Ricardo
Energy & Environment

Haymarket Media Technical Hub Ecological Enhancement Report

Richmond Education and Enterprise Campus Development

Haymarket Media Technical Hub Reserved Matters Application

Planning Condition U07943 on Outline Application 15/3038/OUT

ED13002 | Issue Number 4 | Date 23/07/2019

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Haymarket Media Group

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Date:

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1 Introduction

This report has been prepared by Ricardo Energy and Environment on behalf of the Haymarket Media Group, for the discharge of planning conditions relating to the outline permission (15/3038/OUT) received on the Richmond Education and Enterprise Campus development (REEC) development and in support of the Reserved Matters submission by Haymarket Media Group. The report relates to the Haymarket Technical Hub Development Zone. The area of the proposed development within the context of the wider site is shown in **Figure 1**.

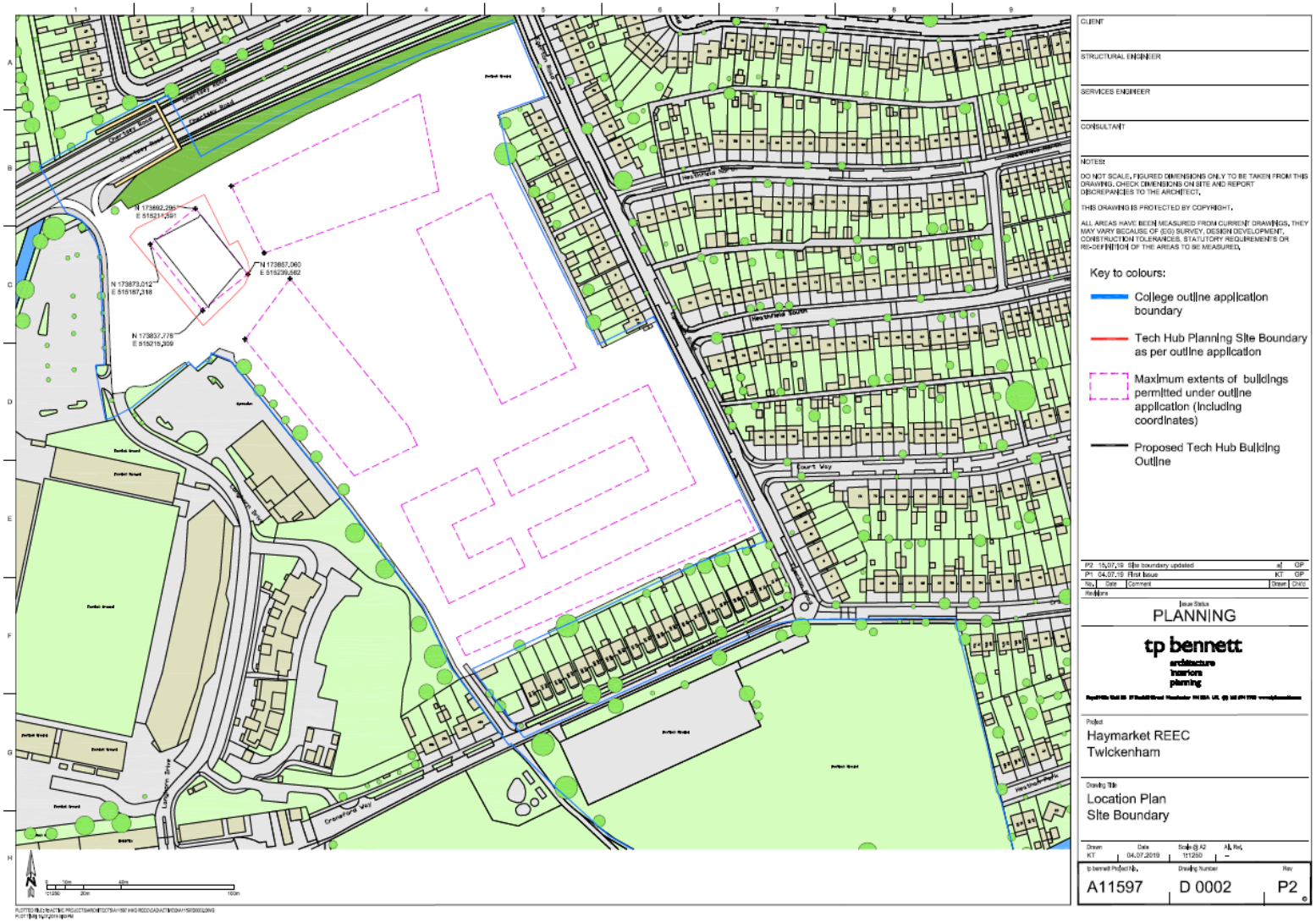
An Ecological Enhancement Report is required to discharge planning condition **U07943 Ecological Enhancement Measures** which states:

"That as part of development hereby approved bat and bird boxes, stag beetle loggeries, green corridors, brown and green roofs, green fences and other ecological enhancements shall be installed in accordance with details to be submitted to and approved in writing by the Local Planning Authority; such details to show the number, type and location of the boxes. These measures shall be installed prior to the occupation of more than 50 flats in the Residential Development Zone hereby approved.

REASON: To preserve and enhance nature conservation interests in the area."

As the discharging of planning conditions has been split into the various development zones, not all the enhancements listed in the Ecology chapter of the Environmental Statement, and planning condition U07943, are applicable. In particular, the inclusion of stag beetle loggeries and scrub habitats are applicable to the College Playing Fields development zone only. This report details the ecological enhancement measures to be implemented as part of the Haymarket Technical Hub Development Zone only, and principally includes; green roof provision, bat and bird boxes, a bug hotel, and native habitat planting and ecological corridor enhancement.

