Fire Safety Strategy Report
for
Maelfa Wellbeing Centre

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Issue No: 05

Revision History

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Client Details

Client:	Wilmott Dixon
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Project:	Maelfa Wellbeing Centre

Validity

This report is produced on the basis of the information and experience available at the time of preparation. It is applicable to the above-mentioned project only in accordance with the client's instructions. It is only valid provided no other modifications are made other than those for which a formal opinion has been sought and given by Bureau Veritas UK.

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1 Introduction

1.1 Background

Roberts Limbrick Architects are designing the Maelfa Wellbeing Centre, a new building next to an existing two-level community hub, located in Llanedyrn, Wales.

The proposed ground floor consist of reception and waiting area, two treatment rooms, 11 consulting rooms, a GPs main office, a group room, a seminar room and ancillary accommodation on the ground floor. The first floor consists of a sub-waiting area, two admin rooms, five interview rooms, a meeting room, a staff rest room, 8 testing/treatment or consulting rooms, a records room and an IT hub. Refer to Figures 1, 2 and 3 below for floor layouts.

The building's top floor level is circa 4m above access level and will be served by two protected escape stairs. There is a void that connects the two floors.

The ground level is connected to the existing building via a door, however, the two buildings will operate separately, so a 60 min compartmentation is proposed to be provided to avoid potential fire spread from one building to the next. Also, the door connecting the two buildings will not be used for escape.

It is understood that the project building does not include and will not include (upon completion of the works) any inpatient areas, as such no sleeping occupants are assumed to be present in the building. It is further understood that this facility is not proposed to be used for treatments involving patient sedation (with subsequent incapacity of self-evacuation). This has been confirmed by the design team. This strategy is therefore development based on the fact that all occupants can evacuate unaided.

Figure 1: Ground Floor Plan

Figure 2: First Floor Plan

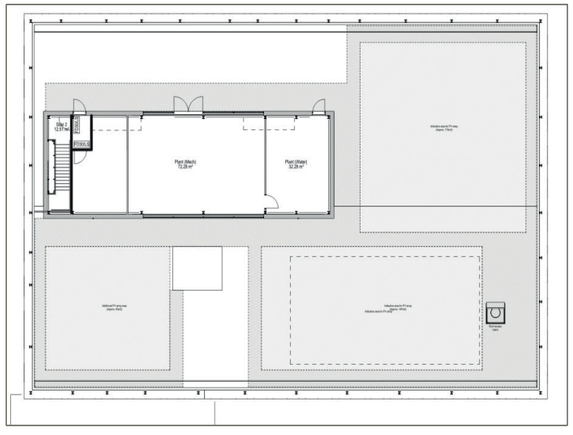


Figure 3: Roof Plan

1.2 Key Stakeholders

The key stakeholders of this development are as follows:

- Customer – Cardiff and Vale University Health Board.
- Building Control Body – CCC Building Control
- Architect – Roberts Limbrick
- Consulting M&E engineer – TB&A
- Civil and Structural Engineer – Cambria

- Principal Designer – WDC
- Principal Designer Advisor – MSAFE
- Adjacent Stakeholders – CCC Regeneration / Powerhub

1.3 Purpose of Report

This report outlines the fire safety strategy for the proposed new treatment building and is intended to highlight the key design issues and the proposed solutions to meet the challenges of compliance with the Building Regulations Part B.

British Standard 9999 (BS 9999:2017) will be used as a guidance document for this development in order to achieve statutory approval under Part B of the Building Regulations 2010.

Where no specific provision is mentioned in this fire strategy regarding any particular aspect reference should be made to BS 9999:2017.

This document will, therefore, act as the basis of discussions between the design team and Approval Authorities, in order to obtain approval in principle for the design in respect to fire safety compliance.

1.4 Sources of Information

This Fire Strategy should be read in conjunction with the drawings provided by Roberts Limbrick Architects.

Note: *The figures within this report are only to illustrate the fire safety principles; for confirmation of layout or other details reference should be made to the current project drawings.*

Table 1: Documents Used within this Report

Drawing	Reference No.	Revision
Proposed Ground Floor Plan	MWC-RLA-ZZ-00-DR-A-07001	P6
Proposed First Floor Plan	MWC-RLA-ZZ-00-DR-A-07002	P4
Proposed Roof Plan	MWC-RLA-ZZ-00-DR-A-07003	P4
Proposed Site Plan	MWC-RLA-ZZ-ZZ-DR-A-00002	P03

2 Statutory Requirements

2.1 The Building Regulations

The building is subject to the statutory requirements of the Building Regulations 2010. It is, therefore, necessary for the building to meet the functional requirements of Part B of Schedule 1 of these Regulations. These requirements can be seen in the figure below:

Figure 4: Part B of The Building Regulations

2.2 Guidance

For the building, compliance with the above requirements will normally be achieved by adopting a design approach which follows the recommendations with BS 9999:2017 where appropriate and supplementing this with fire engineering solutions where necessary to ensure that the key fire safety objectives for the design are achieved.

The document is primarily concerned with life safety, property protection is not specifically considered although the fire protection provisions for the building will offer some degree of property protection. Extreme events such as arson, terrorist attack etc. are not covered by this report.

As with all British Standard Codes of Practice, BS 9999:2017 provides guidance and recommendations relating to its subject matter. It does not contain mandatory clauses or prescriptive requirements, and it is acceptable to deviate from the recommendations made, provided such deviations are supported by adequate evidence that the functional requirements will still be met. The Standard also acknowledges that in some circumstances it may be necessary to use one guidance document to supplement another, and confirms that this is acceptable provided the overall approach is fully integrated into the final design solution.

2.3 The Regulatory Reform (Fire Safety) Order 2005

Once the building is completed and occupied, the Regulatory Reform (Fire Safety) Order [RR(FS)O] becomes the controlling fire safety legislation. The Order came into force in 2006, revoking amongst other legislation the Fire Precautions Act and the Workplace Regulations.

It is necessary, among other things, under this order for the owner/occupier of the building to carry out and maintain a fire safety risk assessment. The building's management team will also be responsible under this order to ensure that the building's fire safety provisions are appropriately managed, maintained and tested over the whole life of the building.

2.4 Construction, Design and Management Regulations

Projects undertaken within the UK are subject to the requirements of the Construction, Design and Management Regulations (CDM).

This report defines the strategy for meeting the functional and performance requirements for fire safety in the finished building. Where any conclusions or recommendations have been arrived at which specify particular materials, products or forms of construction these will have been assessed, in accordance with CDM Regulation 9 (Duties for Designers). In the event that these involve significant residual risks or health and safety critical assumptions, this information will be made available, to the Principal Designer. Where the architect or other consultants use the standards put forward in this report to specify works, they are understood to be competent in alerting the Client, Principal Designer, and Contractor and Building Occupiers of CDM issues.

3 Risk Profile

3.1 Occupancy Characteristic

The building is categorized as **Occupancy Characteristic B** consisting of people who are awake and unfamiliar with the building layout, as the majority of the occupants will be patients.

3.2 Fire Growth Rate

A fire growth rate of **Medium (Category 2)** is applicable to this building.

3.3 Risk Profile

The building is therefore **Risk Profile B2**.

3.4 Automatic Water Fire Suppression Systems (AWFSS)

As a result of the height and use, the building is not required to be provided with a sprinkler system in accordance with BS 9999:2017.

4 Means of Warning & Escape

4.1 Evacuation Strategy

The means of escape has been designed based on the following assumptions:

- Any fire in the building is assumed to be unintentional and therefore it is unlikely to start in two different locations at one time;
- In the event of a fire alarm, the new building should evacuate simultaneously. The actuation of the fire alarm system should result in the evacuation of all the occupants. The new building and the existing community hub will operate as two separate buildings and will not evacuate simultaneously.
- Suitable evacuation muster points will be identified & agreed with the Wellbeing Centre management and these will form part of the evacuation procedures.

4.2 Fire Detection & Alarm Systems

The minimum recommended fire alarm system as recommended by BS 9999:2017 is the provision of a category manual call point system. However, it is recommend that the Wellbeing Centre should be provided with a category L1 automatic fire detection and alarm system in accordance with BS 5839-1.

This category of system requires detectors to be located in all escape routes, circulation spaces, all rooms accessed directly from an escape route and any other rooms considered to represent a higher fire risk.

All inner rooms should be provided with automatic fire detection and alarm system so that if a fire were detected in the access rooms, the occupants in the inner room will receive early warning to evacuate immediately.

Table 2: Fire Detection and Fire Alarm System

Accommodation	Minimum Acceptable System	Provided System
B2	M	L1 in accordance with BS5839-1

Optical type smoke detectors will be provided throughout the building with the exception of rooms that may contain naked flames or within which smoke or steam (plant rooms) may be expected. In these cases, heat detectors will be provided as an alternative to the smoke detectors. However, heat detectors are not suitable for use within escape routes or circulation routes and optical type smoke detectors will be provided throughout these areas.

Table 3: Fire Detectors

Areas	Detector
All Areas	Smoke Detectors
Plant Rooms	Heat Detectors

Type A (direct operation) manual call points, designed in accordance with BS EN 54-11;2001 and installed in accordance with BS 5839-1: 2013, will be located at all storey and final exits between 1.2m and 1.4m from the finish floor level.

Audible alarm sounders designed to comply with BS 5839-1: 2013 will be provided throughout the building. The alarm signal will be distinct from any other alarms or signals used in the building.

It should be ensured that the fire alarm takes priority over any other sound system or sound effect to be used in the main hall, and the evacuation signal or tone will be distinct from other sounders.

In addition to audible alarms, visual alarms devices (VADs) will be provided to isolated areas such as Toilets or plant rooms etc. The visual alarm devices must comply with BS EN 54 part 23; 2010.

All inner rooms will be provided with means of warning such as sounders, doors or walls with adequate vision panels. The access rooms will be provided with appropriate fire detection systems.

Furthermore, it will be necessary for the fire detection and alarm system to be linked to other systems and equipment as necessary to ensure operation or activation in a fire scenario as follows:

- Hold-open devices on fire doors to be released;
- Air handling plant to shut down;

Note: *The provision of a Category L1 detection and alarm system provides a clear benefit over the minimum recommended fire protection package (Category M). This enhancement allows for a 15% variation in the travel distances, stair widths and door widths under Section 18 of BS 9999:2017.*

4.2.1 Void detection

Category L1 fire detection & alarm systems require any void over 800mm in height to be provided with detection. Following a risk assessment, it is proposed that voids with no fire load (and therefore no ignition source) in them are not provided with detectors. There are no voids connecting multiple rooms, as all partition walls are enclosed to full height. **This approach is to be agreed with the Statutory Approvers.**

4.2.2 Security Doors

All doors on escape routes fitted with a lock or fastening will be readily operated, without the use of a key and without having to manipulate more than one mechanism. Where the door is likely to be used by more than 60 persons, panic hardware complying with BS EN 1125 will be installed on the side approached by persons making their escape. All electrically powered locks will automatically unlock on actuation of the fire alarm system.

The door leaf of any doorway or exit should be hung to open in the direction of escape, and should always do so if the number of persons that might be expected to use the door at the time of a fire is more than 60.

4.2.3 Protected power circuits

The cables for fire alarm circuits should conform to BS 5839-1:2013.

The cables for voice alarm circuits should conform to BS 5839-8:2013.

The cables for emergency voice communication circuits should conform to BS 5839-9:2011.

The cables for all other circuits that require a resistance to fire, either for life safety, fire-fighting or property protection should conform to BS 8519.

4.2.4 Backup Power Supplies for Fire Safety Systems

All essential electrical cables supplying power to fire safety equipment will be fully robust and their routes will be cautiously chosen to limit the potential for damage. Secondary power supplies will be required to all equipment essential for functioning during a fire, including the fire detection and alarm systems and the emergency lighting system.

The secondary power supply will comply with BS 8519: 2010 - *Selection and installation of fire-resistant power and control cable systems for life safety and fire-fighting applications. Code of practice*

Where possible all insulation and casing on cables should be of the zero halogens low smoke (0HLS) type to minimise the risk from toxic and corrosive fumes and smoke.

The fire alarm system shall be provided with power supply backup via the provision of dedicated batteries. The batteries shall be capable of maintaining the standby load for a minimum of 23hr, and the alarm load for 30min.

4.2.5 Emergency Lighting & Signage

Emergency lighting will be provided in all escape routes, in accordance with BS 5266: Part 1; 2016 and BS EN 1838; 2013.

Escape and other fire safety signage will be provided in accordance with the recommendations of BS 5499: Part 1; 2016.

Emergency lighting will be provided to comply with the table below.

Table 4: Emergency Lighting

Building Characteristic	Areas Requiring Emergency Lighting
B	All escape routes (including external escape routes)
Any Risk Profile	All sanitary accommodation with a floor area over 8m^2
	Windowless sanitary accommodation with a floor area not more than 8m^2
	Electricity ad generator rooms
	Switch room/ battery room for emergency lighting

Escape and other fire safety signage will also be provided in accordance with BS ISO 3864 Part 1: 2011 and BS 5499 Part 4: 2013.

The signage will be consistent throughout the building and will comply with the recommendations of BS ISO 3864 Part 1 and comprise a graphical symbol, directional arrow and supplementary text.

4.2.6 Interface with Existing Power Hub

A fire detected in the Wellbeing Centre would not cause the Power Hub to be evacuated, or vice-versa. However, a signal will be sent in the building where the fire did not occur alerting the building management that a fire is occurring in the adjacent building.

4.3 Occupancy

Table 5 below summarises the expected maximum occupancy levels per floor.

Table 5: Total Expected Occupancy Levels

Level	Expected Occupancy
Ground Floor	209
First Floor	114

It should be noted that Table 5 lists the maximum occupancy per level (assuming the worst case distribution of occupants) for the purpose of calculating exit widths.

The expected occupancy has been confirmed by the clients.

4.4 Horizontal Evacuation

4.4.1 General Requirement

In accordance with the BS 9999: 2017 the following should be adopted:

- The horizontal escape routes are required to be kept free from obstacles, such as steps or raised thresholds, which delay or impede travel in an emergency evacuation or escape. Where such obstacles occur, a suitable ramp should be provided. All escape routes which will be utilised by wheelchair users, including external, where applicable should be flat or suitably ramped.
- Regardless of risk profile the exit door width should be not less than 800mm, or 850mm where unassisted wheel chair is necessary.
- Corridors at all levels will not be less than 1,200mm in clear width and cross-corridor doors will not be less than 1,050mm.
- Cross-corridor fire doors (FD30s) will be provided where a corridor is greater than 12m in length and/or serves more than one exit, this will limit the spread of smoke, therefore, minimising the chance of two escape routes being compromised as a result of a fire.
- All dead-ends greater than 4.5m in length will be protected with 30 minutes fire resistance and door opening into the corridor will be FD30S doors with self-closers in lieu of a cross corridor door.
- Dead-end corridors (more than 2m long) should be provided with 30 minutes fire resistance, as shown below.

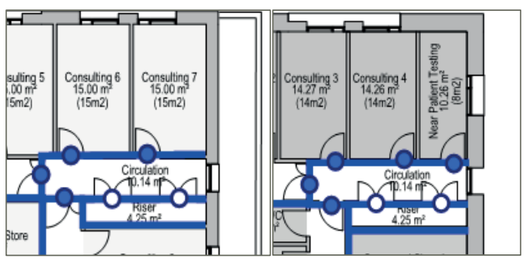


Figure 5: Dead ends in corridors: ground floor (left) and first floor (right)

4.4.2 Travel Distance

The maximum applicable travel distance in accordance with BS 9999:2017 is shown in the table below. The provision of a Category L1 detection and alarm system provides a clear benefit over the minimum recommended fire protection package (Category M). This enhancement allows for a 15% variation in the travel distances under Section 18 of BS 9999:2017.

Table 6: Travel Distance Requirements

One Way Travel Distance	One Way Travel Distance with 15% increase	Two Way Travel Distance	Two Way Travel Distance with 15% increase
20 m	23 m	50 m	57.5 m

Note: *Any room or area that is provided with a single exit should be restricted to a maximum of 60 occupants.*

All horizontal travel distances are compliant.

4.4.3 Open Void between Ground and First Floor

The waiting area at Ground Floor is adjacent to the main escape routes from the building extension. Furthermore, the waiting area has a two-level high void, therefore it is also open onto the First Floor escape routes. As the waiting area may include combustible materials, it is important to ensure that any fire starting in the waiting room would not impede the evacuation of the rest of the building. Therefore, the area containing the waiting area and the adjacent circulation spaces should be separated from the rest of the building with 30 minute fire resisting construction at both ground floor and first floor, as shown in the figures below.

In case of fire starting in the Ground Floor waiting area, it is assumed that the occupants of this area and the nearby spaces will evacuate through the nearest final exits, while the rest of the ground floor occupants (140 people) will proceed to the exit from stair 3, therefore the storey exit and final exit should be sized appropriately to accommodate the expected occupancy (see sections below).

At First Floor, each of the storey exits must be able to accommodate the entire floor occupancy.

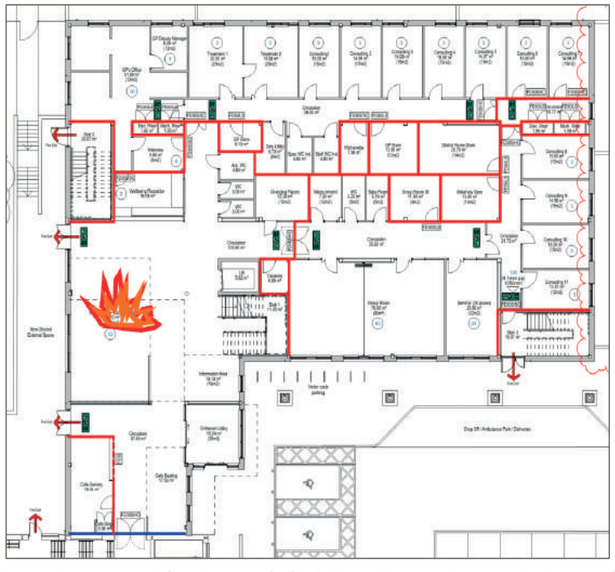


Figure 6: Evacuation strategy at ground floor in case of a fire in the waiting area (storey exits in green, final exits in red)

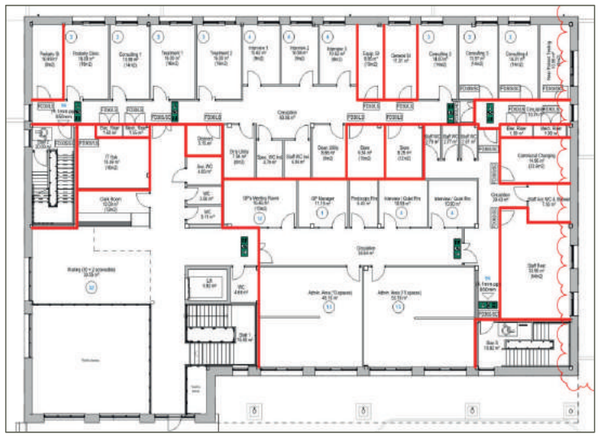


Figure 7: Evacuation strategy at first floor in case of a fire in the waiting area (storey exits in green)

4.4.4 Inner rooms and Access rooms

The proposed building contains rooms where the only escape route is through another room. This inner room scenario is present in multiple locations on the ground floor and on the first floor as shown in the figures below.

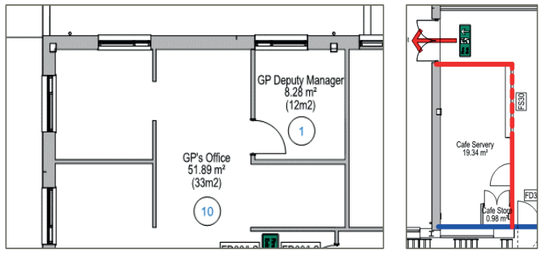


Figure 8: Inner rooms at ground floor

Analysis of the provided layouts indicates the building complies with the requirements for inner room scenarios.

A category L1 alarm and detection system is proposed to be installed in the building in accordance with BS 5839 Part 1. As a result, the access rooms will be fitted with an automatic fire detection and alarm system that serves to warn occupants of the inner room.

In all scenarios, the occupant capacity of the inner rooms should not exceed 60 people.

4.4.5 Recesses Off Corridors

Recesses more than 2m off corridors need to be enclosed in fire rated construction. There is such a scenario on the first floor of the Wellbeing Centre, as shown below. However, the recessed rooms are WCs and an interview room, which will have a very low fire load, therefore the risk of fire in any of those rooms is negligible and enclosing this recess in fire rated construction is an overprovision. **This approach has to be agreed with the Statutory Approvers.**

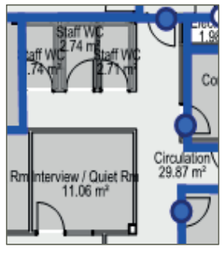


Figure 9: Recess off corridor at First Floor

4.4.6 Escape Door Widths

Any room serving less than 60 occupants can be provided with one exit with a minimum clear width of at least 850mm in order to satisfy wheelchair users' escape, in line with Part M.

Where the floors are expected to have more than 60 occupants they will have more than one exit, with the doors opening in the direction of escape, and a clear width representative of the expected occupancy levels.

Where there is access to more than one exit, it will be assumed that the largest exit is unavailable due to the location of the fire and the remaining exits will be sized such that there is sufficient capacity for all the anticipated occupants.

Table 7: Minimum Number of Exits/ Routes

Maximum Number of Persons	Minimum Number of Exits or Escape Routes
60	1
600	2
More than 600	3

Escape door widths are calculated using the maximum occupancy multiplied by the minimum door width required per person from Table 12 in BS 9999:2017. The provision of a Category L1 detection and alarm system provides a clear benefit over the minimum recommended fire protection package (Category M). This enhancement allows for a 15% variation in the door widths under Section 18 of BS 9999:2017 and is considered in the calculation of the compliance of the storey exits.

Table 8 summarises applicable variables and compliance for door width calculations.

Table 8: Minimum Door Width Per Person

Level	Occupancy	Min. door width per person (mm)	Min. door width after applying 15% reduction (mm)	Minimum required storey exit width (mm)	Available storey exits after discount	State of compliance
Ground Floor	140	4.1	3.485	850mm*	1 exit of 1050mm	Acceptable
Ground Floor Waiting area	69	4.1	3.485	850mm*	1 exit of 1800mm	Acceptable
First	114	4.1	3.485	850mm*	1 exit of 1050mm	Acceptable

**Note: Where a door has a width of less than 1050mm, the number of people safely accommodated by that exit width (n) is calculated using n = 500/m, where m is the minimum door width per person.*

***Note:** Minimum door widths per person has not been provided for the Plant room as the occupancy is considered so low within the spaces they will require a minimum exit width of 800mm.*

***Note:** 800mm is the minimum required door with in accordance with BS 9999:2017 for Part B compliance. Larger exits may be required to satisfy other parts of the Building Regulations such Part M.*

For the purposes of this report, the width of a doorway is the clear width of the opening between the door leaf and frame (or projecting building hardware or the width between two opening door leaves in the case of double doors) assuming that the door leaf is free to open 90 degrees or more.

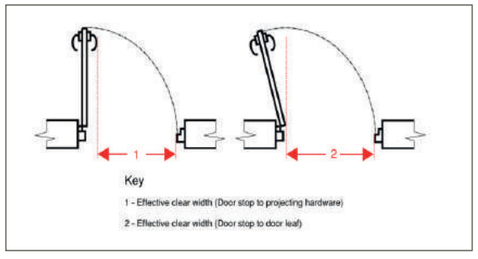


Figure 10: Door Clear Width Calculation

4.5 Vertical Evacuation

4.5.1 Escape Stair Widths

The minimum required stair width has been based on the preceding occupancy approximations above and the following assumptions:

- 114 expected occupancy on the upper floor.
- One stair will be discounted.
- The stair width per person for a B2 risk profile building, over one upper floor and in accordance with Table 13 in BS 9999:2017, is 4.8mm.

The building is provided with two protected stairs of 1250mm.

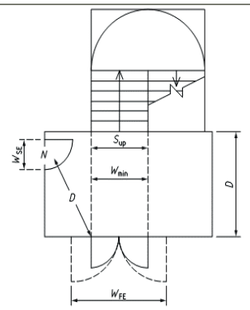
Table 9: Internal Protected Stair width Calculations

Occupancy	Number of Floors Served	Minimum Stair width per person	Minimum Stair width per person after applying 15% reduction (mm)	Minimum Required Stair Widths	State of Compliance
114	1	4.8mm	4.08mm	1000mm	Acceptable

4.6 Final Exit and Final Exit Widths

The final exit doors leading from the stairs should be at least the same width as the stairs leading to it. Therefore the final exit from stair 2 has to be at least 1250mm wide. Further to this it is noted that the protected stairs discharge directly to a place of safety outside the building which is in line with the requirements of BS 9999. The exit from Stair 2 is compliant with the requirements.

The final exit from stair 3 requires a merging flow calculation, using the formula shown in the figure below.



If $N > 60$ and $D < 2$ m

$W_{FE} = S_{up} + W_{SE}$

Otherwise

$W_{FE} = NX + 0.75S_{up}$

where:

N	is the number of people served by the final exit level storey exit;
D	is the lesser distance from the final exit level storey exit or the lowest riser from the upward portion of the stair, in metres (m);
W_{FE}	is the width of the final exit, in millimetres (mm);
S_{up}	is the stair width for the upward portion of the stair, in millimetres (mm);
W_{SE}	is the width of the final exit level storey exit, in millimetres (mm);
X	is the minimum door width per person (see **16.6** and Clause **18**), in millimetres (mm);
W_{min}	is the absolute minimum width of the final exit and should be not less than the width of the stair, in millimetres (mm).

Figure 11: Merging flow at final exit (from BS9999:2017)

Table 10: Merging flow at final exit from Stair 3

Occupants served (N)	Distance to exit (D)	Min. width door per person (X)	Stair Width (S_{up})	Min. Required Final Exit Widths	State of Compliance
>60 (140)	>2	3.485mm	1250mm	1450mm	Acceptable

4.7 Roof Escape

The roof level contains three plant rooms and is accessed through Stair 2 via a lobby. Alternative means of escape is provided via a roof access hatch opening into Stair 3. The travel distances on the roof are compliant.

The roof will be accessed for maintenance only by authorized personnel.

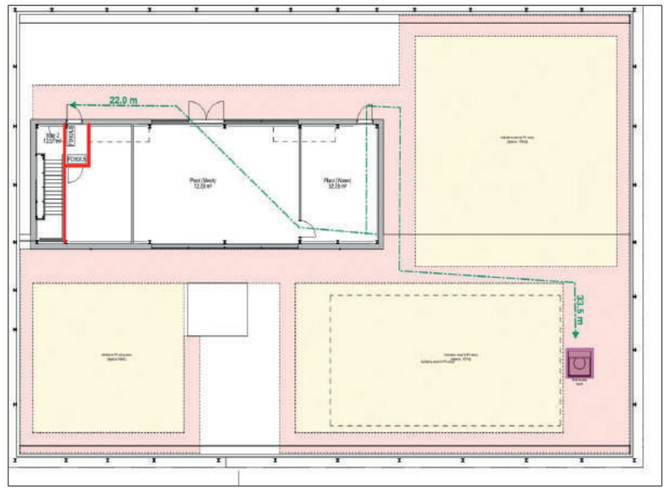


Figure 12: Escape from the roof

4.8 Disabled Evacuation

The means of escape for disabled persons is largely dependent upon the building management. No reliance will be placed on the fire service to assist in the evacuation process. Disabled evacuation procedures will coincide with normal evacuation procedures.

Disabled occupants on the ground floor will be able to evacuate through the main entrance or via the nearest exit to place of ultimate safety outside the building.

Disabled occupants on the upper floor will evacuate using the protected staircases, where they can get to the ground floor and evacuate the building. Any occupants in wheelchairs will require an adequate number of trained staff available to assist in the evacuation.

Both stairs will be provided with a disabled refuge space which will be a minimum of 900mm x 1400mm and this will be located within the stair landing area on both upper levels, and will not reduce the clear width of the escape route.

An Emergency Voice Communication (EVC) system will be provided which will communicate with a master station suitably located (internally on the ground floor or the reception), to allow staff to coordinate the evacuation of occupants waiting in refuges.

An evacuation chair will be provided at each refuge for use by trained staff when evacuating any disabled occupants.

Note: *Staff will need to be available to offer assistance to disabled individuals evacuating the upper floors if required.*

5 Internal Fire Spread (Linings)

The surface finishes should satisfy the following classifications shown in the table below, when tested under either the National Classifications (in accordance with BS 476) or under the European Classifications (in accordance with BS EN 13501-1:2002).

Table 11: Wall and Ceiling Lining Requirements

Location	National Class	European Class
Small rooms not exceeding 30m^2	3	D-s3,d2
Other Rooms	1	C-s3,d2
Circulation Spaces	0	B-s3,d2

Note: *When a classification includes 's3, d2' this means that there is no limit on the production of smoke or flaming droplets/particles.*

The surface linings of the walls and ceilings should generally conform to the classification recommended above for the appropriate location. Parts of walls may have a poorer performance than specified above (but never less than National Class 3 or European Class D-s3,d2) provided the total area of those parts in any one room does not exceed one half of the floor area of the room, subject to a maximum of 60m².

6 Internal Fire Spread (Structure)

6.1 Fire Resistance of Elements of Structure

The building is not more than 5m measured from access level to the height of the top occupied storey.

All elements of structure should be provided with 30 minutes of fire resisting construction.

Table 12: Fire Resistance Requirements

Part of the Building	Minimum provisions when tested to the relevant part of BS 476(minutes)			Method of Exposure
	Loadbearing Capacity	Integrity	Insulation	
Structural Frame, Beam or Column	30	N/A	N/A	Exposed faces
Load bearing Wall	30	N/A	N/A	Each side separately
Floors	30	30	30	From Underside
Roofs Any part forming an escape route	30	30	30	From Underside
External Walls Any part more than 1000mm from the relevant boundary[1]	30	30	15	From inside the building
Enclosure Protected escape stairs, lifts, Services risers	30	30	30	Each side separately
Fire resisting construction[2] Place of special fire hazard	30	30	30	Each side separately
Cavity Barriers	N/A	30	15	Each side separately

Notes: *[1] excluding permitted unprotected areas in section 7.2.*

[2] Refer to Section 6.3 for more information on places of special fire hazard.

Any element of structure supporting a section of the roof, which does not form the function of a floor, is not required to be fire rated.

6.2 Compartmentation

Compartment sizes on each floor level should be restricted to 8000m² for a building with **Risk Profile B2** having a height of less than 18m. Analysis of the use areas within the building indicates no requirements for compartmentation.

As such, it is not considered necessary to provide compartmentation between ground and 1st floor.

Areas of ancillary accommodation should be enclosed in fire rated construction consisting of either 30 or 60 minutes depending the level of hazard within these areas. Refer to Section 6.3 for more information.

The protected escape stairs should be enclosed in 30 min of fire rated construction with self-closing FD30S fire doors therein. 30 minutes of fire rated construction and cross corridor door should be provided to ensure the subdivision between the two escape routes.

The wall separating the Wellbeing centre from the adjacent hub should have a fire resistance of 60min together with FD60S fire door.

The proposed building satisfies the criteria for compartmentation in accordance with the requirements of BS 9999:2017.

6.3 Places of Special Fire Hazard

All storage areas and kitchens containing cooking facilities are considered to be places of special fire hazard and should be enclosed with construction having not less than 30 min fire resistance. Similarly, all plant areas should be enclosed in walls having not less than 30 min fire resistance, unless they are areas containing high voltage equipment, in which case the fire resistance should be 60 min.

