Cardiff Parkway Developments Ltd

Cardiff Parkway

Outline Construction Environmental Management Plan

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1 Introduction

1.1 Project overview

Cardiff Parkway Developments Limited (CPDL) is proposing a development at Cardiff Hendre Lakes. The proposed development will comprise:

- A new railway station comprising the formation of up to 4 no. platforms on the South Wales Mainline Railway;
- A station building with up to 2,500m^2 gross external floor area, passenger concourse and forecourt, transport interchange, car parking, ancillary uses and associated infrastructure works; and
- A business park comprising development in the B1, B2 and B8 use classes with up to 90,000m^2 gross external floor area, ancillary uses and associated infrastructure works.

1.2 Purpose of the outline CEMP

This document is the outline Construction Environmental Management Plan (CEMP) to accompany the planning application for the proposed development.

The outline CEMP contains control measures, and the standards to be implemented throughout the construction of the works in order to mitigate impacts during construction which have been identified during the Environmental Impact Assessment (EIA) that was prepared for the outline planning application for Cardiff Hendre Lakes.

The Contractor would be responsible for producing the final CEMP in accordance with the requirements set out in this document. It is likely that the final CEMP would be a condition of planning to be agreed with and approved by Cardiff Council before commencement of construction. The CEMP will therefore evolve and is subject to refinement, amendment and expansion as necessary.

1.3 Guidance and other documents

The outline CEMP is intended to satisfy the principles of the International Environmental Management Systems (EMS) Standard ISO 14001. The appointed Contractor(s) would ensure that the CEMP for the proposed development complies with the Contractor(s)'s own EMS.

The CEMP would be developed in accordance with relevant best construction practice guidance including:

- Guidance for Pollution Prevention (GPP) 1 – 29. In particular:
    - GPP 2 Above Ground oil storage tanks;
    - GPP 5 Works and maintenance in or near water;
    - GPP 6 Working at construction and demolitions sites;
    - GPP 21 Pollution incident response planning;

  - GPP 22 Dealing with Spills;
  - GPP 26 Safe storage – drums and intermediate bulk containers
- CIRIA Environmental handbook for building and civil engineering projects.

1.4 Assumptions of the outline CEMP

The outline CEMP is based on the information available from the Environmental Statement (ES) that has been prepared in support of the outline planning application for Cardiff Hendre Lakes.

Any planning conditions and commitments made following submission of the planning application (if required) would be incorporated into the CEMP by the appointed Contractor(s) who would be responsible for developing the outline CEMP into the full, detailed CEMP to be signed off by the Local Authority.

It is assumed that a number of Contractors (including specialist contractors and sub-contractors) may be appointed during construction. All site construction staff, including sub-contractors, would be required to comply with the CEMP throughout the entire construction stage of the proposed development.

It is assumed that any failings in environmental management will be corrected through regular site monitoring and site audits, undertaken by the Contractor's Environmental Manager.

1.5 Document and records

There shall be two electronic copies of the CEMP, one to be held on site by the Environmental Manager and the other off site by the Contractor. Both copies are to be kept up to date by the Contractor's Environmental Manager.

1.6 Incident response planning

The Contractor(s) will develop a Pollution Incident Response Plan which identifies the procedures for the event of a pollution incident during construction. The procedures will be in accordance with the guidance set out in GPP 21 Incident Response Planning.

All environmental incidents and accidents will be recorded and reported to the Contractor(s)'s Site Foreman and the Project Manager. Following a review of the incident, the Contractor's Environmental Manager will instigate an appropriate change in procedure where necessary.

The appropriate equipment required to implement these procedures shall be made available by the Contractor(s) and stored within the Contractor(s)'s compound.

2 Roles and Responsibilities

This section of the outline CEMP identifies the roles and responsibilities of those involved in environmental management during construction.

2.1 Employer

Cardiff Parkway Developments Ltd are the Employer and will appoint project managers on their behalf to oversee the construction stage of the project.

2.2 Project Manager

The Project Manager will act on behalf of the employer, with responsibility for managing construction of the proposed development within the agreed environmental constraints in conjunction with all other necessary management processes.

2.3 Contractor

It is assumed that a number of Contractor(s) (including specialist contractors and sub-contractors) will be appointed during construction of the proposed development. There may be separate contractors for the Enabling Works and the Main Construction Contract.

2.4 Environmental Manager

An Environmental Manager will oversee the implementation of CEMP including environmental control measures, mitigation and procedures. The Environmental Manager will be appointed by the Contractor prior to the enabling works and will implement the control measures during the enabling works and main construction.

The Environmental Manager shall monitor, measure and review the environmental performance of the construction activities.

The Environmental Manager will host regular internal and external meetings and undertake audits to review the operation and effectiveness of the CEMP. The results shall be reported by the Environmental Manager at monthly construction progress meetings and used to update the CEMP.

The Environmental Manager will be responsible for the implementation of other environmental management plans.

2.5 Community Liaison

The Employer and the Contractor will prepare a procedure for local community liaison with regards to construction activities. Regular community forum meetings will be held to keep the community informed of project progress including anticipated issues which may be of interest.

The Employer will provide the community with general enquiry and emergency contacts for them to use, such that any issues may be raised directly with them, in the event that people feel it appropriate to do so. However, the primary contact would be through the Contractor which will provide a site-based Community Liaison Officer (CLO) and will ensure all site generated enquiries and/or complaints are effectively logged, communicated and actioned in agreement with The Employer. The CLO will align with and assist the delivery of the overarching Communication and Engagement plan.

The CLO will represent the Contractor at any required internal and external partnership/stakeholder meetings. These meetings will relate specifically to community initiatives or communications tasks for the proposed development.

The CLO will be the primary point of contact for the Community Development Manager relating to matters on the ground. Themes the CLO will regularly communicate are: progress of construction; barriers to progress; reported issues; resolution of those issues; and report impact on overall objectives. The CLO will also be responsible for:

- Building and maintaining positive relationships with stakeholders facilitating a dynamic and effective communication procedure with established communications team and generating an acceptance of a common vision with all partners/stakeholders;
- Ensuring positive awareness of the project brand to all internal and external stakeholders;
- Working closely with the communications team and particularly the Community Development Manager to plan and deliver community liaison tasks to ensure the delivery of the Key Performance Indicators (KPI's) of the communication and engagement plan;
- Delivering, monitoring and communicating on the 'Buy Social' clauses and subsequent targets of the project;
- To be the primary point of contact for the service provider of the 'Buy Social' initiative; and
- Communicate and administer all enquiries and/or complaints in an effective and timely manner, reporting up when required.

The contractor and the site will be registered with the Considerate Construction Scheme and will be monitored and measured against the code of Considerate Practice.

3 Control of construction processes

3.1 Training, awareness and competence

The Contractor(s) will set out a programme of training to enable all site personnel to be aware of the potential risk to the environment during the construction progress.

The Environmental Manager will set out a series of induction courses for all site personnel including sub-contractors. The induction courses shall ensure all site personnel (including any new personnel) are aware of the environmental risks which have the potential to happen during construction. The inductions will inform the construction team on how to identify relevant environmental risks on site, record actions taken to protect the environment and implement best practice to minimise pollution.

Environmental Awareness Toolbox Talks will be delivered by the Environmental Manager on a regular basis. These will provide an update to the site team on any relevant environmental issues as the construction progresses.

Selected members of the site management team including the Construction Site Foreman and Environmental Manager will be given practical training in the use of the spill kits, appropriate PPE, clean-up procedures and the appropriate disposal and recycling plans.

3.2 Environmental inspections, monitoring and reporting

The Environmental Manager will prepare a monthly environmental report to be tabled at the monthly site progress meetings. This report will monitor the implementation of the CEMP and review the ongoing site monitoring and inspections.

The monthly reports will be circulated to the Employer and the Contractor(s) for consultation and review.

3.3 Internal communications

All staff and Contractor(s) will be informed of the content and location of the CEMP and associated management plans and method statements. Method Statements will be used to communicate specific environmental requirements as appropriate.

The Environmental Manager will have responsibility for communicating any changes and updates in policy, procedure, best practice guidance and legislation.

The Contractor(s) will have responsibility for maintaining internal communication, including changes to material on display.

