BREEAM Pre-Assessment
Clean Power Properties Ltd

Micheldever Station

Prepared for:
Clean Power properties Ltd & Network Rail Infrastructure Ltd

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EXECUTIVE SUMMARY

The **Building Research Establishments Environmental Assessment Method** (BREEAM) Scheme is the national standard for assessing the sustainability of new construction developments. BREEAM aims to differentiate between developments with higher environmental performance by providing a sustainability rating.

Clean Power Properties Ltd and Network Rail Infrastructure Ltd (the Applicant) are proposing to construct an Energy Recovery Centre at a former, now disused, rail freight yard/sidings at Micheldever, Hampshire. The proposed development has been pre-assessed against the relevant BREEAM protocols to demonstrate the sustainability credentials of the proposed development at the planning stage and to provide the design team with an indication of likely performance given current design intent and an understanding of the sustainability considerations that will need to be taken into account in the developing detailed design stages.

The Proposed Development

The Energy from Waste facility shall incorporate the construction of a new building to accommodate a Renewable Energy Generation Facility comprising the following elements;

- A single impermeable technically engineered portal framed building approx 130m by 40m, at a height of 9m (to the ridge).
- The configuration of the building will be rectangular shaped dependant on site access and physical constraints.
- A number of ancillary structures shall be located adjacent to the waste reception and pyrolisis building, including; a small gasometer (c. 6m (d) x 9m (h)), a cooling plant and a static pressurised nitrogen cylinder.
- There will be a stack associated with the pyrolisis plant, which will be 20m in height and a maximum of 120cm in diameter.
- Each engine will have a single stack approx 100cm in diameter which exits through the building to a height of 20m.
- An emergency flare will be fitted in close proximity to the engines and gas holder.
- A building of approximately 5m by 3m at a height of 3m will house the electricity sub-station to serve the facility.
- A small security / gatehouse building will be located adjacent to the site access and exit.
- Where Installed the site will be fitted with 2 x AD digester tanks (25m dia) and 2 x AD digestate tanks (32m dia). The tanks will be fitted externally and extend to a height of 9 metres.

This BREEAM Pre-assessment was informed by correspondence with the design team in addition to the following documentary sources;

- Latest site / design drawings, prepared by AlmCa Architecture & Design LLP (AlmCa) and Sol Environment Ltd (Sol);
- Design & Access Statement (DRAFT), prepared by AlmCa Architecture & Design LLP;
- Ecological Impact Assessment (DRAFT), prepared by SLR Ltd;
- Flood Risk Assessment and SUDs Strategy prepared by SLR Ltd;

- Air Quality Impact Assessment prepared by SLR Ltd;
- Contaminated Land Assessment prepared by SLR Ltd; and
- Energy Strategy (RSOL0612RL_ES_1), prepared by Sol Environment Ltd (Sol);

It was ascertained that the Clean Power Properties Ltd / Network Rail Infrastructure design team are committed to achieving a minimum BREEAM *'Very Good'* rating for the proposed development.

Due to the current stage of the proposals, where detailed proposals are to be developed the design team worked on the principal that the credits awarded would be likely to be achieved by the final design.

Findings

Overall, the development is likely to gain a ***BREEAM 'Excellent'*** rating. The total score of **72.18%** for the proposed scheme as a whole is within the *'Excellent'* bracket of 70% – 85% and far exceeds the initial project design target of 'Very Good'.

Graphical summary of findings

The figures below show a summary of the percentage of available credits which are likely to be achieved in each section (land use & ecology, management, etc), given current design intent, for the proposed development.

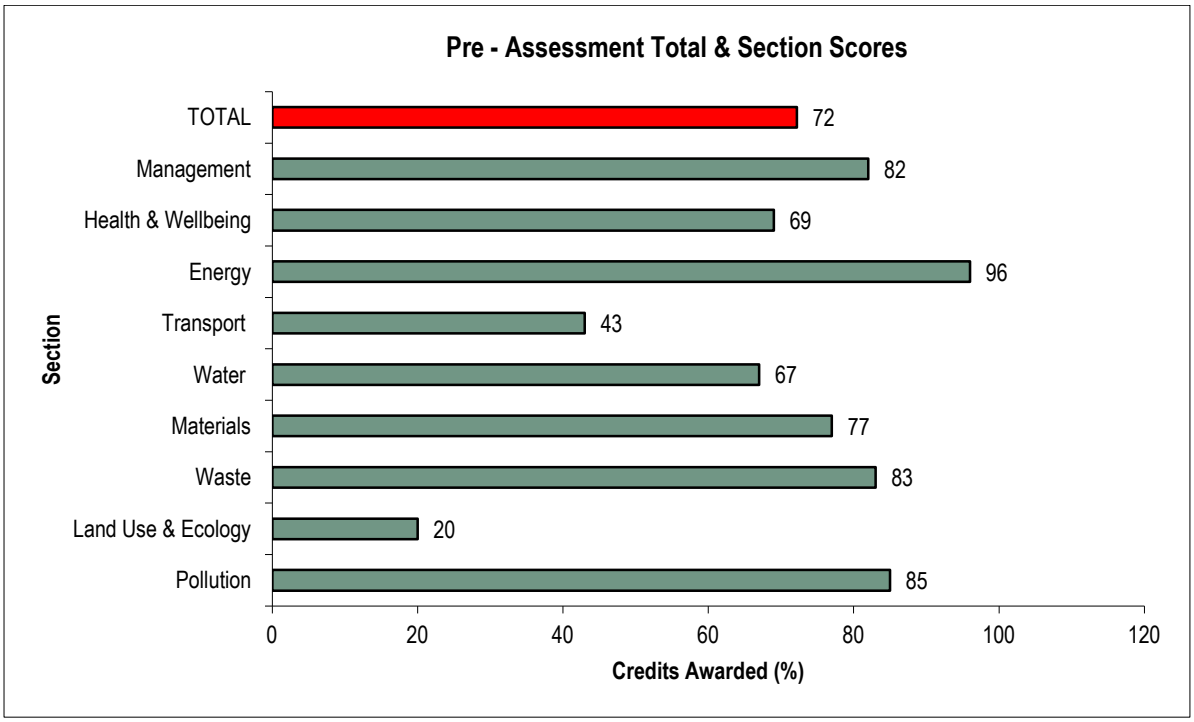

Figure ES1: Predicted Percentage of the Total Score Achievable and a Breakdown of the Percentage of Credits Awarded in each Issue area for the development.

Summary

It can be seen from Figure ES 1 that the proposals perform well in the following environmental categories;

- Management: Stringent management and monitoring practices (administered through a proprietary EMS) and a commitment to go beyond best practice under a Considerate Constructors Scheme (CCS) or equivalent to ensure sufficient mitigation of environmental impacts derived from construction activities;
- Energy: The building exploits waste heat and renewable power generated by the process to provide all regulated building heating and hot water requirements. In addition to the waste derived electrical generation, the building has incorporated photovoltaic solar panels for the generation of electricity.
- Water: All rainwater falling onto the site will be harvested and reused. The site has a waste water treatment facility which recycles and recovers all grey water from the process for reuse. Furthermore, the site is designed with water efficient fittings within all areas to ensure the consumption of potable water during site operation is minimised;
- Materials: The selection of materials for the main building elements and external hard landscaping which have a low embodied environmental impact, with materials to have a Green Guide Rating of B or better; and that materials and products are responsibly sourced.
- Waste: Stringent construction site waste management procedures, re-use of demolition material, implementation of policies to divert construction waste from landfill together with provision of ample recycling facilities ensures waste streams derived from both construction and operational phases is minimised or re-used / recycled; and
- Pollution: The proposed use of waste heat for building heating and domestic hot water systems, limiting the impact of refrigerants, and minimising light pollution, will ensure pollution derived from the construction and subsequent operation of facilities is minimised.

Irrespective of current predicted performance, there remains some further limited opportunity to increase the BREEAM score. These improvements mainly lie in the areas of site ecology and refrigerants. These opportunities are identified in Section 5 of this report.

As this pre-assessment has been undertaken in the early stages of design, much of the evidence base required to demonstrate achievement of credits is yet to be finalised. It is possible that due to changes in the design or a lack of necessary evidence at the later design stages, there may be credits which cannot be awarded at the time the certification assessments are carried out. The project team should ensure that the requirement to demonstrate achievement of sufficient credits is fully taken into account during design development, tendering and construction.

- Section 6 of this report provides details outlining the Design and Post Construction Stages of BREEAM certification;
- Appendix 1 provides details of the evidence needed from the design team to support the certification process; and
- Appendix 2 provides a glossary of the all of the technical terms used within the body of this report.

1. INTRODUCTION: BREEAM

1.1 Background

The Building Research Establishments Environmental Assessment Method ('BREEAM' hereafter) is an environmental assessment method for rating and certifying the performance of new construction projects. It is a national standard for use in the design and construction of all new developments with a view to encouraging continuous improvement in sustainable building techniques.

The BREEAM Scheme is designed to evolve with increasingly tightening Building Regulations, and the development of technology and innovations, with the most recent version of BREEAM released in July 2011, placing a greater emphasis on overall life cycle efficiencies and stakeholder participation.

The BREEAM Scheme covers nine categories of sustainable design (each of which contains a number of environmental issues), comprising:

- Management;
- Health & Wellbeing;
- Energy;
- Transport;
- Water;
- Materials;
- Waste;
- Land Use and Ecology; and
- Pollution.

A further 'Innovations' section is provided to award developments that go above and beyond the levels set out in the standard criteria, where exemplary performance levels are achieved.

Each issue is a source of environmental impact which can be assessed against a performance target and awarded one or more credits. In addition to meeting minimum standards (which vary according to the BREEAM rating sought), achievement of the requirements in each design category scores a number of percentage points. The overall total percentage 'score' then determines the BREEAM Rating achieved by the assessed development.

1.2 Scoring System

Credits are available for each category meeting the specified levels of performance. The number of credits available in each category does not necessarily reflect the relative importance of the issues being assessed, and will vary depending on the developments' Scheme type. Before the final score is calculated, each of the scores in the nine categories is multiplied by an 'Issue Weighting Factor' before the final score is calculated (see Table 1.1). The Weighting Factors reflect the relative importance of each of the categories covered under BREEAM.

Table 1.1; BREEAM 2011 Issue Weighting Factors

Environmental Impact Categories	No of Credits in Category	Environmental Weighting Factor (as % of total possible points score available)
Category 1 – Management	22	12%
Category 2 – Health & Wellbeing	16	15%
Category 3 – Energy	28	19%
Category 4 – Transport	11	8%
Category 5 – Water	9	6%
Category 6 – Materials	13	12.5%
Category 7 – Waste	6	7.5%
Category 8 – Land Use & Ecology	10	10%
Category 9 – Pollution	13	10%
Total	**128**	**100%**

The BREEAM scoring runs from Unclassified to Outstanding, as depicted in Table 1.2 below.

Table 1.2; BREEAM Performance Ratings

BREEAM Rating	Performance	Score
UNCLASSIFIED	Does not meet levels of standard good practice	<30
PASS	Top 75% of UK new non-domestic buildings (standard good practice)	30
GOOD	Top 50% of UK new non-domestic buildings (intermediate good practice)	45
VERY GOOD	Top 25% of UK new non-domestic buildings (advanced good practice)	55
EXCELLENT	Top 10% of UK new non-domestic buildings (best practice)	70
OUTSTANDING	Less than top 1% of UK new non-domestic buildings (innovator)	85

The BREEAM Rating is awarded on the basis of achieving both a set of mandatory minimum standards and a score level as set out above. The minimum standards vary depending on the Rating aspired.

1.3 Minimum Standards

Before a development can start to be awarded points under BREEAM *'Very Good'* it must achieve minimum standards in the following categories:

- **Man 01: Sustainable Procurement - One Credit.** There is a requirement for a development to achieve a single credit under this issue. This can be gained from any of the listed criteria under Project Brief and Design, Construction & Handover, or Aftercare.
- **Hea 01: Visual Comfort – Criterion 1.** This stipulates that all fluorescent lamps and compact fluorescent lamps to be used on the development are to be fitted with high frequency ballasts. Note that a credit is not awarded for compliance with this criterion.
- **Hea 04: Water Quality – Criterion 1.** To ensure the safety from waterborne disease and contamination. All water systems are to be designed to comply with the Health & safety Executives "Legionnaire's Disease – The Control of Legionella Bacteria in Water Systems" Approved Code of Practice and Guidance 2000, and other relevant standards.
- **Ene 02: Energy Monitoring – One credit.** To ensure that energy monitoring is provided for all major energy consuming systems. Monitoring to be either via a Building Energy Management System (BEMS) or via separate accessible sub-meters, with energy consuming use to be clearly identified.
- **Wat 01: Water Consumption – One Credit.** A minimum performance improvement of 12.5% over the national baseline standard benchmark for efficiency of water consuming fittings. Consideration must therefore be given to specifying water efficient sanitary items and the use of recycled rainwater or grey water.
- **Wat 02: Water Monitoring – Criterion 1.** Water meters are to be specified on the mains water supply of each building under assessment, and include water supplied from borehole or private sources. Note that a credit is not achieved for compliance with this criterion only.
- **Mat 03: Responsible Sourcing – Criterion 3.** All timber to be used on the project must be sourced in accordance with the UK Governments Timber Procurement Policy, ensuring that timber and wood derived products will be legally and sustainably sourced as outlined in the CPET 2nd Edition 2006 Report.
- **LE 03: Mitigating Ecological Impact – One Credit.** To minimise the impact of the development on existing site ecology. The change in ecological value is to be no greater than a score of minus nine (-9), as determined by a suitably qualified Ecologist.

1.4 BREEAM Assessment – a two-stage process

The BREEAM Scheme allows for a building to be assessed at the design stage and post-construction before the formal BREEAM Certification (and Rating) is awarded; this will ensure that the completed development meets sustainability performance as designed. During the certification assessment, which will lead to a formal BREEAM rating and certificate, the assessment stages are as follows:

1. An initial Design Stage certification – at this stage an Interim Certificate is issued, based on a provisional Rating.
2. A Post-Construction check is required to verify the rating in the 'as constructed' state before a final BREEAM Certificate can be issued.

The Design Stage assessment and Post-Construction Check must be carried out by a licensed assessor, who registers the assessment with the BRE.

This report forms the Pre-Assessment which is the initial stage of the Design Stage Certification process. Sol has verified with BRE that the Energy Recovery Centre will be assessed under the BREEAM 2011 New Constructions 'Other Buildings' Scheme, and will be registered with BRE by Sol Environment Ltd accordingly.

2. APPROACH & METHODOLOGY

In order to gain an understanding of the likely BREEAM rating achievable for the application Site, Sol Environment Ltd were appointed by the developer, Clean Power Properties Ltd ('CPPL' hereafter), to undertake a BREEAM pre-assessment for the proposed Energy Recovery Centre development in Micheldever Station, Hampshire.

In addition to this appointment Sol, as a registered BRE Accredited Professional and technical Advisor to the project, has provided design advice to the design team to ensure that the proposed development exceeds the minimum standards required by BREEAM.

The purpose of this pre-assessment report is to identify the strengths and weaknesses of the proposals in relation to the BREEAM criteria, and to identify appropriate opportunities to improve the score towards an aspired 'Very Good' rating.

