

Red & Yellow Specialist Extra Care Melliss Avenue - Kew

Sustainable Construction Checklist October 2018





Quality information

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Introduction

A Sustainable Construction Checklist (SCC) is required in support of a planning application to the London Borough of Richmond upon Thames for the following classes of development:

- An all new residential development providing 1 or more new dwellings, including conversions and extensions that create one or more new dwellings.
- An all new non-residential development providing 100m² or more floor area, including extensions over 100m².

The SSC is used to assess compliance with Richmond Borough's minimum policy requirements. The issues are scored, with an overall score indicating the level of sustainability of the development.

Section 2 describes the proposed development which this SCC supports. In Section 3, the sustainability issues for the proposed development are discussed based on the categories within the SCC. Where appropriate, further information is provided to support the scoring within the SCC. The completed SCC is included as Appendix A, with a BREEAM pre-assessment included as Appendix B.

The Proposed Development

The proposed development is the Red & Yellow Specialist Extra Care Facility located at the Former Biothane Site at Melliss Avenue, Kew, TW9 4BD.

This development involves the demolition of existing buildings and structures and redevelopment of the site to provide a Specialist Extra Care facility (C2 Use Class) for the elderly with existing health conditions. It comprises 89 units with extensive private and communal healthcare, therapy, leisure and social facilities. The building is ground plus 3 to 5 storeys including setbacks. The scheme includes the provision of car and cycle parking, associated landscaping and publicly accessible amenity spaces including a children's play area.

More details are provided in the Design & Access Statement and the planning drawings.

Sustainable Construction Checklist (SCC)

A completed copy of the SCC is included as Appendix A to this report, from which it can be seen that an overall score of 59.5 is achieved for the new Specialist Extra Care facility. This equates to a Residential new-build 'A' rating, meaning the development makes a major contribution towards achieving sustainable development in Richmond.

As mentioned above, this section of the report provides further information, supporting evidence and justification for the credits scored in the enclosed SCC. Section reference numbers below follow the SCC.

1 Minimum Policy Compliance (Residential and Non-Residential)

Carbon Dioxide Emissions Reduction

The Energy Strategy for reducing the consumption and associated carbon dioxide (CO₂) emissions has been guided by the Mayor's Energy Hierarchy:

- Passive design and energy efficiency 'Be Lean'
- Energy efficient supply of services 'Be Clean'
- On-site renewable energy technologies 'Be Green'

The strategy is set out in the Energy Statement which has been prepared by AECOM and is submitted in support of the planning application. The document refers to the relevant planning policy and targets. A summary of the Energy Strategy is set out below.

A baseline scheme has been determined which would meet the requirements of Building Regulations ADL A 2013. This was based on modelling of sample dwellings and of the non-domestic areas which was scaled to represent the building as a whole. The approach provides the basis for assessing the CO_2 savings resulting from the proposed energy strategy compared to Building Regulations Part L.

In accordance with the RBKT Local Plan (adopted July 2018), the residential part of the development should meet at least 35% CO_2 emissions reduction through onsite solutions, with further reduction to zero carbon through a payment to the council. The non-residential part of the development should meet at least 35% CO_2 emissions reduction through onsite solutions.

Passive design principles and an energy efficient building fabric and building services specification will be adopted. These are detailed in the Energy Statement. This approach will result in an estimated 4% saving in regulated CO_2 emissions over the site-wide baseline.

The potential for connection to nearby existing low carbon heat distribution networks has been investigated but is deemed not viable. Next, the use of on-site Combined Heat and Power was considered. This has not been progressed as there is no existing gas supply to the site and there are concerns regarding the heat losses from the distribution pipework – both in terms of system efficiency and unwanted heat gains. Biofuel CHP was also reviewed and dismissed on the grounds of air quality and the impact of fuel deliveries.

After consideration of a range of on-site renewable energy technologies, two technologies were deemed suitable – solar photovoltaic (PV) panels and air source heat pumps (ASHPs). These will be used to reduce the demand for grid electricity and to provide the primary source of heating.

It is proposed that rooftop PV panels will be fixed above a green roof. The proposals are for 285m² of panel above the commercial areas and 145m² for the domestic areas, a total of 430m². The panel area is based on the expected performance of the PV panels, as this is the critical element in relation to the savings achieved, rather than the overall area of the arrays. The assumed performance is set out in the Energy Statement. Spacing of the PV panels is expected to allow areas of light and shade to the roof below, creating a range of microclimates and enhancing the biodiversity of the roof.

Heating will be provided via an ambient temperature water loop around the building serving an electrically fuelled heat pump in each dwelling. The local heat pump will be similar in appearance to a domestic boiler. The water loop will recharge using air source heat pumps. The use of a low temperature water loop will reduce distribution losses and the risk of overheating in corridors. The combination of ASHPs and electric heat pumps means that, as the grid decarbonises, the CO_2 emissions associated with heating at the development will proportionately reduce. The use of a lower temperature water loop has the added benefit of providing future flexibility to connect to a low carbon heat network if one were to become available in the area.

With the combination of passive design, energy efficiency measures and renewable measures, the target of 35% on-site CO₂ savings is predicted to be met. This is shown below.