3.4 Communications with the Statutory bodies and the public

The Contractor(s) will organise and facilitate regular meetings with statutory environmental bodies to provide an update on risk mitigation, progress against targets and a review of site monitoring and inspections. This will provide a mechanism for updating and adapting the CEMP as the project progresses.

The Contractor(s) will maintain a record of all meetings held with statutory bodies during construction stage.

A notice board shall be identified on site where environmental information on the project shall be displayed.

4 Environmental Control Measures

This section of the outline CEMP identifies the control (i.e. mitigation) measures that have been identified for each environmental topic assessed within the Environmental Statement (ES) that has been prepared in support of the planning application for the proposed development.

4.1 General Measures

General site management measures include those listed below:

- Excavation plant machinery will be fitted with fuel spill kits.
- Lighting will be positioned and directed so as not to unnecessarily intrude on adjacent buildings and land uses (including foraging habitats) and prevent any unnecessary interference with local residents.
- Welfare facilities will be provided on site and maintained by a licenced Waste Carrier.
- Vehicle/equipment washing facilities will be positioned away from watercourses and constructed with a drainage system which will capture run-off and effluent which will then be contained for proper treatment as per the Surface Water Management Plan.
- To minimise noise, vibrational and air quality impacts from vehicles and plant/equipment, the Contractor(s) will instigate behavioural policies for all site staff. This will include:
    - Minimising traffic to site by 'sharing' vehicles or by the use of a site bus (this will be detailed in the Construction Traffic Management Plan (CTMP);
    - Avoidance of part load deliveries (this will be detailed in the CTMP);
    - Utilisation of a pre-booked delivery policy to minimise holding vehicles prior to loading or unloading (this will be outlined in the CTMP); and
    - Ensuing that all construction plant, vehicles and equipment are turned off rather than left idling while awaiting usage (this will be detailed in the CTMP). Where feasible use of hybrid generators which help reduce noise and fuel consumption.
- Areas will be clearly marked and managed to prevent them becoming overfilled and ensure that the areas are suitable for the materials stored.
- Hazardous materials such as fuel will be stored within secure compound areas to prevent spillage, theft or malicious damage. A single Control of Substances Hazardous to Health (COSHH) area will be established to ensure the correct level of protection against fire spills and other chemical hazards. This will prevent sub-contractors and others creating individual stores, which are then not recorded or controlled.

4.2 Traffic and Transport

A CTMP will be prepared that outlines a range of measures to minimise potential traffic impacts arising from the construction of the Cardiff Hendre Lakes development proposals. It is anticipated that the CTMP will be secured via a planning condition.

The CTMP will be reviewed and updated in line with the construction programme and is anticipated to include details of the following:

- Designated construction traffic routes to avoid disruption on local roads;
- Temporary traffic control measures, where required, such as temporary traffic signals and Bankspersons;
- Heavy Good Vehicle (HGV) movements will be restricted as far as reasonably possible so as to avoid peak traffic flow periods (08:00-09:00 and 16:30-18:00);
- Temporary and permanent site access proposals, alongside an access management strategy to avoid potential traffic congestion in the peak hours;
- Speed limits shall be put into place on site for all vehicular movements;
- Sufficient parking and circulation will be provided within the site to avoid impacts on the neighbouring highways nuisance car parking;
- Where appropriate, all vehicles carrying loose material shall be covered;
- A wheel wash facility shall be used for vehicles egressing the site;
- Where necessary, use of road sweepers shall be incorporated to ensure highways remain clear of dust and mud;
- Road edges and pathways shall be swept by hand and damped down as necessary;
- Stockpiles to be damped down enclosed or covered as appropriate, be sealed or sprayed with chemical bonding agents as required, and located away from any sensitive receptors wherever possible; and
- Neighbouring communities and businesses will be consulted and kept informed of the traffic management proposals.

4.3 Noise and Vibration

This outline CEMP details the reasonably foreseeable worst case working hours for the works including extended working hours for particular types of work that it is known cannot practicably be carried out within normal working hours. It also details the generic noise and vibration suppression measures to be employed.

The Contractor's Environmental Management System shall include systems for implementing the requirements of the CEMP with respect to noise and vibration.

4.3.1 Working Hours

Control of working hours is a fundamental means of controlling noise and vibration and is likely to form part of a planning condition. The Contractor will carry out the works in such a way as to limit, as far as reasonably practicable, the adverse noise and vibration impact of the construction activities.

Normal working hours

Normal working hours will be from 0800 to 1800 on weekdays (excluding public and/or bank holidays), from 0800 to 1300 on Saturdays with no working on Sundays. The Contractor will undertake works within these normal working hours as far as reasonably practicable and, where practicable, operations anticipated to cause disturbance will be limited to these hours.

Where this is not practicable, preference should be given to undertaking noise generating works during the daytime over the weekend. Where this is not possible, noisy works should be confined to evening periods rather than night. Night working should be considered as a last resort or where the need is driven by other constraints (road or rail possessions for example).

Construction of the new railway station will require engineering works to be scheduled to minimise disruption on train services to Cardiff and Newport. Construction works associated with the station and railway will therefore include overnight and weekend working. These works will be planned months in advance and information will be made available to local residents.

Start up and shut down periods

In order to maintain the above working hours, the Contractor may require a period of up to one hour before and up to one hour after normal working hours for start up and close down of activities. The list below sets out the foreseeable specific activities that may need to be carried out in the start up and close down periods;

- arrival and departure of workforce and staff on site;
- deliveries;
- maintenance and checking of plant and machinery;
- start-up of machinery and movement to/from work site;
- general refuelling;
- site inspections and safety checks prior to commencing work;
- site meetings; and
- site clean up.

The start up and close down periods are not an extension of normal working hours, and particular care will be taken to limit and control disturbance to local residents during such periods. These activities shall be undertaken as close to the normal working hours as reasonably practicable. These activities shall not include the operation of plant or machinery giving rise to appreciable noise levels.

The Contractor shall be held responsible for ensuring these restrictions on working hours are given to all drivers, including those delivering all site materials.

Construction plant repair and maintenance works

It is the intention to undertake all repairs and maintenance of construction plant during normal working hours. However, by exception repair and maintenance may need to be carried out on Sundays, limited to the hours of 09.00 to 16.00, or during extended working hours during the week. Activities outside normal working hours that could give rise to disturbance will be kept to a practicable minimum. Such maintenance activities shall only be undertaken within a construction site compound behind the site hoarding.

Extended Working Hours: Foreseeable specific activities of a shorter duration

Certain activities or phases of work of short or intermittent duration which for reasons of safety or engineering practicability will require periods of night time, Sunday and/or bank holiday working from time to time. Such activities include, but are not limited to:

- major concrete operations and other continuous operations;
- setting-up of traffic management schemes;
- short term construction activities requiring road and railway closures/possessions;
- the delivery of abnormal loads in accordance with the requirements of the Highways Authority and Police, for example during mobilisation and demobilisation;
- delivery of materials, personnel and equipment by road and rail to construction activities requiring road and railway closures/possessions; and
- essential maintenance work.

Where construction activities have to be undertaken during possessions of operational railways, the site-specific evaluation of best practicable means to minimise noise should give due weight to the need for operational availability of the railways and the adverse impact on the travelling public associated with any constraint on availability.

4.3.2 Noise and vibration control

Noise

The Contractor will, in so far as is reasonably practicable, seek to control and limit noise and vibration levels so that residential properties and other sensitive receptors are protected from excessive noise and vibration levels arising from construction activities. Best practicable means shall be employed at all times and at all sites.

Generic measures to be considered in implementing Best Practicable Means will be consistent with the recommendations of BS 5228 and will, where reasonably practicable, include one or more of the following as appropriate:

- Careful selection of plant, construction methods and programming.

Only plant conforming to SI 2001/1701 (UK implementation of EC directive 2000/14/EC on noise emission) will be used if placed on the market or put into service since January 2002. Plant placed on the market or put into service prior to that date shall conform to SI 1985/1968 (as amended) or to SI 1988/361 (as amended) as appropriate to the type of plant.

- Equipment to be sited as far from sensitive receptors or as close to any acoustic screen located between the activity and the receptor as reasonably practicable.