Figure 1. Site Location Plan (TP Bennett drawing no. A11597D0002P1)



2 Habitat Enhancements

2.1 Trees

The Haymarket Tech Hub Development Zone offers some opportunities for replanting and strengthening the green corridor along the A316 Chertsey Road, and between the site and the Richmond upon Thames College (RuTC) Development Zone. The planting schedule for the Tech Hub Development Zone is shown on **Appendix 1** (LUC Drawing LD-PLN-400). This includes provision for planting of 21 trees (see **Appendix 1**) – the majority of these will be planted along the east boundary of the Tech Hub, adjacent to the RuTC Main College Building, with the rest scattered along the west (adjacent to Marsh Farm Lane) and south (opposite the RuTC STEM Building) boundaries. This will enhance bat commuting and foraging opportunities and provide additional nesting sites for birds and complement the planting to be undertaken in the College Development Zone, to enhance the habitat connectivity throughout the wider REEC site.

The following species are proposed for use; Himalayan birch *Betula utilis jacquemontii*, rowan *Sorbus aucuparia* and liquidamber *Liquidambar styraciflua.* The Himalayan birch are clustered along the eastern boundary associated with the car parking area, whilst the rowan are along the western boundary to tie with the native trees which exist along Marsh Farm Lane. The two liquidamber stands are located in the south west corner of the site. Further details on the planting specification and numbers are found on **Appendix 1**.

All tree planting will be undertaken in accordance with BS 5837 'Trees in relation to design, demolition and construction. Recommendations' and BS 8545 'Trees from nursery to independence in the landscape. Recommendations'. Further details on the planting methodology are found in **Appendix 1**.

2.2 Native Hedgerows

Two lengths of hedgerow habitat will be provided along the northern boundary of the site (see **Appendix 1**), providing a 17.6m length in total. The species composition will be a mixture of guelder rose *Viburnum opulus*, crab apple *Malus sylvestris* and whitebeam *Sorbus aria*. The composition will be evenly split between the three species. All three species are of value to wildlife providing berries/fruit for birds to feed on, pollen for various insects, and leaves favoured by caterpillars of a number of moth species e.g. Rowan Slender (*Parornix scoticella*) which feeds on whitebeam leaves. Further details of the planting is found in **Appendix 1**.

2.3 Native Groundcover

There will be areas of planting in the form of mixed herbaceous understorey ground cover (approximately 256m^2), along the eastern boundary associated with the car parking area, forming an understorey to the Himalayan birch, and western boundary within the ecological corridor. The species to be used are great woodrush *Luzula sylvatica*, golden shield fern *Dryopteris affinis*, lady fern *Athyrium filix-femina*, gladden *Iris foetdissima*, bugle *Ajuga reptans*, sweet woodruff *Galium odoratum*, melick *Melica nutans* and Bowman's root *Gillenia trifoliate* (a non-native).

The species chosen are suitable for shaded areas, and a number are evergreen or semi-evergreen and therefore areas of foliage will persist through the autumn and winter providing shelter for birds and

invertebrates. Daffodil (*Narcissus pseudonarcissus*) and bluebell (*Hyacinthoides non-scripta*) will also be planted.

Further details, including the relative percentage mix for each species is found in **Appendix 1**.

2.4 Ecological Corridor

A 2m wide (minimum) ecological buffer (total area approximately 100m^2) will be planted along the western boundary, adjacent to Marsh Farm Lane. The buffer planting matrix will consist of mixed flowering shrub and herbaceous understorey. The species used in the buffer include; old man's beard *Clematis vitalba*, white dogwood *Cornus alba*, hazel *Corylus avellana*, spindle *Euonymus europaeus*, ivy *Hedera hibernica,* holly *Ilex aquifolium*, honeysuckle *Lonicera periclymenum*, dog-rose *Rosa canina*, elder *Sambucus nigra*, goat willow *Salix caprea* and guelder-rose *Viburnum opulus*.

The buffer will provide enhance the green corridor and linkages being created along Marsh Farm Lane and the wider site, with improved ecological connectivity and foraging and nesting opportunities for bat and birds. Further details, including the relative percentage mix for each species is found in **Appendix 1**.

2.5 Green Roof

The Development Management Plan (2011) for London Borough Richmond-upon-Thames, used when compiling the Environmental Statement to support the planning application, referred to green roofs under Policy DM SD 4 (Adapting to Higher Temperatures and Need for Cooling) and DM SD 5 (Living Roofs) DM OS 5 (Biodiversity and New Development). The Development Management Plan has been superseded by the Local Plan which was adopted in July 2018. The Local Plan includes the following relevant policies; LP17 (Green Roofs and Walls), LP12 (Green Infrastructure), LP20 (Climate Change Adaptation) and LP15 (Biodiversity). LP17 states that green roofs be incorporated into new developments where technically feasible and subject to considerations of visual impact, aiming to provide at least 70% coverage.

The feasibility of including a green roof on the Tech Hub building has been investigated and it is considered to be possible to include green roof modules on 85% of the area of roof not taken up by essential plant equipment. 'Plant' includes; ventilation, vents, roof lights, roof access hatch with additional space required for maintenance of these structures.

The area of green roof proposed for the Tech Hub building is 855m^2 of a total 1005m^2 of available space. The area of available space for green roof is calculated as the gross internal roof area (1104m^2) minus the area occupied by the plant compound (99m^2). The area being taken up by the photovoltaic panels and raised northlights has not been excluded from the calculations of area of 'available' roof space.

The green roof will be created using Bauder's XF118 Wildflower Blanket (see **Plate 1** and **Appendix 2**; TP Bennet Drawing D 0105 – Proposed Roof Plan), a wildflower blanket system which consists of a mixture of up to 24 species of wildflower and herbs (see **Appendix 3**). The species mix includes: *Achillea millefolium, Armeria maritima, Bellis perennis, Campanula glomerata, Campanula rotundifolia, Centaurea cyanus, Centaurium erythrea, Dianthus deltoides, Echium vulgare, Galium verum, Geum rivale, Linaria vulgaris, Lotus corniculatus, Lychnis flos-cu-culi, Papaver rhoes, Pilosella aurantiaca, Prunella vulgaris, Rhianthos minor, Saponaria officianalis, Scabiosa columbaria, Sedum acre, Silene uniflora, Silene vulgaris, Thymus polytricus*.