Site-wide Assessment	Regulated CO ₂ (Tonnes p.a.)	Unregulated CO ₂ (Tonnes p.a.)
Building Regulations ADL A 2013 Compliant Baseline	202.1	99.7
After passive design and energy efficiency measures ('be lean')	194.6	99.7
After low carbon technologies ('be clean')	194.6	99.7
After renewable energy technologies ('be green')	131.4	99.7

Estimated CO₂ Emissions after Each Stage of the Energy Hierarchy

Estimated Regulated CO₂ Savings from Each Stage of the Energy Hierarchy

Site-wide Assessment	Regulated CO ₂ savings (Tonnes p.a.)	Improvement over baseline (%)
Estimated savings from 'be lean'	7.5	3.7%
Estimated savings from 'be clean'	0	0%
Estimated savings from 'be green'	63.1	31.2%
Total estimated cumulative CO ₂ emissions over Baseline	70.7	35%

The ventilation and cooling strategies which are included in the Energy Statement are described in Section 2.1 below.

Environmental Rating of the Development

In accordance with the London Borough of Richmond Upon Thames minimum policy compliance, this development will target a BREEAM rating of "Excellent".

A BREEAM New Construction 2014 Pre-assessment has been undertaken and can be found in Appendix B. This pre-assessment demonstrates that the development can achieve a BREEAM rating of 'Excellent" (>70%) and determines an appropriate strategy to achieve certification at this stage of the development. The actual route to certification at both the design and construction stages may vary as the assessment and design of the development progresses.

The principles required by the credit criteria selected to achieve an "Excellent" rating are seen to be demonstrated across all the documentation associated with this planning submission.

Water Usage

Water efficiency measures and devices will be installed within the development to achieve an equivalent maximum daily water usage of 105 litres/person/day as per the minimum policy compliance requirements. The calculation and likely sanitary fittings that will be specified to achieve this compliance can be seen in Appendix C.

2 Energy Use and Pollution

2.1 Need for Cooling

When developing the energy strategy, in addition to basic overheating compliance tests, dynamic thermal modelling has been used to assess the overheating risk. A number of sample apartments were selected for the overheating analysis. The assessment and details of the design response are set out in the Energy Statement.

In summary:

- Insulation will be provided in both the roofs and walls to reduce heat gains. It is anticipated that U-values better than those stated in the Building Regulations will be achieved. A green roof is also proposed which assists in passive cooling.
- Shading measures including a brise soleil and other overhangs will be used to reduce excessive heat gains and prevent overheating.
- Mechanical ventilation with heat recovery (MVHR) will be provided to apartments because of the external noise issues on the site. In addition, passive ventilation will be available in the form of openable windows.
- Cooling is not anticipated to be required or provided to the apartments.

Active cooling will be provided in non-residential parts via Air Source Heat Pumps.

2.2 Heat Generation

As described in the Energy Statement, a high efficiency, low carbon communal heating system, powered by electricity, is proposed for the development; this system will use heat pumps to feed a low temperature communal hot water circuit around the building. Within each flat, an individual water-to-water heat pump will produce higher temperature water to meet the space heating and domestic hot water needs.

2.3 Pollution: Air, Noise and Light

2.3a Air Pollution

An Air Quality Assessment (prepared by AECOM) and a Construction Management Plan (prepared by Blue Sky Building) have been produced to support this planning application. These documents provide an outline of the reduction strategies that will be implemented to reduce the dust emissions from the construction process.

In addition to this, within the 2014 BREEAM New Construction pre-assessment (as per Appendix B) the following BREEAM credits have been targeted in order to reduce air pollution associated with the development:

- Hea02: Indoor Air Quality
- Hea02: VOC Emission Levels (products)
- Pol 01: Impact of refrigerants.

2.3c Noise Pollution

A noise survey and assessment report has been produced by AECOM. This demonstrates that the development will take measures both to reduce existing noise and to enhance the existing soundscape of the site. To avoid creating any new noise generation/transmission issues in operation, the following steps are recommended:

- British Standard 4142:2014 guidance will be adhered to ensure noise emissions from the development will meet required levels.
- The building should incorporate high performance acoustic glazing together with a concrete roof and a heavy weight façade build-up to ensure a reduction in existing noise, specifically from overhead air traffic.
- New plant will be specified to be quieter than the existing background noise levels.

The associated Noise Survey and Assessment document is included separately as part of the application.

2.3d Light Pollution

The BREEAM New Construction 2014 pre-assessment, summarised in Appendix B, demonstrates that the development will take measure to reduce light pollution impacts. This is through targeting the following credits:

- Pol04: Reduction of night time pollution
- Ene03 : External Lighting

Ene03 requires all external lighting to be specified with a 60Lm/circuit watt average and to be managed by both daylight sensors and time controls. To comply with Pol04 requirements, the external lighting will need to be dimmed between 11pm and 7am if required for safety and security or otherwise switched off.

3 Transport

3.1 Provision for the safe, efficient and sustainable movement of people and goods

The proposed development will include innovative travel technologies in the form of electric charging points, alongside indoor cycle and mobility scooter storage.

A full Transport Assessment, including a travel plan, has been produced by AKTII and Tyréns, and forms part of the planning submission. This document, based on TfL's Best Practice Guidance, identifies that the following sustainable travel options will be available to both the residents and staff:

- 27 car parking spaces (12 allocated to blue badge disabled)
- Electric charging points will account for 20% of all car parking spaces
- Cycle parking 10 secure and sheltered long stay spaces, 18 short stay spaces
- Kew Gardens Tube Station (1km walking distance from the site)
- Local bus routes.

