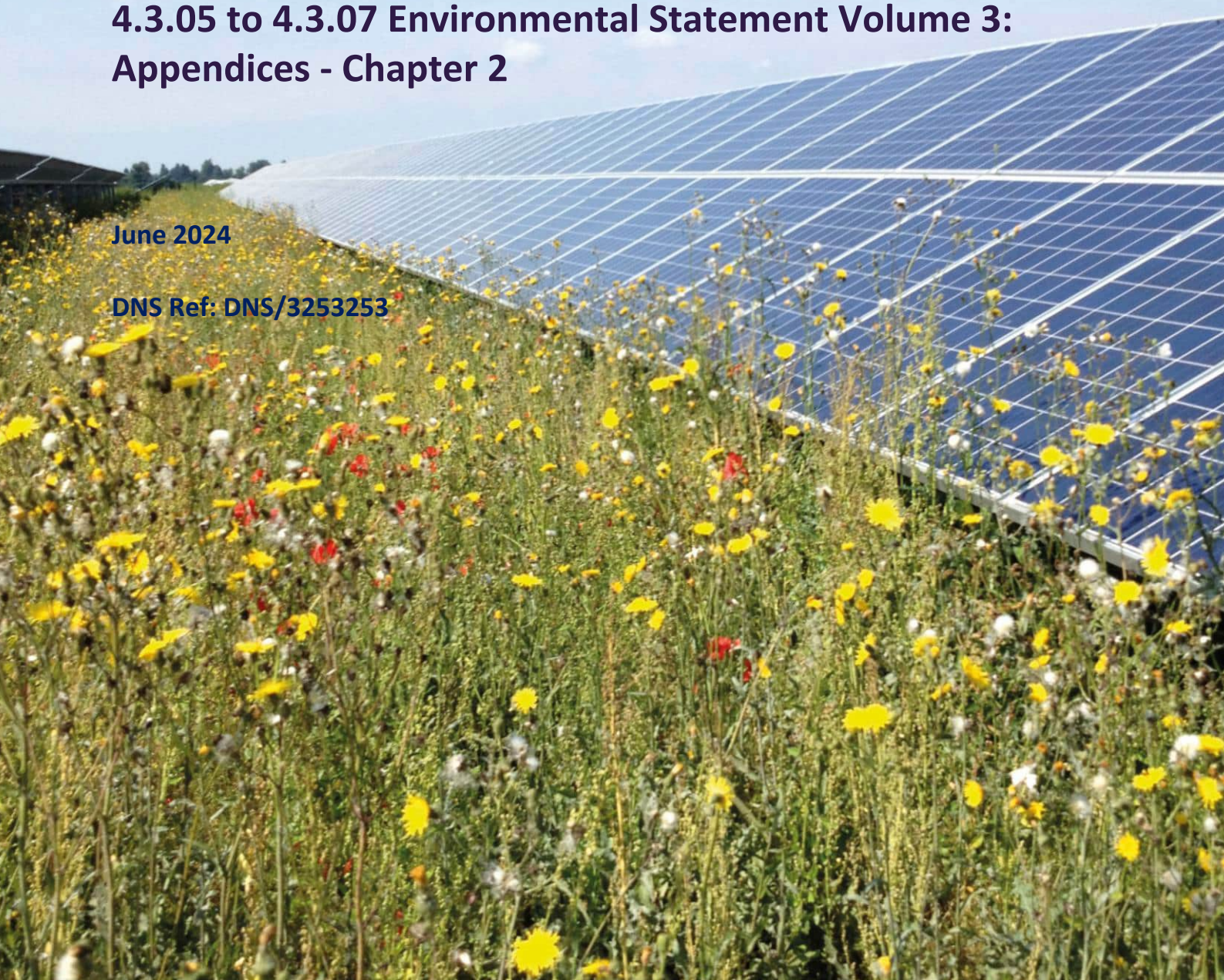
Plas Power Solar and Energy Storage Project

4.3.05 to 4.3.07 Environmental Statement Volume 3: Appendices - Chapter 2



June 2024

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Chapter 2: Proposed Development Description
Appendices

Appendix 2.1
Outline Battery Safety Management Plan

Abbott Risk Consulting Limited

ARC-1198-001-R3

Lightsource bp Plas Energy Storage – Outline Battery Safety Management Plan

Issue 2 – May 2024

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Executive Summary

This Outline Battery Safety Management Plan (OBSMP) is for the proposed Plas Battery Electrical Storage System (BESS) installation near Wrexham. The aim of the OBSMP, at this planning phase of the programme, is to define the proposed safety strategy, requirements, and processes necessary to meet derived safety objectives and to set a level of safety performance that the installation is to be measured against. These standards are derived from the following sources:

1. Planning Practice Guidance (PPG) for Renewable and Low Carbon Energies.

2. Fire and Rescue requirements detailed in the National Fire Chiefs Council (NFCC) Report Grid Scale Battery Energy Storage System Planning – Guidance for (Fire and Rescue Services) FRS.

3. Factory Mutual (FM) Global Loss and Prevention Datasheet 5-33 (as cited in the NFCC Report).

4. Lightsource bp (LSbp) Tiln BESS Fire Strategy and Emergency Response.

It also provides the basis for the safety management processes and procedures required to satisfy the identified safety requirements for a BESS system capability.

The preliminary safety hazard identification and analysis, based on like for like energy storage systems of this type, namely Lithium-Ion battery technology, has determined the likely causes and hazards and enabled the initial identification of potential control measures that when implemented will ameliorate the level of risk posed to an acceptable level.

It is proposed that, as far as reasonably practicable and for this planning stage of this BESS installation, that the currently foreseeable hazards associated with the technology proposed have been identified. These will form the initial safety foundation going forwards and be actively managed as the Project and installation matures. At this juncture of the programme the selection of the BESS to be positioned at Plas has yet to be decided.

The design, development, and manufacture of the BESS requires the development and maintenance of high standards in respect of safety and operational sustainability. It will be the responsibility of all personnel involved in the future development of the proposed undertaking to strive to reduce the potential for accidents to the lowest practicable level by being ‘risk aware’ and promoting a supportive safety and environmental culture at all stages of the development. This OBSMP is the starting point from which the Project will progress.

It will be essential that the design process is subject to a Design Risk Analysis by a competent designer or design House in compliance with the CDM Regulations 2015.

Abbreviations

ALARP	As Low As Reasonably Practicable
ARC	Abbott Risk Consulting Ltd
BESS	Battery Electrical Storage System
BMS	Battery Management System
BoM	Bill of Materials
CDM	Construction Design and Management
CID	Current Interrupt Device
DBSMP	Detailed Battery Safety Management Plan
FAQs	Frequently Asked Questions
FDSS	Fire Detection and Suppression System
FM	Factory Mutual
HSAWA	Health and Safety at Work Act
HSE	Health and Safety Executive
IEC	International Electrotechnical Commission
LSbp	Lightsource British Petroleum
NFCC	National Fire Chiefs Council
NFPA	National Fire Prevention Association
OBSMP	Outline Battery Safety Management Plan
PCIP	Pre-construction Information Plan
PPG	Planning Practice Guidance
PTC	Positive Thermal Coefficient
REACH	Registration, Evaluation, Authorisation & Restriction of Chemicals Regulations
RoHS	Restriction of Hazardous Substances Directive
SME	Subject Matter Expert
UK	United Kingdom
UL	Underwriters Laboratory
UV	Under-Voltage

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1.0 Outline Battery Safety Management Plan (OBSMP) Purpose

1.1 Aim

The aim of this report is to outline the safety management approach that will be adopted. Furthermore, the overall Battery Energy Storage System (BESS) safety aim is that the levels of risk of accident, death or injury to personnel or other parties, and to the environment due to BESS activities are to be mitigated and managed as far as possible through diligent development, design, construction, and operation. In accordance with the Health and Safety Executive (HSE) Reducing Risk, Protecting People - Guidance [Ref. 1], BESS development should aim to reduce risks to 'As Low As Reasonably Practicable' (ALARP).

1.2 Scope

The scope of this report for the proposed Plas BESS development (the Project) and capability covers the physical and functional aspects of the equipment. The BESS safety management will cover design, validation, siting, operation, fire strategy and emergency response, and removal from site (post use). It will also include any remote monitoring and control, maintenance, storage / transportation, and calibration.

1.3 Context

This OBSMP has been developed by Abbott Risk Consulting Ltd (ARC) in the role of the Safety Subject Matter Expert (SME) and aims to identify the safety requirements (and any additional derived safety requirements) such that the proposed Plas BESS development can be assessed against a common benchmark, criteria set and safety targets.

This BESS OBSMP has been developed at this early planning stage with the client LSbp to identify and assess the potential risks associated with the BESS design, installation, and operating capability, and to provide a robust safety argument, supported by evidence, prior to full commissioning. It is proposed that the safety programme will develop following three phases reflecting the maturity of the programme:

1. **OBSMP (Planning)** – this report. The OBSMP informs on how safety management is to be conducted. It outlines:

    a. The processes, procedures and means by which the BESS safety management is to be conducted, implemented, and assessed, such that the BESS design and development, initial construction, and operation safety performance can be conducted with an acceptable level of residual risk.

    b. It provides the criteria and targets against which the installation will be assessed.

    c. It provides the initial compliance status against key requirements contained in the Planning Practice Guidance (PPG) (and referenced guidance).

d. It identifies the common hazards associated with BESS installations of this type.

2. **Detailed Battery Safety Management Plan (DBSMP) (Installation and Implementation)** – The DBSMP will be produced post planning consent and will build upon the OBSMP and reflect the maturity of the Project and availability of detailed information and evidence to support safety claims. The DBSMP:

    a. Assesses the level of residual risk posed by the BESS design to individuals (both those directly involved in the operation and 3rd parties), the immediate environment, the asset (BESS), interfacing / interdependent assets and property / equipment that could be affected by the operation of the BESS (noise, radiated emissions etc.).

    b. Contains the Emergency Response and Contingency Plans.

    c. References to supporting evidence.

    d. Details any recommendations for improvement.

3. **Site Safety Audit (Operation)** – Validates the BESS installation against the safety requirements and identified control measures in the DBSMP. It also validates that the safety processes and procedures required to ensure that the risk posed by the design remains within the bounds established and associated requirements have been implemented i.e., training, provision of Personal Protective Equipment, calibration, scheduled maintenance etc. Appropriate reports by the manufacturers and installers will be included in the Site Safety Audit to validate competency and technical due diligence. This will be further validated independently via input from the Client's Owner's Engineering Consultants.

The incumbent technology at the time of writing is primarily based on Lithium-Ion batteries. Due to the pace at which battery technology is developing, the precise battery chemistry will not be selected, and solution confirmed until the detailed design phase of the development. As such, this report this written leaning on the subject matter expertise that ARC have in this technological domain, industry good practice and regulation. Selection of equipment will be based on proven and evidential technical and safety performance.

A section of Frequently Asked Questions (FAQs) is provided at Appendix A to the OBSMP.

2.0 Project Overview

2.1 The Project

The application site covers approximately 140 hectares and is located wholly within the administrative boundary of Wrexham County Borough Council. The site is approximately 2.5km to the west of Wrexham city centre.

The site comprises two interconnected areas north and south of the A525 Ruthin Road. The larger part of the site is bounded by the A525 Ruthin Road to the north, to the east by the A483, to the south by Plas Power Woods and its westernmost point by agricultural fields beyond which lies Rhos Berse Road and Nant Road.

The proposed development will include a 33kV cable that will connect the solar farm, BESS and associated infrastructure to the Legacy Substation located approximately 1.2km to the south-west of the site, north of the B5246 Bronwylfa Road. See Figure 6-1 for an illustration of the BESS compound layout.

The main components of the Proposed Development are:

- 14 x Battery Blocks (each comprised of 4x BESS Enclosures).
- 7 x Twin Medium Voltage (MV) Skid (each comprised of 2 x Power conversion systems and 1 x MV transformer).
- 1 x Monitoring House.
- 1 x Backup Generator.
- 1 x Intake Substation.
- 1 x Transformer.

3.0 Safety Objectives

3.1 High Level Safety Objective

The primary safety objective across the BESS project is to minimise risk to health and safety of the public, employees, property, and the environment by complying with applicable legal requirements and relevant emerging good practice for grid scale connected BESS. These will be distilled into safety requirements that will be included in the requirements for prospective suppliers during the tendering and contracting stage. Compliance with these safety requirements (by the potential suppliers) will be used as part of the safety argument, to demonstrate that '***The risk posed to individuals, the environment and property from the BESS programme of work has been reduced to a level that is Broadly Acceptable or Tolerable and ALARP' as directed by the HSE***. Compliance with the Construction Design and Management (CDM) Regulations 2015 will require the following documentation:

- Pre-Construction Information Plan (PCIP).
- Review of Contractor Competency and Prequalification.
- Review of Contractor Construction Phase Plan.
- Registration of the Project on HSE UK F10 form.
- Understanding of LSbp Golden Rules (see Appendix B).

- On completion of the BESS installation a competent Health and Safety File is produced by the Principal Contractor for BESS which clearly identifies all Residual Risks.

- A comprehensive set of Operational Manuals and “As Builts” including all Single Line Diagrams and Schematics.

- A Fire Strategy and Emergency Response Plan (ERP).

These derived safety requirements will be fundamental to the BESS development and will be used to ensure that all direct and indirect safety requirements for BESS are met and the supplier(s) and installers are safety competent and compliant.

4.0 Legislation and Compliance Requirements

Legislative compliance, specifically safety, for the BESS will be demonstrated by compliance with the UK Health and Safety at Work Act (HSAWA) 1974 and the appropriate underlying legislation that is enacted through the HSAWA. The following current legislation has been determined as applicable to the BESS development:

1. Health and Safety at Work etc. Act 1974 – UKSI1974/0037.
2. Control of Noise at Work Regulations 2005 – UKSI 2005/1643.
3. Control of Substances Hazardous to Health Regulations 2002 – UKSI 2002/2677.
4. Control of Vibration at Work Regulations 2005 – UKSI2005/1093.
5. Electrical Equipment (Safety) Regulations SI 1994/3260.
6. Electro-magnetic Compatibility Regulations SI 2006/3418.
7. Fire Safety (Employees’ Capabilities) (England) Regulations SI 2010/471.
8. Fire Safety Order 2023
9. Fire Safety Act 2021
10. Lifting Operations and Lifting Equipment Regulations 1998 – UKSI1998/2307.
11. Management of Health and Safety at Work Regulations 1999 – UKSI1999/3242.
12. Manual Handling Operations Regulations 1992 – UKSI1992/2793.
13. Personal Protective Equipment Regulations 2002 – UKSI2002/1144.
14. Provision and Use of Work Equipment Regulations 1998 – UKSI1998/2306.
15. Reporting of Injuries, Diseases and Dangerous Occurrences Regulations SI2013/1471.
16. Supply of Machinery (Safety) Regulations 2008 – UKSI2008/1597.
17. Workplace (Health, Safety and Welfare) Regulations 1992 – UKSI1992/3004.
18. Registration, Evaluation, Authorisation & Restriction of Chemicals Regulations (REACH) – 1907/2006.
19. Restriction of Hazardous Substances Directive (RoHS) – 2011/65/EU.

20. Dangerous Substances and Explosive Substances Regulations 2002 - SI 2002/2776.
21. Construction (Design and Management) Regulations - SI 2015/51.
22. Health and Safety (Safety Signs and Signals Regulations 1996).
23. Waste Batteries and Accumulators Regulations 2009.

4.1 Relevant Regulation and Industry Benchmarks

Safety Guidance for the BESS installation will be demonstrated by alignment with prevailing industry guidance, both national and globally. The following industry guidance / best practice has been determined as being applicable to this BESS installation:

1. PPG Renewables and Low Carbon Energy, which refers out to.
    a. National Fire Chiefs Council (NFCC) Grid Scale Battery Energy Storage System planning – Guidance for FRS.
    b. Factory Mutual (FM) Global Property Loss Datasheet 5-33 – Lithium-Ion BESS.
2. National Fire Protection Association (NFPA) – Energy Storage Systems and Solar Safety, which refers out to:
    a. Underwriters Laboratory (UL)1973 – Standard for Batteries for Use in Stationary, Vehicle Auxiliary Power, and Light Electric Rail Applications.
    b. UL9540A – BESS Test Methods.
    c. UN38.3 – Standard Requirements for Lithium-Ion Battery Production.
3. International Electrotechnical Commission (IEC) 61508 - Functional Safety of Electrical/Electronic/Programmable Electronic Safety-related Systems (E/E/PE, or E/E/PES).

4.2 NFCC Guidance

The NFCC Report Grid Scale Battery Energy Storage System Planning – Guidance for FRS [Ref. 4] details the FRS requirements anticipated at BESS installations. The alignment of the proposed project with these guidelines are outlined in Table 6-1 based on the site layout detailed in Figure 6-1.

5.0 Safety Controls and Good Practice

5.1 BESS Procurement

LSbp operates with a stringent prequalification process that leverages the global technological capabilities of the company in the selection of all components. The Applicant is therefore experienced in conducting thorough tendering processes for procuring battery storage equipment and services, working with Tier 1, bankable, suppliers of battery cell manufacturers, inverters, and transformers.

This limits the selection of manufacturers to only those which are approved by LSbp.

Only suppliers and products that conform to ISO 9001, UN38.3, CE, and local regulation, as well as pass both technical and financial auditing will be considered.

The LSbp procurement processes look to inspect manufacturing facilities and periodically monitor production lines. The inspections evaluate production quality documentation and production line process, against pre-defined documentation to verify that the quality requirement is correctly respected and implemented. The following aspects are specifically checked:

- Material management.
- Procurement and supplier management.
- Manufacturing processes.
- Quality system.
- Reliability program.
- Training.
- Corrective action and non-confirming process and process improvements.
- Corporate social responsibility, environmental, health and safety.

LSbp employs a robust quality process at the development and procurement stages that ensures safe and continuous operation.

We require the designs to incorporate the most advanced fire detection and suppression systems, including adhering to the UL9540 and NFPA 855 standards, as well as conform to local and industry standards.

5.2 Design Safety

As a minimum it is anticipated that the BESS supplier and operator will provide a layered protection approach from cell to container to remote monitoring. The envisaged safety control measures and design features under consideration, and those that will be flowed to the prospective suppliers, include:

1. Appropriate battery chemistry selection - balancing energy density requirements against available volume and operating parameters.

2. Cell module level control – consideration of the use of battery technology incorporating Current Interrupt Devices (CID) and Positive Thermal Coefficient (PTC) protection, enabling the cell to disconnect from the battery in the event of cell failure.

3. Implementation in the design of an approved Battery Management System (BMS) and a layered protection system in accordance with UL1973 [Ref. 2] guidelines.

4. Safety certification and qualification to UL9540A [Ref. 3] or equivalent.

5. The ability for 24/7 Remote Monitoring and Control and automated shut-down.

6. Off-gas detection to allow for preventative interaction.

7. Battery chemistry bespoke Fire Detection and Suppression System (FDSS) fitted to containers.

8. Site Security and Monitoring.

9. At a site and installation level:

    a. The segregation of containers in accordance with the national and international guidance detailed in this report.

    b. The landscaping of land adjacent to and between BESS containers and maintenance of vegetation to provide a natural firebreak.

    c. The provision of suitable and sufficient access / passing points for emergency services.

    d. Communication with local emergency services and the provision of site maps, detailing BESS locations, access points and water sources.

    e. Drainage Study and other groundwater studies, Soil Investigations, Ground Resistivity, Hydrology, Roads, and Bridges access assessment. Environmental Impact Assessments, Existing buildings and services, (All to be included in the PCIP) for contractors.

5.3 Testing

Once chosen, the battery system will be tested in accordance with UL9450A or its successor. UL9540A was developed to address safety concerns identified by the building codes and the fire service in the United States and is considered the global standard for evaluating the propensity of BESS to suffer from thermal propagation at cell, module, rack and enclosure level. The results of all four tests at each level will be made available on request.

5.4 Decommissioning

Disposal activities will be considered at the procurement contract stage and will be included within the BESS safety management process and detailed in the DBSMP. As the programme matures the hazard log will be expanded to cover each phase of product development and installation.

The chosen BESS supplier will be designated as the producer of the battery components and the party placing the battery components on the UK market, and as such has certain obligations in respect of battery disposal pursuant to the Waste Batteries and Accumulators Regulations 2009 (or such equivalent regulations in force at the time of decommissioning).

It is assumed that all components replaced during the defects notification and warranty period will be returned to the manufacturer and recycled.

The BESS development will be subject to a decommissioning plan for submission to the Local Authority on request. This is essentially a reverse engineering exercise with

a large component on safe disposal of the batteries, to comply with the Waste Batteries and Accumulators Regulations 2009.

LSbp will follow the hierarchy of waste management throughout the life of the Scheme and during construction (subject to monthly reports) as follows:

- Reduce – batteries have a finite life based on a number of factors, primarily the total number of cycles undertaken. The operation will attempt to manage the degradation by the selection of services and cycling that maximises the overall life. Consideration will be given to supplementation of the equipment or operation at a lower output.

- Recycle – The supplying manufacturer will have obligations under the Waste Batteries and Accumulators Regulations 2009 (as amended) (or such equivalent regulations in force at the time of decommissioning) and will be contractually obliged to offer a recycling service.

- Recovery – The recycling should allow any useful materials to be recovered and re-enter the supply chain.

- Disposal – Any disposal of batteries shall be undertaken in compliance with all applicable Laws and all regulatory requirements, product stewardship, registration disposal and recycling or take back requirement.

5.5 Maintenance

Any hazardous materials used in the BESS development will need to be fully justified and captured in the BESS Hazardous Materials Register, a sub-set of the Bill of Materials (BoM). The register is used to highlight the hazardous materials contained within BESS and provides justification as to why they cannot be eliminated and to highlight exact quantities of hazardous materials that are present to satisfy legislative requirements. The BESS Hazardous Materials Register will be made available to the local emergency services.

The site will be regularly kept free of vegetation, litter, and any combustible materials.

All internal roads will be maintained to a standard suitable for use during usual operation and emergency response.

All required hazard signage, contact information for emergency response and security will be attached to main gates and boundary fencing. (To comply with the Health and Safety (Safety Signs and Signals Regulations 1996)).

5.6 Emergency Plans

Prior to construction of the BESS, Emergency Plans and Risk Assessment will be developed that will outline how the operator will respond to incident and accident scenarios at site. This will include the interfaces with external first responder organisations. An on-site fire containment strategy will be incorporated into the overall site drainage design at the detailed design stage.

The Emergency Response Plans will be developed in an iterative manner in parallel to technical safety requirements. This will ensure that the BESS design and Emergency Plans are properly integrated (e.g., that BESS layout ensures access for first responders) and that appropriate information can be provided to first responders (e.g., the type and meaning of external indication on containers) to include in their planning activities.

Current guidance states that Lithium battery fires will not be tackled with water other than for the purpose of cooling down and fire prevention to other assets local to the fire.

The Emergency Response Plan will be formed through two distinct elements, both of which will be communicated to the FRS on commissioning of the asset, these being:

1. The Risk Management Plan, a distillation of the OBSMP and DBSMP which will include:

    a. The hazards and risks at and to the facility and their proposed management.

    b. Any safety issues for the FRS responding to emergencies at the facility.

    c. Safe access to and within the facility for emergency vehicles and responders, including to key site infrastructure and fire protection systems.

    d. The FDSSs (i.e., bespoke FDSS fitted to BESS containers, off-gas detection systems, enclosure fire rating etc.)

    e. Any natural or built infrastructure and on-site processes that may impact or delay effective emergency response.

2. The Emergency Response Plan will be developed and include:

    a. How the FRS will be alerted.

    b. The site layout including infrastructure details, operations, number of personnel, and operating hours. Key points on-site such as entrances and availability of hydrants and shut of isolations as identified by What 3 Words Codes for the Local Fire and Rescue Service. This will require consultation and site visits by North Wales Fire and Rescue Service (01931522006).

    c. A site plan depicting key infrastructure, site access points and internal roads.

    d. Details of emergency resources, including FDSSs and equipment; gas detection; emergency eyewash and shower facilities; spill containment systems and equipment; emergency warning systems; communication systems; personal protective equipment; first aid.

e. Up-to-date contact details for facility personnel, and any relevant off-site personnel that could provide technical support during an emergency.

f. A list of any dangerous goods stored on-site.

g. Site evacuation procedures.

h. Emergency procedures for all credible hazards and risks, including building, infrastructure and vehicle fire and vegetation / flora fire.

6.0 Site Specific Safety

6.1 Siting

The site has been selected due to its minimal environmental constraints, distance from nearby residences and proximity to a viable grid connection. The nearest residential property is approximately 100m from a battery unit.

The northern part is bound by the A525 Ruthin Road to the south and extends northwards towards Higher Berse Road. Coedpoeth lies approximately 120m to the west and New Broughton lies approximately 600m north-west of the site. The site comprises several agricultural fields, primarily used for pasture grazing, bounded by a mixture of mature woodland, trees, hedgerows, fencing, agricultural tracks, and roads.

Figure 6-1 illustrates the site layout for the Plas BESS installation.

Any planting as part of the landscaping plan will sit a minimum of 10m from any BESS container.

There are no public footpaths or rights of way within the BESS boundary.

Analysis within the Transport Survey of the local road network has shown that the site is accessible to emergency response vehicles. Furthermore, new external and external access tracks proposed on-site are suitable for emergency response vehicles, proving space for manoeuvring and a circular service road.