Table 13: Fire Resistance Requirements for Ancillary Accommodations

Area	Minimum Fire resistance (minutes)
Store rooms	30
Cleaner's stores	30
Server and hub rooms	30
Plant room	30*
Café	30

**Note: 60 min if not low or extra-low voltage.*

It is proposed to have a café at ground floor, which would have a kitchen and be classified as a place of special fire risk. To mitigate the risk, the café servery is enclosed in 30 min fire resisting construction as shown below.

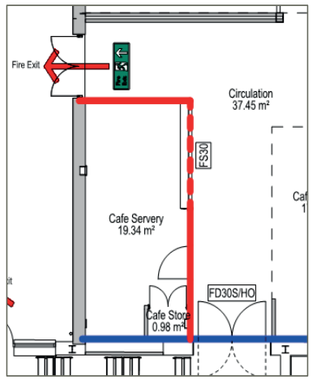


Figure 13: Café at ground floor

6.4 Fire Doors

Fire doors should be provided in all fire rated enclosures in accordance with BS 476-Part 22:1987 and specified with cold smoke seals (only where smoke seals are required) in accordance with the recommendations of BS 476 Section 31.1. The fire resistance requirements for the doors are shown in the table below:

Table 14: Fire Doors

Position of Door	Rating (When Tested in Accordance With BS 476-22)	Rating (When Tested in Accordance With BSEN1634-1)
Enclosing an escape stair	FD 30S	E 30S$_a$
Enclosing a services riser	FD 30[1]	E 30[1]
Enclosing place of special fire hazard	Same fire resistance as the wall it is fitted in	Same fire resistance as the wall it is fitted in
Sub-dividing corridors	FD 30S	E 30S$_a$
Within a cavity barrier	FD 30S	E 30S

[1]Smoke seals should be provided if the position of door is within a protected escape route.

Fire doors on circulation routes may be held open by devices which release automatically when the fire alarm activates. The control of such hold-open devices should conform to BS 7273-4. It is recommended that doors on hold-open devices close at night to prevent warping of doors over time.

Fire doors should incorporate self-closing mechanisms (or be kept locked shut when not in use), and cold smoke seals should be provided where the suffix (S) is indicated in the table above.

Fire doors should be identified by appropriate standard signs "Fire Door – Keep Closed" or "Fire Door – Keep Locked Shut".

6.5 Concealed Spaces

Concealed spaces or cavities in the construction of the building provide a ready route for smoke and flame spread, especially in voids above and below ceilings/floors. As the smoke or flames would be concealed it presents a greater danger.

Cavity barriers should therefore be provided to sub-divide the cavities to restrict the spread of smoke and flame spread and should be provided in the following areas;

- Around openings and to close off edges of cavities[1];
- At the junction between an external cavity wall and any wall, floor or door assembly which forms a fire resisting barrier and every compartment floor or wall;
- Within cavities that exceed the distances set out within the following table.

[1]Where Steel Framing Systems (SFS) is used, if the steel supports the structure, fire stopping (to the same fire resistance as the elements of structure) should be in place of cavity barriers around openings and to close top of cavities.

The maximum dimensions of concealed spaces are indicated within the table below.

Table 15: Maximum Dimensions of Cavities

Location	Class of Surface Exposed	Max Dimension in any Direction
Between a roof & a ceiling	Any Class	20m
Floor cavity	Class C-s3, d2/ Class 1	20m
Any other Cavity	Class C-s3,d2 / Class 1	20m
	Any Class	10m

***Note**: National classifications do not automatically equate to the equivalent classifications in the European*

Where a single room exceeds 20m in any direction, cavity barriers within the ceiling void (and within any floor voids) need only to be placed on the line of enclosing walls/partitions of any room and where services penetrate any fire-resisting floors to avoid vertical and horizontal voids meeting, provided that:

- The cavity barriers are no more than 40m apart; and
- The surface of the material/product exposed in the cavity being Class 0 or Class 1 (national class) or Class C-s3, d2 or better (European Class).

Every cavity barrier should be constructed to at least 30 minutes fire resistance as indicated in Section 5.1. It may be formed by any construction provided for another purpose if it meets the provisions for cavity barriers.

The cavity barriers wherever possible should be tightly fitted to a rigid construction and mechanically fixed in position. Where this is not possible the junction should be fire stopped.

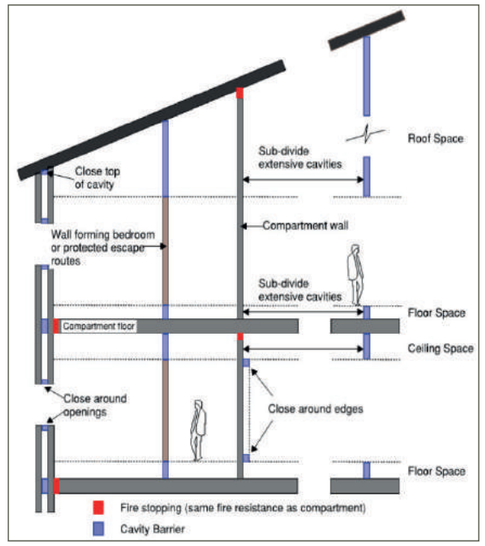


Figure 14: Provisions of Cavity Barriers and Fire Stopping

Cavities that may exist above or below any fire resisting construction because the construction is not carried to full storey height or, (in case of the top storey) to the underside of the roof covering should be either:

- Fitted with cavity barriers on the line of the partitions as indicated within Figure 10; or
- For cavities above the partitions, enclosed on the lower side by a fire resisting ceiling which extends throughout the building, compartment or separated part.

The provisions in the table above do not apply to any cavity described below;

- In a wall which should be fire resisting only because it is load bearing;
- In a masonry or concrete external cavity wall (two leaves of brick or concrete each at least 75mm thick, cavity closed around gaps and to close of edges of cavities);
- Formed behind the external skin of an external cladding system with a masonry or concrete inner leaf at least 75mm thick, or by over-cladding an existing masonry (or concrete) external wall, or an existing concrete roof, provided that the cavity does not contain combustible insulation and the building is not put to a residential or institutional use;
- Between double skinned corrugated or profiled insulated roof sheeting, if the sheeting is a material of limited combustibility and both surfaces of the insulating layer have as surface spread of flame at least Class 0 or Class 1 (national) or Class – Cs3, d2 or better (European) and make contact with the inner and outer skins of cladding;
- In any floor or roof cavity above a fire resisting ceiling (at least 30 minutes FR) which extends throughout the building or compartment, subject to a 30m limit on the extent of the cavity;
- Below a floor next to the ground or over site concrete, if the cavity is less than 1000mm in height or if the cavity is not normally accessible by persons unless there are openings in the floor such that it is possible for combustibles to accumulate in the cavity (in which case cavity barriers should be provided and access should be provided to the cavity for cleaning).

6.6 Protection of Openings and Fire-stopping

6.6.1 Fire-stopping

If the fire separating element is to be successful, every joint or imperfect fit, or opening to allow services to pass through the element, should be adequately protected by sealing or fire stopping so that the fire resistance of the element is not impaired.

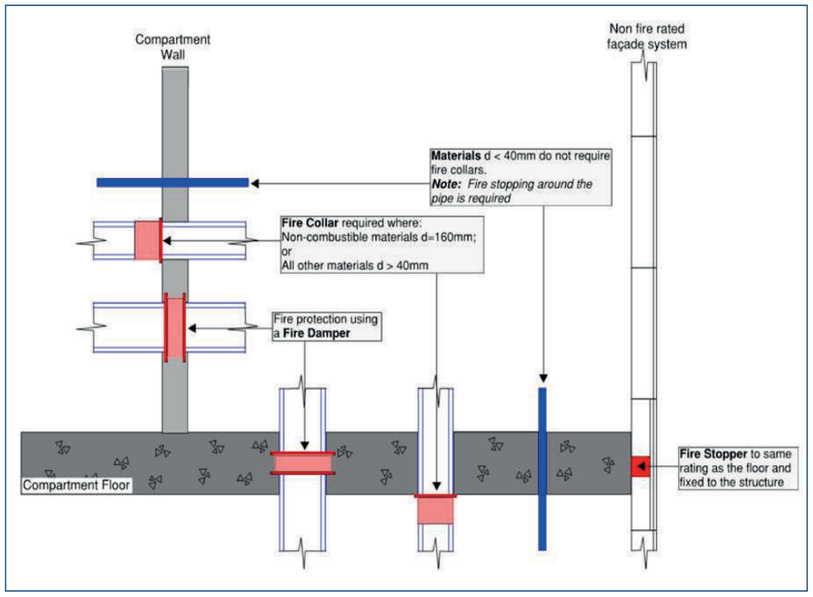
Pipes that pass through a fire separating element, should meet one of the following provisions;

- **Proprietary seals** - Provide a proprietary sealing system which has been shown by test to maintain the fire resistance of the wall, floor or cavity barrier
- **Restricted pipe diameter** - Where a proprietary sealing system is not used, fire stopping may be used around the pipe, keeping the opening as small as possible. The nominal internal diameter of the pipe should not be more than the relevant dimension given in the Table 14.

Table 16: Maximum Nominal Diameter of Pipes Passing Through Compartments

Situation	Pipe material and maximum nominal internal diameter (mm)		
	Non-combustible material	Lead, aluminium, aluminium alloy, uPVC, fibre cement	Any other material
Structure enclosing a protected shaft which is not a stairway or lift shaft	160	110	40
Any other situation	160	40	40

Note: *Any non-combustible material which, if exposed to a temperature of 800°C, will not soften or fracture to the extent that flame or hot gas will pass through the wall of the pipe.*



6.6.2 Ductwork

Where air handling ducts pass through compartmentation/ fire resisting construction the integrity of these compartments should be maintained. There are three basic methods in order to prevent smoke and flame spread through the building/ compartment.

The requirements for each option are indicated below.

Method 1 *- Protection using fire dampers*

- Fire dampers that are thermally operated can be provided where ductwork goes though fire resisting construction. *Fire dampers are not suitable for protected escape routes*
- Fire and smoke dampers that are actuated by automatic fire detection (AFD) should be provided where ductwork goes through a protected escape route such as protected corridors, dead end conditions etc or in smoke control systems.

Note: *Fire dampers should be tested to BS EN 1366 Part 2:1999. And be classified to BS EN 13501 Part 3:2005. They should have an E classification equal to or greater than 60 minutes.*

Note: *Method 1 is not suitable for ductwork serving kitchen extracts.*

Method 2 *- Protection using fire resisting enclosures*

- The fire resisting enclosures should achieve the same fire resistance as the wall the ductwork penetrates which forms a compartment known as a protected shaft. This allows a multiplicity of services to be transferred together with the duct to traverse a number of compartments within the building without the need for further sub divisions. Fire dampers (thermally or actuated by AFD) will only be required where the ductwork enters or leaves the protected shaft.

Method 3 *- Protection using fire resisting ductwork*

- The ductwork itself forms a protected shaft. The ductwork should achieve the same fire resistance as the wall the ductwork penetrates. The fire resistance can be achieved by the ductwork material itself, or through the application of a protective material.

Note: *The supporting hangers should be capable of supporting the ductwork for not less than the period of fire resistance of the ductwork.*

6.6.3 Air Transfer Grilles

Any air transfer grilles required as part of the ventilation system should not be provided within any wall, door, floor or ceiling enclosing a protected stairway or entrance hall. Air transfer grilles located in any fire hazard rooms should be provided with both fire and smoke containment. Any transfer grilles fitted in fire doors will need to be accompanied by a test certificate provided by the door manufacturer.

7 External Fire Spread

External surfaces of the walls should be constructed in order to adequately resist the spread of fire across the façade of the building. The building is not more than 18m high with all facades greater than 1 from the relevant boundary, therefore other than the requirements applicable to the external wall surface specified in the table below, there are no specific requirements applicable to the external wall build-up in terms of combustibility.

Table 17: Provisions for External Surfaces or Walls

Distance from Relevant Boundary	Height of the Wall	External Wall Surface Classification
1m or more	Building with one storey of risk profile B2	Class 0 (national class) or Class B-s3,d2 or better (European Class); profiled or flat steel sheet at least 0.5mm thick with an organic coating of no more than 0.2mm thickness is also acceptable

7.1 External Wall Build-up

The following build-ups are proposed:

Ground Floor external walls - Masonry

1. 15mm plasterboard
2. 150mm SFS
3. 150mm thick Rockwool insulation within the SFS zone
4. 12.5mm thick Sheathing board
5. Insulation within cavity
6. Air cavity
7. 102.5mm thick facing brick

First Floor external walls - Cladding

1. 15mm plasterboard
2. 150mm SFS
3. 150mm thick Rockwool insulation within the SFS zone
4. 12.5mm thick Sheathing board
5. Insulation within the cavity
6. Air cavity / aluminium bracketry & rails
7. 9mm thick Rockpanel cladding

Roof external walls - Profiled metal cladding

1. Cladding rails by Structural Engineer
2. 280mm thick Mineral wool insulation
3. Profiled metal cladding

These are compliant with the above requirements for a building of this type and height, with the exception of the Insulation within the cavity which will be a Kingspan Kooltherm K112 Framing Board, which achieves Class F. However, as this board is fully encapsulated within other layers which are non-combustible, it is considered an acceptable proposal.

The combustibility of ancillary items such as cavity trays, vents or membranes is outside of the scope of this report.

7.2 Roof Coverings

Roof coverings refer to the external material layers, not the roof structure as a whole. The table below describes the separation distances according to the type of roof covering.

Table 18: Roof Covering Spacing

Designation of Covering of Roof or Part of Roof		Minimum Distance from any Point to Relevant Boundary			
National Class	European Class	Less than 6 m	At Least 6m	At Least 12 m	At Least 20 m
AA, AB or AC	$B_{ROOF}(t4)$	Acceptable	Acceptable	Acceptable	Acceptable
BA, BB or BC	$C_{ROOF}(t4)$	Not acceptable	Acceptable	Acceptable	Acceptable
CA, CB or CC	$D_{ROOF}(t4)$	Not acceptable	Acceptable [1][2]	Acceptable[1]	Acceptable
AD, BD (or CD[2])	$E_{ROOF}(t4)$	Not acceptable	Acceptable	Acceptable [1]	Acceptable
DA, DB, DC (or DD[2])	$F_{ROOF}(t4)$	Not acceptable	Not acceptable	Not acceptable	Acceptable[1][2]

[1] Not acceptable on any buildings with a volume of more than 1500m³.

[2] Acceptable on buildings not listed in Note 1, if part of the roof is no more than 3m² in area and is at least 1500mm from any similar part, with the roof between the parts covered with a material of limited combustibility.

7.3 Space Separation between Neighbouring

To prevent the risk of external fire spread to and from buildings opposite, the amount of unprotected area that is allowed on an elevation should be limited or the separating distance increased such that the risk is reduced. However, based on site plans, it is not considered that there is a risk of fire spread due to the space separation between neighbouring buildings, as the Wellbeing Centre is approximately 30m or more distance away from the site boundaries. However, the distance from the west elevation to the site boundary is 5.5m and the distance from the south façade on the first floor to the site boundary is 8.2m, which requires an analysis using the enclosing rectangle method described in BRE187.

The space separation calculations are based on the following information;

- The floor is not a compartment floor;
- compartment height is approximately 8m;
- The building is not sprinkler protected.

The provide site layout indicated only the west and south elevation may be at risk of external fire spread, as shown below.

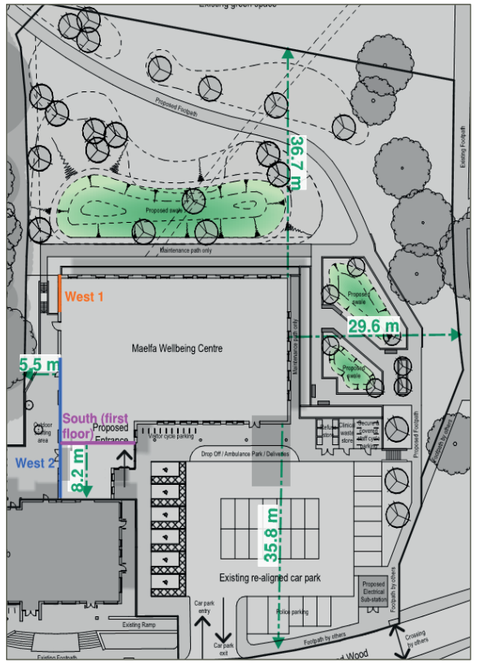


Figure 15: Site plan showing distances from façades to site boundary

Table 19: BR 187 Allowable Unprotected Areas

Elevation	BR 187 Enclosing Rectangle	Distance to Relevant Boundary	Allowable Unprotected Area (%)	Allowable Unprotected Area (m²)	Proposed Unprotected Area (m²)	State of Compliance
West 1	9 x 9 = 81m²	5.5m	40%	32.4 m²	11.5m²	Acceptable
West 2	9 x 24 = 216m²	5.5m	23.3%	50.3 m²	49.8m²	Acceptable
South (first floor)	6 x 15 =90m²	8.2m	84%	75.6 m²	20.2m²	Acceptable

8 Access and Facilities for Fire-fighting

8.1 Access to Buildings

The total area of the building is less than 8000m^2 and is less than 11m in height. Therefore, vehicle access for a pump appliance should be provided to 15% of the building perimeter.

Access for the fire service vehicle is provided via Round Wood and the existing car park. The perimeter of the building is 149.2m, and access is provided to 42.9m, which is more than 15% of the total perimeter. Therefore the fire vehicle access is compliant.

The new access roads will need to meet the criteria set in Table 20 below.

Table 20: Fire Service Vehicle Access Routes

Appliance	Min. Width of Road between Kerbs	Min. Gateway Width	Min. Clearance Height	Min. Carrying Capacity	Min. Turning Circle	
					Kerb to Kerb	Wall to Wall
Pump	3.7m	3.1m	3.7m	12.5 tonnes	16.8m	19.2m

Note: *Dead-end fire service access roads may be up to 20 meters long without being provided with a turning bay (i.e. a fire service vehicle should not have to reverse further than 20m).*

8.2 Firefighting Water Supply

A fire hydrant should be located within 90 metres of the entrance to the building from Round Wood.

It has been confirmed by the existing site survey that there is an existing fire hydrant 90m from the building entrance, therefore the water supply is compliant with BS999:2017.

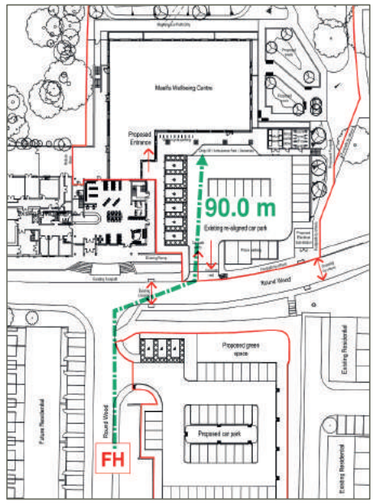


Figure 16: Fire hydrant location

9 Fire Safety Management

9.1 Management Level

The fire strategy assumes that there will be appropriate fire safety management of the premises when in use. BS 9999:2017 recommends that this building should have Level 2 management level. This requires conformity with requirements of legislation (i.e. RRFSO: 2005). Extreme events such as arson or terrorist attack are outside the remit of BS9999:2017.

9.2 Management Requirements

Effective arrangements should be put in place to manage all aspects of fire safety in the premises and the details of those arrangements need to be recorded, e.g. within a fire safety management plan. The arrangements should include the following key areas that are provided within BS 5588-12:

- Development of a suitable emergency procedure;
- Staff training plan and appropriate staffing levels for the occupancy;
- Maintenance contracts for essential fire safety systems and equipment;
- Schedule of in-house checks and tests;
- Display of appropriate fire safety notices and signs;
- Communications arrangements;
- Liaison with the fire service;
- Fire prevention, including control of works on site (e.g. hot work permits);
- Contingency plans;
- Preparation of personal emergency evacuation plans (PEEPs) for staff, occupants and visitors as necessary. To ensure an appropriately resourced response, tailored to the individual needs of the disabled person and the specific features of the building. This plan will also need to consider the evacuation of disabled visitors.
    - **Individual PEEP for disabled people who are regularly in the premises** – Following discussions with the individual, a plan can be developed for their specific needs which should contain details of how they will evacuate the premises.
    - **PEEPs for visitors to the premises who will make themselves known to staff –** visitors who are likely to require assistance in the event of an evacuation should be encouraged to make themselves known to staff.
    - The plan should ensure that reliance is not placed upon the fire service for the evacuation of disabled and wheelchair bound occupants.

Note: *The above list is not intended to be exhaustive, only to highlight some key areas.*

9.3 Fire Safety Manual

A Fire Safety Manual should be created to contain design information and operational records. The design information forms the basis of an ongoing history document to which additional material is added when the building is occupied and at regular intervals thereafter. The fire safety manual should;

- Provide a full description of the assumptions and philosophies that led to the fire safety design, including explicit assumption regarding the management of the building, housekeeping and other management functions;
- Provide the nature of the fire safety planning, construction and systems designed into the building, and their relationship to overall safety and evacuation management;
- Provide documentation produced at the design stage to describe the use of the various protection systems in each type of incident, and the responsibilities of the staff;
- Provide a continuously updated record of all aspects of the building and the building users that affect its fire safety.

Appendix 9

Acoustic Strategy / Report

FORMANT.
STRAIGHTFORWARD ACOUSTIC DESIGN

MAELFA WELLBEING HUB
DETAILED ACOUSTIC STRATEGY

Project no. P1011
Report ref. MWC-FOR-ZZ-XX-RP-Y-XX-0003
Date 13-05-2020
Revision P01

FORMANT.
STRAIGHTFORWARD ACOUSTIC DESIGN

CONTENTS

REVISION HISTORY

Date	Revision	Notes
13/05/2020	P01	For information

EXEC SUMMARY

This report summarises the key acoustic issues and detailed acoustic strategy for the development of Maelfa Wellbeing Hub. This report builds supersedes the previously issued Outline Acoustic Strategy Report.

BUILDING ACOUSTIC DESIGN

A detailed acoustic design strategy has been developed for all key aspects of the building envelope and internal elements. During detailed design the following issued have been addressed:

- The proposed roof build-up has been assessed and is compliant with the acoustic criteria.
- Partition and door ratings have been allocated on the architects plans. These have been reviewed and acoustics comments have been incorporated by the architect.
- We have explained to the client the limitations of sealing moveable wall systems, which need to be weighed up against the cost and the benefits of the flexibility of the system. A minimum Rw 52 dB wall is recommended but this could still fall short of the HTM 08-01 criterion on-site.
- We have reviewed the floor-ceiling build-up and the design is compliant with the acoustic criteria. Acoustic lino is required in a number of 1st floor rooms and upgraded sound insulation ceiling tiles in critical spaces (i.e. Consulting, Treatment, Seminar and Group Rooms).
- A range of acoustically critical interface/junction details have been prepared by the architect and reviewed by Formant.

BUILDING SERVICES NOISE CONTROL

External plant noise emissions have been reviewed based on the plant selections provided by the M&E Engineers. Rating sound levels have been calculated at nearby receptors and the proposed design is compliant with the noise limits.

Noise from key items of internal plant have been reviewed (i.e. FCUs, MVHRs, etc) and advice has been provided to the M&E consultant on additional noise attenuation. The advice is reproduced in this report for completeness.

BREEAM

This report provides the design stage evidence for all available credits under Hea5. Details of the qualifications of the acoustician and the proposed acoustic test regime have been provided.

The noise impact assessment evidence for Pol5 has been provided separately to the BREEAM Assessor and is reproduced in this report for completeness.

1 INTRODUCTION

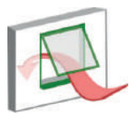
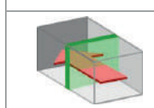
Formant has been appointed by Willmott Dixon Construction to provide acoustic design advice for the proposed development of Maelfa Wellbeing Hub, Llandeyrn, Cardiff.

This report provides:

1) A summary of applicable legislation, policy and guidance and our interpretation of the client's acoustic brief.
2) A full list of acoustic performance criteria
3) Key architectural acoustic design issues
4) Key building services noise control issues
5) A summary of the BREEAM Hea5 and Pol5 evidence

2 ACOUSTIC CRITERIA

New healthcare buildings in the UK are required to comply with the requirements set out in HTM 08-01 *Acoustics*. In addition, the development is targeting the available BREEAM 2018 credits under Hea5 and Pol5. The following acoustic criteria are compliant with both documents.

Acoustic issue	Performance standard	Room and adjacency, if applicable
 **Internal ambient noise level (IANL)** $L_{Aeq,1hr}$	35 dB	**Large Meeting Rooms** (Seminar Room)
	40 dB	**Small office-type spaces** (Consulting Rooms, Treatment Rooms, Offices) **Small Meeting Rooms** (Meeting Room, Breakout Space, Multi-purpose Room, Interview Rooms)
	50 dB	**Public spaces** (Waiting areas)
	55 dB	**Circulation and Hygiene** (Corridors, Circulation, Toilets)
 **Airborne sound insulation (walls and floors)** $D_{nT,w}$	42 dB	Between Offices, Toilets,
	47 dB	Between Consulting/Treatment Rooms Between Seminar and Group Room

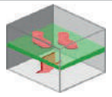
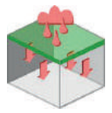
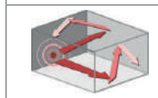
Acoustic issue	Performance standard	Room and adjacency, if applicable
 **Impact sound insulation (floors)** $L'_{nT,w}$	65 dB	All floors above noise sensitive spaces
 **Rain noise** L_{Aeq}	60 dB	Small office-type spaces (inc. Consulting Rooms) Small meeting rooms
	65 dB	All other spaces
 **Reverberation time** T_{mf}	0.8secs	Seminar Room, Group Room (Not specified in HTM 08-01 – proposed by Formant)
 **Plant noise emissions** Noise Rating (internal) or Rating Sound Level (external)	NR30	**Large Meeting Rooms** (Seminar Room)
	NR35	**Small office-type spaces** (Consulting Rooms, Treatment Rooms, Offices) **Small Meeting Rooms** (Meeting Room, Breakout Space, Multi-purpose Room, Interview Rooms)
	NR40	**Public spaces** (Waiting areas) **Circulation** (Corridors, Circulation) **Utility** (Dirty Utility, Clean Utility)
	NR45	**Personal Hygiene** (Toilets)
	34/30 dB	Noise sensitive receptors outside the site (day/night)

Table 1 Acoustic Criteria

MAELFA WELLBEING HUB
DETAILED ACOUSTIC STRATEGY

3 ACOUSTIC DESIGN: BUILDING ACOUSTICS

3.1 VENTILATION STRATEGY AND BUILDING ENVELOPE

BASELINE NOISE SURVEY

A baseline noise survey was undertaken by Formant on 20 February 2019. Full details of the survey are provided in the noise impact assessment (MWC-FOR-ZZ-XX-RP-Y-XX-0001). A summary of the measured noise levels at the site is:

- Ambient noise levels ranging from **48 to 50 dBL_{Aeq}**.
- Lowest background noise levels of **44 dBL_{A90} (daytime)** and **40 dBL_{A90} (night time)**

VENTILATION STRATEGY

The results of the survey show that the noise levels at all proposed facades range from 48-50 dBL_{Aeq}, which would equate to an **internal level ranging from 33-40 dBL_{Aeq} with windows open and up to 25 dBL_{Aeq} with windows closed**. This is compliant with the HTM 08-01 criteria for all types of space within the proposed development.

The building design generally incorporates a natural ventilation strategy, with the exception of the Group Room and Seminar Room which have mixed-mode mechanical ventilation and cooling. A number of other rooms have MVHR units, either due to a lack of external façade and/or high room occupancy. During detailed design we have reviewed the equipment specifications and advised on the need for attenuation. Further details of services noise control measures to be incorporated into the design are set out in Section 4 of this report.

OPENABLE WINDOWS

HTM 08-01 states that:

> *"open windows can affect room-to-room sound insulation and lead to privacy problems if external areas are accessible by staff and patients. The design should take account of this so that privacy is achieved. Access to external areas close to openable windows in private areas may therefore need to be controlled."*

This issue is applicable to the ground floor Consulting Rooms, which have a maintenance path running immediately outside. We have assumed that management of this issue would be undertaken by the client once the building is in operation, for example by preventing public access to this area and notifying staff of the potential privacy risk when maintenance staff are working in the area.

FAÇADE SOUND INSULATION

In general, noise break-in to the proposed development will be dominated by noise passing through open windows or trickle vents, therefore the design of the façade will not have a material effect on the IANLs. The proposed façade and glazing selections are considered suitable in terms of sound insulation.

ROOF SOUND INSULATION

The proposed roof build-up comprises a Euroclad Elite standing seam roof with mineral wool insulation. This roof, in conjunction with the proposed ceiling tiles, will provide the required sound insulation performance to adequately attenuate airborne and rain noise.

3.2 INTERNAL SOUND INSULATION

PARTITIONS

During the detailed design, the Architect has incorporated the required sound insulation ratings shown on our acoustic marked-up plans into their partition types and layout plans. We have reviewed the partition types and have provided comments on acoustic ratings.

The proposed partitions are required to run full height from slab-to-slab in order to meet the acoustic performance criteria on-site and good detailing/workmanship is also essential. This will be reviewed by Formant via a site inspection at a suitable construction stage.

As noted during the Outline Design stage, the proposed R_w 56 dB partition falls 1 dB short of the recommended HTM 08-01 R_w rating for one partition on the 2nd floor, which has an exceptionally large ratio of partition to floor area. The HTM 08-01 calculation suggests a 7 dB site tolerance for workmanship/flanking, which is reasonably generous, therefore with good workmanship and detailing, it should still be possible to meet the on-site criteria. Alternative solutions would be to either upgrade all the partitions between Confidential rooms, or to introduce a new partition type for just one wall, but neither of these are considered to be a pragmatic solution.

MOVEABLE PARTITIONS

A moveable partition is proposed between the Seminar Room and Group Room. We have explained to the client that even with a high specification system, it is still possible that the moveable partition would fall short of the HTM 08-01 sound insulation requirements between these spaces (D_{nTw} 47 dB) because they are inherently difficult to seal on-site.

We recommend that the proposed moveable partition be rated at least R_w 52 dB, which is capable of providing a reasonable level of privacy and could still achieve the HTM 08-01 on-site criterion. If a higher performance product is affordable within the costplan, this should be used, but we understand the client accepts the risk of non-compliance with HTM 08-01 regardless of the laboratory rating.

DOORS

The proposed door strategy is to provide R_w 30 dB doorsets to all rooms defined in HTM 08-01 as 'Confidential' or 'Private'. The locations of these doors have been marked up on a set of drawings which have informed the architectural door schedules.

Acoustic doors rely on a good set of seals in order to provide effective sound insulation. However in medical facilities the provision of a full set of seals can sometimes be compromised by other design constraints such as opening force, infection control, patient safety (for example if double-swing doors are required) and ventilation regimes. No infection control design conflicts have been identified to us.

Many of the doors which require acoustic ratings are a door-and-a-half design. It should be noted that these doorsets will require a rebated meeting stile with acoustic seals or astragals such as those shown in Figure 1. Whichever design is adopted, the **doorset**, not just the door blanks, must achieve the required R_w rating.

Figure 1 Acoustic meeting stile options for 'door-and-a-half' design

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The inter-connecting doors between the 1st floor GPs Office and the adjacent GP Manager Office/Consulting Room 1 are proposed to be rated R_w 35 dB, which is an enhancement on the standard acoustic door. However it should be noted that this would not meet the HTM 08-01 sound insulation requirements between these spaces due to the difficulties arising from sealing the doors.

INTERNAL GLAZING

Internal glazing is proposed in some corridor walls. HTM 08-01 does not require a specific rating for corridor wall glazing, therefore we propose a solution whereby the composite sound insulation performance of the corridor wall is not reduced, compared to a corridor wall without glazing. We have calculated the minimum sound insulation performance requirements for the proposed corridor wall glazing is **R_w 34 dB** (e.g. 10 mm standard single glazing or 8 mm laminate glazing).