The green roof will provide additional a biodiversity benefits by creating suitable habitats for invertebrates and bird species which utilise brownfield sites. The wildflower blanket is endorsed by Buglife, and uses >95% recycled materials.

Plate 1: Bauder Wildflower Blanket XF118

There will also be an area of biodiverse roof over the cycle and refuse stores in the north-west corner of the Tech Hub site, adjacent to the Marsh Farm Lane ecological corridor (see **Figure 2** in **Section 3.2**).

Green roofs are low maintenance but are not maintenance free. As a result, the following maintenance activities will be carried out annually during the spring and autumn of the first year and annually thereafter:

- Removal of debris and leaves from the roof surface, rainwater outlets, chutes, gutters, etc. All debris should be removed from the roof and not flushed down rainwater pipes.
- Replace areas of settled substrate.
- Replace failed plants with new cuttings/plugs.
- Hand weeding of the roof to removal any undesirable plants. At least every five years the vegetation / top layer of substrate should be disturbed by hand using a rake, to maintain the desired habitat and prevent succession to a more stable habitat type.
- Fertiliser application.

All inspections / maintenance activities will be recorded on a roof plan, marked with co-ordinates of the location of specific issues, to provide an ongoing record of the inspection which can be compared year on year.

3 Species Enhancements

The loss of semi-natural habitat across the site will result in a loss of feeding and nesting opportunities for bats and breeding birds. To mitigate the loss of these opportunities, 15 bird boxes and 6 bat boxes will be installed across the site. The Tech Hub Development Zone will provide 1 bird nest box and 1 bat box, as discussed in Sections 3.1 and 3.2 below. The Development Zones for the School, College, Residential and Playing Fields will provide additional bird nest sites and bat boxes.

Opportunities for further species enhancements in the Tech Hub Development Zone include terrestrial invertebrate habitat creation (see Section 3.3).

3.1 Bat Box

Information obtained from the bat surveys carried out to support the outline application[1] suggests that the majority of bat activity is associated with the River Crane and Duke of Northumberland's River, around the grassland habitats to the north and south of the college, alongside Challenge Court and along peripheral habitats. Common pipistrelle *Pipistrellus pipistrellus* and soprano pipistrelle *Pipistrellus pygmaeus* were the dominant species recorded, with serotine *Eptesicus serotinus* and *Nyctalus* sp. recorded in low numbers.

The bat box proposed for the Tech Hub Development Zone will be located on the inside face of the west parapet to provide proximity to the ecological corridor and additional planting along Marsh Farm Lane. The exact specifications for the bat box have yet to be determined and will depend on fixtures to the parapet but a wall mounted box, such as the 2FE Schwegler Wall-Mounted Bat Shelter (see **Plate 2**), or other general purpose bat box would be appropriate. The proposed location in shown on the roof plan in **Appendix 2**.

Plate 2 Wall Mounted General Purpose Bat Plate or Box (*Photo credit: www.nhbs.com*)

The following points will be considered important in the positioning of bat boxes:

[1] Cascade Consulting (2015) *Richmond Education and Enterprise Campus Development: Environmental Statement*, Chapter 15 Ecology, Appendix 15.2 Breeding Birds and Bats Species Report. Report prepared by Cascade Consulting for London Borough of Richmond Upon Thames

- To increase the chance of it being used, locate the box at a site where bats are known to feed that is sheltered from strong winds and exposed to the sun for part of the day;
- Ideally, boxes should be located together facing in different directions to provide a range of temperature conditions. For example, boxes facing from south-east to south-west allow the sun to fall on each box for part of the day. During very hot days a south-facing box may overheat, but other boxes should have some shade during the day;
- Bat boxes should be located close to a linear vegetation feature such as a tree line or hedgerow. Some bat species use these features for navigation between their roosting site and feeding ground and to avoid flying in open and exposed areas;
- Most species will use higher positioned boxes.

3.2 Bird Box

Information obtained from the bird surveys to support the outline planning application[1] suggests that the majority of bird activity is associated with the peripheral vegetation around the edge of the site, notably the grassland area of Challenge Court, the mature tree line along the western and northern boundary of the College site, and the semi-natural habitat bordering the playing fields and watercourses. The species recorded using habitats around the College site included a range of typical garden species such as robin *Erithacus rubecula*, blackbird *Turdus merula*, wren *Troglodytes troglodytes*, blue tit *Cyanistes caeruleus*, great tit *Parus major* and greenfinch *Chloris chloris*.

The bird nest site provision in the Tech Hub Development Zone will comprise one general purpose, wall mounted bird box. The bird box proposed is a robin and wren bird box (see **Plate 3**).

Plate 3 Robin and Wren Wall Mounted Bird Box (*Photo credit: www.wildcare.co.uk*)