Specific measures to be employed may include, where reasonably practicable:

- provision of lined and sealed acoustic covers for equipment which will be in place while equipment is running;
- regular maintenance of all equipment;
- operation of equipment in the mode of operation that minimises noise;
- shutting down equipment when not in use;
- avoiding waiting or queuing on the public highway with engines running;
- construction of temporary infrastructure to minimise noise and vibration e.g. solid site hoarding;
- selection of piling methods which minimise noise and vibration;
- breaking out concrete by means other than percussion;
- noise reduction measures for temporary ventilation equipment;
- handling all materials in a manner which minimises noise;
- the use, by preference, of non-audible warning systems and where audible warnings are necessary for reversing, vehicles operations will be planned to minimise reversing;
- fitting of silencers to all plant, machinery and vehicles;
- design and use of site hoarding and screens, where practicable and necessary, to provide acoustic screening at the earliest opportunity. Where practicable, doors and gates will not be located opposite occupied noise-sensitive buildings;
- erection of operational noise barriers as early as practicable in the construction process to provide additional protection against construction noise; and
- choice of routes and programming for the transport of construction materials, spoil and personnel.

Site specific best practicable means measures will be identified by the Contractor on a site-by-site and activity-by-activity basis and agreed with the local authority

through s.61 consents if required. Additional mitigation will be provided, where reasonably practicable, for activities that are of longer duration, are close to noise sensitive receptors and/or have to be undertaken at more sensitive times such as night-time, weekends and bank/public holidays.

Vibration

The Contractor shall use best practicable means to minimise vibration generated by the works in order to:

- avoid adverse effects on vibration sensitive equipment;
- to minimise disturbance to residents and other users of buildings close to the works ; and
- to protect buildings from physical damage, if it is not reasonably practicable to avoid very high levels of vibration.

The Contractor shall use Best Practicable Means to minimise the effects of vibration on people and buildings. In establishing criteria, controls and working methods, the Contractor will take account of guidance in BS 6472, BS 5228 and BS 7385.

Where activities that are likely to give rise to high levels of vibration are planned then vibration predictions shall be undertaken. The predictions shall be used to guide the selection of steps to minimise vibration and other activities (such as advanced information leafleting and in extreme cases building condition surveys) where it is not practicable to minimise vibration at source.

For the protection of buildings from damage, the Contractor will need to carry out vibration predictions and act on the results of the predictions and/or measurements.

Action to assess and where necessary minimise any adverse effects on vibration sensitive equipment will be dealt with on an individual basis as appropriate.

Taking and Recording Noise and Vibration Measurements

The following information will be provided for all noise and vibration measurements. Consideration should be given to preparation of a pro-forma for noise and vibration surveys, to include those items listed below:

- calibration levels at the beginning and end of the measurement period;
- make, model and serial number of all noise and vibration monitoring equipment used during the measurement period;
- a site plan, drawn to scale, showing the location of the measurement points;
- monitoring position (height, freefield/façade, microphone orientation, etc);
- method of fixation of transducers/geophones used for vibration monitoring;
- the date, start time and duration of all measurements taken;
- the noise and vibration indices being measured e.g. LAeq, LAmax,F , PPV, VDV etc.

- the response time of the measurement;
- weather conditions, in particular with respect to wind and rain;
- construction activities taking place at the time of the readings;
- any relevant comments relating to the works and ambient noise or noisy intrusions including other events not related to the works causing high levels of noise and/or vibration;
- the name and designation of the person taking the readings.

Noise and Vibration Monitoring Records

The results of noise and vibration monitoring undertaken by the Contractor will be submitted to the relevant local authority, if requested, for review. A logbook will be kept on-site containing records of all noise and vibration monitoring. This logbook will be kept available for inspection by the local authority and will contain records for at least the previous three months.

Noise monitoring results will be presented in accordance with recommendations in Annex E of British Standard BS 5228: Part 1: 1997 and in a format to be agreed with TfL and relevant local authorities.

The Contractor shall be cognisant of the advice given in BS 6472: 1992 and BS 7385: Part 2: 1993 with respect to appropriate data to be recorded when carrying out vibration monitoring.

4.3.3 Monitoring Equipment

Description

All measurements will be made using a sound level meter complying with BS EN 60804, 1991, Specification for Integrating Sound Level Meters (if manufactured prior to 2003), or to BS EN 61672, Part 1, 2003 Electroacoustics – sound level meters – specification (if manufactured since that date).

All sound level meters will be checked with a sound level calibrator conforming to BS 7189: 1989 (if manufactured prior to 2003) or to BS EN 60942: 2003 (if manufactured since that date) before and after each measurement, and the result of the check recorded.

All sound level meter kits (sound level meter and sound level calibrator) must hold a valid calibration certificate issued by a United Kingdom Accreditation Service (UKAS) accredited calibration laboratory (or equivalent European accreditation body approved by the Project Manager). Periodic calibration of sound level meters meeting the requirements of BS EN 60804 is to be carried out in accordance with BS 7580: 1997: Parts 1 and 2 as appropriate. Meters meeting the requirements of BS EN 61672-1 shall be periodically calibrated in accordance with BS 7580: 1997 until such date as it is superseded by BS EN 61672: Part 3, when the latter standard shall be used. Sound level calibrators shall be calibrated in accordance with BS EN 60942: 2003. Sound level meter kits shall undergo calibration as specified in this paragraph every 12 months.

Selection of vibration monitoring equipment will take into consideration recommended guidance and specifications in relevant standards and guidelines, including British Standards 7482: Parts 1 and 3: 1991, BS 5228: Part 1: 1997 and BS 6841: 1987. The transducer used for monitoring shall be capable of recording vibration simultaneously in 3 orthogonal directions. Fixing of transducers shall be in accordance with BS 7385: Part 1: 1990.

4.3.4 Pre-construction ambient noise survey

Ambient noise levels were surveyed for the Environmental Impact Assessment. Levels may have changed since that time, and it will be appropriate to carry out further ambient noise monitoring prior to the start of the Contractor's works, dependent upon the requirements of the relevant Part B. Early discussion should be held by the Contractor with the local authority to determine whether additional pre-construction noise data needs to be collected.

Prevailing ambient vibration levels have not been monitored. This is because response to vibration arising from construction activities is governed by absolute levels of vibration rather than the prevailing ambient levels that exist at this time.

4.4 Air Quality

4.4.1 General Provisions

The air quality assessment carried out for the proposed development, as presented in the ES, has identified "high risk" for dust soiling, "low risk" for human health and "medium risk" for ecological impact during construction. As a result, the appropriate mitigation measures relevant to the risks of the site has been identified in the ES. These mitigation measures are in line with the recommendations from the Institute of Air Quality Management (IAQM) guidance[1] and will be adopted.

Communications

- Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk and should include as a minimum the recommended measures in this document. The desirable measures should be included as appropriate for the site. The DMP may include monitoring of dust deposition, dust flux, real-time PM_{10} continuous monitoring and/or visual inspections.

Site management

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken;
- Make the complaints log available to the local authority when asked;

[1] IAQM (2016) Guidance on the Assessment of Dust from Demolition and Construction (Version 1.1)

- Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book; and
- Hold regular liaison meetings with other high-risk construction sites within 500m of the proposed development boundary, if any, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/ deliveries which might be using the same strategic road network routes.

Monitoring

- Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of site boundary, with cleaning to be provided if necessary;
- Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked;
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions; and
- Agree dust deposition, dust flux, or real-time PM_{10} continuous monitoring locations with Cardiff Council. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during earthworks and construction.

Preparing and maintaining site

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible;
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site;
- Fully enclose specific operations where there is a high potential for dust production and the site is active for an extensive period;
- Avoid site runoff of water or mud;
- Keep site fencing, barriers and scaffolding clean using wet methods;
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below; and
- Cover, seed or fence stockpiles to prevent wind whipping.

Operating vehicle/machinery and sustainable travel

- Ensure all vehicles switch off engines when stationary - no idling vehicles;
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable;

- Impose and signpost a maximum-speed-limit of 15mph on surfaced and 10mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate);
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials; and
- Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems;
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate;
- Use enclosed chutes and conveyors and covered skips;
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate; and
- Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Waste management

- Avoid bonfires and burning of waste materials.

4.4.2 Activities-specific mitigation measures

The following mitigation measures, specific to the earthworks, construction and trackout activities, will be adopted.