FLOORS SOUND INSULATION

The proposed 1st floor slab needs to provide **at least $D_{nT,w}$ 47 dB** (airborne sound insulation) and **no greater than $L'_{nT,w}$ 60 dB** (impact sound insulation) above/below Confidential rooms.

The proposed structural deck is a metal-concrete composite floor slab of 150 mm overall depth, with a lay-in-grid mineral fibre ceiling tile. This type of build-up provides the following sound insulation performance:

Parameter	Typical expected performance	Notes
Airborne sound insulation	R_w 50-55 dB, typically achieving around **$D_{nT,w}$ 45-50 dB** on site.	OK for most adjacencies, but potential for slight shortfall in some areas. See ceiling section below for the proposed solution.
Impact sound insulation	**$L'_{nT,w}$ 50-55** dB with carpet floors, **$L'_{nT,w}$ 60-65** with lino or other hard floor finishes	Resilient backed lino or resilient underlay beneath hard 1st floor finishes will be adequate to meet the criteria.

Table 2 Floor sound insulation typical performance

ACOUSTICALLY RESILIENT FLOOR FINISHES

As stated above, acoustically resilient lino or underlay is required to reduce impact noise from 1st floor rooms which are located above acoustically sensitive ground floor rooms. We understand that the proposed product is Excellence Tapiflex which provides impact noise reduction of 19 dB. This is acceptable to meet the on-site impact sound insulation requirements.

CEILING SOUND INSULATION

Whilst the primary reason for providing ceilings is to meet the room acoustic requirements detailed in the following section, full acoustic tile ceilings are also beneficial in reducing flanking over the head of acoustic partitions and to enhance the airborne and impact sound insulation of floors above acoustically sensitive rooms.

We have reviewed the architects' reflected ceiling plans which incorporate our advice to upgrade the '*standard acoustic ceiling tile'* (either Rockfon Tropic or Medicare are proposed depending on room uses) to an '*enhanced sound insulation and absorptive ceiling tile'* (Rockfon Blanka dB46 is proposed), in Consulting, Treatment, Seminar and Group Rooms.

FLANKING AND BUILDING SERVICE PENETRATIONS

It is important that the design and construction of flanking elements and service penetrations does not compromise the sound insulation performance of an acoustically rated partition or floor construction. To achieve this, flanking paths should normally be designed to be 10 dB better than the partition or floor.

A range of interface and junction details have been prepared by the architect and reviewed by Formant during the detailed design. In addition to this, the key acoustic principles for some critical junctions are set out below.

Head details for 1st floor/roof-partition abutments will need to ensure that a good seal is provided with the profiled metal deck. A suitable detail is illustrated below:

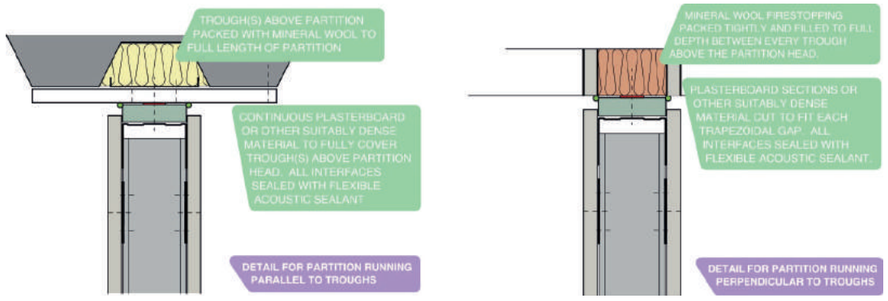

Figure 2 Head details for acoustic partition meeting profile steel deck (acoustic principles only)

Acoustic partition junctions must ensure there are no continuous lightweight elements (e.g. corridor wall linings and façade wall linings) spanning both rooms. Examples are illustrated in Figure 3 below.

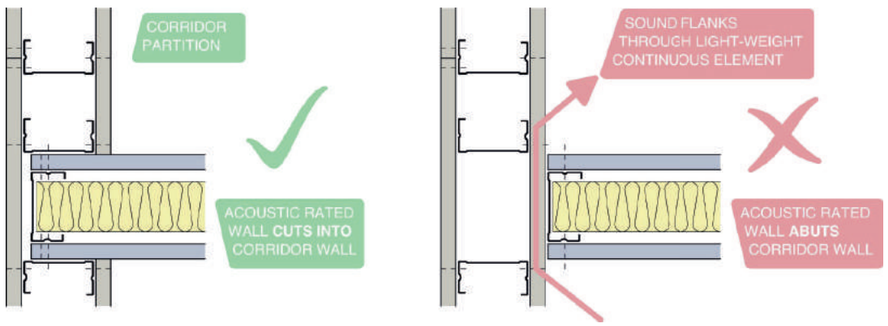

Figure 3 Corridor wall junctions to minimise flanking transmission (acoustic principles only)

BUILDING SERVICES PENETRATIONS

One of the most common causes of acoustic test failures is unnecessary/poorly sealed building services penetrations.

Wherever possible, all building services distribution should be via corridors, not through acoustic partitions. This concept is illustrated in Figure 4 and applies particularly to occupied spaces around the central core of the building, which we assume will require mechanical ventilation due to a lack of façade.

Services routing includes conduit, pipework, ductwork and any other services, all of which should be run down the corridor and punch into individual rooms, as illustrated below:

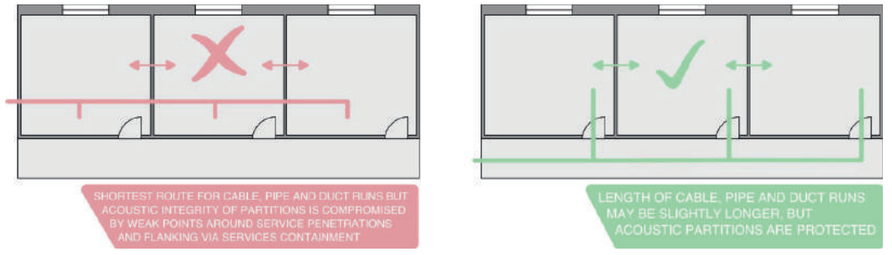

Figure 4 Routing services to avoid acoustically critical partitions

Back-to-back electrical socket boxes should be avoided in acoustic partitions. All electrical sockets in acoustic partitions should be backed with a pattress and/or sealed with an acoustically suitable detail as per the partition system manufacturer's guidelines, to ensure the sound insulation performance of the partition is not undermined.

3.3 ROOM ACOUSTICS

Good room acoustics are essential to ensure clear communication in meeting and seminar rooms and to provide a comfortable acoustic environment for patients and staff.

As well as providing absorption to improve speech clarity, absorptive ceilings are also required in corridors and circulation spaces to control reverberant noise build-up and to minimise disturbance to other parts of the building.

ABSORPTION CLASSES

Acoustic absorption performance ranges from Class A (highly absorptive) to Class E (slightly absorptive). The classes are illustrated in Figure 5.

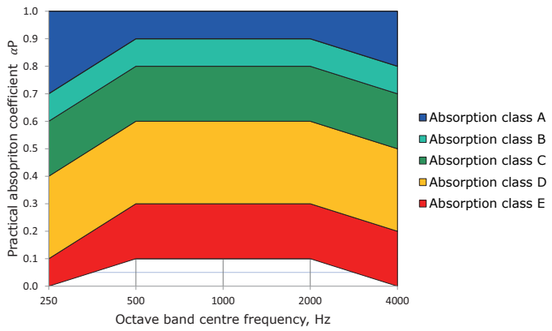

Figure 5 Acoustic absorption classes

ABSORPTION PRODUCTS

The required absorption will be provided via a lay-in-grid ceiling tile. We understand that three different ceiling tiles are proposed:

- Rockfon Blanka dB46 (Class A)
- Rockfon Medicare (Class A)
- Rockfon Tropic (Class A)

The proposed ceiling tiles all provide the required acoustic absorption to meet the HTM 08-01 requirements. The minimum area of ceiling which is acoustically absorptive is 80%, which allows for a small plasterboard perimeter, if required.

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4 ACOUSTIC DESIGN: BUILDING SERVICES NOISE

A detailed review of the proposed M&E design has been undertaken during Detailed Design. The advice provided to the M&E consultant has been incorporated into their documentation but is reproduced below for completeness.

4.1 EXTERNAL PLANT NOISE EMISSIONS

A noise impact assessment of external plant noise emissions has been undertaken in line with the method if BS 4142:2014. The assessment considers the nearest Noise Sensitive Receptor (NSR) to the east of the site, as this is likely to be most exposed to plant noise from the building. A summary of the assessment is shown in the table below:

Plant item	Code	Sound power level (dBA)	No. of items	Correction for no. of items (dB)	Distance to nearest NSR (m)	Distance attenuation (dB)	Screening or internal plantroom reduction (dB)	Feature correction (dB)	Rating sound level at NSR $L_{A,r}$ (dB)	Measured L_{A90}	Comparison with L_{A90}
AHU	AHU/02/001	66.6	1	0	68	-45	-10	0	11.9	40	-28.1
Rooftop Condensers	CU-02-01 and 02	73	2	3	76	-46	-10	0	20.4	40	-19.6
	CU-02-03 to 05	67	3	5	76	-46	-10	0	16.2	40	-23.8
Café condenser	CU-00-001	67	1	0	80	-46	-20	0	1.0	40	-39.0
Dirty Extract	EF/02/001	60.7	1	0	71	-45	-10	0	5.7	40	-34.3
Café Extract	EF/00/001	55.7	4	6	80	-46	-20	0	-4.3	40	-44.3
MVHRs (north elevation)	MVHR-00-01 to 02 & MVHR-01-01 to 03	51.5	5	7	71	-45	-10	0	3.5	40	-36.5
MVHRs (south elevation)	MVHR-00-01 to 03 & MVHR-01-04 to 05	51.5	5	7	71	-45	-10	0	3.5	40	-36.5
Cafe MVHR	MVHR-00-006	51.5	1	0	71	-45	-20	0	-13.5	40	-53.5
All plant (cumulative)									**22.5**	**40**	**-17.5**

Table 3 Plant noise emissions calculations

CALCULATION ASSUMPTIONS

Conservative screening corrections have been applied where there is no direct line of sight between the plant and the receptor as follows:

- -10 dBA for partial screening (e.g. by the parapet wall) or
- -20 dBA for full screening (e.g. the plant is located on different elevation of the building to the NSR and is screened by the entire building massing)

No feature corrections have been applied to the plant because the noise emissions levels are predicted be more than 10 dB below the background noise at the NSR, therefore none of the applicable noise characteristics are likely to be audible.

Please note that we have assumed that the specified environmental-side silencers are a standard ≥900 mm splitter attenuator and that the silencers have been sized appropriately such that regenerated air-flow noise does not materially contribute to the noise emissions.

INTERNAL PLANTROOMS NOISE BREAK-OUT

The pumps and boilers are housed within an enclosed rooftop plantroom with a louvred access door. In order to ensure that the noise emissions via the louvred door do not exceed the above limits **the selection of boilers and pumps should ensure noise levels inside the plantroom do not exceed NR70.**

BREEAM POL5

The above assessment demonstrates that the proposed plant will be significantly more than 5 dB below the representative background noise level therefore BREEAM credit Pol5 can be awarded.

4.2 INTERNAL PLANT NOISE CONTROL

MVHR NOISE

The noise data for the MVHRs and their attenuator insertion losses has been provided by Nuaire, based on the air flows and pressures listed in TB&A's schedule. We have reviewed the proposed design and have identified some areas where additional attenuation and/or reduced fan speeds are required in order to meet the noise criteria, as summarised in Table 4 below.

Rooms	Plant/system	Additional attenuation requirements
Ground Floor Treatment	MVHR-00-001 and 002	Supply branch noise levels are 3 dB above criterion with proposed 90º bend 973 mm attenuators. **EITHER**: reduce fan speed to match 1st floor MVHRs at 120 l/s **OR**: Increase attenuation on supply branch. If there is no space for larger or secondary attenuators, we recommend incorporating an internally lined bend (25 mm acoustic lining) after the silencer. This would be *just* compliant.
Large Group Room	MVHR-00-003 and 004	An additional 1200 mm secondary attenuator (XBC45-HS-MS12) is required on the supply branches after the FCU.
Seminar	MVHR-00-005	An additional 1200 mm secondary attenuator (XBC45-HS-MS12) is required on the supply branch after the FCU. The extract branch attenuator also needs to increase in length from 1050mm to 1200 mm (XBC45-HE-MS12).
Café	MVHR-00-006	No additional attenuation required.
01 Floor Treatment	MVHR-01-001 to 003	No additional attenuation required.
01 Floor Admin Offices	MVHR-01-004 and 005	Calculated noise levels are L_{Aeq} 47 dB due to supply branch noise. No specific noise criterion for multi-person offices in HTM 08-01. Small offices are L_{Aeq} 40 dB, but larger offices can typically accommodate L_{Aeq} 45 or even 50 dB. If a larger attenuator (1200 mm) can be accommodated on the supply branch, we would recommend this, to reduce levels to L_{Aeq} 44 dB.

Table 4 MVHR internal noise attenuation requirements

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CROSSTALK ATTENUATORS

We have reviewed the proposed ductwork layouts and are happy that attenuators have been provided in all critical locations where potential crosstalk issues could occur between rooms. No additional attenuators are therefore required to control crosstalk between rooms. However as shown above, secondary attenuators are required in some areas to reduce down-cut noise from MVHRs (and see note below on FCU noise).

In all cases we have assumed that silencers will be sized to suit the air-speeds in the duct in order to ensure that airflow regenerated noise does not contribute to the noise levels in the rooms assessed.

FCU NOISE

The noise data for the FCUs is based on data provided from Mitsubishi. In the Café, the FCUs are ceiling mounted, and the data shows that the selections are suitable to meet the IANL criterion of L_{Aeq} 50 dB.

In the Groups Rooms and Seminar Room the units are ducted above the ceiling tiles. The only data Mitsubishi have been able to provide is for units tested with 2 m of open ducts in an anechoic chamber, as illustrated in the sketch below:

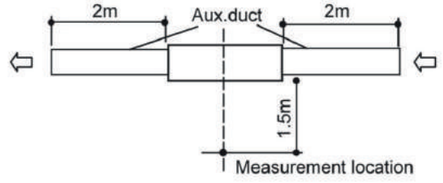

Figure 6 Sketch of test positions for FCU noise measurements (taken from Mitsubishi datasheet).

Unfortunately this test method does not provide any usable data for this assessment, because it does not distinguish between duct-borne and case-radiated noise. We have therefore been able to calculate only an estimated noise level in the room. The estimated FCU noise levels are within the noise criterion (L_{Aeq} 35 dB) because of the provision of additional secondary attenuators (see Table 4 above, required to control MHVR noise) which will reduce the down-duct FCU noise.

Based on the information available and the addition of secondary attenuators, there is a low risk that FCU noise would exceed the criteria in the Group Room and Seminar Room. However in the absence of suitable test data we cannot confirm compliance.

VENTILATION SYSTEM BALANCING AND COMMISSIONING

This assessment shows that the proposed design is capable of achieving compliance with the noise criteria. It is the responsibility of the M&E sub-contractor and the commissioning engineers to ensure that the MVHRs and FCUs are balanced correctly and commissioned such that they meet the noise criteria in each room.

4.3 GENERAL MEP NOISE GUIDANCE

The following general guidance should be adopted by the M&E subcontractor for the installation of MEP plant.

DUCTWORK INSTALLATION

Ductwork should be installed to ensure a minimum of regenerated noise and laminar airflow within the system by incorporating:

- gradual bends;
- gradual changes in cross sectional area/long transition pieces, and;
- rectangular ductwork with a near unity aspect ratio.

Maximum airspeeds in the ductwork systems and at terminal components should be designed so as to not cause regenerative noise issues in any rooms.

As a general guide, Ductwork shall be sized in order to meet the maximum airspeeds shown below:

IANL criterion L_{Aeq}, (dB)	Applicable rooms	Ducts leading to the room (m/s)	Terminal airspeeds (m/s)
35	**Large Meeting Rooms** (Group Room)	4	2.5
40	**Small office-type spaces** (Consulting Rooms, Treatment Rooms, Offices) **Small Meeting Rooms** (Seminar, Meeting Room, Breakout Space, Multi-purpose Room, Interview Rooms)	6	3
50	**Public spaces** (Waiting areas)	6	4

Table 5 Guideline air velocity limits for ductwork

GRILLES/DIFFUSERS

Grilles and diffusors should be selected such that regenerated airflow noise within a single room does not cause the room noise criterion in that room to be exceeded.

SELF NOISE

Ductwork should be installed in a manner to ensure that no self-noise such as rattling or ringing is audible during or subsequent to high level (at least 100 dB one third octave band limited pink noise 31.5 – 10,000 Hz) noise.

LIFT NOISE

Criteria for noise and vibration levels of lifts are provided in CIBSE Guide D – Transportation Systems in Buildings (2010), and these are considered appropriate. The following is a summary of the criteria:

- Door noise, at 1.5m from the centre of the floor and 1m from the door face, should not exceed 65 dBA. Noise levels in the car at the rated speed in the cycle, should not exceed 55 dBA for lift speeds of 0.5-2.0 m/s and should not exceed 60 dBA for speeds of 2.0-7.0 m/s.

- If applicable, the sound reduction properties of the lift machine room construction, including doors, hatches, ventilation openings etc., should be adequate to prevent the escape of noise at values that exceed the acoustic design criteria for the surrounding areas.
- Maximum (RMS) acceleration level in any $^1/_3$ octave band should not exceed 0.08 m/s^2 in the horizontal or vertical vibration frequency range 1-80 Hz.
- Maximum (RMS) acceleration level in any $^1/_3$ octave band should not exceed 0.1 m/s^2 in the vertical vibration frequency range 1-80 Hz during acceleration/deceleration and start/stop.

PLANT VIBRATION ISOLATION

To control vibration transmission through the building structure, it will be necessary to install vibration isolation to any plant equipment which generates significant levels of vibration (e.g. pumps, fans, condensers, etc).

All internal and external plant containing moving parts housed within plant rooms should be mounted on a heavy framework or plant base supported by anti-vibration mounts or resilient pads to reduce vibration transfer and structure-borne noise. The selection of appropriate anti-vibration mounts should be based on limiting noise transfer to a level at least 10 dB below the internal noise criteria in any adjacent rooms.

FLEXIBLE CONNECTIONS

All ductwork, pipework and conduit should incorporate flexible connections as necessary where:

- connection is made to plant items e.g. at all inlets and outlets;
- they are necessary to prevent noise and vibration transmission to satisfy noise and vibration criteria, and
- connection is made to isolated structures or services components.

Flexible connections shall be installed between two on-axis pipe/duct/conduit sections and should not be used to make up for misalignment. If ducts/pipes/conduit do not coincide on-axis then they should be adjusted to meet this requirement. The flexible connection should be installed so that it is neither stretched nor compressed in comparison to its normal relaxed state.

5 BREEAM

5.1 HEA5

Three credits are available under Hea5 provided that the building meets appropriate acoustic performance standards and testing requirements relating to sound insulation, indoor ambient noise level and room acoustics. The proposed criteria are based on HTM 08-01 and any deviations or alternative standards have been justified in this report.

5.2 POL5

One credit is available where a noise impact assessment compliant with BS 4142:2014 is commissioned and the noise level from the assessed building, as measured in the locality of the nearest or most exposed noise-sensitive development, is at least 5 dB lower than the background noise throughout the day and night. The proposed criteria are based on the Local Authority requirements which are 5 dB more onerous than BREEAM.

A BS4142 Noise Impact Assessment has been completed and is detailed in Section 4.1 of this report therefore this credit can be awarded.

5.3 SUITABLY QUALIFIED ACOUSTICIAN

The assessment and design work detailed in this report have been undertaken by Paul Driscoll, MIOA. Paul can be considered to be 'suitably qualified' for the purposes of a BREEAM assessment because:

1. He has over 14 years relevant experience working as an acoustic consultant in the UK, working on projects in all sectors of the built environment; including, acting in an advisory capacity to provide recommendations for suitable acoustic performance levels and mitigation measures; and
2. He is a Member of the Institute of Acoustics.

5.4 DEMONSTRATING COMPLIANCE

A programme of acoustic measurements will be carried out by a compliant test body in accordance with the acoustic testing and measurement procedures outlined below.

5.4.1 SOUND INSULATION TESTS

Measurements of sound insulation (airborne and impact) will be made between a sample of rooms and other noise sensitive spaces, in accordance with the relevant part of BS EN ISO 16283 series. Where possible, measurements will be conducted between one in four pairs of adjacent noise sensitive rooms.

5.4.2 REVERBERATION TIME MEASUREMENTS

Measurements of reverberation time will be made in the large Group Room with the engineering grade (or better) requirements of BS EN ISO 3382-2:2008 and in each receiver room.

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5.4.3 INDOOR AMBIENT NOISE MEASUREMENTS

Noise level measurements will be made in at least one in ten noise sensitive rooms, and in at least four rooms in which noise levels can be expected to be greatest - either because they are on the noisiest façade or because they are on a naturally ventilated façade.

5.4.4 ENVIRONMENTAL NOISE EMISSIONS MEASUREMENTS

There is no requirement to measure environmental noise emissions to demonstrate compliance with Pol5.

Appendix 10

Ecology & Arboriculture Reports

PRELIMINARY ECOLOGICAL APPRAISAL

Llanederyn Wellbeing Hub, Cardiff

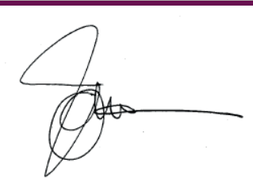
Llanederyn Wellbeing Hub
PEA Report
1
06 February 2019

REPORT

Document Status

Version	Purpose of document	Authored by	Reviewed by	Approved by	Review date
1	PEA Report	Stephen Devereaux	Tim Oliver	Tim Oliver	06/02/2019

Approval for issue

Tim Oliver  2019-02-06

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1 INTRODUCTION

1.1 Purpose and scope of this report

1.1.1 RPS was commissioned by Willmott Dixon Construction Limited to undertake a Preliminary Ecological Appraisal (PEA) of the site proposed for the development of a new Wellbeing Hub in Llanederyn, Cardiff. This assessment comprises a desk study, Phase 1 Habitat Survey, and a preliminary protected species assessment and has been prepared following best practice guidelines published by CIEEM.

1.1.2 The PEA aims to:

- undertake a desk-based review of designated sites and records of protected species and other priority species;
- map and assess the habitats present on site and in the immediate surroundings;
- assess the potential for the habitats to support protected species or other species that could present a constraint, and make appropriate recommendations for further survey work if necessary;
- review potential impacts on key ecological features
- provide outline options for mitigation and biodiversity enhancement

1.2 Survey Area and Context

1.2.1 The site lies within an urban park adjoining the existing Powerhouse Hub building in Llanederyn, with a central Ordnance Survey grid reference of ST202801. The development site comprises managed amenity grassland, sections of surfaced footpath, an existing car park and a hard surfaced multi-use games area (MUGA) enclosed by fencing. Three semi-mature ash trees are present on the eastern edge of the amenity grassland within the development with a few further ash trees in grassland adjacent to the boundary of the proposed development.

1.2.2 A block of semi-natural broadleaved woodland is situated on the western side of the park and is approximately 0.7ha in size, extending up to Llanederyn Drive to the west.

1.2.3 Further amenity grassland, a children's play area, and boundary woodland form the northern part of the urban park with links to a further linear block of semi-natural woodland to the north east, located between residential housing estates.

1.2.4 A residential road (Round Wood) forms the southern boundary, with retail businesses and the Maelfa shopping centre located to the south.

1.2.5 The River Rhymney and adjoining woodland and grassland forms a wide wildlife corridor running broadly north–south through the eastern part of Cardiff. This wildlife corridor lies 0.5km to the east of the site at the closest point and has linkage with the woodland blocks within the Llanederyn area.

1.3 Development proposal

1.3.1 It is proposed to build a new Llanederyn Wellbeing Hub linked with the existing Powerhouse Hub building.

1.3.2 The new building is to be constructed in the southern part of the urban park, on land that is currently amenity grassland, an existing car park, and a MUGA. On the western side, the development boundary abuts the eastern boundary of the block of semi-natural woodland. The development boundary is shown on the Habitat Plan (ECO00501-001) and the development proposal is illustrated on the Proposed Site Plan (WDC Sketch 01-RevA).

1.3.3 The proposed development includes the redesign of the existing car park and the creation of a drop off zone to service the new building.

1.3.4 The ground floor of the new building will be elevated above existing ground level link into the existing building. Consequently a retaining wall will need to be constructed on the western boundary of the development with the construction area overlapping the edge of the block of semi-natural woodland.

1.3.5 The application site boundary includes the amenity grassland and three ash trees to the east and north of the car park and MUGA. A Sustainable Urban Drainage Scheme (SUDS) will be constructed on the northern and eastern sides of the new building; comprising a small attenuation basin and two linear soakaways.

1.4 Legislation and policy

1.4.1 Relevant legislation, and policy guidance as listed below have been considered within the PEA process and have informing recommendations.

- The Conservation of Habitats and Species Regulations 2017;
- The Wildlife and Countryside Act 1981 (as amended);
- The Protection of Badgers Act 1992;
- Environment (Wales) Act 2016
- The Natural Environment and Rural Communities Act 2006;
- Planning Policy Wales (PPW)
- Technical Advisory Note 5 (Nature Conservation and Planning)
- Cardiff Local Development Plan

2 METHODS

2.1 Desk Study

2.1.1 The desk study identified the statutory and non-statutory sites of nature conservation interest within a 2km radius of the site. Species records within a 2km radius of the site (from the last ten years) were requested from the South East Wales Biodiversity Records Centre (SEWBReC). Information on non-statutory sites was requested from SEWBReC and Cardiff Council. Statutory designated sites and SSSI impact zones were reviewed using the Multi-agency Geographic Information for the Countryside website (MAGIC). Aerial imagery and the 1:25,000 OS map was used to assess the wider context of the site and its position in relation to green corridors and connectivity with other habitats.

2.2 Habitat Survey and Protect Species Scoping

2.2.1 The preliminary ecological appraisal includes a Phase 1 Habitat survey and a scoping survey for protected species and other species of conservation concern which could be present in areas affected by the development proposals.

2.2.2 The survey and the Preliminary Ecological Appraisal Report have been undertaken in accordance with relevant guidance including: The Handbook for Phase I Habitat Survey (JNCC, 2010), the Guidelines for Preliminary Ecological Appraisal (CIEEM 2017), and BS42020:2013 Biodiversity Code of Practice for Planning and Development (BSI, 2013).

2.2.3 The site walkover survey was undertaken on 21st January 2019 by Tim Oliver MCIEEM. During the survey, habitats within the survey area were classified, mapped and described, with respect to their structure and broad floristic composition. The ecological value of adjacent off-site habitats was considered in order to understand the site in its wider ecological context.

2.2.4 The habitats within the site were assessed for their potential to support legally protected or otherwise notable flora and fauna that may be a consideration in the planning process with regard to UK and European wildlife legislation and UK planning policy (at all geographical scales). If encountered, invasive non-native plant species currently listed in Schedule 9 of the Wildlife and Countryside Act 1981 (as amended in 2010) were noted and mapped. Botanical nomenclature in this report follows that laid out by Stace (2010).

2.2.5 Signs indicating the presence of protected or priority faunal species were noted where they were encountered, including droppings, burrows, tracks and evidence of feeding. The trees within the site were provisionally assessed during the walkover. The diameter at breast height (DBH) was estimated for each accessible mature and large semi-mature tree.

2.3 Limitations

Desk Based Assessment

2.3.1 The desk study data is third party controlled data, purchased for the purposes of this report only. RPS cannot vouch for its accuracy and cannot be held liable for any error(s) in these data.

Survey

2.3.2 The site walkover was undertaken outside of the optional period for habitat and botanical survey when most any plant species are not in flower. At this time of the year some plant species will not be visible above ground but the presence of the basal leaves of many herbaceous species and grassland structure allowed an assessment floristic diversity. The grassland is part of a managed urban park and although the height of the sward indicates that not all the grassland is frequently mown to a short sward, sufficient information was obtained to assess the grassland habitat. A number of woodland ground flora species were emerging from the ground providing information on the age and value of the woodland.

2.3.3 The protected/priority species scoping assessment provides a preliminary view of the likelihood of these species occurring on the site, based on the suitability of the habitat, known distribution of the species in the local area provided in response to our enquiries and any direct evidence on the site. It should not be taken as providing a full and definitive survey of any protected/notable species group.

2.3.4 The survey results contained in this report can be considered accurate for two years, assuming there are no significant changes to the site. Due to the inherently transient nature of the species, and to a lesser extent habitats, further surveys would be required after this period to review habitat status and reassess the potential for use by protected and priority species.

3 RESULTS

3.1 Designated Sites

3.1.1 There is two statutory designated sites for nature conservation value within 2km of the site, one SSSI located 1.7km from the site and a LNR located 0.9km from the site. There are 18 non-statutory sites located within the 2km search radius of the site, of which six are located within 1km of the site. A summary of these designated sites is provided in Table 3.1 below.

Table 3.1: Designated sites within 2km of the site

Site name	Type	Approx. area (ha)	Interest Features	Distance from site (km)
Statutory Sites				
Llanishen and Lisvane Reservoir Embankments	SSSI	6.19ha	Diverse assemblage of grassland fungi	1.9km
Howardian	LNR	6.5ha	Nature reserve in the Lower Rhymney valley consisting of woodland, wild flower meadows, ponds and reed beds	0.9km
Non-statutory Sites				
Llanedeyrn Woods Complex	SINC	28ha in total	A series of 12 semi-natural woodland sites creating a dispersed woodland mosaic throughout Llanedeyrn	0km
Rhymney River Valley Complex	SINC	30ha	Area of riverside habitats including woodland, amenity parkland and grassland sections	0.6km
River Rhymney	SINC	42ha	Comparatively unmodified main river of importance to migratory fish, otters, wildfowl and bankside vegetation and acting as a major wildlife corridor	0.6km
Nant Glandulais	SINC	2.5ha	Unmodified tributary with diverse bankside vegetation	0.8km
Swan Mear Wood	SINC	0.5ha	Semi-natural woodland	0.9km
Coed-y-Cwar	SINC	3.5ha	Semi-natural woodland	1km
Discovery Wood	SINC	1ha	Semi-natural woodland	1.2km
Scott Wood	SINC	1ha	Semi-natural woodland	1.2km
Roath Park Wild Gardens	SINC	2.6ha	Parkland with wildflower meadows	1.6km
Roath Park Lake	SINC	1.3ha	Recreational lake within a parkland setting	1.6km
Fishpond Woods	SINC	1.5ha	Area of semi-natural woodland within a parkland setting	1.6km
Nant Fawr Community Woods & Nant Fawr Meadows	SINC	3.7ha	Area of semi-natural woodland containing a brook within a parkland setting	1.7km
Lower Rookery Woods	SINC	1.9ha	Area of semi-natural woodland within a parkland setting	1.7km
Rhyd-y-Pennau Complex	SINC	4.5ha	Marshy alder carr and ancient semi-natural woodland supporting species such as bullfinch and song thrush	1.8km
Llanishen Reservoir & Llanishen reservoir grassland and scrub	SINC	30ha	Wetland site with an assemblage of stoneworts and pondweeds and a population of common toad. The surrounding scrub and grassland support populations of slow worm and grass snake	1.9km

Wellbeing Hub @ Maelfa

3.1.2 The woodland block on the boundary of the survey area is part of the Llanedeyrn Woods Complex SINC. This SINC is a group of 12 separate blocks of semi-natural ancient woodland blocks within this area of Cardiff with most of the areas enclosed by housing estates. The ground flora in the blocks of woodland include sspecies that are characteristic of ancient semi-natural woodland. Bat species have been recorded in the Llanedeyrn Woodlands Complex with direct linkage to the woodlands within the nearby River Rhymney wildlife corridor to the east. All the blocks forming the Llanedeyrn Woods Complex are located within 1km of the site. There is public access into most of SINC woodland blocks with their amenity value for the local community is a further factor in their designation.