6.2 Security

During construction, the site will be secured with temporary fencing, CCTV and in-person security. During operation, a 2m high palisade fence and security cameras will be in place that are remotely monitored 24/7.

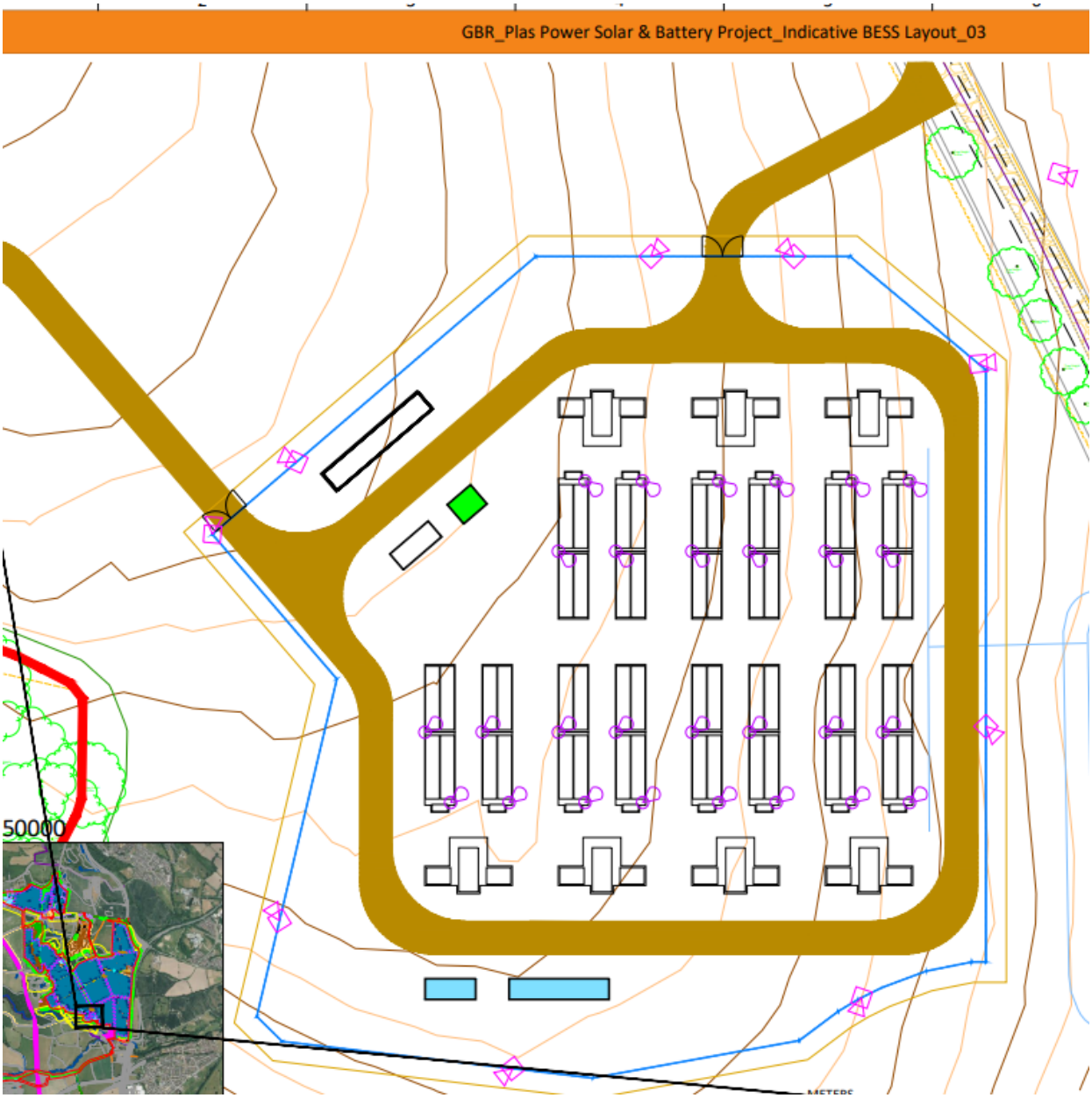


Figure 6-1 – Plas BESS Compound Layout

6.3 Fire and Rescue Service

The North Wales Fire and Rescue Service (NWFRS) is the regional FRS for the Plas site:

1. **Consultation.** Discussion with the NWFRS on the initial layout, installation and safety measures took place 19th October 2023. NWFRS input was instrumental in subsequent design changes and improvements to the site layout and installation. This preliminary consultation with the NWFRS established that the emergency

response is anticipated to be focused on preservation of life and public safety. Given the rural location of the Project and highly restricted access to the Project site, there is a low chance of personnel being found in direct harm from a fire event within the battery compound during normal operation. The 2nd response would likely involve quenching of the surrounding land and containers to mitigate the risk of a fire event spreading between battery blocks. Further consultation with the NWFRS is anticipated and feedback on this OBSMP and compliance with the NFCC recommendations will be sought. The NWFRS responded to the pre-application consultation confirming that they have no objection to the Proposed Development, referring the Local Planning Authority to standing advice by the fire authority. They also requested a familiarisation visit to the site when construction is complete. Following wider feedback from pre-application consultation, changes were made to the drainage design relating to fire water management as well as enhancing access arrangements to the BESS site. As a result, the NWFRS were informed separately regarding these changes and sent a copy of the latest layout.

2. **Water Supply**. The Applicant has identified a hydrant near the Project which is privately owned by Hafren Dyfrdwy (a North and mid Wales Water Company). Hafren Dyfrdwy have been contacted to make them aware of the proposals and the potential use of this hydrant by the fire service in the unlikely event of a fire on site, and although no response has yet been received, communication with Hafren Dyfrdwy is anticipated to continue as the design progresses.

3. **NFCC Guidance Compliance.** The NFCC has provided guidance to regional FRS regarding grid scale BESS and planning. This NFCC Guidance [Ref. 4] has been distilled into the 14 key salient points arising from the guidance and is presented at Table 6-1, this details the site layout and compliance status reflecting the NFCC guidance.

Ser	Requirement	Site Status	Options / Comments
1	Access - Minimum of two separate access points to the site	**Compliant**	Access to the site containing the BESS is possible from the South via the Plas Buckley Road (accessed via the B5098) at the junction near St Mary's Plas Power Church and from the North via the A525 in the direction of Coedpoeth.
2	Roads/hard standing capable of accommodating fire service vehicles in all weather conditions. As such there should be no extremes of grade	**Compliant**	Immediate access road is 5.5m wide and BESS service roads are 4.5m wide. Site-wide – OS Map indicates no significant gradient on the access to the site or at the site itself. All site service roads are suitable for Heavy Goods Vehicles , given the need to locate the ISO containers and other installations using transporters of a similar size and weight to that used by the FRS.
3	A perimeter road or roads with passing places suitable for fire service vehicles	**Compliant**	Service road leads to site area housing BESS with several points in which to pass or turn.
4	Road networks on sites must enable unobstructed access to all areas of the facility	**Compliant**	Service roads run centrally through the site providing access to all BESS and other site infrastructure.
5	Turning circles, passing places etc. size to be advised by FRS depending on fleet	**TBC**	The preliminary site layout will need to be consulted on with NWFRS for their comments and input.
6	Distance from BESS units to occupied buildings & site boundaries. Initial min distance of 25m	**Compliant with caveats**	Site containing BESS is 25m distant from occupied buildings (less site buildings). Reduction of distances may be possible in areas of lower risk is stated in the NFCC Guidance.

Ser	Requirement	Site Status	Options / Comments
7	Access between BESS unit – minimum of 6 metres suggested. If reducing distances, a clear, evidence based, case for the reduction should be shown	**Compliant subject to confirmation**	The suggested 6m separation is based on a 2017 Issue of the FM Global Loss and Prevention Datasheet 5-33 (footnote 9 in the NFCC Guidance refers). This datasheet was revised in July 2023 and now details the following: 1. For containerized LIB-ESS comprised of Lithium iron phosphate (LFP) cells, provide aisle separation of at least 5 ft (1.5 m) on sides that contain access panels, doors, or deflagration vents. 2. For containerized LIB-ESS comprised of Lithium nickel manganese cobalt (NMC) cells where wall construction is unknown or has an ASTM E119 rating less than 1 hour, provide aisle separation of at least 13 ft (4.0 m) on sides that contain access panels, doors, or deflagration vents. For containerized NMC LIB-ESS where wall construction is documented as having at least a 1-hour rating in accordance with ASTM E119, aisle separation of at least 8 ft (2.4 m) is acceptable. The site layout has been designed with the BESS containers end-to-end and side-to-side in blocks of 4 with separation distance which has been informed by current BESS manufacturer guidance (UL9540A – BESS Test Methods) that limits the possibility of propagation. Fire and Heat Flux models will be provided by BESS manufacturer in advance of construction that demonstrates that propagation between containers is reduced to a satisfactory level when final technology is selected.
8	Site Conditions – areas within 10m of BESS Units should be cleared of combustible vegetation	**Compliant**	BESS and other installations will be positioned on concrete plinths and the land between laid out to hardcore with a gravel cover. No trees are present within 10m of BESS units, the Ecology and Landscape Plan refer.
9	Water Supplies	**Compliant with caveats**	Other than the reservoir to the North of the Site an additional water supply, a hydrant near the Project, which is privately owned by Hafren Dyfrdwy, has been identified as a possible secondary source. Discussion with Hafren Dyfrdwy have yet to be entered into but subject to further consultation with the NWFRS this is considered a possible supply of water in the event of a fire.
10	Signage	**Compliant**	Signage to be positioned at the entrance to the site boundary on the bridleway, and at the fence line of the site. Signage to be confirmed through design process.
11	Emergency Plans	**Compliant**	Future iteration of the OBSMP to DBSMP will roll up the Emergency Response Plan, outlining who and how the FRS will be alerted, facility description, number of operatives, detailed site plan etc.

Ser	Requirement	Site Status	Options / Comments
12	Environmental Impacts	Compliant	An Environmental Impact Assessment has been conducted for the Plas Site. The Flood Consequences Assessment (FCA) & Conceptual Drainage Strategy details how fire water will be managed in the unlikely event of a fire. The FCA Appendix 8.1 refers; to summarise, the drainage design associated with the energy storage site has allowed capacity for fire water to be captured and cycled for re-use in the event of a fire. This has been managed by lining the BESS site and appropriately sizing the attenuation pond downstream of the energy storage site with an impermeable membrane to capture fire water in the unlikely event of an emergency, the attenuation pond will be controlled via a downstream pen-stock valve which can be closed in the emergency scenario. This will allow fire water to be captured and prevented from entering the local surface waterbodies and or groundwater if any form of contamination has occurred.
13	System design, construction, testing and decommissioning	**Compliant with caveats**	Several of the elements under this aspect of the NFCC Guidance will be contained in the OBSMP, however details of the actual BESS chemistry, rack layout, suppression systems, detection, decommissioning will only be in the DBSMP as and when the decision on what is being used has been determined. The need to determine the Make and Model of the BESS prior to planning consent has been agreed at several appeals not to be a condition.
14	Deflagration Prevention and venting	**Compliant with caveats**	Elements of this requirement will be flowed to prospective BESS suppliers, but the actual design adopted will only be identifiable at the point at which the decision is made as to what BESS to be procured. It is acknowledged that deflagration venting is most effective when fitted to the roof of the BESS Units, as such deflecting blast upwards and away from FRS personnel. This requirement will be flowed to prospective BESS suppliers.

Table 6-1 – NFCC FRS Requirements X-Ref to Plas BESS

7.0 Conclusions and Recommendations

7.1 Conclusions

This is the initial OBSMP for the Proposed Development and as such the identification of potential hazards, causes and controls is limited to the concept stage, i.e., the BESS concept design and the initial proof of design artefact. Therefore, several controls have been identified are also conceptual and subject to technological assessment, as such no ALARP statements can yet be formulated.

All the control measures identified thus far are founded on good practice and based on previous knowledge of BESS systems in use and other associated products using Lithium-Ion electrical storage technology or similar. These mitigations may in some instances require further development and ratification as the programme progresses. Upon successful implementation, and with suitable evidence available to validate effectiveness, reassessment can be conducted with the aim to consider the reduced level of risk.

It is concluded that, as far as reasonably practicable and for this planning stage of the Proposed Development, that currently foreseeable hazards associated with the equipment have been identified, and these will be developed and managed with prospective suppliers during the tendering, contracting and construction stages. These hazards will be actively managed throughout the life of the installation and added to as necessary as the BESS project develops and will be reported on regularly.

This OBSMP has been developed using existing knowledge of the BESS capability and leans heavily on the subject matter expertise that ARC have in this technological domain. Further development of the BESS design will provide more detailed information that will enhance future safety analysis and management, where further understanding of the hazards and development of mitigations can be undertaken to reduce the potential level of risk posed by BESS.

7.2 Recommendations

It is recommended that the BESS safety management and criteria (for assessment and analysis) as defined in this OBSMP, is adhered to throughout the BESS project lifecycle to ensure that safety management is developed as the programme progresses and remains valid through the life of the BESS capability.

It is recommended that to maintain an acceptable level of residual risk, that all the identified control measures are assessed as the design matures to elicit; applicability, feasibility and the potential amelioration afforded. At this juncture of the programme, it is not possible to declare ALARP, however successful implementation of the proposed framework for safety management presented in this OBSMP will provide the necessary arguments and supporting evidence to make such a claim.

8.0 References

1. Reducing Risk, Protecting People (HSE Publications) - https://www.hse.gov.uk/risk/theory/r2p2.pdf.

2. UL1973 – Standard for Batteries for Use in Stationary, Vehicle Auxiliary Power, and Light Electric Rail Applications.

3. UL9540A – BESS Test Methods.

4. NFCC Grid Scale Battery Energy Storage System Planning – Guidance for FRS dated Nov 2022.

5. Client HSE Management System.

Appendix A - FAQs

Ser	Question	Answer
1	How does a BESS work?	A BESS generally employs Li-Ion technology, but other technologies are available, to temporarily store electrical energy, very much in the same manner as a mobile phone or laptop battery, but on a much bigger scale. The energy can be stored and released when demand on the National Grid is high and assists in balancing out variations in demand. BESS can be connected to a Photo Voltaic Solar Farm and store energy throughout the day for release in the evening and in this mode of operation is a green renewable energy. An alternative use for BESS is to store electrical energy generated by energy suppliers during period of low demand and releasing in periods of high demand, thus balancing out variation on the National Grid. This mode of operation allows energy suppliers to operate their power station in a more economical manner and assists in reducing the carbon-footprint of the power suppliers. Two different primary Lithium-Ion battery chemistries (the elements that form the energy storage parts of the batteries) are used in BESSs, these being: ○ **Lithium iron phosphate (LFP)** - LFP batteries are possibly the best types of batteries for BESSs. They provide cleaner energy since LFPs use iron, which is a relatively green resource compared to cobalt and nickel. Iron is also cheaper and more available than many other resources, helping reduce costs. The overall production cost is lower as well. LFP batteries have a lower power density, but this characteristic is less important for energy storage systems than it is for Electric Vehicles (EVs), as BESS can occupy larger spaces without concern. LFP batteries are also safer because thermal runaways are less likely, and they have a higher life cycle (between 2,000 and 5,000 cycles) than most other Li-ion battery technologies. ○ **Lithium NMC** - NMC batteries feature both strong energy and power density, and they are relatively safe compared to other types of Lithium-Ion batteries when it comes to thermal runaways. However, they offer a significantly lower number of life cycles compared to LFP batteries, generally between 1,000 and 2,000 cycles. NMC batteries also require cobalt and nickel, which are more expensive and harmful to the environment. There is also significant concern about shortages in these minerals, which can significantly impact both cost and availability.

Ser	Question	Answer
2	How safe is a BESS?	The Department for Energy Security and Net Zero, promulgates on a regular basis the Renewable Energy Planning Database. From the quarterly extract (dated Jan 2024) the data has been filtered for BESS installations in the UK and the following salient points are deduced: 1. As of May 2024, 96 BESS sites are operational across the UK. 2. Since 2006 BESS have an approx. total of 605 years of operation. 3. There has currently been only one reported UK BESS fire that required FRS attendance, this occurred at Carnegie Road, Liverpool in Sept 2020, which employed batteries using NMC chemistry cells – these being more energy dense than LFP and other chemistries. 4. This equates to 1.88-07 (0.000000188) failures per hour (fph) for BESS fires in the UK – relating this back to the Risk Classification Matrix at Table 6-2 this means the frequency of a BESS fire in the UK in the 'remote' category. To date nobody in the UK has been killed in a BESS incident. BESS are designed to industry specific guidelines and subject to UK legislation.
3	How is the BESS temperature controlled?	The Lithium-Ion batteries are housing in an ISO type container which is fitted with an Environmental Control Unit (ECU). The ECU maintains the temperature and humidity within the container, allowing the Lithium-Ion batteries to operate within the optimum temperature range. The temperature of individual Lithium-Ion cells in each battery is monitored by the BMS and is reported back to the container level BMS which adjusts the internal temperature in response. Should the ECU develop a fault the container will isolate charge and discharge to the batteries until the fault has been rectified. All faults to the BESS are remotely fed to a centralised Control Room.
4	What is Thermal Runaway?	Thermal Runaway (TR) is the term used to describe an internal short-circuit in one of the battery cells that can lead to cell over-pressure and the venting of combustible gases. Should this gas ignite then the cell will increase in over-pressure and the resulting fire will be self-sustaining until all the material in the cell is expended. Short-circuits in cells are generally a result of: 1. Cell penetration by a foreign object (not usually an issue for a BESS as the batteries are housed in sturdy containers). 2. Impurities in the electrolyte (deposited during the manufacturing process), which over time can lead to the formation if dendrites (electrolytic crystals) which puncture the membrane isolating the anode and cathode – this can, but not

Ser	Question	Answer
		always result in a short-circuit and TR. Dendrite formation was a common problem in early NMC battery chemistries but is not prevalent in LFP and emerging battery chemistries. 3. Over-temperature in the cell because of: a. Over-charging (which is controlled by two separate BMS – battery and rack). b. High ambient temperature – controlled by the ECU.
5	How can TR be controlled?	TR is not always inevitable, and the nature of the cell design is such that early warning signs of a stressed cell can be detected by the BMS. Initial signs of cell degradation are an increase in the time it takes the cells to reach full charge (maximum voltage) and a decrease in the time it takes to discharge. These indicators are picked up by the BMS and if persistent the BMS will isolate (prevent charge and discharge) to the battery and inform the centralised Control Room. In turn an engineer will be dispatched to remove the battery and replace it with a serviceable item. If these indicators are not present, and the cell enters early stages of short-circuit the over-pressure in the cell will result in the venting of off-gas which is detected by the off-gas detectors built into the container. This will result in the container disabling the charge and discharge (the act of charging and discharging the batteries generates heat, which is what we want to avoid) and setting the ECU to maximum volume setting. This has a twofold effect, it clears the container of combustible gas and cools the internals, taking the energy out of the cells (Lithium-Ion like other batteries do not perform well in low temperature conditions).

Ser	Question	Answer
6	How is a BESS fire controlled and suppressed?	If the TR is not controlled and spreads, known as Thermal Runaway Propagation (TRP) the FDSS will activate. There are currently two types of FDSS that are used in BESS: gaseous systems and aerosol systems. Each system has advantages and disadvantages: 1. Aerosol systems are better in terms of extinguishing the fire and benefit against gaseous systems, which generally supress the fire by reducing the level of oxygen in the container. 2. Gaseous systems are instantaneous in operation, the gas being kept under pressure in bottles. Aerosol, by the nature of the deployment as a fine mist, take a little longer to reach all areas of the container. 3. Aersol system generally require a more complex and intricate delivery system to reach all areas of the container. 4. Gaseous system requires a sealed environment in which to operate. As such if the container is opened and oxygen reintroduced it can lead to the fire reigniting. 5. Various FDSS aerosols (also known as aqueous) and gaseous systems are available, and they use a variety of aerosol solutions.
7	Can water be used to extinguish a Lithium-Ion fire?	The use of water to extinguish a BESS fire has some drawbacks and disadvantages over bespoke FDSS aerosol mediums, these being: 1. The high conductivity of water may cause short circuiting of cells presenting collateral damage risk and increase the spread of the fire internal in the BESS. 2. A high volume of water is required to cool the cells below the critical temperature to prevent TR propagation, this results in a high volume of fire water run-off and a potential environmental impact. 3. The application of water on a BESS fire increases the generation of gases such as Carbon Monoxide (CO), Hydrogen (H_2) and Hydrogen Fluoride (HF). Applying water causes incomplete combustion of organic substances inside the battery resulting in production of CO rather than Carbon Dioxide (CO_2); when water is applied, H_2 is released that, without combustion, can react with phosphorus pentafluoride, if present in free form, to produce gaseous HF. 4. Due to the design of the batteries and racks (in which they are contained), the inability of water to cool the cell interiors may result in re-ignition of a fire once the water application is halted.

Ser	Question	Answer
8	What are the environmental consequences of a BESS fire?	In the event of a BESS fire several chemicals in gaseous form can be released and the composition and concentration of the plume (also refer to as the vapour cloud) is dependent on the chemistry in use, the design and components of the BESS and the magnitude of the fire. Amongst the general gases released are CO, HF, Oxygen and Hydrogen. The only UK BESS fire (Carnegie Road, Liverpool – Sept 2020) was monitored and the resultant composition of the plume determined as being negligible in toxic gas concentration.
9	How is the BESS site secured?	BESS Site are secured through fences / walls and are monitored remotely via CCTV. Warning signs along the fence indicate the presence of electrical storage facilities within the site.
10	How is the serviceability of the BESS assured?	The Health and Usage data for each BESS is remoted to a centralise Control Room and the serviceability of each battery determined on an hour-to-hour basis. Given that the batteries have a finite number of cycles over a given period it is envisaged that the batteries will be renewed several times in the 40-year life of the site.

Appendix B

Client LSbp Golden Rules



Appendix 2.2
Outline Construction Environment Management Plan (oCEMP)

Contents

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1 Introduction

1.1 Introduction

1.1.1 This Outline Construction Environmental Management Plan (OCEMP) has been prepared in support of a planning application for the Plas Power Solar and Energy Storage Project at Plas Power Estate, Wrexham.

1.1.2 This OCEMP outlines the activities involved in constructing the solar and BESS project, together with mitigation and management measures to prevent or reduce potential effects upon the environment and nearby sensitive receptors during the construction phase of the development. This report should be read in conjunction with the Outline Construction Traffic Management Plan (OCTMP) (document reference: 3.04). The OCEMP will be further developed with the Engineering, Procurement and Construction (EPC) Contractor for the project and a detailed construction programme has been developed.

1.1.3 A Decommissioning Environmental Management Plan (DEMP) will be produced prior to the decommissioning phase and will detail mitigation and management measures to reduce potential effects upon the environment and nearby sensitive receptors during the decommissioning phase of the development. This OCEMP therefore does not consider the decommissioning phase.

1.1.4 The approved OCEMP shall be adhered to throughout the period of construction activities unless otherwise agreed in writing by LPA.

1.1.5 The document is structured as follows:

- Section 1 – Introduction
- Section 2 – The Site and Project Description
- Section 3 – Construction Methods
- Section 4 – Construction Working Hours
- Section 5 – Traffic Management
- Section 6 – Amenity
- Section 7 – Noise Management
- Section 8 – Dust
- Section 9 – Materials and Waste Management
- Section 10 – Biodiversity Management
- Section 11 – Hydrology Management
- Section 12 – Storage
- Section 13 – Safety and Security

2 The Site and Project Description

2.1 Site

2.1.1 The application site (the "site") covers approximately 136 hectares (ha) and is located wholly within the administrative boundary of Wrexham County Borough Council (WCBC). The site is approximately 2.5 km to the west of Wrexham town city centre.

2.1.2 The site comprises two interconnected areas north and south of the A525 Ruthin Road. The southern and larger part of the site is bound by the A525 Ruthin Road to the north, to the east by the A483, to the south by Plas Power Woods and its westernmost point by agricultural fields beyond which lies Rhos Berse Road and Nant Road. The northern part is bound by the A525 Ruthin Road to the south and extends northwards towards Higher Berse Road. Coedpoeth lies approximately 120m to the west and New Broughton lies approximately 600m north-west of the site. The site comprises several agricultural fields, primarily used for pasture grazing, bound by a mixture of mature woodland, trees, hedgerows, fencing, agricultural tracks and roads.

2.2 The Proposed Development

2.2.1 The Proposed Development is for a solar project with a battery energy storage system (BESS). The Proposed Development will consist of the construction of solar panels mounted on metal frames, new access tracks, underground cabling, perimeter fencing with CCTV cameras, switchgear substations, inverters, transformer stations, auxiliary transformers, permanent storage containers, monitoring houses, a BESS and all ancillary grid infrastructure and associated works. It will also include landscaping and ecological enhancement areas. The project will include a 33kV cable that will connect the solar, BESS and associated infrastructure to the Legacy Substation located approximately 1.2km to the south-west of the site, north of the B5246 Bronwylfa Road.

3 Construction Methods

3.1 Implementation and Management

3.1.1 The EPC Contractor will be appointed and will be responsible for the construction of the Proposed Development. The contractor will ensure that all measures and mitigation identified within the approved OCEMP are taken into account and implemented during the construction. In addition, the OCEMP will be monitored regularly throughout the duration of the construction phase so that good practice is implemented. The implementation of commitments within the OCEMP will be documented in an environmental compliance log which will be available for WCBC to review on request. The Contractor would be responsible for maintaining the log and keeping a photographic record of key activities.