At the time of the pre-assessment, the proposed development is at RIBA Design Stage B-C 'Concept Design'. At this early design stage there is not sufficient detailed design information available to enable Design Stage BREEAM certification to be carried out and the BREEAM rating established as likely at pre-assessment cannot be formally awarded (see Section 6 for information on the formal assessment process).

The pre-assessment is intended to identify how the Energy Recovery Centre will score when the current designs are formally assessed under the BREEAM Scheme.

3. DEVELOPMENT SUMMARY & RATING

3.1 Rating Findings

The design team are committed to aiming to achieve a BREEAM 'Very Good' rating for the development, where possible. The finding of the pre-assessment predicts that the proposed development ***is likely to achieve BREEAM 'Excellent'***, with a provisional score of **72.18%** and therefore significantly meets the design team target.

In awarding this score, the following assumptions have been made:

- Management:
  - Due to the scale of the project, it has been assumed that the main contractor will have a comprehensive Environmental Management System in place, and that criteria under this section for which the Contractor will ultimately have responsibility will be a consideration by the Client team as part of the Tender selection process;
- Energy / CO_2:
  - Reduction in CO_2 emissions to achieve a 100% improvement on TER benchmarks. – refer to credits Ene 01 & Ene 04;
  - Correctly specified SMART meters will be installed that measure both electricity and gas consumption – refer to Credit Ene 02;
  - External lighting comprise adequate ratings, with dedicated energy efficient fittings and adequate controls – refer to Credit Ene 03;
- Transport:
  - Cycle storage facilities will be compliant with the space and security requirements in accordance with the BREEAM 2011 Technical Manual – refer to Credit Tra 03;
- Water:
  - All rainwater will be harvested by the scheme and used for industrial and domestic uses;
  - High efficiency fittings are specified and installed to reduce the demand for potable water within the development - refer to Credit Wat 01;
- Materials:
  - The majority of the key building elements (by volume percentage) will achieve a Green Guide rating of A+ to B - refer to Credit Mat 01;
  - The Developer and Contractor will ensure that procurement practices are in accordance with corporate and government procurement policy – refer to Mat 03 / Mat 04;
- Waste:
  - There will be suitable occupational waste storage within the building and then all wastes arising from the site will be processed through the Waste Recovery Plant – refer to Credit Wst 03;

Sol has provided an assessment of the predicted BREEAM performance of the development (based on limited information available at outline stage). In addition, Section 5 identifies opportunities for improvement (approximately ranked in terms of cost / difficulty and the potential score by which the total

will increase) which, dependant on those incorporated into the site design (and associated evidence is provided, see Appendix 1), would provide an improvement in BREEAM performance.

Although this report provides recommendations, specific requirements of BREEAM can easily be misinterpreted or excluded at design stage. It is noted that a BREEAM Accredited Professional has been appointed for the pre-planning application stages, however it is recommended therefore that this appointment is continued throughout all design stages to ensure the development proceeds in a manner that complies with the relevant requirements of BREEAM (*particularly those mandatory minimum requirements, which must be satisfied in order for the aspired rating to be certified*).

Table 3.1 below provides a summary of the BREEAM credits that are likely to be achieved, given current design intent as outlined by the design team.

Table 3.1; Credits likely to be achieved given current design intent							
Ref	**Credit Title**	**Max available credits**	**% per credit**	**Likely credits**	**Credit criteria**	**Comments**	**Action for**
Management							
Man 01	Sustainable Procurement	8	0.55	7	Project Brief & Design 1 credit awarded for the involvement of Client/ building occupier/ contractor and design team in the development of the project design and brief. 3 credits available for appointment no later than RIBA Stage C of an Accredited Professional, to monitor, report and set BREEAM targets.	It is understood that extensive consultation has been undertaken between Clean Power Properties Design team and the technology provider (Vaporo Tech Ltd) in regard to requirements of the brief. Documentary evidence to be provided. The first credit has been assumed to be achievable. A BREEAM Accredited Professional (Sol Environment) has been appointed on this development.	CPPL Design Team
					Construction & Handover 1 credit awarded where a compliant thermographic survey of the building fabric is to be undertaken by the contractor and that there is a commitment to carry out remedial works required following the survey. 1 credit awarded for appointment of project team to monitor and programme commissioning of all building services in line with BSRIA and CIBSE guidelines, on behalf of the Client. A specialist commissioning manager is required where complex systems are installed.	A full thermographic survey to ensure that the required building permeability and air tightness is achieved. This requirement is to be included within the Contract documentation, with detailed criteria to be stated. Due to the nature of the development, extensive mechanical ventilation will be required (i.e. 'complex systems'). All building services and ventilation systems will be commissioned in accordance with the BSRIA and CIBSE will be required to the majority of areas. A specialist commissioning manager is to be appointed, to be independent of the supply chain.	CPPL Design Team

Table 3.1; Credits likely to be achieved given current design intent							
Ref	Credit Title	Max available credits	% per credit	Likely credits	Credit criteria	Comments	Action for
					Aftercare 1 credit awarded where seasonal commissioning will take place over a 12 month period following occupation. To include full load testing, (seasonal and high occupancy), occupant feedback and recommissioning. 1 credit awarded where there is a commitment to collect energy and water consumption data for a minimum 12 month period, and provision of aftercare support for building occupants.	Given the nature of the building, specialist aftercare recommissioning is not required, however all plant and equipment will be subject to ongoing assessment and maintenance. Credit cannot be awarded.	CPPL Design Team
Man 02	Responsible Construction Practices	2	0.55	2	Credits are awarded where there is a commitment to comply with best practice site management principles using either the CCS or an alternative locally / nationally recognised scheme. 1 credit for compliance with the approved scheme (a CCS score between 24 and 31.5, with a score of at least 3 in each section). 2 credits where contractor 'significantly exceeds' compliance of the relevant scheme (a CCS score between 32 and 35.5). Exemplary performance is achieved for scores of 36 or more.	The tender documentation will include a statement that requires the Contractor to 'significantly achieve' compliance under the Considerate Constructors Scheme or equivalent Scheme, (i.e. achieving a score of at least 32 under the CCS), in order to achieve 2 credits.	CPPL Design Team
Man 03	Construction Site Impacts	5	0.55	5	Credits are awarded where procedures exist in order to monitor and control environmental impacts associated with site construction activities (Energy, Water and Transport).	During construction, the Contractor will be required to set objectives and targets and subsequently monitor progress under a proprietary environmental management system.	CPPL Design Team

Table 3.1; Credits likely to be achieved given current design intent							
Ref	Credit Title	Max available credits	% per credit	Likely credits	Credit criteria	Comments	Action for
					One Credit is available for each of the five items (5 credits total): a. Energy Consumption- Monitor and record and report consumption (kWh) and CO_2 emissions ($kgCO_2$) arising from site activities; b. Water -Monitor, record and report water consumption (m3) arising from site activities (accounting for recycled water); c. Transport -Monitor, record and report on transport of materials and waste, from factory gate to site, and to waste processing destinations, recording $kgCO_2$, mileage (Km) and fuel use (Litres); d. All site timber used is sourced in line with the UK Governments Timber Procurement Policy. e. Construction Site Management – Contractor operates an EMS in accordance with ISO 14001/ EMAS, and compliant with BS8555 2003 (to Phase 4 implementation stage). Best practice is to be implemented regarding Pollution Prevention in line with Environment Agency Guidelines.	It is recommended that construction site environmental impacts are controlled and monitored sufficiently in order to gain maximum credits. Subsequently, the listed impacts on the left must be monitored, data collected and reported, and all site timber (including construction timber such as hoardings, shuttering, scaffold) must be sourced in accordance with the UK Governments Timber Procurement Policy. It is recommended that these requirements be set out in the Tender/ preliminary agreements with the Contractor and that a basic Environmental Management System (EMS) is in place for the Works in order to ensure sufficient monitoring systems are implemented (and sufficient allocation of responsibilities occurs). Requirements are to be included within Tender/ Contract documentation to ensure that maximum credits are achieved.	

Table 3.1; Credits likely to be achieved given current design intent							
Ref	Credit Title	Max available credits	% per credit	Likely credits	Credit criteria	Comments	Action for
Man 04	Stakeholder Participation	4	0.55	4	Consultation: 1 Credit available for Consultation with building users and all relevant stakeholders during the formation of the Brief. This includes the preparation of a consultation plan, defining timescales and methodology. Communication to be recorded, and demonstrate that the process has informed the design. A third party consultation method is to be used for schools such as a Design Quality Indicator.	A full public exhibition and stakeholder consultation process has been carried out by the client. This process has involved the engagement with relevant stakeholders (e.g. Planning Authorities, The Highways Authority, The Environment Agency, conservation/ local community groups, English Heritage, Natural England, Water Authorities) when developing the design. It is also noted that Public Exhibition and consultation was held in Micheldever on 8th – 9th June 2012. Further stakeholder meetings have been held with specific residential stakeholders when requested. It has therefore been anticipated that this credit will be achieved.	CPPL Design Team
					Inclusive and Accessible Design: 1 Credit is available where inclusive design can be demonstrated, via the development of a compliant Design & Access Statement in line with CABE guidelines. Statement should provided consideration of Disabled users, people of different groups (e.g. age/ fitness), and parents with children.	A Design & Access Statement has been prepared by AlmCa Architecture & Design LLP , and submitted as part of the Planning Application, which provides a strategy for inclusive design. The statement also notes relevant accessibility standards used in the design of the stadium (Ref. Section 4 of the D&A Statement).	CPPL Design Team
					Building User Information: 1 Credit available for the provision of a compliant non- technical Building User Guide	A comprehensive Building User Guide is to be provided. Requirement is to be included in Tender / Contract documents, noting scope and contents as listed in the	CPPL Design Team

Table 3.1; Credits likely to be achieved given current design intent							
Ref	Credit Title	Max available credits	% per credit	Likely credits	Credit criteria	Comments	Action for
					(for users/ staff/ non technical managers, to be a standalone document, separate from O&M manual).	BREEAM 2011 Manual (optional formats, e.g. electronic and hardcopy) will be produced for non-technical building users/ managers.	
					Post Occupancy Evaluation: 1 credit is available where there is a commitment to undertake a Post Occupancy Evaluation (by a third party, after one year of occupancy), to include a review of the design and construction process, and to gain building performance feedback from building users regarding internal environment; controls and maintenance; facilities & amenities; access and layout, and other relevant issues. There should be a commitment to disseminate POE information.	It is understood that the client will provide a commitment to undertake POE, with documentation to include scope and details of dissemination of information.	CPPL Design Team
Man 05	Life Cycle Cost and Service Planning	3	0.55	0	To Achieve the first (1) Credit, a Life Cycle Cost (LCC) analysis is to be undertaken (at RIBA stages C/D), in accordance with PD 156865:2008, with a study period of 60 yrs to include construction, operation and maintenance. A critical appraisal should be completed at feasibility stage, in line with ISO 15686 Buildings and Constructed Assets - Service Life Planning Part 1. The Second (1) credit is achieved where analysis has been carried out at strategic and	Life Cycle Cost analysis has not been undertaken at time of this pre-assessment, and therefore due to the current stage of the project it is envisaged that these credits are unlikely to be achieved.	NA

Table 3.1; Credits likely to be achieved given current design intent							
Ref	**Credit Title**	**Max available credits**	**% per credit**	**Likely credits**	**Credit criteria**	**Comments**	**Action for**
					system level has been carried out for at least two building components within the Envelope, Services, Finishes, or External space, and that the component selection has been based on this analysis. A Third (1) credit is available where the LCC model has been updated at RIBA stages D/E, that this update has informed the specification and design, and that a maintenance strategy has been developed that has been informed by the LCC.		
Health and Wellbeing							
Hea 01	Visual Comfort	3	0.94	1	BREEAM Minimum Standard (all levels): All Fluorescent and compact fluorescent lamps are to be fitted with high frequency ballasts	Lighting specification is to include requirement for high frequency ballasts to all fluorescent lamps.	CPPL Design Team
					Daylighting 1 credit – Occupied spaces to achieve an Average Daylight Factor (ADF) of ≥ 2%, for 80 % of area (m^2) of relevant spaces. In addition, a uniformity ratio of 0.4 (or minimum daylight factor of 0.8%), OR a view of sky (from 0.7m height) and the room depth criteria (based on room size, window head height and average reflectance of surfaces), are to be achieved	It is noted from design plans that the majority of occupied spaces are located at the building perimeter and incorporate extensive glazing where practical, in order to maximise natural daylighting within these areas. It is anticipated that the required daylight factor and/ or uniformity ratios would be achievable. Design Team are to demonstrate compliance via Daylight Calculation.	CPPL Design Team

					Glare Control & View Out 1 Credit available where glare has been designed out through building layout or design. Glare control strategy should be integrated with lighting strategy, to avoid conflict with lighting control system (and wasted energy). View out to be provided to all relevant building areas, and to be within 7m of external wall, with windows to be at least 20% by area of surrounding walls. Where greater than 7m from walls, window openings to be in line with Table 1.0 of BS 8206.	A Glare control strategy is to be developed (e.g. blinds/ brise soleil) to ensure compliance with this criteria. Design Team to ensure that that shading is designed to address glare control to coordinate with heating/ cooling control systems. Extensive glazing has been provided where practical to occupied spaces and from design layout plans, it is noted that many of the relevant areas (occupied spaces) have a room depth of up to 10m, (i.e.> than 7m requirement and therefore to achieve this credit it must be demonstrated by the Design Team that window openings are sized in accordance with the noted BS. It is anticipated at this stage that this credit will not be achieved.	CPPL Design Team.
					Internal and External lighting: 1 credit available where Internal lighting illuminance (lux) levels to relevant areas has been designed in line with CIBSE Code for Lighting 2009 or equivalent. Where computer screens are present lighting to be to CIBSE Lighting Guide 7. Lighting controls to all relevant areas should be appropriately zoned. External Lighting illuminance (lux) levels to all areas are to be specified in line with BS 5489-1:2003 and A2:2008 'Lighting of Roads and Public Amenity areas'.	Detailed requirements for internal and external light fittings and controls are to be included within the lighting specifications to ensure that this credit is achieved. Note that internal lighting controls should be separately zoned. It is recommended that these requirements are included within the building technical specification. The design team will ensure that the proposed external lighting scheme will fulfil any requirements of the ecology findings and be low level, non intrusive and high efficiency.	CPPL Design Team
Hea 02	Indoor Air Quality	4	0.94	4	Minimising Sources of air pollution: 1 credit available where an Indoor Air Quality plan has been produced (covering strategy for the removal, dilution & control, flush-out and testing of pollutants). Opening windows to be >10m from polluting sources, (intake and	The Design Team confirms that the development will be mechanically ventilated. It is noted from design information that natural ventilation will also be provided via openable windows within the office spaces. Given the nature of the building use, this aspect only	M&E Eng. / CPPL Design Team