3.2 Species

3.2.1 Records of protected species were obtained from SEWBReC. A number of species of conservation importance or otherwise notable were recorded within the 2 km search radius of the site. A summary of these records is provided in Table 3.2.

3.2.2 In order to simplify the results, only records of species from the last 10 years are shown. In addition, only data with a 6 figure grid reference resolution or higher are provided, since locations given at a lower resolution do not allow accurate calculation of distance to the site boundary.

Table 3.2: Species records within 2km of the site

Common name	Scientific name	Nearest distance from site (m)	Year of most recent record	Conservation Status
Common Pipistrelle	*Pipistrellus pipistrellus*	168	2017	EPS, WCA5, S7
Soprano Pipistrelle	*Pipistrellus pygmaeus*	168	2017	EPS, WCA5, UKBAP, S7
Nathusius's pipistrelle	*Pipistrellus nathusii*	857	2016	EPS WCA5
Brown long-eared bat	*Plecotus auritus*	858	2016	EPS, WCA5, UKBAP
Daubenton's bat	*Myotis daubentonii*	1896	2014	EPS WCA5
Natterer's bat	*Mytosis nattereri*	1311	2012	EPS WCA5
Noctule bat	*Nyctalus noctula*	548	2016	EPS, WCA5, UKBAP, S7
Bat species	*Chiroptera sp.*	865	2014	EPS, WCA5
European otter	*Lutra lutra*	1637	2011	EPS, WCA5, UKBAP, S7
Hazel dormouse	*Muscardinus avellanarius*	970	2017	EPS, WCA5, UKBAP, S7
West European hedgehog	*Erinaceua europaeus*	1033	2018	UKBAP, S7
Bittern	*Botaurus stellaris*	1637	2010	WCA1.1, UKBAP, WBAm, S7
Black-headed gull	*Chroicocephalus ridibundus*	1647	2017	UKBAm, S7
Brambling	*Fringilla montifringilla*	1830	2017	WCA1.1
Bullfinch	*Pyrrhula pyrrhula*	1183	2015	UKBAP, WBR, S7
Cuckoo	*Cuculus canorus*	1276	2010	UKBAP, WBR, S7
Dunnock	*Prunella modularis*	679	2018	UKBAP, UKBAm, S7
Fieldfare	*Turdus pilaris*	927	2015	WCA1.1, WBAm
Greganey	*Anas querquedula*	1594	2017	WCA1.1, WBAm
Goldeneye	*Bucephala clangula*	1802	2013	WCA2, UKBAm
Green sandpiper	*Tringa ochropus*	1657	2017	WCA1.1, UKBAm
Hobby	*Falco Subbuteo*	927	2016	WCA1.1, WBAm

House sparrow	*Passer domesticus*	1481	2017	UKBAP, S7
Kingfisher	*Alcedo atthis*	679	2017	WCA1.1, WBAm
Lapwing	*Vanellus vanellus*	1237	2010	UKBAP, UKBAm, S7
Lesser spotted woodpecker	*Dendrocopos minor*	1740	2012	UKBAP, UKBR, S7
Long tailed duck	*Clangula hyemalis*	1802	2014	WCA1.1, UKBR
Marsh tit	*Poecile palustris*	1802	2015	UKBAP, UKBR, S7
Mediterranean gull	*Larus melanocephalus*	1657	2015	WCA1.1, WBAm
Merlin	*Falco columbarius*	927	2011	WCA1.1, WBAm
Peregrine	*Falco peregrinus*	927	2012	WCA1.1, UKBAm
Pied flycatcher	*Ficedula hypoleuca*	1466	2015	LBAP, WBR
Pintail	*Anas acuta*	1802	2016	WCA1.2, WBAm
Red kite	*Milvus milvus*	927	2018	WCA1.1, WBAm
Redwing	*Turdus iliacus*	927	2016	WCA1.1, UKBR
Ringed plover	*Charadrius hiaticula*	1657	2010	UKBR, S7
Scaup	*Aythya marila*	1802	2018	WCA1.1, UKBAP, UKBR
Song thrush	*Turdus philomelos*	679	2017	UKBAP, UKBR, S7
Starling	*Sturnus vulgaris*	927	2015	UKBAP, UKBR, S7
Common lizard	*Zootoca vivipara*	1476	2014	WCA5 (part), UKBAP, S7
Grass snake	*Natrix Helvetica*	1802	2018	WCA5 (part). UKBAP, S7
Slow worm	*Anguis fragilis*	1003	2014	WCA5 (part), UKBAP, S7
Common frog	*Rana tempraria*	1016	2017	
Common toad	*Bufo bufo*	1012	2017	UKBAP, S7
Palmate newt	*Lissotriton helveticus*	1113	2017	
European eel	*Anguilla Anguilla*	1963	2017	UKBAP, S7
Large wainscot	*Rhizedra lutosa*	1447	2015	UKBAP, S7
Bluebell	*Hyacinthoides non-scripta*	1254	2012	WCA8
Foliose lichen	*Parmotrema perlatum*	8340	2014	

Abbreviations used in Table 3.2:

EPS: The Conservation (Natural Habitats, &) Regulations 2017 (Schedule 2 or Schedule 4); **WCA1**: Wildlife & Countryside Act Schedule 1, **WCA2**: Wildlife & Countryside Act Schedule 2; **WCA5**: Wildlife & Countryside Act Schedule 5; **WCA8**: Wildlife & Countryside Act Schedule 8;

UKBAP: UK Biodiversity Action Plan priority species; **S7**: Section 7 species of Environment (Wales) Act; **WBR:** Red list Bird of Conservation Concern (BoCC) in Wales; **WBAm:** Amber list BoCC in Wales; **UKBR:** Red list BoCC in the UK; **UKBAm:** Amber list BoCC in the UK

3.3 Habitats

3.3.1 The habitat types and boundary features are shown on the Habitat Plan with the proposed development boundary. Photographs of habitats are given in Appendix B.

Amenity Grassland

3.3.2 Amenity grassland is the main habitat within the urban park, present around the car park and MUGA and on the sloping to the north of the MUGA.

3.3.3 The majority of the grassland on the eastern side of the park is frequently mown and has a short sward and low species diversity (Plate 1, Appendix B). Perennial rye-grass *Lolium perenne* is the most abundant species with Yorkshire fog *Holcus lanatus*, creeping bent *Agrostis stolonifera* and daisy *Bellis perennis* also at least locally frequent. Other species occurring at low frequency include ribwort plantain *Plantago lanceolata*, white clover *Trifolium repens*, creeping buttercup *Ranunculus repens*, dandelion *Taraxacum* sp., and cut-leaved cranesbill *Geranium dissectum*.

3.3.4 On slightly banked ground adjoining the eastern side of the car park, red fescue is locally abundant with frequent tussocks of cock's-foot *Dactylis glomerata* and tall fescue *Schedonorus arundinacea* with creeping cinquefoil *Potentilla reptans*.

3.3.5 Grassland to the north and west of the MUGA has a longer sward indicating that it is subject to a lower frequency of mowing. Aerial imagery taken in the summer shows that the grass alongside the paths have been frequently mown but with a longer 'meadow sward' away from the paths. Yorkshire fog is the dominant species with frequent perennial rye-grass and occasional cock's-foot. Herbaceous species comprise common ruderals (daisy, creeping buttercup, broad-leaved dock *Rumex obtusifolius*) and occasional species more typically associated with neutral grassland; common mouse-ear *Cerastium fontanum,* common knapweed *Centaurea nigra* and timothy *Phleum pratense.*

3.3.6 North of the MUGA the grassland is tussocky and although Yorkshire fog remains abundant, cock's-foot, tall fescue and red fescue *Festuca rubra* are all locally abundant with timothy, hogweed *Heracleum sphondylium* common knapweed *Centaurea nigra* and cuckooflower *Cardamine pratensis* (Plate 2, Appendix B).

3.3.7 A small area of recently established amenity grassland area adjoins the existing Powerhouse Hub building. The short sward is dominated by perennial rye-grass with bent grasses and Yorkshire fog occurring at low abundance. There are two small planted trees in the grassland.

3.3.8 Overall, from the survey data obtained in January, the amenity grassland is considered to have value for nature conservation in the context of the site. The presence of common knapweed, cuckooflower, and creeping cinquefoil within a sward indicates that the grassland has higher ecological value than the typical frequently mown amenity grassland and the park will contribute to the biodiversity value of the local area.

Parkland Trees

3.3.9 There are nine semi-mature ash trees on the eastern edge of the amenity grassland, three of which are located entirely within the development boundary with a further two with a canopy spread extending into the site. The trees are up to 12m in height with trunks diameter (DBH) between 35 and 50cm. The trees are relatively young, lacked knot holes or other features with the potential to have developed cavities and showed no signs of decay.

3.3.10 The trees at their current size and structure will benefit biodiversity but only in the context of the site and the immediate surroundings.

Semi-natural Woodland

3.3.11 The semi-natural broadleaved woodland to the west of the amenity grassland comprises a number of widely spaced large old standard woodland trees, predominantly pedunculate oak *Quercus robur* and ash *Fraxinus excelsior.* The shrub layer is relatively sparse with scattered hazel coppice *Corylus avellana* and a few holly *Ilex aquifolium* shrubs (Plate 3, Appendix B). Silver birch *Betula pendula*, and a large cherry *Prunus sp*. trees were also noted. Several of the large standard trees had significant damage at the base including signs of past fires. A fallen dead tree with ivy in the eastern half of the woodland create an additional niches for biodiversity.

3.3.12 Low open bramble *Rubus fruticosus* agg and ivy *Hedera helix* were the most frequent ground flora species at the time of the survey but a number of vernal spring woodland flowers were noted with wood speedwell *Veronica sylvatica* and wild arum *Arum maculatum,* both locally frequent in the eastern half of the woodland with low numbers of lesser celandine *Ficaria verna*, and wood avens *Geum urbanum*. Wood sedge *Carex sylvatica* was locally frequent in the northern part of the woodland.

3.3.13 The canopy of a few mature trees extend across the path, most notably on the south-eastern woodland edge where a mature oak (T834) has a wide one-side canopy (Plate 4, Appendix B). The ground flora in this location is a partial cover of low growing bramble (Plate 5, Appendix B).

3.3.14 On the eastern edge of the woodland, blackthorn *Prunus spinosa* and a few hazel shrubs adjoin the surfaced footpath. The patchy flora beneath these shrubs is a mix of ivy, bramble and grasses (Yorkshire fog and annual meadow-grass *Poa annua*) along with cleavers *Galium aparine,* wild arum and greater stitchwort *Stellaria holostea* (Plate 6, Appendix B).

3.3.15 The southern boundary of the woodland is defined by a wall associated with Powerhouse Hub building. There is an open growth of ivy on the wall with the young ash, hazel and willow *Salix* sp., establishing alongside, which have been subject to periodic cutting back.

3.3.16 The woodland is a habitat of high level of biodiversity value (county) due to its age and structure, floristic diversity, and context as part of a group of ancient woodland blocks in Llanederyn.

3.4 Species Scoping Survey

Mammals

Bat Species

3.4.1 The semi-natural woodland area contains several mature trees which could have features of high value to roosting bats, and the woodland edge has value as potential foraging habitat.

3.4.2 The mature oak tree on the south-eastern boundary of the semi natural woodland has an uneven canopy with a wide spread to the SE extending over the footpath and adjoining amenity grassland. The DBH of the tree was relatively narrow for its age (90cm) and there are signs of past damage and fungal growth at the base and there is ivy growth on the main trunk and on the lower parts of the largest branches (Plate 4, Appendix B). Due to its age and structure, the tree could have cavity features of high suitability for use by roosting bats. No other woodland trees are located close to the footpath on the woodland edge in the vicinity of the proposed building.

3.4.3 The ash trees in the parkland grassland have not yet developed any cavity features and show no signs of significant decay and currently have negligible potential value for roosting bats.

3.4.4 Powerhouse Hub is a very modern recently constructed community building, which opened to the public in September 2017. The external elevation of the upper sections of the building are surfaced in brightly coloured facia boards with plastic guttering at the edge of the flat roof. The building appears to have been constructed to a high standard and given its age it lacks gaps in the structure that could be utilised by roosting bats. In addition, three 'end of row' residential houses adjoin the eastern boundary of the urban park with the gable ends of the buildings facing the amenity grassland and ash trees.

3.4.5 Some bat species occur widely in urban areas and the River Rhymney wildlife corridor will be used by a range of bat species including less common species that typically avoid artificial lighting. The woodlands and green spaces around Llanederyn also provide a foraging resource for local bat populations. The car park and paths within the park, including the path along the woodland edge are lit at night by lighting columns. Consequently, foraging over the amenity grassland and along wood edge is expected to be limited to common species that do not avoid artificial light, although the level of foraging activity of these species can be high where there are concentrations of airborne insects around artificial lighting.

Hazel Dormouse

3.4.6 The closest record of hazel dormouse is from a woodland 970m from the site. The woodland block has features that could be utilised by dormice (scattered hazel coppice, mature trees) but the lack of a dense shrub layer and areas of bramble thicket means that there is limited cover and few potential sources food. The woodland block habitat is classified as sub-optimal for this species.

3.4.7 There are no records of dormice from any of the other woodland blocks within the SINC which is largely enclosed by housing estates. The likelihood of dormice being present in the 0.7ha woodland block is considered to be very low/negligible.

Badger

3.4.8 No signs of setts or badger activity (paths, latrines, foraging) were recorded in the eastern half of the woodland during the survey. A single mammal burrow too small to have been created (or used) by a badger was noted in the eastern half of the woodland and is most likely to have been dug by a rabbit.

3.4.9 There is high confidence in the absence of badger setts with a sparse shrub layer, good visibility of the ground and limited cover. Public access would cause indirect disturbance to badgers and the context of the woodland makes the potential for future colonisation unlikely.

Nesting Birds

3.4.10 The trees in the semi-natural woodland will be expected to have holes in their structure and some have dense ivy growth providing opportunities for birds to build nests. Robin, blue tit and great tit were all recorded during the survey and could nest in this habitat.

3.4.11 The woodland as a whole should support a wider assemblage of nesting species than is present in the surrounding area and will also provide food for bird species nesting in the adjoining areas

including gardens. No nest sites would be expected in the amenity grassland but this habitat will be used for foraging by some species nesting nearby.

Amphibians and Reptiles

3.4.12 There are no known ponds or areas of standing water within the vicinity park and no known features with the potential to support a breeding population of great crested newts. It is possible that there are small ponds in nearby gardens and more commonly occurring amphibian species (common frog and common toad) could be present in woodland and grassland areas outside of the breeding season.

3.4.13 Slow worms also commonly occur in urban areas utilising gardens, as well as grassland and scrub habitats. The amenity grassland areas lack potential refuges and hibernacula, and will be subject to regular management and is unlikely to be important for populations of either amphibian or reptile species, if present.

Invertebrates

3.4.14 Based on the findings of the Phase 1 habitat survey the amenity grassland is likely to support a small assemblage of species with a predicted limited wildflower species diversity / abundance. The areas of more tussocky grassland, supported a slightly higher number of wildflower species, and have more niches for invertebrates than the more uniform short mown areas.

3.4.15 The semi-natural woodland will support a much more diverse invertebrate fauna than the grassland. A high number of invertebrate species should occur on the mature trees with many niches associated with living and deadwood. The scattered hazel coppice, varied ground flora and ancient woodland soils, with decomposing leaf litter, all create opportunities for invertebrates to exploit.

Invasive Plants

3.4.16 No non-native invasive species listed under Schedule 9 of the Wildlife and Countryside Act 1981 were recorded during the Phase 1 habitat survey.

4 IMPLICATIONS OF DEVELOPMENT

4.1 Designated sites

4.1.1 The two statutory designations (a SSSI and a LNR) are located outside the zone of influence of the proposed development with no strong connectivity or potential impact pathways between the site and these designated sites.

4.1.2 The proposed development footprint abuts the eastern boundary of one of the blocks of semi-natural woodland within the Llanedeyrn Woodlands Complex SINC. A retaining wall is to be constructed on the boundary with the woodland. The footpath alongside the woodland edge may also be upgraded.

4.1.3 The proposals will require construction activities on the woodland edge adjoining shrubs and ground flora; the pruning back of the canopy of the mature oak (T834); and construction on the edge of the RPA of this mature oak tree.

4.1.4 Consideration will need to be given to the potential for temporary disturbance of the woodland soils and flora in the working area; and indirect impacts on adjacent woodland habitats through the movement of surface water/dust/chemicals from the construction site.

4.1.5 The potential for adverse impacts has been addressed through the avoidance built into detailed construction design. The implementation and maintenance of robust environmental protection (detailed in a Construction Environment Management Plan or equivalent) would protect adjoining habitats from adverse impacts during construction.

4.1.6 In the event that potential adverse impacts on the woodland edge cannot be ruled out, then appropriate mitigation or compensation will be designed and implemented. Mitigation, if required would establish features of the same value and extent as those that were impacted and will need to be subject to ongoing post-works monitoring, maintenance and where required remedial measures to demonstrate delivery of the mitigation commitments.

4.1.7 All other SINC sites are at least 600m from the development boundary and fall outside the zone of influence of this proposed development.

4.2 Habitats

Semi-natural broadleaved woodland

4.2.1 The potential impacts on the woodland are summarised in Section 4.1. The working area will extend up to the woodland edge in a location adjoining the back of the existing Powerhouse building. Low bramble is the principal vegetation cover with no shrubs. None of the ancient woodland indicator species were recorded in this location and the open nature of this corner of the wood adjoining the back of the existing building, suggest that it was subject to some disturbance during the construction of the existing building.

4.2.2 The position and orientation of the retaining wall has been modified to ensure that ground excavation will be outside of the root protection area (RPA) of the oak tree and that the working area will be restricted to the edge of the RPA.

4.2.3 The eastern side of the wide spreading canopy will need to be pruned back by about 2m where it would overhang the building construction area.

4.2.4 The ground inspection of the outer branches on the eastern side of the tree confirmed that there were no significant cavities or other potential roost features that would be affected by the proposed pruning.

4.2.5 Tree surgery following best practice would avoid creating features that would be at risk of being attacked by disease or fungal species and could prolong lifespan of the tree. More detailed information is provided in the tree report (MWC-ARB-ZZ-XX-DR-Z-570.1-0001).

Amenity Grassland

4.2.6 The development will result the loss of less than 0.3ha of amenity grassland. This is a proportion of the total extent of this habitat within the park. The partial loss of amenity grassland, and the localised loss of common plant species within this habitat (which also occur in the areas adjoining the development) would be a minor impact in the context of the site.

Hard Standing

4.2.7 The development will also result in the removal of the MUGA and redevelopment of the existing car park. There will be no ecological impacts relating to these areas.

4.3 Species

Bats

4.3.1 No potential bat roost sites will be directly affected by the development proposal with the powerhouse hub lacking any features that could be used by bats and the protection of trees incorporated in the layout and design of the scheme.

4.3.2 The mature oak (Tree 834) on the south-east woodland edge will be retained alongside the proposed building development. The construction of the retaining wall will ensure that the ground in almost all of the RPA will remain outside of the development footprint, but in the absence of mitigation controls, construction activities could result in distance or ground compression in the RPA.

4.3.3 Outer branches will need to be pruned back by up to 2m. The inspection from the ground found observed no potential cavity features in these barrow diameter branches and no potential roost features would be affected.

4.3.4 The mature oak will fall outside of the construction area and will be protected by exclusion fencing for the duration of construction. Features in the main trees will remain unaltered and available to roosting bats for the duration of construction and once the new building is completed. The other woodland trees on the eastern boundary are more set back from the footpath and development area.

4.3.5 An increase in artificial lighting (and particularly light spill onto the woodland edge from external lighting and potentially internal lighting) could affect the use of Tree 834 (if there is a potential roost feature) and the value of the woodland edge as a bat flight line/foraging area.

4.3.6 No potential roost features were identified in the off-site buildings facing onto the eastern boundary of the park. Two buildings are situated 10 and 15m from the development boundary but this edge of the park would retain its value as a potential flight line for species typically found in modern housing estates.

Badgers

4.3.7 There are no active badger setts within the survey area and no evidence of activity was found during the walkover. As such, the site was not considered to be part of a territory of a badger social group.

Breeding Birds

4.3.8 The pruning back of primarily narrow diameter branches on the mature oak (Tree 834) would be unlikely to directly affect nesting birds with no cavity features or typical nesting features in the outer canopy. There is potential for birds to nest in features associated with the main part of Tree 834, which would be located close to the construction area, or other mature trees on the eastern side of the woodland. Depending on the timing of the site works there is potential for breeding birds to move away from the development during the construction period.

4.3.9 The young hazel and blackthorn shrubs adjoining the path are small and even in full leaf would lack dense cover typically favoured for nest sites. Their position alongside a frequently used path further decrease the likelihood of use.

4.3.10 Following a precautionary approach, construction activities could result in the temporary displacement of a very small number of pairs from the section of the eastern woodland edge adjoining the construction site. This temporary impact would not affect the conservation status of any of the local populations of bird species.

Amphibians and Reptiles

4.3.11 Based on the absence of records of great crested newts and lack of potential breeding habitat, there would be no scope for populations of great crested newt to be affected by the scheme.

4.3.12 In relation to reptiles there are no past records from close to the site and the site does not have high value for these species. Under a precautionary approach, there is a low likelihood of individual reptiles (slow worm) or common amphibians to present within or adjoining the proposed development area.

4.3.13 Reptiles are protected from killing and injury and in the absence of any mitigation measures, individual slow worms could be affected by site activities (along with common amphibian species).

Invertebrates

4.3.14 The proposed development will require localised tree pruning and result in the partial loss of grassland of relatively low value. All the features of specific value for invertebrates that will be lost within the development area make up a small proportion of the equivalent opportunities in the immediate vicinity and wider local area. In this context, any impact would be at worst minor in the context of the site with no predicted loss of any invertebrate species from the assemblage currently using the park.

5 MITIGATION RECOMMENDATIONS

5.1 Designated sites

5.1.1 Following detailed construction design for the retaining wall and footpath, the potential for the woodland edge habitat to be impacted should be re-assessed. All efforts should be made to establish a working area that avoids incursion into the woodland.

5.1.2 Construction methods and construction area layout should be designed to ensure that the woodland, beyond the eastern edge remains an exclusion areas for machinery, equipment and storage for the duration of construction. In order to avoid impacts, robust construction site fencing (Heras or equivalent) should be installed in accordance with BS: 5837 to delineate the exclusion area. The mature oak tree (T834) will be subject to tree protection measures, as part of the contractor exclusion fence.

5.1.3 Good environmental working practices should employed at all times for the duration of construction to protect features within designated site beyond the site boundary. Detailed protection measures should be specified in a CEMP or an equivalent document, defining their implementation and remedial measures, including pollution prevention, the control of surface water and off-site dust/substrate deposition, working hours, and any artificial lighting.

5.1.4 Should the working area extend onto woodland soils the mitigation measures will be implemented to avoid any long term impacts with the avoidance of soil compaction and damage to ground flora. If significant ground disturbance is unavoidable, the stripping and storage of woodland topsoil would be a last resort measure to be used in restoration following development.

5.1.5 Should the existing surface footpath be subject to improvement works, any loss of shrubs would be subject to mitigation through replacement native shrub planting (hazel and holly) in the first planting season following the completion of the development. Three new shrubs should be planted for each one removed or significantly impacted.

5.2 Habitats

5.2.1 The protection and mitigation of the semi-natural woodland is described above in Section 5.1.

5.2.2 The loss amenity grassland should be offset by the incorporation of biodiversity value into the small SUDS scheme to be created on the northern and eastern sides of the new development.

5.2.3 The banks of attenuation features and soakaways are typically dry for the majority of the time and species that can survive in dry ground in summer would be more likely to thrive than species associated with wet or marshy grassland. A simple neutral meadow grassland species mix should be sown on the sloping sides of the SUDS features.

5.2.4 Ideally wildflower species should also be sown into the base of the SUDS features, subject to the operational requirements. Species selection would be based on the anticipated conditions and should native comprise wetland species that can survive periods of drying out.

5.2.5 The species used should be native to local area and wherever possible sourced from a local supplier of native seed. The grassland should be subject to a meadow style management, ideally being cut once or twice a year with the grassland always left uncut between mid May and mid July. Due to the importance of the area for amenity, it is assumed that grassland adjoining the footpaths will be subject to frequent mowing as required for the sites recreational use.

5.2.6 Management of the grassland area to the north (outside the application boundary) should could to include substantial areas managed as a longer sward in which neutral grassland wildflowers can survive and expand their populations.

5.2.7 It is anticipated that all the semi-mature ash trees on the eastern side of the development will be retained and protected with exclusion fencing to be installed around their RPAs. Should this not be possible, one or more areas of new native tree planting should be incorporated into the final design.

5.3 Species

Mammals

Bats

5.3.1 The scheme and construction method should be designed to avoid the potential for any impacts on roosts in T834 and other mature trees set back form the eastern boundary of the woodland. No potential roost features are present in the sections of branches to be pruned back.

5.3.2 Where the works will indirectly affect the trunk or larger branches of the oak tree (including light spill), then an aerial inspection should be carried out by a licensed bat worker to assess presence/absence of roost features. This survey would inspect the structure to record cavities, and where present to assess their size and suitability for bats with the aid of an endoscope. Where there are potential indirect impacts, the use of a potential roost feature would need to be assessed through emergence / re-entry surveys in late spring and summer.

5.3.3 In the event bats use the trees and the impacts cannot be avoided, then an European Protected Species mitigation licence, issued by Natural Resources Wales (NRW), for be obtained for the development accompanied by the actions that will be implemented to avoid harming individuals or removing roost features.

5.3.4 The park has low level artificial lighting with an existing column on the eastern boundary of the woodland with some existing light spill onto woodland edge. The lighting design for the western boundary of the development should be designed to avoid additional light spill onto the SINC woodland with the use of less intensive lighting and specification that direct light where it is required with negligible back lighting higher 2m above ground level.

5.3.5 Additional bat roosting opportunities could be provided as part of the scheme, either as bat boxes incorporated into dark locations on the western elevation of the new building or (subject to landowner permission), installed on larger trees in the woodland within the ownership of Cardiff Council. As an enhancement, if there is a mechanism that would make them difficult to steal or be vandalised, four artificial bat boxes (constructed of woodcrete) could be fixed to the trunks of mature trees within the woodland. Each box would be installed at least 4m above ground level and broadly on the southern side of the tree.

Badger

5.3.6 Following best practice, the continued absence of badger setts should be confirmed shortly prior to the commencement of any development to ensure legal compliance.

Birds

5.3.7 Where dense vegetation, trees or their canopy fall within the development site boundary, these features should be cut back or felled outside of the bird breeding season (i.e. vegetation clearance carried out between September and the end of February). Where this is not possible the absence of nests would need to be confirmed by a suitably qualified ecologist in advance of any clearance work and any active nests retained and protected until the young have fledged.

5.3.8 Long lasting artificial bird nest boxes (constructed of woodcrete) could be fixed to larger trees in the adjoining woodland (subject to landowner permission), to provide an additional resource for cavity nesting species.

Amphibians and Reptiles

5.3.9 General good practice protection measures should be implemented during the establishment of the construction site to ensure that any reptiles or other common amphibians present in the development area can safely disperse into adjoining habitats. If any long rank vegetation has established it should be cut to 100mm above ground level systematically working towards the woodland.

5.3.10 The separate stripping of short mown amenity grassland (and if required woodland topsoil) should also be carried out systematically working from east to west, the noise and disturbance from the enabling works encouraging movement into cover on the woodland edge beyond the contractor exclusion fencing.

5.3.11 The SUDS scheme and proposed creation of new grassland habitat would have features of greater potential value than the existing amenity grassland for both slow worm and common amphibian species.

Invertebrates

5.3.12 The establishment of neutral meadow grassland with a component of wildflowers on sides of each of the SUDS features would have at least equivalent value for invertebrates as the existing amenity grassland that falls within the development area.

6 CONCLUSION

6.1.1 The development proposals relate to a new 'Wellbeing Hub' to be constructed to the north and connected to the existing Powerhouse building. The development is located in an urban park in the Llanederyn area of Cardiff with the surrounding area largely residential areas with some mixed use commercial/retail development.

6.1.2 The majority of the site is amenity grassland with a hardstanding car park, MUGA and surfaced footpaths and a few semi-mature trees. The amenity grassland which has relatively low species diversity but supports a higher number of grass and herb species than is present in the typical frequently mown amenity grassland.

6.1.3 The development boundary extends up to the edge of a 0.7ha block of semi-natural woodland listed on the Ancient Woodland Inventory. The block forms part of the Llanederyn Woodland Complex SINC along with eleven other ancient woodland blocks in the local area. This woodland habitat on the boundary of the proposed development has importance for nature conservation at a county level.

6.1.4 A large mature oak (T834) lies directly adjacent to the south-western boundary of the development and the canopy will be subject to selective pruning back as part of the proposal. Based on the age and structure of the tree as seen from the ground, it is likely to have cavity features suitable for roosting bats. Site design and the construction working area should protect the tree from damage and potential bat roost features from indirect impacts.

6.1.5 Impacts on the edge of the SINC woodland should be avoided as far as is practical taking into the account the design requirement for the new centre to be at the ground floor level of the existing Powerhouse above the woodland. Full protection of the SINC habitats adjoining the construction area should be implemented by the entire contractor team. The installation and maintenance of the environmental protection measures should be documented (photographs and simple site log with dates).

6.1.6 The lighting scheme should avoid increasing in the level of light spill which could affect the use of any bat roosts within the woodland and/or reduce the value of the woodland edge for foraging and commuting bats.

6.1.7 As an enhancement, bat boxes could be installed on mature trees in the woodland adjoining the site to provide artificial potential roost features.

6.1.8 No badger setts or signs of activity were recorded in the woodland. The timing and design of the working area should bird nesting habitat during the breeding season wherever possible, with confirmation of the absence of nests required by an ecologist in advance of vegetation clearance within the breeding period. There is a low likelihood of slow worm or common amphibian species occurring in the development area during enabling works and systematic ground clearance should be employed as part of best working practice.

6.1.9 The SUDS areas in the final scheme should be designed to have benefit for biodiversity with the establishment of neutral grassland comprising locally native species on the banks providing a new resource that would have value at the level of site and have higher value than the existing habitats for a range of species.