3.1.2 A ‘responsible person’ will be designated to oversee the application of the OCEMP during all phases of construction and require that all personnel follow and adhere to the procedures outlined within the OCEMP. The detailed CEMP (to be produced prior to construction) will confirm key roles and responsibilities on site.

3.1.3 The detailed CEMP will include further information in respect of:

- Silt pollution prevention measures
- Procedures to deal with emergencies and/or spills
- Measures for the storage of oils and chemicals
- Details of any water discharge permits (if applicable)
- Further details of site waste management

3.2 Construction Programme

3.2.1 The timing of the construction of the Proposed Development would be dependent on securing planning permission and the discharge of any pre-commencement planning conditions. The construction of the Proposed Development will be in two phases – solar and BESS. The construction programme for the solar and associated infrastructure will be approximately 12-18 months and is expected to complete in 2026.

3.2.2 Construction of the BESS will take approximately 6-9 months (independent of the overall construction programme). The BESS element of the Proposed Development will be constructed at a later date and is expected to be constructed during 2032 and will be completed by 2033 at the latest.

3.2.3 It is assumed that the construction is likely to be phased as shown in **Tables 3.1** and **3.2**.

Table 3.1 Indicative Construction Programme – Solar

Construction Stage	Start	End
Site Preparation (incl. accesses, construction compound, fencing)	Q1 2025	Q1 2025
Delivery of construction materials	Q1 2025	Q3 2025
Construction and installation of the solar arrays, and associated infrastructure	Q2 2025	Q1 2026
Demobilisation and equipment removal	Q1 2026	Q2 2026
Landscaping including biodiversity enhancements	Q1 2026	Q4 2026
Commence operation	Q1 2026	N/A

Table 3.2 Indicative Construction Programme – BESS

Construction Stage	Start	End
Site Preparation (incl. accesses, construction compound, welfare)	Q3 2032	Q3 2032
Delivery of construction materials	Q3 2032	Q4 2032
Construction of the BESS	Q4 2032	Q1 2033
Demobilisation and equipment removal	Q1 2033	Q2 2033

Landscaping including biodiversity enhancements	Q4 2032	Q1 2033
Commence operation	Q1 2033	N/A

3.3 Construction Activities

3.3.1 The broad sequence of construction activities is likely to be:

- Site entrance creation and enabling works,
- Erection of security fencing and gates,
- Laying down of temporary construction compounds,
- Installation of the temporary compounds,
- Construction of access tracks through the site,
- Delivery of solar, PV and associated equipment,
- Installation of foundations for structures such as inverters, transformers, and substations,
- Piling and installation of mounting frames, solar panels and solar farm infrastructure,
- Cable trenching, ducting and backfilling,
- Installation of inverters, transformers, and substations,
- Laying of underground cable from the solar farm to the existing Legacy Substation,
- Commissioning of the solar farm and grid connection,
- Landscaping and ecological enhancements works, and
- Demobilisation from the site, including removal of the temporary construction compound.

3.3.2 Construction of the BESS will consist of the following principal activities:

- Delivery of the BESS and associated equipment,
- Installation of foundations for structures,
- Cable trenching, ducting and backfilling,
- Installation of BESS containers and associated infrastructure,
- Commissioning of the solar farm, BESS and grid connection.

4 Construction Working Hours

4.1.1 Construction working hours will be 07:00 to 19:00 hours Monday to Friday, 07:00 to 13:00 hours on Saturday and at no time on Sundays or on public or bank holidays. However, noisy activities such as piling will be undertaken 08:00 to 18:00 hours Monday to Friday and 08:00 to 13:00 hours on Saturday. In the event that works are required outside of these hours in exceptional circumstances, this would be agreed with the LPA prior to commencement of the activity, as necessary.

5 Traffic Management

5.1 Construction Traffic

5.1.1 An Outline Construction Traffic Management Plan (OCTMP) (document reference: 3.04) has been produced and provides a framework for management of construction vehicles associated with the development. The OCTMP aims to estimate the traffic generation due to construction, the vehicle routes which will be used, the construction programme and the strategies which will be implemented to reduce adverse impacts and overall help manage construction vehicle and staff movements. A detailed CTMP will be produced once an EPC Contractor has been appointed. A summary of the OCTMP is provided below and the full document is included in the DNS application.

5.2 Deliveries and Traffic

5.2.1 During the construction phase, traffic movement to and from the site will be reduced as much as practicable.

5.2.2 Deliveries will be restricted to the following hours:

- 0800 to 1800 Monday to Friday; and
- 0800 to 1300 on Saturday.

5.2.3 Deliveries will also be scheduled, where practicable, to avoid peak traffic times, i.e. avoiding rush hours and before and after school pick up/drop off times.

5.2.4 All delivery vehicles will be able to enter the sites and unload within the compound areas. There will be no queuing, parking or unloading within the public highway. The EPC contractor will be required to select a suitable layby or motorway service station on route to the site for delivery vehicles to wait at if required. This can be used to coordinate deliveries.

5.2.5 Based on previous experience, the construction works are estimated to require around 1,200 HGV movements across the course of the solar construction programme (and less for the BESS). Based on a 12-month construction programme and 5.5 day working week this would equate to around 4-5 HGVs (8-10 movements) per day. However, it is recognised that a flat profile across the programme is unlikely and there will be peaks in activity associated with overlaps in the construction programme and more transport intensive activities taking place.

5.3 Traffic Signage

5.3.1 Construction vehicle site accesses will need to be carefully designed to facilitate safe vehicle turning movements and where appropriate signage and traffic management measures may need to be utilised.

5.3.2 Cable route works are likely to be accesses via Bersham road B5098 or B5097 and then unnamed local roads. Cable works in the carriageway would likely require temporary road closures to achieve safe working areas. Controls would include diversionary routes, maintaining access (where practicable) and consideration of working out of hours. The final details will be set out in a detailed CTMP post planning consent.

5.4 Construction Workforce

5.4.1 A framework Construction Worker Travel Plan (CWTP) (document reference: 3.04, Section 7) has been developed to promote sustainable transport for workers during the construction and commissioning phases. This will be developed further once an EPC Contractor has been appointed and the final construction programme and worker numbers are confirmed. A final CTWP will be provided as part of a detailed CTMP to be submitted post planning consent. A similar management plan will be produced at the decommissioning stage.

5.4.2 Through the use of the CWTP the Principal Contractor will encourage the workforce and visitors to the site to:

- reduce their reliance on car travel;
- increase the use of walking cycling and public transport; and
- encourage work practices that reduce the need to travel, where practicable.

5.4.3 The Principal Contractor and subcontractors will seek to use a locally based workforce where practicable to help reduce the distance travelled to site and increase the potential to use non-car modes.

5.4.4 Members of the workforce living within 2km of the site will be encouraged to walk to work; those living within 5km of the site will be encouraged to cycle. All staff members will be encouraged to car share where practicable and to arrive on-site prior to the AM network peak hour.

5.5 Temporary Construction Compounds

5.5.1 During construction delivery vehicles will be constrained to the site access tracks and construction compound areas. Certain vehicles will be working within the sites, including the piling rig and small vehicles for on-site transport of equipment.

5.5.2 No vehicle parking, loading or unloading will take place within the public highway. The construction compound areas will be used for all parking, turning, unloading / loading.

6 Amenity

6.1.1 There is an existing Public Right of Way (PRoW) which currently runs through the Site – the 'Bersham Public Footpath 1'. The PRoW runs north / north-west through the southern portion of the Site before meeting A525. It continues approximately 650m to the west along A525 where it runs north through the northern portion of the Site.

6.1.2 There will be no extinguishment of this PRoW as a result of the Proposed Development, however some minor re-alignment will be required. The current WCBC Definitive PRoW Map shows the alignment of this route in a different position to the path walk on the ground. As such, the re-alignment of the route will additionally realign the Definitive Map, resulting in an alignment which is more accessible where the existing alignment is affected by steep topography.

6.1.3 Where appropriate, landscaping will be incorporated along the PRoW to screen views of the Development. A width of 5m will be incorporated for all PRoWs to be retained through the Site.

7 Noise Management

7.1.1 Best Practicable Means (BPM) of noise control will be applied during construction works to reduce noise (including vibration) at neighbouring residential properties and other sensitive receptors as far as practicable.

7.1.2 BPM are defined in Section 72 of the Control of Pollution Act 1974 and Section 79 of the Environmental Protection Act 1990 as those measures which are:

"reasonably practicable having regard among other things to local conditions and circumstances, to the current state of technical knowledge and to financial implications".

Safety
Integrity
Respect
Sustainability
Drive

7.1.3 The recommendations of BS5228: 2009+A1:2014 'Code of practice for Noise and Vibration Control on Construction and Open Sites', will also be implemented.

7.1.4 In order to limit potential noise impacts, noise generating construction works shall only be undertaken between:

- 0800 and 1800 Monday to Friday; and
- 0800 to 1300 on Saturdays.

7.1.5 Noise during construction will be controlled by limiting the hours of noise generating activities, where practicable. The noisiest activity is the piling of the mounting frames into the ground. The piling will be undertaken at the start of the construction process.

7.1.6 Any noise complaints shall be directed to the Site Manager as soon as reasonably practicable. Depending on the nature of the complaint, remedial action may need to be undertaken.

8 Dust

8.1.1 In order to control, prevent and reduce, so far as practicable, dirt on the access route and emissions of dust and other airborne contaminants during the construction works, the following measures will be implemented:

8.1.2 All vehicles exiting the sites during construction will require wheel washing. Depending on the time of year, and conditions on the sites, wheel washing facility requirements will vary.

- During summer or dry conditions, wheel washing facilities should include a pressure washer with suitable drainage as a minimum.
- During winter or wet conditions, wheel washing facilities should include ride on/off wheel washers if required.

8.1.3 The EPC Contractor will monitor the public highway conditions and will assess if further measures are required to maintain road cleanliness, such as road sweeping.

8.1.4 Given the ground condition of the sites, no significant dust issues are anticipated to arise during construction. If conditions on site are very dry then water misting/spraying will be employed to dampen ground to avoid any dust nuisance.

8.1.5 During windy conditions, dust generating activities will be avoided or reduced, where practical and any soil stockpiles will be covered when left for extended periods of time.

9 Materials and Waste Management

9.1 Management of Topsoil and Subsoil

9.1.1 No soils are expected to be generated that cannot be re-used on the site.

9.1.2 Good practice guidance for soil reinstatement would be followed, i.e. Defra Code of Practice for the Sustainable Management of Soil on Construction Sites.

9.1.3 Measures set out in the outline Soils Resource Management Plan (oSRMP) (document reference 3.08) will also be followed during the construction period to ensure that there is no adverse impact on soil function as a result of construction. Such measures include:

- Restricting the timing of works so that certain construction activities are undertaken when soils are sufficiently dry.
- Retention of soil profiles by separation and correct replacement of subsoil and topsoil.
- Avoiding compaction through restriction of works during heavy rainfall events and amelioration as appropriate.
- Appropriate storage of soils for reuse.

9.1.4 In accordance with the Building Research Establishment (BRE) 'Agricultural Good Practice Guidance for Solar Farms', during the construction process the time of year will be taken into account and low ground pressure tyres will be used to avoid soil compaction.

9.1.5 Earthworks will be required to create stable, level platforms for the associated infrastructure for the solar PV (e.g. the intake and customer substations) and also for the battery, and to create the trenches for the cables.

9.1.6 Topsoil will be removed from the relevant areas and set aside separately from any subsoil. When backfilling the cable trenches, the subsoil will be replaced first, followed by the topsoil.

9.1.7 Any topsoil not required for backfilling will be used to build up areas where new planting is to be undertaken in accordance with the detailed Landscape Proposals, and the remainder will either be thinly spread on the site or removed from site and disposed of at an appropriate facility.

9.1.8 Topsoil removed during construction of the access track will be retained onsite in a suitable bund at least 10 metres from any watercourse, for use in site landscaping.

9.1.9 Once construction is complete, both sites will be seeded in accordance with the detailed Landscape Plan and the detailed CEMP (to be produced prior to construction).

9.2 Management of Waste

9.2.1 The EPC Contractor will ensure that all waste is disposed of responsibly from the sites during and immediately following construction.

9.2.2 A Site Waste Management Plan will be developed to deal with waste generated during the construction phase. The collection of waste material will be via skips which will be situated to the side of the main compound area and selected areas within plots. Separation of the waste will take place for this reason thus waste skips for wood, card/paper, plastic, metal and general waste will be provided. All waste will be disposed of by licensed waste carriers to licensed tips.

9.2.3 The potential waste generated during the construction process will primarily be related to packaging, and will include:

- The pallets that the solar panels are packaged in - These will be either wood crates, or cardboard boxes. These will be removed from the sites on a regular basis. If they arrive on wooden pallets, then these have a value and will either be returned to the manufacturer/distributer, or collection by a local contractor will be arranged. If they arrive packaged in cardboard boxes, then these will be removed on a regular basis, either through a hired skip, or through trips to the closet appropriate recycling station.
- Packing materials for various components (such as screws, cabling, and mounting frames) - Any non-recyclable waste will be stored in a skip for regular removal to an appropriate landfill.
- Food waste from workers - Personal rubbish will be collected along with non-recyclable packaging materials, for disposal at an appropriate landfill.
- Portable toilets - Will be hired for the duration of the construction period; therefore, there will be no human waste issues.

9.3 Storage of Hazardous Materials

9.3.1 Hazardous materials, such as fuels and oils, will be stored within suitable containers within the compound. Above ground storage tanks will be located on a designated area of hardstanding within an appropriate bund. No underground storage tanks will be used during the construction period. Storage of liquids such as degreasers, solvents, lubricants and paints would be in segregated, bunded enclosures.

10 Biodiversity Management

10.1.1 The site is currently in agricultural use, and predominantly used for grazing. Wildlife is likely to be concentrated around boundary hedges and trees. An ecological assessment and the Environmental Statement outlines mitigation measures to reduce impacts on wildlife during construction.

10.2 Hedgerows

10.2.1 All hedgerow habitats will be protected from accidental damage during the construction phase by a suitable buffer zone of 6 metres. This protection zone will be delineated by a suitable fence and maintained for the duration of the works, and there will be no access, storage of materials, ground disturbance, burning or contamination within the fenced areas.

10.3 Badger

10.3.1 A walkover survey should be undertaken of areas of woodland within 30m of working areas prior to the start of construction to confirm that no new badger setts have been established. In the event that a new sett is found, a suitable buffer should be implemented or a sett closure licence sought from NRW if sett disturbance cannot be avoided.

10.3.2 During construction, open excavations should be infilled at the end of each working day or a ramp (such as a timber plank) should be created to prevent badgers (or other faunal species) becoming trapped. Regular gaps of sufficient size to allow access by badger should be included in perimeter fencing so that badgers can continue to use the site for foraging

10.4 Bats

10.4.1 Stand-offs should be implemented around all boundary habitats. If lighting is required during construction this should be directed away from hedgerows and boundary habitats.

10.5 Nesting birds

10.5.1 To prevent potential adverse effects on ground-nesting birds, a check should be undertaken by an Ecological Clerk of Works no more than 48 hours in advance of works within the pasture fields during the breeding bird season (generally March-August inclusive).

10.5.2 Suitable buffer zones should be implemented around active nests. No works should be undertaken within the buffer and the buffer areas should remain unlit until the young have fledged and dispersed from the nest site.

10.6 Great Crested Newt

10.6.1 Where it has been identified that construction works have the potential to affect great crested newts or their resting places, construction works should be carried out in accordance with a Great Crested Newt (GCN) Mitigation Strategy and under a European Protected Species (EPS) License. A Method Statement will be prepared and submitted under the EPS License and must be adhered to.

10.6.2 Precautionary working will be implemented for all areas of habitat of higher potential value for GCN including any disturbance of longer field margin grassland.

10.6.3 Wherever practical, existing established field margin grassland will be left undisturbed. The precautionary working would involve fingertip searches by an Ecological Clerk of Works where foraging habitat will be disturbed during the active season.

10.7 Dormouse

10.7.1 Where short sections of hedgerow removal (up to 10m) are required to widen the access for vehicles transporting the infrastructure onto the site, precautionary working measures should be undertaken. This will follow a non-licence method statement which will presume the presence of dormice in the local network of hedgerows. Checks for dormice nests will be undertaken in the section affected followed by the gradual removal of hedgerow overseen by an Ecological Clerk of Works.

10.7.2 A Welsh Government Dormouse Mitigation Licence would be sought from Natural Resources Wales should dormouse be encountered during the works and any works with the potential to affect the species postponed until the licence is granted.

10.8 Trees

10.8.1 A pre-commencement site meeting with the arboriculturist and developer will identify trees requiring protection during the construction phase. Tree protection barriers conforming to guidance given within BS 5837-2005 will be erected for any trees identified as needing protection.

10.8.2 The majority of hedgerows and mature trees surrounding the site will be retained and protected in line with BS 7837. There will be a requirement for a small amount of hedgerow removal to provide access tracks, where an existing opening cannot be utilised, which should be in strict accordance with the Arboricultural Impact Assessment (AIA) (ES Volume 3, Appendix 5.8 - document reference: 4.03.24).

10.8.3 The security fence will be installed inside the boundary vegetation, and all subsequent construction and deconstruction work will take place inside the security fence, thus the construction area will be isolated from any animals traversing the site.

10.8.4 The removal of vegetation (including the improved and poor semi-improved fields) must be completed outside of the bird nesting season (March to August inclusive), therefore between September and February, or be preceded by a check for active nests by a suitably qualified ecologist. If clear of nests, vegetation should be removed within 48 hours. If a nest is found, an appropriate buffer will be established by the ecologist, which is to be left undisturbed until the ecologist confirms that the checks have fledged, or the nest is no longer active.

10.8.5 A Construction Exclusion Zone (CEZ) by erection of tree protection fencing and the site security fence is to be established to reduce the potential for harm to occur to retained trees as far as practicable. No earthworks should be undertaken within the CEZ as indicated on the Tree Protection Plan. Within the CEZ there must be no mechanical digging or scraping, no alteration to existing ground levels including soil stripping, no earthworks, no handling or discharge of any chemical substance, concrete washings or of any fuels. Furthermore, vehicular or pedestrian access and the storage of any materials is prohibited within the CEZ. The CEZ is indicated on the Tree Protection Plan as Root Protection Zones (please refer to AIA, ES Volume 3, Appendix 5.8 - document reference: 4.03.24).

10.8.6 Additionally, no materials that may contaminate the soil such as concrete mixings, diesel oil and vehicle washings shall be discharged within 10m of the stem of any tree and no fires shall be lit within 10m of the maximum extent of a trees crown as concrete wash out, vehicle cleaning maintenance and refuelling would be in contained areas, which will be located in suitable areas on the site.

10.9 Invasive Species

10.9.1 Japanese knotweed (*Reynoutria japonica*) is listed in Schedule 9 of the Wildlife and Countryside Act 1981 and is subject to controls set out in Section 14 of this Act.

10.9.2 Small patches of Japanese knotweed are present in the northern parcel of the site. Where Japanese knotweed is present, appropriate stand-offs have been incorporated as part of the development proposals.

10.9.3 An Invasive Species Management Plan will be produced as part of the detailed CEMP which will be produced prior to construction of the Proposed Development. The Management Plan will include measures for control and where appropriate, eradication of the species.

11 Hydrology Management

11.1 Construction Drainage Systems

11.1.1 During the construction phase of the Proposed Development, temporary drainage mitigation techniques would be used, including, but not limited to, runoff interceptor channels installed prior to the construction of the operational drainage design so that discharge from the site is controlled in quality and volume during construction. The construction drainage system would be designed so that any runoff produced would be treated before being discharged to the surrounding environment. This may include the use of settling tanks and/or ponds to remove sediment, temporary interceptors, and hydraulic brakes. Any drainage service runs would be surrounded by appropriate granular bedding material to reduce any potential leaks from infiltrating into the below groundwater body. Monitoring would be undertaken and any damage to the temporary drainage network would be repaired/replaced.

11.2 Construction Techniques and Processes

11.2.1 Dust suppression equipment would be used to reduce the spread of sediment within the site, so that any dust created during construction is diverted into specific drainage systems equipped with sediment interceptors.

11.2.2 Construction material and / or spoil within construction compounds would be positioned away from surface watercourses / significant ecological areas (where available) and no hazardous substances would be stored within close proximity of the drainage network.

11.2.3 The main construction compounds and storage areas would be positioned within the western part of the site away from the surface watercourses.

11.2.4 Any area at risk of spillage, such as vehicle maintenance areas and hazardous substance stores (including fuel, oils and chemicals) would be bunded and carefully sited to reduce the risk of hazardous substances entering the drainage systems and local watercourses as far as practicable. Additionally, the bunded areas would have impermeable bases to limit the potential for migration of contaminants into surrounding watercourses and significant ecological habitats following any potential leakage/spillage event.

11.2.5 In line with standard building practices and as a precautionary measure, it is recommended that ground floor threshold levels of ancillary buildings would be raised a minimum of 150 mm above external ground levels, where feasible.

11.3 Excavation and Piling Mitigation Measures

11.3.1 Mitigation measures would be incorporated into the construction techniques so that the groundwater flow and quality is protected. During any piling and / or foundation excavation, the area would be isolated from surface water until completed. Should any groundwater be encountered during excavation, appropriate dewatering methods would be considered. Any water arising from excavations would be disposed through the temporary drainage system (if uncontaminated) and following removal of silt. Should contamination be encountered during excavation, work would be stopped until appropriate measures are in place to prevent mobilisation. Good practice construction techniques and design would be used for any excavations during the installation of foundations.

11.4 Pollution Prevention Measures

11.4.1 Refuelling of machinery would be undertaken within designated areas where spillages can be easily contained. Machinery would be routinely checked to ensure it is in good working condition.

11.4.2 Any tanks and associated pipe work containing hazardous substances included in List 1 of the Groundwater Directive (2006/118/EC) would be double skinned and be provided with intermediate leak detection equipment.

11.4.3 The following specific mitigation measures for the protection of surface water during construction activities would be implemented.

- Management of construction works to comply with the necessary standards and consent conditions as identified by NRW and WCBC.
- A briefing for all staff highlighting the importance of water quality, the location of watercourses and pollution prevention included within the site induction.
- Areas with prevalent runoff to be identified and drainage actively managed, e.g. through bunding and / or temporary drainage.
- Disturbance in areas close to watercourses reduced so far as practicable.
- Excavated material to be placed in such a way as to avoid any disturbance of areas near to the banks of watercourses and any spillage into the watercourses.
- Construction materials to be managed in such a way as to effectively reduce the risk posed to the aquatic environment.
- Plant machinery and vehicles to be maintained in a good condition to reduce the risk of fuel leaks.
- Drainage works to be constructed to relevant statutory guidance.
- Consultation with NRW during the construction period to promote good practice and to implement proposed mitigation measures.

Safety
Integrity
Respect
Sustainability
Drive

11.5 Water Quality Monitoring

11.5.1 Water quality monitoring would be carried out throughout the construction phase so that discharge of pollutants or increase in suspended sediment is avoided. A water quality monitoring methodology and schedule would be developed in consultation with stakeholders.

12 Storage

12.1.1 No long-term on-site storage of materials is required during construction.

12.1.2 During construction the HGVs will provide the materials at regular intervals throughout the construction period as construction progresses, rather than being delivered all in one go. Thus, infrastructure can be unloaded in the construction compounds from the HGVs, and transported directly to where it is needed using smaller internal vehicles, or by hand where appropriate. Short term storage of materials can be accommodated within the construction compounds until it is required.

13 Safety and Security

13.1.1 The EPC Contractor will be in charge of Health and Safety on-site. A Health and Safety board identifying potential hazards will be updated daily with all visitors required to sign in and adhere to on-site Health and Safety practices. All personnel working on both sites will be required to wear a high visibility vest or jacket, steel cap boots, and a hard hat as well as any other activity-specific safety wear.

13.1.2 It is intended that the security fence that will surround the Proposed Development for the duration of its life will be erected at the start of to the construction phase, so that the site is secure from the start. However, if this is not practicable, the site will have 24 hour security on patrol in order to adhere to health and safety regulations as well as prevent crime.

Appendix 2.3
Outline Construction Traffic Management Plan (oCTMP)

Plas Power Solar and Battery Project

Outline Construction Traffic Management Plan

On behalf of **Lightsource bp**



Project Ref: 330610724 | Rev: v3.1 | Date: 22 May 2024

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For and on behalf of Stantec UK Limited				

Revision	Date	Description	Prepared	Reviewed	Approved
2.3	February 2024	Client comments	FL	TH	AN
3.1	May 2024	Consultation comments	FL	TH	AN

This report has been prepared by Stantec UK Limited ('Stantec') on behalf of its client to whom this report is addressed ('Client') in connection with the project described in this report and takes into account the Client's particular instructions and requirements. This report was prepared in accordance with the professional services appointment under which Stantec was appointed by its Client. This report is not intended for and should not be relied on by any third party (i.e. parties other than the Client). Stantec accepts no duty or responsibility (including in negligence) to any party other than the Client and disclaims all liability of any nature whatsoever to any such party in respect of this report.

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1 Introduction

1.1.1 Stantec has been commissioned by Lightsource bp (the Applicant) to produce an outline Construction Traffic Management Plan (CTMP) to support the Development of National Significance (DNS) application for the Plas Power Solar and Battery Project (herein referred to as the 'Plas Power Project' or Proposed Development') to the west of Wrexham.