					exhausts >20m), with CO_2 or air quality sensors specified to variable occupancy areas. 1 Credit awarded where decorative paints and varnishes are specified to meet VOC emission standards to BS EN 1330:2001, and where other relevant materials meet VOC emission standards. 1 credit available where Post construction testing demonstrates Formaldehyde concentration is <100 micrograms/m^3 and Total VOC concentration is < 300 micrograms/m^3.	applies to the office buildings and occupied parts of the development. The provisional layout indicates that the Mechanical ventilation intakes and exhausts are at least 10m apart and at least 20m from sources of pollutants. It is envisaged that the first credit will therefore be achieved. Requirements for VOC emission level testing are to be included within the specification for each relevant material used, to ensure one (1) credit is achieved. A commitment is to be provided by the client that Formaldehyde and TVOC testing will be undertaken at the post construction, (pre-occupation) stage, and that corrective steps will be taken to ensure airborne TVOC concentration levels are within stated limits. (1 credit).	
					Potential for Natural Ventilation: 1 credit is available subject to provision of a compliant natural ventilation strategy, confirming that occupied spaces are capable of providing fresh air entirely by natural ventilation. Openable window area to be 5% of internal floor area, and evenly distributed, and confirmed via CIBSE AM10 compliant software modelling. Two levels of user control must be provided. Where mechanical ventilation used, potential for natural ventilation must be demonstrated in accordance with the above criteria.	As noted above, the development will be mechanically ventilated, within provision of opening windows to all occupied areas. It is noted that several relevant (occupied) areas have a room depth >7m. For these areas, software modelling would need to demonstrate compliance. It is however envisaged that with effective positioning of openable windows (informed by modelling) that an adequate cross flow of air will be provided to all spaces, and that this credit will be achievable.	CPPL Design Team
Hea 03	Thermal Comfort	2	0.94	2	1 credit awarded where CIBSE AM11 compliant 'fully dynamic' Thermal software modelling has been undertaken and demonstrates compliance	Thermal Modelling is to be conducted in line with requirements to confirm compliance.	CPPL Design Team

					with CIBSE Guide for Environmental Design standards, and that the building complies with TOR requirements of appropriate industry standards. TOR metric (%) to be reported and provided together with minimum and maximum temperatures for summer and winter settings. 1 credit available where the thermal modelling has informed the temperature control strategy for building users. Heating/ cooling controls, should to be zoned and occupant controlled, with amount to be determined through discussions with the end user.	A Thermal Comfort Strategy is to be provided, together with design information describing compliant occupant control mechanisms, with control zones within the office areas identified.	
Hea 04	Water Quality	1	0.94	1	BREEAM Minimum Standard: Building Services water systems -Minimising risk of contamination. Water systems to comply with Health & Safety Executives 'Legionnaires disease, The control of legionnella bacteria in water systems', Approved Code of practice & Guidance 2000.	Building Services Specification is to confirm compliance with this criterion for all water systems.	CPPL Design Team
					1 credit available where, in addition to the above, a failsafe humidification system is provided (where humidification present). Fresh drinking water is also to be provided for staff (via point of use chilled mains fed supply or water coolers), at safe and convenient locations.	Design team are to ensure that failsafe humidification systems are provided, with compliance to be stated within the system specification. Mains fed chilled drinking water points will be included at relevant locations (staff communal areas, education/ communal spaces and changing areas) to ensure credit is achieved.	CPPL Design Team
Hea 05	Acoustic Performance (Sound Insulation)	4	0.94	2	Pre-requisite – A suitably qualified acoustician (SQA) to be appointed to provide design advice and testing, and that the development meets acoustic performance standards for Indoor ambient noise levels within relevant spaces in line with relevant standards.	It is understood that internal acoustic performance criteria have not been set, at this stage of the design. However, due to the type, nature and purpose of the building all offices will be designed to ensure that the appropriate acoustic environment (BS 8233: 1999)	Entran / CPPL Design team

					Credits are awarded where the development achieves the indoor ambient noise levels to acoustic performance standards required by BS 8233:1999 tables 5 & 6, for all relevant areas (first credit), and reverberation times compliant with BS 8233: 1999, Table 8 for rooms used for speech if present (second credit). This can be demonstrated by carrying out pre-completion testing by the acoustician with remedial works/ re-testing required where relevant, to ensure standards are met.	between and within the various use types (shop floor & production areas, offices, education areas and meeting rooms). On this basis it is anticipated that the development is to achieve the relevant performance criteria for each space type. The Building Specification is state acoustic testing and performance requirements for all areas.	
Hea 06	Safety and Security	2	0.94	1	First (1) credit awarded for provision of compliant Safe Access to the building within external areas (regarding cyclist/ pedestrian/ delivery vehicles), through the use of compliant designated routes to the building entrance, in accordance with Local Transport Note 2/08, or National Cycle Network Guidelines. Lighting for access routes is to be in accordance with BS5489-1:2003 + Appendix 2:2008 (as Hea 01) The second (1) credit is available for Security of the Site and building: Consultation with a security consultant (or Police Architectural Liaison Officer) is required to have taken place during or prior to RIBA Stage C, and it is to be demonstrated that this process has informed the design, to comply with the principles of Secured By Design and/ or Safer Parking.	From the design plan drawings, the CPPL site is well connected to existing pedestrian, road and cycle routes, with the main entrance to the site being located from Overton Road. It is anticipated at this stage that dedicated cycle and pedestrian routes will be provided, as part of the detailed landscape plan, and that the first (1) credit will be achieved. Confirmation provided through both DAS and Site Plans and SLR EIA Transport Chapter. No consultation with either the police or the CTSA (counter terrorism) during early design stages. However these will be targeted as part of the detailed design stages. It therefore assumed that the second credit will not be achieved.	CPPL Design Team

Energy							
Ene 01	Reduction of CO_2 Emissions	15	0.68	15	Credits are awarded (from 1 to 15) based on the percentage performance improvement progressively better than the Target Emission Rate (TER), using the Approved Document L1A 2010 TER as a baseline. Benchmark minimum standards are as follows: ≥ 25% = 6 credits (BREEAM Excellent); ≥ 40% = 10 credits (BREEAM Outstanding); ≥ 100% = 15 credits (Zero Net CO_2 Emissions) Credits are derived from the Energy Performance Ratio for New Constructions, using BREEAM Ene 01 calculator. This takes into account the buildings operational demand, consumption and resulting CO_2 emissions, and utilises performance data from approved energy calculation software.	The design team are committed to achieving a 100% reduction in CO_2 emissions for the development. The below measures will be considered and incorporated into the design, in order to obtain sufficient improvements in TER and subsequent energy performance; • Design of the external fabric elements to maximise energy efficiency by achieving high performance U-values; • All hot water provided by waste heat recovery from main process plant. • All building electricity provided through Solar PV and/or renewable generation.	CPPL Design Team
Ene 02	Energy Monitoring	2	0.68	2	1 credit: BREEAM Very Good Minimum Standard. All major energy consuming systems to be monitored via either BEMS or accessible pulsed output sub-meters. Energy consuming use is to be clearly identifiable to building users	The design team have confirmed that pulsed output sub meters will be specified to all relevant energy consuming systems. The entire site will be controlled and operated in accordance to an integral BEMS.	CPPL Design Team
Ene 03	External lighting	1	0.68	1	All external lighting to be energy efficient fittings, and to comply with the following performance criteria: • Building, Access ways and pathways: - Luminous efficacy >50lamp lumens / circuit Watt with a Colour rendering Index	The design team have confirmed that all external space (including wall fixed and decorative lighting) and security lighting will satisfy the criteria for this credit. It is envisaged that energy efficient lighting will be used for throughout all aspects of the development.	CPPL Design Team

					(Ra) >60 Ra OR - 60 lamp lumens/circuit Watt, with Ra<60. • Car parking, roads, floodlighting: - Luminous efficacy >70lamp lumens/circuit Watt with a Colour rendering Index >60 Ra OR - 80 lamp lumens/circuit Watt, with Ra<60. • Signs and Up lighting: - Luminous efficacy >60 lamp lumens/circuit Watt with lamp wattage of at least 25W OR - 50 lamp lumens/circuit Watt, when lamp wattage is less than 25W. All external light fittings are to be controlled through a time switch, or daylight sensor to prevent use during daylight hours.	Performance criteria are to be detailed within the lighting specification to ensure compliance. All external light fittings (including decorative lighting) are to be fitted with PIR and daylight cut-off sensors (or timed switch), to ensure compliance with this credit.	
Ene 04	Low or Zero Carbon Energy Technology	5	0.68	4	1 Credit available where a compliant Feasibility Study has been undertaken, and includes recommendations for Low or Zero Carbon (LZC) technologies, with confirmation to be provided that a local LZC technology has been specified in line with recommendations made. Study to be carried out at RIBA stage C. 2 credits are available where (dependent on the first credit being achieved) the specified LZC results in 10% reduction in CO_2 emissions (3 credits awarded for a 20% reduction). OR alternatively up to 3 credits are available where the feasibility study includes a Life Cycle Assessment of the carbon impact of any specified LZC, and which demonstrates a	The design team have commissioned and provided initial consideration and analysis of appropriated LZC technologies for the site. The LZC study is provided has been undertaken, (ref. Energy Strategy Report RSOL0612RL01_ES_1). Initial software modelling has been completed as part of the Summary Energy Report and considers the combination of several LZC technologies in its analysis; The LZC concludes that all building heating, cooling and ventilation should be provided utilising the available renewable sources that have been either integrated into the building or available as a result of the EfW scheme.	CPPL / Design Team

					resulting % reduction in lifecycle CO_2 emissions. (2 credits where LCA study only, 3 credits for LCA study + 10% reduction, 4 credits for LCA study +20% reduction). 1 Credit is awarded where a free cooling strategy is utilised (e.g. Ground water cooling, displacement ventilation).	In essence: - all heat (domestic heating and hot water) will be supplied from the waste heat available from the pyrolysation / power plant. - All electrical power will be supplied from either the Solar or CHP generation systems. It is noted that CHP is generally not classed as a renewable technology, however in this case it is fuelled by renewable sourced (waste derived) synthesis gas and certified as renewable by Ofgem. On this basis it is assumed that regulated CO_2 emissions will be reduced in excess of 100% and that a total of 4 credits will be achieved.	
Ene 06	Energy Efficient Transportation Systems	2	0.68	2	1 Credit where Lift/ Escalator/ Moving Walkway analysis has been undertaken to inform selection, numbers and sizing (including counter balancing ratio) of the relevant system, based on demand and usage patterns. A minimum of two types of system are to be compared in regard to energy consumption, with the most energy efficient system selected as a result of the analysis. A second credit is available where additional energy efficient/ saving features are specified for the system (e.g. load sensing devices, or variable speed/ voltage/ frequency drive controllers are utilised).	A DDA compliant single person passenger lift has been included in the design of the main building. The specific details of the lift have not been provided at this stage. It is recommended that a commitment be made to provide to ensure that an efficient lift system is specified, to ensure the first credit is achieved. Details will also be included within the specification to ensure that load sensing, variable speed controllers are used. Therefore it has been assumed that the second credit will be achieved.	CPPL / Design Team
Ene 08	Energy Efficient Equipment	2	0.68	2	Two credits are available where it can be confirmed via Specification that function or equipment that will be responsible for the majority of unregulated energy consumption	A commitment has been made by the design team to provide energy efficient equipment in accordance with relevant Schemes for all areas, in order to ensure these credits can be achieved.	CPPL / Design Team

					within the development is to be compliant with relevant energy efficient criteria as listed within the BREEAM 2011 Technical Manual. For example, 'Small power and plug in equipment' is to be on Energy Technology Product List (ETPL), Energy Star, Government Buying Standards, or Buying Solutions schemes. 'Kitchen and Catering facilities' should demonstrate incorporation of one energy saving measure outlined in relevant sections of CIBSE Guide TM50.		
Transport							
Tra 01	Public Transport Accessibility	5	0.73	0	5 credits available. The public transport Accessibility Index (AI) is to be determined and used to verify the number of credits to be awarded, based on service provision from compliant transport nodes (bus services with stops within 650m of the building, and rail services with stations within 1000m), surrounding the site.	The application site is located within a broadly rural setting and access to non-car infrastructure reflects this. Indeed, there are no footpaths, cycleways or bus stops within accessible distance of the site. Nevertheless, the opportunity to travel to the site by non-car travel modes would be limited by virtue of the number of staff that would be employed at the site and the bias towards shift patterns of working, which naturally reduces the propensity to travel by means other than car. Hence, the main opportunity for sustainable travel exists with the potential to encourage staff to car share, which would reduce the number of private motor vehicles on the road network. Based on the lack of sufficient bus and rail connectivity, it is estimated that no credits will be achieved.	CPPL / Design Team

Tra 02	Proximity to Amenities	1	0.73	0	Proximity to Cash point, Grocery, Post box, Pharmacy or Medical centre (GP Surgery) is to be confirmed if within 500m of the building entrance (note these facilities are not required to be 'stand-alone' facilities). 1 Credit awarded where at least 2 of these amenities are present.	The nearest neighbourhood centres are Micheldever Station which is more than 500m from the site. On this basis it is expected that the credit will not be achieved.	CPPL / Design Team
Tra 03	Cyclist Facilities	2	0.73	1	1 credit can be awarded where safe, secure and weather proof cycle storage is provided as follows: 1 space per 10 staff on site, plus 1 per 10 beds provided. Cycle storage must be of size as described in the BREEAM 2011 Technical Guide. A Second credit can be awarded where 2 compliant cyclist facilities (showers, changing facilities & lockers, and drying space for clothes) are provided for every 10 staff.	Design Team information confirms that a minimum of 10 secure cycle store spaces are being provided at the Energy Recovery Plant. It is anticipated that there would normally be <30 staff on site (~3 spaces), and therefore in the absence of detailed staff numbers at this stage it is anticipated that this credit would be achieved. A minimum of 5 spaces is shown on the site layout plan. Provision of dedicated lockers and changing facilities has been confirmed. Therefore this credit has been assumed.	CPPL / Design Team
Tra 04	Maximum Car Parking Capacity	2	0.73	1	Credits are awarded for car parking space provision per building user, relative to the sites Accessibility Index (accessibility to transport links) on a sliding scale. Sites benefit from a higher ratio of building users for every car space provided, with this ratio increasing where sites are deemed to be more accessible (i.e. a higher AI). For example, 2 credits are achieved where 1 space per 4 building users is provided for a site with AI <4. The same credits will be achieved where 1 space per 6 building users is provided for a site with an AI of 8.	It is noted within design team information that at car parking spaces are to be provided on the proposed site, with 4% of these dedicated as disabled parking spaces. Detailed numbers of building users is not currently available. However, on the basis of an estimated 30 staff, this results In a car space/ building user ratio of 2:1. It is anticipated that this would achieve one credits at this stage.	CPPL / Design Team

Tra 05	Travel Plan	1	0.73	1	1 credit available where a Travel Plan has been prepared at feasibility stage, and is particular to the site and demands of the proposed development. The TP should use transport survey information as its basis, and include recommendations to meet plan objectives and minimise car-based travel patterns. It will also need to be demonstrated that this has informed the final design.	It is understood that a Travel Plan has been provided by SLR as part of the planning application documents. The plan has been designed to meet the Local Authority requirements. The scope of the travel plan will cover all necessary issues for employees and visitors and has been informed by a site specific Transport Assessment. On this basis, it is expected that this credit will be achieved.	CPPL / Design Team