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FIGURES

Figure 1: Habitat Map

Wellbeing Hub @ Maelfa

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Legend

- Development Boundary

Survey Area

- Amenity Grassland
- Hard Standing
- Semi-natural Broadleaved Woodland

Rev	Description	By	CB	Date

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Client: MAELFA HUB

Project: LLANEDERYN WELLBEING CENTRE

Title: HABITAT PLAN

Status	Drawn By	PM/Checked By
FINAL	RW	TO
Project Number	**Scale @ A3**	**Date Created**
ECO00501	1:500	FEB 2019

Drawing Number: **ECO00501-001** Rev: **-**

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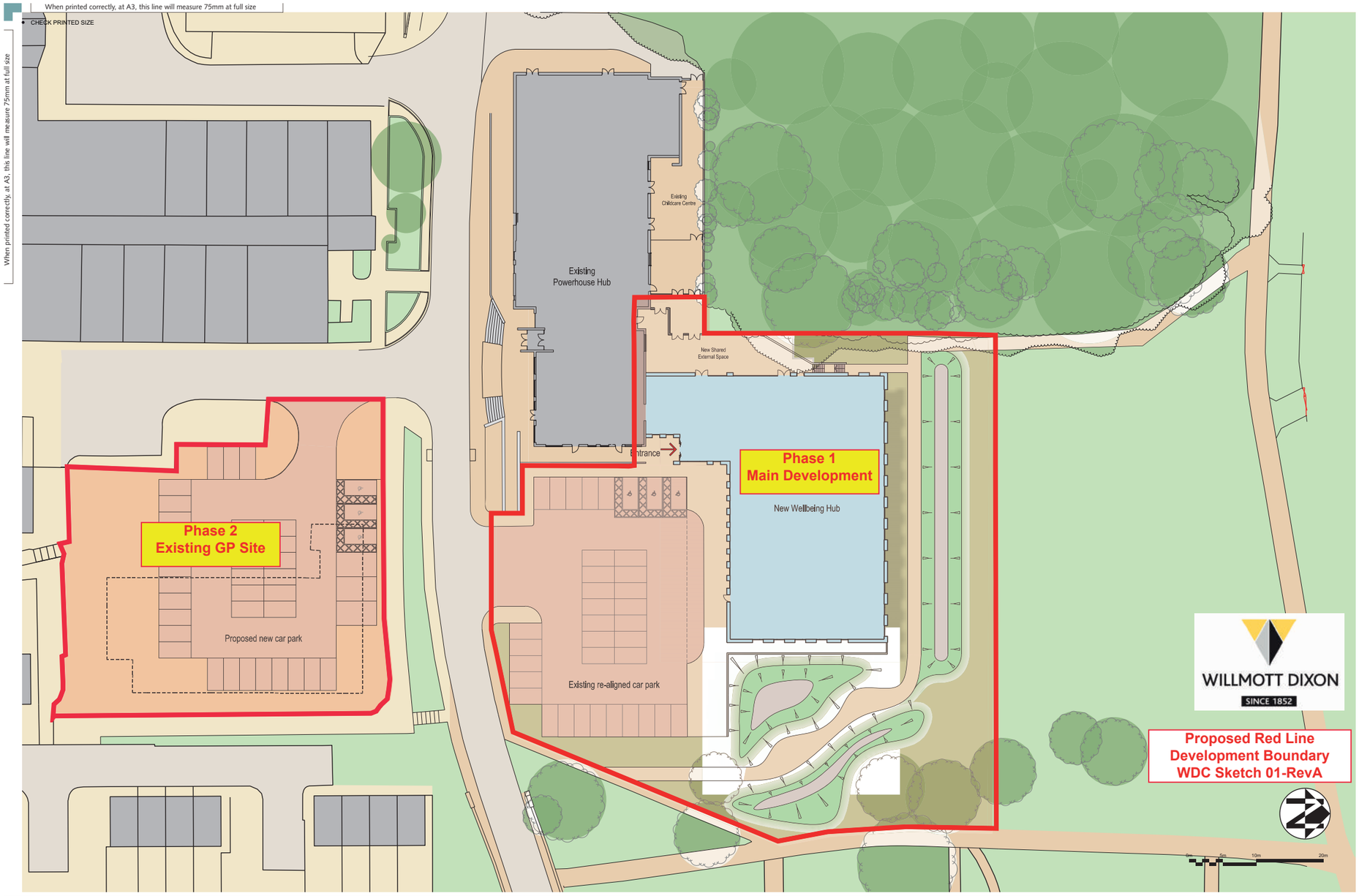
Figure 2 - Development Proposals

Wellbeing Hub @ Maelfa



Llanedeyrn Wellbeing Hub

AEDET PRESENTATION - PROPOSED SITE PLAN

Date: January 2019 Scale: 1:500/A3 Dwg No: 9125 001

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Appendix A

Relevant legislation

Reptiles

All common UK reptile species (Adder Vipera berus, Grass Snake Natrix natrix, Common Lizard Zootoca vivipara and Slow Worm Anguis fragilis) are protected through part of Section 9(1 and 5) of the Wildlife & Countryside Act 1981 (as amended). This prohibits:

- Intentional or reckless injuring or killing;
- Selling, offering or exposing for sale, or having in possession or transporting for the purpose of sale, any live or dead wild animal or any part of, or anything derived from, such an animal; or
- Publishing or causing to be published any advertisement likely to be understood as conveying buying or selling, or intending to buy or sell, any of those things.

Birds

All birds, their nests and eggs are afforded protection under the Wildlife and Countryside Act 1981, as updated by the Countryside and Rights of Way Act 2000. It is an offence to:

- intentionally kill, injure or take any wild bird;
- intentionally take, damage or destroy the nest of any wild bird while it is in use or being built; and
- intentionally take or destroy the egg of any wild bird.

Schedule 1 birds cannot be intentionally or recklessly disturbed when nesting and there are increased penalties for doing so. Licences can be issued to visit the nests of such birds for conservation, scientific or photographic purposes but not to allow disturbance during a development even in circumstances where that development is fully authorised by consents such as a valid planning permission.

Bats

All British bat species are fully protected under Schedule 5 of the Wildlife and Countryside Act 1981, as updated by the Countryside and Rights of Way Act 2000. All British bats are also included on Schedule 2 of The Conservation of Habitats and Species Regulations 2017 as European Protected Species. It is an offence to:

- intentionally or recklessly kill, injure or capture bats;
- deliberately or recklessly disturb bats (whether in a roost or not); and
- damage, destroy or obstruct access to bat roosts

A roost is defined as 'any structure or place which [a bat] uses for shelter or protection'. As bats tend to reuse the same roosts, legal opinion is that a roost is protected whether or not bats are present at the time of survey.

A licence will therefore be required by those who carry out any operation that would otherwise result in offences being committed.

The following bat species are listed as being of principal importance for the conservation of biodiversity in England, (commonly referred to as UKBAP Priority species): Barbastelle, Bechstein's, Noctule, Soprano Pipistrelle, Brown Long-eared, Greater Horseshoe, and Lesser Horseshoe.

Badger

Badgers are protected under the Protection of Badgers Act 1992. This act is based on the need to protect badgers from baiting and deliberate harm or injury. The act makes it an offence to:

- Wilfully kill, injure, take, possess or cruelly ill-treat a badger, or attempt to do so;
- Intentionally or recklessly interfere with a sett. Sett interference includes disturbing badgers whilst they are occupying a sett, as well as damaging or destroying a sett or obstructing access routes.

A sett is defined as "any structure or place that displays signs indicating current use by a badger".

Hazel Dormouse

Hazel Dormouse *Muscardinus avellanarius* is fully protected under Schedule 2 of the Conservation of Habitats and Species Regulations 2017. The Regulations prohibit:

- Intentionally, recklessly or deliberately kill, injure or take a Dormouse;
- The deliberate disturbance of this species in such a way as to be significantly likely to affect:

– Their ability of to survive, hibernate, migrate, breed, or rear or nurture their young; or;

– The local distribution or abundance of Dormice.

- Damage or destruction of a breeding site or resting place (nest);
- The possession or transport of Dormice or any other part of.

Dormice are also protected under the Wildlife and Countryside Act 1981 (as amended) through their inclusion in Schedule 5. Under the Act, they are protected from:

- Intentional or reckless disturbance (at any level);
- Obstruction of access to any place of shelter, breeding or rest;
- Selling, bartering or exchange of these species, or parts of.

Offences can be deliberate, intentional or reckless and penalties for any of the above include fines of up to £5k and imprisonment of up to 6 months, per animal affected.

Dormice are also listed on Section 41 of the NERC Act 2006 as a Species of Principal Importance; national objectives & targets include the maintenance of the geographical range and viability of existing Dormice populations to ensure that it remains in favourable conservation status.

Appendix B

Site Photographs

Plate 1 Amenity grassland east of MUGA

Plate 2 Amenity grassland north of MUGA

Plate 3 – Semi-natural broadleaved woodland

Plate 4 Mature oak (T186) with one-sided canopy overhanging the footpath

Plate 5 Low bramble ground cover in south-eastern corner of woodland block

Plate 6 – Eastern boundary of SINC woodland and footpath

WILMOT DIXON CONSTRUCTION LTD

MAELFA WELLBEING HUB – TEMPORARY CAR PARK

ECOLOGICAL APPRAISAL REPORT

JUNE 2019

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WILMOT DIXON CONSTRUCITON LTD

MAELFA WELLBEING HUB – TEMPORARY CAR PARK

ECOLOGICAL APPRAISAL REPORT

JUNE 2019

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APPENDICES

DRAWINGS	TITLE	SCALE
CA11625-001	Site Location Plan & 2Km Search Area	1:25,000@A3
CA11625-002	Habitat Plan	1:1,250@A3

WILMOT DIXON CONSTRUCTION LTD
MAELFA WELLBEING HUB – TEMPORARY CAR PARK
ECOLOGICAL APPRAISAL REPORT

EXECUTIVE SUMMARY

This report provides the results of an Ecological Appraisal for a temporary car park (TCP) at a site located within part of St Teilo's school grounds, Llanederyn. The Rhymney River Section SSSI, Penylan Quarry SSSI, Rumney Quarry SSSI, Llanishen and Lisvane Reservoir Embankments SSSI and Howardian LNR are located within 2km of the site. Additionally, there are 22 non-statutory sites of nature conservation value located within 2km of the site. Part of the Llanederyn Woodland Complex SINC is located to the southern of the site.

The desk study has identified records for bats, European hedgehog (*Erinaceus europaeus*), hazel dormouse (*Muscardinus avellanarius),* Eurasian otter (*Lutra lutra*), water vole (*Arvicola terrestris*), reptiles, amphibians, birds and invertebrates within 2km of the site.

The TCP site comprises primarily of improved grassland, bare ground and neutral semi-improved grassland bounded by fences.

Receptors, which the appraisal has identified may be subject to adverse effects in the absence of mitigation, are as follows:

- Non-statutory designation (Llandederyn Woodlands Complex SINC);
- Common reptiles; and
- Breeding Birds.

Further assessment of potential effects on Llandederyn Woodlands Complex SINC may be required dependent upon the development proposals.

Provisional mitigation for birds and other species which may use the site has been proposed. This includes checks for occupied nests prior to vegetation clearance and measures to be undertaken during construction to avoid harm and disturbance to wildlife.

1 INTRODUCTION

1.1 Terms of Reference

1.1.1 Wardell Armstrong LLP (WA) was commissioned by Wilmot Dixon to undertake an Ecological Appraisal for a Temporary Car Park (TCP) (hereafter referred to as the 'site') directly east of Llanedeyrn Health Centre, CF23 9PN. The site is currently part of St Teilo's school grounds, CF23 9PD, centred on approximate National grid reference ST 20265 79956. The location of the site is shown on Drawing Number CA11625-001 Site Location Plan & 2Km Search Area.

1.1.2 This report has been produced with reference to current guidelines for preliminary ecological appraisal (Chartered Institute of Ecology and Environmental Management (CIEEM, 2017)) and British Standard BS 42020:2013 (BSI, 2013) which involves the evaluation of potential ecological constraints based on Extended Phase 1 (Joint Nature Conservation Committee (JNCC, 2010)) survey data and background desk study.

1.2 Scope of Report

1.2.1 The purpose of the appraisal is to satisfy the requirements of the Planning Policy Wales (PPW) by identifying the likely presence of ecological receptors within or near the site that could be subject to adverse effects arising from the proposed development.

1.2.2 The following ecological features have been considered:

- Statutory and non-statutory nature conservation areas;
- Section 7 priority habitats and species;
- Areas of Ancient Woodland;
- Legally protected species; and
- Invasive species.

1.2.3 This report also seeks to identify any requirement for further specialist survey where the initial assessment cannot be relied upon to adequately determine presence or reliably infer absence of protected species/taxa. An indicative assessment of potential adverse effects is provided, although this is not a substitute for full Ecological Impact Assessment (CIEEM, 2018).

1.2.4 Provisional mitigation measures and enhancement opportunities are also discussed, where appropriate.

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ECOLOGICAL APPRAISAL REPORT

1.3 Description of Development

1.3.1 It is proposed that the site is developed for use as a temporary car park.

1.4 Site Context

1.4.1 The site comprises improved grassland, bare ground and neutral semi-improved grassland, covering approximately 0.15 hectares. Adjacent to the northern boundary of the site is one building (a small sports hall), and an existing small car park. The site is bounded by fencing to the north and south, semi-natural woodland to the south, and neutral semi-improved grassland to the east.

1.4.2 Residential housing 'Round Wood' and a minor road, is situated directly north of the site. There are commercial residences, including Llanedeyrn Health Centre, located along the western boundary of the site.

2 METHODOLOGY

2.1 Desk Study

2.1.1 The desk study was informed by a review of existing available information provided by South East Wales Biological Records Centre (SEWBReC) in September 2018 for a 2km search radius from the site's boundary. Satellite mapping was also used to gain contextual habitat information.

2.1.2 Specific information was sought for:

- Statutory designated sites;
- Locally designated (non-statutory) sites;
- Ancient woodland; and
- Section 7 Priority Habitats and Species.

2.1.3 The Multi Agency Geographic Information for the Countryside (MAGIC[1]) website was utilised to gather data.

2.1.4 Priority species and habitats agreed under the UK BAP are those which were identified as being the most threatened and requiring conservation action. The UK BAP was superseded by '*The UK Post-2010 Biodiversity Framework* 'which was published in July 2012 with work focusing at the country level but the list of priority habitats and species remain the basis for the biodiversity work in the countries. Therefore, habitats and species listed under Section 7 of the Environment (Wales) Act (2016) (hereafter referred to as Section 7) were reviewed as they consider habitats and species of key significance to sustain and improve biodiversity in relation to Wales. This act replaces the duty in Section 42 of the Natural Environment and Rural Communities (NERC) Act 2006**.**

2.2 Extended Phase 1 Habitat Survey

2.2.1 Wardell Armstrong LLP carried out an Extended Phase 1 Habitat Survey of the site on 6th August 2018.

2.2.2 The survey broadly followed the techniques outlined in the '*Handbook for Phase 1 Habitat Survey*' (Joint Nature Conservation Committee, 2010) and the '*Guidelines for Baseline Ecological Assessment*' (institute of Environmental Assessment, 1995).

[1] http://www.magic.gov.uk [Accessed in March 2018]

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2.2.3 Each of the main habitats was classified according to the relevant criteria including vegetation composition expressed according to the DAFOR[2] system (refer to Appendix 1). In addition to mapping and description of habitats, incidental observations of protected and/or notable species and the potential for such species to occur on site (and in the surrounding landscape where relevant) were also recorded for mapping and data collection.

2.2.4 Target notes, provided in Appendix 1, are used to describe the habitat and species composition and highlight features of ecological interest. Specific habitat features are mapped on Drawing Number CA11625-002 Habitat Plan.

2.3 Preliminary Roost Assessment (PRA)

2.3.1 In conjunction with the Phase 1 Habitat Survey an external Preliminary Roost Assessment (PRA) of the sports building to the north of the TCP site was undertaken by an ecologist from Wardell Armstrong LLP. The location of the building is shown on Drawing Number CA11625-002 Habitat Plan.

2.3.2 The PRA of the building was undertaken to identify potential locations suitable for roosting bats including a search for external features such as cracks, crevices and gaps that could provide access opportunities for bats. Equipment used included torch and binoculars.

2.3.3 The building and any trees located on site have been categorised using the assessment criteria in Table 4.1 of the 3rd ed of the BCT Guidelines (Collins 2016)[3].

- Known or confirmed roost;
- High: Structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitats;
- Moderate: Structure or tree with one or more potential roost sites that could be used by numbers of bats due to their size, shelter, protection, conditions and surrounding habitats, but unlikely to support a roost of high conservation concern;

[2] D – Dominant, A – Abundant, F – Frequent, O- Occasional, R-Rare.

[3] Collins, J. (ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London.

- Low: Structure or tree with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation);
- Negligible: Structure or tree with no potential to support bats.

2.3.4 The surrounding habitat both within and adjacent to the site was also surveyed to assess its potential to be used by foraging and commuting bats. This information was combined with a review of aerial photography and OS data to provide contextual information about the local habitat and its likely use by bats.

2.4 Nomenclature

2.4.1 Vascular plant names follow '*New Flora of the British Isles'* (Stace, 2010) with vernacular names as provided in the Botanical Society of the British Isles website (BSBI, 2013)[4]. The common and scientific name of species/taxa is provided when first mentioned in the text, with only the vernacular name referred to thereafter.

2.5 Assessment Limitations

2.5.1 Ecological surveys are limited by factors that affect the presence of plants and animals such as time of year, weather, migration patterns and behaviour. The survey was undertaken in August and therefore represents a valid sample of ecological evidence present on that date/season. The report is not designed, nor is it required to present a complete inventory of flora/fauna.

2.5.2 The absence of desk study records cannot be relied upon to determine absence of a particular species/habitat. Often, the absence of records is a result of under-recording within the given search area.

2.6 Quality Assurance & Environmental Management

2.6.1 The surveys and assessments have been overseen by and the report checked and verified by a member of CIEEM, whom is bound by its code of professional conduct. All surveys and assessments have been undertaken with reference to the recommendations given in British Standard BS 42020, and as stated within specialist guidance, as appropriate and referenced separately.

[4] http://rbg-web2.rbge.org.uk/BSBI/intro.php

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3 RESULTS AND EVALUATION

3.1 Statutory and Non-Statutory Designated Sites

3.1.1 The desk study results for designated sites within 2km of the site are evaluated in Table 1 below.

3.1.2 Sites which are considered potentially sensitive to the proposed works by virtue of the sensitivity of supported species or habitat assemblages, the distance/ecological connectivity to the site and the nature of the perceived impacts are highlighted in bold text and are discussed in the final sections of the report. Designated sites are mapped on a drawing provided by SEWBReC attached as Appendix 2 – Sites Designated for Conservation Within 2km.

3.1.3 Sites for which potential adverse effects are not anticipated are excluded from further assessment.

Table 1: Designated Sites Evaluation

Site Name and Status[5]	Reason for Designation	Approximate Distance and Location from the Site	Potential Adverse Effects
Rhymney River Section SSSI	The site is composed of a short tidal stretch of the Rhymney River Estuary in Cardiff, it includes 300m of river and a steep bank. The SSSI is designated for its geological and palaeontological significance.	Approximately 1.1km to the south east of the site. Approximate central grid reference ST 2179 0202.	No – The proposed development is considered unlikely to have a significant impact either directly or indirectly, on the qualifying features of this designation.
Penylan Quarry SSSI	The site is composed of a quarry. The SSSI is designated for its palaeontological significance.	Approximately 1.2km to the south west of the site. Approximate central grid reference ST 1978 8171.	No – The proposed development is considered unlikely to have a significant impact either directly or indirectly, on the qualifying features of this designation.

[5] **SPA** – Specially Protected Area, **SAC** – Special Area for Conservation, **Ramsar** – site designated under the Ramsar Convention, **SSSI** – Site of Special Scientific Interest, **SINC** – Site of Importance for Nature Conservation, **NNR** – National Nature Reserve, **LNR** – Local Nature Reserve, **KWS** – Key Wildlife Site

Table 1: Designated Sites Evaluation			
Site Name and Status[5]	**Reason for Designation**	**Approximate Distance and Location from the Site**	**Potential Adverse Effects**
Rumney Quarry SSSI	The site is composed of a small disused quarry situated in a residential area of east Cardiff. The SSSI is designated for its geological and palaeontological significance.	Approximately 1.5km to the south east of the site. Approximate central grid reference ST21477881.	No – The proposed development is considered unlikely to have a significant impact either directly or indirectly, on the qualifying features of this designation.
Llanishen and Lisvane Reservoir Embankments SSSI	The site is composed of a mosaic of neutral and calcareous semi-improved grassy embankments, with areas of rank grassland. The SSSI is designated for its diverse assemblage of grassland fungi, including over 25 species of waxcap *Hygrocybe spp*. Furthermore, the boundary of Lisvane Reservoir SSSI (outside the 2km boundary) is contiguous with the inner boundary of the Llanishen and Lisvane Reservoir Enbankments and is notified for its overwintering bird interest.	Approximately 2km to the south east of the site. Approximate central grid reference ST18788185	No – The proposed development is considered unlikely to have a significant impact either directly or indirectly, on the qualifying features of this designation.
Howardian LNR	The site is a relic estuarine habitat. It is composed of a mosaic of woodland, wildflower meadow, ponds and reed beds. The LNR is designated for its wildlife interest and public enjoyment.	Approximately 0.7km to the south east of the site. Approximate central grid reference ST20627908.	No – The proposed development is considered unlikely to have a significant impact either directly or indirectly, on the qualifying features of this designation.
Llandederyn Woodlands Complex SINC	**The site is composed of a collection of approximately 12 woodland areas distributed around Llanederyn. The SINC is designated for its woodland features.**	**The nearest woodland area is to the south of the site. Approximate central grid reference ST20277989.**	**Yes – given the proximity of the site to the SINC, the proposed development may cause adverse effects.**

3.1.4 The below details non-statutory Sites of Importance for Nature Conservation (SINCs) within 2km of the site;

- Cathays Cemetery;
- Coed-y-Cwar;
- Discovery Wood;
- Fishpond Wood;
- Lamby North;
- Llanishen Brook (south);
- Llanishen Reservoir;
- Llanishen Reservoir Grassland and Scrub;
- Lower Rookery Wood;
- Nant Fawr Community Woodlands;
- Nant Fawr Meadows;
- Nant Glandulais;
- Rhyd-y-Pennau Complex;
- Rhymney Grassland East;
- Rhymney River Valley Complex;
- River Rhymney;
- Roath Brook;
- Roath Park Lake;
- Roath Park Wild Gardens;
- Scott Wood; and
- Swan Mear Wood.

3.1.5 None of these designated sites are located adjacent or in close proximity to the site. Therefore, the proposed development is considered unlikely to have a significant impact either directly or indirectly, on the qualifying features of these designations.

3.2 Habitats

3.2.1 All habitats on and around the TCP site are described in Table 2, together with an indication of their potential to support Section 7 Priority Habitats and Species. The table also provides an evaluation of the sensitivity of the habitats relative to the proposed works.

3.2.2 Habitats which have the potential to be subject to adverse effects are indicated with bold text and are discussed in the latter sections of the report. Habitats for which potential adverse effects are not anticipated are excluded from further assessment.

3.2.3 The location and extent of habitats is shown on Drawing Number CA11625-002 Habitat Plan.

Table 2: Habitat Description and Evaluation			
Phase 1 Habitats		**UK BAP/ Section 7**	**Potential Adverse Effects?**
<u>Semi-improved Neutral Grassland</u> Part of the site comprises of semi-improved neutral grassland. Dominant species include; Yorkshire fog (*Holcus lanatus*), and perennial rye-grass (*Lolium perenne*). Other species include: birds-foot-trefoil (*Lotus corniculatus*), bristly ox-tongue (*Picris echioides*), broad-leaved dock (*Rumex obtusifolius*), bulbous buttercup (*Ranunculus bulbosus*), cabbage sp. (*Brassicaceae*), common alder (*Alnus glutinosa*), creeping bent (*Agrostis stolonifera*), daisy (*Bellis perrennis*), dandelion (*Taraxacum officinale*), red clover (*Trifolium pratense*), rose campion (*Lychnis coronaria*), scentless mayweed (*Tripleurospermum inodorum*), sedge sp. (*Cyperaceae*), and spear thistle (*Cirsium vulgare*).		x	No potential adverse effects.

Table 2: Habitat Description and Evaluation			
Phase 1 Habitats		**UK BAP/ Section 7**	**Potential Adverse Effects?**
<u>Broadleaved scattered trees</u> There are scattered trees, both semi-mature and mature, around the site. Eight mature trees are located along the fence-line to the north of the site. There is also an isolated mature trees to the west of the site, along the earth bank, and one in the existing car park to the north. There are also six semi-mature trees intertwined with a small fence to the north-west of the site, adjacent to the existing car park. Some were identified as having features that bats could utilise as roosts (Please refer to Appendix 2 Target Notes – Target Notes 3a – 3d).	 	x	No, the trees are located off site.

Table 2: Habitat Description and Evaluation			
Phase 1 Habitats		**UK BAP/ Section 7**	**Potential Adverse Effects?**
<u>Scattered scrub</u> A small patch of scattered scrub is present within the south east corner of the neutral semi-improved grassland. The scrub is dominated by cabbage sp. and common alder.		x	No potential adverse effects.
<u>Building</u> There is one building located adjacent to the norhern boundary of the site (Please refer to Appendix 1 Target Notes – Target Note 2 and Appendix 4 Preliminary Roost Assessment Results).		x	No – the Building is located off site

Table 2: Habitat Description and Evaluation			
Phase 1 Habitats		**UK BAP/ Section 7**	**Potential Adverse Effects?**
<u>Earth bank</u> A man-made earth bank is situated adjacent to fencing. It is located to the west of the site and along the northern boundary of the existing car park, and the southern boundary of the large area of bare ground. The earth banks are mainly bare with a scattering of vegetation, including: birds-foot-trefoil, broad-leaved dock, and Yorkshire fog.		x	No potential adverse effects.

Table 2: Habitat Description and Evaluation			
Phase 1 Habitats		**UK BAP/ Section 7**	**Potential Adverse Effects?**
<u>Hardstanding</u> Hardstanding is located to the east and north of the site. To the north is an existing car park, within the neutral semi-improved grassland to the east is a path leading towards the sports building, and surrounding the building itself.		x	No potential adverse effects.
<u>Fence</u> Fencing bounds many areas across the site, particularly surrounding the boundaries, the building, and the car park.		x	No potential adverse effects.

3.3 Species

3.3.1 Protected and Section 7 priority species are evaluated in order to identify potential ecological constraints in Table 3 below, based on the desk study records, presence, extent and viability of supporting habitat, ecological connectivity and perceived nature and extent of effects.

3.3.2 Species/taxa for which potential adverse effects are not anticipated are excluded from further assessment.

Table 3: Protected Species Evaluation				
Species/taxa	**Desk Study record?**	**Status[6]**	**Supporting Habitat**	**Potential Adverse Effect?**
Bats *Chiroptera*	**Yes – 279 records of bats within 2km of the site including: noctule (*Nyctalus noctula),* common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), Nathusisus' pipistrelle (*Pipistrellus nathusii*) brown long-eared (*Plecotus auritus*), greater horseshoe (*Rhinolophus ferrumequinum*), Natterer's (*Myotis nattereri*) Daubenton's (*Myotis daubentoniid*), serotine (*Eptesicus serotinus*), and Nyctalus sp. (*Nyctalus*).**	**EPS, WCA, Bern, Section 7**	**Yes. Mature trees have the potential to support roosting bats. The semi-natural broadleaved woodland to the south of the site can be used for roosting, foraging and commuting. The building to the north of the site is considered to have moderate bat roosting potential (please refer to the Preliminary Roost Assessment Results in Appendix 4).**	**Yes – If mature trees, buildings or woodland potentially used for foraging/commuting are impacted upon by the proposed development.**
Badger *Meles meles*	No	BA	No evidence of badger activity observed. However, the semi-natural broadleaved woodland to the site to the south could provide habitat for badgers.	Unlikely to be affected unless found to be present in the future.
Brown hare *Lepus europaeus*	No	Section 7	No – The habitats within the site are considered unlikely to support brown hare.	No – The habitats on site are unlikely to support this species.
European hedgehog *Erinaceus europaeus*	Yes – 6 records of hedgehog within 2km of the site. Nearest record is approximately 1.08km from the site in 2014. The most recent record was in 2017.	Bern, Section 7	No – The habitats within the site are considered unlikely to support hedgehogs. However, the semi-natural woodland to the south of the site could provide habitat for hedgehogs.	Unlikely to be affected unless found to be present in the future.

[6] **EPS** – European Protected Species, **WCA** – Fully protected under Section 9 of the Wildlife and Countryside Act, **WCA5** –Protected under Section 9, Part 5 of the Wildlife and Countryside Act only, **BA** – Protection of Badgers Act, **BAP** – Biodiversity Action Plan Priority Species, **LBAP** – Local BAP , **Section 7** – Environment (Wales) Act, 2016, **Bern** – The Bern Convention on the Conservation of European Wildlife and Natural Habitats, **UKBR (RSPB)** - RSPB UK Red listed birds, **UKBAm (RSPB)** - RSPB UK Amber listed birds

Table 3: Protected Species Evaluation				
Species/taxa	**Desk Study record?**	**Status[6]**	**Supporting Habitat**	**Potential Adverse Effect?**
Hazel Dormouse *Muscardinus avellanarius*	Yes – 408 records of hazel dormice within 2km of the site. Nearest 6 records are approximately 0.74km from the site in 2011. The most recent record was in 2017.	EPS, WCA5, Section 7	No – The habitats on site are considered unlikely to support hazel dormice. However, the semi-natural broadleaved woodland to the south of the site could provide habitat and food sources for this species.	No – The habitats on site are unlikely to support this species.
Eurasian otter *Lutra lutra*	Yes – 3 records of otter within 2km of the site. Nearest record is approximately 1.42km from the site in 2011. the most recent record was in 2014.	EPS, WCA5, Section 7	No – The habitats within the site are considered unlikely to support otter.	No – The habitats on site are unlikely to support this species.
Water vole *Arvicola amphibia*	No	WCA5, Section 7	No – The habitats within the site are considered unlikely to support water vole.	No – The habitats on site are unlikely to support this species.
White-clawed crayfish *Austropotamobius pallipes*	No	EPS, WCA, Section 7	No – The habitats within the site are considered unlikely to support white-clawed crayfish.	No – The habitats on site are unlikely to support this species.
Common reptiles	**Yes – 3 species of reptile shown to be using the habitats within the desk study radius, namely** **- common lizard (1 record, nearest record 1.56km from the site in 2014 and is the most recent record)** **- slow worm (6 records, nearest record 0.77km from the site in 2014. The most recent record was also in 2014).**	**WCA, Bern, Section 7**	**Yes – Grassland with a variable structure, with a mixture of vegetation heights (e.g. tussocky grass, shorter patches, and basking areas) is suitable for common reptiles.** **Woodland margin could also provide possible suitable habitat for common lizard, slow worm and grass snake.**	**Yes – vegetation clearance and direct habitat loss have the potential to harm/disturb reptiles, if present.**

Table 3: Protected Species Evaluation				
Species/taxa	**Desk Study record?**	**Status[6]**	**Supporting Habitat**	**Potential Adverse Effect?**
	- **grass snake (1 record, nearest record 1.89km from the site in 2017 and is the most recent record).**			
Great crested newt (GCN) *Triturus cristatus*	No records within 2km of the site and no waterbodies present within 500m of the site.	EPS, WCA, Section 7	No – The habitats within the site are considered unlikely to support GCN.	No – The habitats on site are unlikely to support this species.
Other amphibians	Yes – 3 other species of amphibian shown to be using the habitats within the desk study radius, namely - palmate newt (11 records, nearest records approximately 0.78km from the site in 2009. The most recent was in 2016). - common frog (8 records, nearest record approximately 0.78km from the centre of the site in 2011. The most recent record was in 2014). - common toad (5 records, nearest record approximately 0.78km from the centre of the site in 2014 and is the most recent record).	WCA, Bern, common toad is a Section 7 species	No – The habitats within the site are considered unlikely to support amphibians.	No – The habitats on site are unlikely to support this species.
Birds	**Yes - Numerous bird records within 2km search area including but not limited to:** - **cuckoo (*Cuculus canorus*)** - **fieldfare (*Turdus pilaris*)**	**WCA1, Bern Section 7**	**Yes – Foraging and limited breeding habitat provided in grassland and broad-leaved scattered trees within the site, and also the broadleaved woodland located to the south of**	**Yes – Potential breeding and foraging habitat may be lost/disturbed by proposed development.**

Table 3: Protected Species Evaluation				
Species/taxa	**Desk Study record?**	**Status[6]**	**Supporting Habitat**	**Potential Adverse Effect?**
	- **house sparrow (*Passer domesticus)*** - **lesser spotted woodpecker (*Dendrocopos minor*)** - **linnet (*Carduelis cannabina*)** - **pied flycatcher (*Ficedula hypoleuca*)** - **redwing (*Turdus iliacus*)** - **song thrush (*Turdus philomelos*)** - **spotted flycatcher (*Muscicapa striata*)** - **starling (*Sturnus vulgaris*)** **Incidental sightings included:** • **Pied wagtail (*Motacilla alba*)**		**the site. The building could also support nesting birds such as house sparrow or house martin *Delichon urbica*. Two old nests were observed on the building.**	
Barn Owl (*Tyto alba*)	No records within 2km of the site. However, 23 records within 5km. Nearest record is approximately 2.60km from the site in 2015. the most recent record was in 2016.	WCA1, Bern Section 7	No – The habitats within the site are considered unlikely to support barn owl.	No – The habitats on site are unlikely to support this species.
Invertebrates	Yes - Various records within search area for species of local conservation concern status including: - Banded demoiselle (*Calopteryx splendens*); - Beautiful demoiselle (*Calopteryx virgo*); and - Black-tailed skimmer (*Orthetrum cancellatum*). Incidental sightings include: - Speckled wood (*Pararge aegeria*)	LBAP	No – The habitats within the site are considered unlikely to support protected/notable invertebrates.	No – The habitats on site are unlikely to support protected/notable invertebrate species.