The provision of sustainable transport options is further confirmed by the BREEAM pre-assessment; see Appendix B, which targets the following credits:

- Tra02: Proximity to Amenities
- Tra03: Cyclist Facilities
- Tra04: Maximum car parking facilities
- Tra05: Travel Plan.

4 Biodiversity

4.1 Minimising the threat to biodiversity from new building, lighting, hard surfacing and people

As described in the *Preliminary Ecological Appraisal* included as part of the planning application, the former Biothane Site at Melliss Avenue is predominantly comprised of hardstanding features associated with the on-site waste treatment facilities, interspersed with a relatively large area of neutral semi-improved grassland with intermittent patches of tall ruderal and ephemeral/short perennial herbs. Additionally, continuous scrub and a variety of semi-mature and occasional mature trees line the site's east boundary with the Kew Riverside Walkway and scattered, ornamental varieties of oak and other trees line both south and west boundaries.

The habitats present on site are suitable for nesting birds and provide potential foraging, commuting and hibernation habitat for Western European hedgehogs, which have been recorded within the wider local area. In addition, features within a small building within the Thames Water site and several ivy covered trees within the Proposed Development site have the potential to support roosting bats.

In the process of the development, it is predicted that 6,400m² of these existing ecological features / habitats will be removed.

In regards to ecological enhancement, the following recommendations have been made:

- Creation of nectar rich, structurally diverse green roofs, green walls and planters to replace and enhance the species-rich semi-improved grassland;
- Planting of native trees to replace and mitigate the loss of existing trees;
- Creation of an species-rich urban mini-meadow, designed for urban pollinating insects such as bumblebees (LBAP species');
- Providing nesting/refuge opportunities for pollinators through the installation of habitat boxes;
- Provision of deadwood piles and/or a stag beetle loggery to provide habitat for saproxylic insects;
- Nesting provision for swifts and house sparrows, which are priority species listed under the London BAP;
- Integration of bat bricks and bird nest bricks into the building design; and,
- Provision of scrub and grassland habitat which connects with adjacent linear habitat to benefit hedgehogs (a national and local priority species listed under Section 41 of the NERC Act and London BAP).

A biodiversity strategy has been produced which demonstrates the incorporation of new features and/habitats within the development

This strategy lays out a number of new features, including:

- Tall native Shrub Planting
- Low native Shrub Planting
- Ornamental Shrub Planting with Plans for Pollinators
- Native trees
- Meadow habitat
- Lawn
- Biodiverse Green Roof.

Additionally, the BREEAM 2014 New Construction pre-assessment in Appendix B indicates that the development is targeting LE02, LE03, LE04 and LE05 credits. These credits relate to the protection of existing ecological features and promoting ecological enhancement through the production of an ecology report at design stage, and undertaking the required recommendations at post construction stage.

The supplementary information that evidences the information within the checklist can be seen in support of this planning application. This is seen within the Design & Access Statement and Open Space Assessment as produced by Marchese Partners/Wilder Associates and the Tree Survey and Constraints plan produced by Wilder Associates.

5 Flooding and Drainage

5.1 Mitigating the risks of flooding and other impacts of climate change in the borough

A flood risk assessment has been produced by AKT II as part of the planning application. The following measure within the drainage hierarchy has been incorporated into the development's design:

• Discharge rainwater to surface water drain

As a result of the development, there will be a decrease in the area of permeable surfacing by 1280m² and there will be more impermeable surfaces in the new development than at present. This is a result of contamination/ high ground water / underlying conditions on the site not allowing for infiltration of water through the substrate.

6 Improving Resource Efficiency

6.1 Reduce waste generated and amount disposed of by landfill though increasing level of re-use and recycling

Demolition of the remaining buildings on the former Biothane plant site will be required prior to the construction of the proposed development. A *Construction Management Plan*, produced by Blue Sky Building, and *Contaminated Land Assessment*, produced by AKT II, accompany the planning submission and detail the following values for demolition waste:

- 35% will be re-used in the new development
- 20% will be recycled

Additionally, a ground investigation report has been produced by Soiltechnics ("Soiltechnics report May 2018"), Also forming part of the planning submission, this document contains a site contamination assessment and remediation plan which has been put in place to remediate contamination (section 13).

Additionally, the BREEAM New Construction 2014 pre-assessment, as seen in Appendix B, shows that the development is targeting the following credits:

- Wst 01: Construction Waste Management
- Wst 02: Recycled Aggregates

During construction all waste produced is to be recorded with an initial KPI of 7.5m³/100m² GIA targeted, alongside the inclusion of recycled or secondary aggregates within construction.

6.2 Reducing levels of water waste

The following water conservation measures will be incorporated into the development:

- Fitting of water efficient sanitary fittings
- Use of water efficient A or B rated appliances

- A water meter will be fitted.

This can be confirmed by the BREEAM 2014 New Construction pre-assessment, found in Appendix B, in which the development is targeting the following credits:

- Wat01: Water consumption
- Wat02: Water monitoring
- Wat03: Water leak detection and prevention
- Wat04: Water efficient equipment.

7 Accessibility

7.1 Ensure flexible adaptable and long-term use of structures

As described within the *Design & Access Statement* produced by Marchese Partners as part of the planning application, the design of the development and new accommodation within it will meet the requirements of the nationally described space standard for internal space and layout. Additionally, it will also meet the Building Regulation Requirement M4 (2) 'accessible and adaptable dwellings' alongside Building Regulation Requirement M4 (3) 'wheelchair user dwellings'.