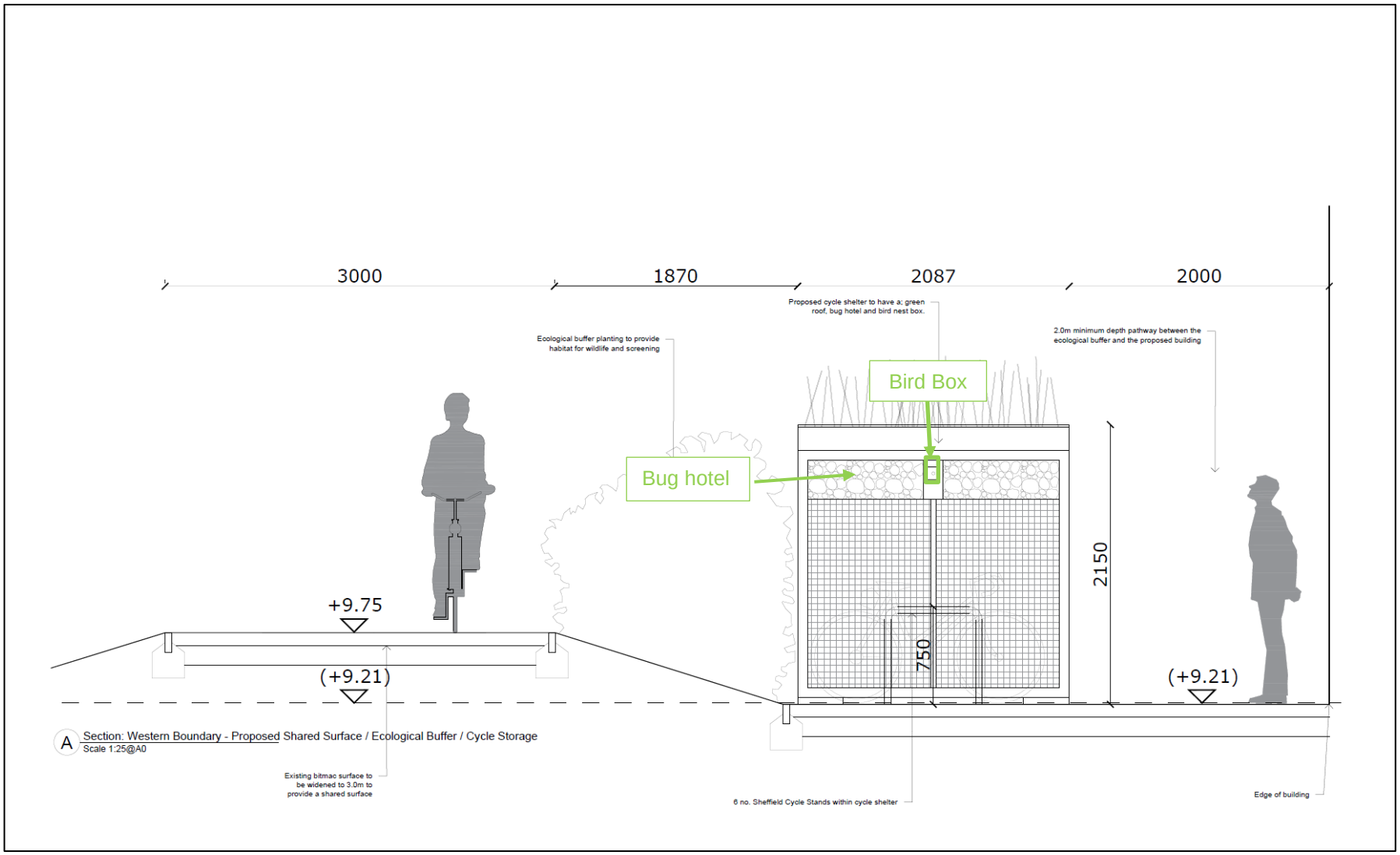
The following points will be considered when locating the bird boxes:

- Nest boxes of the same type should not be sited too close together as this may promote aggressive behaviour between neighbours;
- The front of the nest box should be angled vertically or slightly downwards to prevent rain from entering the nest box. The box should also be sheltered from prevailing wind, rain and strong sunlight;

- Small-hole boxes are best placed around 3m above the ground, avoiding sites where foliage an obscure the entrance hole;
- Open fronted nest boxes should be hidden from view, for example on a fence that has shrubs or creepers growing against it;
- Boxes should be placed such that they are inaccessible to predators, such as foxes, cats and squirrels; and
- Installation of boxes towards the end of winter stand a good chance of being used, as pairs begin to prospect in the latter half of February.

The proposed location for the bird box is on the cycle rack enclosure, approximately 2m high, and adjacent to the Marsh Farm Lane ecological corridor, as shown on **Figure 2**.

Figure 2. Bird Box Location on Cycle Rack Shelter (taken from LUC drawing SEC-650)



3.3 Bug Hotel

Provision has been made within the roof of the cycle rack enclosure for a 'bug hotel'. The hotel will be designed to provide shelter for a number of insects including solitary bees, ladybirds, lacewings, and wasps.

The cycle shelter is located in close proximity to the ecological corridor, which includes nectar-rich food plants such as honeysuckle, and the nesting tubes/blocks situated at a height of approximately 2m, thereby maximising the potential for use. The location of the bug hotel can be seen in **Figure 2**.

4 Conclusion

The REEC development results in the loss of relatively low value habitats given the urban context of the site. The semi-natural habitats of greater biodiversity value are located at the periphery, or outside the site.

The total proposed planting in the Haymarket Tech Hub Development Zone will provide 21 native trees, 17.6m length of native hedgerow, 100m^2 of native planting to enhance the ecological corridor along Marsh Farm Lane, and 256m^2 of groundcover along the eastern and western boundaries. This planting will enhance existing ecology corridors along Marsh Farm Lane, and provide better connectivity within the site itself, creating valuable habitat and providing food for a range of insects, birds and bats.

In addition to the habitat creation and enhancement to be provided as part of the development, a number of species enhancements will be provided, including a bird nesting box, a bat roosting box and invertebrate 'bug' hotel.

The landscape planting and ecological enhancements will minimise the significance of the effect of the reduction in bat foraging habitat by enhancing roosting opportunities and improving habitat provision for a range of prey species. The provision of tree planting will provide a beneficial effect on the scattered tree habitat and the bird and invertebrate populations will also be benefited from the planting and provision of specific nesting sites.

Appendix 1 – LUC Drawing- LD-PLN-400 Soft Landscaping

GENERAL
All supply, planting and other landscape works to be in accordance with relevant British Standards and Codes of Practice. Works to be undertaken by a competent and accredited landscape contractor with 12months Defects Liability/ in contract maintenance. Health and vigour of all planting stock to be maintained throughout with regular watering, pruning etc. Failed planting stock to be replaced as required.

