing details on identification and the required biosecurity precautions. An ECoW will be present during all works to help implement biosecurity measures.
 - Clearance works should avoid the period when Himalayan balsam has ripe seeds. When seeds ripen is dependent on the weather that year, but typically the period is from July until the end of October.
 - Vegetation clearance works will be undertaken methodically; commencing in areas with no presence of INNS, then working through areas with increasing levels of infestation. This will help prevent works spreading seeds and contaminated soils to areas onsite that are not currently infested.
 - Clearance works will avoid the area with INNS if the infestation is outside the treatment area or until treatment on the species has been completed. Before any treatment commences, if there is risk of vehicular or pedestrian incursion

into the area where INNS are growing then the plant stems will be fenced with temporary orange mesh fencing. Default stand-off distances are provided below. It may be possible to reduce these distances following the ISA, based on the data collected.

- Vehicular and people movements will be restricted to specific routes within the Project Site thereby helping to limit the spread of seeds and contaminated soils around Site.
- Cleaning stations will be set up at designated entry/exit points to demarcated areas. A jet wash should be available for vehicles and brushes and buckets of water should be available for clothing and equipment.
- No plant, equipment or personnel should leave a demarcated area without ensuring that all mud and/or plant material has been removed from vehicles, equipment and clothing/footwear.
- Any soil within demarcated areas will be considered to potentially contain INNS material (seeds etc.). When soils potentially containing viable INNS material seeds are taken off Site, such soils are classified as controlled waste and there is a duty of care for their proper disposal, i.e. the soil must be transported by an appropriately licensed carrier and disposed of at an appropriately licensed waste disposal facility.
- Personnel will be reminded of biosecurity requirements at the start of each work day and should be updated on any changes to management plans, i.e. information on the locations of any newly identified stands.
- Following the ISA, where additional biosecurity hazards are identified, they will be incorporated into the Invasive and Non Native Species Protocol.

Control

6. Potential control measures have been provided for each species identified within the Project Site Boundary below. Following the ISA a single actionable option will be specified for each stand, based on the recommendations below, in combination with a review of site development plans and activities.

Himalayan Balsam

7. Away from watercourses, depending on development plans, stands within working areas or stands within 6 m of a working area will be controlled by a combination of:
 - Herbicide treatment (potentially followed by hand removal once the quantity of plants has been reduced):
 - excavation and (i) burial or (ii) offsite disposal; and
 - raising the soil profile above existing stands, thus preventing future growth
8. Any herbicide treatments will use appropriate herbicide, which will be applied by an appropriately qualified contractor.
9. Seeds from Himalayan balsam typically remain viable for 18 months in soil. Follow-up monitoring of the treated stands will confirm treatment has been successful when no new seeds have germinated; after which the soil is considered inert

(assuming no other contaminants are present). Typical treatment periods are for 2 years of control action followed by at least a 1 year monitoring period. Herbicide should be applied three times in the year.

10. Where excavation is required, the recommended excavation area is 6 m radius to a 30 cm depth, although through the commissioning of soil core analysis it may be possible to reduce the depth at which soil needs to be removed. The excavated material will need to be disposed of as controlled waste or buried within the Project Site.
11. Where the soil profile is raised, 30 cm soil is sufficient to prevent regrowth.
12. Where Himalayan balsam is growing next to a watercourse control will not be effective in the long term, since new seeds will travel from further up the catchment (where Himalayan balsam is abundant) and re-colonise the area. In such areas, management will focus on containment (i.e. implementation of biosecurity protocols).

Japanese Knotweed

13. In areas where there is a risk of spreading Japanese knotweed (stands within 7 m of access routes and storage compounds – following the ISA and through risk assessment it may be possible to reduce this distance to 4 m), the stands will be managed appropriately. A single actionable option for each stand will be determined for each stand with takes account of development plans. Options include:
 - Herbicide treatment;
 - Rhizome fragmentation and cultivation (e.g. soil rotation) to stimulate growth and reduce herbicide treatment time requirements;
 - excavation and (i) stockpiling, (ii) burial or (ii) offsite disposal; and
 - raising the soil profile above existing stands, thus preventing future growth.
14. Any soil containing Japanese knotweed material will be removed from the Project Site following the appropriate duty of care, or buried within the Project Site.
15. To reduce the risk of spread and future growth, a herbicide treatment programme will commence as far in advance of construction works as is practical. Typical treatment periods are for 3 years followed by a 2 year monitoring period. However, mature stands can take significantly longer to successfully treat. The presence of mature stands will be identified as part of the ISA. Herbicide should be applied once in the year.
16. Where herbicide treatment is used in isolation there is a risk that dormant but viable rhizomatous material remains underground after treatment appears successful above ground, and as such the soil in such areas should not be disturbed and if it is subsequently removed, it remains classified as controlled waste moving forward.
17. Where the soil profile is to be raised above Japanese knotweed, the plants should first be treated with herbicide in advance for as long as possible. Depending of

maturity and time scales, it may be beneficial to lay a geomembrane in the area prior to raising the soil level.