Table 3: Protected Species Evaluation				
Species/taxa	**Desk Study record?**	**Status[6]**	**Supporting Habitat**	**Potential Adverse Effect?**
	- Small white (*Pieris rapae*)			
Protected plant species	Yes - A number of notable plant species, including but not limited to; - bluebell (*Hyacinthoides non-scripta*); - pyramidal orchid (*Anacamptis pyramidalis*); - rigid hornwort (*Ceratophyllum demersum*); - fen bedstraw (*Galium uliginosum*); - slimy waxcap (*Gliophorus irrigates*); and - orange waxcap (*Hygrocybe aurantiosplendens*).	WCA, LBAP	No – The habitats within the site are considered unlikely to support protected plant species	No – The habitats on site are unlikely to support protected plant species.
Invasive plant Species	Yes - A number of invasive plant species; - Giant knotweed (*Fallopia sachalinensis*) - Indian Balsam (*Impatiens glandulifera*), - Japanese Knotweed (*Fallopia japonica*) - Japanese rose (*Rosa rugosa*) - Knotweed (*Fallopia japonica x sachalinensis = F. x bohemica*) - Montbretia (*Crocosmia aurea*), - Rhododendron (*Rhododendron ponticum*) - Three-cornered garlic (*Allium triquetrum*) - Yellow Archangel (*Lamiastrum galeobdolon*),	Section 9 WCA	No invasive species were observed at the time of survey.	No invasive plant species present at the time of survey.

4 DISCUSSION AND RECOMMENDATIONS

4.1 Sensitive Receptors

4.1.1 The following designated sites, habitats and species (receptors) have been evaluated as being subject to potential adverse effects:

- Non-statutory designations (Llanederyn Woodlands Complex SINC);
- Bats;
- Common reptiles; and
- Breeding Birds.

4.1.2 Potential effects, requirements for further survey, and proposed mitigation/ compensation are discussed below for each of the identified potential constraints.

4.2 Non-designated Sites

Llanederyn Woodlands Complex SINC

4.2.1 The site is designated for its woodland features. The SINC is composed of a collection of approximately 12 woodland areas distributed around Llanederyn.

4.2.2 The woodland edge should be protected from damage and/or disturbance during construction works in accordance with BS 5837:2012 Trees in Relation to Design, Demolition and Construction and in accordance with any Tree Protection Plans approved by the Local Authority.

4.3 Species

Bats

4.3.1 A disused brick building (Target Note 2) located adjacent to the northern boundary of the site was assessed as having moderate bat roost potential. Bats may also potentially forage along the woodland edge along the southern boundary of the site.

4.3.2 It is recommended that the lighting scheme for the development is designed so that there will be no light spill on to the woodland edge or existing building during construction and operation of the development to maintain dark corridors. A lighting scheme will be developed with reference to current guidance contained in Bats and Artificial Lighting in the UK Guidance Note 08/18 (BCT & ILP,2018).

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Common Reptiles

4.3.3 The mosaic of habitats in the area which include neutral semi-improved grassland with the site provide possible foraging and refugia habitat. Vegetation clearance and direct habitat loss could have adverse effects on common reptiles if present.

4.3.4 The construction works therefore have the potential to harm/disturb common reptiles if present at the time of the works. The risk of harming reptiles can be reduced through the implementation of Reasonable Avoidance Measures under a Precautionary Working Method Statement (PWMS). The method statement can be covered under an appropriate planning condition.

Birds

4.3.5 Limited breeding and foraging habitat for birds is located within the site including grassland habitat (foraging only) and broad-leaved scattered trees in addition to the broadleaved woodland located to the south of the site. The building may also support breeding birds such as house sparrow and house martin.

4.3.6 Potential breeding and foraging habitat may be lost or disturbed by the proposed development.

4.3.7 Any vegetation clearance should be undertaken outside of the bird breeding season (March to August, inclusive). If this is not possible, then areas of vegetation clearance and the building should be checked by a suitably qualified ecologist 48 hours in advance of any affecting works for the presence of occupied nests. Any subsequent advice provided by the ecologist, as to how to accord with legislation, should be followed.

4.4 General recommendations

4.4.1 Wooden planks should be placed in all excavations which are to remain open overnight. This will provide a means of escape for any badger or other mammal which may enter the excavation. Any temporarily exposed open casing system will be capped in such a way as to prevent badgers or other mammals from gaining access.

4.4.2 Night-time work should be avoided whenever possible so potential for disturbance to badgers or other mammals present will therefore be very limited.

5 REFERENCES

5.1.1 British Standards Institution (2013) BS42020:2013: Biodiversity – Code for practice for planning and development.

5.1.2 British Standards Institute (2015) *Biodiversity – Code of Practice for Planning and Development.*

5.1.3 CIEEM (2016) Guidelines *for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, 2nd edition.* Chartered Institute of Ecology and Environmental Management, Winchester.

5.1.4 Chartered Institute of Ecological and Environmental Management. (2012). *Guidelines for Preliminary Ecological Appraisal*.

5.1.5 Collins, J. (ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London.

5.1.6 Institute of Environmental Assessment, (1995) *Guidelines for Baseline Ecological Assessment.* E. & F. Spon, London.

5.1.7 Joint Nature Conservation Committee (2010), *Handbook for Phase 1 habitat survey: A technique for environmental audit*, English Field Unit, Nature Conservancy Council.

5.1.8 Multi-Agency Geographic Information for the Countryside: www.magic.gov.uk

5.1.9 Stace. C. A., '*New Flora of the British Isles'* (1997), Cambridge University Press.

5.1.10 Bat Conservation Trust & Institute of Lighting Professionals (2018) Bats and artificial lighting in the UK. Bats and the Built Environment Series. Guidance Note 08/18.

Appendix 1

Target Notes

Appendix 1 – Target Notes

The target notes are shown on the Phase 1 Habitat Plan (CA114625-002). The abundance of species is given using the DAFOR scale outlined in the table below:

Abundance	Approximate Percentage Cover
Dominant	>50%
Abundant	30-50%
Frequent	Many individuals
Occasional	Few individuals
Rare	Isolated individuals
Local	Distinct populations

1. Semi-natural broad-leaved woodland is located adjacent to the south of the site and is part of the Llanederyn woodland complex SINC. It is separated from the site by a corrugated metal fence.

Species	Abundance	Species	Abundance
Trees / Shrubs			
Hawthorn	O	Willow sp.	O
Forbs			
Bramble	O		

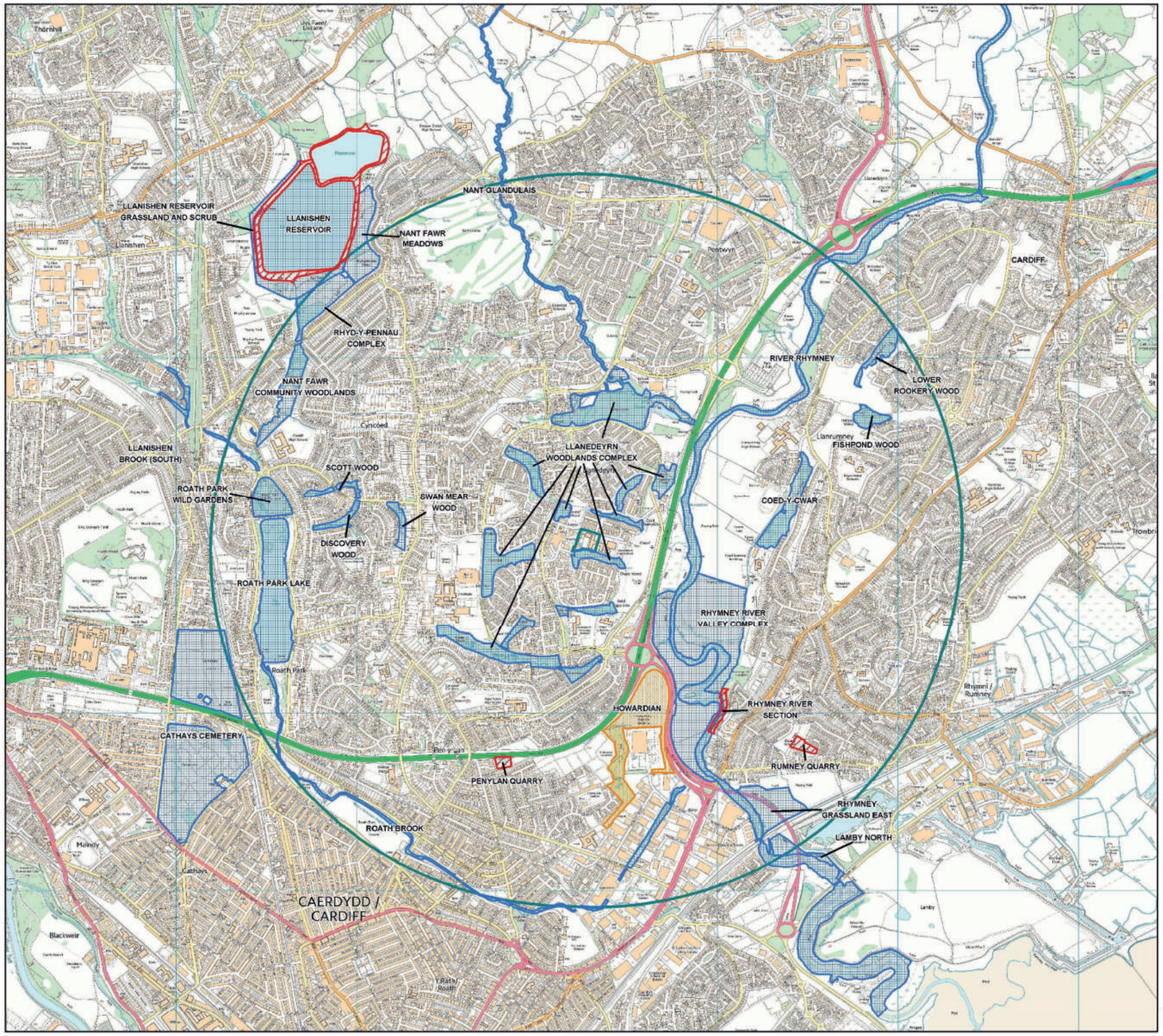
2. A disused, flat-roofed, brick building, previously used as a sports hall. It has facia board with gaps running along the bottom, there are also additional gaps around the building. It is adjacent to the northern boundary of the site, next to a car park.

3. There were several mature trees on and around the site that could possibly have bat roosting potential.

Reference No. and NGR	Species	Description
3a. ST 20230 79985	Maple sp.	~36ft tree partially covered in ivy at the base of the tree. Located on a raised bank along a fence line at an improved grassland field margin. The tree has very shallow cankers and some small broken branches but has no cracks.
3b. ST 20236 80018	Maple sp.	Tree that has been cut on one side due to it growing over the fence line into residential housing. Located on a raised bank along a fence line west of the car park.
3c. ST 20292 80020	Maple sp., Cherry sp., Willow sp.	A collection of a line of 5 trees, two maple sp., two cherry sp. and a willow sp. They are located along the northern boundary of the site next to the fence line. The trees have very shallow cankers and are growing a heavy amount of moss.
3d. ST 20330 80006	Maple, Willow sp.	Three ~36ft trees, one maple and two willow sp. They are located along the northern boundary of the site next to the fence line. They are separated from 3c by a fence. The trees have very shallow cankers, the willows have some cracked branches, and the maple has a visible crack running up the trunk.

Appendix 2

Sites Designated for Conservation within 2km



BIODIVERSITY INFORMATION SEARCH (DESIGNATED SITES):

ST TEILO'S CHURCH IN WALES HIGH SCHOOL
ST2027179970

- Search Area and 2km Search Buffer
- Site of Special Scientific Interest
- Site of Importance for Nature Conservation
- Local Nature Reserve

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CANOLFAN GOFNODION BIOAMRYWIAETH DE DDWYRAIN CYMRU

Appendix 3

Summary of Species (Fauna) Protection and Legislation

Appendix 3 – Summary of Species (Fauna) Protection and Legislation

Summary of Legislation

Protection for animals included on Schedule 5 of the Wildlife and Countryside Act 1981 (As Amended)		
Section 9	Part 1	intentionally kill, injure, take a scheduled animal
	Part 2	possess or control (live or dead animal, part or derivative)
	Part 4 (a)	Intentionally or recklessly damage, destroy or obstruct access to any structure or place used by a scheduled animal for shelter or protection
	Part 4 (b)	Intentionally or recklessly disturb an animal occupying such a structure or place
	Part 5 (a)	Sell, offer for sale, possess or transport for the purpose of sale (live or dead animal, part or derivative)
	Part 5 (b)	advertise for buying or selling such things

Section 7 of the Environment (Wales) Act 2016 replaces the duty in section 42 of the NERC Act 2006. It lists all the living organisms of principal importance for the purpose of maintaining and enhancing biodiversity in relation to Wales. The section 7 list is the same as the previous list under Section 42.

Protection for animals included on Schedule 2 of the Habitat Regulations 2017		
A person commits an offence if he:		
Section 43	Part 1	(a) Deliberately captures, injures or kills any wild animal of a European protected species (b) Deliberately disturbs wild animals of any such species. (c) Deliberately take or destroy the eggs of such an animal (d) Damage or destroy a breeding site or resting place of such an animal
	Part 2	For the purpose of paragraph (1)(b), disturbance of animals includes in particular any disturbance which is likely a) to impair their ability i. to survive, breed or reproduce or to rear or nurture their young; or ii. in the case of animals of a hibernating or migratory species, to hibernate or migrate. b) to affect significantly the local distribution or abundance of the species to which they belong
	Part 3	It is an offence to: a) be in possession of, or to control, b) transport, c) sell or exchange, or d) to offer for sale or exchange.
	Part 4	Paragraph (3) applies to: a) any live or dead animal or part of animal (i) which has been taken from the wild, and (ii) which is a species or subspecies listed in Annex IV(a) of the Habitats Directive; and b) anything derived from such an animal or any part of such an animal.
	Part 5	Paragraph (1) and (3) apply regardless of the stage of the life of the animal in question.

Bats

All UK bat species are European Protected Species and afforded full protection through inclusion of Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of the Conservation of Habitats and Species (Amendment) Regulations 2012.

Barbastelle, Bechstein's, noctule, common pipistrelle, soprano pipistrelle, brown long-eared, greater horseshoe and lesser horseshoe bats are included within Section 7 of The Environment (Wales) Act 2016. Species included in this list are considered by the Secretary of State to be "*of principal importance for the purpose of conserving biodiversity*". Barbastelle, Bechstein's, noctule, soprano pipistrelle, brown long-eared, greater horseshoe and lesser horseshoe bats are listed as a priority species on the UK Biodiversity Action Plan (BAP). All bat species are included on the Cardiff local BAP.

Badgers

Badgers are afforded full protection under the Protection of Badgers Act 1992, which makes it an offence to:

- Wilfully kill, injure or take a badger;
- Possess or control any live or dead badger or any part, or anything derived from, a dead badger;
- cruelly ill-treat a badger, or attempt to do so;
- To interfere with a sett by:
  - damaging or destroying it;
  - obstructing access to, or any entrance of, a badger sett;
  - causing a dog to enter a badger sett;
  - disturbing a badger when it is occupying a sett.;
- Sell a live badger or offer one for sale.

It is also an offence to mark, attach any ring, tag or other marking device to a badger unless authorised under licence.

Hedgehog

Hedgehogs are protected under Schedule 6 of the Wildlife and Countryside Act 1981, which prevents animals being killed or taken in certain ways. they are included within Section 7 of The Environmental (Wales) Act 2016. Species listed on this section are considered to be of '*principal importance for the conservation of biodiversity*' and as such are listed as a priority species on the UK Biodiversity Action Plan (BAP).

Hazel Dormouse

The hazel dormouse is a scarce species, whose distribution has declined by more than half in the past century. Dormice are afforded full protection through inclusion on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of the Conservation of Habitats and Species (Amendment) Regulations 2012.

Dormice are included within the Section 7 of The Environmental (Wales) Act 2016. Species listed on this section are considered to be of principal importance for the conservation of biodiversity and as such are listed as a priority species on the UK Biodiversity Action Plan (BAP) and the Cardiff local BAP.

Otter

Otters are afforded full legal protection through inclusion on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of the Conservation of Habitats and Species (Amendment) Regulations 2012.

Otters are included within Section 7 of The Environmental (Wales) Act 2016. Species listed on this section are considered to be of principal importance for the conservation of biodiversity and as such are listed as a priority species on the UK Biodiversity Action Plan (BAP) and the Cardiff local BAP.

Water Vole

The UK water vole population has undergone a dramatic decline particularly over the last two decades. A decline in numbers has been attributable to direct loss of habitat, habitat fragmentation, water pollution and through predation, in particular by mink.

Water voles are not a European protected species; however, they are now fully protected under Schedule 5 of the Wildlife and Countryside Act 1981.

Water voles are included Section 7 of The Environmental (Wales) Act 2016. Species listed on this section are considered to be of principal importance for the conservation of biodiversity and as such are listed as a priority species in the UK Biodiversity Action Plan and the Cardiff Local BAP.

White-clawed crayfish

White-clawed crayfish are afforded partial protection through inclusion of Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) in respect of section 9 (part 1 & 5), which makes it an offence to:

- Intentionally capture (take) a white-clawed crayfish; and
- sell, offer for sale, possess or transport a white-clawed crayfish (live or dead, part or derivative) for the purpose of sale or advertise for buying or selling.

This legislation covers all life stages of white-clawed crayfish.

White-clawed crayfish are included within the Section 7 of The Environmental (Wales) Act 2016. Species listed on this section are considered to be of principal importance for the conservation of biodiversity and as such are listed as a priority species on the UK Biodiversity Action Plan (BAP).

Reptiles

Six native reptiles occur in Britain: the adder (*Vipera berus*), the grass snake (*Natrix natrix*), the smooth snake (*Coronella austriaca*), the sand lizard (*Lacerta agilis*), the common lizard (*Zootoca vivipara*) and the slow worm (*Anguis fragilis*).

The smooth snake and sand lizard are afforded complete protection through inclusion on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of the Conservation of Habitats and Species (Amendment) Regulations 2012.

These two species are very limited in their UK distribution and are not recorded in the Cardiff area. Other common reptiles (common lizard, grass snake, adder and slow worm) are protected against intentional killing and injuring, sale and possession.

All six reptile species are listed as a priority species on the UK Biodiversity Action Plan. Common reptiles are included in the Cardiff local BAP.

Great Crested Newts

Great crested newts are afforded full protection through inclusion of Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of the Conservation of Habitats and Species (Amendment) Regulations 2012.

This legislation covers all life stages of great crested newts. Under the Wildlife and Countryside Act 1981, other amphibians, including smooth and palmate newts and common frogs cannot be sold or be offered for sale. The habitats of these amphibians are not legally protected.

Great crested newts are included within Section 7 of The Environmental (Wales) Act 2016. Species listed on this section are considered to be of principal importance for the conservation of biodiversity and as such are listed as a priority species on the UK Biodiversity Action Plan (BAP) and the Cardiff local BAP.

Birds

All wild birds, their nests and eggs are protected throughout the breeding season (1 March to 31 August) under the Wildlife and Countryside Act, 1981 (as amended), which makes it an offence intentionally (with certain limited exceptions and in the absence of a licence) to:

- Kill or injure any wild bird;
- Take, damage or destroy the nest of any wild bird whilst it is in use or being built; and
- Take or destroy the egg or any wild bird.

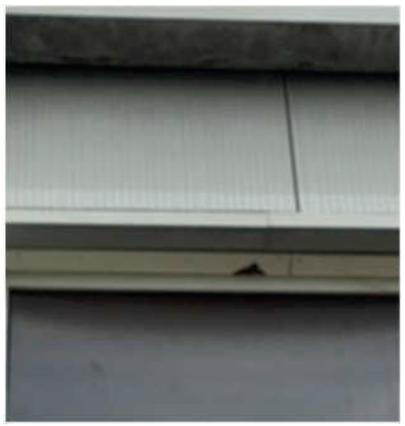
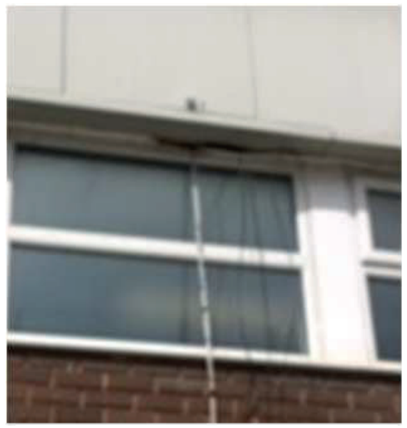
It is also an offence to possess any live or dead wild bird or egg, or anything derived from a wild bird or egg. Restrictions on trade and advertising also apply.

Bird species listed on Schedule 1 of the Wildlife and Countryside Act, 1981 (as amended) are afforded additional protection against intentional or reckless disturbance whilst it is nest building, or at a nest containing eggs or young or disturbance to the young of a Schedule 1 bird.

In addition to this legal protection, the leading governmental and non-governmental conservation organisations in the UK have reviewed the population status of the birds regularly found here and produced a list of birds of conservation concern. Of the 247 species assessed, 67 were placed on the red list of high conservation concern, 96 on the amber list of medium conservation concern and 81 on the green list of low conservation concern. Consideration is therefore given to those species listed as being of conservation concern.

Appendix 4

Preliminary Roost Assessment Results

Appendix 4: Preliminary Roost Assessment Results		
Description	**Photograph**	**Potential**
Single-storey flat-roofed, brick building, previously used as a sports hall. Gaps are present along several upper window ledges, below the facia board, particularly along the southern aspect of the building. There is also a longer, larger gap along the eastern aspect with wires hanging out.	  	Moderate

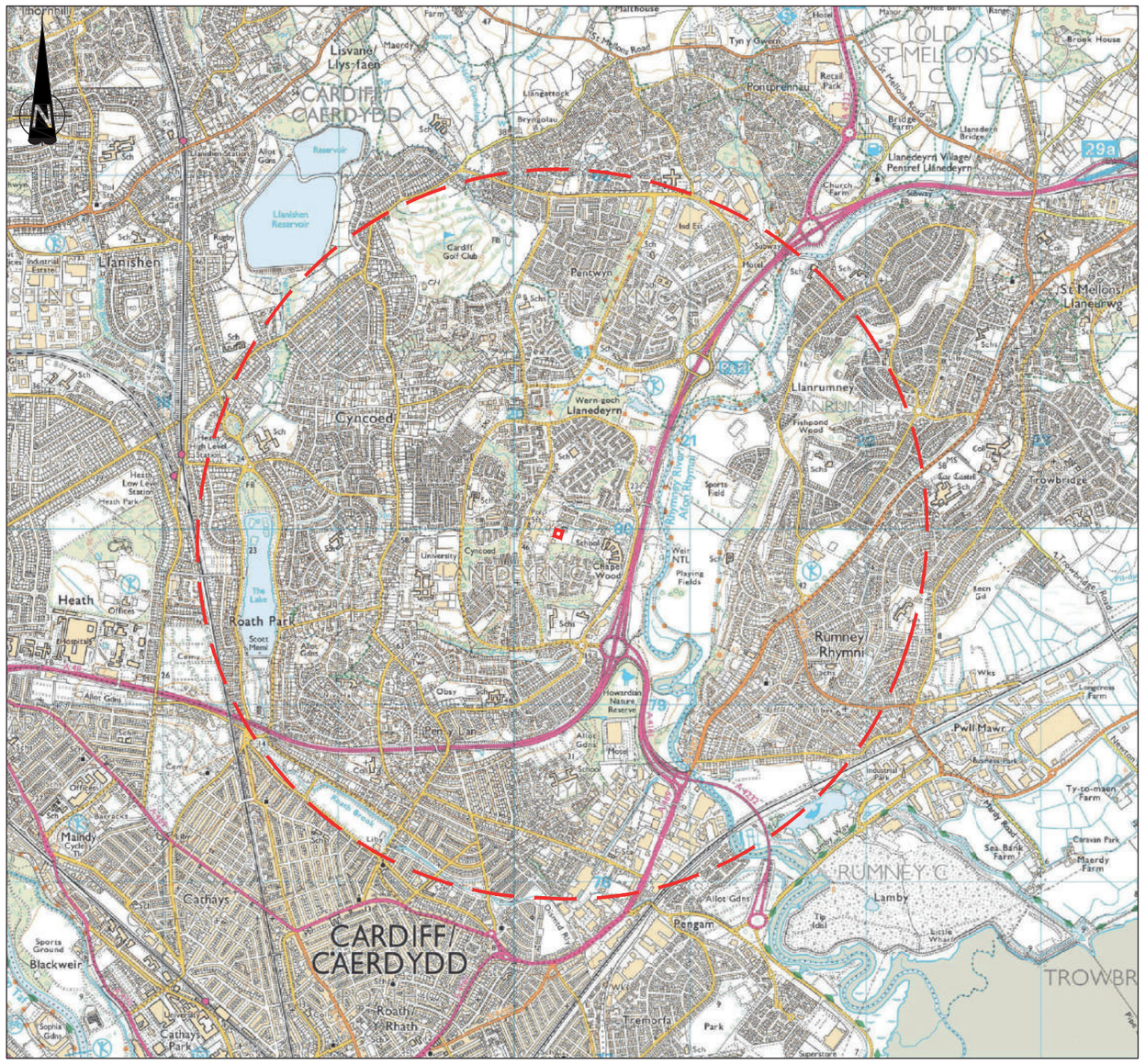
Appendix 4: Preliminary Roost Assessment Results		
Description	**Photograph**	**Potential**
On all sides of the building a small gap is present between the facia board and the roof. On the western aspect there is also a small gap between the facia board and the brick building. There is a window, on the southern aspect of the building, where a white plastic board has come away, this has created a void.		

Appendix 4: Preliminary Roost Assessment Results		
Description	**Photograph**	**Potential**
There are three air vents present on the southern aspect of the building.		
There is a small, rectangular vent that runs along the western aspect of the building above the facia board, its ends, at the north-west and south-west corners are open, creating a small gap.		

Appendix 4: Preliminary Roost Assessment Results		
Description	**Photograph**	**Potential**
		

DRAWINGS

Wellbeing Hub @ Maelfa



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DO NOT SCALE FROM THIS DRAWING

REFERENCE

Site boundary

2Km Search area

REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D

CLIENT

WILLMOTT DIXON CONSTRUCTION Ltd

PROJECT

MAELFA WELLBEING HUB

DRAWING TITLE

SITE LOCATION PLAN
& 2Km SEARCH AREA

DRG No.	REV
CA11625-001	

DRG SIZE	SCALE	DATE
A3	1:25,000	11.06.2019

DRAWN BY	CHECKED BY	APPROVED BY
AW	AB	AB

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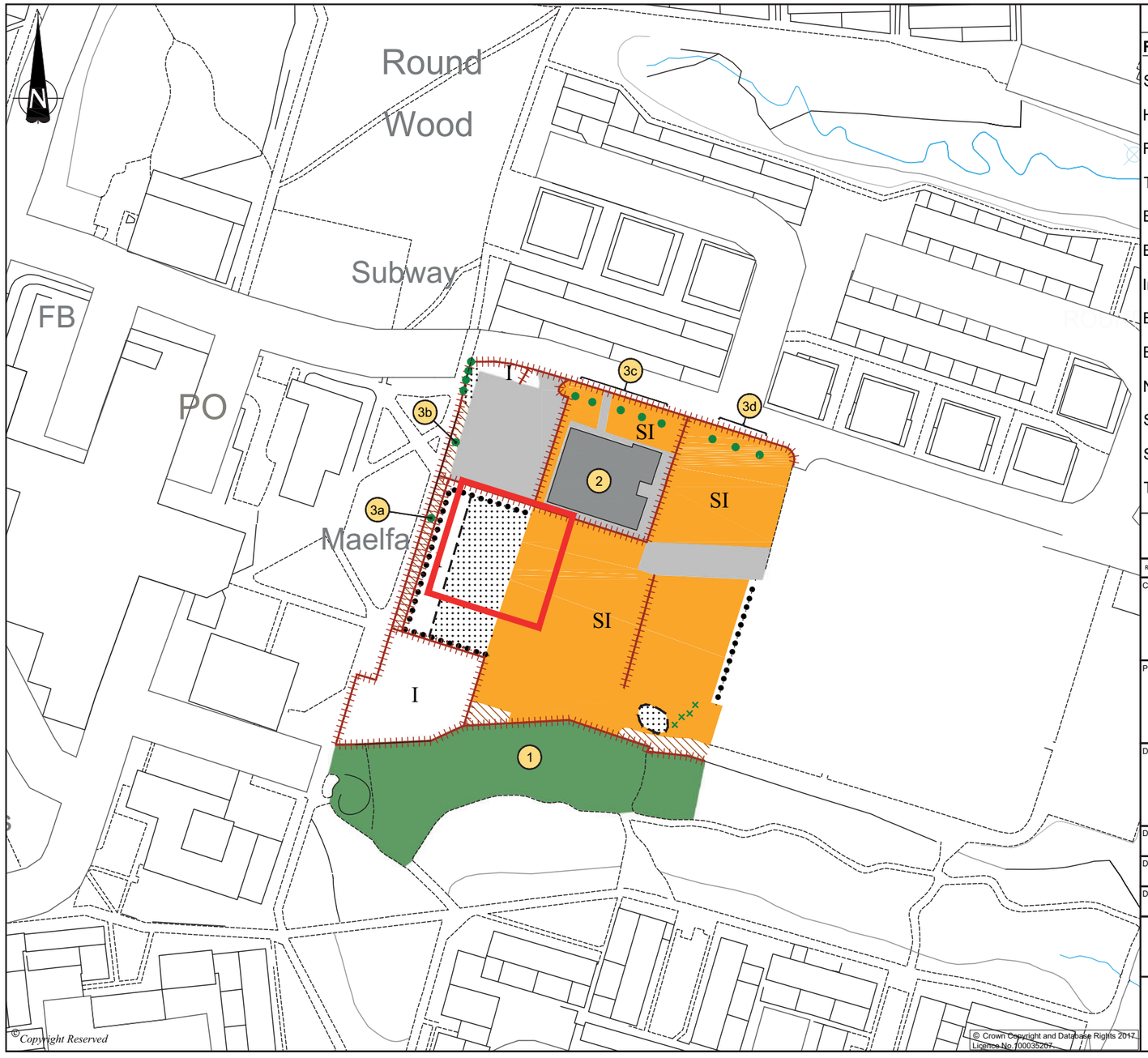

DO NOT SCALE FROM THIS DRAWING

REFERENCE

- Site boundary
- Hardstanding
- Fence
- Tall ruderal
- Bare ground
- Earth bank
- Improved grassland (I)
- Building
- Broad-leaved scattered trees
- Neutral semi-improved grassland (SI)
- Semi-natural broad-leaved woodland
- Scattered scrub
- Target note (1)

REVISION	DETAILS	DATE	DR'N	CHK'D	APP'D

CLIENT

WILLMOTT DIXON CONSTRUCTION Ltd

PROJECT

MAELFA WELLBEING HUB

DRAWING TITLE

HABITAT PLAN

DRG No.	REV
CA11625-002	

DRG SIZE	SCALE	DATE
A3	1:1250	11.06.2019

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AW	AB	AB

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MAKING COMPLEX EASY

LLANEDERYN HEALTH CENTRE BAT ROOST ASSESSMENT

1 SURVEY PURPOSE AND SCOPE OF THE SURVEY

1.1.1 This letter report is an updated Appendix to the Preliminary Ecological Appraisal Report and presents the findings of assessments for bat roost potential of a mature oak tree, and the Llanedeyrn Heath Centre building, both of which will be directly or indirectly affected by the new Wellbeing Hub in Llanedeyrn, Cardiff.