Water							
Wat 01	Water Consumption	5	0.67	2	Credits awarded using sanitary ware fitting specifications for water consuming components, and details of grey water/ rainwater systems to determine potable water consumption (litres/ person/ day). BREEAM Wat 01 calculator used to determine credits achieved. Credits awarded based on predicted water consumption, as a % improvement compared against national baseline performance benchmarks: 12.5% = 1 credit 25% = 2 credits 40% = 3 credits 50%= 4 credits 55% = 5 credits	Design team are to ensure BREEAM Very Good Minimum Standard 1 credit is to be achieved via specification of water efficient fittings, to result in a total water consuming efficiency of 12.5% against national benchmarks. It is anticipated that high efficiency water saving fittings will be installed within the development (to have at least 25% improvement over baseline standards) to ensure that two credits are achieved The site has been designed to have a very high level of rainwater harvesting. All toilets shall be fed by the water collected in the rainwater / grey water harvesting tanks. All fittings will be specified to achieve at least a 25% improvement over national performance benchmarks, to ensure a minimum of two (2) credits are achieved.	CPPL / Design Team
Wat 02	Water Monitoring	1	0.67	1	BREEAM Very Good Minimum Standard: Water meter to be specified to the mains water supply to the building.	Design team to ensure requirement within the specification.	CPPL / Design Team

					1 credit awarded where Pulsed output meters (mains and sub) are specified to be installed to the mains water supply and any major water consuming plant (where plant consumes 10% of buildings water demand). For plant, monitoring can be via meter or integral system. Meters should be capable of connecting to a BMS system.	M&E Specification is to include requirement for pulsed output mains meter and relevant sub meters, to ensure this credit is achieved.	CPPL / Design Team
Wat 03	Water Leak Detection and Prevention	2	0.67	2	1 credit is awarded for the specification of a compliant leak detection system on mains water within and between the building and utilities water meter (to be audible alarmed, programmable and activated when flow rate reaches a pre-set maximum). 1 credit is available where flow control devices are to be fitted to WC areas, to ensure water is supplied only when needed (can be controlled by either timer/ volume/ presence detection/ central control unit utilising a combination of these).	The Specification is to include a requirement for a compliant leak detection system, with flow control devices to be installed on the water supply to WC areas, in order to ensure 2 credits are achieved.	CPPL / Design Team
Wat 04	Water Efficient Equipment	1	0.67	1	1 credit is available subject to provision of a compliant irrigation system for internal/ external planting. OR where it can be confirmed that no irrigation system will be installed for internal/ external planting or landscaping, and that planting will rely solely on precipitation or manual watering. Compliant irrigation systems include; drip feed subsurface systems with moisture sensors and rain stat; and irrigation via reclaimed rain or grey water. Where Vehicle Wash system is installed, it must use a partial reclaim unit in line with the ECA Water Technology List.	The design team have confirmed that rainwater harvesting is proposed for the development and forms a key design requirements of the site. On this basis it is anticipated that this credit will be achieved.	CPPL / Design Team

Materials							
Mat 01	Life Cycle Impact of Materials	6	0.96	4	Credits are awarded through the specification of six key construction elements: external walls, windows, roof, upper floor slabs, Internal walls, and floor finishes, and their quantified environmental life cycle impact (based on Green Guide Ratings of each specified product/ material for each element). Life cycle Green House Gas emissions for each element are also to be reported (for 60 year building life). Credit level to be verified by Mat 01 calculator based on data to be provided. Areas and thicknesses, or volumes for each constituent element material to be provided.	It is the intention of the design team that new elements within the development shall comprise a sufficiently robust construction, and utilise new materials with a low embodied environmental impact (rated A+ to B in accordance with the BRE Green Guide) by implementing the following measures; • Affording advantage to those materials with a lesser environmental impact; • Reviewing alternative materials that have a lower environmental impact when developing material specifications, including recycled materials; and • Reviewing the embodied energy within potential building materials and reduction of the embodied energy where feasible. It is anticipated at this stage that 4 credits will be achievable.	CPPL / Design Team
Mat 02	Hard Landscaping & Boundary Protection	1	0.96	1	80% of hard landscaping and boundary protection to achieve and A or A+ Green Guide ratings. Credits achieved are to be determined by the BREEAM Assessor from Specifications and external layout information to be provided. Access/ approach roads and vehicle manoeuvring areas are to be excluded from assessment under this Issue.	From the EIA, external landscaping will predominantly comprise of hard surfaces to car parking areas generally. With the exception of the roadways and tank bases, a majority of the site will comprise soft ground. All boundary protection shall have a minimum Green Guide Rating of 'A'. The proposals also shows that boundary protection will be provided by native buffer planting and trees, which has a GG Rating of 'A+'. On this basis it is assumed that this credit will be achieved. Developed specifications will be required to verify compliance during the following design stages.	CPPL / Design Team

Mat 03	Responsible Sourcing of Materials	3	0.96	2	Minimum Standard for All BREEAM ratings: 100% of timber must be legally sourced. All timber to be specified to be sourced in accordance with UK Governments Timber Procurement Policy. Credits awarded where 80% of assessed materials used in the **key building elements** are responsibly sourced: Frame, ground floor, upper floors, roof, external walls, internal walls, foundations / substructure, fittings (including staircase, windows, doors, floor finishes), and hard landscaping. Responsible sourcing to be verified via compliant scheme Certification, with Tier Level 1-7 allocated to the applicable material/ product. The Mat 03 Responsible Sourcing calculator must be used to assess the credits achieved, and requires volumes of applicable materials and their provenance to be inputted. Note that materials within existing retained elements do not need to be considered for this credit.	Design team to include requirements for timber sourcing within relevant specification clauses to ensure compliance. The Project team will ensure that materials for new key building elements are specified and procured in accordance with the following; • All timber will be sourced from legally logged and sustainable sources (FSC / CSA / PEFC) verified timber with a full chain of custody (CoC); • Supplier environmental credentials form an essential element of the selection criteria (particularly certifications such as ISO 14001 / EMAS etc.); and • Suppliers/ manufacturers hold relevant responsible sourcing Certification (e.g. BES6001) for products and materials specified. Based on the above, it is assumed that the majority of materials utilised for the construction of the Energy Recovery Centre development will be covered by certifications (such as ISO 14001 / EMAS) and achieve at least a 'Good' performance rating under British Standard BES 6001; 2008[1].	CPPL / Design Team

[1] BES 6001:2008 is a Global standard that provides a framework for the assessment of responsible product sourcing and provides a route to certification of construction products.

Mat 04	Insulation	2	0.96	2	One credit is awarded for specification of insulation materials with a low embodied environmental impact for external walls, ground floor, roof, and building services. Credit level is determined by the Insulation Index achieved for each product via Mat 03 calculator (based on Green Guide ratings and the volume weighted thermal resistance). 1 credit is available where at least 80% of all specified insulation materials/ products for the relevant elements are responsibly sourced as per criteria noted under Mat 03.	All new insulation products will be chosen to have a Green Guide Rating to achieve an Insulation Index of at least 2.There are many compliant products widely available and manufacturers now have relevant data available (it may need to be requested from technical departments as it is not always included in technical product data). The team are also to ensure that specified insulation products are responsibly sourced, through their specification, in accordance with the requirements of Mat 03. The proposed Curtain Walling Systems are manufactured by Paroc and meet all necessary requirements.	CPPL / Design Team
Mat 05	Designing for Robustness	1	0.96	1	1 Credit can be awarded where internal & external areas of vehicular, trolley and pedestrian movement occurs has been identified, and that protection measures have been specified to vulnerable parts of the building. Scope to include protection of building fabric within; circulation/ public areas; internal areas within 1m of vehicular/ trolley movement; and 1m of vehicular parking/ manoeuvring or 2m of delivery areas.	Due to the use type of this building and high quality specification to be construction, it is anticipated in absence of details at this stage that the requirements of this credit will be met.	CPPL / Design Team

Waste							
Wst 01	Construction Site Waste Management	4	1.25	3	Monitoring and reporting of waste generated on site in defined waste groups, and compliance with legal requirements as set in SWMP regulations 2008 for and with best practice. The plan should include the setting of targets to promote resource efficiency in accordance with guidance from WRAP, Envirowise, BRE and DEFRA. The plan must address diversion of waste from landfill. Credits are available for construction resource efficiency where non- hazardous construction waste is limited to a minimum 13.3m3 (or 11.1 tonnes) per 100m^2 of Gross Internal Floor Area (1 Credit), 7.5m^3 (or 6.5 tonnes) / 100m^2 (2 credits), and 3.4m^3 (or 3.2 tonnes) / 100m^2 (3 credits). Note that the above efficiency benchmarks exclude demolition and excavation waste. One further credit is available where non-hazardous waste (70% volume/ or 80% by weight) of non demolition waste, and 80% volume/ or 90% by weight of demolition waste is diverted from landfill. All credits dependent on a compliant Site Waste Management Plan being in place.	In order to obtain sufficient tradable credits for Wst 01, The project team will require the principle Contractor to develop a comprehensive site waste management plan that comprises: • Procedures and commitments for increasing construction resource efficiency and minimising construction waste and diverting waste from landfill, including; – Waste monitoring procedures, establishing benchmarks and key performance indicators for waste production and classification; – Details on recovery / re-use options; – Target limit of 7.5m^3 (or better) non-hazardous waste/ 100m^2 GIFA; – Commitment to diverting at least 70%volume/ 80% by weight of non-hazardous construction waste, *and* 80% volume/ 90% by weight of non-hazardous demolition waste from landfill. Based on the above, it is envisaged that three (3) credits will be achieved.	CPPL / Design Team
Wst 02	Recycled Aggregates	1	1.25	1	1 Credit available. Compliance can be shown via the specification of minimum levels of recycled / secondary aggregate use (relative to	Specification to include requirement to use recycled or secondary aggregates within the development, with the total amount to be at least 25% of total high grade/	CPPL / Design Team

					amount of high-grade aggregates used) for structural frame; floor slabs; bitumen (paved areas and roads); concrete road surfaces; pipe bedding; building foundations; granular fill & capping; and gravel landscaping.	secondary aggregate used in the construction, in order to ensure the credit is achieved. This credit has been assumed to be achievable at this stage.	
Wst 03	Operational Waste	1	1.25	1	1 Credit awarded where there is to be provision of dedicated storage facilities for operational (in use) related recyclable waste streams. Storage areas/ Bins must be labelled, accessible, and of an appropriate size and capacity. Where consistent generation of waste exists, the following should be provided; Static waste compactor or baler (within service or dedicated waste management space); A vessel for composting organic waste OR space for storing segregated food waste and compostable material, together with provision of a water outlet for cleaning.	Design drawings show that provision has been made for dedicated storage of waste within the offices and external areas. All wastes will be processed through the process plant and will be fully recovered.	CPPL / Design Team

Land Use and Ecology							
LE 01	Site Selection	2	1.00	2	Compliance can be demonstrated where it can be confirmed that 75% of the proposed development footprint is on land 'developed' (occupied) in the last 50 years (1 credit). A second credit is awarded where a site investigation report confirms that the existing site is significantly contaminated, and that remedial action is required to allow the development to progress.	The proposed site is owned by Network Rail and is a former rail yard. The site is a designated brownfield site with historical industrial use. A detailed site walkover and document review has been carried out by SLR Ltd and a Phase 1 site assessment completed (SLR EIA Chapter 10 – Land Quality). The baseline conditions have been drawn from widely available published materials and a previous technical report completed by SLR. With respect to geology, ground conditions and land quality it is concluded that, should appropriate mitigation measures be implemented (following completion of ground investigations and development/implementation of a remediation strategy), there will be no significant residual impacts or cumulative effects associated with the proposed redevelopment. In order to verify contamination conditions, a comprehensive intrusive investigation will be undertaken prior to construction. The investigation will include an assessment of land gas conditions at the site, with gas monitoring undertaken over an appropriate period of time. The findings of the investigation will be reported to the Local Authority and a strategy for dealing with any contamination and/ or ground gas identified will be prepared and agreed with the Local Authority. It is considered that it will be possible to eliminate or	CPPL design team / EAME

						minimise all significant pollutant linkages to an acceptable level with appropriate remediation and control measures. Therefore it is anticipated the second credit will be awarded.	
LE 02	Ecological Value of Site & Protection of Ecological Features	1	1.00	0	One credit is awarded for developing land of inherently low value (either using the BREEAM Ecology checklist or a suitably qualified ecologist (SQE) can confirm that the construction zone is of 'low ecological value'. Confirmation is also required that all existing features of ecological value (trees, hedges and watercourses) will be sufficiently protected to relevant UK and EU standards by the Contractor, prior to and during clearance, preparation and construction activities.	The network rail site has undergone a Phase 1 and Phase 2 detailed Ecology Surveys. All surveys were carried out by a competent ecologists (Pell Frischmann) The application site is wholly contained within Micheldever Oil Terminal SINC and comprises calcareous grassland, scrub and bare ground mosaics. The ecological evaluation identified the following receptors of ecological importance within the site: • Micheldever Oil Terminal SINC supports species-rich calcareous grassland plant communities; • Slow worm; • roosting bats in trees assumed present for the purposes of mitigation; • commuting / foraging bats; • Dormouse assumed present for purposes of mitigation (present locally); • Nesting peregrine falcon; • Nesting birds; and • Invertebrate assemblage The assessment of impacts upon receptors within and around the application site have identified a range of potential impacts, i.e. habitat loss, fragmentation, hydrological, dust, noise and visual impacts; that could	CPPL design team

						result from the construction and operation of the proposed development. The ecological receptors have been assessed against these impacts to identify the likelihood of significant ecological effects. Mitigation measures have been devised to avoid, minimise or compensate for potential impacts upon plant communities, slow worms, bats, dormouse, invertebrates, peregrine falcon and birds, specifically in regard to habitat loss and noise and visual disturbance. Residual impacts of the proposed development have been highlighted with specific regard to habitat loss from the Micheldever Oil Terminal SINC. Residual habitat loss associated with Micheldever Oil Terminal SINC has been quantified at 0.25 ha of calcareous grassland, although this does not take into account areas of calcareous grassland which attempts to re-instate would be made as part of the proposed conservation management programme, which at this stage are not quantifiable. The implementation of the conservation management plan would help to secure the presence of calcareous grassland at the SINC in the long term. At present this residual impact is considered to be of minor significance in the short term. On this basis it has been assumed for the purposes of this pre-assessment that the credit will not be achieved.	

