MAYOR OF LONDON

London Plan Guidance

Whole Life-Cycle Carbon Assessments

March 2022

Copyright

Published by:
Greater London Authority
City Hall
Kamal Chunchie Way,
London E16 1ZE
www.london.gov.uk
enquiries 020 7983 4100
Minicom 020 7983 4458

ISBN 978-1-84781-736-5

Acknowledgements

Special thanks go to Cundall and Targeting Zero for their contribution to the preparation of this guidance document and the Whole Life-Cycle Carbon Assessment template.

Table of contents

London Plan Policy	Policy SI 2 Minimising greenhouse gas emissions Part F
Planning Application type and how the London Plan Guidance will be applied	All applications for referable development (outline, detailed and/or hybrid applications) are required to submit a Whole Life-Cycle Carbon (WLC) assessment. WLC assessments for non-referable major development are encouraged.
Who is this guidance for?	Planning authorities, developers, architects, energy consultants, engineers and applicants.

1 Introduction

1.1 What is this guidance?

1.1.1 This guidance explains how to prepare a Whole Life-Cycle Carbon (WLC) assessment in line with Policy SI 2 F of the London Plan 2021 using the WLC assessment template. Policy SI 2 F applies to planning applications which are referred to the Mayor. However, WLC assessments are also supported and encouraged on major applications that are not referable to the Mayor.

1.1.2 This guidance explains how to calculate WLC emissions and the information that needs to be submitted to comply with the policy. It also includes information on design principles and WLC benchmarks to aid planning applicants in designing buildings that have low operational carbon and low embodied carbon. For queries relating to this guidance, please email: ZeroCarbonPlanning@london.gov.uk.

1.2 What are WLC emissions?

1.2.1 WLC emissions are the total carbon emissions[1] resulting from the construction and the use of a building over its entire life, including its demolition and disposal. They capture a building's operational carbon emissions from both regulated[2] and unregulated[3] energy use, as well as its embodied carbon emissions - that is, emissions associated with raw material extraction, the manufacture and transport of building materials, and construction; and the emissions associated with maintenance, repair and replacement, as well as dismantling, demolition and eventual material disposal. A WLC assessment also includes an assessment of the potential savings from the reuse or recycling of components after the end of a building's useful life. It provides a true picture of a building's carbon impact on the environment.

1.2.2 The Mayor's net zero-carbon target for new development continues to apply to the operational emissions of a building. The WLC requirement is not subject to the Mayor's net zero-carbon target; but planning applicants are required to calculate operational and embodied emissions, and demonstrate how they can be reduced as part of the WLC assessment. Planning

[1] 'Carbon emissions' is used in this document as a shorthand term for greenhouse gases measured in carbon dioxide equivalent emissions, or CO_2e emissions.

[2] The carbon emissions arising from energy used by fixed building services, as defined in Approved Document Part L of the Building Regulations. These include fixed systems for lighting, heating, hot water, air conditioning and mechanical ventilation.

[3] The carbon emissions relating to cooking and all electrical appliances, and other small power.

applicants should continue to follow the GLA's Energy Assessment Guidance to assess and reduce operational emissions and insert the relevant information into the WLC assessment, as explained in this guidance.

1.2.3 Designing a development that follows a WLC approach will:

- ensure that a significant source of emissions from the built environment is accounted for, which is necessary in achieving a net zero-carbon city
- achieve resource efficiency and cost savings, by encouraging refurbishment, and the retention and reuse of existing materials and structures, instead of new construction
- identify the carbon savings from using recycled material and the benefits of designing for future reuse and recycling, to reduce waste and support the circular economy
- encourage a 'fabric first' approach to building design, to minimise mechanical plant and services in favour of natural ventilation
- ensure operational and embodied emissions are considered at the same time to find the best solutions for the development over its lifetime
- identify the impact of maintenance, repair and replacement over a building's life cycle which, by informing the building's design and specification, improves lifetime resource efficiency and reduces life-cycle costs, contributing to the future proofing of asset value
- encourage local sourcing of materials and short supply chains, with resulting carbon, social and economic benefits for the local economy
- encourage durable construction and flexible design, both of which contribute to greater longevity and reduced obsolescence of buildings and avoid carbon emissions associated with demolition and new construction.