Appendix A : Sustainable Construction Checklist

LBRUT Sustainable Construction Checklist - January 2016

This document forms part of the Sustainable Construction Checklist SPD. This document must be filled out as part of the planning application for the following developments: all rms ouccurrent rorms part of the sustainable construction checkins SPD. This document **must** be fulled out as part of the planning application for the following developments: all residential development providing one or more new neise. And all other forms of development providing **100sqm or more of non-residential floor space**. Developments including **conversions leading to one or more new units**, and all other forborned providing development providing **100sqm or more of non-residential floor space**. Developments including new non-residential development of less than 100sqm floor space, extensions less than 100sqm, and other conversions are strongly encouraged to comply with this checklist. Where further information is requested, please either fill in the relevant section, or refer to the document where this information may be found in detail, e.g. Flood Risk Assessment or similar. **Further guidance** on completing the Checklist may be found in the Justification and Guidance section of this SPD.

Property Name (if relevant):	Red & Yellow Specialist Extra Care, Mellis Avenue, Kew	Application No. (if known):							
Address (include, postcode)	Former Biothane Site, Melliss Avenue, Kew, London, TW9 4BD								
Completed by:	AECOM								
For Non-Residential		For Residential							
Size of development (m2)		Number of dwellings 96							
1 MINIMUM COMPLIANCE (RESIDENTIAL AND NON-RESIDENTIAL)									
Energy Assessment	ment been automitted that demonstrates the superiod energy and earbox disuids a	missions on the from energy officiency and	Voc						
renewable energy me	asures, including the feasibility of CHP/CCHP and community heating systems? If y	yes, please tick.	Tes						
Carbon Dioxide emissions re What is the carbon did	eduction		TBC						
Policy DM SD 1 and London Plan Policy 5.2 (2015) require a 35% reduction in CO ₂ emissions beyond Building Regulations 2013.									
Percentage of total site CO2 emissions saved through renewable energy installation?									
Percentage or total site CO2 emissions saved inrough renewable energy installation?									
1A MINIMUM POLICY COMPLIANCE (NON-RESIDENTIAL AND DOMESTIC REFURBISHMENT)									
	Please check the Guidance Section of this SPD for the p	policy requirements							
Environmental Rating of dev	elopment:								
Non-Residential new-build (10	Osqm or more)		<u></u>						
BREEAM Level Extensions and conversions fo	r residential dwellings	Have you attached a pre-assessment to support this?	v						
BREEAM Domestic R	efurbishment Please Select	Have you attached a pre-assessment to support this?							
Extensions and conversions for	r non-residential buildings	Line of the bard of the second s	_ {						
BREEAM Level	Please Select	Have you attached a pre-assessment to support this?							
Score awarded for En	vironmental Rating:		Subtotal 8						
BREEAM:	Good = 0 , very Good = 4, Excellent = 8, Outstanding = 76								
1B MINIMUM POLICY C	OMPLIANCE (RESIDENTIAL)								

Water Usage Internal water usage limited to 105 litres person per day. (Excluding an allowance 5 litres per person per day for external water consumption). Calculations using the water efficiency calculator for new dwellings have been submitted.

√1 Subtotal 1

2. ENERGY USE AND POLLUTION	
2.1 Need for Cooling	Score
 How does the development incorporate cooling measures? Tick all that apply: 	
Energy efficient design incorporating specific heat demand to less than or equal to 15 kWh/sqm	
Reduce heat entering a building through providng/improving insulation and living roofs and walls	✓ 2
Reduce heat entering a building through shading	☑ 3
Exposed thermal mass and high ceilings	4
Passive ventilation	✓ 3
Mechanical ventilation with heat recovery	✓ 1
Active cooling systems, i.e. Air Conditioning Unit	0
2.2 Host Congration	
b How have the heating and eating waterns with professore to the heating watern historychy, hear colorted (defined in London Plan policy 5 6)? Tick all	hosting and
5. Now have the hearing and cooling systems, with preference to the hearing system metaricity, been selected (defined in London Fian policy 3.0)? Fick an cooling systems that will be used in the development.	rieating and
country systems that will be used in the development. Connection to existing heating or cooling networks powered by renewable energy	
Connection to existing heating of cooling networks powered by relevance energy	
Site wide CHP petwork nowered by renewable energy	
Site wide CHP network powered by gas	
Communal beating and cooling powered by renewable energy	H ₂
Communal heating and cooling powered by gas or electricity	
Individual heating and cooling	
2.3 Pollution: Air, Noise and Light	
a. Does the development plan to implement reduction strategies for dust emissions from construction sites?	☑ 2
b. Does the development plan include a biomass boiler?	-
If yes, please refer to the biomass guidelines for the Borough of Richmond, please see guidance for supplementary	
information. If the proposed boiler is of a qualifying size, you may need to completed the information request form found	
on the Richmond website.	-
c. Please tick only one option below	
Has the development taken measures to reduce existing noise and enhance the existing soundscape of the site?	⊠ 3
Has the development taken care to not create any new noise generation/transmission issues in its intended operation?	21
d Has the development taken measures to reduce light collution impacts on character, residential amonity and hisdiversity?	
u. Has the development taken measures to reduce light politition impacts on character, residential amenity and biodiversity?	⊻ 5
e Have you attached a Lighting Pollution Report?	
	Subtotal 19
Please give any additional relevant comments to the Energy Use and Pollution Section below	
Please refer to the relevent section within the associated Sustainable Construction Checklist report for additional comments and document references,	

3.1 Provision for the safe efficient and sustainable movement of people and goods a. Does your development provide opportunities for occupants to use innovative travel technologies?