LE 03	Mitigating Ecological Impact	2	1.00	0	BREEAM Very Good Minimum Standard: 1 Credit awarded where it is confirmed that the development will result in 'minimal change' in ecological value of the site (an ecological value between 0 and -9). A Second credit is available where this value is equal to or greater than 0 (zero), i.e. 'no negative change' has resulted.	The findings of the Ecology Report have established that site is of ecological value. The Ecologist report has made a number of recommendations to improve or at least ensure that 'minimal change' in the site ecological value. Therefore no credit has been assumed at this stage.	CPPL Design team
LE 04	Enhancing Site Ecology	3	1.00	0	One Credit where a Suitably Qualified Ecologist has been appointed and has produced an Ecology Report based on a site survey, and in line with BREEAM criteria. The Report should provide recommendations for the protection and enhancement of site ecology. It must be confirmed that these recommendations have or will be implemented. A second credit is available where the SQE can confirm a site ecological value increase of up to 6 species, with a third credit awarded for an increase of at least 6 species, as a result of the development.	The Ecological Impact Assessment document, notes that the proposals will result in minor significant impacts. On this basis it is assumed that no credits will be achieved under this Issue.	CPPL Design Team
LE 05	Long Term Impact on Biodiversity	2	1.00	0	1 credit is available where a suitably qualified ecologist has been appointed prior to site activities, and that all relevant legislation for protection and enhancement of ecology has been complied with during design and construction phases. If relevant a compliant habitat management plan is to be produced for the first 5 years following completion. Two of the six additional listed BREEAM Issue criteria are to be implemented. A second credit is available provided that four additional criteria (or all relevant criteria as confirmed by the ecologist) are complied with.	The Ecological Impact Assessment prepared by Pell Frischmann sets out the principles of a mitigation and protection strategy for site-wide ecology, relating to both retained existing and proposed new planting, during and after construction, including recommendations for habitat management where relevant. Compliance cannot be verified at this stage via the EIA, however given that the site has a recognised ecology value, it is anticipated thast no credits will be achieved in this issue.	CPPL Design team / Pells

Pollution							
Pol 01	Impact of Refrigerants	3	0.77	2	Three credits are available where it can be confirmed that no refrigerants will be used in the development. Alternatively, if refrigerants are to be used they are to comply with additional criteria. Credits could be achieved depending on the Direct Effect Life Cycle CO_2 emission levels of the refrigerants specified, and their Global Warming Potential, Charge, cooling capacity, and Sectoral release factors. 2 credits for DELC CO_2 of 100kgCO_{2e}/ kW cooling capacity, 1 credit for a DELC CO_2 of 1000kgCO_{2e}/ kW. 1 Credit also available a refrigerant leak detection and automatic pump down systems are in place, with alarm detection activating pump down at detection of refrigerant maximum 2000ppm (0.2%).	Mechanical ventilation is to be used throughout the development. In the absence of more detailed system/ specification information at this stage, it has been assumed that refrigerants will be used in the development. It is recommended that the M&E specification is to include for a requirement that refrigerants used will have a DELC CO_2 equivalent emissions limit of 100kgCO_2 cooling capacity, or air conditioning system refrigerants to have a Global Warming Potential of 10 or better, to ensure two credits can be achieved.	CPPL Design Team
Pol 02	NO_x Emissions	3	0.77	3	Credits are awarded where the space heating & cooling plant system has a dry NOx emission level (0% O_2 excess) limit of <100mg/ KWh boiler Class 4 (1 credit), or <70mg/kWh boiler Class 5 (2 credits) or <40 mg/kWh (3 credits).	The Energy Statement concludes that all site heating and hot water will be provided through the use of waste heat from the thermal processes will be utilised for the offices and non production areas. These credits will be awarded by default.	CPPL Design Team
Pol 03	Surface Water Run-off	5	0.77	4	Flood Risk: 2 Credits are available where the site is within a flood zone a low annual probability of flooding and that a compliant site specific Flood Risk Assessment confirms there is a low risk of flooding from all sources. Only 1 credit is available where the site has a medium/ high risk of flooding. (The FRA will still need to confirm that the development is to the approval	A site specific Flood Risk Assessment has been carried out by SLR and has been used to evaluate site risk. Based upon the Flood Zone Maps published by the EA, the proposed development is shown to lie entirely within 'low probability of occurrence' Flood Zone 1 (which represents an annual probability of less than 0.1% of a flood occurring in any one year).	CPPL Design Team

					of the local authority, and that appropriate flood resistance/ resilience measures have been incorporated). Access to building to be >600mm above design flood level.	All potential sources of flooding to the application site have been considered and assessed in detail within the FRA provided in Appendix 9/1. The primary flood risk associated with the the proposed development is posed by the additional surface water runoff generated as a result of the proposed increase in impermeable area onsite, which could potentially result in an increase in flood risk to offsite areas. There is a potential risk to the site itself associated with overland flow, conveyed from the adjacent higher ground to the east and north of the application site. Overall, it is concluded that, with respect to the groundwater and surface water environments, there would be no significant residual impacts of the proposed development with the proposed mitigation measures in place. Two (2) credits have been assumed for the purposes of this assessment.	
					Surface Water Runoff: 1 credits is awarded where the relevant Consultant can confirm a compliant surface water run-off strategy and that peak run-off rate to watercourses is no greater than for the existing site (provision to ensure that this allows for 1 in 100 yr return period, and that allowance has been made for climate change). A second credit is available where the relevant Consultant can confirm that a failure in the local drainage system will not result in flooding	As above, an FRA has been undertaken and a Drainage Strategy, prepared by SLR Ltd has been provided, which notes that the proposed drainage design has been based on allowable discharge rates calculated for the existing Greenfield site, in accordance with PPS25. The Strategy also notes that 2 no. below ground attenuation and harvesting tanks are to be utilised to control the discharge of surface water from the site, and that these will be sized for a 1/100yr storm event plus 20% allowance for climate change, to prevent flooding. On this basis, it is anticipated that the two (2) credits will	

					property AND the run-off volume (over development lifetime) is no greater than for the existing site, and that volume of run-off resulting from 100yr 6 hour event will be prevented from leaving the site (via SUDs or infiltration), allowing for climate change and current best practice.	be achieved.	
					Minimising Water course Pollution: 1 credit is available where the design minimises water course pollution in accordance with relevant Guidelines (Pollution Prevention Guide 3 and SUDS Manual). It must also be confirmed that there is no discharge from the developed site for rainfall up to 5mm.	The design of the site contains and harvests all surface water runoff from site for use within the process. The Drainage Strategy notes that the design will comply with PPG3, with Class 1 Bypass separators included in the drainage design. A number of Petrol interceptors will be installed for any peak runoff discharges do not impact any controlled watercourses. On this basis one (1) credit has been assumed at this stage.	
Pol 04	Reduction of Night Time Pollution	1	0.77	1	1 Credit can be awarded where the specification for external lighting confirms compliance with ILE Guidance for Reduction of Obtrusive Light (Table 1), that external lighting will be auto switched off between 2300 and 0700, and where safety and security lighting will be auto set to lower level at these times. Illuminated signage (if relevant) will comply with ILE Technical Report 5 'The Brightness of Illuminated Advertisements'.	No formal lighting strategy design has been provided however the design team have confirmed that all lighting schemes will ensure that external lighting to the buildings, car park and roads has considered reduction of obtrusive light , regarding sky glow; light intrusion and; source intensity. The technical specification will ensure that fittings selected do not emit light at or above the horizontal plane. Whilst reference to the specific ILE guidance is not noted, the document cites compliance with ILP's Guidance Notes for the Reduction of Obtrusive Light: 2011, and it is anticipated that compliance with this credit will be demonstrated. The Lighting Specification is	CPPL / Design team

						to also ensure compliance with relevant guidance, stating control parameters, for all external light fittings, including car parking and security lights.	
Pol 05	Noise Attenuation	1	0.77	1	The Credit can be awarded where there will be no noise sensitive areas/ buildings within 800m of the development. If present, the credit can be awarded where a compliant Noise Impact Assessment in accordance with BS 7445 is produced by a qualified acoustician, the assessment to include background noise levels at the nearest noise sensitive site to the proposed development. Where noise levels from the proposed result in a difference of +5dB (day) and +3dB (night) when measured at the nearest noise sensitive site, steps are to be implemented to attenuate the noise at source.	The development is located within an area immediately adjacent to an existing railway, major truck road and general high level of ambient noise. There are no immediate noise sensitive receptors abutting the site. The design team have carried out an acoustic assessment of the ambient noise environment and measured the background levels at the nearest noise sensitive location. A site specific Noise Impact Assessment has been undertaken by SLR and all details have been included within the EIA documentation. Although specific details have not been provided at this stage, the design team have confirmed that the attenuation of noise generated by the key operational noise sources will all be mitigated such that the noise impacts are imperceptible. The conclusion of the EIA states that during the operational phase of the development, the noise impact will result in negligible effect on existing residential receptors due to the appropriate design and mitigation of the buildings Therefore this credit is expected to be achievable. Attenuation of noise generated by the development will be in accordance with BS 8233:1999.	CPPL Design Team

4. PERFORMANCE SUMMARY

The pre-assessment process identified the credits and consequent ratings likely to be achieved by the proposed Energy Recovery Centre development.

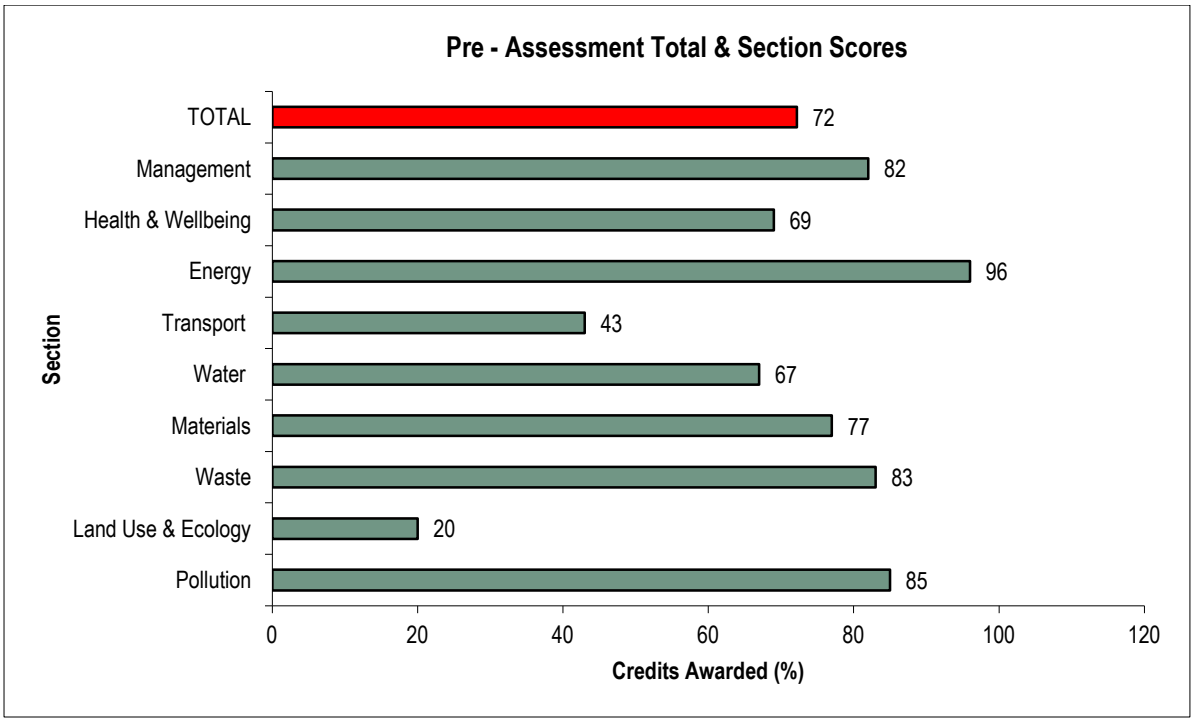

Figure 4.1: Predicted Percentage of the Total Score Achievable and a Breakdown of the Percentage of Credits Awarded in each Section for the development.

The proposed mixed use development is likely to achieve a ***BREEAM 'Excellent'*** rating, given current design intent: The development is likely to achieve a total overall score of approximately **72.18%.**

5. OPPORTUNITIES FOR IMPROVEMENT

Table 6.1 identifies those credits that are considered unlikely to be achievable for all elements of the proposals due to the nature and location of the development.

Table 6.1; Unlikely Credits

Credit	Credit Description	Comment
Tra 01 & 02	Transportation	It is considered unlikely that significant increase in credits can be achieved under these aspects as the sites are not necessarily located in areas served by local amenity or convenient public transport networks.
Man 05	Life Cycle Cost and service life planning	Due to level of project design completed to date, it is not considered feasible to undertake a Life Cycle Cost and service life planning exercise, and a retrospective analysis would be deemed of limited benefit to the scheme.
LE 2, 3 & 4	Ecology	The site is located within an SINC and has been identified as having a significant ecological value. Any development within this site will impact the ecology and hence score badly against BREEAM.

Table 6.2 identifies those credits that can be considered to improve the overall BREEAM score if required at a later stage in design. The arrow gives an indication of the increasing cost or difficulty in achieving each credit. In addition, Column 4 details the associated BREEAM score increase as a result of implementing the relevant opportunity for improvement (this can be added to the current predicted score in order to determine a revised total).

When considering the potential for improvement to the BREEAM score, it is recommended that those credits which are presented lower down the table are considered before those higher up. The 'weighted' score (see Section 1.3) has been given, to facilitate the calculation of the potential improvement to the score, should any of these suggested improvements be adopted.

Table 6.2; Opportunities for Improvement			
Credit	**Credit Description**	**Comment**	**Potential BREEAM points**
Wst 01	Construction Waste Management	One additional credit available where non-hazardous construction waste is limited to 3.4m^3 / 100m^2 gross internal floor area (or 3.2 tonnes / 100m^2 GIFA).	+ 1.25
Mat 01	Life Cycle Impact of Materials	Consider ensuring all building elements achieve a Green Guide rating of A+ to A.	+ 0.96
Mat 03	Responsible Sourcing of Materials	Consider purchasing all building materials from schemes that are compliant with BES 6001:2008 to ensure 54% of available points are achieved.	+ 0.96
Pol 01	Impact of refrigerants	Provision of a permanent refrigerant leak detection system with automatic pump-down.	+ 0.77
LE 04	Enhancing site Ecology	Ecologist to provide advice on potential measures that may further increase the ecology of the development site and its surroundings.	Up to 3 credits (+ 3.00)

Points to note:

As this pre-assessment has been undertaken in the early stages of design, much of the required evidence base has not been finalised. It is quite likely that due to changes in design or a lack of necessary evidence at the later design stages, there may be credits which are not awarded during the design stage assessment, which is when the BREEAM Interim Certificate is issued. Therefore, it is recommended that re-appraisal of designs against BREEAM requirements, as the designs are developed, is regularly undertaken to ensure that credit opportunities are not lost.

6. NEXT STEPS

6.1 Design Stage Assessment

The first stage of the BREEAM assessment is carried out on the detailed design. It is possible to undertake the design stage assessment during the period up to the issue of tender documents (RIBA Stages A – G).

However, the evidence base is required to demonstrate that each credit can be awarded; therefore to gain the most number of credits it is advisable to undertake the design stage assessment once the required information is available (see Appendix 1 for a list of the required evidence base). For example, details of all the sanitary fittings are required to be specified to calculate the score for the water consumption efficiency under BREEAM.

When the Assessor is satisfied with the performance under the BREEAM for the design stage assessment a report will be submitted to BRE to receive an 'Interim' BREEAM certification. This report will contain some documentary evidence together with an 'audit trail' for all specification, clauses, drawings, letters and reports.

6.2 Post Construction Stage Assessment

This can be carried out on the completed development. As part of this process, the Assessor will collate evidence (either documentary, photographic, or site survey evidence) to demonstrate that the development has been built in accordance with the details given at the Design Stage. This assessment is called a 'Post Completion Review Assessment' (PCR).

If changes have been made to the design following the design stage assessment (during the construction phase), that affects the BREEAM score, the Assessor will re-calculate the 'Final' score. This may be different to the Interim score. When the Assessor is satisfied with the performance under the BREEAM Scheme, they will submit a report to BRE to receive a 'Final' BREEAM Certification for the development.