1.1.2 This outline CTMP provides a framework for management of construction vehicles associated with the development. It is anticipated that a detailed CTMP will be produced once a Principal Contractor has been appointed.

1.1.3 This CTMP therefore sets out the anticipated traffic generation during construction, the vehicle routes which will be used, the construction programme and the strategies which will be implemented to reduce adverse impacts.

1.2 CTMP Objectives

1.2.1 The objectives of this outline CTMP are to:

- demonstrate that construction materials can be delivered, and waste removed, in a safe, efficient and environmentally friendly way;
- identify construction deliveries that could be reduced, re-timed or consolidated, particularly during peak periods;
- encourage use of modern, low emission vehicles;
- require that all contractors, suppliers and hauliers are familiar and compliant with the requirements of the CTMP; and
- encourage construction workers to travel by non-car modes to the development site.

1.2.2 This outline CTMP has been produced utilising best practice and guidance including the Transport for London (TfL), Construction Logistics Planning Guidance 2019.

1.3 Site Context and Development Proposals

1.3.1 The application site (the "site") covers approximately 136 hectares (ha) and is located wholly within the administrative boundary of Wrexham County Borough Council (WCBC). The site is approximately 2.5km to the west of Wrexham city centre.

1.3.2 The site comprises two interconnected areas north and south of the A525 Ruthin Road. The southern and larger part of the site is bound by the A525 Ruthin Road to the north, to the east by the A483, to the south by Plas Power Woods and its westernmost point by agricultural fields beyond which lies Rhos Berse Road and Nant Road. The northern part is bound by the A525 Ruthin Road to the south and extends northwards towards Higher Berse Road. Coedpoeth lies approximately 120m to the west and New Broughton lies approximately 600m north-west of the site. The site comprises several agricultural fields, primarily used for pasture grazing, bound by a mixture of mature woodland, trees, hedgerows, fencing, agricultural tracks and roads.

1.3.3 The Proposed Development will include a 33kV cable that will connect the solar project, battery energy storage system (BESS) and associated infrastructure to the Legacy Substation located approximately 1.2km to the south-west of the site, north of the B5246 Bronwylfa Road. There are currently three options for the cable route that are under consideration.

1.3.4 Whilst the preference is to construct the BESS as part of the Proposed Development, there is potential that this part of the Proposed Development may not materialise as planned. If the

construction of the BESS were not to take place, the land where the BESS is currently proposed would be used to place solar panels instead. This outline CTMP has been prepared in the context of the BESS being included in the design.

1.4 CTMP Structure

1.4.1 The remainder of this document is set out as follows:

- **Chapter 2:** Context, Considerations and Challenges – Provides an overview of the site location, size and nature of the Proposed Development plus parking, public transport, walking and cycling access.
- **Chapter 3:** Construction Programme and Methodology – Provides information on the construction programme and stages and methods of construction.
- **Chapter 4:** Vehicle Routeing and Access – Provides details on strategic and local vehicle routes for construction vehicle movements and site access/ egress arrangements.
- **Chapter 5:** Strategies to Reduce Impacts – Outlines the planned measures that will be used and indicates how construction vehicles will be managed to/ from and on-site.
- **Chapter 6:** Estimated Vehicle Movements – Provides a construction vehicle trip generation profile for the duration of the construction programme.
- **Chapter 7:** Implementing, Monitoring and Updating – Identifies how the implementation of the CTMP will be monitored and managed.

2 Context, considerations, and challenges

2.1.1 This chapter outlines the site context, key considerations and challenges to transport for the Proposed Development. It also identifies and responds to policy and guidance which is relevant to the Proposed Development.

2.2 Policy Context

National Policy

2.2.1 Paragraphs 4.1.55 and 4.1.56 of Planning Policy Wales (Edition 11, February 2021) includes the following policy regarding Transport Assessments:

"Transport Assessments are an important mechanism for setting out the scale of anticipated impacts a proposed development, or redevelopment, is likely to have. They assist in helping to anticipate the impacts of development so that they can be understood and catered for appropriately.

Planning applications for developments, including changes of use, falling into the categories identified in TAN 18: Transport must be accompanied by a Transport Assessment. In addition, in areas where the transport network is particularly sensitive, planning authorities should consider requiring Transport Assessments for developments which fall outside of the thresholds set out in TAN 18. Transport Assessments can be required for any proposed development if the planning authority considers that there is a justification or specific need. Transport Assessments provide the basis for negotiation on scheme details, including the level of parking, and measures to improve walking, cycling, and public transport access, as well as measures to limit or reduce levels of air and noise pollution. They should cover the transport impacts during the construction phase of the development, as well as when built and in use. Transport Assessments also provide an important basis for the preparation of Travel Plans. Further guidance on Transport Assessments and Travel Plans is contained in TAN 18."

2.2.2 To satisfy this policy the Applicant has committed to submitting a Transport Statement (TS) and outline CTMP including a framework Construction Workforce Travel Plan (CWTP).

Planning Policy Wales Technical Advice Note 18: Transport

2.2.3 Para D.4 identifies the categories of development for which a transport assessment would be required. The Proposed Development does not fall into the identified categories, and therefore as suggested in the 2020 scoping advice, a Transport Assessment is not required for this Proposed Development. However, A Transport Statement has been produced to accompany the DNS application.

National Transport Delivery Plan 2022 To 2027

2.2.4 The National Transport Delivery Plan 2022 to 2027 revised the mitigation proposals for Wrexham and the A483, as part of policy SRN 6 – Trunk Road Modal Shift Programme:

Wrexham A483 multi-modal corridor improvements and city centre connectivity. Work with Wrexham Council to develop multi-modal improvements. These will include feasibility/investigation of creating an exemplar multi-modal residential and employment development with lower levels of car use, aligned to tests set out in Welsh Government's response to the Roads Review.

2.2.5 Following enquiries on behalf of Lightsource bp the Welsh government advised on the 9th August 2023 that:

As you may have seen on the Welsh Government's website for the A483 Junctions 3 to 6, the preferred option for Junction 4 was announced in March 2021 and the route protected for planning purposes A483: junction 4 preferred route (TR111) (gov.wales)

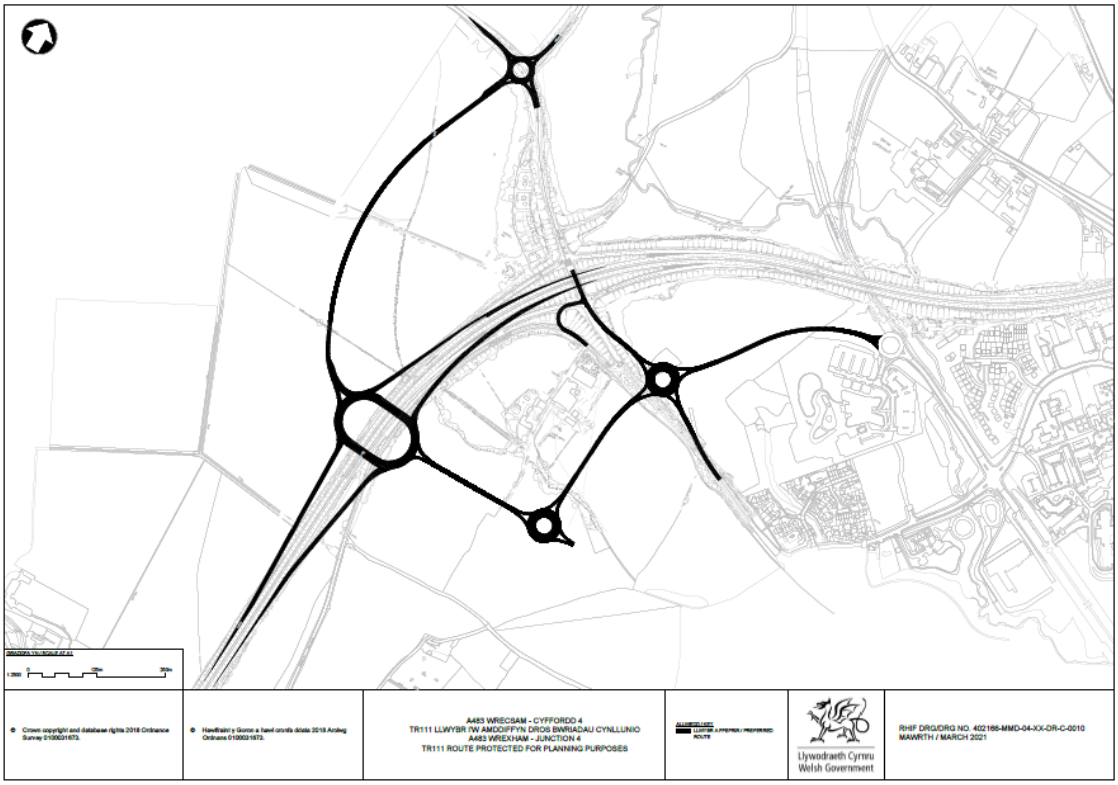
However, the Roads Review Panel recommended in February 2023 that this scheme should not be progressed as the case for change was not well aligned with the Welsh Government's aim to reduce car milage. An alternative scheme has however been included in the Welsh Government's National Transport Delivery Plan 2022 to 2027 which is the Wrexham A483 multi-modal corridor improvements and city centre connectivity.

The Junction 4 improvements are therefore not being progressed any further and we will need to review the TR111 route protection which currently remains in place.

2.2.6 As such, the A483 Junction 4 improvements are no longer being progressed. A copy of the correspondence is included in Appendix A.

2.2.7 For reference the planning protection would have covered the northeastern portion of the southern plot as shown in Figure 2.1:

Figure 2-1 Former A483 Junction 4 Scheme (source: Welsh Government)



Future Wales: The National Plan 2040

2.2.8 Future Wales: The National Plan 2040 was published on 24th February 2021 and is a national spatial strategy that sets out where and how development should take place in Wales to address key national priorities, such as sustaining and developing a vibrant economy, achieving decarbonisation and climate resilience, developing strong ecosystems and improving the health and wellbeing of communities.

2.2.9 Policy 18 of Future Wales 2040 (which relates to renewable and low carbon energy developments of national significance) states that:

"renewable energy projects… will be permitted subject to policy 17 and the following criteria…

9) there are no unacceptable adverse impacts on the transport network through the transportation of components or source fuels during its construction and/or ongoing operation; "

2.2.10 This policy establishes the importance of assessing the impact of development traffic, and the need to consider construction traffic. To satisfy this policy the Applicant has committed to submitting a Transport Statement (TS) and outline CTMP including a framework Construction Workforce Travel Plan (CWTP). As concluded in section 5 of the Transport Statement, there are no unacceptable adverse impacts on the transport network as a result of the Project.

Local Policy

2.2.11 At the time of writing no specific local policy guidance was noted as relevant for the Proposed Development.

2.3 Site Location

2.3.1 The application site covers approximately 136 hectares (ha) and is located wholly within the administrative boundary of Wrexham County Borough Council. The site is approximately 2.5km to the west of Wrexham city centre.

2.3.2 The strategic site location is shown on Figure 2.1.

Figure 2-2 Strategic site location plan



2.3.3 The site comprises two interconnected areas north and south of the A525 Ruthin Road. The southern and larger part of the site is bound by the A525 Ruthin Road to the north, to the east by the A483, to the south by Plas Power Woods and its westernmost point by agricultural fields beyond which lies Rhos Berse Road and Nant Road. The northern part is bound by the A525 Ruthin Road to the south and extends northwards towards Higher Berse Road. Coedpoeth lies approximately 120m to the west and New Broughton lies approximately 600m north-west of the site.

2.3.4 The Proposed Development will include a 33kV cable that will connect the solar project, battery energy storage system (BESS) and associated infrastructure to the Legacy Substation located approximately 1.2km to the south-west of the site, north of the B5246 Bronwylfa Road.

2.3.5 Two indicative site layout plans (for the scenario with and without the inclusion of the BESS) are provided in Appendix B.

2.4 Local Access

2.4.1 The highway network around the site has been assessed and is described below. The highway network was considered to help identify the most appropriate routes for construction vehicles and staff to access the site and cable route working areas. Table 2.1 below provides an overview of the highway links assessed and commentary is then provided below.

Figure 2-3 Local highway network

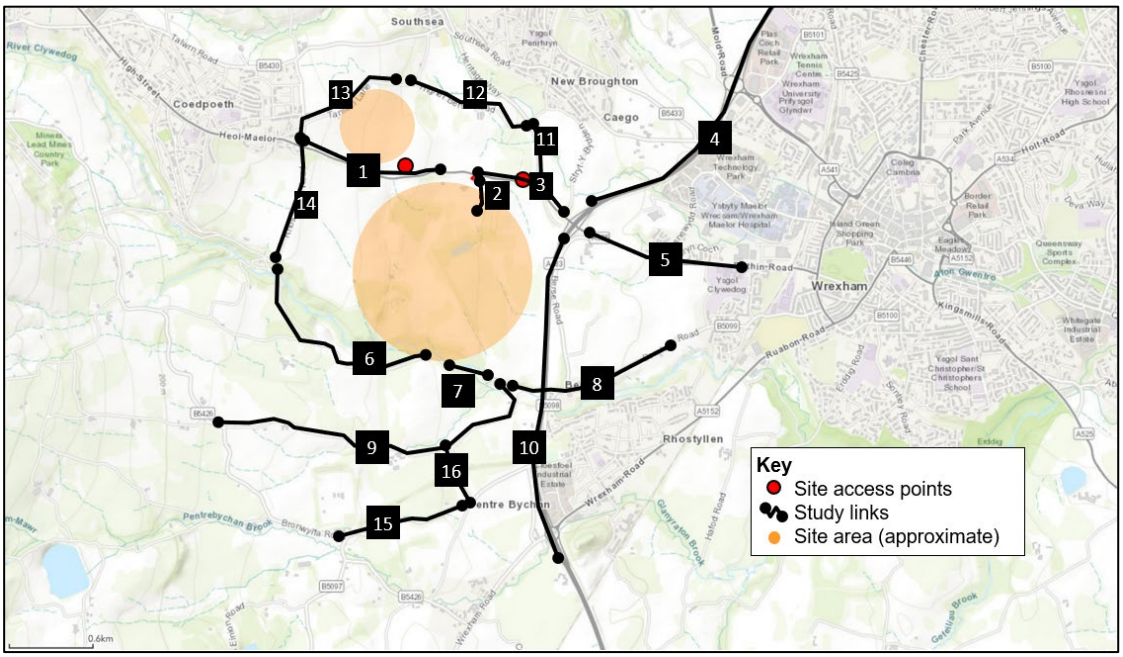


Table 2-1 Local highway network

Link	Description	Minimum estimated width	Speed limit
1	A525 west of Plas Power	6 metres	50mph
2	Plas Power Home Farm Access	5 metres	n/a
3	A525 east of Plas Power	7.1 metres	50mph
4	A483 north of A525	7.5 metres	70mph
5	A525 east of A483	7 metres	50mph
6	Unnamed Road	4.8 metres	60mph
7	Unnamed Road	4.5 metres	60mph
8	Unnamed Road onto B5099 Bersham Road	5.1 metres	60mph
9	Unnamed Road to B5426	3.7 metres	60mph
10	A483 south of A525	7.5 metres	70mph
11	Heritage Way	7.3 metres	60mph
12	Higher Berse Road	3.5 metres	60mph

13	Tan Llan	3.2 metres	60mph
14	Rhos Berse Road	5.2 metres	60mph
15	B5097	6.2 metres	50mph
16	Unnamed Road	2.8 metres	60mph

Link 1: A525 west of Plas Power

2.4.2 The A525 is a single carriageway road with a narrow footway along its northern side. The road has no physical constraints identified to use by HGV construction traffic, although the road narrows to the west, on the approach to Coedpoeth. The A525 through Coedpoeth is more constrained by buildings, walls immediately next to the very narrow verge on the southern side of the A525. The speed limit on this road is 50 mph and there is not an existing pattern of road traffic collisions. The access to the northern plot of the site is located on this corridor. Advance signing and traffic management will be considered as part of the safe design of the access making drivers aware of HGV traffic turning into and out from the construction site.

Link 2: Plas Power Home Farm Access

2.4.3 This private access way is approximately 5 metres wide. It consists of a bound surfaced single track route which leads to a narrower single track access route. The route has kerbed edges at its start and a grass verge, with some wooden fences adjacent to the road. This route was considered as a potential construction and permanent maintenance access but was discounted on the basis of potential impact on the existing residential dwellings.

Link 3: A525 east of Plas Power

2.4.4 The A525 is a single carriageway road with a footway on the northern side of the road. The road has no constraints identified to use by HGV construction traffic. As the A525 approaches the A483 the road widens and turning lanes are available at junctions. The northern access to the southern plot of the proposed site is located on this corridor with a connecting frontage between Plas Power Home Farm access and junction 4 of A483.

Link 4: A483 north of A525

The A483 is a dual carriageway road with no formal footways. The road has no constraints identified to use by HGV construction traffic. The A483 is accessed via slip roads from the A525, slip roads are available in both northbound and southbound directions. The road is managed by the North and Mid Wales Trunk Road Agent (NMWTRA) as a Welsh Trunk Road and will form part of the strategic access to the development.

Link 5: A525 east of A483

2.4.5 The A525 east of the A483 is a single carriageway road with a footway on the northern side of the road. As the road enters Wrexham and transitions to a 30mph speed limit, the footway is marked as a shared unsegregated footway/cycle track. The road has no constraints identified to use by HGV construction traffic but is not likely to form part of the access strategy for the construction of the development.

Link 6: Unnamed Road

2.4.6 This unnamed road has no significant curtilage development, serves as access for a number of cottages, houses and farms. In general the corridor has hedges on both sides and grassed verges. The hedgerows would fulfil the criteria for a protected hedgerow in most instances.

2.4.7 This lane is 4.8 metres wide with some width increases on bends and adjacent to field or building accesses. It would not be suitable for use to access the development.

Link 7: Unnamed Road

2.4.8 This unnamed road has no significant curtilage development, serves as access for a number of cottages, houses and farms. In general the corridor has hedges on the southern side and grassed verges. The northern side of the road has a stone wall and a layby/passing point set into this wall. The hedgerows would fulfil the criteria for a protected hedgerow in most instances.

2.4.9 There is a bridge with a narrow stone parapet approximately 100m to the west of the existing point of access. This bridge has no posted weight restrictions, and the road narrows to approximately 3.5-4 metres wide, precluding two-way traffic over the bridge.

2.4.10 This lane is approximately 4.5 metres wide with some width increases on bends and adjacent to field or building accesses. The route is unlikely to form part of the access strategy during construction and would only be used for minimal access to the south of the site for smaller vehicles during the operational phase.

Link 8: Unnamed Road onto B5099 Bersham Road

2.4.11 This corridor passes through the village of Bersham, a small settlement with dispersed buildings. As the road runs east, a pedestrian footway is present on the northern side of the corridor. This route passes under the A483 dual carriageway. No height clearance signs are present which means it is safe for HGV routeing. This lane is approximately 5.1 metres wide with some width increases on bends and a layby on the southern side of the road west of the A483 underpass. Part of the road could be used for access to the cable connection works area depending on the preferred cable connection route.

Link 9: Unnamed Road to B5426

2.4.12 This unnamed road has no significant curtilage development, serves as access for a number of cottages, houses and farms, and a solar power facility located northwest of a substation adjacent to Talwrn village. In general the corridor has hedges on both sides and wide grassed verges. The hedgerows would fulfil the criteria for a protected hedgerow in many instances. This lane is approximately 3.7 metres wide with some width increases on bends. The road could be used for access to the cable connection works area depending on the preferred cable connection route.

Link 10: A483 south of A525

2.4.13 The A483 is a dual carriageway road with no footways. The road has no constraints identified to use by HGV construction traffic. The A483 is accessed via slip roads from the A525, slips are available in both northbound and southbound directions. It is not anticipated that this link would form a primary part of the construction access strategy, subject to the determination of materials and equipment supply chain. The route is a Trunk Road and is acceptable for use by large HGVs.

Link 11: Heritage Way

2.4.14 Heritage Way is a single carriageway road with no footways. The road has no constraints identified to use by HGV construction traffic. Heritage Way is accessed via a priority junction with the A525. This road is approximately 7.3 metres wide and would not be the preferred access route for the construction period but could be used for low volume smaller operational traffic.

Link 12: Higher Berse Road

2.4.15 Higher Berse Road is a single track road which has no significant curtilage development, serves as access for a number of cottages, houses and farms. In general the corridor has hedges on both sides and grassed verges. The hedgerows would fulfil the criteria for a protected hedgerow in most instances.

2.4.16 This lane is approximately 3.5 metres wide with some width increases on bends and adjacent to field or building accesses. The route would require mitigation measures to be used for HGVs and will not be used for construction access.

Link 13: Tan Llan

2.4.17 Tan Llan has no significant curtilage development, serves as access for a number of cottages, houses and farms. In general the corridor has hedges on both sides and grassed verges. The hedgerows would fulfil the criteria for a protected hedgerow in most instances. Tan Llan is approximately 3.2 metres wide with some width increases on bends and adjacent to field or building accesses. This route is not proposed to be part of the access strategy during construction or operation.

Link 14: B5097

2.4.18 The B5097 is a single carriageway road with no footways. The road has no constraints identified to use by HGV construction traffic. The B5097 has lengths of hedgerow on either side of the carriageway which would fulfil the criteria for a protected hedgerow, and grass verges. The B5097 is approximately 6.2 metres wide with some width adjacent to building accesses. The B5097 provides access to the Legacy substation and may form part of the cable connection route.

Link 15: Unnamed Road

2.4.19 This unnamed road is a single track with no curtilage development or accesses along its length. The lane has hedges on both sides and grassed verges. The hedgerows would fulfil the criteria for a protected hedgerow in most instances. There is a disused railway line which passes over this road using a brick-built viaduct, which does not have an indicated maximum height clearance. The lane is approximately 2.8 metres wide and is national speed limit. The road may form part of the cable connection route.

Public Rights of Way

2.4.20 There is an existing Public Right of Way (PRoW) which currently runs through the Site – the ‘Bersham Public Footpath 1’. The PRoW runs north / north-west through the southern portion of the Site before meeting A525. It continues approximately 650m to the west along A525 where it runs north through the northern portion of the Site.

2.4.21 There will be no extinguishment of this PRoW as a result of the Proposed Development, however some minor re-alignment will be required. The current Wrexham County Borough Council Definitive PRoW Map shows the alignment of this route in a different position to the path walk on the ground. As such, the re-alignment of the route will additionally realign the Definitive Map, resulting in an alignment which is more accessible where the existing alignment is affected by steep topography.

2.4.22 Where appropriate, landscaping will be incorporated along the PRoW to screen views of the Development. A width of 5m will be incorporated for all PRoWs to be retained through the Site.

2.4.23 There are no known designated or signed cycle paths within the vicinity of the Site. However, the local road network could feasibly be used for cycling, although the nature of the A525 in the vicinity of the site may not be considered an attractive environment for cycling.

2.5 Considerations and Challenges

2.5.1 Construction vehicle site accesses will need to be carefully designed to facilitate safe vehicle turning movements and where appropriate signage and traffic management measures may need to be utilised.

2.5.2 Cable route works are likely to be accessed via Bersham road B5098 or B5097 and then unnamed local roads. Cable works in the carriageway would likely require temporary road closures to achieve safe working areas. Controls would include diversionary routes, maintaining access (where practicable) and consideration of working out of hours. The final details will be set out in a detailed CTMP post planning consent.

3 Construction Programme and Methodology

3.1.1 The section provides information on the anticipated construction programme, methodology and working hours. At this stage the construction programme is indicative, and the final programme will be confirmed in a detailed CTMP to be submitted post planning consent.

3.2 Construction Programme

3.2.1 The indicative construction programme shown in Table 3-1 and 3.2 is based on previous experience and professional judgement. Construction of the solar PV is expected to take approximately 12-18 months, with an estimated transition from construction to operation phase occurring in Q1 2026. Construction of the BESS will take approximately 6-9 months. As shown the construction of the solar project and the BESS are separate phases with the BESS installation following on several years after the solar PV is operational.

3.2.2 As detailed in Section 1, there is potential that development of the BESS may not materialise and therefore the Proposed Development design has built in flexibility to place solar panels in this location instead. The construction programme outlined below is in the context of the BESS being included in the design.

Table 3-1 Indicative Construction Programme – Solar PV

Construction Stage	Start	End
Site Preparation (incl. accesses, construction compound, fencing)	Q1 2025	Q1 2025
Delivery of construction materials	Q1 2025	Q3 2025
Construction and installation of the solar arrays, and associated infrastructure	Q2 2025	Q1 2026
Demobilisation and equipment removal	Q1 2026	Q2 2026
Landscaping including biodiversity enhancements	Q1 2026	Q4 2026
Commercial operation	Q1 2026	N/A

Table 3-2 Indicative Construction Programme – BESS

Construction Stage	Start	End
Site Preparation (incl. accesses, construction compound, welfare)	Q3 2032	Q3 2032
Delivery of construction materials	Q3 2032	Q4 2032
Construction of the BESS	Q4 2032	Q1 2033
Demobilisation and equipment removal	Q1 2033	Q2 2033
Landscaping including biodiversity enhancements	Q4 2032	Q1 2033
Commercial operation	Q1 2033	N/A

3.2.3 Figures 3-1 and 3-2 provide the indicative construction programme in Gantt chart form and help identify the overlaps in the different construction stages.