Please explain: Yes - Charging points for electric vehicles will cover 20% of parking spaces and access to indoor cycle and mobility scooter storage. A travel plan will also be produced which will inform the residents and staff of the most sustainable models of transport. **√** 2 b. Does your development include charging point(s) for electric cars? For major developments ONLY: Has a Transport Assessment been produced for your development based on TfL's Best Practice Guidance? c. If you have provided a Transport Assessment as part of your planning application, please tick here and move to Section 3 of this Checklist. **√** 5 For smaller developments ONLY: Have you provided a Transport Statement? □ <u>5</u> d. Does your development provide cycle storage? (Standard space requirements are set out in the the Council's Parking Standards - DM DPD Appendix 4) If so, for how many bicycles? **√** 2 e. **v** -Is this shown on the site plans? □ <mark>2</mark> Will the development create or improve links with local and wider transport networks? If yes, please provide details. f. Subtotal 9 Please give any additional relevant comments to the Transport Section below Please refer to the relevent section within the associated Sustainable Construction Checklist report for additional comments and document references,

space? (Indicate if yes)
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7	ACCESSIBILITY			
7.1	Ensure flexible adapta	ble and long	term use of structures	
a.	If the development is r	residential. w	il it meet the requirements of the nationally described space standard for internal space and layout?	<u>र</u> 1
		If the standard	ds are not met, in the space below, please provide details of the functionality of the internal space and lavout	
AND				
b.	If the development is r	residential, w	ill it meet Building Regulation Requirement M4 (2) 'accessible and adaptable dwellings'?	☑ 2
		If this is not m	net, in the space below, please provide details of any accessibility measures included in the development.	
				_
		For major res	idential developments, are 10% or more of the units in the development to Building Regulation Requirement	✓ 1
		M4 (3) 'wheel	chair user dwellings'?	
OR				
с.	If the development is r	non-residenti	al, does it comply with requirements included in Richmond's Design for Maximum Access SPG	2
		Please provid	le details of the accessibility measures specified in the Maximum Access SPG that will be included in the	
		development		
				Subtatal
Disease			to the Design Standards and Assessibility Castion below	Subtotal 4
Flease	give any additional releva	un continens.	THE DESIGN STATEMENTS AND ALLESSING VISION SHE TO THE DECIMA	
			to the besign outnoted and necessionary decision below	
Bloose	refer to the relevant costi	on within the c		
Please	refer to the relevent section	on within the a	associated Sustainable Construction Checklist report for additional comments and document references.	
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Appendix B: BREEAM pre-assessment

Credit Summary BREEAM Multi Resi 2014 -Melliss Avenue, Kew		Credit no.	Credits Available	Anticipated credits	Description
Management	Project brief and design	Man 01	1	1	Stakeholder consultation (project delivery)
Credit value		Man 01	1	1	Third parties consulted and evidence of change in design from consultation
0.57%		Man 01	1	1	Sustainability champion - BREEAM performance targets
		Man 01	1	1	Sustainability Champion to monitor/attend key meetings
	Life cycle cost and service life planning	Man 02	2	2	LCC to PD 156865:2008 carried out; has plan for project based on building structure/envelope and strategy for services component and fit-out options
		Man 02	1	1	Component level LCC plan
		Man 02	1	1	Capital cost reporting (£/m2)
	Responsible construction practices	Man 03	1	1	Contractor operates EMS
		Man 03	Pre-requisite	1	All timber sourced in accordance with the UK Government's Timber Procurement Policy:
		Man 03	1	1	Sustainability Champion (construction)
		Man 03	2	2	Considerate construction scheme - >35 and 7 per section
		Man 03	1	1	Monitor construction-site impacts (energy/water)
		Man 03	1	1	Monitor construction-site impacts (transport of materials and waste)
	Commissioning and handover	Man 04	1	1	Commissioning schedule and responsibilties
		Man 04	1	1	Commissioning building services - specialist commissioning manager
		Man 04	1	1	Thermographic Survey and Airtightness Testing
		Man 04	1	1	Building User Guide and Training Schedule
	Aftercare	Man 05	1	1	Aftercare support

Credit Summary BREEAM Multi Resi 2014 -Melliss Avenue, Kew		Credit no.	Credits Available	Anticipated credits	Description
		Man 05	1	1	Seasonal Commissioning
		Man 05	1	1	Post-occupancy evaluation
Section Credit Total			21	21	
Weighted section total			12%	12.00%	
Health	Visual comfort	Hea 01	1	1	Glare control - glare control strategy
Credit Value	Daylighting	Hea 01	1	0	Daylighting - Kitchen, Living rooms, Dining Rooms, Studies, Communal occupied spaces meet requirements - 2 % of 80% of minimum area (m ²), plus (a or (b and (c, or specific lux levels. Or Kitchen & Living rooms, dinning rooms, studies, 100% of area (m ²) needs to achieve at least 100 lux for 3450 hours per year or more. Non-residential / communal occupied spaces, 80% at 200 lux for 2650 hours per year or more.
0.83%	View Out	Hea 01	1	0	View out - self contained flats - living rooms. Also, communal lounges, bedrooms: Within 5m of wall with window with adequate view out (10m view, seated eye level), window at least 20% of surrounding wall area. At least 80% of the room has a view of sky from desk or table top height (0.85m in multi-residential buildings).
	Int & Ext Lighting	Hea 01	1	1	Int & Ext Lighting in compliance with CIBSE with zoning and controls
	Indoor air quality	Hea 02	1	1	Indoor air quality plan
		Hea 02	1	0	A/C inlets & outlets 10m apart & >20m from ext sources of poll + CO_2 sensors in unpredicable/variable occupancy
		Hea 02	1	1	VOC emission levels (products)
		Hea 02	1	1	VOC, formaldehyde emission levels (post-construction)
		Hea 02	1	0	Potential for Natural Ventilation
	Thermal comfort - Overheating	Hea 04	1	1	Thermal modelling - overheating in accordance with CIBSE AM11 and CIBSE TM52.
		Hea 04	1	0	Thermal modelling - climate change consideration - adaptability
		Hea 04	1	1	Thermal zoning and controls
	Acoustic performance	Hea 05	4	3	Bedrooms and self contained dwellings - based on improvement over building regs (airborne and impact): 1 - 3db 3 - 5db 4 - 8db