Floating Pennywort

18. There is one pond recorded as supporting floating pennywort in 2014. The pond is under the footprint of the proposed Power Generation Plant and is not hydrologically connected to any other waterbodies or watercourses. As such, the pond can be infilled with inert soil and then built on. No material or water will be removed from the pond.

Rhododendron and Montbretia

19. The ISA will be used to confirm locations and extents.
20. Montbretia is located on the edge of the Access Road, and should be treated by herbicide at the same time as the other species. The corms react well to herbicide treatment, and since the plant does not produce viable seed, this course of action will be effective at controlling the plant.
21. Rhododendron is present within the woodland which is not being disturbed during the construction of the Project. As such, there is no risk of causing the spread of rhododendron as the seeds produced by rhododendron will not establish in the disturbed soils of a development site (such seeds require very specific conditions to germinate AND establish).

Appendix G Hedgerows

1. These measures will be applicable to the following Project components:
 - Access Road;
 - Electrical Connection; and
 - Gas Connection.
2. To allow bats to continue to use commuting and foraging routes during construction, the connectivity of tree lines and hedgerows along the Gas Connection, Access Road and Electrical Connection routes will be maintained utilising 'brown hedgerows' of brash. At least one hour before sunset key linear features as identified in ES Figure 3.6 will be reinstated utilising brash.
3. On completion of construction works the hedgerow gaps will be reinstated by planting species typical of the hedgerow as whips of four per metre in a double staggered row. Shrubs will be bare rooted and comprise 1.5 m size class. Spiral guards will be used to help prevent damage from rabbits. Some brash can be left in situ to help maintain the linear feature whilst the whips are establishing.
4. In the two winters following planting, any dead shrubs should be replaced with the same species mix as the original planted.
5. The grass around the base of the trees/shrubs (0.5 m diameter) should be killed at least once annually using an approved non residual herbicide for three years following planting.
6. Additional hedgerow planting is covered in Planting Proposals Section 4.6.

Appendix 3.5

Outline Lighting Strategy



Abergelli Power Station

OUTLINE LIGHTING STRATEGY





FIRST ISSUE / FOR REVIEW (P0) PUBLIC

**PROJECT NO. 70034053
OUR REF. NO. 70034053**

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QUALITY CONTROL

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CONTENTS

1	LIST OF ABBREVIATIONS	1
2	INTRODUCTION	2
2.1	PURPOSE AND SCOPE OF REPORT	2
2.2	PROJECT LOCATION	2
3	DESIGN PHILOSOPHY, STANDARDS AND GUIDANCE	4
3.1	DESIGN PHILOSOPHY	4
4	LIGHTING DESIGN	5
4.1	LIGHTING BY ZONE DEFINITION	5
4.2	ZONE 1: ALL SITE ROADS AND CAR PARKING	5
4.3	ZONE 2: GAS TURBINE GENERATOR AND ELECTRICAL PLANT AREAS	5
4.4	ZONE 3: GAS AND ELECTRICAL CONNECTION POINTS ,WATER TANK AND FUEL STORAGE AND MAINTENANCE COMPOUND	5
4.5	ZONE 4: AGI	5
5	LIGHTING EQUIPMENT	7
5.1	GENERIC EQUIPMENT AND INSTALLATION	7
6	LIGHTING CONTROLS	9
6.1	LUMINAIRE OPERATION	9

APPENDICES

APPENDIX A – SITE LOCATION PLAN

APPENDIX B – GENERATING EQUIPMENT SITE

1 LIST OF ABBREVIATIONS

AGI	Above Ground Installation
CMS	Control Management System
CCTV	Closed Circuit Television
CCS	City and County of Swansea Council
hrs	Hours
K	Kelvin
lux	Unit of illuminance
min	Minutes
mph	Miles per hour
R_a	Colour Rendering Index
W	Watt (unit of power)