PLANTING METHODOLOGY
Soil
Soil to be free of pests, disease, fungus and foreign matter.
Do not use topsoil contaminated with subsoil, rubbish or other materials that are corrosive, explosive, flammable, hazardous to human or animal life or detrimental to healthy plant growth.
The Contractor shall appoint a suitably qualified and approved, independent Soil Scientist to undertake the sampling and testing of the soil materials considered for importation.
An approved Soil Scientist is: Tim O'Hare Associates LLP, Howbery Park, Wallingford, Oxon, OX10 8BA, Tel: 01491 822653, www.toha.co.uk
Subsoil to be in accordance with BS 3882 'Specification for topsoil'.
For trees planted in hard landscape a load bearing growing medium will be necessary. This will be Urban tree planting medium, Grade: 0.6-2 mm.
Green compost for soil amelioration to be incorporated into soil for tree and shrub planting to be in accordance with BSi PAS 100:2011 or current revision and sourced from a PAS 100 compliant facility.
Fertilizer to be incorporated into soil for tree and shrub planting: Scotts Enmag CRF (11%N:22%P2O5:9%K2O:6%MgO).
Prepare undisturbed topsoil in accordance with BS 4428 'Code of Practice for general landscape operations': Break up hard ground thoroughly, remove visible roots and large stones with a diameter greater than 50 mm, dig areas covered with turf over to full depth of topsoil and treat weeds at appropriate times with a suitable translocated non-residual herbicide.
Prepare subsoil by excavating/placing fill to the required profiles, loosening thoroughly when ground conditions are reasonably dry to a depth of 450mm and removing stones larger than 50mm, arisings, contaminants, debris and builders' rubble.
Spread topsoil in layers of 150 mm maximum depth and gently firm each layer before spreading the next. After spreading topsoil, when weather and ground conditions are suitably dry and non-plastic, the soil profile shall be ripped at 300mm centres to a minimum depth of 300mm (grass areas) or 600mm (shrub beds, hedges) to decompact the soils and key in the topsoil and subsoil layers. Any large, compacted lumps of soil shall be broken down by further appropriate cultivation (in accordance with BS 4428) to produce a fine tilth suitable for planting (<30mm), turfing and seeding (<10mm). Cultivations shall ensure that the topsoil is fully aerated.
In order to avoid physical degradation to the soil during all phases of soil handling (e.g. spreading, cultivation, amelioration, planting, turfing and seeding), soil handling operations shall be carried out when soil is non-plastic (friable) in consistency (i.e. at least 5% below the soil's lower plastic limit). Soil shall not be unnecessarily compacted by trampling or trafficking by site machinery or handled when frozen or during and after heavy rainfall.

Timing
- Deciduous trees and shrubs: Late October to late March. Field-grown trees and shrubs planted out of season to be spring-ringed at nursery.
- Conifers and evergreens: September/ October or April/ May.
- Herbaceous plants: September/ October or March/ April.
- Container grown plants: At any time if ground and weather conditions are favourable. Provide watering and weed control as necessary.
- Dried bulbs, corms and tubers: September/ October.

Standard
All planting to be carried out in accordance with BS 4428 and during suitable weather conditions. Do not use mechanical tools within 100 mm of tree and plant stems. Water as necessary to ensure establishment and continued thriving of planting.
Plants to be materially undamaged, sturdy, healthy and vigorous specimen, of good shape and without elongated shoots, grown in a suitable environment and hardened off and free from pests, diseases, discoloration, weeds and physiological disorders. Plant standard to
BS 3936 'Nursery stock'. Name, forms, dimensions, provenance and other criteria as scheduled and defined in the National Plant Specification. Plant handling shall be in accordance with HTA 'Handling and establishing landscape plants'.

Groundcover
Geotextile fabric to all beds to be laid before planting. Cut flaps neatly for planting and refit closely around plant stems. Mulch with Melcourt Mini Pine Mulch, 60mm depth. Finished level of mulch to be 30 mm below adjacent grassed or paved areas.

Tree and Shrub Planting
Planting bed depth to be 450mm minimum. Biodegradeable weed fabric to all beds to be laid before planting. Cut flaps neatly for planting and refit closely around plant stems. Mulch with Melcourt Mini Pine Mulch, 60mm depth.
Finished level of mulch to be 30 mm below adjacent grassed or paved areas.

All native tree and shrub pnting to be undertaken in accordance with BS 8545 'Trees from nursery to independence in the landscape. Recommendations'.
Tree pits to be excavated to 450x450x450mm. Backfill with ameliorant (1 m^3 per 10 m^3 of topsoil) and fertilizer as specified.
All plants (except climbers) to be protected with biodegradable treeshelter, 60cm high with single timber stakes. Ensure that protection methods do not impede natural movement of trees and shrubs or restrict growth.
Tubex 500x500mm biodegradable hessian mulch mats to be installed to each pit with galvanised steel pegs.