Credit Summary Resi 2014 -Melliss	BREEAM Multi Avenue, Kew	Credit no.	Credits Available	Anticipated credits	Description
	Safety and security	Hea 06	1	1	Safe Access for all types of building arrivals
		Hea 06	1	1	Security of site and building - Security Needs Assessment.
Section Credit Total			18	12	
Weighted section total			15%	10.00%	
Energy	Reduction of energy use and CO_2 emissions	Ene 01	12	6	0.375 EPRnc (energy demand, primary energy efficiency, CO2 emissions) minimum for Excellent.
Credit Value	Energy monitoring	Ene 02	1	1	BEMS/Sub-metering major energy uses
0.68%	External lighting	Ene 03	1	1	Ext lighting 60 Lm/circut watt average, daylight sensor and time control.
	Low carbon design	Ene 04	1	1	Passive design analysis
		Ene 04	1	0	Free cooling
		Ene 04	1	1	Renewable feasibility study & an LZC option installed
	Energy efficient transportation systems	Ene 06	1	1	Transport Analysis (lifts/escalators)
		Ene 06	1	1	Standby mode, variable control, >55lumens/circuit watt with auto idle switch off.
		Ene 06	1	1	Regenerative Drive if demonstrated to save energy
	Energy efficient equipment	Ene 08	2	2	90% unregulated energy use analysed. Likely to include Small power and plug in equipment (domestic white goods), IT intensive area, data centre, swimming pool, communal laundry, kitchen and catering facilities.
Section Credit Total			22	15	
Weighted Section Total			15%	10.23%	
Transport	Public transport accessibility	Tra 01	3	0	Accessibility to public transport

Credit Summary Resi 2014 -Melliss	BREEAM Multi Avenue, Kew	Credit no.	Credits Available	Anticipated credits	Description
Credit Value	Proximity to amenities	Tra 02	2	2	4 within 500m, and 7 within 1000m (awarded independently) including at least 3 of food outlet, cash point, outdoor space plus additional options of postal facility, community space, leisure facility, GP, pharmacy, childcare/school.
1.00%	Cyclist facilities	Tra 03	1	1	Covered & secure cycle racks (10% of building staff) Showers (10% of cycle racks), changing facilities & lockers. Minimum of 4 cycle spaces. Wheelchair or electric buggy storage places 10% residents. 5% if >50% credits achieved in Tra 01.
	Maximum car parking capacity	Tra04	2	2	Car parking capacity (dependent on transport accessibility index)
	Travel plan	Tra 05	1	1	Public transport, disabled accessibility, cycle spaces & storage, etc
Section Credit Total			9	6	
Weighted Section Total			9%	6.00%	
Water	Water consumption	Wat 01	5	3	1 12.5 % reduction compared to standard building. 2 25 % reduction 3 40 % reduction. 4 50 % reduction. 5 55 % reduction.
0.78%	Water monitoring	Wat 02	1	1	Pulsed water meter on incoming supply and water consuming plant or building areas accounting for 10% consumption.
	Water leak detection and prevention	Wat 03	1	1	Leak detection within building and to boundary
		Wat 03	1	1	Sanitary supply shut off
	Water efficient equipment	Wat 04	1	1	Estimate and minimise unregulated water use (irrigation most likely)
Section Credit Total			9	7	

Credit Summary BREEAM Multi Resi 2014 -Melliss Avenue, Kew		Credit no.	Credits Available	Anticipated credits	Description
Weighted section total			7%	5.44%	
Materials	Life cycle impacts	Mat 01	6	4	External Walls, Windows, Roof, Upper Floor Slab, Internal walls and floor finishes / coverings assessed against Green Guide
Credit Value	Hard landscaping/boun dary protection	Mat 02	1	1	80% Hard Landscaping and Boundary Protection are Green Guide A+/A rated
0.96%	Responsible sourcing of materials	Mat 03	Pre-requisite	1	All timber sourced in accordance with the UK Government's Timber Procurement Policy:
		Mat 03	1	1	Sustainable procurement plan
		Mat 03	3	2	Responsible sourcing of materials
	Insulation	Mat 04	1	1	Insulation index >2.5. Insulation to be A-rated and with relatively high thermal conductivity.
	Designing for durability and resilience	Mat 05	1	1	Protection of vulnerable building features from danger (bollards, hard wearing surfaces, kick plates etc), exposed parts from degradation
	Material efficiency	Mat 06	1	1	Optimise use of materials in design, procurement, construction, maintenance and end of life - planning and monitoring
Section Credit Total			14	11	
Weighted Section Total			13.5%	10.61%	
Waste	Construction waste management	Wst 01	3	2	Construction resource efficiency of non hazardous construction waste. 1 13.3 m3/100m2 gross internal floor area or 11.1 tonnes 2 7.5 m3/100m2 gross internal floor area or 6.5 tonnes 3 3.4 m3/100m2 gross internal floor area or 3.2 tonnes
Credit value		Wst 01	1	1	Diversion from Landfill 70% vol or 80% tonnage (non-demolition)
1.06%	Recycled aggregates	Wst 02	1	1	Recycled or secondary aggregate is 25% of total high grade aggregate, and used in: 15% Structural frame 30% Bitumen/hydraulically bound base, binder and surface courses for paved areas and roads 20% Building foundations 15% Concrete road surfaces 100% Pipe bedding 100% Granular fill and capping