Figure 3-1 Indicative Construction Programme – Solar project

No.	Construction Stage	Year 1 (2025)				Year 2 (2026)			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1	Site Preparation (incl. accesses, construction compound, fencing)								
2	Delivery of construction materials								
3	Construction and installation of the solar arrays, and associated infrastructure								
4	Demobilisation and equipment removal								
5	Landscaping including biodiversity enhancements								
6	Commercial operation								

Figure 3-2 Indicative Construction Programme – BESS

No.	Construction Stage	Year 8 (2032)		Year 9 (2033)
		Q3	Q4	Q1
1	Site Preparation (incl. accesses, construction compound, welfare)			
2	Delivery of construction materials			
3	Construction of the BESS			
4	Demobilisation and equipment removal			
5	Landscaping including biodiversity enhancements			
6	Commercial operation			

3.3 Construction Method

3.3.1 Construction of the solar project is expected to take approximately 12-18 months and will require the following activities:

Solar project Site

- Enabling and site access works
- Erection of security fencing and gates;
- Laying down of temporary construction compound;
- Installation of the temporary compounds;
- Construction of access tracks through the site;
- Construction of drainage infrastructure (in accordance with the Drainage Strategy)
- Delivery of solar, BESS and substation equipment;

- Installation of foundations for structures such as inverters, transformers, and substations;
- Piling and installation of mounting frames, solar panels and other solar infrastructure;
- Cable trenching, ducting and backfilling;
- Installation of inverters, transformers, and substations;
- Installation of BESS containers and associated infrastructure;
- Laying of underground cable from the solar project to the Legacy Substation;
- Commissioning of the solar project, BESS and grid connection;
- Landscaping and ecological enhancements works; and
- Demobilisation from the site, including removal of the temporary construction compound.

BESS installation

3.3.2 Construction of the BESS will take approximately 6-9 months and will consist of the following principal activities:

- Delivery of the BESS and associated equipment
- Installation of foundations for structures
- Cable trenching, ducting and backfilling;
- Installation of BESS containers and associated infrastructure;
- Commissioning of the solar project, BESS and grid connection.

Cabling

3.3.3 All of the cabling within the northern and southern areas of the site will be laid underground via surface dug trenches of approximately 1m deep and 50cm wide and backfilled. These will utilise existing access tracks and road options wherever possible, particularly where sensitive habitats or archaeology are potentially present.

3.3.4 A cable route between the northern and southern parcels will be installed using Horizontal Directional Drilling (HDD) under the road and trees into the site and via an existing Public Right of Way (PRoW) to reduce disruption to the road and any impact on the woodland as far as practicable.

3.3.5 The 33kV cable route from the substations to the south of the site, will connect to the existing Legacy Substation to the south-west of the site, passing to the east of Bersham Ironworks Museum, under the River Clywedog and Clywedog Trail via HDD.

3.3.6 As presented in Appendix B, the ‘preferred cable route option’ is shown as well as three short alternative cable route options. All options will route south of the site before joining the Plas Buckley road. All options would follow the existing unnamed road west to the north of Cadwgyn Hall, before connecting to the legacy substation. Cable Route Option 1 would pass to the south of Cadwgyn Hall through agricultural fields, before connecting to Legacy Substation. Cable Route Option 1 would cross Footpath ESC/1. Should this cable route be pursued, the PRoW may need to be temporarily closed for the duration of the works.

3.3.7 The Preferred cable route would however route along the road past Cadwgyn Hall, the excavation of the trench to install the cable would be limited to the extent of the road to avoid impact on Offa's Dyke.

3.3.8 All cable route options will likely require the temporary diversion or temporary closure of Footpath 'ESCLUSHAM/ABOVE/3' adjacent to the west of the legacy substation during the construction and laying down of the cable route, this would be for a temporary period and then re-instated following the cable route construction.

3.3.9 Where practicable the cable routes will be installed within the fields adjacent to the roads to reduce disruption to the road as far as practicable. There may be the need to remove some of the trees to the south of the site, adjacent to A483, where the cable routes out of the site and if HDD is not practical.

3.3.10 The final working arrangements from the cable connection works will be confirmed in the detailed CTMP prior to construction.

Plant and Equipment

3.3.11 A range of plant and equipment will be required over the course of the construction period including but not limited to that listed in Table 3-3

Table 3-3 Construction Plant and Equipment

Equipment	Function
Dump trucks	Earth distribution as required for any levelling
Vibrating roller	Compacting tracks
Piling machine(s)	Ramming piles of mounting frames / fencing posts into the ground
Telehandler(s)	Distributing materials
Crane	Capable of lifting inverters, transformers, battery containers, etc into place
Fuel bowser	Refuel plant as required
Concrete mixer	Foundations for inverters, transformers, battery containers, etc.
JCB Diggers / cable trenching machines	Trenching for cables

3.4 Working Hours

3.4.1 The site working hours will be:

- 07:00-19:00 Monday to Friday
- 07:00-13:00 Saturday
- No working on Sunday or Bank Holidays

3.4.2 The first/last working hours would principally be for site mobilisation/demobilisation at the start and end of the working day. Noisy activities such as piling will be undertaken 08:00 to 18:00 hours Monday to Friday and 08:00 to 13:00 hours on Saturday. In the event that works are required outside of these hours in exceptional circumstances, this would be agreed with the WCBC prior to commencement of the activity, as necessary.

4 Vehicle Routeing and Access

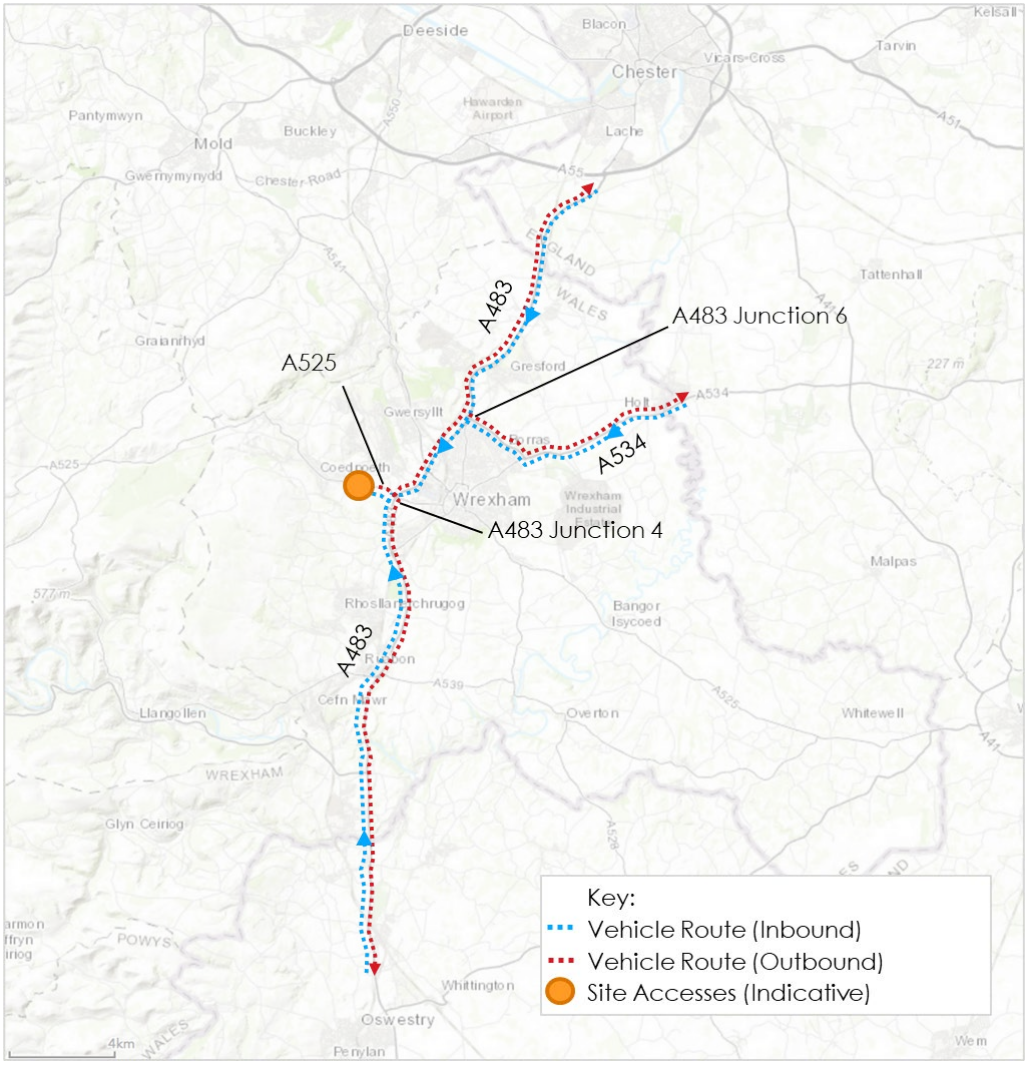
4.1 Strategic Vehicle Routeing

4.1.1 The main strategic vehicles routes to access the site are:

- A483 towards Chester in the north and Oswestry and the A5 to the south. These routes provide the links to larger cities such as Cardiff and Swansea to the south, Liverpool and Manchester to the North.
- A534 towards Nantwich, linking to the A500 towards Stoke-on-Trent and the M6. This route links to Birmingham, Bristol, Derby and Nottingham.
- Junction 4 of the A483 provides access on to the A525 with access to both the southern and northern parcels of land being taken from the A525.

4.1.2 The strategic site location and vehicle routes are shown on Figure 4.1.

Figure 4-1 Strategic Vehicle Routes



4.2 Local Vehicle Routeing

4.2.1 Local construction vehicle routeing to the site with be via junction 4 of the A483 on to the A525 with access to both the southern and northern parcels of land being taken from the A525. The local vehicle routes are as shown in the Figure 4.2 below.

Figure 4-2 Local Vehicle Routes to the Site



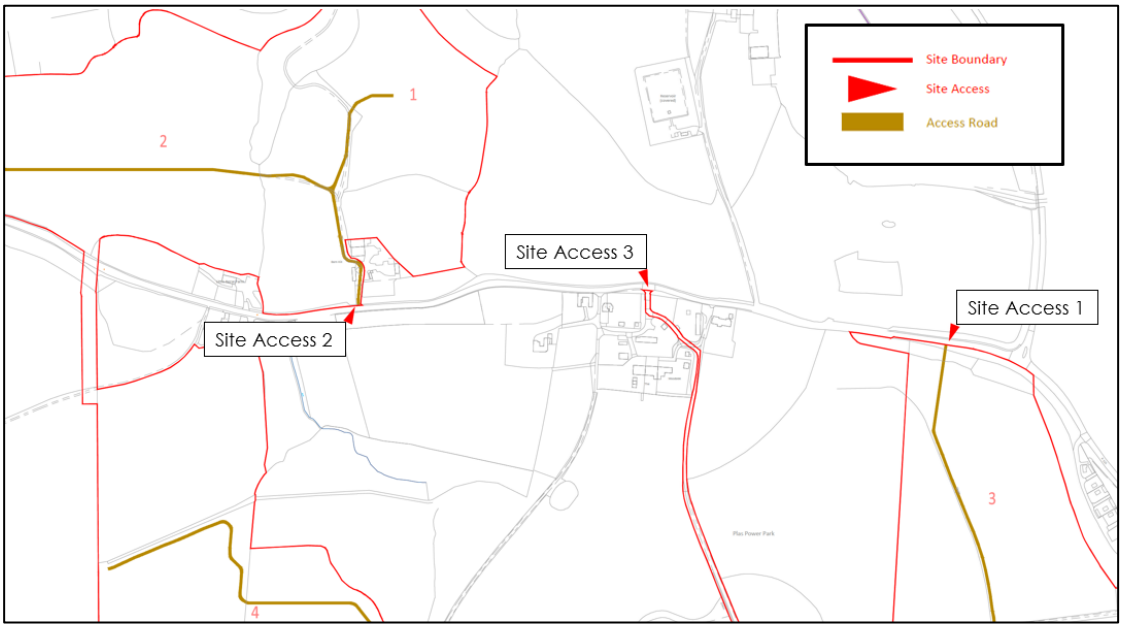
Off-site Cable Connection

4.2.2 Local construction vehicle routeing to the cable connection works area will either be via A483 junction 4 and then south on the B5098 or A483 junction 3 and then north on the B5098. Both routes connect to a series of unnamed local roads that will be utilised for the construction of the off-site cable connection.

4.3 Site Access Locations

4.3.1 Several access points will be used for the construction, operation and maintenance and decommissioning of the Proposed Development. If necessary, some minor modifications will be required for temporary accesses to be created from the highway to enable access to the site for construction. Site access locations are shown in Figure 4-3 below.

Figure 4-3 Solar project Site Access Locations



4.3.2 A description of the site access points is provided below.

Access 1

4.3.3 A new access (Access 1) will be constructed to the east along the A525 west of Heritage Way, which will serve as the main construction access point for the southern parcel of the site and will subsequently also be used as the main access for operation and site visits. Whilst Access 1 is being constructed, there will be a short-term temporary requirement to use Access 3 to access the site during construction set up and establishment. The existing Home Farm access (Access 3) will be used for maintenance when the Proposed Development is operational if required.

4.3.4 Access 1 will need to provide sufficient width to allow a large articulated vehicle to enter and exit the site safely. Up to approximately 25m of the existing wall and two trees will also need to be removed and the existing road sign will need to be relocated. It is proposed to retain the stonework from the affected section of wall and use it to create an entrance way to the site with the wall curving round with the radii of the entrance junction. This access would have the advantage that it would avoid properties situated around the Home Farm access and would minimise the distance between the A483 strategic route and the southern area of the site.

4.3.5 Concept design drawings including vehicle swept path analysis can found in Appendix C.

Access 2

4.3.6 The access to the northern parcel of the site (Access 2) will be via an existing farm access routeing north off the A525. The existing access is currently used by large agricultural vehicles and would be suitable for HGVs with some improvements. It will require advance signage to warn of the site access and construction vehicle movements and potential speed reduction via traffic management. Through detailed design and the road safety audit process the access safety will be examined, but at this stage the access is considered a safe and viable HGV access point with appropriate traffic management. This access point could be reconfigured in a number of ways and designed to accommodate the required movements, although as it is the sole point of access for adjacent dwellings, reconfiguration would require maintaining the access for residents.

4.3.7 There will be no access to the northern part of the site from Tan Llan Lane to the north.

4.3.8 Abnormal Indivisible Loads (AILs) (if required) would be able to access the site via Access 2 using the identified strategic routes which are suitable for use by AILS. Should an AIL be needed a suitably qualified haulier would confirm the route from point of origin using the required notification process (see Section 4.4 for more detail on AILs).

4.3.9 Concept design drawings including vehicle swept path analysis to reconfigure the access to accommodate the required vehicle types and turning movements as well as maintaining the access for residents in adjacent dwellings can be found in Appendix C. The drawings indicate that the required visibility can be achieved with some vegetation removal. Turning movements will be restricted to right turn in and left turn out only.

Access 3

4.3.10 Site access 3 is the existing Home Farm access. This access will not be used for construction but will be used for maintenance access when the Proposed Development is operational. It is listed here for completeness.

Access 4

4.3.11 It is not proposed to use the access to the southern part of the site from the south along Rhos Berse Road (Access 4) during construction, operation or decommissioning, but may be needed in exceptional circumstances and will be limited to staff or emergency vehicular access sonly and would be limited to cars and LGVs.

Road Safety Audit

4.3.12 Following consultation with WCBC, a Stage 1 Road Safety Audit (RSA) was undertaken for the proposed access arrangements, dated 01 December 2023. The site was visited by the Audit Team on Wednesday 29 November 2023 at 12:00. The weather was sunny and the road surface was damp. Traffic flows were moderate to high and there were no pedestrian or cycle flows. The RSA actions identified in response to the road safety audit problems have been discussed and agreed between the design organisation (Stantec) and Overseeing Organisation (WCBC).

4.3.13 The Stage 1 RSA Response Report can be found in Appendix D for reference. Note that at the time of this report's preparation, the access labels were different to the ones noted within this CTMP. The table below outlines the changes:

Table 4-1: Site Access Label Changes

RSA Response Report	CTMP (this Document)
Site Access 1	Site Access 1
Site Access 2	Site Access 1
Site Access 3	Site Access 3

Internal Access

4.3.14 Existing farm tracks will be used for internal access within the site where practicable. Where required, new access tracks will be formed, usually using a layer of permeable crushed stone. Geosynthetic reinforcement or soil stabilisation may be used to reduce the depth of track construction. The surface will be a compact granular material (crushed rock) up to an approximate thickness of 0.3m, dependent on the ground conditions. Width will increase at bends and at the entrance point. The tracks will measure between 3.5m and 4.5m wide.

4.3.15 The internal access tracks will also be utilised as an access for emergency services to the BESS compound to the south of the Site. Swept path analysis has been undertaken to ensure that emergency vehicles are able to safely access both accesses of the BESS compound. The swept path analysis is detailed in Appendix F of the Transport Statement.

Temporary Construction Compounds

4.3.16 Secure temporary construction compounds will be used to store materials and provide welfare facilities during the construction period. The Site will have a single primary construction compound located in the southern site. There are also expected to be up to three secondary compounds providing a materials hub, welfare and waste management facilities across the Site.

4.3.17 The temporary compound will be formed of a temporary permeable hardcore / gravel base atop a mesh membrane to facilitate ease of removal when construction is complete. Primary compounds will likely include:

- Temporary gated security fencing (e.g. Heras Fencing), security officer kiosk, and temporary CCTV cameras;
- Temporary portable buildings to be used for offices, welfare and toilet facilities;
- Materials and equipment storage areas;
- Parking and turning areas for delivery vehicles and workers' vehicles; and
- Wheel washing facilities.

Off-site Cable Connection Access

4.3.18 Access to the cable connection works areas will be taken directly from the road in which the works are taking place. Plant and equipment will be delivered and removed directly to or from the works areas. Refuelling will be carried out either on-site by way of mobile tanker or off-site. The materials will typically be delivered in bulk direct to the works areas where space allows. The onsite operation will require direct removals of surplus excavated material from the work site along with any removed vegetation from the route.

Temporary Traffic Management

4.3.19 The cable connection work taking place within the carriageway will likely need either a rolling lane closure along the carriageway with temporary traffic lights to facilitate single lane alternate working or temporary road closures during working hours due to the width restrictions along the road to achieve the necessary safe working areas in accordance with Traffic Signs Manual Chapter 8 – Road Works and Temporary Situations[1]. Alternative diversionary access routes will be identified, agreed with the WCBC and signed accordingly.

4.3.20 There may be potential to undertake the works out of hours or overnight to avoid disruption on the road network. However, this would need to be agreed and may not be permissible given associated noise impacts. All temporary traffic management measures would be (post planning consent) subject to the local authority's street works permitting process and would require detailed drawings, works programme and construction method which would be provided by an approved contractor.

[1] DfT (2009): Traffic signs manual - GOV.UK (www.gov.uk)

The required temporary traffic management measures will be confirmed in a detailed CTMP produced post planning consent.

4.4 Abnormal Indivisible Loads

4.4.1 AILs are not anticipated through the construction period, although may be required for the transport of specific equipment or components. The strategic and local vehicle routes identified above are considered suitable for the movement of an AIL should one be required. If an AIL is required, it will ultimately be the responsibility of the haulier to determine the requirements of the AIL movement i.e. route planning, notification period, notifying authorities, attendants and escorts etc. The haulier will be required to make use of relevant guidance such as the Fleet Operator Recognition Scheme (FORS) abnormal load toolkit[2] and the ESDAL or equivalent notification process[3].

[2] FORS: Managing Abnormal Indivisible Loads toolkit for operators - FORS - Fleet Operator Recognition Scheme (fors-online.org.uk)

[3] ESDAL: ESDAL abnormal load notification - GOV.UK (www.gov.uk)

5 Strategies to Reduce Impacts

5.1 Site Planned Measures

5.1.1 Table 5-1 sets out the measures to be implemented to manage vehicle visits and delivery/ collections at the site. Further detail is provided in the subsequent paragraphs. The Site Planned Measures Checklist below ensures that the CTMP is effective in achieving the aims of reducing environmental impact, road risk, congestion and cost. As per best practice guidance[4], the measures are categorised as follows:

- **Committed** – indicates a measure that shall be implemented;
- **Proposed** – indicates a measure that is feasible and shall be studied further to determine its practicality; and
- **Considered** – indicates a measure that is not currently relevant (or may be in the future).

Table 5-1: Site Planned Measures Checklist

Site Planned Measures Checklist	Committed	Proposed	Considered
Measures influencing construction vehicles and deliveries			
Safety and environmental standards and programmes	x		
Adherence to designated routes	x		
Delivery scheduling		x	
Re-timing for out of peak deliveries		x	
Use of holding areas and vehicle call off areas			x
Use of logistics and consolidation centres			x
Measures to encourage sustainable freight			
Freight by Water*			x
Freight by Rail*			x
Material procurement measures			
DfMA and off-site manufacture		x	
Re-use of material on site		x	
Smart procurement		x	
Other Measures			
Collaboration amongst other sites in the area			x
Implement a staff travel plan	x		

** If site, consolidation centre or holding areas are within 100m of foreshore of navigable waterway or rail freight siding.*

[4] Construction Logistics and Community Safety (CLOCS): Planned Measures (clocs.org.uk)

5.2 Measures influencing construction vehicles and deliveries

Safety and environmental standards and programmes

5.2.1 The Applicant is committed to requiring that all contractor and sub-contractor vehicles arriving at site comply with relevant safety measures and recommendations relating to Work Related Road Risk[5].

5.2.2 Industry good practice will be adopted to support the works at the Proposed Development. This will be achieved through the procurement process whereby the sub-contractors and supply chain will be preferred if they are members of or signed up to relevant best practice schemes and initiatives including, for example:

- **Considerate Constructors Scheme (CCS)** – promotes best practice that relates to on-site activities and those in the vicinity of the site.
- **Fleet Operator Recognition Scheme (FORS)** – FORS is a voluntary accreditation scheme for fleet operators which aims to raise the level of quality within fleet operations, and to demonstrate which operators are achieving exemplary levels of best practice in safety, efficiency, and environmental protection.
- **Construction Logistics and Community Safety (CLOCS)** – CLOCS brings the construction logistics industry together to revolutionise the management of work-related road risk and ensure a road safety culture is embedded across the industry. The aim is to help protect vulnerable road users who share the roads with construction vehicles.

Adherence to designated routes

5.2.3 Vehicle routes to/ from the site via the local and strategic road network are as specified in Chapter 4. These access routes have been reviewed with respect to reducing potential impacts, conflicts and hazards such as schools and hospitals, as far as practicable. A copy of the route plan will be given to all suppliers when orders are placed so that drivers are fully briefed on the required route to take. The supplier will be made aware that these routes are always required to be followed unless otherwise agreed or diversions are in place.

5.2.4 Routes for AILs would be determined by the haulier in collaboration with the affected Police services and LHAs. These would be determined by the configuration of the load, depending on its height, width, weight and length. The need for escort vehicles would be determined through that process.

Delivery scheduling

5.2.5 Delivery scheduling for road movements would be confirmed with the Principal Contractor's logistics team. An electronic Delivery Management System (DMS) will be implemented to book and manage vehicles visiting the site. This could be a proprietary system or bespoke to the Proposed Development. Such systems can record all details relevant to the vehicle visit, which are then available for the inclusion in monitoring reports if required. More information regarding the system would be presented in the detailed CTMP following planning permission.

5.2.6 Re-timing for out of peak deliveries Timing of deliveries outside peak traffic times may improve the operational efficiency of the construction site, as well as lessening the impact of vehicle activity on the road network in the vicinity of the site. The arrival/departure of HGVs to/from the site during the morning peak (i.e. outside 08:00-09:00hrs) will be reduced so far as practicable. Suppliers and hauliers will be made aware of this commitment and monitoring will be undertaken through the DMS.

[5] Work Related Road Risk - Transport for London (tfl.gov.uk)

Use of holding and vehicle call off areas

5.2.7 The likely quantity of materials that will be needed and the number of estimated vehicles trips during the works does not warrant a vehicle holding or call-off area for managing movements. However, deliveries for the northern site may utilise the main access and compound for the southern site as a laydown area. Materials can then be delivered to the northern site when required in a controlled fashion.

Use of logistics and consolidation centres

5.2.8 The likely quantity of materials and the number of estimated vehicles trips during the works is not considered sufficient to warrant use of a dedicated consolidation centre. It is also considered that consolidation will be achieved through the supply chain i.e. PV panels will be delivered in bulk quantities to maximise the vehicle payload and minimise vehicle trips.

5.3 Measures To Encourage Sustainable Freight

Freight by Water

5.3.1 The site is not within 100 metres of a navigable waterway, therefore it is not considered feasible to transport freight by water for this development.

Freight by Rail

5.3.2 The site will not be within 100 metres of a useable rail head or siding, so it is not considered that transporting freight by rail is appropriate for this development.

5.4 Material Procurement Measures

DfMA and off-site manufacture

5.4.1 The potential to use prefabricated assemblies and techniques would be considered as an approach to reduce the number of construction vehicle movements, once a Principal Contractor has been appointed. A decision as to how prefabrication might be integrated into the construction process would be included in the detailed CTMP.

Re-use of material on site

5.4.2 Consideration would be given to the reuse of excavated material for cabling works filling, depending on its suitability - e.g. potential contamination. Where practicable, the project will seek to maximise the reuse of suitable soils for landscaping, to reduce waste disposal.