2 INTRODUCTION

2.1 PURPOSE AND SCOPE OF REPORT

- 2.1.1. This Outline Lighting Strategy provides guidance and professional recommendations for the design and operation of the permanent external lighting design of Abergelli Power Station. This does not address the lighting requirements during the construction of the power stations lighting installation and it does not address the emergency lighting requirements.
- 2.1.2. The purpose of this report is to ensure that the permanent external lighting meets the necessary standards required for its purpose and that the impact of the lighting on the surrounding area is mitigated as far as reasonably practicable without detriment to the safe operation of the site. It is advised that following the guidance within this report will assist in obtaining planning permission for the site from a lighting perspective.

2.2 PROJECT LOCATION

- 2.2.1. The Project site is located north of Junction 46 of the M4, approximately 8.15km north of Swansea. The site is adjacent to the Swansea North Substation and the Felindre Gas Compressor Station. At present, it mainly consists of farmland and rural roads, with no current sources of artificial light, with the exception of security lighting at the Substation and Gas Compressor Station as well as the nearby Abergelli Fach Farm. The site resides within the area maintained by City and County of Swansea Council (CCS) who will require consultation on appropriate planning applications for the lighting.

Figure 1 – Site Overview Map

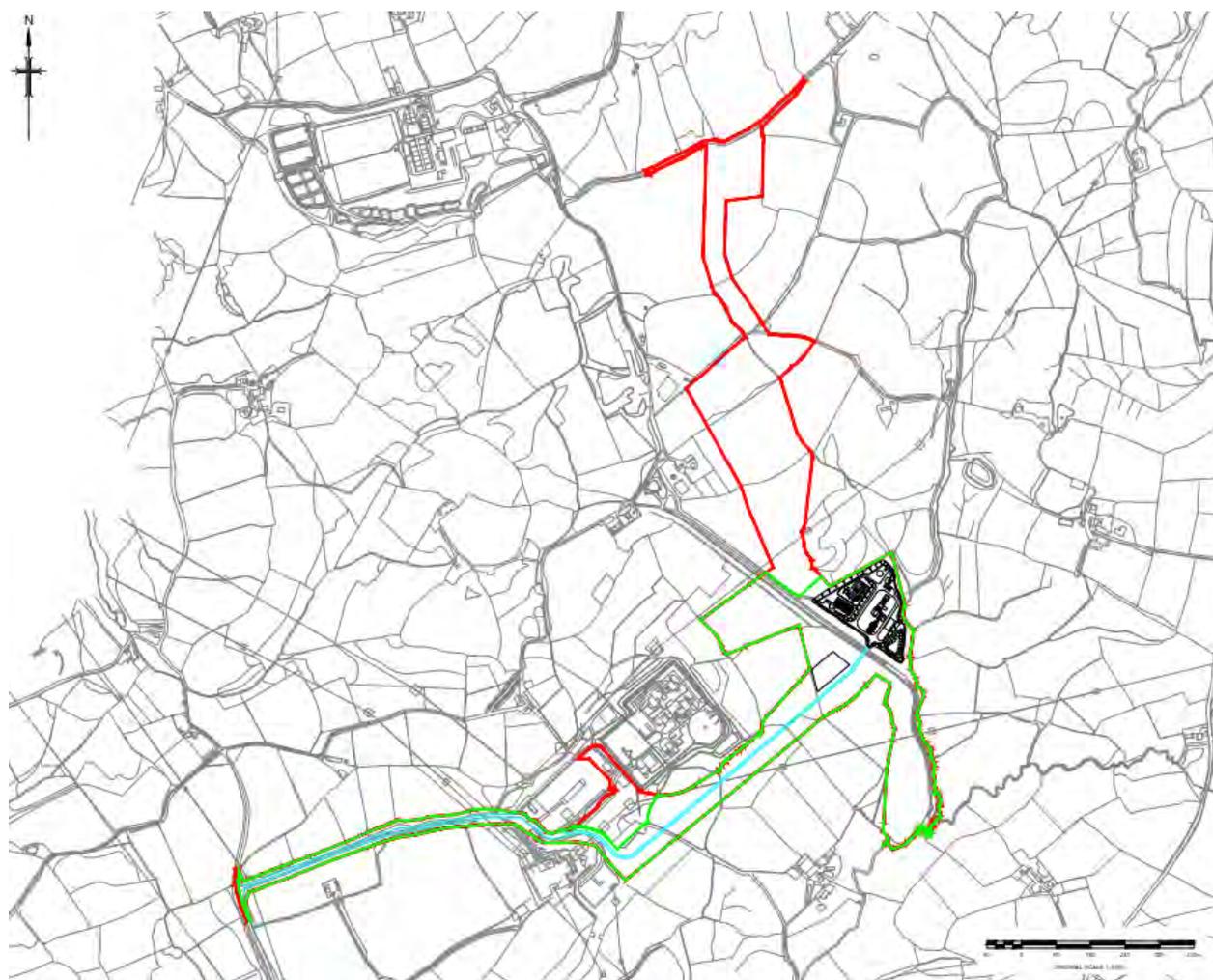


Figure 2 – Proposed Site Location Overview Image



3 DESIGN PHILOSOPHY, STANDARDS AND GUIDANCE

3.1 DESIGN PHILOSOPHY

- 3.1.1. Maintaining a 'dark site' and minimising the level of light spill as far as reasonably practicable, are the underpinning factors that will be sought in the design of the lighting for the Project. During the hours of darkness, only critical light sources will remain in operation, these include emergency exit illumination and site security lighting at a low level. Whilst the site Access Road shall not be lit to avoid impacting the local environment including wildlife and adjacent residents as much as is reasonably practicable.
- 3.1.2. A curfew will be implemented for all non-critical lighting from 23.00 to 05.00 hrs to reduce the impact of the development on the local environment. This means that all non-critical lighting will be switched off during these hours via a time clock. Routes and entrances not in constant use will be controlled via a movement detector or manual switch, ensuring that lighting in these areas will be switched off the vast majority of the time. The sensitivity of the motion detectors will be set so as not to be activated by the movement of large mammals such as badgers and otters.
- 3.1.3. The site internal road lighting will be controlled with the utilisation of a time clock or a photocell to ensure the only hours of operation are during darkness. All other site lighting, with the exception of Above Ground Installation (AGI) (lighting, will be controlled via group switching from the control room and only used when necessary for tasks in that specific area to avoid unnecessary light emission.