Earthworks

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable;
- Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable; and
- Only remove the cover in small areas during work and not all at once.

Construction

- Avoid scabbling (roughening of concrete surfaces) if possible;
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place;

- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery; and
- For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.

Trackout

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use;
- Avoid dry sweeping of large areas;
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport;
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable;
- Record all inspections of haul routes and any subsequent action in a site log book;
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned;
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable);
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits; and
- Access gates to be located at least 10 m from receptors where possible.

4.5 Water resources

4.5.1 General provisions

Site compounds will be located away from all surface water features and watercourses and outside of the flood plain.

Wherever practicable, grey water systems will be used at site compounds to reduce run-off from site, improve water efficiency and reduce the potential for polluting discharges to surface watercourses.

A site drainage plan will be prepared in advance of construction works, identifying the location of all watercourses and drains/drainage paths and showing mitigation measures to protect the receiving water environment from pollutants from the scheme's construction.

All drainage on site will be identified and mapped, with colour coding used to distinguish between surface water, foul sewer and combined drainage. This will ensure that all those working on site are aware of the type of drain in the event of a pollution incident.

Pollution control measures such as the use of oil interceptors, the placement of bunds or sediment traps will be used to prevent sediment run-off entering drains.

Where possible, a 2m buffer will be provided between reen banks and construction activities or equipment in order to preserve the structural integrity of reen banks and to reduce the likelihood of construction run-off into reens.

All personnel will attend a site induction before commencing work on site. The briefing will emphasise the sensitivity of the watercourses, surrounding habitat and methods and working practices employed to protect the water environment.

4.5.2 Surface water management

Surface water management systems will be installed early in the construction sequencing and carefully managed to prevent localized flooding or pollution of surface and groundwater from sediment and other contaminants.

Silt fencing, cut-off ditches and soil bunds will be constructed downslope of excavations, to retain and convey water to adequately sized treatment areas to prevent the ingress of sediment contaminated water.

Areas of exposed sediment deemed at risk of erosion during heavy rainfall or flood inundation will be protected using either temporary measures (e.g. sheeting) or semi-permanent measures (for example coir matting) until vegetation is able to establish on these surfaces.

Temporary surface water drainage measures will be planned and designed appropriately prior to installation and recorded on drawings. This should include details on:

- Soil/sediment settlement rate;
- Drainage system capacity;
- Details of systems installed to intercept and treat contaminated water run-off; and
- Details of steps to prevent bypassing of the drainage system.

Use of cut-off drains or ditches to convey water around the site and/or prevent sediment laden water entering excavations and watercourses.

Sediment laden water will be treated to allow suspended solids to settle out before disposal.

Settlement ponds will be constructed to promote the removal of sediment from site runoff. Ponds will be large enough to ensure sufficient residence time for particulates to settle out, prior to discharge of the water.

4.5.3 Severe weather and flooding

The Contractor will consider the potential impacts of extreme weather events during construction. To ensure resilience of the scheme to such extreme weather events, the contractor will use a short to medium-range weather forecasting

service from the Met Office or other approved weather forecast provider to manage weather-related risks and inform programme management and impact mitigation measures. Given the site location adjacent to the Severn Estuary, this should also consider potential tidal flooding.

The Contractor's EMS will consider all measures deemed necessary and appropriate to manage extreme weather events and should specifically cover training of personnel and prevention and monitoring arrangements.

4.5.4 Vehicle and plant movements

Haul routes will be regularly inspected and maintained to minimise sediment laden run-off.

During the earthworks mass haul operation, damping down of the haul roads to minimise dust being generated by plant movements would be required. This would minimise dust pollution causing nuisance to neighbouring properties and businesses along the route of the scheme.

All vehicles, plant and equipment will be regularly inspected and maintained in accordance with manufacturers' recommendations. Records of inspections will be maintained on site.

Areas of hard standing will be provided at site access and egress points, where practicable. The areas will be regularly inspected and cleaned.

Site wheel washing facilities will be established at access and egress points and located away from watercourses and the floodplain. Cleaning will be carried out in a bunded area and wastewater will either be recycled or discharged to foul sewer (with consent from the sewerage undertaker). If unable to be discharged, waste will be removed from site by a licensed waste carrier for disposal to an appropriately licensed facility.

Guidance from GPP13 will be used to put in place good practice for vehicle washing and cleaning.

4.5.5 In-Channel working

Any instream works or works close to watercourses will follow GPP5.

Any temporary works to divert watercourses during construction, either by gravity flumes or over pumping will include suitable provisions to pass high flows.

The use of construction materials on site will be free from contaminated material to avoid potential contamination of the watercourse.

4.5.6 Storage of fuels, oils and other chemicals

Management of the storage of fuels, oils and chemicals are to follow the instructions listed below:

- Spill kits to be available near all points of work and personnel trained in their use.

- COSHH store to be bunded and locked when not in use.
- In areas of limited footprint, settlement tanks and oil separators will be used to treat contaminated water from the work areas.
- Physical barriers to stop material overspill.
- No fuels, oils or other chemicals will be stored in high- risk locations such as:
    - Within 50 metres of a spring, well or borehole;
    - Within 10 metres of a watercourse;
    - Places where spills could enter open drains or soak into groundwater; or
    - On a floodplain.
- Storage tanks for oils, fuels or chemicals will be sited on an impermeable base, surrounded by an impermeable bund, and inspected regularly for leaks. Any valve, filter, sight gauge, vent pipe or ether ancillary equipment must be kept within the bund when not in use. The drainage system of bunded areas shall be sealed with no outlet to any watercourse, pond or underground strata.
- Bunded areas will be located on stable and on level ground and located away from watercourses, ditches and drains.
- Associated pipework should be situated above ground and protected from accidental damage.
- All bulk fuels storage must be contained within a double skinned bowser/container or have a bund. Double skinned tanks or bowsers must also be bunded unless the outer skin would provide secondary containment. The bund must have sufficient volume to contain 110% of the contents of the largest fuel/pipe container or 25% of the total storage capacity of all the containers, whichever is the greater.
- All fuel containers, including those containing waste fuels, must be stored on a drip tray/bunded area away from vehicle traffic within a designated storage area, where possible, to avoid damage.
- Plant will be regularly inspected, serviced and maintained to minimise the risk of leaks/spills. At the end of each working day, driveable plant will be moved away from watercourses.
- Refuelling will be carried out in accordance with Pollution Prevention Guideline (PPG) 7.

4.5.7 Topsoil stripping and storage

Wherever possible, topsoil will be left in place to minimise the amount of unprotected ground exposed to runoff. Where topsoil removal is required it would take place as late as possible prior to other works in the area. Topsoil will be stored away from watercourses on level areas.

In advance of vegetation clearance and soil stripping operations commencing within 10m of a watercourse, appropriate control measures would be implemented to prevent contamination.

Topsoil stockpiles would be created and managed in accordance with best practice guidance. The sides of stockpiles would be graded to prevent ponding and to help shed rainwater. Exposed stockpiles that are to remain for long periods would be seeded with a standard Rye Grass seed mix immediately upon completion and in suitable weather conditions. This would minimise soil erosion during the soil storage period and to help reduce colonisation of nuisance weeds.

Silt fencing would be installed around the margins of topsoil mounds to minimise the risk of sediment-laden runoff reaching watercourses.

Cleared land would be reseeded as soon as practicable, to minimise exposed soil and subsequent sediment runoff.

4.5.8 Consents

Depending on the nature of the earthworks, an abstraction licence may be required for de-watering operations. The consenting authority would be Natural Resources Wales (NRW). A separate licence may be required for each location or activity.

An Ordinary Watercourse Consent is required for all works carried out over, under or near an ordinary watercourse. Ordinary watercourses include non-main rivers and all ditches, drains, cuts, culverts, dikes, sewers (other than public sewers) and passages through which water flows.