Smart procurement

5.4.3 Where appropriate suppliers are available and suitable contracts can be negotiated, materials, equipment and plant will be sourced from local suppliers. Suppliers who can demonstrate working arrangements that align with the CTMP objectives, such as reducing vehicle movements, will be preferred.

5.5 Other Measures

Collaboration amongst other sites in the area

5.5.1 The Applicant will consider working with other construction site contractors in the vicinity off the site. This could include initiatives such as the use of a sharing delivery scheduling information to manage vehicle movements effectively and potentially using the same supplier for specific materials where practical.

5.5.2 The progress of the Redrow Homes residential development to the east of the A483 will be kept under review as the project progresses.

Implement a Construction Workforce Travel Plan

5.5.3 A framework Construction Worker Travel Plan ('CWTP') has been developed in Section 8 to promote sustainable transport for workers during the construction and commissioning phases. This will be developed further once a Principal Contractor has been appointed and the final construction programme and worker numbers are confirmed.

6 Estimated Vehicle Movements

6.1.1 It is expected that a range of construction vehicles types would access the site to enable construction, of the development. The include but are not limited to the following:

- Light Goods Vehicles (LGVs) i.e. vans and small flatbeds – movements for plant maintenance, PPE, fixings/small components, sundry items, canteen supplies, couriers, post/parcels (note LGVs do not include staff minibuses);
- Heavy Goods Vehicles (HGVs) i.e. 2-6 axle rigid or articulated lorries – movements of materials/component deliveries, PV tables, mounts and panels, plant deliveries, piling rigs, spoil removal, aggregate supplies, cabling, containerised equipment, fencing etc.

6.2 Solar Project

6.2.1 Based on previous experience the construction works could require around 1,200 HGV movements across the course of the construction programmes for both the solar project and BESS. Based on a 12 month construction programme and 5.5 day working week this would equate to around 4-5 HGVs (8-10 movements) per day. However, it is recognised that a flat profile across the programme is unlikely and there will be peaks in activity associated with overlaps in the construction programme and more transport intensive activities taking place. Therefore, the following peaks in HGV and LGV movements have been identified:

- HGVs (Daily Peak): 15 (30 movements)
- LGVs (Daily Peak): 4-6 (8-12 movements)

6.2.2 An initial construction vehicle profile has been developed in the table and figures below. This should be considered indicative at this stage and will be developed further once a Principal Contractor has been appointed and the final construction programme and method are known. This information will be provided in a detailed CTMP submitted post planning consent.

Table 6-1 Estimated Construction Vehicles – Peak Monthly and Daily – Solar project

No.	Construction Stage	Duration		Peak Daily (two way)		Peak Monthly (two way)	
				HGVs	LGVs	HGVs	LGVs
1	Site Preparation (incl. accesses, construction compound, fencing)	Q1 2025	Q1 2025	8	4	184	92
2	Delivery of construction materials	Q1 2025	Q2 2025	14	6	322	138
3	Construction and installation of the solar arrays, and associated infrastructure	Q2 2025	Q1 2026	16	6	368	138
4	Demobilisation and equipment removal	Q1 2026	Q2 2026	6	4	138	92
5	Landscaping including biodiversity enhancements	Q1 2026	Q4 2026	6	4	138	92
6	Commercial operation	Q1 2026	N/A	0	0	0	4

6.2.3 Table 6.1 indicates that there would be a peak in vehicle movements in Q2 2025 when there is overlap between construction stage 2 and 3. A further but smaller peak would then occur in Q1 2026 when there is overlap between stages 3, 4 and 5. Although stages 4 and 5 are considered to be less transport intensive. It should also be noted that the peak monthly movements are very much a worst-case scenario i.e. reflecting the daily peak occurring on everyday of the month. Therefore, in reality the actual number of vehicle movements across the peak month is likely to be less.

6.3 BESS

Table 6-2 Estimated Construction Vehicles – Peak Monthly and Daily – BESS

Construction Stage	Duration		Peak Daily (two way)		Peak Monthly (two way)	
			HGVs	LGVs	HGVs	LGVs
Site Preparation (incl. accesses, construction compound, welfare)	Q3 2032	Q3 2032	4	4	92	92
Delivery of construction materials	Q3 2032	Q4 2032	6	4	92	92
Construction of the BESS	Q4 2032	Q1 2033	6	4	92	92
Demobilisation and equipment removal	Q1 2033	Q2 2033	4	4	92	92
Landscaping including biodiversity enhancements	Q4 2032	Q1 2033	2	2	46	46
Commercial operation	Q1 2033	N/A	0	0	0	2

6.3.1 Table 6.2 indicates that there would be a peak in vehicle movements in Q4 2032 when there is overlap between construction stage 2 and 3. A further but smaller peak would then occur in Q1 2033 when there is overlap between stages 3, 4 and 5. Noting, that stages 4 and 5 are considered to be less transport intensive.

Construction Workforce

6.3.2 It is estimated that there will be approximately 100 construction workers needed, but it is expected there will be a maximum of 75 staff on site at any one time. The number of staff on site will vary subject to the overall programme of works.

6.3.3 The Applicant has indicated that based on experience from another solar project development it is estimated around 1/3 (33%) of construction workers car share. It is considered reasonable to apply this car share mode split to the Proposed Development. This would suggest around 50 staff will potentially arrive at site by car.

6.3.4 It should be noted that it is anticipated that construction staff will be locally based where practicable and would likely arrive at site via the A525 from the east from Wrexham or further afield using the A483. Workers will arrive at site between 7-8am therefore missing the AM network peak hour and travelling in the opposite direction to the predominant traffic flow along A525 eastbound towards Wrexham (see traffic flow data provided in the Transport Statement).

6.3.5 It is expected that workers will leave the Site across the afternoon period depending on their working hours and the activities taking place on site. Therefore, the departure profile will be dispersed across several hours and the predominant direction of travel would be east towards

Wrexham and the A483. This would again be counter to the predominant traffic flow direction (westbound) identified in the PM as shown in the traffic flow data provide in the TS.

6.3.6 A framework Construction Workforce Travel Plan (CWTP) has been developed to help manage construction workforce travel and can be found in Section 7 below.

6.4 Cable Connection

6.4.1 The number of works vehicles likely to be on-site in the works area at any one time will vary from 2-4 dependent on the available space on-site and the construction activity taking place. For example, site set up might require one transit van, one small flatbed lorry and one rigid Hiab lorry to deliver barriers, fencing, cones and traffic signs and lights. During reinstatement works there may be one small flatbed lorry, one rigid Hiab lorry bringing plant and equipment and one tipper lorry delivering surface reinstatement materials.

6.4.2 Based on the scenario above it is likely that the Electrical Connection works will generate between 4-8 vehicle movements per day. This range of daily vehicle movements is likely to be consistent across the duration of the construction programme. It should also be noted that no additional vehicle movements will be needed to transport workers to site as they will all arrive via works vehicles.

6.4.3 The vehicle movements will be spread out across the day with workers arriving on-site in works vehicles at the start of shift between 07:00-08:00. Plant, equipment and materials will then be delivered as required across the working day dependent on the activities taking place. Any collections will likely take place later in the day. Deliveries will seek to be timed outside of network peak hours wherever practicable.

7 Framework Construction Workforce Travel Plan

7.1.1 A framework Construction Worker Travel Plan ('CWTP') has been developed to promote sustainable transport for workers during the construction and commissioning phases. This will be developed further once a Principal Contractor has been appointed and the final construction programme and worker numbers are confirmed. A final CTWP will be provided as part of a detailed CTMP to be submitted post planning consent.

Workforce Numbers

7.1.2 **Solar project and BESS:** There will be approximately 100 construction workers needed, but it is expected there will be a maximum of 75 staff on site at any one time. The number of staff on site will vary subject to the overall programme of works.

7.1.3 **Cable connection:** The size of the construction workforce required will likely vary from between 3-10 workers on-site at any one time depending on the size (length) of the works area and the construction activities taking place.

7.1.4 For the cable connection works all workers will travel to the work areas using works vehicles. The cable connection work areas will be accessed by works vehicles (vans and lorries) only. No private vehicle parking will be provided at the work areas. It is not expected that any workers will travel to the works area via public transport, cycling or walking. As only works vehicles (i.e. vehicles needed to complete the construction work) will be used for transporting workers to site and workers will generally be sharing vehicles which are themselves delivering plant and materials, then workforce commuting will be done efficiently and there will be no unnecessary vehicle journeys.

Objectives

7.1.5 Through the use of the CWTP the Principal Contractor will encourage the workforce and visitors to the site to:

- reduce their reliance on car travel;
- increase the use of walking cycling and public transport; and
- encourage work practices that reduce the need to travel, where practicable.

7.1.6 The Principal Contractor and subcontractors will seek to use a locally based workforce where practicable to help reduce the distance travelled to site and increase the potential to use non-car modes.

7.1.7 Members of the workforce living within 2km of the site will be encouraged to walk to work; those living within 5km of the site will be encouraged to cycle. All staff members will be encouraged to car share where practicable and to arrive on-site prior to the AM network peak hour.

7.1.8 The CWTP objectives describe the key 'goals' that the CWTP seeks to achieve. These aims are as follows:

i. To reduce carbon emissions associated with private car travel by encouraging the workforce to utilise sustainable modes of travel such as walking, cycling and public transport.

ii. To encourage efficiency in travelling to the site in order to reduce the impact and frequency of travel by the chosen mode such as by car sharing.

iii. To ensure members of the workforce are aware of the Travel Plan and its constituent measures.

iv. To reduce any transport impacts of the site on the local community.

v. Improve the health and well-being of the workforce by promoting the health benefits of active travel.

7.1.9 The above objectives will be achieved by introducing measures that focus on promoting access to the site by sustainable modes of transport as an alternative to the private car.

Measures

7.1.10 A number of measures and initiatives will be utilised to encourage sustainable travel choices amongst members of the workforce at the site. These will actively discourage reliance on private car use by influencing travel behaviour in favour of walking, cycling and public transport use. These will be developed further following the appointment of Principal Contractor.

Appoint Travel Plan Co-ordinator

7.1.11 A Travel Plan Coordinator ('TPC') who will champion initiatives to reduce the environmental impacts of workforce travel and to reduce the impacts of commuting on the local road network.

7.1.12 The TPC would:

- implement and actively promote Travel Plan measures to maximise the use of non-car modes of travel to and from work, such as:

vi. providing information on public transport services in the area;

vii. promoting the use of cycle facilities at the temporary construction compounds; and

viii. extolling the virtues of active travel and encouraging walking for those living within 2 km of or cycling for those living within 5 km.

ix. require workforce inductions, briefings and communications include information and guidance on the importance of environmentally friendly commuting.

x. act as a focal point for workforce commuting issues.

xi. manage the monitoring, assessment and review of workforce travel patterns.

xii. engage with subcontractors to encourage their workers to commute sustainably or utilise car sharing.

xiii. Workers that do drive to site will be encouraged to travel to site outside of identified network peak hours. In particular arriving at site before 8am.

7.1.13 Further measures that will be considered for implementation include but are not limited to:

7.1.14 Use of notice boards, Travel Plan events such as cycle maintenance, provision of comprehensive welfare facilities to encourage walking and cycling, identifying Travel 'Champions', providing a welcome/induction travel pack, providing cycle training opportunities, use of a workforce bus, providing workforce and visitor parking, providing electric vehicle charging facilities.

Workforce Trip Generation

7.1.15 As stated above it is estimated that a maximum of 75 staff will be on site at any one time depending on the activities being undertaken. The Applicant has indicated that based on experience from another solar project development they are estimating around 1/3 (33%) of construction workers car share. It is considered reasonable to apply this car share mode split to the Proposed Development. This would suggest around 50 staff will potentially drive to site.

Workforce and Visitor Parking

7.1.16 Based on the workforce trip generation stated above it is expected that around 50 car parking spaces will be provided on site for use by the workforce with additional spaces for occasional visitors. Parking provision will be kept under review and should demand for parking reduce over the course of the construction programme car parking spaces may be removed.

8 Implementing, Monitoring and Updating

8.1 Overview

8.1.1 This section provides an overview of how the CTMP will be implemented, monitored and, if necessary, updated.

8.1.2 An appointed Construction Logistics Manager will be in charge of implementing the CTMP on behalf of the Principal Contractor. Using the delivery / collection booking method stated in in Section 5, a record will be kept of vehicle visits to site to provide evidence on the number and type of vehicles, and the efficiency and accuracy of the visits made. This information will help highlight actual impacts of visits against predictions and identify areas where improvement or remedial measures may be needed. Through the vehicle booking system and site gate checks the following information will be collected and analysed:

8.1.3 Number of vehicle movements to site including:

- Total vehicle count by day
- Vehicle type/ size /age
- Vehicle arrival, departure and dwell time
- Delivery/collection accuracy compared to schedule

8.1.4 Breaches and complaints including:

- Vehicle routing
- Unacceptable queuing
- Unacceptable parking
- Supplier FORS accreditation (if applicable)

8.1.5 Safety including:

- Logistics-related accidents
- Record of associated fatalities and serious injuries
- Staff travelling mode
- Vehicles and operations not meeting safety requirements

8.2 Compliance Arrangements

8.2.1 For those suppliers and hauliers that fail to follow advice to avoid delivering during peak periods or conform to other instructions, the site manager will liaise with these operators to seek improvements in their level of compliance. Should no improvement be forthcoming the supplier may be removed from the contract.

An incident/ complaints register will be created into which incidents/ complaints can be recorded. Once entered, the incident/ complaint will be dealt with using the normal procedures that the main contractor has in place for its development site construction works.

8.3 Reporting & Review Arrangements

8.3.1 Weekly reviews of vehicle activity will be held between the site management group using the data collected as stated above. Where an issue or compliant is identified the site management group and the Construction Logistics Manager will implement remedial actions to provide a resolution.

Appendix A Correspondence with Welsh Government

AGENDA

Meeting Title: **Plas Power Solar Farm Transport Scoping**

Required Invitees: Doug Bailey, Cerys Jones, Matthew Phillips (WCBC), Katy McGuinness (Lightsource BP), Ryan Vincent, Shaun Gaffey, Tim Hapgood (Stantec).

Apologies:

Date of Meeting: Thursday 7th September 10.30 – 11.30

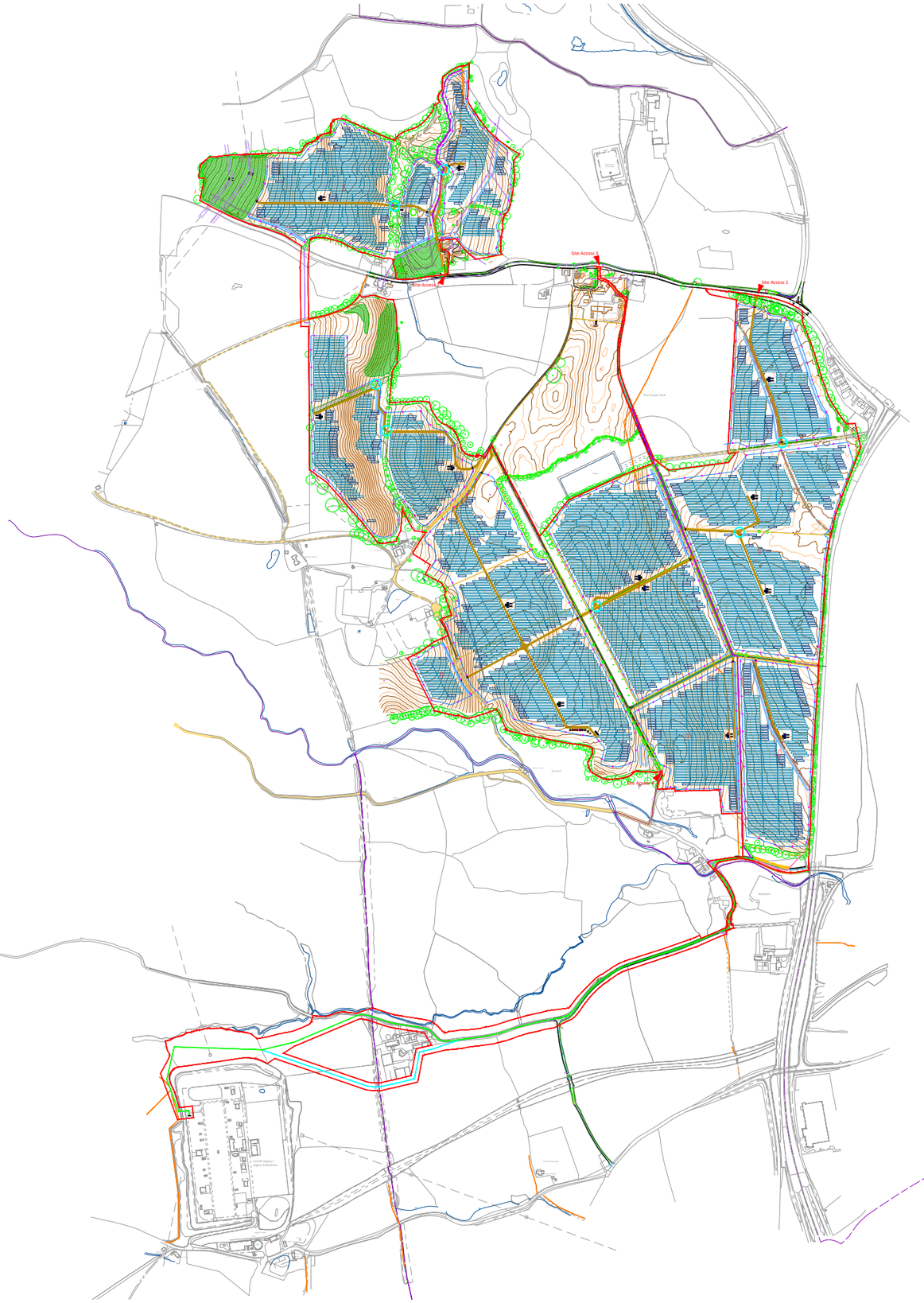
Location: Microsoft Teams

Item	Subject	Time (mins)
1.	Introductions	5
2.	Overview of the Project	5
3.	Site Location & Study Area ▪ A483 J4 Improvement Scheme	10
4.	Baseline conditions ▪ ATC – traffic flow and speed data ▪ Accident data	10
5.	Construction, operation, decommissioning ▪ Programme, trip gen, staffing, working hours ▪ Construction vehicle routes, site access, cable routes	15
6.	Approach to the DNS & Transport Scoping ▪ Environmental Statement ▪ Transport Statement ▪ Construction Traffic Management Plan	10
7.	Next Steps	5

Appendix B Indicative Site Layout Plans

GBR_Plas Power Solar & Battery Project_LP2 - Indicative Site layout_15

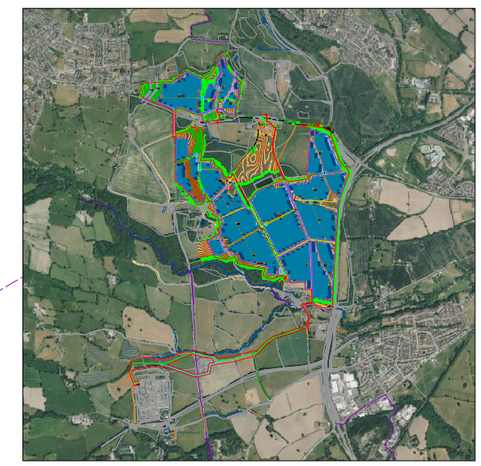
Area 1,355,959 m2 (335.06 acres)



- Site Boundary
- Site Access
- Security Fence
- Module Table 30 x 2
- Module Table 15 x 2
- Transformer
- Inverter
- Switchgear Substation
- PV Intake Substation
- GRP
- Customer Substation
- Monitoring House
- Auxiliary Transformer
- Spares Container
- Access Road
- Access Gates
- CCTV
- Toilet
- BESS Enclosure x 4
- BIC
- Twin MV Skid
- Backup Generator
- BESS Intake Substation
- Spares Container
- BESS Security Fence
- Landscape / Biodiversity
- Preferred Cable Route Option
- Cable Route Option 1
- Cable Route Option 2
- Cable Route Option 3
- Cable Route
- Existing PRoW
- Proposed PRoW diversion
- Possible hedge removal
- Indicative Swales
- Attenuation Pond
- Existing Access Road
- Existing Tree
- Existing Hedgerow/Vegetation
- Existing Ditch
- Cable Sealing End

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DA			22.05.2024
DRAWN	CHECKED	APPROVED	DATE

PROJECT NAME & ADDRESS:
Location: Plas Power Estate, Rhosrobin
Postcode: Caego, Wrexham, Wales

NOTES:
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Paper Size:	Scale:	Sheet:
A3	1:12500	1

CAPACITY:

DRAWING TITLE:
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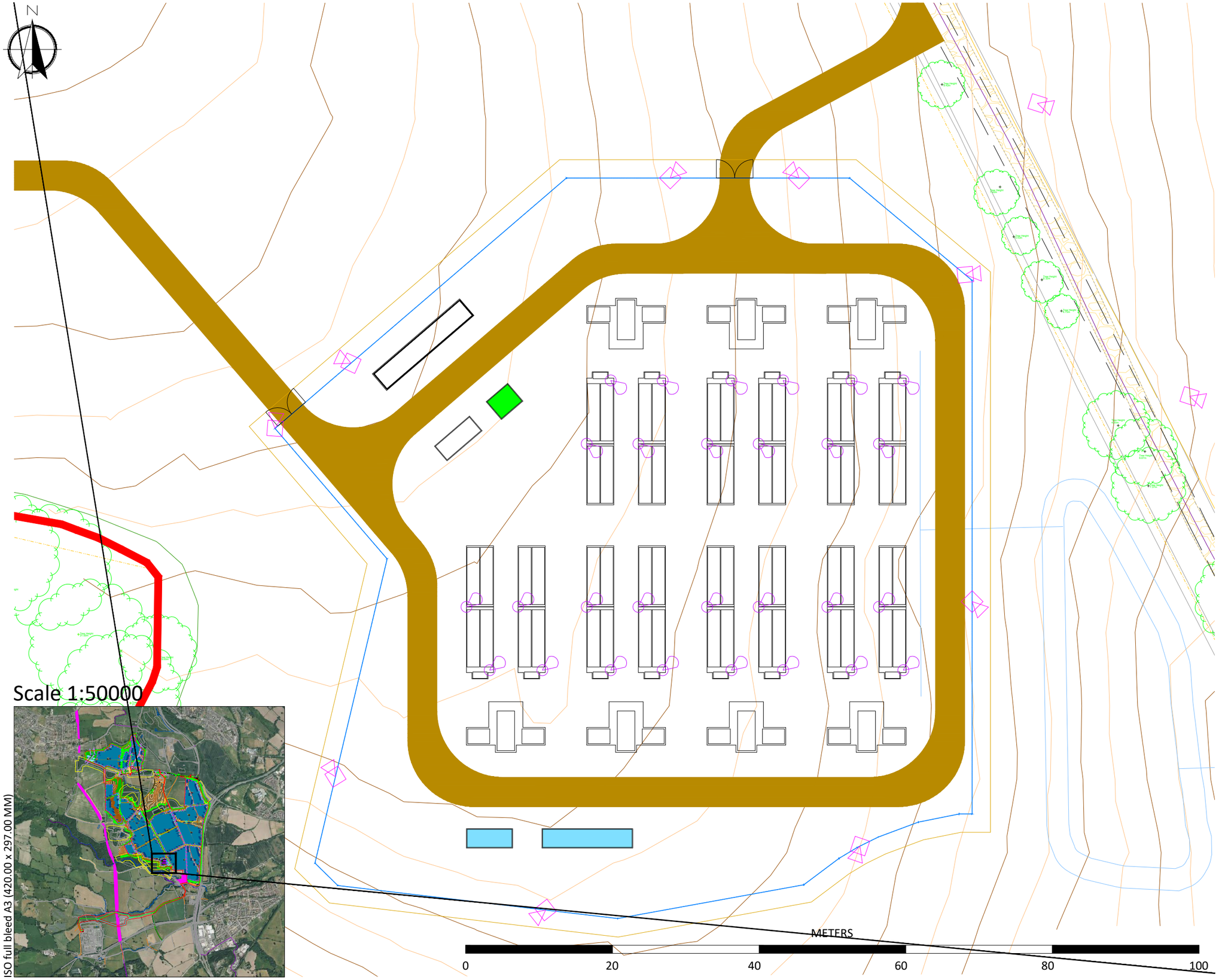
DRAWING NUMBER:	STATUS:
LP2-PDL-S	Pre-application Consultation

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GBR_Plas Power Solar & Battery Project_Indicative BESS Layout_03



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DA			22.05.2024

PROJECT NAME & ADDRESS:
Location: Plas Power Estate, Rhosrobin
Postcode: Caego, Wrexham, Wales