- 3.1.4. The general lighting control philosophy is for the lighting to be controlled by a combination of both time clock and photocell arrangements with additional local control for open compound lighting, perimeter lighting around buildings and external stairs and platforms with automatic delayed off controls where appropriate.
- 3.1.5. It is noted that the site may at times be unmanned, therefore road lighting and site lighting may not be required at all times. The final lighting design will take into consideration the planned operation times of the site and will reduce the amount of lighting required when the site is unmanned. System operators will have the ability to override any lighting circuit and, where necessary, individual luminaires from the control room. The use of digital dimming will be considered to minimise energy consumption even further.
- 3.1.6. All luminaires will have the necessary optical control and will be appropriately aimed to completely omit direct upward light emission. Luminaires shall also be positioned and aimed so that so that peak light intensities from any fitting do not unintentionally illuminate any building or structural façade. All luminaires shall be a minimum of IP65 rated, whilst in areas deemed hazardous explosive proof fittings shall be utilised.
- 3.1.7. The main drivers for the design are as follows:
- The health and safety of all employees performing their working duties as well as all visitors attending site
 - To provide the safe movement of both vehicular and pedestrian traffic around the site during the hours of darkness.
 - To reduce light pollution in the forms of light trespass, glare and sky glow.
 - To aid the security of both the site and its occupants with the inclusion of lighting with a cooler colour temperature should be used throughout the site to improve CCTV images.
- 3.1.8. The lighting design for the operation of the power station will be developed to comply with the Institution of Lighting Professionals publication: Guidance Notes for the Reduction of Obtrusive Light: a recognised best practice guide for the reduction of light pollution.

4 LIGHTING DESIGN

4.1 LIGHTING BY ZONE DEFINITION

4.1.1. For the purposes of this indicative lighting design, Abergelli Power station has been split into four zones.

- Zone 1: Comprising of internal roads and car parks
- Zone 2: Comprising of the gas turbine generator and electrical plant areas
- Zone 3: Comprising of the electrical and gas connection points, gas receiving facility ,Water and fuel storage areas and maintenance compound
- Zone 4: AGI

4.1.2. The AGI is required to be lit only during necessary maintenance inspections and visits.

4.1.3. Please note the Access Road will not be illuminated.

4.2 ZONE 1: ALL SITE ROADS AND CAR PARKING

4.2.1. The internal road and car park(s) will be lit by column mounted luminaires, mounted at a nominal height of 6m.

4.2.2. The road lighting will only operate during the hours of darkness with the use of either a timeclock or a photocell.