4.6 Ground conditions

4.6.1 General provisions

It is envisaged that many of the risks identified in relation to the earthworks will be covered by the use of the following measures:

- Dust control measures during the works, wheel washers for any offsite movements, construction of appropriate temporary transport networks within the construction area, covering of loads during on site transport;
- Health and safety training, guidance notes and signs and suitable welfare facilities. Promotion of good hygiene practices implemented for the duration of the works with no smoking, eating, or drinking in the locale of excavations in potentially contaminated areas;
- The use of protective clothing and equipment; appropriate Personal Protective Equipment (PPE) provided to all construction workers. The assessment of risks to construction workers and the provision of appropriate PPE would be the responsibility of the contractor involved in the works;
- Health and safety risk assessments will consider available chemical testing results for soils, groundwater and surface water, and will inform identification of adequate mitigation measures;

- Health and safety risk assessments will consider available information on ground conditions and ground gas monitoring data, and will inform identification of adequate mitigation measures with respect to potential risk arising due to encountering isolated pockets of methane during deep intrusive works like piling or band drain installation As a minimum, this should include development of an appropriate method statement, which will set out procedures allowing for control and monitoring of exposure to ground-gas during any intrusive construction activities;
- Health and safety risk assessments will consider and implement recommendations made within the detailed UXO risk assessments;
- Where there is a potential risk of asbestos published guidance (Ciria 733) with respect to managing risk of asbestos in soil and made ground will be considered.
- Materials management plan shall be developed to manage movement, import, reuse and disposal of materials. This shall include a specification for materials suitability for use criteria that are protective of both the water environment and human health.
- An Action Plan for safely dealing with unexpected contamination to be developed. This shall include provisions to appoint a suitably qualified and experienced contaminated land practitioner to provide a watching brief and supervisory role should unexpected contamination be encountered. This role shall include assessment of the risks to the construction works and workers. In addition, the Action Plan shall set out procedures for dealing with unexpected contamination to allow for assessment of identified contamination, review of health and safety provisions, review of remediation/disposal options, identification of measures limiting environmental impact of these materials. As a minimum, this should include sampling and testing of the encountered materials in-situ or upon excavation, assessment of risk to the environment, storing contaminated materials in a designated and suitably controlled location i.e. lined and bunded, and appropriate waste disposal procedures;
- Environmental monitoring to ensure environmentally sound working practises are being adopted and adhered to and allowing for early warning system preventing detrimental impact on the water environment surrounding the development. A monitoring plan shall be prepared by the Contractor and agreed with regulators. It should include baseline monitoring, monitoring during and post construction of controlled water receptors identified by a suitable risk assessment, and set out an Action Plan should impact be identified.

4.6.2 Site specific measures

Site specific measures will be proposed as the design develops.

4.7 Biodiversity

The purpose of this section is to outline appropriate measures to protect the ecology of the proposed development, with special attention to specified ecological resources, as identified within the ES. This section will:

- Specify measures that will be implemented during construction to ensure that impacts on sensitive ecological features are reduced;
- Outline principles for the monitoring and maintenance for these features.

If significant new ecological information comes to light, then these measures should be revised accordingly by the proposed development ecologist. A detailed final CEMP will be produced by the Contractor(s).

The following important receptors will be considered and protected through the implementation of the detailed CEMP:

- Statutory designated sites including Sites of Special Scientific Interest (SSSIs), Special Areas of Conservation (SACs), Special Protection Areas (SPAs), Ramsar sites, and non-statutory designated sites including Sites of Importance for Nature Conservation (SINCs);
- Protected and notable species (e.g. dormice, bats, otter, water vole, badger, invertebrates, amphibians and fish); and
- Other habitats and features of ecological importance.

Where reasonably practicable, environmental mitigation will be provided via the design and implemented by the contractor within the works. This will require preparatory work to be undertaken ahead of the start of construction to permit timely progress of the programme.

Detailed measures to deal with ecological constraints will be prepared including the following, as appropriate:

- Summary of features of interest for all known areas of nature conservation interest which may be affected due to construction;
- Provision of guidance on ecological best practice methods to be followed to mitigate potential ecological effects during construction;
- Procedures to be adopted in the event of unanticipated discovery or disturbance of protected species;
- Reference to the relevant procedures, including any special measures, to be implemented in the event of a pollution incident, where this occurs on or adjacent to an area where protected and/or notable species are known to be present; and
- Individual species or habitat management plans to include the information above (where appropriate) for:
  - Terrestrial habitats;
  - European Protected Species (otter and bats);
  - Badger;
  - Breeding birds;

- Invertebrates;
- Freshwater fish, including migratory species; and
- Common reptiles;
- Other protected and/or notable species, e.g. amphibians.

Species or habitat management plans will be prepared by the Contractor.

The Contractor will, where reasonably practicable, reduce any habitat loss within the land provided for the scheme by keeping the working area to the minimum required for construction of the Scheme.

4.7.1 Measures to reduce potential impacts on ecological resources

Bats

Areas of particular importance for commuting / foraging bats (including woodland and linear features such as hedgerows) will be retained in order to maintain connectivity for bats for as long as possible during the construction phase.

Following the severance of these features to accommodate the works, dead hedges will be installed during the remainder of construction stage to maintain the flight paths. These must be in place from dusk until dawn during the bat activity season.

A Toolbox Talk regarding bats and foraging and commuting routes should be given by the Ecological Clerk of Works (ECoW) prior to any works commencing.

Where potential presence of roosting bats in any building or tree cannot be ruled out after the full suite of field surveys and pre-construction surveys (undertaken in accordance with best practice guidance), these precautionary measures must be carried out, including the soft-felling of trees and the soft-stripping of buildings, or other built structures.

Where possible planting for the scheme will take in to account general habitat requirements for bats and seek to create habitat and to replace severed linkages/ commuting corridors such as hedgerows through translocations and/ or new planting through habitat creation.

As a general precaution, tree felling would only be undertaken in autumn, between late August and October/early November. This is because bats do not have dependent young at this time and are not hibernating and should therefore be active enough to escape harm if proper precautions are taken.

Night working should be avoided where possible. If it cannot be avoided, it should be restricted in the vicinity of known bat commuting routes and valuable areas of foraging habitat (i.e. commuting routes should not be illuminated nor have generators placed next to them).

Production of a construction stage lighting strategy to limit the use of construction lighting and ensure all essential lighting is specified and designed to reduce light spill. This is to include locations of lighting and lighting level details. The following measures should be considered within the construction stage lighting strategy:

- No bat roosts, or important foraging and commuting habitat to be directly illuminated– lighting should be positioned and directed to ensure no light spill over 0.5 Lux onto any retained or created habitats;
- Lighting levels to be as low as current standards and guidelines allow;
- Lighting will only be provided in essential areas;
- Lighting will be directed to where it is needed, and light spill avoided;
- LED lighting produces no ultraviolet component and therefore is ideally suited as it greatly reduces the attraction of insects;
- The height of lighting columns in general will be as low as possible. However, there are cases where taller columns will enable light to be directed downwards at a more acute angle and therefore reduce horizontal spill light.

During construction, mitigation for the temporary loss of habitat will include the provision of new roosting habitat including bat boxes in trees to be retained.

Dormice

Areas of particular importance for dormice (woodland, hedgerows and scrub) will be retained in order to maintain connectivity for dormice for as long as possible during the construction phase.

Following the severance of these features to accommodate the works, dead hedges will be installed where possible during the remainder of construction stage to maintain connectivity.

A Toolbox Talk regarding dormice should be given by the ECoW prior to any works commencing.

The following measures should be considered within the construction stage lighting strategy:

- No important dormouse habitat should be directly illuminated– lighting to be positioned and directed to ensure no light spill over 0.5 Lux onto any retained or created habitats;
- Lighting levels will be as low as current standards and guidelines allow;
- Lighting will only be provided in essential areas;
- Lighting will be directed to where it is needed, and light spill avoided;
- The height of lighting columns in general will be as low as possible. However, there are cases where taller columns will enable light to be directed downwards at a more acute angle and therefore reduce horizontal spill light.

Otter

Where otters are known to be present, work by the Contractor will be done under a precautionary method of working as direct by a suitably qualified ecologist / ECoW.

In addition, no steep-sided, deep and/or water-filled excavations would be left unguarded overnight as otters could fall in and become trapped. Any major excavations that need to be left uncovered overnight would have their slopes battered. If it is necessary to leave small deep, steep-sided or water-filled excavations open overnight they will be protected with suitable fencing.

Night working will be avoided where possible. If it cannot be avoided, it should be restricted in the vicinity of known commuting routes and valuable areas of foraging habitat.