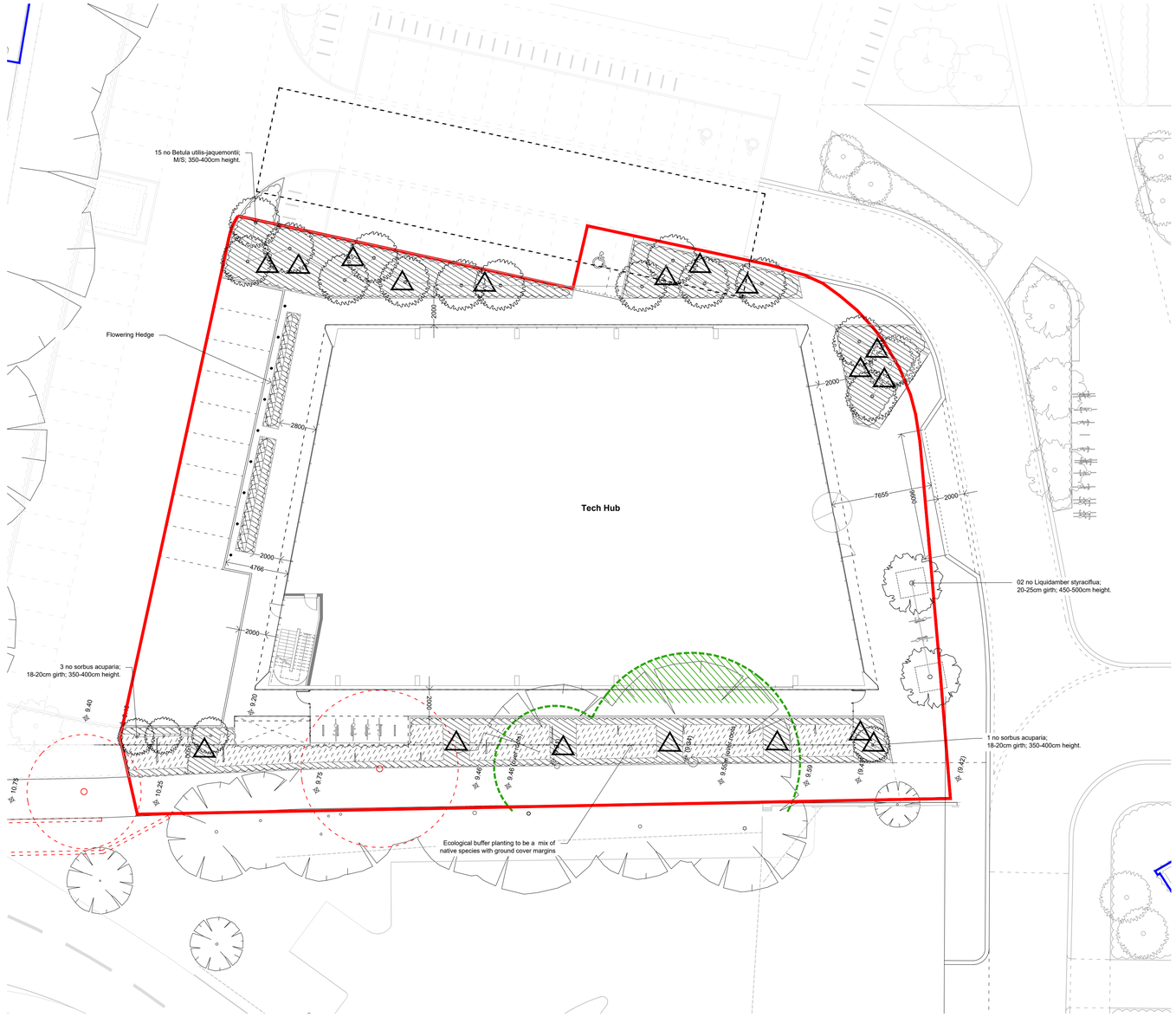
Trees
All tree planting to be undertaken in accordance with BS 5837 'Trees in relation to design, demolition and construction. Recommendations' and BS 8545 'Trees from nursery to independence in the landscape. Recommendations'.
For detail of tree pit including root barrier, guying system and aeration and irrigation pipe refer to LUC drawing 10743-LD-DET-610. Trees in hard landscape to be planted in load bearing growing medium as specified with tree grilles (Furnitubes - Portman steel).
Semimature trees to be root prepared and transplanted to BS 4043 'Recommendations for transplanting root-balled trees'.
All standard trees to be secured with 2 no. stake. Stakes to be 50mm diameter softwood, peeled chestnut, larch or oak, straight, free from projections and large or edge knots and with pointed lower end with nails to BS 1202.
All multistem tree to be secured using Platypus rootball anchoring kits.
Backfill with ameliorant (1 m^3 per 10 m^3 of topsoil) and fertilizer as specified.
Mulch with Melcourt Mini Pine mulch. Finished level of mulch to be 70 mm below adjacent grassed or paved areas.

MAINTENANCE
Contractor to maintain planting throughout duration of 12 month Defects Liability Period. Health and vigour of all planting stock to be maintained throughout with regular watering, pruning etc. Failed planting stock to be replaced as required.

Trees
Newly planted trees across the site will need to be watered regularly by hand during establishment i.e. for 3 years after planting.
Soil around the base of trees in grass will be kept clear of weeds.
Stakes/ties/ guys will be inspected and maintained in good order, adjusted and repaired where necessary to prevent rubbing of bark and removed when no longer required.
Trees will be visually inspected on routine maintenance visits for damage and general safety and security issues. Damaged branches will be removed from both tree and ground promptly to minimise damage to the tree and danger/obstruction to users of the site.
For newly planted trees formative pruning work will be carried out as required and as appropriate for the species to remove branches overhanging or obstructing access and to maintain the form and health of the tree. All pruning to be carried out by a Member of the Arboricultural Association and in accordance with BS 7370 'Grounds maintenance. Recommendations for maintenance of soft landscape'.