1.1.2 The survey comprised a daytime inspection of the tree from the ground to identify potential roost features (PRFs), followed by a climbing survey of the tree. The tree (Tree T834 Pedunculate oak shown on Figure 1) was assessed during the Preliminary Ecological Appraisal (PEA) as potentially having features that could be used by bats, and a tree climbing inspection was recommended to confirm the presence/absence of potential roost features.

1.1.3 The health centre was subject to an internal and external inspection in mid June and a follow up inspection of the potential cavity features in mid July and a dusk emergence survey. The existing health centre building, located outside of the development area, is due to be demolished to facilitate the construction of the temporary construction car park.

1.1.4 The aim of the surveys was to assess the suitability of the tree and the health centre building to be used by roosting bats and to confirm the presence / likely absence of bat roosts.

2 METHOD

2.1 Llanedeyrn Health Centre Building Inspection

2.1.1 An internal and external building inspection was carried out by Tim Oliver MCIEEM on the 12th June 2019, an ecologist with over 20 years-experience in ecological consultancy. The external structure of the building was inspected from the ground to record the structure of the building and to identify and map any potential cavity features in the fabric of the building including any roof spaces. The survey was aided by the use of a torch (with a red filter), mirrors, binoculars and a ladder. A follow up inspection of features was undertaken on 11th July aided by the use of a torch (with red a filter).

2.1.2 During the surveys, searches were made beneath potential features on the outside of the building and around the internal roof courtyard areas, to record the presence/absence of signs of bat activity including droppings on window sills, walls or the ground, polishing around openings, feeding remains, and staining (from urine).

2.2 Llanederyn Health Centre Dusk Emergence Survey

2.2.1 A dusk emergence survey of potential roost features identified during the daytime building inspection was carried out on Thursday 11th July 2019.

2.2.2 The survey covered the three features identified during the daytime inspection as having cavities potentially capable of being used by roosting bats:

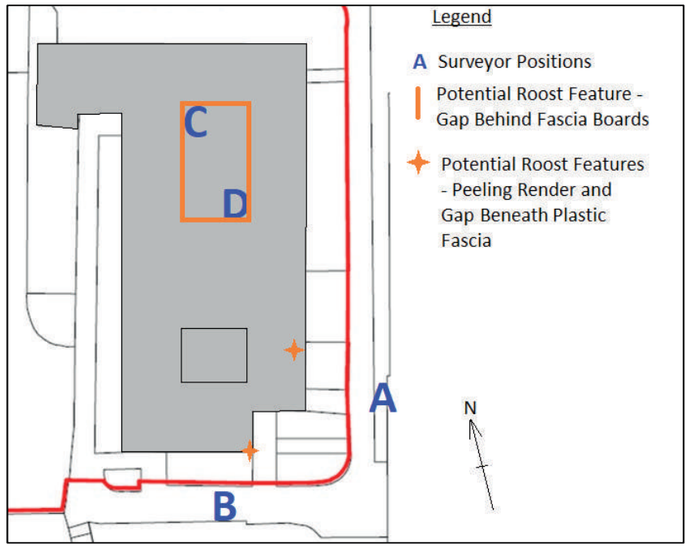
- the fascia boarding at the top of the wall (around an enclosed but accessible single storey section of the building).
- damaged external cladding below the flat roof on the southeast corner of the building.
- a small gap created by peeling render

2.2.3 The emergence survey was carried out in dry weather with a gentle breeze, partial cloud cover and an overnight low temperature of 16℃. The survey started at 21:05 and finished at 23:00 with sunset at 21:28.

2.2.4 Each surveyor used either an Elekon Bat logger hand held bat detector and recorded or an Anabat Express bat detector and recorded. Recorded bat calls were analysed using either Bat Explorer and Kaleidoscope software.

2.2.5 The survey was carried out by a team of four surveyors, two covering the fascia boards above the enclosed single storey roof, and two covering features on the southeast corner of the building. The surveyors were: Paul Turner MCIEEM, Georgia Kelly, ACIEEM, Laura White ACIEEM and Stephen Devereaux, Student CIEEM. Surveyor positions and locations of potential roost features are shown on Figure A1.

Figure A1. Llanedeyrn Health Centre Bat Survey – Positions of Surveyors and potential Roost Features.



2.3 Pedunculate Oak Tree (Tree 834)

2.3.1 The assessments were carried out on the 12th June 2019. Weather conditions during the assessments were mild and cloudy with a light breeze and after several days of light to moderate rain.

2.3.2 The tree inspection was carried out by Steve Wadley, an experienced bat specialist and arboriculturalist with over six years experience in consultancy. Steve is a qualified tree climber and holds a Natural Resources Wales (NRW) bat survey and handling licence.

2.3.3 The tree was inspected from the ground and from height by an experienced and qualified tree climber. The survey searched for all potential roost features in the structure of the tree. All potential cavity features such as loose lifted bark, rot holes, cracks, splits, dense ivy and other features were identified and inspected with the aid of a torch and endoscope. Searches were made for signs of bat activity in and around cavities including smoothed bark, staining and droppings.

Bat Roost Potential

2.3.4 The overall suitability of the tree and the buildings was described in accordance with the BCT guidelines (BCT, 2016) taking into account all potential roost features present and their context in the wider landscape. The suitability categories used are described in Table A.1.

Table A.1 Guidance for Assessing the Potential Suitability for Use by Roosting Bats of Features on Trees and Buildings (From BCT, 2019).

Suitability	Description of Roosting Habitat
Negligible	Negligible habitat features on site likely to be used by roosting bats.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, approximate conditions and / or suitable surrounding habitat to be used regularly by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation).
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat, but unlikely to support a roost of high conservation status (with respect to roost type only – the assessment in this table is made irrespective of species conservation status which is established after presence is confirmed).
High	A structure or tree with on or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.

2.3.5 Bats can use a wide variety of building features as roosts, and the preference for different roost characteristics varies between species. Pipistrelle bats are the most likely to be encountered in urban buildings and will often roost individually in very small cavities or crevices such as bleed gaps between bricks, beneath facias or roof tiles, and in small gaps around door and window frames.

3 RESULTS

3.1 Llanedeyrn Health Centre - Building Inspection

3.1.1 The health centre building is a tiered 2-storey structure with the upper storey projecting approximately 0.5m beyond the lower storey. The roof is flat with a shallow pitch. There are two single-storey flat-roofed sections with plastic skylights enclosed on all sides by 2-storey sections. The enclosed flat single storey roofs were accessed through windows on the first floor.

3.1.2 The outer façade is a mix of concrete render and tile on the ground storey with rendered brick on the second storey and small areas of wooden cladding. The inner façade around the internal single-storey flat roof sections is also concrete rendered. Metal framed windows are present on both floors of all elevations. There is also a small single-storey section of rendered brick with a shallow pitched corrugated metal roof, an enclosed stairwell and single-storey flat roofed section, and on the roof a water tank with a flat felt roof and insulated corrugated metal cladding.

3.1.3 Narrow strips of metal cladding define the edges of the flat roofs which are fixed flush with the building with no openings or internal cavities of potential value for bats. There were no missing bricks or openings in the walls (such as bleed gaps) which could be used by bats either as roost or to gain access into internal voids. The render has come away in areas on the outer elevations, but the revealed brickwork is sound with no gaps in the bricks or beneath the render.

Building Features and Roosting Potential

3.1.4 The building has very few features which could be used by bats lacking any substantial enclosed roof voids that would have high potential value for bats.

3.1.5 The main cavity feature was a gap behind the wooden roof fascia boarding around the edge of the larger of the two enclosed single storey sections of the building (Plate 1).

Plate 1 Enclosed single-storey building section with wooden fascia boards at the top of each wall

3.1.6 There was a narrow gap extending upwards approximately 30cm between the fascia and the wall with an opening at the bottom. The opening and gap were approximately 4cm wide above the recessed windows but much narrower (less than 1cm) where the fascia adjoins the wall.

3.1.7 In four locations (one on each elevation) there was a gap at the top of the fascia board cavity with an opening into a shallow void between the internal ceiling and flat roof. This void was not accessible either externally or internally without removing damaging part of the roof structure. The only potential bat access into this feature is via the fully surveyable gap behind the fascia boarding.

3.1.8 Above the recessed windows, there was no landing surface to access the gap, making access for bats more difficult. The detailed examinations of the entire length of the gaps behind the fascia boards revealed no signs of use by bats such as staining, polishing of droppings, and no droppings were found anywhere on the walls, windows sills or ground beneath the gaps. The feature is assessed as having moderate - low suitability for roosting bats but the absence of any associated signs and presence of cobwebs means the likelihood of current use is very low/negligible.

3.1.9 On the south-east corner of the building there was a narrow gap beneath a lifted plastic fascia panel. The gap did not lead to a larger cavity, and the smooth plastic fascia would make it very difficult for bats to land and crawl into the gap. The feature was considered to have at best low suitability to be used opportunistically as an occasional day roost by crevice dwelling species.

3.1.10 A further very small gap was recorded on the south-east corner of the building where the flexible render on the underside of the second storey overhang has peeled back creating a horizontal tapering crevice approximately 4cm high and 20cm deep between the loose render concrete beneath. This feature could be clearly seen throughout and there were no signs of bat use. This feature has at best low / negligible suitability for an individual bat.

3.1.11 A louvered panel on the door of the plant room on the western elevation would enable a bat to access the internal space, but there are no cavity features within the plant room where bats could roost.

3.1.12 There was a hole on the southern elevation where a ventilation pipe has become detached from the wall. The hole did not open into the building interior but did provided access into a narrow wall cavity approximately 2cm wide between the inner and outer walls. There were no signs of bat use visible around the hole or the opening into the wall cavity.

3.1.13 A water tank enclosure on the roof was partly open with the roller door raised approximately 50cm. There were no droppings or other signs of use by bats within the enclosure or on any external surfaces.

3.2 Llanedeyrn Health Centre - Dusk Emergence Survey

3.2.1 No bats were seen, and no bat calls were recorded by the surveyors positioned on the enclosed first floor roof covering all the fascia boards and water tank enclosure. In addition, no bats emerged or entered the potential cavities on the south-east corner of the building and no bats were recorded flying close to these features.

3.2.2 In the immediate locality, a very low level of bat activity was observed during the survey. Individual common pipistrelle *Pipistrellus pipistrellus* bats were observed flying over Maelfa Road, to the east of the building with occasional foraging around the street light and small block of shrubs.

3.2.3 Infrequent passes of common pipistrelle were also seen and recorded close to the southern elevation.

3.2.4 In total, 42 common pipistrelle passes were detected in the southern part of the eastern elevation (Location A) between 21:35 and 22:42, with most activity between 21:55 and 22:10. Along the southern elevation, 25 common pipistrelle passes were detected between 21:34 and 22:38 with most activity between 21:55 and 22:05. No other bat species were recorded.

3.3 Pedunculate Oak Tree (Tree 834)

Description

3.3.1 The tree is a mature pedunculate oak with a diameter at breast height (DBH) of 75cm and a wide spreading canopy. The canopy is relatively open with thin upper branches extending from the three large and two smaller ascending limbs. There is deep but open ivy growth on the lower part of the tree.

Tree Features and Roosting Potential

3.3.2 A few potential cavity features were noted from ground level on the lower part of the tree.

3.3.3 The end of a wide spreading branch 4m above ground level on the eastern side of the tree (above the footpath) had two vertical horizontal rot holes surrounded by a callus roll. The smaller hole extended approximately 15 cm but the entrance was very narrow and unlikely to be used by a single bat. The second cavity extends for approximately 25cm. There were no signs of scratch marks, smoothing or droppings that would have indicated current use by bats.

3.3.4 On the western side of the tree, there is a tear out surrounded by a callus roll creating a small vertical hollow on a wide ascending branch. The hollow is partly obscured by dense ivy and could be used opportunistically by one or two bats as an occasional day roost.

3.3.5 Elsewhere on the tree is a small tear out, some flaking bark, a split on the upper side of a fallen branch and ivy on the trunk. None of these features provide sufficient shelter to be use by roosting bats.

3.3.6 Above 10m the trunk diameter is approximately 30cm and there were no cavities or features that could be used by roosting bats.

4 CONCLUSION AND RECOMMENDATION

4.1 Llanederyn Health Centre Building

4.1.1 The health centre building possesses few features with potential to be used by bats. The highest potential feature is the gap behind the wooden fascia around the larger enclosed flat roof section with only two very low value features on the exterior of the building.

4.1.2 The building was surveyed internally and lacks any enlarged roof spaces. All relevant parts of the building were fully covered during the emergence survey with no constraints on the survey.

4.1.3 No signs of use by bats were found on or near to any of the potential roost features during daytime inspections on 12th June and 11th July. No bats emerged from or entered any part of the building during the emergence survey. Consequently there is high confidence in the absence of bat roosts and in this context the proposed demolition will not result in a detrimental impact on the conservation status of any bat species.

4.1.4 Following best practice, the fascia boarding would be removed using a 'soft strip' approach under the supervision of a licensed bat surveyor immediately prior to the removal of the fascia boarding. In the unlikely event that a newly established roost is found, then the demolition works could only proceed under a Natural Resources Wales (NRW) European Protected Species (EPS) derogation licence.

4.2 Pedunculate Oak Tree (Tree 834)

4.2.1 The tree possesses two low value potential roost features with no signs of past use. Neither would be suitable for use by more than a small number of bats. Overall the tree has been assessed as having low potential value for roosting bats.

4.2.2 The tree will be retained, but requires canopy thinning adjacent to the new development. Tree protection measures will be implemented as described in the main text of the PEA report. Ideally the branch would be pruned outside of the active season.

4.2.3 Where this is not possible a bat licensed ecologist would re-inspect the potential roost feature for bats immediately prior to pruning. If no signs of bats are found, pruning can continue with no further restrictions. In the unlikely event that the feature has started to be used as a roost then the proposed arboricultural work would be delayed until after a NRW EPS derogation licence has been obtained with the pruning carried out in strict accordance with the licence conditions.

REFERENCES

Collins J. (ed.) (2016). *Bat surveys for Professional Ecologists: Good practice guidelines* (3rd Edition). Bat Conservation Trust, London.

Appendix 11

Building Control

Full Plans Conditional Approval Notice

Building Regulation
Plan Number **PWYN/00028/19/FC**

The Building Act 1984
The Building Regulations 2010 (as amended)

Nathan McDonald
The Carriage Building
Bruton Way
Gloucester
GL1 1DG

1. Details of work

New GP and Outpatient Health Centre and associated support accomodation plus material alterations to existing Powerhub

2. Location of building to which work relates

MAELFA WELLBEING CENTRE, MAELFA, LLANEDEYRN, CARDIFF

3. Approval

The Plans Submitted have been examined and passed by the Authority as complying with the Building Regulations **subject to the conditions defined in the schedule overleaf.**

This approval is for the purposes of the requirements of Building regulations only. It is not an approval under the Town And Country Planning Acts, an approval for improvement grant purposes or any other statutory provision.

Under the requirements of Building regulations you are to notify the authority at certain stages during the execution of work.

If the work is not commenced within three years of submitting the plans to the Authority the Authority may declare the application void under the provisions of section 32 of the Building Act 1984.

4. Authority

This full plans approval notice is authorised by:

James Clemence Operational Manager Development and Building Control

Date 07/05/2020

LABC CYMRU

NEUADD Y SIR COUNTY HALL
CAERDYDD CARDIFF
CF10 4UW CF10 4UW
FFÔN: (029) 22330383 PHONE: (029) 22330383

THE FOLLOWING COMMENTS ARE DERIVED FROM THE BUILDING REGULATIONS 2010:

The outstanding conditions relating to this application are indicated below and you must submit the additional information detailed therein before these items can be discharged.

REGULATION 14.

Please provide all supporting specialist constructional specifications, details, drawings and schedules for further consideration and to include external cladding systems/curtain walling, supports, framing and cavity fire barriers, door and window schedules.

A1 - STRUCTURE.

Provide a Ground Investigation/Geotechnical report for the site. The report should establish ground conditions, contaminated ground, existing services and structures, any below ground mine workings, radon or land gases (methane etc) and consider the bearing capacity of the ground. The report should also identify all relevant engineering measures required.

Provide a full structural engineering package and structural calculations for the proposed development to include both sub and superstructure proposals and all associated elements to accord with all requirements of the Ground Investigation/Geotechnical Report. Designs should include;

1) All prevention and protective measures,

2) Foundations,

3) Floor constructions,

4) All Super Structure proposals including Roof/Plant areas.

Provide details of the design in terms of reducing the sensitivity of the building to disproportionate collapse.

Provide details of the design of any retaining structures which form part of the building.

B1-5: FIRE SAFETY.

A door schedule should be provided that indicates:
· Vision panels and their sizes.
· Glazing type.
· Clear opening sizes.
· Ironmongery and locking mechanisms.
· Fire exit signage.

Provide information on the location of the nearest fire hydrant and flow rates to identify compliance with "National Guidance document on the provision of water for fire fighting (by Water UK, 3rd Edition)".

Provide further risk assessments in respects to the request to remove certain void detection to areas of the premises.

Automatically operated doors should also failsafe open on alarm activation and powered sliding doors should be provided with battery back-up.

C2: RESISTANCE TO MOISTURE

Please provide full details, designs and drawings including cavity tray provisions at all relevant abutments including where cavity barriers provided to relevant external wall systems.

Provide full designs for proposed roofing system including interstitial condensation assessments as appropriate.

G4: HOT WATER SAFETY.

Please provide full designs to identify compliance with Hot Water Safety.

H1/3/6: FOUL/SURFACE WATER DRAINAGE/SOLID WASTE STORAGE.

Provide full and detailed foul and surface water below ground drainage designs including confirmations on adequate access/rodding provisions to all drainage lines, movement joint provisions to below ground drainage runs, soakaway designs and supporting permeability/infiltration calculations/assessments.

Please provide rainwater discharge calculations/designs for the proposed above ground surface water system serving all roof areas.

Please provide full designs for proposed Bin Stores including capacities, wash down and drainage facilities.

J12/3: HEAT PRODUCING APPLIANCES.

Please provide full details including flues, ventilation and position of appliances.

K1/2: STAIRS, LADDERS AND RAMPS/PROTECTION FROM FALLING.

Provide full details of the access ladders to the Roof areas.

Confirm staircase designs in respects to protection to children.

Provide details/designs/calculations for guarding provisions to edges of floors, landings and any relevant areas to BS 6180.

L2A - CONSERVATION OF FUEL AND POWER.

The performance of the building, as built should be consistent with the prediction made in the Design BER calculations. An As Built Assessment is to be provided This will include air permeability and pressure testing.

The necessary provisions (log book) for enabling energy efficient operation are put in place. The data used to calculate the TER and BER should be included in the log book.

Evidence of EPC provision will be required on completion of works.

A report will be required to confirm that the services have been designed in accordance with the CIBSE Guide (Non-Domestic Heating, Cooling and Ventilation Compliance Guide).

M1 - ACCESS TO AND USE OF BUILDINGS.

Provide a full and detailed Access Statement to identify full compliance of the development and to ensure a fully inclusive environment with all requirements of Part M.

All confirmations indicated in the Access Statement should be suitably endorsed on the construction drawings.

N1 - SAFETY GLAZING.

All glazing in critical locations should comply with the test criteria for safe breakage as indicated in British Standard 6206: 1981. (Impact performance requirements for flat safety glass and safety plastics for use in buildings).

Confirmation required of safe opening and closing of windows.

GOODWILL COMMENTS.

It should be ensured that all relevant Planning Approval Conditions are suitably discharged within the required time parameters.

The condition, adequacy and size of the existing foul Public Sewerage system which will serve this development should be fully identified and confirmed as satisfactory in conjunction with the proposed foul outflows/designs from the proposed development.

The formal approval of Dwr Cymru Welsh Water must be obtained for all proposed drainage systems, arrangements and connections to the existing sewerage network, and position of the proposed development in relation to any adjacent sewer apparatus.

The person carrying out the work shall give fire safety information to the responsible person not later than the date of completion of the work, or the date of occupation of the building or extension, whichever is the earlier.

In this regulation “fire safety information” means information relating to the design and construction of the building or extension, and the services, fittings and equipment provided in or in connection with the building or extension which will assist the responsible person to operate and maintain the building or extension with reasonable safety; “responsible person” has the meaning given by article 3 of the Regulatory Reform (Fire Safety) Order 2005.

This information **must be supplied to the Responsible Person on or before completion or occupation** of the building / work (whichever occurs first).

The person carrying out the work shall not later than five days after the work has been completed give sufficient information to the owner about the building’s

ventilation system and its maintenance requirements so that the ventilation system can be operated in such a manner as to provide adequate means of ventilation. Please refer to the Domestic Ventilation Compliance Guide 2010 Edition for work to a dwelling or the relevant Chartered Institution of Building Services Engineers (CIBSE) Guide for work to any building other than a dwelling.

This regulation applies to building work in relation to which paragraph F1(2) or L1(b) of Schedule 1 imposes a requirement, but does not apply to the provision or extension of any building service, fixed system for mechanical ventilation or any associated controls, where testing and adjustment is not possible or would not affect the energy efficiency of that fixed building service.

The person carrying out the work shall, for the purpose of ensuring compliance with paragraph F1(2) or L1(b) of Schedule 1, give to the local authority a notice confirming that the fixed building services have been commissioned in accordance with a procedure approved by the Secretary of State. The notice shall be given to the local authority not later than 5 days after the completion of the work.

The person carrying out the work shall not later than five days after the work has been completed provide to the owner sufficient information about the building, the fixed building services and their maintenance requirements so that the building can be operated in such a manner as to use no more fuel and power than is reasonable in the circumstances.

The person carrying out the work shall, for the purpose of ensuring compliance with paragraph F1(1) of Schedule 1 ensure that testing of the mechanical ventilation air flow rate is carried out in accordance with a procedure approved by the Secretary of State; and give notice of the results of the testing to the local authority. The notice shall record the results and the data upon which they are based in a manner approved by the Secretary of State; and, be given to the local authority not later than five days after the final test is carried out.

IMPORTANT ADVISORY INFORMATION RELATING TO THIS SUBMISSION:

REGULATION 38
This premise and development project involves work which is subject to the provisions of the Building Regulations and the Regulatory Reform (Fire Safety) Order 2005 with respect to fire safety precautions. Under the Building Regulations Regulation 38 and the provisions of the Regulatory Reform (Fire Safety) Order 2005 you are required to furnish the ‘Responsible Person’ (as defined in the Regulatory Reform (Fire Safety) Order 2005) with all relevant fire safety information relating to the design, construction and maintenance schedules (including building services, fittings and equipment) of the completed building work. This information is intended to assist the Responsible Person to operate and maintain the premises with reasonable safety and must be supplied to the Responsible Person on or before completion or occupation of the building / work, (whichever occurs first).
Please Note: The local authority may withhold the issue of a Building Regulations Completion Certificate until you can evidence that the relevant requirements of Regulation 38 have been complied with, i.e. the responsible person has been given the required fire safety information. Please use the

following link to access a template for a Regulation 38 Declaration form (www.cardiff.gov.uk/buildingcontrol) and select document from related items.

Building Control will undertake all necessary consultation measures with the fire authority and other stakeholder's in connection your proposals all relevant information will be conveyed to you as the project co-ordinator.

CONSULTATION WITH THE FIRE OFFICER

The Chief Fire Officer has asked me to remind you that where the premise is subject to the requirements of the Regulatory Reform (Fire Safety) Order 2005 a 'Responsible Person' must be appointed to ensure that the provisions contained in the Order including a Fire Risk Assessment are undertaken; the fire risk assessment can be deposited as part of your Building Regulation submission and may assist in our consideration.

The plans deposited with your application are currently under consideration by the Chief Fire Officer and Cardiff & Vale UHB Fire Officer and I will inform you as quickly as possible of any revisions and/or additional information that may be required.

REGULATION 14: PRE COMPLETION CHECKS AND TESTS

It should be noted that a number of pre completion checks and tests will be necessary before a completion certificate can be issued, the developer is responsible in ensuring that fully competent persons are engaged to undertake those checks and tests, which will be monitored by Building Control; the results in the form of Installation, Completion and Commissioning Certificates must be deposited with Building Control.

IMPORTANT CHANGES TO SEWER ADOPTION AND CONNECTION.

On 1st October 2012 important changes came into force for any building and construction work that involves connection to the public sewerage network in Welsh Water's operating area.

From that date a new adoption process, which is mandatory for all sewers and lateral drains connecting to the public sewerage system, and new construction standards set by the Welsh Ministers' for gravity foul sewers and lateral drains will come into force.

These changes follow the transfer of private sewers on October 1st 2011, when ownership of the vast majority of private sewers and lateral drains which link with the public sewer network transferred to Welsh Water. This clarified the issue of ownership and maintenance.

For further details please refer to the following:-

www.dwrcymru.com - Sewer Adoption and Connection Leaflet
Welsh Government Newsletter August 2012 and website

With respect to this application and the Building Regulations Schedule 1 requirements of H1/H4, The Council has examined Dwr Cymru Welsh Water's Map of Public Sewers (MoPS) in respects of any existing Sewerage Undertaker

apparatus which may be built over by, or is within 3m of, the proposals. **No such apparatus was indicated on the relevant MoPS and therefore Building Control does not have a responsibility to formally consult with the Sewerage Undertaker in respect of these proposals.**

However, private sewers and lateral drains are not currently shown on the MoPS and therefore, agreement/permission for the proposals in respects of any apparatus which is subsequently noted and/or exposed on site (but which is NOT currently shown on the MoPS) will need to be sought and obtained directly by the Applicant and/or Developer from Dwr Cymru Welsh Water and will not be pursued by the Council.

The requirement for such an agreement sits outside the jurisdiction of the Building Regulations and therefore will not be a relevant consideration in the Councils Passing of Plans/Acceptance of Notices and will not be a relevant consideration in the Councils approval of works on site under H1 to H4.

For information Dwr Cymru Welsh Water contact details are:

Dwr Cymru/Welsh Water, Development Services, PO Box 3146, CF30 0EH

Tel: 08009172652 Fax: 02920740472

Email: developer.services@dwrcymru.com

PLEASE NOTE THAT THE ABOVE COMMENTS SHOULD NOT BE CONSIDERED AS EXHAUSTIVE AND HAVE BEEN MADE FOLLOWING CONSIDERATION OF THE INITIAL DESIGNS/DETAILS AS SUBMITTED. FURTHER COMMENTS WILL BE MADE AS ADDITIONAL DESIGNS, INFORMATION, DETAILS AND ASSESSMENTS ARE RECEIVED.

Your Attention is drawn to the following very important information:

Inspection Plan and Notification Framework.

Statutory Notifications.

You are required, by law, to notify the Council in advance of the following stages of the work you are about to undertake:

1. Commencement.
2. Excavation for foundations.
3. Foundation Concrete.
4. Oversite – dpm and floor slab insulation in place.
5. Damp Proof Course.
6. Intention to cover a Drain/sewer.
7. Drain/sewer covered.
8. Occupation (If prior to completion).
9. Completion.

Other Notifications Required.

The Council also requires you to provide the additional notifications outlined below, where relevant to the work you are undertaking:

Extension of a dwelling:

1. Radon Sump prior to covering up.
2. Structural Timber (floor/roof joists) in place but open for inspection.
1. Electrical Installation First Fix (Kitchen/Bathroom location, complete new circuit or existing circuit extended to the external only) in place but open for inspection (Non Registered Domestic Installer Self Certification Schemes Only).
2. Electrical Installation Test satisfactory and ready for witnessing (Non Registered Domestic Installer Self Certification Schemes Only).

Loft Conversion:

1. Structural Steel Beams in place but open for inspection.
2. Existing rafters strengthened but open for inspection.
3. Floor joists in place but open for inspection.
4. Insulation/ventilation to roof/dorma in place but open for inspection.
5. Electrical Installation First Fix (Bathroom location, complete new circuit) in place but open for inspection (Non Registered Domestic Installer Self Certification Schemes Only).
6. Electrical Installation Test satisfactory and ready for witnessing (Non Registered Domestic Installer Self Certification Schemes Only).

Material Alteration to form, or enlarge, a structural opening:

1. Structural Steel Beams in place but beam and bearings open for inspection.

The provision/extension of a fixed domestic electrical installation:

1. Electrical Installation First Fix (Kitchen/Bathroom location, complete new circuit or existing circuit extended to the external only) in place but open for inspection (Non Registered Domestic Installer Self Certification Schemes Only).

2. Electrical Installation Test satisfactory and ready for witnessing (Non Registered Domestic Installer Self Certification Schemes Only).

Material Change of Use i.e. the creation of a dwelling or dwellings within an existing building:

1. Party Wall construction including sound insulation in place but open for inspection.
2. Party Floor construction including sound insulation in place but open for inspection.
3. Pre-Completion Sound Insulation Tests ready for witnessing.

New Build Dwellings, per plot:

1. Radon Sump prior to covering up.
2. Structural Timber (floor/roof joists) in place but open for inspection.
3. Party Wall construction including sound insulation in place but open for inspection.
4. Party Floor construction including sound insulation in place but open for inspection.
5. Pre-Completion Sound Insulation Tests ready for witnessing.
6. Electrical Installation First Fix in place but open for inspection (Non Registered Domestic Installer Self Certification Schemes Only).
7. Electrical Installation Test satisfactory and ready for witnessing (Non Registered Domestic Installer Self Certification Schemes Only).
1. Wall/Floor/Roof thermal insulation prior to covering up.
2. Part M checklist items completed and ready for inspection.
3. Air tightness tests ready for witnessing.

Work for the erection, extension or alteration of a commercial building e.g. office, shop, warehouse/factory etc.

1. Wall/Floor/Roof thermal insulation prior to covering up.
2. Air tightness test ready for witnessing (where new build or extension over 1,000m^2).
3. Fire detection and alarm system test ready to be witnessed.
4. Fire dampers installed and test ready to be witnessed.
5. Emergency lighting test ready to be witnessed.
6. Pressurisation tests ready to be witnessed.
7. Compartmentation complete.
8. Part M checklist items completed and ready for inspection.
9. Air tightness tests ready for witnessing.

Work for the erection, extension or alteration of a hotel, student accommodation, hostel:

1. Party Wall construction including sound insulation in place but open for inspection.
2. Party Floor construction including sound insulation in place but open for inspection.
3. Pre-Completion Sound Insulation Tests ready for witnessing.
4. Part M checklist items completed and ready for inspection.
5. Air tightness tests ready for witnessing.

N.B. The Council will also normally expect to carry out unannounced inspections between the stages identified above.

All notifications can be given using any of the following methods:

- Writing to Building Control, Room 232, County Hall, Atlantic, Cardiff. CF10 4UW..
- E-mail to buildingcontrol@cardiff.gov.uk .
- Telephone on 029 2233 0383/0382/0381.