The negative effects of habitat severance and isolation will be mitigated by careful construction programming. Where appropriate/necessary, there will be the maintenance of safe crossing places for otters, and the installation of temporary and/or permanent fencing to funnel otters towards these crossings, to be detailed within the final CEMP.

The following measures will be considered within the construction stage lighting design:

- No known commuting routes, or important foraging to be directly illuminated – lighting to be positioned and directed to ensure no light spill over 0.5 Lux onto any retained or created habitats;
- Lighting levels will be as low as current standards and guidelines allow;
- Lighting will only be provided in essential areas;
- Lighting will be directed to where it is needed and light spill avoided;
- The height of lighting columns in general will be as low as possible. However, there are cases where taller columns will enable light to be directed downwards at a more acute angle and therefore reduce horizontal spill light.

Water Vole

As described in Section 4.5.1 General provisions above, a 2m buffer will be provided between retained reen banks and construction activities or equipment in order to preserve the structural integrity of reen banks and to reduce the likelihood of construction run-off into reens.

If water vole burrows are identified along impacted reens during pre-construction surveys, habitat manipulation strategies will be prioritised over capture and translocation. Vegetation along the banks of reens to be removed will be strimmed or turf stripped to make the habitat unsuitable for water voles, causing them to relocate away from the area. Water draw-down may also be used to degrade the habitat further. Displacement to always include a destructive search. The deliberate displacement of water voles must be undertaken under a licence issued by NRW.

Displacement to take place in late winter/early spring when population numbers are lowest, and animals are already pre-disposed to move as they begin to establish breeding territories: this is defined as between the 15th February and 15th April for most of Wales. During the breeding season it is likely that females are more sedentary due to the presence of young. Water voles are also more sedentary

in the winter and less responsive to habitat changes. The effectiveness of displacement in autumn is unknown but is considered less likely to be effective than spring displacement due to the higher densities of animals at this time of year, and as breeding can continue until late in the season. In addition, water voles store food below ground during the autumn, and displacement at this time could put animals at greater risk of winter mortality.

Further details of displacement, if required, will be included within the final detailed CEMP.

The following measures should be considered within the construction stage lighting design:

- No known commuting routes, or important foraging to be directly illuminated – lighting should be positioned and directed to ensure no light spill over 0.5 Lux onto any retained or created habitats;
- Lighting levels to be as low as current standards and guidelines allow;
- Lighting will only be provided in essential areas;
- Lighting will be directed to where it is needed and light spill avoided;
- The height of lighting columns in general will be as low as possible. However, there are cases where taller columns will enable light to be directed downwards at a more acute angle and therefore reduce horizontal spill light.

Badger

Any holes/excavations created during construction period which badgers or other mammals could fall into must be covered and a ramp provided.

Birds

During construction, mitigation for the temporary loss of habitat will include the provision of new nesting habitat including bird boxes in trees to be retained.

Procedures for vegetation clearance to minimise the impact on birds are described below.

Barn Owl

During construction, night working would be avoided where possible. If it cannot be avoided, it should be restricted in the vicinity of known commuting routes and valuable areas of foraging habitat (i.e. commuting hedgerows should not be illuminated nor have generators placed next to them).

During construction, mitigation for the temporary loss of habitat will include the provision of new nesting habitat including barn owl boxes in trees to be retained.

European Eel, Lamprey Species and Other Fish Species

Where instream work is required, fish relocation should take place in order to move fish from impacted reens to suitable habitat elsewhere. This would only be done under licence from the Environment Agency. European eel are known to be

present within the reen network within the site, and juvenile lamprey species *ammocoetes* may also be present; both of which are features of the Severn Estuary Special Area of Conservation (SAC) and Ramsar site.

Reens will be drained down under the supervision of an ECoW with a background in freshwater ecology and fisheries. The ECoW role will involve overseeing the dewatering process and fish translocation to move fish from impacted reens to suitable habitat elsewhere; this would involve managing the drawdown rate based on the abundance of fish through liaison with the fish translocation team. As water levels decrease dewatering will be slowed to allow any fish or amphibians to be removed to suitable receptor locations. Fish (and amphibians) would likely be translocated to Primary reens (Feandre and Greenlane reens) located to the east, west and south of the Proposed Development but this would be agreed in advance with the local NRW fisheries/biodiversity officer.

The fish translocation (including European eel and lamprey species *ammocoetes*) would take place as prior to dewatering in order to move fish from impacted reens to suitable habitat outside the construction footprint. Netting and/or electric fishing techniques would be used requiring a Salmon and Freshwater Fisheries Act (SaFFA) Section 27 exception to "use fishing instruments (other than rod and line) and/or remove fish from inland waters" from the NRW.

It is recommended that works in watercourses containing lamprey should only be carried out during the period August to September (except in the case of exceptional circumstances). Translocation and instream works including habitat creation should be undertaken outside of the lamprey spawning season (river and brook lampreys spawn during the period March-April, while sea lamprey spawn during the period May-August)[2].

Pollution could negatively impact European eel and other fish species. This will be mitigated by the implementation of the Pollution Incident Response Plan as described above under Section 1.6 Incident response planning.

Other Section 7 Species

Method statements to be drawn up comprising a series of mitigation measures including timing of works, to prevent adverse impacts on Section 7 species which have been identified as potentially being present throughout the scheme including:

- Hedgehog;
- Brown hare;
- Common toad; and
- Polecat.

4.7.2 Pre-construction surveys

Prior to the construction phase pre-construction surveys will be undertaken in accordance with best practice guidelines. These surveys will include:

[2] https://lampreysurveys.com/timing-of-instream-works/

- Bat surveys of buildings and trees up to 50m from any construction activities to determine if roosts are present.
- Otter and water vole surveys on waterbodies and associated habitat within the construction area and up to 250m from construction activities to determine any breeding or resting sites.
- Barn owl surveys up to 50m from any construction activities.
- Badger surveys up to 50m from any construction activities.

The results of the pre-construction surveys will be reviewed to determine if any protected species licences (or changes to the Draft licences as provided for the application) are required and shared with the Statutory Environmental Bodies.

4.7.3 Procedures for vegetation clearance

General Site Clearance

Any site clearance activities must be in accordance with any mitigation licences from Natural Resources Wales including European Protected Species mitigation licences (for dormice or otter).

Dormice

Any clearance of dormouse habitat to follow a phased approach at the appropriate time of year when the dormice are least vulnerable. This will comprise cutting hedgerows and trees back (to approximately 300mm) in the winter (during the dormice hibernation period) then removing the stumps/roots in the spring once dormice are active and foraging and have found alternative habitat.

All habitat clearance will be carried out under the supervision of an ECoW who will ensure no damage to dormouse hibernation nests and relocate them to alternative habitats where appropriate. The nature and location of the replacement habitats and timing of the vegetation clearance will all be in accordance with the licence method statement.

Habitat connectivity for dormouse to be maintained during construction through dead hedging and use of dormouse bridge structures[3]. Dead hedges for dormice may be constructed using brash from cut and cleared vegetation piled in a line in a similar shape and function as a hedgerow, to mitigate the temporary removal of edge habitat such as woodland edges, hedgerows or tree lines, to provide connectivity and allow dormice to continue along severed habitat during construction.

Bats

Dead hedges can be used to allow bats to continue using a favoured flight line during construction after tree lines/hedgerows/other structures are removed to accommodate the development.

[3] https://animexbridge.com/

Dead hedges may comprise a line of heras fencing panels or similar with hessian or netlon fencing stretched across them to provide a solid feature along which bats can commute during the construction phase. Such structures are only really suitable to maintain connectivity for bats across short distances and are only required during the bat activity season. If they need to be moved during the day due to construction activities, they must be put back before dusk so that the mitigation is effective between dusk and dawn every night.

Birds

Where possible vegetation clearance will be undertaken outside of the breeding bird season (March to August inclusive). If this is not possible, an ECoW should be appointed to carry out a nesting bird check on any vegetation to be cleared, or vegetation directly adjacent to major works, no more than 48 hours prior to works commencing. If an active nest is identified, an appropriate exclusion zone will be decided by the ECoW based on the construction activity taking place. This exclusion zone will be marked out and protected from any clearance activity until the young are fully fledged and have left the nest.