4.2.3. The site Access Road will not be illuminated.

4.3 ZONE 2: GAS TURBINE GENERATOR AND ELECTRICAL PLANT AREAS

4.3.1. The gas turbine generator will be lit by building/wall mounted equipment. The lighting for the area and associated plant and equipment will be provided in the form of floodlights.

4.3.2. The lighting in this area will be grouped switched from the control room to ensure the lighting is operated only when performing necessary working duties or when required.

4.3.3. Where required, column mounted luminaires and equipment at 8m above the working plane will be utilised.

4.3.4. Lighting columns will be fitted with cowls to reduce light spill.

4.4 ZONE 3: GAS AND ELECTRICAL CONNECTION POINTS ,WATER TANK AND FUEL STORAGE AND MAINTENANCE COMPOUND

4.4.1. The lighting of these open areas will utilise column mounted luminaires, mounted at 8m above the working plane.

4.4.2. Lighting columns will be fitted with cowls to reduce light spill.

4.4.3. The lighting in this area will be grouped switched from the control room to ensure the lighting is in operation only when performing necessary working duties or when required.

4.4.4. Areas in which equipment is mounted on columns, the columns will be mid-hinged to raise and lower, for maintenance purposes.

4.4.5. The level of lighting within open areas and compound will be sufficient enough to allow the safe movement of pedestrians and vehicles in areas that they might reasonably be expected to negotiate during hours of darkness.

4.5 ZONE 4: AGI

4.5.1. The AGI will only be lit during routine maintenance visits.

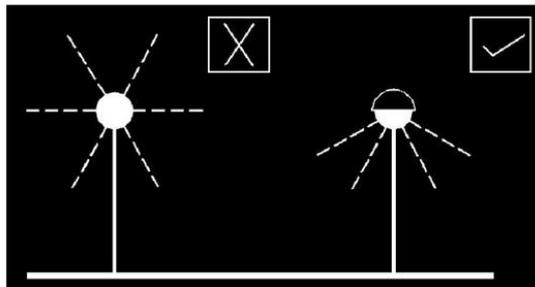
4.5.2. The lighting of the AGI will utilise column mounted equipment at 8m above the working plane.

- 4.5.3. The lighting design will be developed to comply with National Grid standard T/PM/EL/1.
- 4.5.4. The lighting in this area will be operated via a manual switch from the control room to ensure the lighting is in operation only when performing necessary working duties or when required.

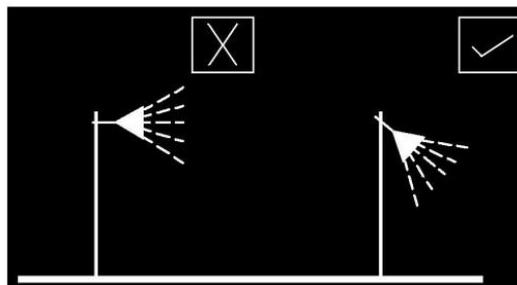
5 LIGHTING EQUIPMENT

5.1 GENERIC EQUIPMENT AND INSTALLATION

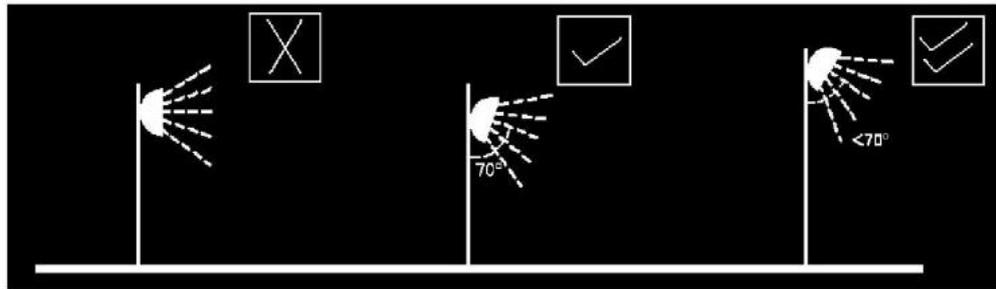
- 5.1.1. All luminaires utilised are designed to minimise upward light spill and are adjustable in elevation to allow for re-alignment so that light can be directed to avoid light spill above the horizontal plane.
- 5.1.2. Luminaires will employ high efficiency integral control gear to minimise circuit parasitic losses and, where appropriate, will be controlled by a site wide lighting control system to minimise waste light output.
- 5.1.3. All external luminaires will be ingress protected to a minimum standard of IP65 and shall be suitable for use in hazardous areas as identified during detailed design.
- 5.1.4. Lighting buildings will have a significant impact on the level of light spill produced. Equally important is the choice of lighting equipment and lighting techniques. This general guidance will be followed when selecting equipment and lighting techniques.