6.3 Ongoing Consultation

Although this report provides recommendations, specific requirements of BREEAM can easily be misinterpreted or excluded at design stage, particularly in relation to the numerous standards with which the client must demonstrate compliance (such as CIBSE / ILE standards etc) and the requirement to consult with various specialists (such as LZC / renewables' consultants, ecologists, acousticians etc). It is therefore recommended that the relevant, competent third parties are engaged throughout all design stages in order to ensure the development proceeds in a manner that complies with the relevant requirements.

Appendix 1: Schedule of Evidence Requirements

Appendix 1; BREEAM Evidence Requirements		
BREEAM Issue	**Credit Title**	**Documentation required**
Man 01	Sustainable Procurement	The following detailed documentary evidence is required for the anticipated Design Stage: • Scope, roles, responsibilities and timing of collaboration to be provided in the form of minutes, programme, responsibility schedule, or specification. • Training schedule, including scope and noting parties involved. • Where an Accredited Professional has been appointed; letter of appointment, programme indicating key work stages, correspondence demonstrating BREEAM as a regular agenda item and AP attendance; AP progress reports • Project Budget/ programme/ specification to confirm that a Thermographic survey is to be undertaken by a professional with Level 2 certification to noted standards, together with a written commitment to ensure remedial works will be implemented, and re-survey. • Appointment letter or responsibilities schedule, and relevant specification to confirm commissioning parameters, together with Contractor programme (noting timing of commissioning) and Commissioning Schedule. • Appointment letter and Commissioning Schedule for seasonal commissioning over 12 month period following completion. • Where there is a commitment to collect energy and water consumption data post occupation, evidence of this commitment/ requirement (via contract/ specification) to be provided. • Where there is a commitment to provide after care support and training, evidence of this commitment/ requirement (via contract/ specification) to be provided.
Man 02	Responsible Construction Practices	The following detailed documentary evidence is required for the anticipated Design Stage: • Specification clause or other confirmation of commitment from the contractor or developer to comply with the Considerate Constructors Scheme or equivalent local or national compliant scheme, and achieve formal certification under the scheme with confirmation to be provided to confirm either 'compliance' is achieved, or significantly exceeded; and • Confirmation that registration with the Considerate Constructor Scheme has taken place no later than the commencement of the construction phase.

Appendix 1; BREEAM Evidence Requirements		
BREEAM Issue	**Credit Title**	**Documentation required**
Man 03	Construction Site Impacts	Project team to confirm compliance via specification/ contract or a signed letter of commitment to meet relevant criteria: • For monitoring and reporting use of energy, water and transport of construction materials and waste. • Confirmation of timber sourcing in line with UK Government Policy • A commitment for the contractor to operate an EMS to ISO 14001/EMAS or equivalent, and implement best practice regarding pollution prevention policies.
Man 04	Stakeholder participation	The design team is to provide the following information at Design Stage Assessment: • List of stakeholders consulted, together with a Consultation Plan with scope and programme. • Records of consultation meetings, with documentation/ information highlighting where outcomes have been incorporated. • Design & Access Statement, or access strategy, together with specifications/ design drawings highlighting where relevant facilities have been provided. • Specification clause or letter from the client confirming the provision of a Building User Guide, noting the contents and parameters to be included. • Signed documentation confirming a client commitment to provide a Post Occupancy Evaluation of the development detailing scope of the evaluation method, and with a commitment to ensure dissemination of information to relevant parties.
Man 05	Life cycle Cost and service life planning	Information to be provided at Design Stage: • Life Cycle Cost Analysis document with date of analysis to be noted • Feasibility stage appraisal • Details of strategic and systems level LCC Analysis to be provided, highlighting options and benefits of selections, and value of selection. • Relevant Specifications and drawings confirming selected elements included resulting from LCC analysis. • Updated LCC analysis to be provided, together with confirmation of timing of update • Copy of the maintenance strategy (or commitment to provide this), together with evidence demonstrating how the LCC Analysis informed the

Appendix 1; BREEAM Evidence Requirements		
BREEAM Issue	**Credit Title**	**Documentation required**
		strategy
Hea 01	Visual Comfort	Specification to confirm mandatory standard criteria for high frequency ballasts to all fluorescent light fittings. Additionally, the following is to be provided at Design Stage assessment: • Scaled Design Drawings labelled with space use, and noting areas (m^2) • Daylight calculations with daylight factors, and uniformity ratios. • Design drawings and window schedules to, together with specifications to confirm window positions, views out and glare control mechanisms. • Lighting design drawings and information showing scope, locations and type of light fittings specified to all internal and external areas, with schedules and/ or lighting specifications confirming compliant lighting levels, performance and control criteria to relevant CIBSE and ILE standards.
Hea 02	Indoor Air Quality	• Indoor Air Quality Plan • Design drawings highlighting locations of intakes/ exhausts/ openable windows and their distances, relative to each other and to sources of potential pollution. • Relevant Specifications to be provided confirming compliance with ventilation standards; provision and type of CO2/ Air quality sensors (where relevant); and VOC Emission level testing standards to be met by specified materials • Design team/ client correspondence to confirm commitment to undertake post construction (pre-occupancy) testing for Formaldehyde and TVOC concentrations to relevant standards. • Letter from design team confirming the ventilation strategy details, and ventilation modelling software used for analysis. • Calculations/ results of ventilation modelling software • Specifications and Manufacturers technical literature for ventilation control mechanisms utilised.

Appendix 1; BREEAM Evidence Requirements		
BREEAM Issue	**Credit Title**	**Documentation required**
Hea 03	Thermal Comfort	• Specification or design team correspondence confirming Thermal modelling criteria in line with CIBSE AM 11, with full dynamic analysis and that the results meet relevant standards • Thermal Modelling output • Time out range (TOR) data • Thermal Comfort strategy to be provided including information that demonstrates how this has informed the temperature control strategy, together with; • Specifications and drawings highlighting methods of occupant controls implemented from the thermal comfort strategy
Hea 04	Water Quality	Minimising risk of contamination • Specification to confirm compliance with the H&S Exec. The control of Legionnaires disease – Approved Code of Practice and Guidance • Specification also to confirm presence and scope of humidification systems. Provision of Drinking Water • Design drawings with locations of mains fed 'point of use' fresh drinking water provision identified.
Hea 05	Acoustic Performance	The following detailed documentary evidence is required for the anticipated Design Stage (DS): • Acousticians report and calculations • Letter confirming timing of appointment of the qualified acoustician, • Relevant specification / contract clauses defining acoustic performance criteria for relevant areas in the development • Where pre-completion testing will be carried out, a letter is required from the developer confirming the intent to: – Meet the relevant sound insulation performance levels – Use a Compliant Test Body to complete testing.

Appendix 1; BREEAM Evidence Requirements		
BREEAM Issue	**Credit Title**	**Documentation required**
		• Where Robust Details will be used; – Confirmation that the Robust Details chosen will achieve the required performance standards for sound insulation (as applicable) Confirmation that the relevant plots are registered with Robust Details Ltd. (the Purchase Statement).
Hea 06	Safety and Security	Safe Access • Design drawings, including a scaled site plan and relevant sections of the specifications to be provided sufficient to demonstrate compliance with safe access criteria for the provision, detail, dimensions, and lighting of pedestrian, cycle routes and access roads. • Confirmation from design team that on site dedicated access footpaths and cycle routes are designed in accordance with NCN Guidelines and Local transport Note 2/28. Security of site and building • Text (specification clause, letter of instruction, formal letter from contractor to developer/assessor) confirming that an ALO/CPDA has been consulted to provide advice early in the design stage (RIBA stage C) to ensure that the requirements of Secured by Design are met; and • That the advice of the ALO/CPDA will be followed; and • Location and details of all recommended/specified security features such as external lighting, door/window locks, etc. and their third party certification levels (if applicable).
Ene 01	Reduction of CO2 Emissions	In order to establish the Energy Performance Ratio for New Constructions (for input to the Ene 01 Calculator) the following information is required at Design Stage: • A copy of the 'As designed' stage Building Regulations Part L approved software output document (BRUKL). • Proof of accreditation for 'accredited external renewable's'. For exemplary level criteria, the following information is required: • A copy of a report/ outputs confirming carbon neutral energy generation (kWh/yr); source of neutral energy; calculated estimate of energy consumption from unregulated systems; calculated estimate of exported energy surplus.

Appendix 1; BREEAM Evidence Requirements		
BREEAM Issue	**Credit Title**	**Documentation required**
		• Confirmation from Client that any surplus carbon neutral energy generated by the development and exported will not be used to claim Renewable Obligation Certificates.
Ene 02	Energy Monitoring	• Detailed documentary evidence (specification or contract) and design drawings to confirm major energy consuming systems, and type, location and scope of energy monitoring system (either via BEMS and/ or pulsed output sub-meters).
Ene 03	External Lighting	• Relevant drawings showing: location of all external light fittings; and • Text (on drawings, specification, letter of instruction) describing location and type of all external light fittings.
Ene 04	Low or Zero Carbon Energy Technology	The following information will be required at Design Stage: • Feasibility study to be provided to confirm that appropriate analysis has been undertaken and recommendations made, with timing of the study noted. • Specifications and design drawings for Low or Zero Carbon technologies utilised. • Output calculations confirming carbon savings resulting from the specified LZC technology. • Life Cycle Assessment Analysis to include system lifetime carbon savings. • Detailed documentary evidence confirming that the specified low or zero carbon technologies: – Meet any additional requirements defined in Directive 2009/28/EC as applicable; and are – Certified under the Micro generation Certification Scheme (as applicable); or – Certified under the CHPQA standard (as applicable) Where free cooling system has been specified, a strategy is to be provided, together with output from the simulation modelling software. Evidence for this credit will be as per the first credit under Hea 03.
Ene 06	Energy Efficient	Information to be provided for Design Stage assessment:

Appendix 1; BREEAM Evidence Requirements		
BREEAM Issue	**Credit Title**	**Documentation required**
	Transportation Systems	• For Professional transportation system analysis report or study and/ or calculations to demonstrate selection of energy efficient systems. • Confirmation of transportation systems specified (lift/ escalator/ moving walkways) • Specifications sections, AND either manufacturers product technical data OR a letter of commitment from the system supplier/ manufacturer that their system complies with energy saving feature criteria
Ene 08	Energy Efficient Equipment	For demonstration of compliance, the design team are to determine the Function/ equipment group that will be responsible for the majority of the unregulated energy consuming use within the development. Once established, the following information is to be provided provided: • Relevant specification sections, drawings, documentation and/ or calculations sufficient to confirm compliance with the certification/ procurement Scheme or Standards relevant to the Function/ equipment Group (A-H) criteria listed within the BREEAM 2011 Technical Manual.
Tra 01	Public Transport Accessibility	Design Team information to be provided at Design Stage: • A scaled map showing the development site and building, with all relevant transport nodes identified. • Timetables for all bus/ train services operating from compliant nodes to be considered This information is required to be input to the Tra 01 calculator to establish the Accessibility Index for the development to determine the credits achieved.
Tra 02	Proximity to Amenities	Design Team information to be provided at Design Stage: • A scaled map showing the development site and building, with all amenities within 500m identified, with their type noted. • Routes to each amenity should be included, these to reflect actual travel paths. Where amenities are due to be developed, the Client is to confirm via letter the type, proximity and timescale for their development.
Tra 03	Cyclist Facilities	• Drawings and text (on drawings, specification, contract or letter of instruction) showing:

Appendix 1; BREEAM Evidence Requirements		
BREEAM Issue	**Credit Title**	**Documentation required**
		– Location, type and size of storage; – Access to cycle storage (from highways and building entrance; any security measures installed; lighting design Plans and specification to demonstrate provisions of cyclist facilities should show: – Location, numbers, type and size of facilities provided – Where designated drying areas are provided, details of the ventilation strategy to be provided. Assumptions and calculations used to determine user numbers and hence cyclist provision should be shown.
Tra 05	Travel Plan	Relevant design stage information: • Travel Plan to be provided, together with a copy of the site-specific transport survey/ assessment data, with timing of the Plan to be stated. • Design drawings should be provided clearly noting where measures recommended within the Travel Plan have been incorporated. (Alternatively, where drawings are not available a letter from the Client can be provided confirming measures will be implemented). • A letter is required from either the Developer or the Occupier, where the building user is known, confirming that the Travel Plan will be implemented following occupation.
Wat 1	Water Consumption	• Completed Wat 01 Calculator based on information provided from specification and detailed documentary evidence showing: – Location, details and type of appliances/ fittings that use water in the dwelling including any specific water reduction equipment with the capacity / flow rate of equipment. – Location, size and details of any rainwater and grey water collection systems provided for use in the dwelling. Where detailed documentary evidence is not available at this stage; • Completed Wat 01 Calculator; and • A letter of instruction to a contractor/ supplier or a formal letter from the developer giving a specific undertaking, providing sufficient information

Appendix 1; BREEAM Evidence Requirements		
BREEAM Issue	**Credit Title**	**Documentation required**
		to allow the water calculations to be completed.
Wat 2	Water Monitoring	Relevant Specification sections (or contract) and design drawings to be provided to confirm: • Scope of Mains water system • Location and type of water consuming plant systems • Location and type of water meters and sub-meters
Wat 03	Water Leak Detection and Prevention	Relevant Specification (or contract), design drawings and manufacturers technical data to be provided covering the following: • Location, scope and type of mains water leak detection systems, detailing capability and flexibility (programmability) of the specified detection system Where flow control devices are to be installed, information provided should identify: • Location and provision of WC facilities • Specification and scope of the flow control device(s) to be used (timed/ volume/ or presence controlled).
Wat 04	Water Efficient Equipment	Design Team information is to be provided confirming the scope of planting/ landscaping within the development site, and detailing the irrigation strategy to be implemented. Where irrigation is to be installed, relevant specification or drawing information is to be provided detailing method, scope and type of irrigation system and any sensor monitoring / water saving systems utilised. Confirmation is to be provided where irrigation systems are not used. Information should include specification details of any Vehicle Wash systems to be installed, detailing partial reclaim systems/ mechanisms used.
Mat 01	Life Cycle Impacts	• Completed Code Mat 01 Calculator Tool, • Areas and thicknesses, or volumes together with specifications for all key building elements at the design stage with the relevant Green Guide element numbers and ratings.

Appendix 1; BREEAM Evidence Requirements		
BREEAM Issue	**Credit Title**	**Documentation required**
		• References stating the design or specification documentation used to complete the tool
Mat 02	Hard Landscaping and Boundary Protection	• Total area (m2) of external hard landscaping and boundary protection • Description (specification/ design drawings) of each applicable element and its materials. • Location and areas of each element, together with Green Guide ratings and element numbers.
Mat 03	Responsible Sourcing of Materials	In order to ensure sufficient credits can be awarded for this module, the following evidence is required for the anticipated Design Stage (DS): • Completed BREEAM Mat 03 Calculator Tool, showing building elements at the design stage • Detailed documentary evidence stating the materials specified in each element, with responsible sourcing Tier Level (1-7) allocated. Where materials are re-used, documentation stating specific materials to be re-used should be provided (supplier information or a letter from the developer is acceptable). Where materials are recycled, documentation stating specific recycled materials should be provided (a letter of intent to use suppliers who can provide an EMS certificate (or equivalent) for the recycling process is acceptable). Where certified materials will be used, the following evidence will be required: • A letter of intent from the developer or other detailed documentary evidence confirming the product shall be sourced from suppliers capable of providing certification to the level required for the particular tier claimed; or • A copy of the relevant certificate(s) as appropriate; – A copy of the timber scheme certificate (including CoC) – BES6001 certificate (or compliant sector standard certificate) – EMAS certificate – ISO14001 certificate.