Amphibians and reptiles

Amphibians, reptiles or other Section 7 species encountered will be carefully moved out of the construction areas to suitable receptor areas outside of the construction footprint.

Within grassland areas the following methods will be considered:

- The height of the vegetation sward will be reduced in stages (Phased habitat manipulation) within works footprint to encourage reptiles to move out of these areas - strimming to 300mm above ground level. The use of this method may vary depending on the time of year and ambient temperatures;
- Installation of exclusion fencing and placement of artificial refugia (roofing felt, corrugated tin) installed at a density of at least 100 per hectare;
- Capture and translocation of reptiles to receptor area;
- Any drift fencing can be removed prior to construction but exclusion fencing to remain in place throughout construction; and
- Inspection of reptile fencing, if required, throughout construction period and maintenance where necessary.

Habitat manipulation methods should be used first, but if reptile translocation programme is required due to numbers, at least 60 visits, with 5 clear days at the end will be required.

Reptile enhancement features such as stone and/or log pile hibernacula's will be provided in the habitat adjacent to that being removed. If required one-way exclusion fencing will be used to prohibit amphibians and reptiles returning to the construction area.

4.7.4 Procedures for instream works

Where instream works or dewatering are required, they will be carried out under the supervision of an ECoW with a background in freshwater ecology and fisheries. The ECoW role will involve overseeing the dewatering process and fish translocation to move fish from impacted reens to suitable habitat elsewhere; this would involve managing the drawdown rate based on the abundance of fish through liaison with the fish translocation team.

As water levels decrease, dewatering will be slowed to allow any fish or amphibians (including Annex II species) to be removed to suitable receptor locations. Fish (and amphibians) would likely be translocated to Primary Reens (Green Lane Branch, Feandre Reen, Greenlane Reen and Railway Reen, located to the north, west, east, and south of the proposed development, respectively) but this would be agreed in advance with the local NRW fisheries/biodiversity officer.

The fish translocation (including European eel and lamprey species ammocoetes) would take place prior to dewatering in order to move fish from impacted reens to suitable habitat elsewhere. Netting and/or electric fishing techniques would be used, under a Salmon and Freshwater Fisheries Act (SaFFA) Section 27 exceptionto “use fishing instruments (other than rod and line) and/or remove fish from inland waters”, obtained from NRW.

Where possible aquatic vegetation from drained waterbodies will be placed on the banks of retained waterbodies for a minimum of 24 hours to allow invertebrates to move out of the vegetation.

Care will be taken during the draining of waterbodies to adhere to the requirements of the Invasive Species Management Plan in relation to invasive aquatic plant species.

4.7.5 Habitat Damage to Retained Habitats

The Pollution Incident Response Plan will be developed by the Contractor(s) to ensure no damage to retained habitats through pollution incidents such as accidental fuel and chemical spills, as described above under Section 1.6 Incident response planning.

4.7.6 Habitat damage through sediment run-off will be prevented through measures outlined above Section 4.4.1 General Provisions

The air quality assessment carried out for the proposed development, as presented in the ES, has identified “high risk” for dust soiling, “low risk” for human health and “medium risk” for ecological impact during construction. As a result, the appropriate mitigation measures relevant to the risks of the site has been identified in the ES. These mitigation measures are in line with the recommendations from the Institute of Air Quality Management (IAQM) guidance and will be adopted.

Communications

- Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk and should include as a minimum the recommended measures in this document. The desirable measures should be included as appropriate for the site. The DMP may include monitoring of dust deposition, dust flux, real-time PM_{10} continuous monitoring and/or visual inspections.

Site management

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken;
- Make the complaints log available to the local authority when asked;
- Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book; and
- Hold regular liaison meetings with other high-risk construction sites within 500m of the proposed development boundary, if any, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/ deliveries which might be using the same strategic road network routes.

Monitoring

- Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of site boundary, with cleaning to be provided if necessary;
- Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked;
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions; and
- Agree dust deposition, dust flux, or real-time PM_{10} continuous monitoring locations with Cardiff Council. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during earthworks and construction.

Preparing and maintaining site

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible;
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site;

- Fully enclose specific operations where there is a high potential for dust production and the site is active for an extensive period;
- Avoid site runoff of water or mud;
- Keep site fencing, barriers and scaffolding clean using wet methods;
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below; and
- Cover, seed or fence stockpiles to prevent wind whipping.

Operating vehicle/machinery and sustainable travel

- Ensure all vehicles switch off engines when stationary - no idling vehicles;
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable;
- Impose and signpost a maximum-speed-limit of 15mph on surfaced and 10mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate);
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials; and
- Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems;
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate;
- Use enclosed chutes and conveyors and covered skips;
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate; and
- Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Waste management

- Avoid bonfires and burning of waste materials.

4.7.7 Activities-specific mitigation measures

The following mitigation measures, specific to the earthworks, construction and trackout activities, will be adopted.

Earthworks

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable;
- Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable; and
- Only remove the cover in small areas during work and not all at once.

Construction

- Avoid scabbling (roughening of concrete surfaces) if possible;
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place;
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery; and
- For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.

Trackout

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use;
- Avoid dry sweeping of large areas;
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport;
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable;
- Record all inspections of haul routes and any subsequent action in a site log book;
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned;
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable);
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits; and
- Access gates to be located at least 10 m from receptors where possible.

Water resources, whilst damage due to airborne dust will be prevented through measures outlined under Section 4.2 Traffic and Transport and Section 4.5.4

Vehicle and plant movements above, and damage due to vehicle emissions from construction traffic will be prevented through measures outlined under Section 4.4 Air Quality above.

A detailed Arboricultural Method Statement (AMS) and Tree Protection Plan (TPP) will be prepared and will describe how trees and hedges will be protected and managed during construction. The AMS will provide an instruction manual and work schedule for the site manager to inform tree and hedge root protection measures prior to and during construction, and is likely to include information on the following:

- A schedule of remedial tree surgery and tree removal works to be completed prior to the commencement of all other operations on site;
- The final location, specifications and installation details of the construction exclusion zones to include both tree protection fencing and ground protection measures;
- The final details and specifications for the special engineering measures where works are proposed to take place within the Root Protection Areas (RPAs) of trees to be retained;
- Arrangements for works at the tree protection orders in order to undertake special engineering measures;
- The location of site compounds, site offices and facilities, including parking arrangements, and areas for the storage of materials. Access routes for heavy plant and machinery, delivery vehicles and issues related to lifting plans for proposed crane use or access to site where aerial tree crown parts may affect intended operations;
- Positions of responsibility on site, communication channels and details of intended contractors to be employed to undertake all arboricultural-related operations;
- A programme setting out the sequence and timing for all works related to the trees on the site;
- The system to be employed for monitoring the completion of each stage of the works and the protection measures specified;
- The appointment of an Arboricultural Clerk of Works. This will be an appropriately qualified and experienced person charged with the supervision and monitoring of the works related to trees and the reporting of satisfactory completion of operations to the client and the Local Planning Authority.

A Hedgerow Translocation Method Statement will be provided with the final CEMP to avoid damage to hedgerows that are to be translocated during the works. A Turfs and Soils Method Statement will be provided with the final CEMP to avoid damage to the turfs and seed bank within the soils during the works.

4.7.8 Invasive species management plan

A full Invasive Species Management Plan will be produced by the Contractor(s) (in consultation with specialist contractors) to set out the requirements and

management of invasive species to prevent the spread of species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended), with exact methods of removal and disposal. General measures that may potentially be used for the invasive species identified within the proposed development boundary are laid out below.

The invasive species identified on site comprise: waterweed (likely *Elodea spp.* or *Lagarosiphon spp.*), Japanese knotweed (*Reynoutria japonica*) and Japanese knotweed hybrid (*Reynoutria japonica x sachalinensis*).

In addition to the control measures set out below, a pre-construction survey will be undertaken of all areas within the construction footprint to identify the location of any invasive species not already identified.