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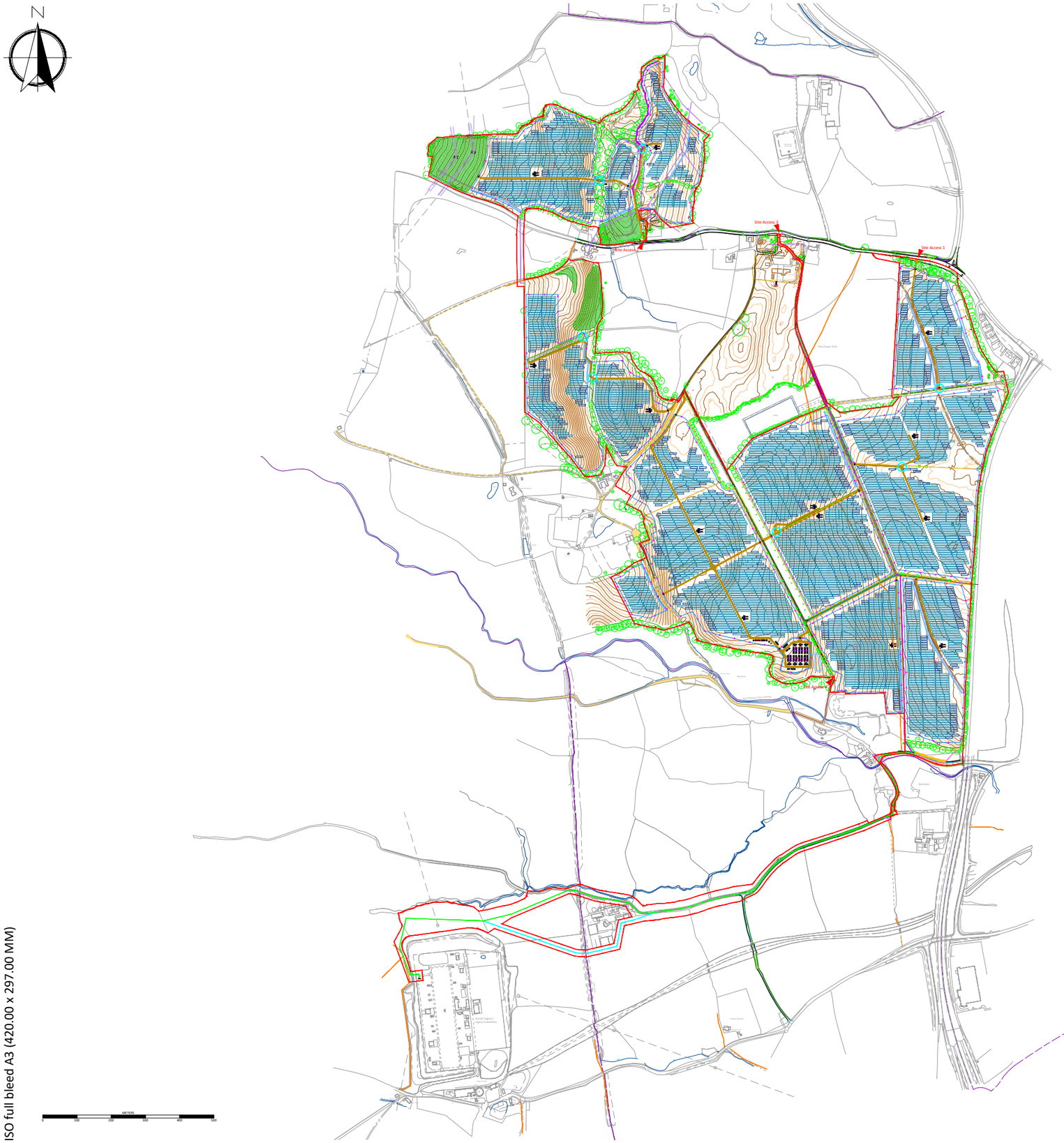
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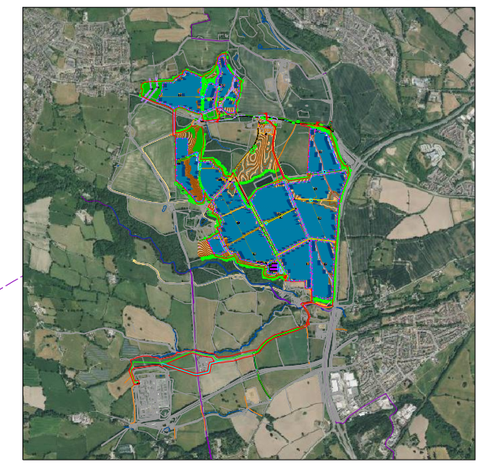
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- Existing Ditch
- Cable Sealing End

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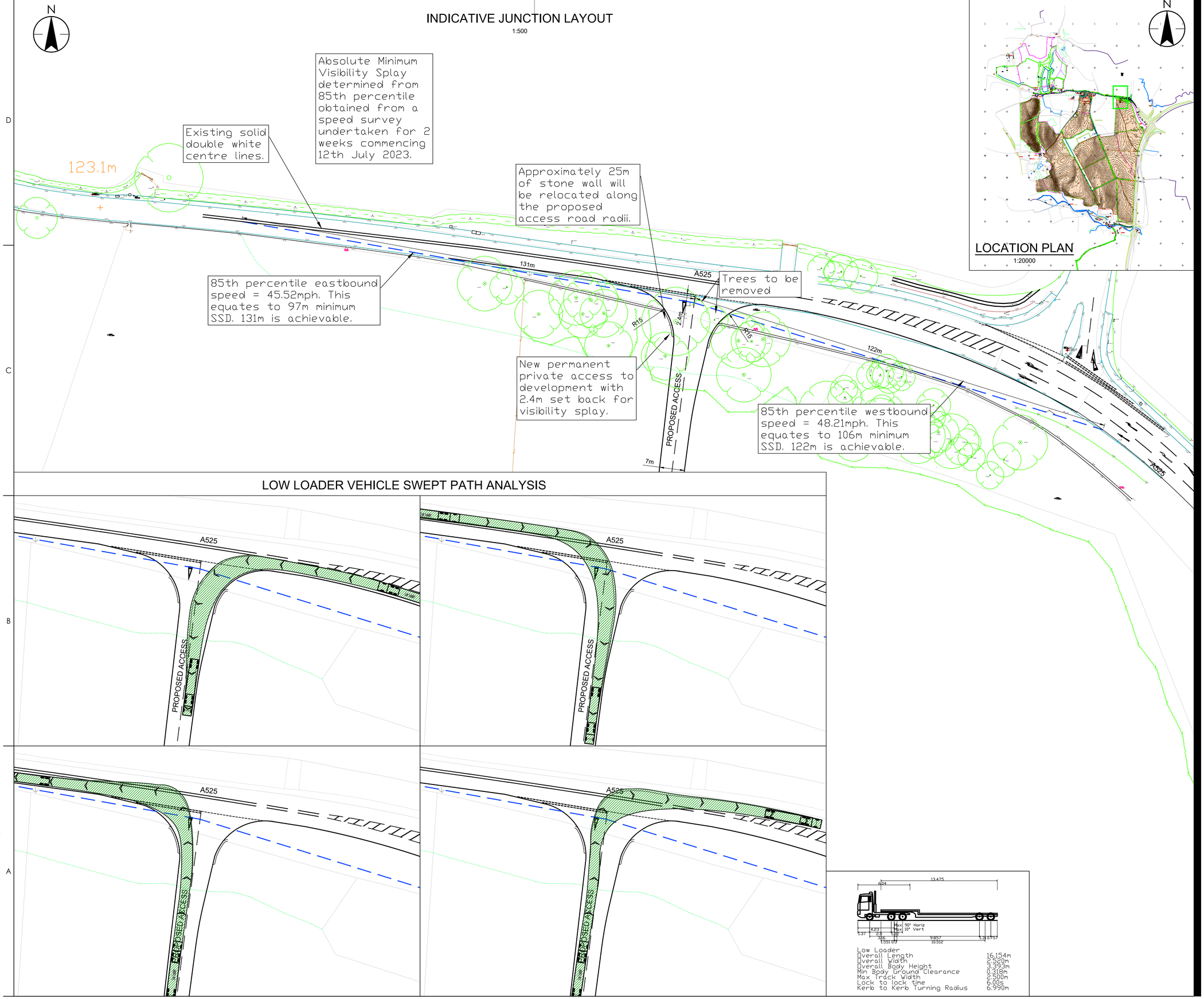
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Appendix C Concept Design Drawings and Swept Path Analysis

INDICATIVE JUNCTION LAYOUT

1:500



LOCATION PLAN

1:20000

LOW LOADER VEHICLE SWEPT PATH ANALYSIS

Low Loader	
Overall Length	16.154m
Overall Width	2.520m
Overall Body Height	3.393m
Min Body Ground Clearance	0.318m
Max Track Width	2.500m
Lock to lock time	6.00s
Kerb to Kerb Turning Radius	6.990m

Stantec

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NOTES:

1. SOUTHERN CONSTRUCTION ACCESS - SWEPT PATH ANALYSIS BASED ON 10mph/16kph SPEED.
2. SITE STOPPING DISTANCE (SSD) IS CALCULATED FROM THE AVERAGE DAILY 85TH PERCENTILE VEHICLE SPEED AND ASSUMES A 2 SECOND REACTION TIME AND DECELERATION RATE OF 0.375g.

KWM	MG	-	2023.10.04
Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

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LIGHTSOURCE BP

PLAS POWER SOLAR DEVELOPMENT

Title

INDICATIVE SOUTHERN SITE ACCESS

Project No.	Scale
330610724	AS SHOWN
Revision	**Drawing No.**
-	**330610724-SK-1200-001**

Plotted: 04.10.2023 10:04 10:15:32 AM By: Fowler, William
File Name: C:\Users\william.fowler\Stantec\Lightsource bp - Transport\04_drawings\cad\330610724sk\330610724-SK-1200-001_indicative southern construction access

INDICATIVE JUNCTION LAYOUT

1:500

Absolute Minimum Visibility Splay determined from 85th percentile obtained from a speed survey undertaken for 2 weeks commencing 12th July 2023.

Temporary widening during construction to existing access way.

2.0m visibility setback for construction access.

Existing solid double white centre lines.

85th percentile eastbound speed = 47.76mph. This equates to 105m minimum SSD. 112m is achievable.

85th percentile westbound speed = 45.52mph. This equates to 97m minimum SSD. 97m is achievable to solid double white centre lines.

Barn Hill

Foxes Hollow

A 525

144.5m

136.9

112m

97m

15m

2m

LOCATION PLAN

1:20000

VEHICLE SWEPT PATH ANALYSIS

Low Loader

Overall Length	16.154m
Overall Width	2.520m
Overall Body Height	3.393m
Min Body Ground Clearance	0.318m
Max Track Width	2.500m
Lock to lock time	6.00s
Kerb to Kerb Turning Radius	6.990m

Rigid Truck

Overall Length	12.000m
Overall Width	2.500m
Overall Body Height	3.928m
Min Body Ground Clearance	0.412m
Track Width	2.471m
Lock to lock time	6.00s
Kerb to Kerb Turning Radius	11.900m

Barn Hill

97m

15m

2m

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UTILITIES NOTE: The position of any existing public or private sewers, utility services, plant or apparatus shown on this drawing is believed to be correct, but no warranty to this is expressed or implied. Other such plant or apparatus may also be present but not shown. The Contractor is therefore advised to undertake their own investigation where the presence of any existing sewers, services, plant or apparatus may affect their operations.

NOTES:

1. NORTHERN CONSTRUCTION ACCESS - SWEPT PATH ANALYSIS BASED ON 5mph/8kph RESTRICTED SPEED LIMIT.
2. SITE STOPPING DISTANCE (SSD) IS CALCULATED FROM THE AVERAGE DAILY 85TH PERCENTILE VEHICLE SPEED AND ASSUMES A 2 SECOND REACTION TIME AND DECELERATION RATE OF 0.375g.

KWM	KWM	-	2023.09.29
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PLAS POWER SOLAR DEVELOPMENT

Title

INDICATIVE NORTHERN SITE CONSTRUCTION ACCESS

Project No.	Scale
330610724	AS SHOWN
Revision	Drawing No.
-	330610724-SK-1200-003

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Notes

UTILITIES NOTE: The position of any existing public or private sewers, utility services, plant or apparatus shown on this drawing is believed to be correct, but no warranty to this is expressed or implied. Other such plant or apparatus may also be present but not shown. The Contractor is therefore advised to undertake their own investigation where the presence of any existing sewers, services, plant or apparatus may affect their operations.

LEGEND

UTILITY LINETYPES

British Telecom		Gas	
Cable Television		Heating Pipes	
Closed Circuit Television		HV Cables	
Communications		Multiple Services Route	
Drainage		Oil	
Drainage - Combined Water		Oxygen	
Drainage - Foul Water		Street Lighting	
Drainage - Storm Water		Traffic Signal Loop	
Empty Duct		Unknown found by GPR	
Electric		Unknown	
Fire Hydrant Main		Unknown Cable	
Fibre Optic		Unknown Pipeline	
Fuel		Water	

Assumed Service Route - See GENERAL NOTES (Using abbreviation of service and colour as above)

UTILITY SURVEY INFORMATION

Area of Concern		Unable to Survey	UTS
Contracted Survey Area	CSA AREA	Unable to Lift (cover)	UTL
Previous Survey Area	PREVIOUS	Unable to Trace	UTT
Extent of (Post processed) GPR	GPR Survey	Unable to Trace (due to blockage)	UTB
Depth to Top of Service (metres)	(0.60d)	Unable to Trace Further	UTF
		End of Trace	UTE

ABBREVIATIONS used on a PAS 128 Survey

(0.65d B2P) 0.65d = Depth in metres, B2 = Quality Level, P = Post processed GPR

TOPOGRAPHIC & UTILITY DETAILS

Barrier (symbol - sized)		Pipe into Ground (symbol)	
Bellaha Beacon (symbol)	BCN	Post (symbol)	PO
Bollard (symbol)	BOL	Rain Water Pipe (symbol)	RWP
Borehole (symbol)		Road Sign (symbol)	RS
British Telecoms IC (sized)	BTIC	Rodding Eye (symbol)	RE
Building (incomplete detail)		Sapling (symbol)	
Cable into Ground (symbol)		Sign Post (symbol)	SP
Cable TV Box (symbol)	CTV	Spot Light (symbol)	SL
CCTV Camera (symbol)		Spot Height	50.00 +
Cover Level in metres	CL 50.00	Stop Cock (symbol)	SC
Direction of Flow (Drainage)		Stop Valve (symbol)	SV
Distribution Board (symbol)	DB	Survey Station (symbol)	
Earth Rod (symbol)	ER	Telephone Pole (symbol)	TP
Electric Cabinet (sized)	EC	Traffic Bollard (symbol)	
Electric Pole (symbol)	EP	Tree (dimensions in metres - e.g.)	
Electric Sign (symbol)	ES	Diameter at 1mh: (bole) / Height: / Spread: / Species:	Dbr 0.3 / Tot 7.5 / ht. 10.2 / Maple
Embankment			
Feeder Pillar (sized)	FP		
Fire Hydrant (sized)	FH	Traffic Light (symbol)	TL
Flag Pole (symbol)	FP	Unknown Valve (symbol)	UV
Flat Roof Level in metres	FRL 50.00	Vent Pipe (symbol)	VP
Flood Light (symbol)	FL	Wall	
Gas Valve (symbol)	GV	Waste Pipe (symbol)	WP
Gate		Water Meter (symbol)	WM
Ground Level in metres	GL 50.00	Water Valve (symbol)	WV
Gulley (sized)	GU	Building Canopy	
Inspection Cover (sized)	IC	Crash Barrier	
Invert Level in metres	IL 50.00	Drainage Channel	Drainage Channel
Junction Box - BT (sized)	JB BT	Drop Kerb (level in metres)	00.00
Junction Box - Comms (sized)	JB COM	Edge Detail (level in metres)	00.00
Junction Box - Elec (sized)	JB	Footpath (level in metres)	00.00
Lamp Post (symbol)	LP	Fence	
Light Bollard (symbol)	LB	Heras Fence	
Light in ground (symbol)	LIG	Kerb channel (level in metres)	00.00
Manhole (sized)	MH	Kerb top (level in metres)	00.00
Manhole Capped Port		Overhead Service Line	OHS
Parapet Level in metres	PL 50.00	Pedestrian Railing	
Pipe Diameter in millimetres	100		

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Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Issue Status

FOR INFORMATION

This document is suitable only for the purpose noted above.
Use of this document for any other purpose is not permitted.

Client/Project Logo

Client/Project

LIGHTSOURCE BP

PLAS POWER SOLAR DEVELOPMENT

Title

INDICATIVE SOUTHERN SITE ACCESS

Project No.
330610724

Scale
AS SHOWN

Revision
-

Drawing No.
330610724-SK-1200-004

Plotted: 04.10.2023 2023.10.04 10:19:57 AM By: Fowler, William
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Appendix D Stage 1 Road Safety Audit Response

Plas Power Solar and Battery Project

Stage 1 Road Safety Audit Response

On behalf of **Lightsource bp**

Project Ref: 332410749 | Rev: - | Date: February 2024

Document Control Sheet

Project Name: **Plas Power Solar and Battery Project**

Project Ref: **332511471**

Report Title: **Stage 1 Road Safety Audit Response**

Date: **February 2024**

	Name	Position	Signature	Date
Prepared by:	Will Fowler	Transport Planner	*W. Fowler*	February 2024
Reviewed by:	Tim Hapgood	Associate Transport Planner	*T. Hapgood*	February 2024
Approved by:	Adrian Neve	Director	*A. Neve*	February 2024
For and on behalf of Stantec UK Limited				

Revision	Date	Description	Prepared	Reviewed	Approved

This report has been prepared by Stantec UK Limited ('Stantec') on behalf of its client to whom this report is addressed ('Client') in connection with the project described in this report and takes into account the Client's particular instructions and requirements. This report was prepared in accordance with the professional services appointment under which Stantec was appointed by its Client. This report is not intended for and should not be relied on by any third party (i.e. parties other than the Client). Stantec accepts no duty or responsibility (including in negligence) to any party other than the Client and disclaims all liability of any nature whatsoever to any such party in respect of this report.

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Appendices

Appendix A Stage 1 Road Safety Audit

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1 Introduction

1.1.1 This Stage 1 Road Safety Audit Response Report has been prepared in response to a Stage 1 Road Safety Audit (RSA) carried out by TMS Consultancy, dated 1st December 2023. The RSA was undertaken for the proposed access arrangements for the Plas Power Solar and Battery Project.

1.1.2 Stantec has been commissioned by Lightsource bp (the Applicant) to produce a Transport Statement (TS) to support the Development of National Significance (DNS) application for the Plas Power Solar and Battery Project (herein referred to the 'Plas Power Project' or 'Proposed Development' to the west of Wrexham.

1.1.3 The audit comprised an examination of the documents listed below.

- Stage 1 Road Safety Audit Brief Document
- ATC survey results
- Swept Path Analysis and Visibility Splays Drawing (Northern Access) –

  330610724-SK-1200-001_Indicative Southern Construction Access
- Swept Path Analysis and Visibility Splays Drawing (Southern Access) –

  330610724-SK-1200-003A_Indicative Northern Construction Access

1.1.4 The site was visited by the Audit Team on Wednesday 29th November 2023 at 12pm. The weather was sunny and the road surface was damp. Traffic flows were moderate to high. There were no pedestrian or cycle flows.

1.1.5 This document intends to respond to the comments and recommendations raised in the Stage 1 Road Safety Audit. The report details whether the RSA recommendations are accepted, accepted with alternative solution, or disagreed. This report will be issued to the RSA team for information and to the Overseeing Organisation, Wrexham County Borough Council (WCBC), to seek agreement with the responses provided.

1.2 Key Organisations

1.2.1 The Stage 1 Road Safety Audit has been requested by WCBC, who are the Overseeing Organisation. The Design Organisations is Stantec UK Limited. The Third-Party Organisation is Lightsource bp. The key personnel involved from each respective organisation are listed below.

Overseeing Organisation

Wrexham County Borough Council – Doug Bailey, Development Control Engineer, Environment and Technical Services

Road Safety Audit Team

Audit Team Leader – Harminder Aulak – BSc (Hons), IEng, FIHE, RegRSA (IHE) National Highways Approved RSA Certificate of Competency

Audit Team Member – Lee Williams – BSc (Hons), MIHE National Highways Approved RSA Certificate of Competency

Design Team

Stantec – Tim Hapgood, Associate Transport Planner

Stantec – Will Fowler, Transport Planner

Stantec – Adrian Neve, Director

Third Party Organisation

Lightsource bp – Katy McGuinness, Head of Environmental Planning, Northern Europe

1.3 Proposed Highway Works

Northern Parcel Access (Access 1):

1.3.1 Junction improvement works to reconfigure the access to facilitate safe turning movements for HGVs. Right turn in, left turn out only. Improvement of visibility splays at junction with some removal of vegetation, based on Absolute Minimum Visibility Splay determined from 85th percentile eastbound and westbound speeds. Temporary warning signage to identify the works access. Potential temporary speed reduction if identified as necessary.

Southern Parcel Access (Access 2):

1.3.2 Construction of new private access along the A525 to serve as main temporary construction access point. Access 2 will also serve as the permanent maintenance access during the development's operation. Access junction will allow for all turning movements but predominantly left in and right out. Access will include 2.4m setback for visibility splays at junction (particularly for A525 west). Construction will include the removal of approximately 25m of the existing wall and removal of two trees.

1.3.3 A copy of the Road Safety Audit can be found at Appendix A of this Response.

2 Designer's Response

2.1 Problem 1 (Visibility Splays)

Location: Both Access 1 and Access 2

Summary: The visibility splays from both accesses appear to be calculated in accordance with the visibility formula given in Manual for Streets 2 (MfS 2). The formula in MfS 2 is recommended where speed limits are up to 40mph, or where actual measured 85 percentile speeds are up to 37mph. Otherwise, visibility splays (or stopping sight distance (SSD)) should be in accordance with Table 2.10 of DMRB CD 109 Highway Link Design.

Visibility splays below DMRB values on higher-speed inter-urban roads could increase the risk of pull-out collisions at junctions, especially in this case where heavy vehicles are likely to be emerging at low speed from the construction accesses.

Recommendation

2.1.1 It should be ensured that the visibility splays at the junction are in accordance with the values given in DMRB CD 109. In this case, the visibility splays at both accesses should have y-distances of 160m, based on the measured 85 percentile speeds giving a design speed of 80kph.

2.1.2 To achieve these distances, additional vegetation and other obstructions such as walls and signs would need to be removed.

Design Team Response

Disagree.

2.1.3 According to DMRB CD 109, the design speed for the road is 85kmph (although the recorded 85th percentile recorded speed is lower). It is agreed that the desirable minimum SSD for this design speed is 160m as demonstrated in the Table 1 below. However, CD 109 also states that Band A all purpose roads have a permitted relaxation of 2 steps, as demonstrated in Table 2, meaning the absolute minimum SSD is 90m.

Table 1 - DMRB CD 109 Table 2.10 Extract

Design speed kph	120	100	85	70	60	50
Stopping sight distance (metres)						
Desirable minimum	295	215	160	120	90	70
One step below desirable minimum	215	160	120	90	70	50

Table 2 - DMRB CD 109 Table 3.1

Road type	Design speed band	Permitted relaxation
Motorways	Band A	1 step
Motorways	Band B	2 steps
All-purpose	Band A	2 steps
All-purpose	Band B	3 steps

2.1.4 The visibility splays presented are in excess of the absolute minimum SSD of 90m and is therefore DMRB compliant.

2.1.5 The formula used to determine the visibility splay distances presented used the reaction time (2s) and deceleration rate (3.679m/s), in accordance with DMRB. Using the 85th percentile recorded speed is an industry standard methodology to determine an SSD more specific to the road.

2.1.6 The access will also have signage in advance to make approaching vehicles aware of the junction and cautious of possible manoeuvres. Vehicles turning left out of the access can do so without overrunning the opposing lane. The temporary nature of the access, the relatively low vehicle movements and the 85th percentile speed being below the road design speed, justifies the use of the absolute minimum SSD rather than the desirable minimum.

2.2 Problem 2 (Left turn movement onto A525 by HGVs)

2.2.1 **Location:** Access 1

2.2.2 **Summary:** The swept path analysis shows that HGVs turning left onto the A525 from the access would encroach into the westbound traffic lane on the major road.

Recommendation

2.2.3 The geometry of the access should be amended to allow HGVs to accomplish the left turn manoeuvre without encroaching into the opposing traffic lane.

Design Team Response

Accept.

2.2.4 An access taper has been added to prevent left-out vehicles overrunning the centreline. An extract of the updated tracking is included below

2.3 Problem 3 (Conspicuousness of access)

2.3.1 **Location:** Access 1

2.3.2 **Summary:** Risk of collisions if road users fail to identify the position of the access.

2.3.3 There are heavy tree canopies along the A525 where the access is located and due to the bends either side, the position is discreet and can easily be missed by road users. Unfamiliar drivers delivering to the site may brake late, swerve suddenly, or attempt to U-turn further along the road. These types of maneuvers could result in collisions, such as shunts, loss of control and side swipes.

Recommendation

2.3.4 The tree canopies should be cut back to improve natural light at the access. The access should also be highlighted by measures such as marker posts which road users could easily identify. Suitable advance temporary signs indicating the access should also be provided.

Design Team Response

Accept.

2.3.5 Tree canopy can be cut back as necessary prior to commencement of construction subject to input from the arboriculturist. Temporary warning signage to identify the works access will also be installed.

2.4 Problem 4 (Existing road markings)

2.4.1 **Location:** Access 1

2.4.2 **Summary:** Worn road markings and reflective road studs could increase the risk of collisions at the access.

Recommendation

2.4.3 The road markings should be renewed (which is likely to require periodic attention over the construction period). The road studs should also be inspected and replaced if necessary.

Design Team Response

Disagree.