Appendix 1; BREEAM Evidence Requirements		
BREEAM Issue	**Credit Title**	**Documentation required**
		– In the absence of certification, confirmation that the company implements a formal EMS is compliant with BS 8555 2003 (or equivalent) and the EMS has completed audit phases 1 - 4 (as outlined in BS 8555). Where any timber is used, the client should provide written confirmation from the supplier/s confirming that: • All timber species and sources to be used in the development will be sourced in compliance with the UK Government. Timber Procurement Policy for legal and sustainable sourcing, OR • Provide chain of custody evidence in accordance with CPET requirements OR • Letter of intent/ Specification confirming that all timber will be procured in line with the policy.
Mat 04	Insulation	At Design Stage, the following information is required to demonstrate compliance with the Embodied Impact criteria for this Issue: • Design drawings and specification/ contract to confirm Locations, areas (m2) and thicknesses, or volumes (m3) and specifications for all insulation within applicable elements. • Manufacturers data to confirm thickness and thermal conductivity of all specified insulation products • Insulation Index, Green Guide ratings and element numbers are to be determined from the above information. • Mat 04 Calculator Tool output For compliance with the Responsible Sourcing criteria under this issue, information requirements are as Mat 03.
Mat 05	Designing for Robustness	The following is required to assess compliance with Design Stage criteria • Design drawings are to highlight those parts of the building identified as being vulnerable from vehicular / pedestrian movement. • Design drawings and specification to be provided to confirm where durability measures are to be incorporated (with locations shown or described)

Appendix 1; BREEAM Evidence Requirements		
BREEAM Issue	**Credit Title**	**Documentation required**
Wst 01	Construction Waste Management	• A copy of the compliant SWMP containing the appropriate benchmarks, commitments and procedures for waste minimisation and diversion from landfill in line with best practice (as per guidance from DEFRA, BRE, and WRAP); or • Confirmation from the developer that a SWMP has/ will be produced and that it includes/will include benchmarks, procedures and commitments for minimising and diverting non- hazardous construction and demolition waste from landfill, and that they will be separated into key waste groups.
Wst 02	Recycled Aggregates	• Design team information (Drawings, Specifications) to confirm use of recycled and secondary aggregates within the applicable elements where high grade aggregates are used. • The Design team should also provide their calculations demonstrating the percentage use (by weight or volume of total high grade aggregate used within each element) of the recycled / secondary aggregates specified. • Documentation is to be provided confirming the source of recycled / secondary aggregates and that the source can provide quantities sufficient to meet amounts required by the specification.
Wst 03	Operational Waste	In order to satisfy the requirements for this Issue, the following evidence is required for the Design Stage (DS): • Information regarding the location, number, types and sizes of internal and external storage dedicated to recycled waste streams; • Design data showing how the facilities have been sized (based on net floor areas and building use) • Project team meeting minutes or letter confirming likely building waste streams and predicted volumes.
LE 01	Site Selection	The following detailed documentary evidence (drawings, report or site photographs) to demonstrate the re-use of land is required at Design Stage; • Type and duration of the previous land use, with end date noted • Total site area (m^2), together with Area/ footprint of previous land use • Proposed site plan showing total area of site, with location and footprint of the proposed development identified (to also identify any temporary works). In regard to the contaminated Land criteria the following is to be provided:

Appendix 1; BREEAM Evidence Requirements		
BREEAM Issue	**Credit Title**	**Documentation required**
		• Land contamination report, as prepared by a specialist with • Design drawings of the site (existing and proposed) identifying the extent and type of contaminants present, with areas requiring remedial works to be clearly shown. • A letter from the Contractor (or from Client if not yet appointed), confirming that the remedial measures stated within the report will be implemented, detailing the remediation strategy and implementation plan.
LE 02	Ecological Value of Site & Protection of Ecological Features	Where a suitably qualified ecologist is appointed; • A copy of a report or letter from the ecologist highlighting the information required as set out in the BREEAM 2011 Technical Manual 'Relating Ecology Reports to BREEAM'; and • Detailed documentary evidence identifying the construction zone and how any areas of ecological value outside the construction zone will remain undisturbed in accordance with the ecologist's recommendations. Protection: The following evidence is required for the anticipated Design Stage; • Detailed documentary evidence confirming ecological features present and how they will be protected.
LE 03	Mitigating Ecological Impact	Where a suitably qualified ecologist is appointed; • Design site plan and survey drawings showing the existing and proposed development • Ecology Report noting information as required within the BREEAM Ecology Checklist (Appendix F) relating to LE 03, OR • Completed BREEAM Ecology Checklist (by the Ecologist), accompanied by a letter from the Client or design team with details of how the ecologists recommendations for mitigating ecological impact will be implemented.
LE 04	Enhancing Site Ecology	An Ecology Report is to be produced, and includes reporting on the enhancement and protection of the site ecology; • Design site plan and survey drawings showing the existing and proposed development • Ecology Report noting information as required within the BREEAM Ecology Checklist (Appendix F) relating to LE 04, OR • Completed BREEAM Ecology Checklist (by the Ecologist), accompanied by a letter from the Client or design team with details of how the ecologists recommendations for enhancing site ecology will be implemented.

Appendix 1; BREEAM Evidence Requirements		
BREEAM Issue	**Credit Title**	**Documentation required**
		Either option should also provide details of any increase in the ecological value of the site in terms of plant species pre and post development.
LE 05	Long Term Impact on Biodiversity	Where a suitably qualified ecologist has been appointed; • Design site plan and survey drawings showing the existing and proposed development • Ecology Report noting information as required within the BREEAM Ecology Checklist (Appendix F) relating to LE 05, OR • Completed BREEAM Ecology Checklist (by the Ecologist) AND • A copy of the Habitat management plan, or specification/ contract/ client letter to confirm a commitment to produce and implement the plan, with the required scope noted. • The Ecologists report should also identify where any of the Additional Criteria listed within the BREEAM 2011 Manual are not relevant to this site. The Report should also note how the key recommendations and relevant Additional Criteria can be achieved, to include timing of actions to help mitigate ecological impact of the works.
Pol 1	Impact of Refrigerants	Documentary evidence to be provided confirming the presence or absence of refrigerants within the proposed development. If present, M&E Specification or letter to confirm details of relevant refrigerant type/ properties and system information. A Copy of the Pol 01 Calculator output is also required.
Pol 2	NOx Emissions	The following detailed documentary (specification) evidence is required for the anticipated Design Stage (DS): • The primary and any secondary heating systems and flue type; and • Dry NOx levels and/or boiler class of the primary and any secondary heating systems. Where NOx calculation is required due to presence of heat pump systems within the development, copies of calculations (as detailed in the methodology based on design stage outputs) should be provided, in order to establish contributing NOx emissions.
Pol 03	Surface Water Run off	Flood Risk For low (Zone 1), medium (Zone 2) or high (Zone 3a) flood risk areas: • A Flood Risk Assessment (prepared according to good practice guidance as outlined in PPS25 Development and Flood Risk) which shows there is a medium or high risk of flooding; and

Appendix 1; BREEAM Evidence Requirements		
BREEAM Issue	**Credit Title**	**Documentation required**
		• Site plans indicating the design flood level, the range of ground levels of the development, car parking areas and site access (lowest to highest), showing that the criteria (finished entrance floor levels and access routes being at least 600 mm above the design flood level) are met, along with any notes explaining the function of any areas lying below the design flood level; and (where medium or high risk) • Confirmation from the local planning authority that the development complies with PPS25 and is appropriately flood resilient and resistant, and has managed any residual risk safely. Where the site is under the protection of flood defences and the flood risk category of the site is reduced: Written confirmation from the Environment Agency of the reduction in flood risk category. Surface Water Runoff: • Statement from an appropriately qualified professional/organisation confirming that they are qualified in line with the BREEAM definition (BREEAM 2011 New Construction Technical Manual) to undertake the above reporting and championing of appropriate SUDS within the site design; • A report containing all information necessary to demonstrate compliance with the peak rate of run-off and volume of run-off requirements, including; – Areas of permeable and impermeable surfaces on the site pre- and post- development; – Details of the permeability characteristics of the site pre- and post-development (e.g. infiltration tests etc where appropriate); – Peak rates of run-off (l/s) calculations for the 1 year and 100 year events, pre- and post-development, including an allowance for climate change over the development lifetime; – Detailed documentary evidence showing the methods used to reduce the peak rate of run-off to pre-development rates; – The pre- development volume of run-off (m^3) for the 100 year 6 hour event; – The additional volume of run-off (m^3) for the 100 year 6 hour event caused by the development without mitigation measures; – The additional volume of run-off (m^3) with the proposed mitigation; – Information to demonstrate that the hierarchical approach to reducing the additional volume of run-off was followed; – Information on the calculation methods used, as well as summary results.

Appendix 1; BREEAM Evidence Requirements		
BREEAM Issue	**Credit Title**	**Documentation required**
		• A Flood Risk Assessment • Drawings showing the pre-development drainage for the site (natural or constructed); • Drawings showing the proposed drainage solution, system failure flood flow routes, potential flood ponding levels and ground floor levels; and • Confirmation from the appropriately qualified professional/organisation that local drainage system failure would not cause an increase in the risk of flooding within dwellings either on or off site. Where tradable credits are sought, the feasibility report should detail design specifications, calculations and drawings supporting designed SUDS schemes and water treatment. Minimising Water Course Pollution: • Design drawings, specification or Building Contract to identify high and low risk areas of the site • Specification of SUDs, source control systems and oil/ petrol separators • Confirmation via Design Team letter confirming compliance with PPG 3 and SUDs manual.
Pol 04	Reduction of Night Time Lighting Pollution	The following information is to be provided at Design Stage: • Specification, or external lighting design data/ calculations confirming performance compliance with ILE Guidance • Information (drawings /specifications) highlighting the scope of the lighting strategy noting security lighting requirements • M&E / Lighting Consultant to provide examples demonstrating compliance of lighting strategy to criteria
Pol 5	Noise Attenuation	The design team are to confirm presence of noise sensitive areas or buildings within an 800m radius. Where these exist the following is to be provided at Design Stage: Drawings identifying existing and proposed noise sensitive locations within or surrounding the site, noting distance from the assessed development, and sources of noise. • An acousticians report should be provided and should note the following: • Acousticians qualifications and professional body memberships

Appendix 1; BREEAM Evidence Requirements		
BREEAM Issue	**Credit Title**	**Documentation required**
		• Recommendations for measures to attenuate noise sources together with • Design plan identifying attenuation measures and their specification. Where an acoustician is yet to be appointed, a formal letter or specification should be provided confirming commitment to appoint an acoustician to undertake BS 4142:1997 compliant Testing, and that any recommendations made by the acoustician will be implemented.

Appendix 2:
Glossary of Terms

Accredited Energy Assessor: A person registered with an accredited energy assessment scheme provider. The scheme provider will be licensed by Communities and Local Government to accredit competent persons to assess the CO_2 emission rates of domestic buildings for the purposes of demonstrating compliance with *Building Regulations*.

Actual Case CO_2 Emissions: CO_2 emissions from the dwelling (Kg CO_2/m_2/year) accounting for the input from specified/installed low and zero carbon technologies.

The standard case dwelling model must be used as the basis for the calculation of actual case emissions. However, where eligible low or zero carbon technologies are specified in the dwelling they can replace the standard systems assumptions from table Cat 1.2 for the purposes of the actual case calculation.

Actual case CO_2 emissions must be calculated in accordance with the methodology defined in table Cat 1.3.

(AD F) Approved Document F1: The Building Regulations for England and Wales Approved Document F1: Means of Ventilation (2010 Edition).

(AD L1A) Approved Document L1A: The Building Regulations for England and Wales Approved Document L1A: Conservation of Fuel and Power in New Dwellings (2010 Edition).

(ALO) Architectural Liaison Officer: This is the same as the Crime Prevention Design Advisor (see definition below) and is the title given to the same role in some police forces. Taken from www.securedbydesign.com

Angle of visible sky: The angle of visible sky u is the angle subtended, in the vertical plane normal to the window, by the visible sky from the centre of the window

Annual flood probability: The estimated probability of a flood of given magnitude occurring or being exceeded in any year. Expressed as a 1 in *x* year event. This is the equivalent to 1-in-x, 1:x or x% chance of a flood event occurring in any one year.

Annual flow rate probability: The estimated probability of a flow rate of given magnitude occurring or being exceeded in any year. Expressed as a 1 in x year event. This is the equivalent to 1-in-x, 1:x or x % chance of the flow rate being exceeded in any one year.

Appropriately qualified professional: A professional or team of professionals with the skills and experience to champion the use of SUDs within the overall design of the development at an early stage.

Approved Document E (AD E): The Building Regulations for England and Wales Approved Document E: Resistance to the Passage of Sound, 2003 edition incorporating 2004 amendments.

Average daylight factor: The average daylight factor is the average indoor illuminance (from daylight) on the working plane within a room, expressed as a percentage of the simultaneous outdoor illuminance on a horizontal plane under an unobstructed CIE 'standard overcast sky'.

Basic building elements: Basic building elements are defined as follows; *Frame,* Ground floor, Upper floors, Roof, External walls, Internal walls, Foundation/substructure, Staircase (includes the tread, risers and stringers).

BES 6001:2008 Framework Standard for Responsible Sourcing of Construction Products: BES 6001:2008 is a BRE Global standard that provides a framework for the assessment of responsible sourcing schemes and provides a route to certification of construction products.

Blowing agents: Any material used to produce a cellular structure in either a plastic or other foam insulation used in either manufacture or installation.

Boiler class: An indication of a boiler's NO_X emissions. Boilers are classified on a scale of 1 to 5, with 1 indicating high NO_X emissions through to relatively low NO_X emissions for a class 5.

Brownfield site: Land which is or was occupied by a permanent structure, including the curtilage of the developed land and any associated hard surfaces.

Building Regulations: Building Regulations apply in England and Wales and promote standards for most aspects of a building's construction, including structure, fire safety, accessibility, sound insulation, drainage, energy efficiency, ventilation and electrical safety.

Building Envelope: For the purpose of issue Mat 1, the building envelope is defined as the overall superstructure of the particular building. Each building envelope may contain single or multiple dwellings.

Catchment: The area contributing surface water flow to a drainage point or a point on a watercourse. It can be divided into sub-catchments

Central rainwater collection system: A system which will collect and store rainwater for use across the development. This could be a large storage tank or other form of surface water system.

Chain of custody (CoC): This is a process used to maintain and document the chronological history of the evidence/path for timber products from forests to consumers.

Compliant test body: Those organisations or individuals having UKAS accreditation or accredited by a European equivalent of UKAS, as well as organisations or individuals registered with the Association of Noise Consultants (ANC) Registration Scheme.

Composting: Composting is a natural process which converts organic waste into an earth-like mass by means of bacteria and micro-organisms. The composting process is also supported by larvae, wood lice, beetles, worms and other such creatures.