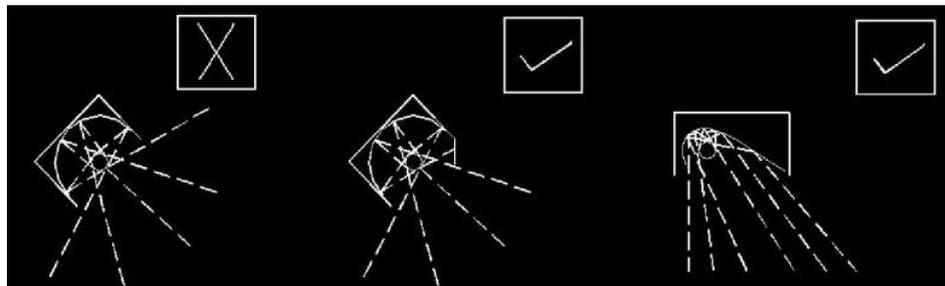
Fixed head lanterns will not emit any direct light above horizontal



Movable luminaires will be tilted so that no light is being emitted above horizontal



Lantern heights will be increased where feasible to reduce tilt angles



Quality luminaire optics will be used which accurately control light distribution and do not spill light into the atmosphere

6 LIGHTING CONTROLS

6.1 LUMINAIRE OPERATION

- 6.1.1. External lighting control will form part of the overall lighting control system. System operators will have the ability to override any lighting circuit and, where necessary, individual luminaires from the control room. The general lighting control philosophy is for the lighting to be controlled by a combination of both time clock and photocell arrangements with additional local control for open compound lighting, perimeter lighting around buildings and external stairs and platforms with automatic delayed off controls where appropriate. The use of digital dimming will be considered to minimise energy consumption even further.
- 6.1.2. The site internal road lighting will be controlled with the utilisation of a time clock or a photocell to ensure the only hours of operation are during darkness. All other site lighting, with the exception of AGI lighting, will be controlled via group switching from the control room and only used when necessary for tasks in that specific area to avoid unnecessary light emission.
- 6.1.3. It is noted that the site may, at times but not all times, be unmanned, therefore road lighting and site lighting may not be required at all times. The final lighting design will take into consideration the planned operation times of the site and will reduce the amount of lighting for an unmanned site.