Credit Summary BREEAM Multi Resi 2014 -Melliss Avenue, Kew		Credit no.	Credits Available	Anticipated credits	Description
	Operational waste	Wst 03	1	1	Labelled communal recycling area of adequate size (indicatively 20m2) with easy access for users and collections, and dwellings (or 6 bedrooms) have three fixed internal storage containers of 7litres each and 30litres total in additional to non-recyclable waste storage.
	Adaptation to climate change	Wst 05	1	1	Adaption strategy - appraisal for structural and fabric resilience including systematic risk assessment.
	Functional adaptability	Wst 06	1	1	Adaption strategy - consideration of adaptability of internal environment for change in working practices, of internal physical space and external shell to accommodate change in use, ease of major plant replacement, local service accessibility, and ability for major refurbishment.
Section Credit Total			8	7	
Weighted Section Total			8.5%	7.44%	
Land use &	Site selection	LE 01	1	1	Site previously developed
Ecology		LE 01	1	0	Contaminated land
Credit Value	Ecological value of site /Protection of ecological features	LE 02	1	0	Low ecological value
		LE 02	1	1	Protection of existing ecological features
1.00%	Minimising impact on existing site ecology	LE 03	2	2	Comparison of ecology pre-development and post-development: 1 - change>-9 plant species/hectare 2- neutral
	Enhancing site ecology	LE 04	1	1	Ecologist report and recommendations

Credit Summary BREEAM Multi Resi 2014 -Melliss Avenue, Kew		Credit no.	Credits Available	Anticipated credits	Description
		LE 04	1	0	Ecological enhancement - Increase by 6+ species/hectare
	Long term impact on biodiversity	LE 05	2	2	Mandatory criteria - SQE, legislation & landscape/habitat management plan. 2 credits for 4 of the following additional criteria: - Biodiversity Champion - Training of site workforce - Monitor and record actions to protection site biodiversity - New ecologically valuable habitat creation - Construction programme minimises disturbance to wildlife
Section Credit Total			10	7	
Weighted Section Total			10%	7.00%	
Pollution	Impact of refrigerants	Pol 01	3	3	No refrigerants (3 credits) OR Automatic pumpdown and dectection moderate air tight enclosure or mech vent plant room 2,000ppm or 0.2% (1 credit) AND/OR Direct Effect Life Cycle CO2 equivalent emissions (DELC CO2e) of ≤100 kgCO2e/kW cooling capacity or GWP of 10 (2 credits) OR DELC CO2e of 1,000 kgCO2e/kW cooling capacity (1 credit)
Credit Value	NOx emissions from heating/cooling	Pol 02	3	3	1. 100mg/kWh, 2. 70 or 3. 40 space heating & water heating.
0.77%	Surface water run- off	Pol 03	2	2	FRA - low flood risk from all sources.
		Pol 03	2	1	No increase in surface water run off peak rate and volume, and design for drainage system failure
		Pol 03	1	0	Minimising water course pollution - No discharge from site for rainfall up to 5mm, SuDs, separators in compliance with applicable standards
	Reduction of night time light pollution	Pol 04	1	1	External lighting in compliance with ILP and dimmed down between 11pm & 7am if required for safety and security or otherwise switched off.
	Reduction of noise pollution	Pol 05	1	1	Plant noise impact assessment & no greater than 5db between 7am - 11 pm & 3db between 11 pm- 7 am.
Section Credit Total			13	11	
Weighted section total			10%	8.46%	
Innovation	Responsible Construction Practices	Man 03	1	1	CCS Score >40 and 7 in each section
Credit Value	Aftercare	Man 05	1	1	3 years of monitoring (electricity, water consumption, occupant satisfaction).