General control measures that may be included within the full Invasive Species Management Plan are as follows:

- Details of invasive species shall be included within the project induction and toolbox talks given to operatives working in areas where the species are or have been known to grow. Any early regrowth shall be reported and dealt with as per methodology detailed below and within the full Invasive Species Management Plan. If the cells have been completed when new growth is discovered this shall be excavated and taken for offsite disposal at licenced facilities;
- There shall be a vehicle cleaning area adjacent to the burial zone and all vehicles used shall be cleaned prior to leaving this area. This area shall not be greater than 7m from the burial zone, material left in the clean down zone shall be collected and deposited into the burial cell;
- The excavation shall remove and transfer invasive species contaminated material with haulage to the holding area being supervised;
- Areas where invasive contaminated material is buried shall be accurately recorded and details of this included within the final CEMP;
- Excavation is to begin from the furthest point of the works and move backwards to avoid traffic on excavated, potentially contaminated ground;
- Vehicles collecting and removing material should be positioned over part of the geotextile prior to loading. Any material that may be dropped by the hopper will be caught by the geotextile;
- Once the works have been completed, the excavator is to be thoroughly cleaned and all arisings placed into the final load of contaminated material;
- In the event of material requiring storage prior to burial this shall be stored in a designated location on an impermeable membrane to prevent spread of the plants. This area will also have a clean down zone; and
- If any material is to be removed for offsite disposal this will only be performed once a disposal location has been identified and this location has confirmed that it will accept the waste. This will require ground investigation data and may need up to 10 days to obtain this information.

4.8 Archaeology and cultural heritage

4.8.1 General provisions

The Contractor shall incorporate the Archaeology and Cultural Heritage Management Plan requirements set out below into the works. They will update and submit the Archaeology and Cultural Heritage Management Plan as part of the final CEMP to Cardiff Council, for acceptance, three weeks before the first access date.

The Contractor shall refer to the relevant requirements of the mitigation strategy when developing the Archaeology and Cultural Heritage Management Plan.

A watching brief will be required to be in place during construction, to mitigate the discovery of any previously unidentified features.

The archaeological programme would be undertaken by an archaeological Contractor registered with the Chartered Institute for Archaeologists and in accordance with a Written Scheme of Investigation (WSI) previously approved by Cardiff Council.

4.8.2 General mitigation

Monitoring must be undertaken in any areas where the ground level is to be reduced or excavated, either for the development itself or for any associated service trenches. As the technique of piling is not conducive to the recovery of archaeological material, the requirement for monitoring any such operations needs to be determined by consultation with the Employer's archaeologist and Cardiff Council.

Works compounds or heavy vehicle working areas and routes associated with the construction phase of the Project will avoid sites and surface features which may be particularly vulnerable to inadvertent damage where feasible. Any significant adverse impact here would be mitigated through inclusion in the proposed controlled soil strip or watching brief in consultation with the Archaeologist.

Archaeological excavation may be appropriate for features found during controlled soil strip, or watching brief, as determined by the Employer's Archaeologist and consultation with Cardiff Council.

4.8.3 Specific mitigation

Previous archaeological field investigations on the Gwent Levels have indicated the high potential for buried archaeological remains to be present within the development area. Mitigation is to be devised in consultation with Cardiff Council which will include archaeological field investigation for evaluation. Evaluation details will be outlined in the WSI.

4.9 Landscape

4.9.1 General provisions

The following measures will be implemented to help mitigate the impact of the development on the landscape and visual resource:

- removal, handling, storage and transplanting of any vegetation which is to be reused, relocated or transplanted;
- a programme for undertaking planting works;
- maximising the retention and protection of all existing trees and vegetation, whether statutorily protected or not, within or in the vicinity of the site, in accordance with BS 5837: 'Trees in relation to design, demolition and construction';
- replace/plant trees with suitably sized trees to the approval of Cardiff Council Tree Officer, and in accordance with the approved programme for undertaking planting works at the first available planting season;
- use of well-maintained fencing and hoardings to prevent unwanted access to the construction site, to provide noise attenuation, screening, and site security where required;
- use of different types of fencing and hoarding to minimise visual intrusion;
- painting the side of hoardings facing away from the site, and to keep them free of graffiti or posters;
- protect and retain existing walls, fences, hedges and earth banks for the purpose of screening as far as reasonably practicable;
- temporary lighting to avoid unnecessary intrusion onto the adjacent buildings and wider landscape to prevent unwanted impacts on night-time lighting;
- Maintain a clean and tidy site, using road sweepers and other appropriate methods.

4.9.2 Protection of trees and vegetation

The Employer will appoint a suitably qualified consultant or arboricultural consultant to oversee works relating to the protection of trees.

Retained trees shall be protected in line with the recommendations in BS 5837: Trees in relation to design, demolition and construction.

Any tree surgery and felling operations will comply with the recommendations in BS3998: Tree work. Recommendations, as appropriate.

The Arboricultural Method Statement shall be followed for works adjacent to existing trees, tree protection and tree removal measures. Refer to section 4.7.5 for further details.

Vegetation clearance would be undertaken, during the appropriate season/time of year, with great care to remove the minimum necessary and to protect and retain adjacent vegetation. Trees to be retained would be protected with fencing in accordance with British Standard BS 5837:2012 Trees in relation to design, demolition and construction and as shown on the TPP in the arboricultural report. These works are to be undertaken outside of the bird nesting season (March to October inclusive) and are to be supervised by a qualified Environmental Clerk of Works.

To prevent the spread of non-native invasive plant species, the appointed contractor must follow the latest guidance as set out by Natural Resources Wales or other relevant authority.

4.9.3 Tree planting and replacement

The supply, storage, handling, planting and maintenance of new planting will be undertaken in accordance with appropriate British Standards, including BS 5837 Trees in relation to design, demolition and construction; BS 3998 Tree Work. Recommendations and BS 4428 Code of practice for general landscape operations (excluding hard surfaces) and other appropriate guidance including the UK Forestry Standard and the UK Woodland Assurance Standard.

Sourcing of plants and seed will be in accordance with current Defra/Natural Resources Wales and industry guidance to prevent the spread of pests and diseases and non-native invasive species. Contractor to refer to UK Plant Health Information Portal and Natural Resources Wales's latest publications on this topic.

4.9.4 Measures to reduce potential impacts on landscape and visual resource

Planting and other landscape measures will be implemented as early as is reasonably practicable where there is no conflict with construction activities or other requirements of the project. The Employer will require its contractors to consider where measures can be implemented early and programme the landscape works accordingly. Locations for landscape measures will relate to the findings of the ES and will be aimed at the protection and mitigation of adverse effects on sensitive views and valued landscape features and characteristics.

A record of how the implementation of the works meets control measures, relevant to protection of the landscape and key landscape features, will be maintained and regularly reviewed.

The Employer, Local Planning Authority, NRW and other bodies (where they have an interest), and adjacent landowners will be consulted, as appropriate, regarding the landscape and planting proposals.

Potential impacts on trees or other mature vegetation will be considered, seeking to avoid and minimise unnecessary impact, when positioning site access and egress points.

Excavated material (especially topsoil) will be handled in an appropriate manner to ensure its viability for reuse. The quality of excavated material (topsoil/subsoil) will need to be tested by a suitability qualified specialist for its suitability to be used for either structural embankments, landscaping or agreed third party use. Appropriate construction good practice in handling all material re-use will be implemented.

The sourcing, testing, stripping, handling, storage and spreading of site-won and imported topsoil will comply with BS 6031: Code of practice for earthworks. Imported topsoil will comply with the BS 3882: Specification for topsoil and requirements for use.

Planting, seeding, wildflower seeding and other landscape works will consider the recommendations of the latest version of the following standards. Alternatively, where a British Standard does not exist, works will follow industry best practice and agreement will be sought from the Employer.

4.9.5 Monitoring

Appropriate inspection, monitoring and maintenance of landscaping and planting and seeding works provided as part of the proposed development, will be undertaken by the contractors throughout the construction period.

The Employer will supply its contractors with information prior to construction to verify the landscape planting and seeding design and arboricultural requirements as set out in the ES, on drawings and in the specification. This will allow the contractors to fully understand the required mitigation measures.

The Employer will require its Contractors to undertake appropriate maintenance of planting and seeding works and implementation of management measures, through the construction period as landscape works are completed. The Contractors will monitor the progress of new landscape works through the construction period. Any failures of planting and seeding will be replaced in accordance with the approved specification and works requirements. This will ensure annual replanting and reseeding works are undertaken (as required) to achieve successful establishment of the landscape mitigation proposals at completion of the construction works.