2.4.4 **Renewal of l**ine markings and road studs are considered to be a **highway** maintenance issue, it is suggested this should be reviewed by the local highway authority, WCBC.

2.5 Problem 5 (Street lighting)

2.5.1 **Location:** Access 2

2.5.2 **Summary:** Risk of collisions if junction is in partial darkness at night.

2.5.3 The existing street lighting will end a short distance to the west of the new junction. Therefore, at night the junction could be in partial darkness and at a point where the eyesight of road users may not transition fully from an unlit to lit area (and vice versa). This could increase the risk of collisions involving road users braking suddenly, swerving or turning abruptly, such as shunts and loss of control collisions.

Recommendation

2.5.4 The street lighting should be assessed and extended as necessary to ensure the junction and immediate approach is suitably illuminated at night.

Design Team Response

Disagree.

2.5.5 The access is considered to be within the street lighting area with existing streetlamps either side of the access on the northern side of the road. Turning movements will be primarily left-in, right-out movements. Vehicle use of the access will take place primarily during daylight hours with no overnight deliveries anticipated.

2.6 Problem 6 (Gradient of minor road arm of junction)

2.6.1 **Location:** Access 2

2.6.2 **Summary:** Risk of collisions involving slow moving HGVs pulling out on to the major road.

Recommendation

2.6.3 It should be ensured that a level dwell area over a suitable distance (to accommodate HGVs) is provided on the approach to the give-way line of the junction.

Design Team Response

Accept.

2.6.4 Levelling works to be undertaken. Access will be within acceptable gradient tolerances – no greater than 1 in 20 - in accordance with Designing for Deliveries guidance (Logistics UK).

2.7 Problem 7 (Existing Information Sign to the west of the new junction)

2.7.1 **Location:** Access 2

2.7.2 **Summary:** Risk of pull-out type collisions if visibility splay is obstructed by an Information Sign.

Recommendation

2.7.3 The sign should be relocated out of the visibility splay.

Design Team Response

Accept.

2.7.4 Suitable relocation position for the sign will be agreed with WCBC.

3 Organisation Statements

3.1 Design Organisation Statement

On behalf of the design organisation I certify that: **1) the RSA actions identified in response to the road safety audit problems in this road safety audit have been discussed and agreed with the Overseeing Organisation.**	
Name:	Tim Hapgood
Signed:	*Tim Hapgood*
Position:	Associate Transport Planner
Organisation:	Stantec
Date:	01.02.24

3.2 Overseeing Organisation Statement

On behalf of the Overseeing Organisation I certify that: **1) the RSA actions identified in response to the road safety audit problems in this road safety audit have been discussed and agreed with the design organisation; and** **2) the agreed RSA actions will be progressed.**	
Name:	
Signed:	
Position:	
Organisation:	
Date:	

Appendix A Stage 1 Road Safety Audit

safer roads for everyone

Plas Power Solar and Energy Storage Project A525 Wrexham, Wales

Road Safety Audit Stage 1

on behalf of Wrexham County Borough Council

Stantec for Lightsource bp

TMS reference no: 18189

Date: 1st December 2023

Revision: 0

THE CHARTERED INSTITUTION OF HIGHWAYS & TRANSPORTATION

INSTITUTE OF HIGHWAY ENGINEERS

QMS ISO 9001 REGISTERED

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1. Project Details

Report Title:	Plas Power Solar and Energy Storage Project A525 Wrexham, Wales Road Safety Audit Stage 1
Author	Harminder Aulak
Document Ref No:	TMS Report Ref No: 18189
Revision	0
Prepared by:	TMS Consultancy
On behalf of:	Wrexham County Borough Council (Overseeing Organisation)
TMS Client	Stantec for Lightsource bp

Document Control Sheet

Issue No	Revision	Audit Team	Completion Date	TMS Issue Date
1	0	HA / LW	01/12/2023	01/12/2023

2. Introduction

2.1 This report describes a Stage 1 Road Safety Audit carried out on access proposals for a new Plas Power Solar and Energy Storage Project on land off the A525 to the west of Wrexham, on behalf of Stantec for Lightsource bp.

2.2 The audit team members were as follows:

Audit Team Leader

Harminder Aulak – BSc (Hons), IEng, FIHE, RegRSA (IHE)
National Highways Approved RSA Certificate of Competency
Technical Director – Engineering Services, TMS Consultancy

Audit Team Member

Lee Williams – BSc (Hons), MIHE
National Highways Approved RSA Certificate of Competency
Principal Engineer, TMS Consultancy

2.3 The audit comprised an examination of the documents listed in **Appendix A**. The Road Safety Audit was undertaken in accordance with the instructions from Tim Hapgood of Stantec.

2.4 The site was visited by the Audit Team on Wednesday 29th November 2023 at 12pm. The weather was sunny and the road surface was damp. Traffic flows were moderate to high. There were no pedestrian or cycle flows.

2.5 The terms of reference of the Road Safety Audit are as described in GG 119 Revision 2. The team has examined and reported only on the road safety implications of the scheme as presented and has not examined or verified the compliance of the design to any other criteria.

2.6 All of the problems described in this report are considered by the audit team to require action in order to improve the safety of the scheme and minimise collision occurrence.

2.7 Scheme drawings are included in **Appendix B**, where the locations of specific problems are referenced. A location plan of the scheme is also included in this Appendix.

2.8 The scheme consists of two accesses for the Plas Power Project, with both located on the A525 to the west of Wrexham. Descriptions of the two accesses are as follows:

Northern Parcel Access (Access 1):
Junction improvement works are proposed to reconfigure an existing access to facilitate safe turning movements for HGVs. Only right turn in and left turn out movements will be permitted. Improvements to visibility will be carried out with some removal of vegetation. Temporary warning signage is proposed to identify the works access. A potential temporary speed reduction if identified will be implemented as necessary. The speed limit of the road is currently 50mph and no street lighting is present.

Southern Parcel Access (Access 2):
The scheme consists of the construction of a new private access (to the west of Hermitage Way) to serve as the main temporary construction access point. Access 2 will also serve as the permanent maintenance access during the development's operation. The junction will allow for all turning movements, but the predominant movements will be left in and right out. The construction will include the removal of approximately 25m of the existing wall and removal of two trees, which will improve visibility. The speed limit is currently 50mph and street lighting is present.

2.9 **Road Safety Audit Response Report**

Following the completion of the road safety audit, the design team should prepare a road safety audit response report in collaboration with the Overseeing Organisation.

The response report should incorporate the following:

- **Decision Log** spreadsheet, where each Problem and Recommendation in the Safety Audit report is reiterated
- In the Decision Log, a response should be provided by the Design Team and Overseeing Organisation for each problem raised in the RSA report, together with an agreed action

Further information is provided in **GG 119 Sections 4.11 to 4.19** and **Appendix F** (where a road safety audit response report template is available).

The response report should be produced and finalised within *one month* of the issue of the RSA report. A copy of the response report should be issued to the Safety Audit Team for information.

3. Items resulting from the Stage 1 Audit Road Safety Audit

3.1 PROBLEM

Location: Visibility splays at both Access 1 and Access 2

Summary: Risk of pull-out type collisions if visibility splays are below DMRB recommended values.

The visibility splays from both accesses appear to be calculated in accordance with the visibility formula given in Manual for Streets 2 (MfS 2). The formula in MfS 2 is recommended where speed limits are up to 40mph, or where actual measured 85 percentile speeds are up to 37mph. Otherwise, visibility splays (or stopping sight distance (SSD)) should be in accordance with Table 2.10 of DMRB CD 109 Highway Link Design.

Visibility splays below DMRB values on higher-speed inter-urban roads could increase the risk of pull-out collisions at junctions, especially in this case where heavy vehicles are likely to be emerging at low speed from the construction accesses.

RECOMMENDATION

It should be ensured that the visibility splays at the junction are in accordance with the values given in DMRB CD 109. In this case, the visibility splays at both accesses should have y-distances of 160m, based on the measured 85 percentile speeds giving a design speed of 80kph.

To achieve these distances, additional vegetation and other obstructions such as walls and signs would need to be removed.

3.2 PROBLEM

Location: Access 1 – Left turn movement onto A525 by HGVs

Summary: Risk of collisions between left turning HGVs and westbound traffic on the A525.

The swept path analysis shows that HGVs turning left onto the A525 from the access would encroach into the westbound traffic lane on the major road. Drivers travelling westbound may not expect to encounter HGVs in their lane in a head-on position (especially as forward visibility may be limited by the right-hand bend in the road) and collisions could occur as a result.

RECOMMENDATION

The geometry of the access should be amended to allow HGVs to accomplish the left turn manoeuvre without encroaching into the opposing traffic lane.

3.3 PROBLEM

Location: Access 1 – Conspicuousness of access

Summary: Risk of collisions if road users fail to identify the position of the access.

There are heavy tree canopies along the A525 where the access is located and due to the bends either side, the position is discreet and can easily be missed by road users. Unfamiliar drivers delivering to the site may brake late, swerve suddenly, or attempt to U-turn further along the road. These types of manoeuvres could result in collisions, such as shunts, loss of control and side swipes.

RECOMMENDATION

The tree canopies should be cut back to improve natural light at the access. The access should also be highlighted by measures such as marker posts which road users could easily identify. Suitable advance temporary signs indicating the access should also be provided.

3.4 PROBLEM

Location: Access 1 – Existing road markings

Summary: Worn road markings and reflective road studs could increase the risk of collisions at the access.

The existing double white line system along the centre of the carriageway is becoming worn and faded. The condition of the reflective studs is also not known. When the access is in use, the scrubbing action caused by the tyres of heavy vehicles is likely to accelerate the deterioration. Worn road markings (and road studs) would reduce the effectiveness of the features and potentially increase the risk of collisions at the access involving turning vehicles.



RECOMMENDATION

The road markings should be renewed (which is likely to require periodic attention over the construction period). The road studs should also be inspected and replaced if necessary.

3.5 PROBLEM

Location: Access 2 – Street lighting

Summary: Risk of collisions if junction is in partial darkness at night.

The existing street lighting will end a short distance to the west of the new junction. Therefore, at night the junction could be in partial darkness and at a point where the eyesight of road users may not transition fully from an unlit to lit area (and vice versa). This could increase the risk of collisions involving road users braking suddenly, swerving or turning abruptly, such as shunts and loss of control collisions.

RECOMMENDATION

The street lighting should be assessed and extended as necessary to ensure the junction and immediate approach is suitably illuminated at night.

3.6 PROBLEM

Location: Access 2 – Gradient of minor road arm of junction

Summary: Risk of collisions involving slow moving HGVs pulling out on to the major road.

The existing land to the south of the A525 falls away from the carriageway. Therefore, the minor arm could have a steep uphill gradient towards the give-way line of the junction. This could result in HGVs being slow moving as they enter the major carriageway, potentially increasing the risk of collisions with other vehicles travelling along the A525.

RECOMMENDATION

It should be ensured that a level dwell area over a suitable distance (to accommodate HGVs) is provided on the approach to the give-way line of the junction.

3.7 PROBLEM

Location: Access 2 – Existing Information Sign to the west of the new junction

Summary: Risk of pull-out type collisions if visibility splay is obstructed by an Information Sign.

There is a large Information Sign (giving distances to settlements) on the southern side of the A525, which is likely to be within the right-hand visibility splay at the new junction. Obstructions to the visibility splay could increase the risk of pull-out type collisions, particularly involving HGVs.



RECOMMENDATION

The sign should be relocated out of the visibility splay.

4. Audit Team Statement

We certify that the terms of reference of the road safety audit are as described in GG 119 Revision 2.

Audit Team Leader

Harminder Aulak – BSc (Hons), IEng, FIHE, RegRSA (IHE) National Highways Approved RSA Certificate of Competency Technical Director – Engineering Services, TMS Consultancy

Signed	[redacted]
Date	1st December 2023

Audit Team Member

Lee Williams – BSc (Hons), MIHE National Highways Approved RSA Certificate of Competency Principal Engineer, TMS Consultancy

Signed	[redacted]
Date	1st December 2023

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Appendix A

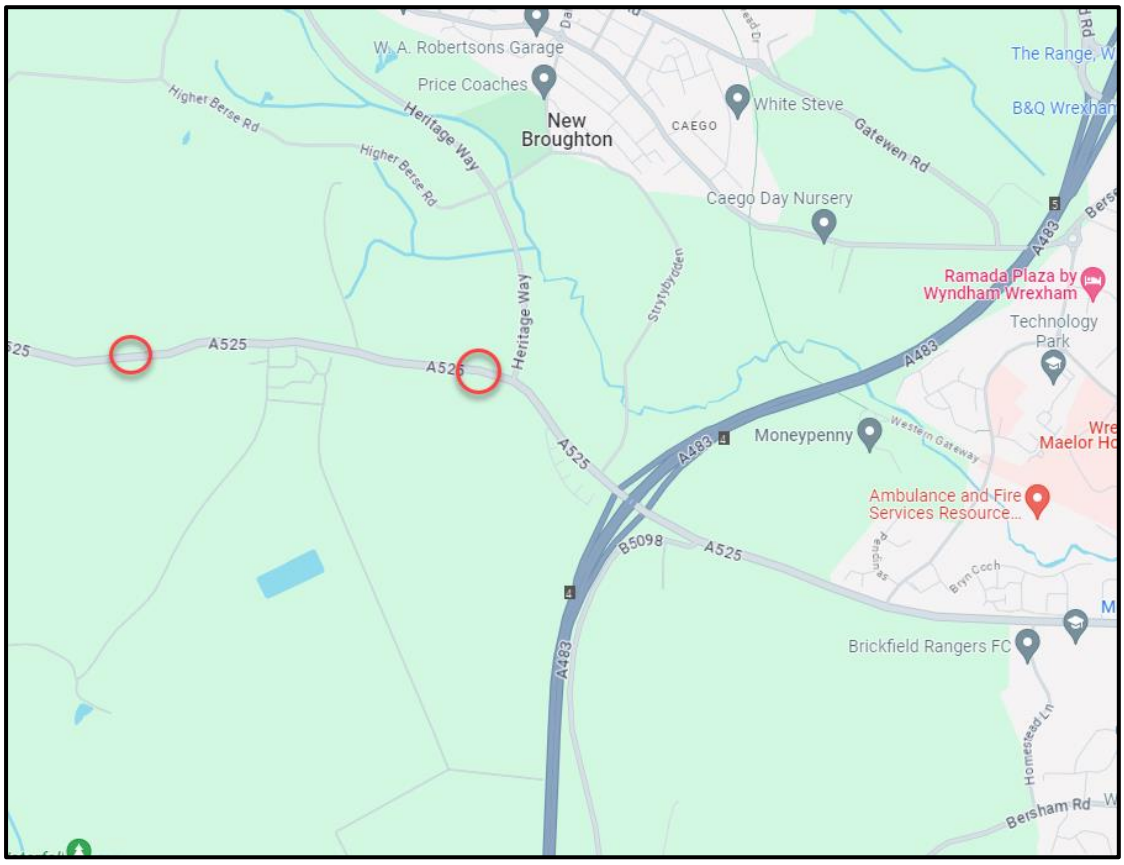
Documents Examined:

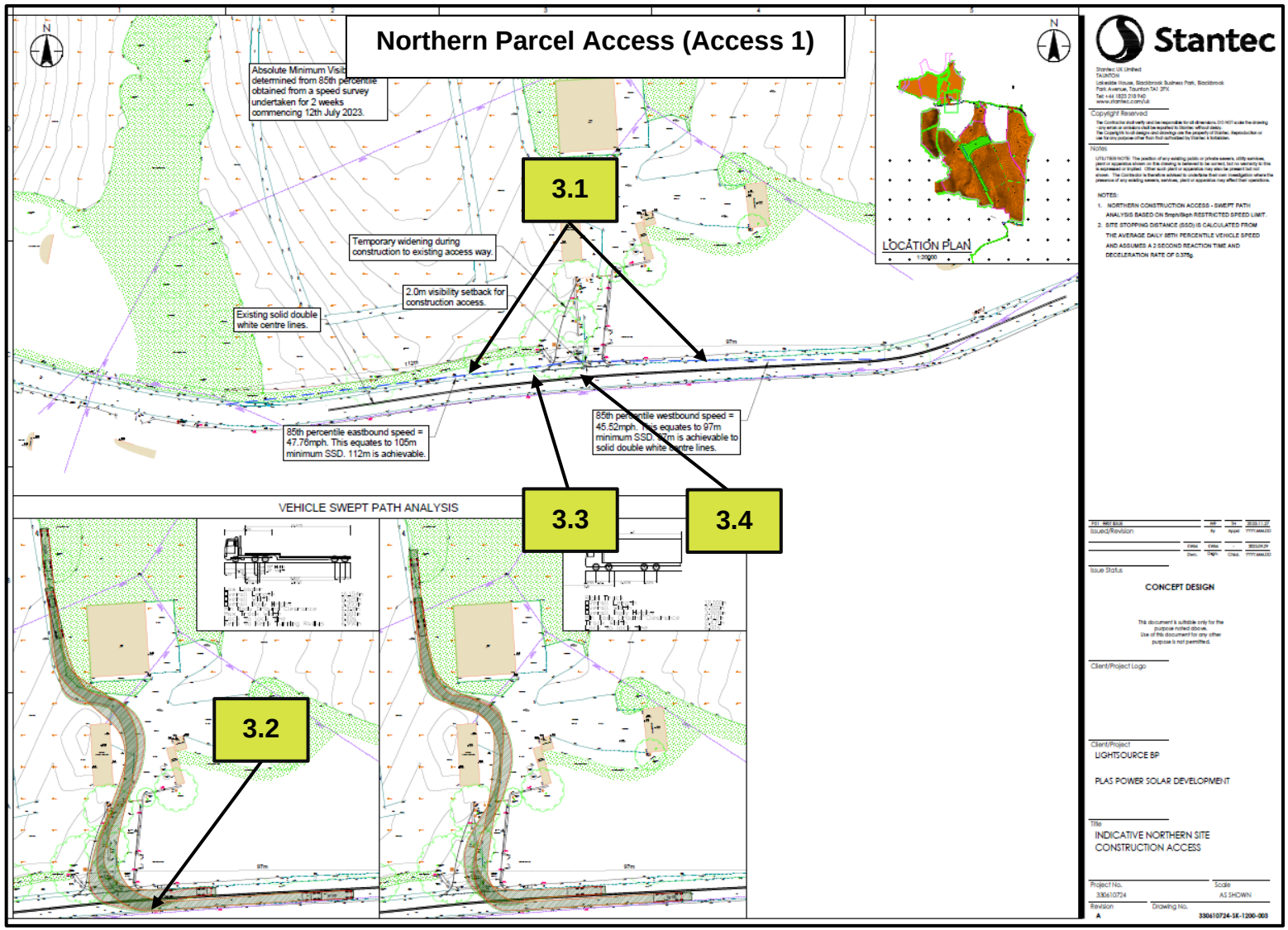
- 231121 Plas Power RSA 1 Brief 330610724.docx
- 231127 Plas Power RSA 1 Brief 330610724.pdf
- 330610724-SK-1200-001_Indicative Southern Construction Access.pdf
- 330610724-SK-1200-003A_Indicative Northern Construction Access.pdf
- RSA1 - Checklist of Information Required - Plas Power 231121.docx

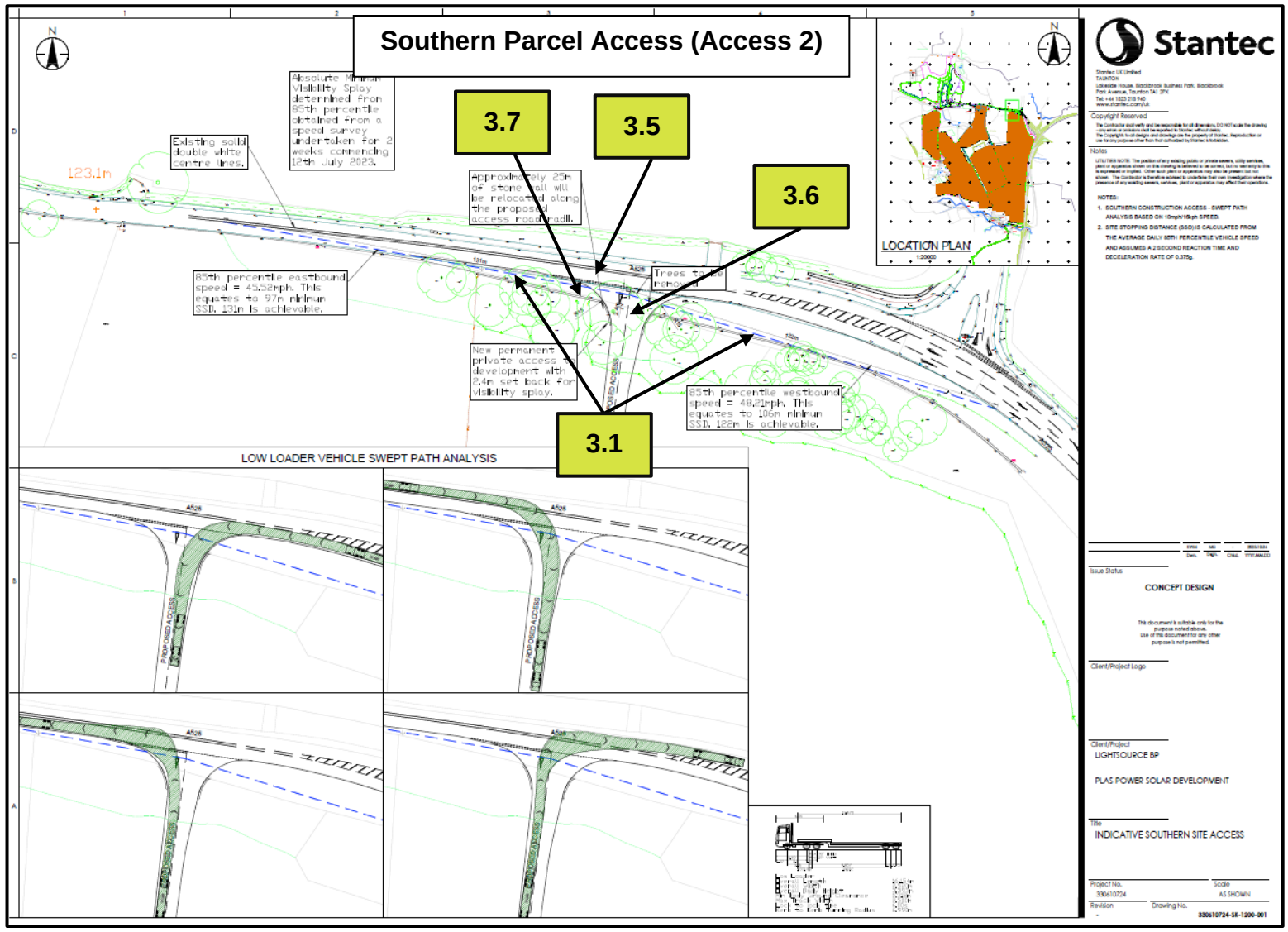
Appendix B

Please refer to the following pages for plans illustrating the locations of the problems identified as part of this audit (location numbers refer to paragraph numbers in the report).

The location of the scheme is shown below:




Northern Parcel Access (Access 1)
Absolute Minimum Visib
determined from 85th percentile
obtained from a speed survey
undertaken for 2 weeks
commencing 12th July 2023.
3.1
Temporary widening during
construction to existing access way.
2.0m visibility setback for
construction access.
Existing solid double
white centre lines.
85th percentile eastbound speed =
47.76mph. This equates to 105m
minimum SSD. 112m is achievable.
85th percentile westbound speed =
45.52mph. This equates to 97m
minimum SSD. 97m is achievable to
solid double white centre lines.
LOCATION PLAN
VEHICLE SWEPT PATH ANALYSIS
3.2
3.3
3.4
Stantec
NOTES:
1. NORTHERN CONSTRUCTION ACCESS - SWEPT PATH
ANALYSIS BASED ON 8mph/8kph RESTRICTED SPEED LIMIT.
2. SITE STOPPING DISTANCE (SSD) IS CALCULATED FROM
THE AVERAGE DAILY 85TH PERCENTILE VEHICLE SPEED
AND ASSUMES A 2 SECOND REACTION TIME AND
DECELERATION RATE OF 0.375g
Issued/Revision
Issue Status
CONCEPT DESIGN
Client/Project Logo
Client/Project
LIGHTSOURCE BP
PLAS POWER SOLAR DEVELOPMENT
Title
INDICATIVE NORTHERN SITE
CONSTRUCTION ACCESS
Project No.
33610724
Scale
AS SHOWN
Revision
A
Drawing No.
33610724-SK-1200-003


Southern Parcel Access (Access 2)
3.7
3.5
3.6
3.1
Existing solid double white centre lines.
Absolute Minimum Visibility Splay determined from 85th percentile obtained from a speed survey undertaken for 2 weeks commencing 12th July 2023.
Approximately 25m of stone wall will be relocated along the proposed access road infill.
85th percentile eastbound speed = 45.32mph. This equates to 97m minimum SSD. 123m is achievable.
New permanent private access to development with 2.4m set back for visibility splay.
85th percentile westbound speed = 48.21mph. This equates to 106m minimum SSD. 122m is achievable.
LOW LOADER VEHICLE SWEPT PATH ANALYSIS
LOCATION PLAN
Stantec
CONCEPT DESIGN
LIGHTSOURCE BP
PLAS POWER SOLAR DEVELOPMENT
INDICATIVE SOUTHERN SITE ACCESS
330610724-SK-1200-001