Credit Summary BREEAM Multi Resi 2014 -Melliss Avenue, Kew		Credit no.	Credits Available	Anticipated credits	Description
	Visual comfort	Hea 01	1	0	3% in 80% and other factors
1.00%	Indoor air quality	Hea 02	2	0	1 credit - formaldehyde <0.06mg/m3 2 credits - formaldehyde <0.01mg/m3
	Reduction of CO ₂ emissions	Ene 01	1	0	1 100% improve in Part L + 10% reduction in regulated emissions 2 100% improve in Part L + 20% reduction in regulated emissions 3 100% improve in Part L + 50% reduction in regulated emissions 4 100% improve in Part L + 80% reduction in regulated emissions 5 Negative Emmissions
	Water	Wat 01	1	0	65% improvement on benchmark
	Life cycle impacts	Mat 01	1	0	Achieving 16 pts for Green Guide ratings
	Responsible sourcing materials	Mat 03	1	0	70% of points achieved
	Construction Site Waste Management	Wst 01	1	0	1.6 m ³ /100m ² gross internal floor area or 1.9 tonnes PLUS Diversion from Landfill 85% vol or 90% tonnage non-demol., and 85%/95% demolition, and 95% excavation.
	Recycled aggregates	Wst 02	1	0	Recycled or secondary aggregate (which comes from within 30km of site) is 35% of total high grade aggregate, and used in: 15% Structural frame 30% Bitumen/hydraulically bound base, binder and surface courses for paved areas and roads
	Adaptation to climate change	Wst 05	1	0	 Achievement of the Structural and fabric resilience issue and: Hea 04 – Criterion 7 (thermal comfort levels, PMV and PPD indices in occupied spaces accounting for climate change). Ene 01 – At least 8 credits. Ene 04 – The Passive design analysis credit Wat 01 – 3 credits Mat 05 – The Material degradation credit in this issue is achieved. Pol 03 – Flood risk – a minimum of one credit is achieved Surface water run off – a minimum of two credits are achieved.
Section Credit Total			11	2	
Weighted section total			11%	2.00%	
		Total		>70%	
				EYCGIIGIII	



UNCLASSIFIED	
PASS	

Credit Summary BREEAM Multi Resi 2014 -Melliss Avenue, Kew	Credit no.	Credits Available	Anticipated credits	Description		
	Low Risk or Achieved			GOOD		
	Mandatory Minimum Standard			VERY GOOD		
	See innovation section			EXCELLENT		
				OUTSTANDING		



Appendix C: Water Efficiency Calculator

AECOM

R&Y Kew

Water Efficiency Calculator

Water Efficiency Calculator

The below water efficiency calculator has been calculated in accordance to the methodology laid out within the document "The Water Efficiency Calculator for new dwellings – Communities and Local Government".

		Internal W	ater Consumption	
		Capacity / Flow		
Installation Type	Unit of Measure	Rate	Litres/person/day	Notes
	Full Flush Volume (Litres)	6	8.76	
	Part Flush Volume (Litres)	4	11.84	The specification of installation types is currently.
Bath	Capacity (litres to overflow)	180	19.8	unknown at this stage. The
	Flow rate (Litres/min)	8	34.96	WRAP "efficient practice" as
	Flow rate (Litres/min)	8	13.88	per standard capacity/flow rates have been targeted
Basin Tap	Flow rate (Litres/min)	6	11.06	This is in-line with the
Washing Machine	Water Consumption (Litres/kg)	8.5	17.85	BREEAM 2014 pre- assessment Wat01 criteria.
Dishwasher	Water Consumption (Litres/place setting)		3.6	
Net Internal Wat	ter Consumption (Litres/p	112.99		
	Normalisa	0.91		

Total Water Consumption (Litres/person/day)	102.82	The internal water consumption target of <105 litres per person, per day will be achieved.
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Appendix D: Improving Resource Efficiency – Waste

	Concrete volume estimate									100
										1
Reactor A	this	Disect	Disint	Area	height	Mohamo		Dy:	6	
	Imml	feel	feel	for 2	Iml	ten ³		Crieckeu.	10	akt
Wall for here	250	19	18.75	7.4	[m]	44				GIVE
Wall 2nd hyp	300	19	18.7	8.9	6	53				
Roof	200	19		284	0.2	57				
Foundation	700	20		314	0.7	220				
Reactor B	1									
	Wall thk	Dia ext	Dia int	Area	height	Volume				Volume [m3] 1913
	[mm]	[m]	[m]	[m]	[m]	(m [*])		102085.1		Volume [m3] 1945
Wall 1st hyp	250	19	18.75	7.4	6	44				
Wall 2nd hyp	300	19	18.7	8.9	6	53				
Roof	200	19		284	0.2	57				
Foundation	700	20		314	0.7	220				
Balancing tank	-	D 1	Phi lue							
	Wall thk	Dia ext	Dia int	Area	height	Volume				
	[mm]	[m]	[m]	[m]	[m]	[m]				
Wall 1st hyp	250	19.5	19.25	7.6	6	46				
Wall 2nd hyp	300	19.5	19.2	9.1	6	55				
Foundation	700	22		380	0.7	266				
PST										
	Wall thk	Dia ext	Dia int	Area	height	Volume				
	[mm]	[m]	[m]	[m ²]	[m]	[m ²]				
Wall 1st hyp	250	16.5	16.25	6.4	4.5	29				
Wall 2nd hyp	300	16.5	16.2	7.7	4.5	35				
Foundation	600	20		314	0.6	188				
Conditioning took										
Conditioning Lank	this	Length	Area	height	Number	Molume				
	Imml	feel	1	feel	[1]	(m ³)				
WARE .	400	funt	36	- C		43.2				
WORK .	400	5	3.0	6		43.4				
Foundation	500	9	45	5		22.5				
tanks	thà	Length	lees.	boiebt	Number	Volume				
	Immi	feel	10021	feel	[1]	(m ^k)				
	200	16.6	1111	100	11	32.2				
	200	6	1.2	6	2	14.4				
Hardstanding		1				11-1				
	thk	Lenght	Area	height	Number	Volume				
	[mm]	[m]	[m*]	[m]	[-]	[m"]				
	200		3000	0.2		600				

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