Transplant tree shelters and weed mat

		Type / Species	Specification	Density/Percentage
Quantity		**Trees**		
	15	Betula utilis jacquemontii	350-400cm height, RB, 4x, multi-stem-bushy, 3 stems min	As shown
	4	Sorbus acuparia	18-20 cm girth, 350-400cm height, RB	As shown
	2	Liquidambar stryraciflua	20-25 cm girth, 450-500cm height, RB	As shown
	%	**Flower Hedge Planting 17.6 linear m**		
	33.3	Viburnum opulus	Hedging plants, 80-100cm, 2 x tr, RB	3/linear m, single row
	33.3	Malus sylvestris	40-60cm height, B, 1+1; Transplant - seed raised; branched; 2 brks. Tree shelter and weed mat	3/linear m, single row
	33.3	Sorbus aria	40-60cm height, B, 1+1; Transplant - seed raised; branched; 2 brks. Tree shelter and weed mat	3/linear m, single row
% of area		**Ecological Buffer Planting Matrix 100m²**		**1 no. tree-shrub+1 no. ivy/1.2m2**
	5	Clematis vitalba	30-40cm height; 2L; several shoots.	1/m²
	15	Cornus alba	40-60cm Height, B, 1+1; Transplant - seed raised; branched; 2 brks. Tree shelter and weed mat	1/m²
	5	Corylus avellana	40-60cm Height, B, 1+1; Transplant - seed raised; branched; 2 brks. Tree shelter and weed mat	1/m²
	10	Euonymus europaeus	40-60cm height, B, 1+1; Transplant - seed raised; branched; 3 brks. Tree shelter and weed mat	1/m²
	5	Hedera hibernica	30-40cm height; 2L; several shoots.	5/m²
	20	Ilex aquifolium	40-60cm height, 2L, Branched; 3 brks. Tree shelter and weed mat	1/m²
	5	Lonicera periclymenum	30-40cm height; 2L; several shoots.	1/m²
	5	Rosa canina	40-60cm height, 2L, Branched; 3 brks. Tree shelter and weed mat	1/m²
	5	Sambucus nigra	40-60cm height, B, 1+0; Seedling; branched; 2 brks. Tree shelter and weed mat	1/m²
	10	Salix caprea	40-60cm height, B, 1+0; Seedling; branched; 2 brks. Tree shelter and weed mat	1/m²
	15	Viburnum opulus	40-60cm height, B, 1+1; Transplant - seed raised; branched; 2 brks. Tree shelter and weed mat	1/m²
% of area		**Groundcover Planting Matrix 256m²**		
	10	Ajuga reptans	1l pot	10/m²
	5	Dryopteris affinis	3l pot	5/m²
	5	Athyrium filix-femina	3l pot	5/m²
	10	Galium odoratum	1l pot	8/m²
	30	Melica nutans	1l pot	8/m²
	30	Luzula sylvatica	1l pot	8/m²
	5	Gillenia trifoliata	1l pot	5/m²
	5	Iris foetdissima	2l pot	5/m²
Quantity		**Bulbs**		
	315	Narcissus pseudonarcissus	Grade 8/9	groups of 15 interplanted amongst ground cover
	630	Hyacinthoides non-scripta	Grade 8/9	groups of 30 interplanted amongst ground cover



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Iss	Date	Description	Drn	Chk
3	12.07.19	Revision to area around refuse store	TB	JB
2	09.07.19	Amended Ecological Buffer Planting Areas	TB	JB

0 4 8 12m

Legend:
- **Site Boundary**
- **Existing trees retained**
- **Existing trees removed**
- **Proposed trees**
- **Proposed Ecological Buffer Planting Matrix** 1 tree-shrub and 1 ivy / 1.2m2, pits 450x450x450mm with mulch mat, tree tube shleters and bark mulch
- **Proposed Groundcover Planting Matrix** 75mm Bark mulch
- **Proposed Flowering Hedge**
- **Proposed bulbs**

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Project
Haymarket Tech Hub
REEC, Twickenham

Client
TP Bennett

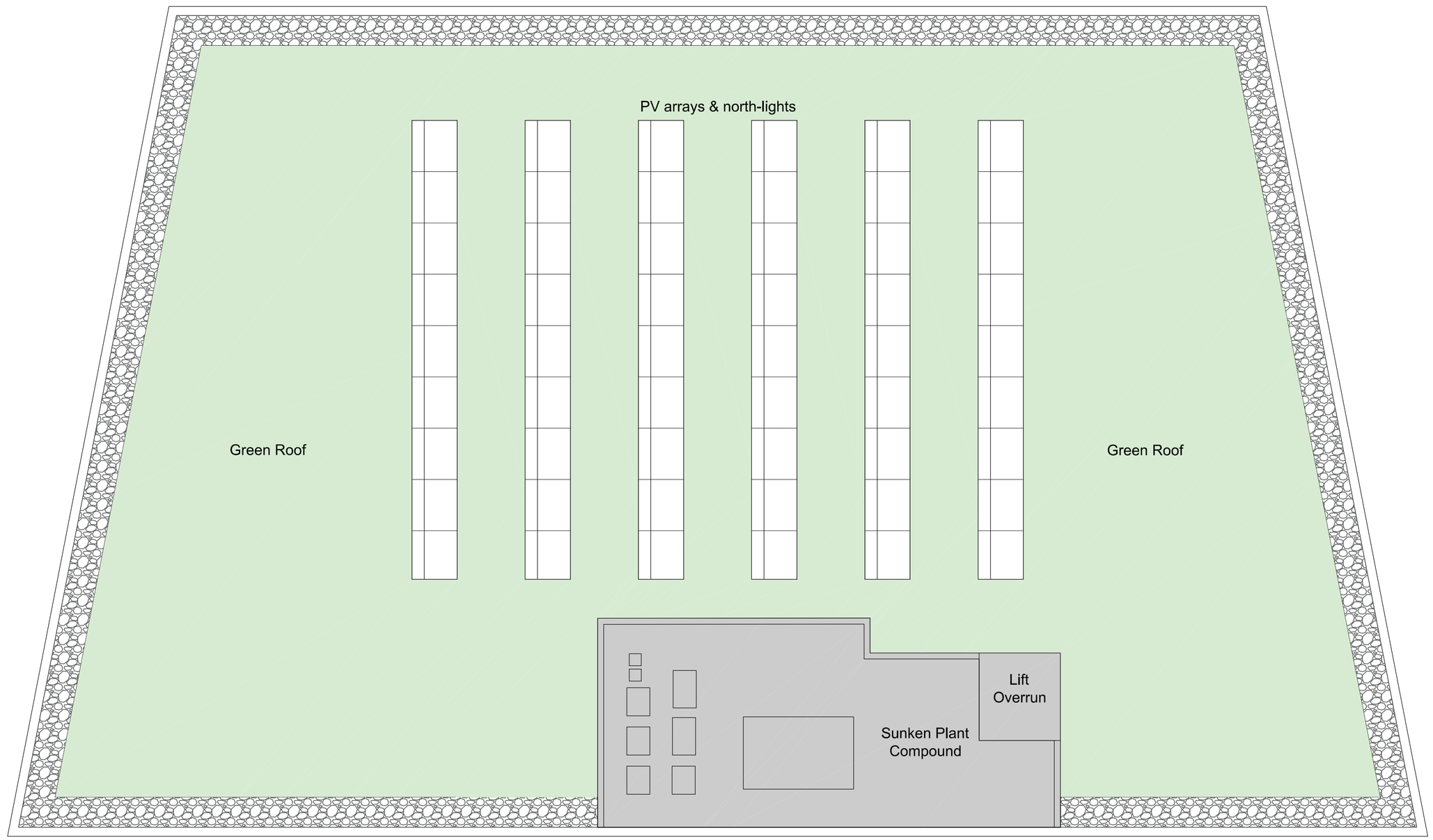
Scale @A1
1:200 @ A1

Status
For Information

Drawing Title
Soft Landscape Plan

Job Nr	Drawing Nr	Issue
10743	LD-PLN-400	3

Appendix 2 – TP Bennett Drawing A11597-D015-P6 - Roof Plan



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1:100 2m 8m

CLIENT

STRUCTURAL ENGINEER

SERVICES ENGINEER

CONSULTANT

KEY PLAN

NOTES:

DO NOT SCALE. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING. CHECK DIMENSIONS ON SITE AND REPORT DISCREPANCIES TO THE ARCHITECT.