Considerate Constructors Scheme (CCS): The Considerate Constructors Scheme is a UK certification scheme that encourages the considerate management of construction sites.

Construction zone: The construction zone includes any land used for buildings, hard-standing, landscaping, site access or where construction work is carried out (or land is being disturbed in any other way), plus a 3m boundary in either direction around these areas. It also includes any areas used for temporary site storage and buildings. If it is not known exactly where buildings, hard-standing, site access and temporary storage and buildings will be located, it must be assumed that the construction zone is the development site.

Contaminated land: A site can be defined as contaminated land where the level of site contamination prevents development unless decontamination is carried out.

Control systems (lighting): A method for controlling the external lighting to ensure that it will not operate unnecessarily, e.g. during daylight hours or when a space is unoccupied. Control systems that can be considered are passive infra red (PIR), 'dusk to dawn' daylight sensors and time switches.

(CPDA) Crime Prevention Design Advisor: "The Crime Prevention Design Advisor (CPDA) is a specialist crime prevention officer, trained at the Home Office Crime Reduction College, who deals with crime risk and designing out crime advice for the built environment. In addition to physical security measures the officer will consider defensible space, access, crime and movement generators all of which can contribute to a reduction in crime and disorder." Taken from www.securedbydesign.com

Dedicated energy efficient light fittings: Fittings that comprise the lamp, base, control gear and an appropriate housing, reflector, shade or diffuser. The fitting must be dedicated in that it must be capable of only accepting lamps having a luminous efficacy greater than 40 lumens per circuit watt. A light fitting may contain one or more lamps.

Design flood level: The maximum estimated water level during the design storm event. A site's design flood level can be determined through known historical data or modelled for the specific site.

(DER) Dwelling Emission Rate: The DER is the estimated CO_2 emissions per m_2 per year ($KgCO_2/m_2$/year) for the dwelling as designed. It accounts for energy used in heating, fixed cooling, hot water and lighting.

Direct Supply: The carbon benefit of energy generated by low or zero carbon technologies can only be allocated to dwellings that are directly supplied by the installation via dedicated supplies.

Discharge point: The point of discharge into watercourses and sewers (see definition of 'Watercourses and sewers')

Dry NO_x: The NO_x emissions (mg/kWh) resulting from the combustion of a fuel at zero per cent excess oxygen levels. If electricity is sourced from the national grid, the associate Dry NO_x emissions are approximately 1200 mg/kWh.

Ecological features: Ecological features are defined in Checklist Eco 1 – Land of Low Ecological Value, and include trees, hedges, ponds, streams, rivers, marshes, wetlands, meadows, species-rich grassland, heath land and heather.

Environmental performance indicators (EPIs): When operated as part of a measuring-to-manage programme, environmental performance indicators allow companies to track how well they are doing and to identify opportunities to: save money and increase profits; use resources more efficiently; minimise waste (raw materials, product, energy, water, packaging, etc); and prevent pollution. For more information see http://envirowise.wrap.org.uk

EMS: Environmental management system.

EMAS: Eco-Management and Audit Scheme

(EPC) Energy Performance Certificate: This is a certificate that confirms the energy rating of the dwelling from A to G, where A is the most efficient and G is the least efficient.

EU Energy Efficiency Labelling Scheme: The EU energy label rates products from A (the most efficient) to G (the least efficient). For refrigeration, the scale now extends to A++. It is a legal requirement for the label to be shown on all refrigeration and laundry appliances, dishwashers, electric ovens and light bulb packaging at point of sale.

(FEE) Fabric Energy Efficiency: Energy demand for space heating and cooling expressed in kilowatt-hours of energy demand per square metre per year (kWh/m^2/year).

Finishing elements: For the purpose of this issue, the assessed finishing elements are defined as: Stairs, Windows, External and internal doors, Skirting, Panelling (including any other trim), Furniture, Fascias and any other significant use.

Flood probability: The estimated probability of a flood of given magnitude occurring or being exceeded in any specified time period. For example, the 100-year flood has a 1-in-100 or 1% chance of occurring in any given year.

Flood Risk Assessment (FRA): A study to assess the risk of a site flooding and the impact that any changes or development on the site will have on flood risk on the site and elsewhere. A flood risk assessment must be prepared according to good practice guidance as outlined in PPS25 *Development and Flood Risk: Practice Guide* (available from www.communities.gov.uk).

Flood storage: The temporary storage of excess run-off or river flow in ponds, basins, reservoirs or on a flood plain during a flood.

Global Warming Potential (GWP): Global Warming Potential is defined as the potential for global warming that a chemical has relative to 1 unit of carbon dioxide, the primary greenhouse gas. In determining the GWP of the blowing agent, the Intergovernmental Panel on Climate Change (*IPCC*) methodology using a 100-year Integrated Time Horizon (ITH) must be applied.

Green Dragon Environmental Standard® (Safon Amgylcheddol Y Ddraig Werdd®): A stepped standard used to accredit compliance with the Green Dragon environmental management scheme. Depending on the content of the EMS being assessed, a level of 1, 2, 3, 4 or 5 may be achieved. At level 4 and above, the Green Dragon Environmental Standard® can be used as evidence of a compliant EMS for small companies being considered under the Mat 2 and Mat 3 issues.

Greenfield run-off rate: The rate of run-off that would occur from the site in its undeveloped state.

The Green Guide to Specification: The Green Guide to Specification is an easy to use comprehensive reference website and electronic tool, providing guidance for specifiers, designers and their clients on the relative environmental impacts for a range of different building elemental specifications. The ratings within the Guide are based on Life Cycle Assessment, using the Environmental Profile Methodology.

Grey-water recycling: The appropriate collection, treatment and storage of used shower, bath and tap water for use instead of potable water in WCs and/or washing machines. Grey-water recycling systems normally collect used shower, bath and tap water and recycle it for toilet flushing.

Habitable space: A space typically occupied for more than 30 minutes during the day with safe access by a permanent stairway or other means of entrance which complies with the requirements of relevant national Building Regulations and where the space is 'finished' with floor, walls, lighting and electric sockets.

Net internal floor area: The area of all *habitable spaces*, including the area taken up by halls, stairwells, cupboards, internal partitions, habitable loft spaces and basements. This also includes common areas of blocks of flats and apartment buildings, including stairwells, circulation spaces and entrance lobbies.

Inclusive access and usability: The purpose of the Code is not to deliver purpose-designed wheelchair housing but rather inclusive general needs housing that caters for the widest possible segment of the population (including older people), and which can easily be adapted to meet the needs of wheelchair users.

Infiltration techniques: Techniques which allow the passage of water into the ground. Techniques used purely for infiltration purposes would typically involve soakaways or pervious paving. Other SuDS techniques, such as swales and filter strips, will also achieve a level of infiltration but, unlike soakaways, they also normally function as a conveyance mechanism for transporting run-off.

Key processes: These are the final major aspects of processing that are carried out. There may be a single process or multiple processes requiring assessment, depending on the end product.

Limiting discharge: The limiting discharge is based upon the calculated pre-development flow rate at a discharge point, but may be increased to 5 l/s.

Low and Zero Carbon Technologies: Technologies eligible to contribute to achieving the requirements of this issue must produce energy from renewable sources and meet all other ancillary requirements as defined by Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC.

Low ecological value: Land defined as having low ecological value using Checklist Eco 1 or defined by a suitably qualified ecologist as having low or insignificant ecological value.

(MCS) Microgeneration Certification Scheme: The Microgeneration Certification Scheme (MCS) is an independent scheme that certifies microgeneration products and installers in accordance with consistent standards. It is designed to evaluate microgeneration products and installers against robust criteria, and provides consumers with an independent indication of the reliability of products, assurance that the installation will be carried out to the appropriate standard and a route for complaints should there be any issues.

MTCC: Malaysian Timber Certification Council.

Net CO_2 Emissions: The annual dwelling CO_2 emissions ($KgCO_2/m_2$/year) from space heating and cooling, water heating, ventilation and lighting, and those associated with appliances and cooking.

No-sky line: The no-sky line divides those areas of the working plane which can receive direct light from the sky, from those which cannot. It is important as it indicates how good the distribution of daylight is in a room. Areas beyond the no-sky line will generally look gloomy.

Non-native invasive species: These are non-indigenous species (e.g. plants or animals) that adversely affect the habitats they invade economically, environmentally or ecologically. For the purposes of the Code, this currently includes only Japanese Knotweed and Giant Hogweed. Further information on their control and disposal and how this fits into the legislative framework relating to such species can be obtained from DEFRA.

Peak rate of run-off : Referred to as Qp [m³/sec], this is the highest rate of flow from a defined catchment area assuming that rainfall is uniformly distributed over the drainage area, considering the entire drainage area as a single unit and estimation of flow at the most downstream point only.

PEFC: Programme for the Endorsement of Forest Certification Schemes.

Post-consumer waste stream: Waste material generated by households or by commercial, industrial and institutional facilities in their role as end-users of the product, which can no longer be used for its intended purpose. This includes returns of material from the distribution chain.

Potable water: Drinking quality water that is taken from a connection to the mains water supply in the dwelling, which may be from the public water supply or a private supply such as from groundwater via a borehole.

Pre-consumer waste stream: Waste material generated during manufacturing processes. Excluded is reutilisation of materials such as rework, regrind or scrap generated in a process and capable of being reclaimed within the same process that generated it.

Probability of flooding – Low (Zone 1): Low annual probability of flooding is an area where the chance of both river and sea flooding each year is <0.1% (1 in 1000) or less.

Probability of flooding – Medium (Zone 2): An area where the chance of river flooding in any year is 1% (1 in 100) or less but greater than 0.1% (1 in 1000), and the chance of flooding from the sea is 0.5% – 0.1% (between 1 in 200 and 1 in 1000).

Probability of flooding – High (Zone 3a): An area where the chance of river flooding in any year is >1% (1 in 100) and the chance of flooding from the sea is >0.5% (1 in 200) or greater.

Probability of flooding – Functional flood plan (zone 3b): The land where water flows or is stored in times of flood.

Qbar: An estimation of the mean annual flood flow rate from a catchment (see Report IH124 *Flood estimations for small catchments*).

Rainfall intensity: Depth of rain falling in a period of time, e.g. mm/hour, sometimes given in l/s/m2.

Rainwater discharge: Rainwater discharge is the rainwater which flows from the development site to watercourses and sewers. It is also referred to as run-off.

Residual risk: The risk which remains after all risk avoidance, reduction and mitigation measures have been implemented.

Robust details: Robust details (RDs) are construction solutions that provide an alternative to pre-completion sound insulation testing as a method of complying with Requirement E1 of Approved Document E (2003 Edition) of the Building Regulations (England and Wales). Robust details must be approved by Robust Details Ltd (RDL) and all development sites must be registered with RDL and built in accordance with the RD specification.

Run-off rate: The rate of flow of water from a surface.

(SAP) Standard Assessment Procedure for Energy Rating of Dwellings: The Government's approved methodology for assessing the energy performance of new dwellings. The current version is SAP 2009 version 9.90, dated March 2010, rev October 2010. The procedure accounts for energy used in space heating and cooling, hot water provision and fixed lighting.

(SBD) Secured by Design: This is a police initiative to encourage the building industry to adopt crime prevention measures in the design of developments to assist in reducing the opportunity for, and fear of, crime, creating a safer and more secure environment. Secured by Design is owned by the Association of Chief Police Officers (ACPO), and has the support of the Home Office Crime Reduction & Community Safety Group and the Planning Section of the Department for Communities and Local Government.

Security lighting: Security lighting is provided to protect property. There are two types of security lighting commonly used in dwellings – high wattage intruder lights that are operated via PIR sensors which only switch on for a short time, and low wattage lighting that is controlled by time switches and daylight sensors.

SFI: Sustainable Forestry Initiative.

Site Inspection Report: A report prepared by the Code assessor during a post construction stage assessment and provided as evidence with the assessment.

Site Waste Management Plan Regulations 2008: Powers were included in the Clean Neighbourhoods and Environment Act 2005 for regulations requiring a SWMP for works involving construction or demolition waste. The regulations, which came into force in April 2008, mean that any construction project in England costing over £300,000 will require an SWMP. See www.environment-agency.gov.uk/business and www.defra.gov.uk.

Soakaway: Underground structure designed to permit infiltration into permeable/slightly permeable ground. They can be grouped and linked together to drain large areas including highways.

Space lighting: The normal lighting required to illuminate a space when in use. It can be used outside the entrance to the home, in outbuildings such as garages and cycle stores, and for external spaces such as paths, patios, decks, porches, steps and verandas.

Staggered dwellings: These are dwellings on several levels which are of unequal floor area. For example, a dwelling with a first floor area greater than the ground floor area which may overhang the ground floor.

Standard Case CO_2 Emissions: CO_2 emissions from the dwelling (Kg CO_2/m_2/year) assuming a standard systems specification, based on the Domestic Building Services Compliance Guide 2010 Edition.

Standard case CO_2 emissions create the baseline against which the contribution of low and zero carbon technologies is measured. They represent the common scenario where a gas boiler is installed and ensure a 'level playing field' to allow a fair comparison of the contribution of low and zero carbon technologies, regardless of the carbon intensity of the actual heating fuel specified.

Statutory safety lighting: Safety lighting is usually provided in multi-residential buildings such as blocks of flats to illuminate stairwells and exit routes when the main lighting system fails. Its design is specified by regulation (BS 5266) and is therefore outside the scope of the Code.

SuDS: As defined in the SuDS manual, sustainable drainage systems are an approach to surface water management that combines a sequence of management practices and control structures designed to drain surface water in a more sustainable fashion than some conventional techniques.

Suitably qualified ecologist: A suitably qualified ecologist is defined as an individual who:

- Holds a degree or equivalent qualification (e.g. N/SVQ Level 5) in ecology or a related subject
- Is a practising ecologist, with a minimum of three years' relevant experience (within the last five years). Such experience must clearly demonstrate a practical understanding of factors affecting ecology in relation to construction and the built environment, including acting in an advisory capacity to provide recommendations for ecological protection, enhancement and mitigation measures. Examples of relevant experience are ecological impact assessments, Phase 1 and 2 habitat surveys, and habitat restoration
- Is covered by a professional code of conduct and subject to peer review.

Supply Chain EMS: This covers all the major aspects of processing and extraction involved in the supply chain for the end product. Note: *Recycled materials* are not required to demonstrate a supply chain EMS. If EMS certification is provided for the key processes for recycled materials, this is assumed by default.

(TER) Target Emission Rate: The target emission rate is the maximum allowable CO_2 emissions per m_2 ($KgCO_2/m_2$/year) arising from energy used in heating, cooling, hot water and lighting which would demonstrate compliance with Criterion 1 of AD L1A.

The TER is calculated using the SAP methodology according to the requirements defined in AD L1A.

Treatment (water): Improving the quality of water by physical, chemical and/or biological means.

Verified ecological report: A verified ecological report is a report carried out by an ecologist who does not fully meet the requirements of a suitably qualified ecologist.

Volume of run-off: The volume of run-off that is generated by rainfall occurring on the site. This is typically measured in cubic metres.

Working plane: The working plane is a notional surface, typically at about desk or table height, at which daylight factor or the 'no-sky line' is calculated or plotted. For the calculations required under the Hea 1 issue, it is at 0.85 m above the floor.