- On site agreement with the building control surveyor at the time of a current visit/inspection.
- On line at www.cardiff.gov.uk/buildingcontrol.htm

Note:

Building Regulation approval is **NOT** permission to build. The additional permissions required to build may include planning permission; party wall act compliance and written legal permission from the owner of the land and/or property to which the proposed works relate.

Compliance with the Building regulations **DOES NOT** automatically ensure compliance with other allied legislation [for example The Workplace (Health, Safety and Welfare) Regulations; The Construction (Design and Management) Regulations; The Housing Act 2004; The Regulatory Reform (Fire Safety) Order; Environmental Protection Acts etc] and you are therefore advised to seek further guidance on complying with all relevant allied legislation from a suitably qualified person/body. Compliance with the Building Regulations does not depend upon compliance with other such legislation/guidance.

Building Regulations are intended to ensure that a reasonable standard of life safety is provided in case of fire. The protection of property, including the building itself, often requires additional measures and insurers will, in general, seek their own higher standards before accepting the insurance risk.

A number of pre completion checks, tests and commissioning will be necessary to all heating, hot water, mechanical and electrical services, sound insulation provisions and air tightness before a completion certificate can be issued. The developer, where applicable, the owner and the builder are responsible for ensuring that registered competent persons only are engaged to undertake the installation of such services and fittings and the subsequent commissioning, checking and testing to the required standards. The results in the form of Installation, Completion and Commissioning Certificates etc must be provided to Building Control at completion stage. Building Control can not be held liable for the employment of, and work carried out by, non competent persons.

Know your responsibility:

The person carrying out building work is responsible in law for complying with the requirements of the building regulations.

Failure to comply with the requirements of the building regulations is a criminal offence and ignorance is not a defence.

If a person contravenes any provision contained in building regulations that person is liable on summary conviction to a fine not exceeding level 5 (**£5,000:00**) on the standard scale **and** to a further fine not exceeding **£50 for each day** on which the default continues after the person is convicted.

The local authority, without prejudice to its right to take proceedings for a fine in respect of the contravention, may by notice also require the owner:

a) to pull down or remove the work; or,

b) to effect such alterations in it as may be necessary to make it comply with the regulations.

103 Procedure on appeal or application to magistrates' court.

(1) Where this Act provides -

(a) for an appeal to a magistrates' court against a requirement, refusal or other decision of a local authority, or

(b) for a matter to be determined by, or for an application in respect of a matter to be made to, a magistrates' court,

the procedure shall be by way of complaint for an order.

(2) The time within which such an appeal may be brought is 21 days from the date on which notice of the local authority's requirement, refusal or other decision was served upon the person desiring to appeal, and for the purposes of this subsection the making of the complaint is deemed to be the bringing of the appeal.

(3) In a case where such an appeal lies, the document notifying to the person concerned the local authority's decision in the matter shall state the right of appeal to a magistrates' court and the time within such an appeal may be brought.

Appendix 12

CDM

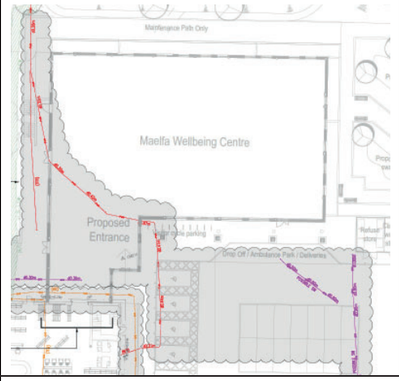
CDM Hazard Elimination and Management Schedule

Project: Maelfa Wellbeing Centre **Date:** 17-06-20

Ref	Feature / Process / Structure / Activity	Hazard or Hazardous Activity	Persons at risk	Design measures taken to eliminate or reduce risk	Information on residual risk	Action required	Responsible Person(s)	Date Reviewed:	Status / Comments
001	Asbestos	Uncontrolled exposure to asbestos during ground works	Construction Operatives Site Visitors	Demolition of existing GP Surgery requires Demolition Asbestos Survey to be completed prior to commencing works. To be commissioned upon vacant possession of GP Surgery. Connections into existing buildings that were constructed post 2000. Ground Investigation Report undertaken by ESP did not located any Asbestos within the screened samples.	High	All operatives to hold in date Asbestos Awareness Training. Any Asbestos identified within Demolition Asbestos Survey to be removed by competent Asbestos Contractors. Ground Works Operatives to hold Asbestos Awareness Training. Works to cease and Client notified if any suspected ACMs are identified during construction works	Client Principal Contractor Contractors	17-06-20	Ongoing
002	Demolition of GP Surgery	Uncontrolled collapse of structures Falls from height Contact with live services	Demolition Operatives Adjoining Property	Design Team to ensure structural behaviour of buildings is considered during design development. Client and Design Team to commission a structural survey to determine demolition requirements.	Low	Demolition Contractor to provide detailed RAMS for the demolition and removal of the building on site. This must address the method of demolition with particular reference to protection of demolition operatives from uncontrolled collapse of building and falls from height. The method of demolition shall also detail measures put in place to protect the adjoining highways and nearby properties. Client / Principal Contractor to ensure that all services supplying the existing buildings are disconnected at an external point prior to the demolition of the same. Any services running live in the ground in the vicinity of works to be highlighted. BS6187:2011 Code of practice for full and partial demolition must be complied with at all times.	Client Principal Contractor Principal Designer Demolition Contractor	17-06-20	Demolition Contractor to provide Demolition Sequencing and Methodology. This should be contained within the CPHSP.
003	Site setup	Unauthorised access Provision of sanitary conveniences	Public Site Operatives	Design Team are reviewing the location of the proposed development footprints to incorporate safety critical arrangements into all construction logistics. WD Construction Management Team have been liaising closely with Design and Client Team throughout design stages to develop detailed site set-up strategy.	High	Principal Contractor to ensure that 2.4m hoarding is provided around the entire site perimeter prior to commencing demolition or construction works on site. Principal Contractor to ensure that suitable welfare and sanitary conveniences are provided on site in accordance with CDM 2015 prior to the commencement of demolition or construction works on site.	Principal Contractor Client	17-06-20	Ongoing
004	Traffic Management	General access to site is restricted due to local highways and on-site space restrictions.	Public	The design and construction team have undertaken a review of proposed material specifications to ensure deliveries to site can be achieved e.g. steels, cladding, glazing and general plant requirements for installation to be reviewed. Client to ensure adequate land available for Contractor's compound and welfare facilities. The site access is partially obstructed by trees at the entrance, including a cat. A Oak. The highway is used to access residential properties at all times of the day and cars are often parked along adjacent roads. It is suggested that the contractor schedules large vehicles and deliveries to avoid busiest times of day and ensure a waiting area for vehicles off the highway to avoid vehicles backing up and affecting traffic flow	High	Properly supervise all entrance/exit points. Seek to utilise separate access and egress points. Consideration to be given to the timing of deliveries Adequate lighting to be provided where required Provide signage on and within the site warning site staff vehicle drivers and members of the public of the danger. Measures for site/pedestrian segregation should be included in CPHSP. A full Traffic management plan for the movement of vehicles, site operatives, machinery, and materials, should developed.	Principal Contractor	17-06-20	Ongoing

CDM Hazard Elimination and Management Schedule

Project: Maelfa Wellbeing Centre **Date:** 17-06-20

Ref	Feature / Process / Structure / Activity	Hazard or Hazardous Activity	Persons at risk	Design measures taken to eliminate or reduce risk	Information on residual risk	Action required	Responsible Person(s)	Date Reviewed:	Status / Comments
005	Existing services	Striking services resulting in fire, explosion, electrocution, flooding and disruption to adjoining properties and area	Operatives Public	Refer to Drawing MWC-TBA-ZZ-XX-DR-ME-XX-0001 outlining location of existing services on or adjacent to site. Existing Gas, Electricity, Data and Water Services are known to be present within the site footprint or below access routes to site. ALL SERVICES INFORMATION HELD ON 4P. 	Medium	A sub-surface scan of the entire site in addition to the information from the local service providers should give an accurate picture of the underground services and structures on site. In addition to the above, the Principal Contractor should operate a permit to dig system on site which would involve the use of the site service drawings and hand held locating equipment prior to breaking ground on site. Safe digging activities should be engaged in the vicinity of any live services on site. All excavation works must be in accordance with the principles set out in HSE Guidance Note HS(G) 47 "Avoiding Danger from Underground Services".	Design Team Principal Contractor	17-06-20	Ongoing
006	Fire Strategy and Installations Regulatory Reform (Fire Safety) Order 2005	Fire Safety Management	End User	Building Regulations Part B to be complied with in Design and Construction. Design Team to be aware of requirements of the regulations and ensure the same are incorporated into the design. Compliance with Client requirements Building Regulations and are likely to address any issues. End users fire risk assessor to have opportunity to comment at design stage so that their comments can be incorporated. Powerhouse “Responsible Person” under RRFSO to develop revised Building Fire Risk Assessment in conjunction with Willmott Dixon for Construction Phase.	Fire strategy document to be included within HS Files and O&M Manuals	All elements of the work will need to meet with the requirements of the Regulatory Reform (Fire Safety) Order 2005. End users/managers to be consulted to ensure that adequate measures are installed to facilitate fire management of the building. PC to be responsible during the build for their specific areas. <u>During Construction</u> Please refer to Pre-Construction information for further information. All fire and emergency arrangements must be compliant with The Regulatory Reform (Fire Safety) Order 2005 and HSG168 and The Joint Code of Practice on the Protection from Fire of Construction Sites and Buildings Undergoing Renovations. Coordinated fire strategy essential between Powerhouse and Willmott Dixon works. Additional consideration required for wider works by LA for houses scheme which will also be underway.	Fire Engineer Client Principal Contractor Design Team	17-06-20	Ongoing

CDM Hazard Elimination and Management Schedule

Project: Maelfa Wellbeing Centre **Date:** 17-06-20

Ref	Feature / Process / Structure / Activity	Hazard or Hazardous Activity	Persons at risk	Design measures taken to eliminate or reduce risk	Information on residual risk	Action required	Responsible Person(s)	Date Reviewed:	Status / Comments
007	Glazing sizes and weights	Work at height Manual Handling LOLER PUWER	Operatives	Consideration of glazing weights and dimensions must factored into specifications. Particularly large sections to be used, relevant pre-construction information to be made available to the Principal Contractor Design incorporates large or heavy sections of glazing, specifically: Glazed balustrade to internal atrium Triple Glazed Sections heavy	Low	Design Team to provide strategy for glass replacement and maintenance. Glazing specifications and manufacturers information to be provided within H&S Files.	Design Team	17-06-20	Ongoing
008	Temporary works	Collapse of existing structures and structures under construction	Operatives Adjacent occupants	Design Team have minimised the requirements for Temporary Works where possible, however, there will still be temporary works that are required. Temporary Works will include: • Hoarding • Crane Lifting mat • Steel Frame • Formwork for concrete works • PCC Plank Propping • Propping during GP Surgery Demolition • Retaining Wall Construction Propping • Construction of undercroft and new building connections to old structure	Medium	Contractors should be able to demonstrate that they have in place effective arrangements for controlling risks arising from the use of temporary works. These are usually captured in a temporary works procedure which will contain most or all of the following elements: • Appointment of a Temporary Works Co-ordinator (TWC) • Preparation of an adequate design brief. • Completion and maintenance of a temporary works register • Production of a temporary works design (including a design risk assessment and a designer's method statement where appropriate). • Independent checking of the temporary works design. • Issue of a design/design check certificate, if appropriate. • Pre-erection inspection of the temporary works materials and components	Principal Contractor Structural Engineer	17-06-20	Appointments of TWD and TWD to be confirmed. BS5975 to be implemented at all times

CDM Hazard Elimination and Management Schedule

Project: Maelfa Wellbeing Centre **Date:** 17-06-20

Ref	Feature / Process / Structure / Activity	Hazard or Hazardous Activity	Persons at risk	Design measures taken to eliminate or reduce risk	Information on residual risk	Action required	Responsible Person(s)	Date Reviewed:	Status / Comments
009	Scaffolding	Collapse of scaffolding structures causing death and major injury	Construction Operatives Demolition Operatives	Limited, scaffolding provides the safe means of access to enable works to be undertaken.	Low	All scaffolding is to be installed by a NASC Contractor or a competent experienced contractor who can confirm that they are working to the prescribed standards of NASC or higher. All scaffolding is to be constructed in accordance with TG20:13 Guide to Good Practice for Scaffolding with Tube and Fittings. Any scaffolding should be erected in accordance with NASC guidance notes. Any scaffold that does not employ a “basic” design as determined in NASC TG20 must be accompanied by a design by a suitably qualified scaffold engineer.	Design Team Principal Contractor	17-06-20	Ongoing
010	Surrounding Environment	Injury to members of public	Public	Limited due to site location. The site is located within a residential area. The neighbouring Powerhouse and The Hub will be in operation during the works.	Medium	The neighbouring Powerhouse and The Hub will be in operation during the works. Works will also be undertaken further along Round Wood to the residential properties. The Principal Contractor must outline within their Construction Phase Plan details for ensuring the site remains secure and the local access route is protected at all times. PC to ensure all access roads remain free from obstruction, particularly access and egress to residential properties.	Design Team Principal Contractor	17-06-20	Ongoing
011	Working near existing trees	Collision with existing trees or destabilising existing trees.	Site operatives	Contractor to be aware of site constraints and root protection zones	Medium	Ensure no excavation within root protection zones, use temporary fencing to set out boundaries. Contractor to consider tree canopies when arranging crane/plant working areas.	Principal Contractor	17-06-20	Ongoing

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Ref	Feature / Process / Structure / Activity	Hazard or Hazardous Activity	Persons at risk	Design measures taken to eliminate or reduce risk	Information on residual risk	Action required	Responsible Person(s)	**Date Reviewed:**	Status / Comments
012	Installation of Structural Steel Frame	Installation and access for steels which may result in falls from height and falling materials. Temporary Works	Operatives	Permanent bracings included and positions clearly shown on drawings. Column baseplates to have 4 bolts. Permanent works design loads provided to contractor for use in temporary works design. Floors and other restraints specified as being grouted up as work proceeds. Designers to consider location, size and nature of steels that will need to be installed in the structure. They should provide any information that may assist the contractor in planning the installation of the same. Significant residual hazards and key assumptions to be noted on drawings. Please refer to Cambria's Structural Design Information.	Medium	A. Steel erector/contractor to provide method statement and sequencing programme to ensure sequence of erection is suitable for temporary stability. B. Steel erector to provide temporary props/bracing where required by desired erection sequence. C. Erector to ensure all bolts are securely fastened in column bases if not braced/propped until such a time that a connection to a permanent stability frame/system can be achieved. D. Temporary bracing provided where required and to remain in place until frame is fully braced and concrete floors have achieved minimum design strength Fabricator to install lifting points at correct centres on the steels where possible to assist lifting on site. PC or the appointed sub-contractor to allow for contract lifts for the installation of steels. Safe means of access to install the steels also to be considered. Programme to allow for adequate curing time of any walls where steels are to be placed. Designers to supply detailed information at the earliest opportunity to allow adequate time for planning the installation including outline requirements of a Temporary Works strategy. Significant residual hazards and key assumptions to be noted on drawings.	Design Team Principal Contractor	17-06-20	Ongoing – WD and Cambria to liaise and ensure all info required is available for planning of works
013	Installation of Structural Steel Frame	Temporary instability of partially completed structure during construction	Operative	Floor slabs and beams designed to act compositely to provide diaphragm action transferring lateral loads to stability frames. Roof bracing provided to act as wind girders to transfer lateral loads to stability frames.	Medium	Residual Risks: • Instability of completed structure due to future alterations to building structure. • Removal of sections of floor. • Removal of stability frames (bracing). • Demolition. To be recorded in Residual Risk Register in H&S Files	Design Team Future Contractors	17-06-20	A. Future alterations to be reviewed by qualified structural engineer to ensure stability is not compromised. B. Final construction issue structural drawings to be included in O&M manual. C. Demolition to be undertaken by qualified and experienced contractor who should be provided with all relevant record information.
014	Crane position	Over sailing neighbouring buildings within school grounds. Over loading / foundation design. Crane overturning.	Public Operatives	Crane location to be identified and designed as early as possible to facilitate installation of precast floor slabs, precast stairs and steel frame	Low	Design to consider possible location and construction of mobile crane. Prior to using mobile crane suitable investigation required to determine point loads of crane on site Design should also consider the movements required of the mobile crane throughout site before, during and after lifting activities. Consult with prospective Lifting Contractor as necessary. Over sailing rights to be obtained from neighbouring properties.	Design Team Principal Contractor	17-06-20	Ongoing

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015	Composite Slabs	Collapse during construction	Operatives	1. Slabs and beams designed to allow for ponding of concrete in construction phase. 2. Slabs to be poured to thickness to mitigate large build-up of concrete due to deflections. 3. Structural deck to be positively fixed to beams in accordance with manufacturer's recommendations.	Medium	A. Contractor to ensure concrete placed, not dropped from height. B. Concrete to be poured evenly ensuring distribution of load. C. Propping of longer span beams/deck to be considered. Refer to Cambria's Design Information for more detail.	Principal Contractor Design Team	17-06-20	Ongoing
016	Steel Frame Erection - MEWPS	MEWPS operating on the precast planks to erect the steelwork resulting in failure of precast planks	Operatives	MEWPS should not operate on the precast planks for the erection of the steelwork unless the loading of the MEWP has been confirmed as acceptable by the precast plank manufacturer and all planks have been grouted up.	Medium	MEWPS should erect steelwork either on the working platform around the perimeter of the building, or within the footprint of the building where precast planks have not yet been installed. Should a MEWP be operating within the footprint of the building on the working platform, then the contractor must consider how the MEWP gains access and egress from the footprint (sleeper walls will be installed	Client Design Team	17-06-20	Ongoing
017	Lifting and placing precast concrete components.	Failure of lifting equipment Collapse of structure	Operatives	1. Precast stairs and other restraints specified as being grouted up as work proceeds. 2. No oversized components to be used in the permanent works where practicable.	Medium	A. PCC subcontractor to provide method statements to address lifting and placing precast concrete units. B. Sequence for placing precast units must minimise asymmetrical loading and/or torsional loading on the frame. C. Propping to be used where necessary (TW Designer and Temporary Works Coordinator to be consulted).	Principal Contractor Design Team	17-06-20	Ongoing
018	Masonry Construction	Collapse of walls Manual Handling	Operatives	1. Windposts included in the design where necessary. 2. Masonry specified not to be loaded until mortar has attained design strength. 3. Masonry units exceeding 20kg weight specified as being mechanically placed. 4. Internal non-loadbearing walls specified as being temporarily supported until building envelope is complete to prevent collapse due to potential wind loads in the temporary state.	Medium	A. Method statements to address masonry work. B. Temporary support provided where required. C. Restraints and windposts completed beforehand and built into masonry as work proceeds.	Principal Contractor Design Team	17-06-20	Ongoing
019	Floor Voids	Falls from height	Operatives	1. Fabrication details to accommodate fixings for safety measures (e.g. edge protection). 2. Voidsafe protection specified to prevent falls through service voids. 3. Slab edges clearly identified on slab GA drawings to highlight requirement for temporary edge protection.	Medium	Residual Risk: Voidsafe not installed. Late addition of service voids. A. Edge protection to be provided. B. Address in method statements. C. Review latest co-ordinated drawings.	Principal Contractor Design Team	17-06-20	Ongoing
020	Coatings for structural elements, in particular steelwork	COSHH Asphyxiation	Operatives	Specify shop applied coatings for steelwork.	Medium	A. Avoid harmful chemicals wherever possible. B. Communal protection and suitable PPE for all work involving chemicals. C. Address in method statements. D. Consider lining/boarding in lieu of intumescent coatings.	Principal Contractor Design Team	17-06-20	Ongoing

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021	Working with in-situ concrete elements	Failure of formworks or falsework (Temporary Works) COSHH	Construction Operatives	Limited based on requirement of design. Competent contractor to be engaged for this element of works. Please refer to Cambria's Design Information	Medium	The project involves several areas of reinforced concrete construction, these elements will need to be carefully planned to ensure that temporary works associated with the same are managed effectively and the leading edges are adequately protected. The R/C Contractor will be required to develop suitable method statements and risk assessments prior to commencing works on site. This must address the following items: • Materials falling from above • Silica dust and HAVS from scabbling and vibro-poking operations. • Working with concrete (cement burns). • Cutting and craning re-bar. • Operatives falling from height during construction of the new floor, in particular from the leading edge as the falsework system is constructed. • Falls from height when constructing formwork and falsework and pouring concrete into the same. • Striking of shuttering. • Failure of structural formwork. A competent designer must be appointed to design the formwork/falsework system and a competent foreman must be appointed to ensure that the formwork/falsework is constructed in accordance with the design. The R/C Contractor shall provide a Lifting Plan for the lifting of re-bar, formwork/falsework and shuttering and shall also provide competent Slingers and Banksmen to control lifting on site. A "Permission to Load" must be issued prior to pouring concrete. This will be issued following inspection of the formwork/ falsework by the competent foreman	Design Team Principal Contractor	17-06-20	Ongoing
022	Proposed Retaining Walls	Falls from height Collapse of retaining walls	Construction Operatives End Users	The main works contract includes a retaining wall with a maximum retained height of 2.8m. All retaining wall designs incorporate handrails / guarding to prevent falling from height. Temporary guarding will be required during construction works if the permanent guarding is not in place	Medium	Proposed construction sequencing of retaining walls to be agreed between structural engineer, Principal Contractor and Temporary Works Designers. Backfilling of retaining walls to be agreed between structural engineer, Principal Contractor and Temporary Works Designers. Proposed edge protection at top of retaining walls to be developed by design team.	Design Team Principal Contractor	17-06-20	Ongoing

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023	Excavations	Collapse of adjoining structures Failure of Temporary Works Excavation walls collapsing Excavation of trampoline pit and hydrotherapy pits – excavation wall collapses	Construction operatives	Please refer to Cambria's Design Information.	Low	Surveys to be made available to Principal Contractor once appointed. All underground services must be located prior to excavation commencing on site. This will include the use of plans obtained from statutory services providers and the use of cable locating devices such as CAT scanners. Operatives must engage safe digging practices, including the use of hand tools within 0.5 metres of any live service. All services are to be treated as live until disconnection is confirmed. All services, where they cross excavations are to be provided with adequate support to prevent damage. The Services are not to be used for access across excavations. No person is permitted to enter any excavation unless the sides are properly supported or battered back to a safe angle for the ground conditions which apply. Even shallow trenches may require support in very poor conditions. A competent person is to be appointed to carry out daily inspections of all excavations at the commencement of each shift. Extra support will be required if any adjacent structures or vehicle activities are placing a surcharge on the excavation walls. Any groundwater is to be pumped from excavations on a regular basis.	Design Team Principal Contractor	17-06-20	Ongoing
024	Frame stability during plank installation	Collapse of structure injuring operatives	Construction operatives	Structural Engineer to provide details	Medium	Principal Contractor to develop Temporary Works Strategy in accordance with design specification and BS5975.	Structural Engineer Principal Contractor Contractor	17-06-20	Ongoing
025	Connection and breakthrough to existing structure	Temporary Works Hand Arm Vibration	Construction operatives	Full structural investigations to be undertaken between Structural Engineer and Principal Contractor.	Medium	Principal Contractor to develop Temporary Works Strategy in accordance with design specification and BS5975.	Structural Engineer Principal Contractor Contractor	17-06-20	Ongoing
026	Fire Stopping	Access during construction Working at height	Construction operatives	Design Team to undertake full review of all fire stopping in conjunction with Willmott Dixon to ensure buildability is considered from the outset of designs. Design Team have sought to reduce need to make penetrations throughout earlier Design Stages.	Low	Service penetrations to be reviewed and coordinated throughout the Stage 5. WD and Team to utilise federated models for all penetrations and positioning of ductwork etc.	Architect M&E Principal Contractor	17-06-20	Ongoing

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027	Access and Maintenance - Window Cleaning Strategy	Working at height Falls from height	End User	The East, South & West elevations of the building are provided with a suitable hard surface area such as permeable block paving for carrying out window cleaning via reach and wash poles. The northern elevation has a reinforced grass maintenance path provided, constructed from a system called Bodpave 85 which is suitable for regular trafficked surfaces of pedestrians and vehicles / MEWPS	Medium	Refer to Roberts Limbrick Access and Maintenance Strategy. Documented Access and Maintenance Strategy to be issued by Design Team to Client for comments. Documented Access and Maintenance Strategy to be included in H&S Files.	Design Team	17-06-20	Ongoing
028	Access and Maintenance - Roof	Falls from height Manual Handling	End user	The main flat roof of the building is accessed via internal stairs, providing safe and secure access onto the roof. The perimeter of the flat roof has permanent guarding in the form of roof upstands with a min. height of 1100mm. This is a viable option for accessing and maintaining the flat roof gutters and outlets. An external walkway with integral guarding is to be provided locally in front of the external windows on the Southern elevation (over the double height void area). The single storey roof is to be constructed using aluminium standing seam with a mono-pitch, the gutter will be accessible externally using a Skyvac or similar. No other edge protection is required to this roof for maintenance. Access onto the roof will be via a locked external door, access to keys for window cleaners will need to be managed by Building Users. No edge protection outside of this zone, therefore scaffolding access would be required. Residual risk to be documented in H&S Files for management to prevent unauthorised access roof.	Medium	Refer to Roberts Limbrick Access and Maintenance Strategy. Documented Access and Maintenance Strategy to be issued by Design Team to Client for comments. Documented Access and Maintenance Strategy to be included in H&S Files. Consideration of existing Hub building façade by link connection required for cleaning and maintenance.	Design Team Principal Contractor	17-06-20	Ongoing
029	Mechanical and Electrical Plant Access, Maintenance and Replacement Strategy	Falls from height Manual Handling Electrical Working Lifting operations	End User	Initial Plant maintenance and replacement strategy has been produced by Troup, Bywaters + Anders which has been developed in line with UK Health and Safety Standards.	Medium	Refer to Troup, Bywaters + Anders Initial Plant maintenance and replacement strategy. Documented Plant maintenance and replacement strategy to be issued by Design Team to Client for comments. Documented Access and Maintenance Strategy to be included in H&S Files.	Architect M and E Designer	17-06-20	Ongoing
030	Rainwater Pipes access and maintenance for cleaning	Falls from height	End user	Rainwater Goods can be cleaned on main roof from safety of roof enclosed within 1100mm parapet. Gutters to upper plant roof can be cleaned from roof level with the use of a SkyVac system eliminating the need to work at height Link building roof gutters can be cleaned from ground level with the use of a SkyVac system eliminating the need to work at height.	Medium	Refer to Roberts Limbrick Access and Maintenance Strategy. Documented Access and Maintenance Strategy to be issued by Design Team to Client for comments. Documented Access and Maintenance Strategy to be included in H&S Files.	Design Team Principal Contractor	17-06-20	Ongoing
033	PV Maintenance	Falls from height	End Users Future Contractors Site Operatives	PV panels have been located on the main roof allowing easy and safe access within the 1100mm parapet edge protection. The PV's have been positioned a safe distance back from the parapets to enable cleaning and maintenance to be undertaken safely. What is the size and weight of units for replacement procedures? Statement to be included in Access and Maintenance Strategy for cleaning and maintenance of plant room roof PV Maintenance and Cleaning – To be reviewed further during design development.	Medium	Refer to Roberts Limbrick and Troup, Bywaters + Anders Initial Plant maintenance and replacement strategy. Documented Plant maintenance and replacement strategy to be issued by Design Team to Client for comments. Documented Access and Maintenance Strategy to be included in H&S Files.	Architect M and E Designer	17-06-20	Ongoing

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034	Internal Glazing Cleaning	Falls from height Breaking of glazing	End User Future Contractors	Internal glazing can be cleaned by a specialist cleaning contractor generally from floor level. High level windows are located at First Floor within the double height void space, these will need to be cleaned using a pole cleaning system or an internal scaffold tower. Glazed balustrades to the First-Floor void areas can be cleaned by a specialist cleaning contractor from the First Floor circulation area. The outer face of the glazed balustrades can be cleaned in a similar manner as the high-level windows mentioned above. Glazed balustrades to the feature stair can be cleaned by a specialist cleaning contractor from the stairs themselves. Care is to be taken to other users of the stairs and no trip hazards are left on the stairs during or after the cleaning.	Medium	Refer to Roberts Limbrick Access and Maintenance Strategy. Documented Access and Maintenance Strategy to be issued by Design Team to Client for comments. Documented Access and Maintenance Strategy to be included in H&S Files.	Design Team Principal Contractor	17-06-20	Ongoing
035	External Bin Store and Bike Sheds	Climbing risks for youths	Public	Gaps to cladding on external Bin and Cycle store to be reduced to omit risk of climbing. Stage 5 Design Development to eliminate risk of climbing.	Low	Design Team are reviewing and revising the proposed designs to eliminate or adequately minimise the risks of climbing up structure and onto roof.	Design Team Principal Contractor	17-06-20	Ongoing
036	Groundworks adjacent to and connecting into the existing structure e.g. Undercroft	Structural collapse of existing building	End Users Public Site Operatives	Design Team have developed a specific sequencing for this element of works.	TBC	TBC	Design Team Principal Contractor	17-06-20	Ongoing
037	Furniture in close proximity to internal balustrade	Falls from height	Public End User	Final furniture specification to be agreed with Client, however current design allows for seating to be linked together in groups of 3-4. No single seats that are easily moved to be specified. A 1000mm path is currently provided along the length of the balustrade, no seating is to be positioned up against the balustrade.	Low	Residual Risks to be documented in H&S Files	Design Team End User	17-06-20	Ongoing
038	Maintenance of basement area drainage systems	Working in confined spaces Lighting	End User Future Contractors	Dainage pipe work runs through undercroft and into rainwater gardens. Within raised water planters there will be manholes for maintenance works.	Low	Pre-Cast concrete manholes in external garden areas and rodding eyes will be located outside of building.	Design Team	17-06-20	Ongoing
039	External Landscaping - Swales	Drowning within the surface water storage bodies (swales and raingardens)	Members of Public	The swale and rain garden features have been designed to be shallow features which only fill in extreme storm events.	Low	Minimise water depth within components - basin to drain within 48 hrs. banks designed with shallow gradients (max 1:3). Areas of permanent water in base to be planted with vegetation as barrier. Natural surveillance provided from footpaths / windows. Exceedance route to be provided for all features. Biorention planters to have minimal water depth (max 200mm), and be fully planted with dense planting.	Landscape Architect	17-06-20	Ongoing
040	Carpark areas	Collisions / accidents	Building users Public	Bollards / kerbs used to protect pedestrian areas where required. Appropriate signage to be put in place	Low	Deign to be developed in line with Client and H&S Regs requirements	Landscape Architect	17-06-20	Ongoing

Design Risk Assessments

Appendix 13

Covid-19

Response to Covid-19

The Covid-19 pandemic has undoubtedly had an adverse effect on the stakeholders involved with this project in one way or another.

The spread of the disease and subsequent recovery is viewed as unpredictable and no one is able to predict what and for how long measures are going to be required to combat the disease.

For the avoidance of doubt there is currently no provision within the agreed SCP's Target Cost or Programme. This said the SCP has provided cost and programme guidance to the CA and Health Board based on the current Construction Leadership Council's Standard Operating Procedures to form a guide so that a realistic cost estimate can be inserted into the overall business case for dealing with any potential consequences that may be required as a result of Covid-19.

Upon execution of Confirmation Notice Nr 2 all parties will review the latest available Construction Leadership Council guidance on Standard Operating Procedures for construction projects and reach an agreement on what measures (including associated time and cost implications) will be adopted by the scheme prior to construction work commencing on site.

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THANK YOU | DIOLCH YN FAWR