ALL AREAS HAVE BEEN MEASURED FROM CURRENT DRAWINGS. THEY MAY VARY BECAUSE OF (EG) SURVEY, DESIGN DEVELOPMENT, CONSTRUCTION TOLERANCES, STATUTORY REQUIREMENTS OR RE-DEFINITION OF THE AREAS TO BE MEASURED.

ROOF GIA (INSIDE PARAPET) = 1104m sq.
SUNKEN PLANT AREA (INC, LIFT OVERRUN = 99m sq.
PV ARRAYS AND NORTH-LIGHTS = 138m sq.
PERIMETER ACCESS ROUTE = 12m sq.
GREEN ROOF AREA IS 77.4% OF GIA

No.	Date	Comment	Drawn	Chk'd
P6	12.07.19	Roof areas figures added. Plant amended	AJ	GP
P5	11.07.19	Skylight omitted	AJ	GP
P4	03.07.19	Plan updated to suit elevations. Landscape amended.	KT	GP
P3	02.07.19	Landscape Plan Updated	KT	GP
P2	19.06.19	Landscape Plan Updated	DK	GP
P1	10.06.19	Pre-app meeting issue.	KT	GP

Revisions

Issue Status
PLANNING

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Project
Haymarket Tech Hub REEC
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Drawing Title
Proposed Roof Plan

Drawn	Date	Scale @ A1	Alt. Ref.
KT	03.06.2019	1:100	--

tp bennett Project No.	Drawing Number	Rev
A11597	D 0105	P6

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PLOT TIME: 15.07.2019 10:33 AM

Appendix 3 – Bauder WB Native Wildflower Blanket Product Data Sheet

Revision: 13/07/2018 – V1

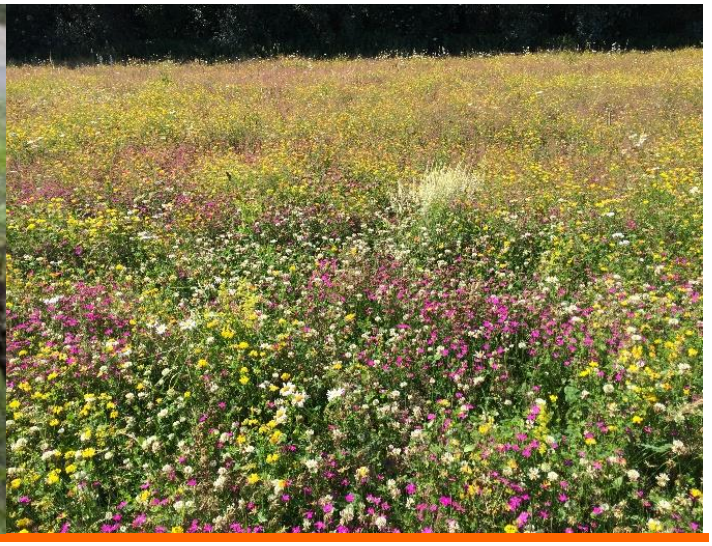
PRODUCT DATA SHEET

Bauder WB Native Wildflower Blanket

A British growth vegetation Blanket designed for use on green roofs. Containing a broad mix of UK native wildflower species. Suitable to be laid on Bauder (FLL Compliant) Biodiverse substrate.

Intended Use

Bauder WB Native Wildflower Blanket contains a broad mix of British Wildflowers grown in substrate on a coir carrier. The natural fibres of the coir carrier promote the rapid rooting of the blanket into the substrate. The product is installed over Bauder, FLL Compliant Biodiverse Substrate (see Product Data Sheet). The vegetation is a mix of hardy Wildflowers, annuals and herbs. The vegetation is cut back in the summer prior to delivery to reduce plant stress.



PRODUCT INFORMATION AND TECHNICAL PERFORMANCE		
Characteristic	**Unit**	**Value**
Maximum saturated weight	kg/m²	≤ 30
Thickness	mm	30 to 40
Species	Nos	36 wildflower species + 4 grass species (≤10%)
pH Value	pH	6.5 to 7
Material		Substrate and wildflower plants, grown on a coir mat carrier (100% Natural product)
Typical roll size	m	1 x 2
Rolls per pallet	Rolls	Typically 20 rolls - Dependant on weight (40m²)
Pallets per articulated lorry	Pallets	26 pallets – Dependant on weight (1040m²)

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Revision: 13/07/2018 – V1

PRODUCT DATA SHEET

CERTIFICATION AND ENVIRONMENTAL INFORMATION	
International Standards Organisation (ISO)	ISO 9001:2015 Quality Management Certificates EN1271 (UK) and 70499/03-15_e (Germany).
Flora Locale – Membership	
Perfect for Pollinators	
Endorsed by Buglife (the invertibrate charity)	
Recycled content	≥ 95% recycled material

INSTALLATION GUIDANCE

Normally installed directly onto levelled Biodiverse Substrate. WB Blanket should be installed as soon as possible on delivery. Care should be taken not to traffic the Blanket. WB Blanket should be laid by skilled operative. See Bauder's Green Roof Installation Guide for full details.

The correct watering and aftercare is required for this product.

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