2 Process and methodology

2.1 Before submitting a WLC assessment

2.1.1 Achieving the maximum WLC reductions for a proposed building begins early on in a development's design. Applicants should work closely with design teams at the earliest stages of project development to identify the priorities for the WLC assessment, and the opportunities and likely constraints in reducing WLC emissions. These should be built into the project brief, and should be aligned with the energy strategy for the site and with the Circular Economy Statement.

2.1.2 The WLC principles, which can be found in Table 2.1, should inform the design of the development from the earliest stages and throughout the WLC assessment process. The life-cycle modules which each principle relates to are also provided in the table. See section 2.5 for information on the life-cycle modules. It is good practice at this stage to commit to setting WLC targets for the site that the applicant will aim to achieve. The WLC benchmarks (see Appendix 2) are a useful starting point.

2.1.3 For further advice on what to consider prior to undertaking a WLC assessment, including roles and responsibilities within the project team, the Royal Institute of British Architects (RIBA) has produced a guide for architects;[4] and LETI (the London Energy Transformation Initiative) has produced an Embodied Carbon Primer[5] for anyone working in the construction industry.

Table 2.1 WLC principles

No.	Principle	Description	Relevant life-cycle modules
1	**Reuse and retrofit of existing built structures**	Retaining existing built structures for reuse and retrofit, in part or as a whole, should be prioritised before considering substantial demolition, as this is typically the lowest-carbon option. Significant retention and reuse of structures also reduces construction costs and can contribute to a smoother planning process.	A1-A5, B1-B6, C1-C4, D
2	**Use repurposed or recycled materials**	Using repurposed or recycled or materials, as opposed to newly sourced materials, typically reduces the carbon emissions from constructing a new building and reduces waste. This process would start by reviewing the materials already on site for their potential for inclusion into the proposed	A1-A5, B1-B5, C1-C4,D

[4] https://www.architecture.com/-/media/gathercontent/whole-life-carbon-assessment-for-architects/additional-documents/11241wholelifecarbonguidancev7pdf.pdf

[5] https://www.leti.london/ecp

No.	Principle	Description	Relevant life-cycle modules
		scheme. Many of the currently available standard products already include a degree of recycled content.	
3	**Material selection**	Appropriate low-carbon material choices are key to carbon reduction. Ensuring that materials are selected with consideration of the planned life expectancy of the building reduces waste, the need for replacements, and the in-use costs. It is important to note that the overall lifetime carbon emissions of a product can be as much down to its durability as to what it is made of. For example, bricks may have high carbon emissions in terms of their manufacture, but they have an exceptionally long and durable life expectancy. The selection of reused or recycled materials and products, plus products made from renewable sources, will also help reduce the carbon emissions of a project.	A1-A5, B1-B5, C1-C4, D
4	**Minimise operational energy use**	A 'fabric first' approach should be prioritised to minimise the heating and cooling requirement of a building and the associated systems. Naturally ventilated buildings avoid the initial carbon and financial costs of a ventilation system installation, and the repeat carbon and financial costs of its regular replacement.	A1-A5, B1-B4, B6
5	**Minimise the carbon emissions associated with operational water use**	Carbon emissions from water use are largely due to the materials and systems used for its storage and distribution, the energy required to transfer it around the building, and the energy required to treat any wastewater. The choice of	A1-A5, B1-B7,

No.	Principle	Description	Relevant life-cycle modules
		materials used and the durability of the systems, which help avoid leakage and resulting damage to building fabric, are therefore key aspects of reducing the carbon emissions of water use. On-site water collection, recycling and treatment, and storage can have additional positive environmental impacts as well as reducing in-use costs.	C1-C4, D
6	**Disassembly and reuse**	Designing for future disassembly ensures that products do not become future waste, and that they maintain their environmental and economic value. A simple example is using lime rather than cement mortar - the former being removable at the end of a building's life, the latter not. This enables the building's components (e.g. bricks) to have a future economic value as they can be reused for their original purpose rather than becoming waste or recycled at a lower level (e.g. hardcore in foundations). Designing building systems (e.g. cladding or structure) for disassembly and dismantling has similar and even broader benefits. Ease of disassembly facilitates easy access for maintenance and replacement leading to reduced maintenance carbon emissions and reduced material waste during the in-use and end-of-life phases. This leads to the potential for material and product reuse which also reduces waste and contributes to the circular economy principle.	A1-A5, B1-B5, C1-C4, D