APPENDIX TITLE

Appendix A

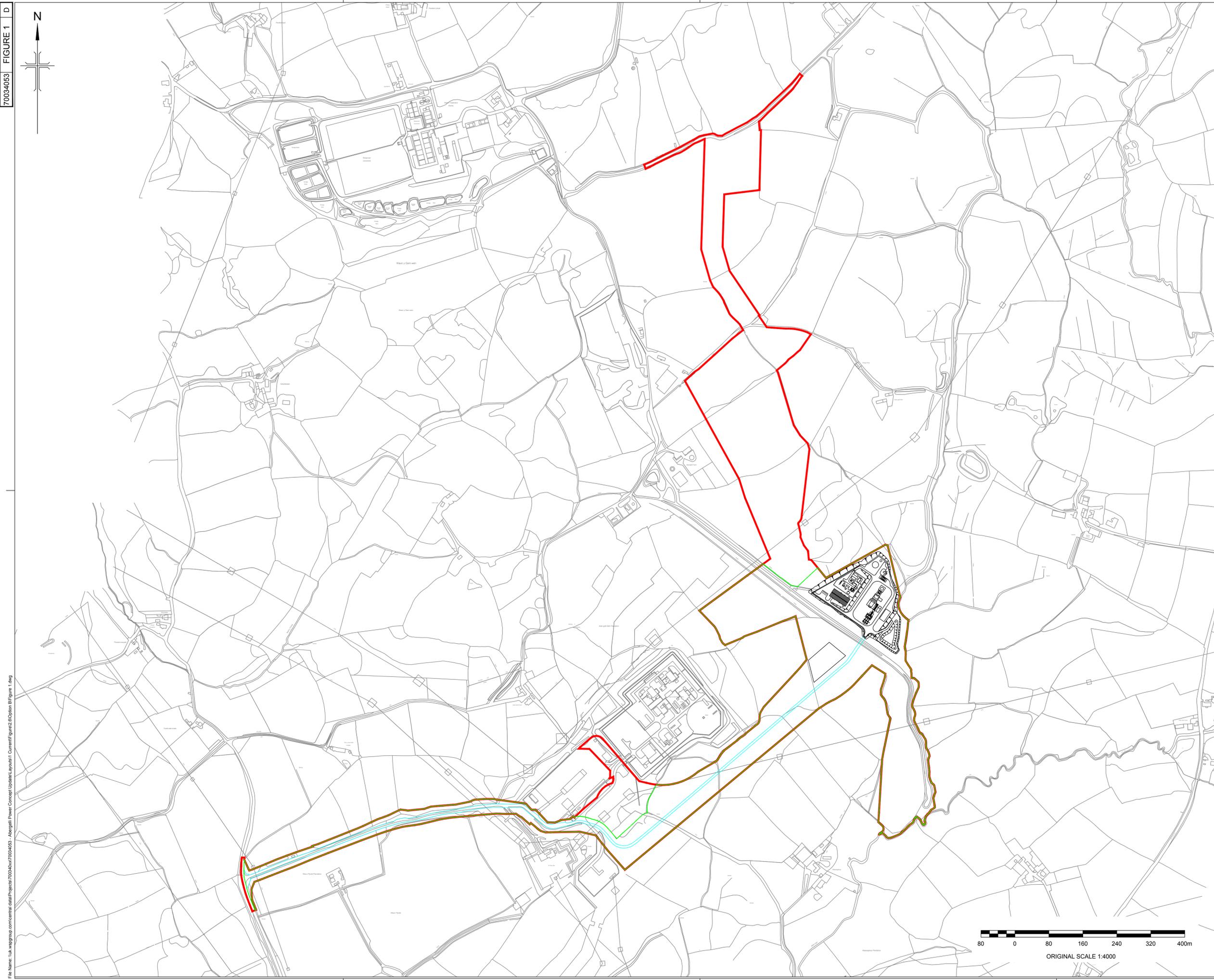
SITE LOCATION PLAN





LEGEND

- ORDER LAND
- ORDER LIMITS
- ACCESS ROAD



Rev	Date	Description	By	Chk	App
D	10/05/2018	UPDATED IN LINE WITH CLIENT COMMENTS	SPS	SJS	IMG
C	03/04/2018	LEGEND UPDATED	SPS	SJS	IMG
B	22/03/2018	ATTENUATION POND DETAILS UPDATED. WATER EASEMENT UPDATED	SPS	SJS	IMG
A	16/02/2018	FIRST ISSUE	JPW	SJS	IMG

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Client:



Site/Project:

**ABERGELLI
POWER
PROJECT**

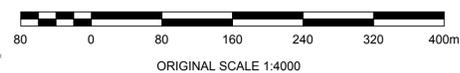
Title:

**SITE LOCATION PLAN
REG5(2)(o)**

Drawn: JPW	Checked: SJS
Designed: IMG	Approved: IMG
Date: 16/02/2018	Scale: 1:4000
Project Number: 70034053	Sheet: 1 OF 1
Drawing Number: FIGURE 1	Revision:

70034053 **FIGURE 1** D

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Appendix B

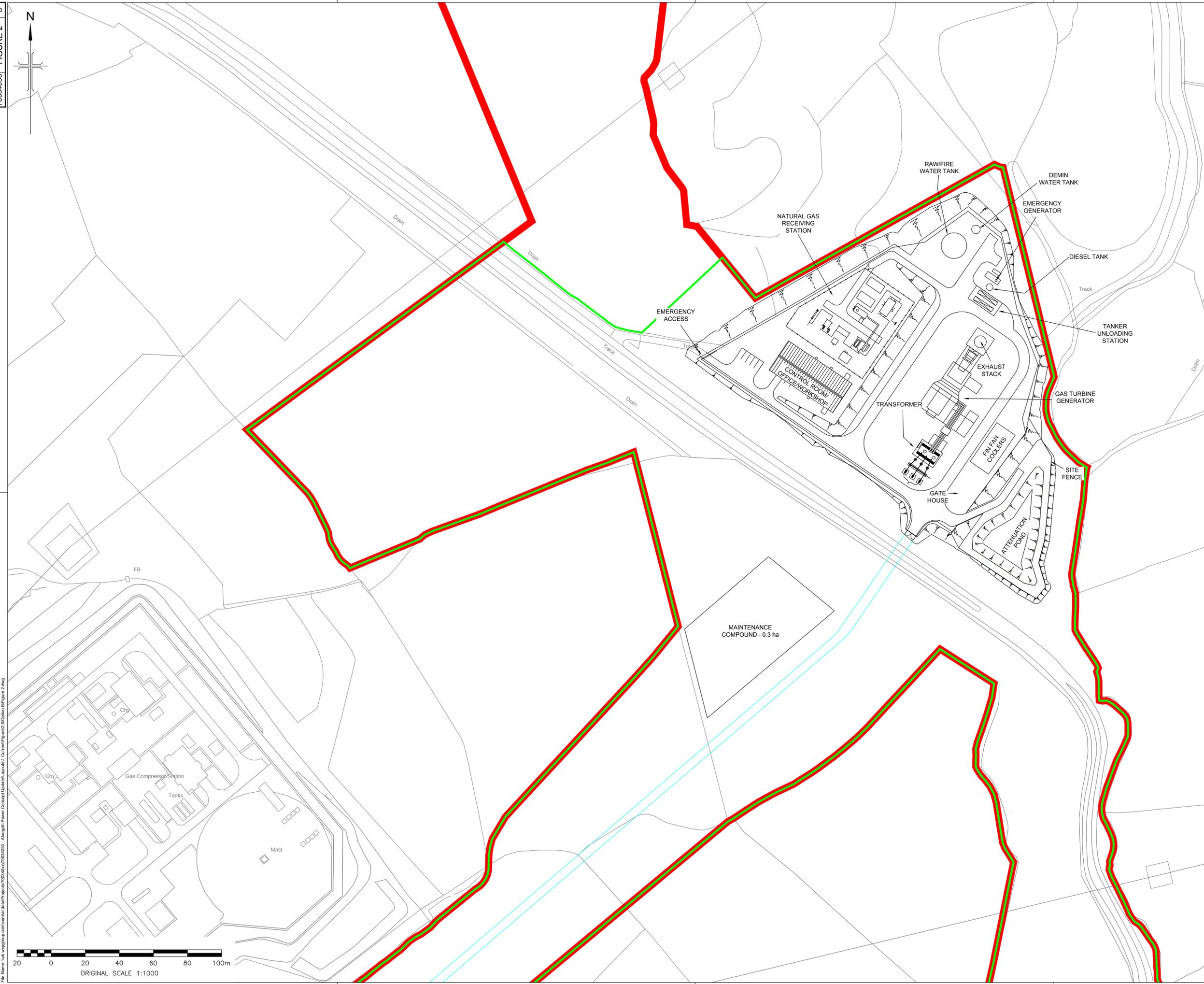
GENERATING EQUIPMENT SITE





LEGEND

—	ORDER LAND
—	ORDER LIMITS
—	ACCESS ROAD

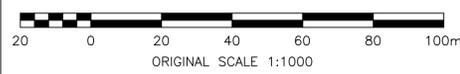


NOTES:
 * INFORMATION TAKEN FROM WEST GLAMORGAN WATER BOARD RECORD DRAWINGS No. 112/4/1/12A DATED 1969

Rev	Date	Description	By	Chk	App
C	10/05/2018	UPDATED IN LINE WITH CLIENT COMMENTS	SPS	SJS	IMG
B	03/04/2018	LEGEND UPDATED	SPS	SJS	IMG
A	16/02/2018	FIRST ISSUE	JPW	SJS	IMG

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ABERGELLI POWER PROJECT	
INDICATIVE LAYOUT GENERATING EQUIPMENT Reg5(2)(o) DOCUMENT REFERENCE 2.6	
Drawn: JPW	Checked: SJS
Designed: IMG	Approved: IMG
Date: 16/02/2018	Scale: 1:1000
Project Number: 70034053	Drawing Number: FIGURE 2
Sheet: 1 OF 1	Revision:
70034053 FIGURE 2 C	
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File Name: \\uk.wspgroup.com\central_data\Projects\70034053\Abergelli Power Concept\Update\Layouts\Current\Figure2.dwg





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