No.	Principle	Description	Relevant life-cycle modules
7	**Building shape and form**	Compact efficient shapes help minimise both operational and embodied carbon emissions from repair and replacement for a given floor area. This leads to a more efficient building overall, resulting in lower construction and in-use costs. A complex building shape with a large external surface area in relation to the floor area requires a larger envelope than a more compact building. This measure of efficiency can be referred to as the 'wall to floor ratio', or the 'heat loss form factor'. This requires a greater use of materials to create the envelope, and a potentially greater heating and/or cooling load to manage the internal environment.	A1-A5, B1-B6
8	**Regenerative design**	Removing carbon from the atmosphere through materials and systems absorbing it makes a direct contribution to carbon reduction. Examples include unfinished concrete, some carpet products and maximising the amount of vegetation.	A1, B1, D
9	**Designing for durability and flexibility**	Durability means that repair and replacement is reduced which in turn helps reduce lifetime building costs. A building designed for flexibility can respond with minimum environmental impact to future changing requirements and a changing climate, thus avoiding obsolescence which also underwrites future building value. Buildings designed with this principle in mind will be less likely to be demolished at their end-of-life as they lend themselves to future refurbishment. Examples include buildings being designed with 'soft spots' in floors to allow for future	A1-A5, B1-B5, C1-C4, D

No.	Principle	Description	Relevant life-cycle modules
		modification and design, as well as non-structural internal partitions to allow layout change.	
10	**Optimisation of the relationship between operational and embodied carbon**	Optimising the relationship between operational and embodied emissions contributes directly to resource efficiency and overall cost reduction. For example, the use of insulation has a clear carbon benefit whereas its fabrication will generate carbon emissions. This means that it is important to look not only at the U-value of insulation, but also the carbon emissions from the manufacture and installation of different product options. Avoiding fully glazed façades will reduce cooling demand and limits the need for high-carbon materials (glass units, metal frame, shading device etc) at both the construction and in-use stages through wholesale replacements.	A1-A5, B1-B6
11	**Building life expectancy**	Defining building life expectancy gives guidance to project teams as to the most efficient choices for materials and products. This aids overall resource efficiency, including cost efficiency and helps future-proof asset value.	A1-A5, B1-B5, C1-C4, D
12	**Local sourcing**	Sourcing local materials reduces transport distances, and therefore supply chain lengths; and has associated local social and economic benefits, e.g. employment opportunities. It also has benefits for occupiers as replacement materials are easier to source. Transport type is also highly relevant. A product transported by ship will have significantly lower carbon emissions per mile than one sent by	A1-A5, B3-B5

No.	Principle	Description	Relevant life-cycle modules
		HGV. A close understanding of the supply chain and its transport processes is therefore essential when selecting materials and products.	
13	**Minimising waste**	Waste represents unnecessary and avoidable carbon emissions. Buildings should be designed to minimise fabrication and construction waste, and to ease repair and replacement with minimum waste, which helps reduce initial and in-use costs. This can be achieved through the use of standard sizes of components and specification and by using modern methods of construction (MMC).[6] Where waste is unavoidable, the designers should establish the suppliers' processes for disposal or preferably reuse or recycling of waste.	A1-A5, B1-B7, C1-C4, D
14	**Efficient construction**	Efficient construction methods (e.g. modular systems, precision manufacturing and MMC) can contribute to better build quality, reduce construction-phase waste and reduce the need for repairs in the post-completion and defects period (snagging). These methods can also enable future disassembly and reuse with associated future carbon savings.	A1-A5, B1-B7, C1-C4, D
15	**Lightweight construction**	Lightweight construction uses less material, which reduces the emissions of the building as there is less material to source, fabricate and deliver to site. Foundations can then also be reduced	A1-A5, C1-C4, D

[6] MMC is defined as "a range of approaches which spans off-site, near site and on-site pre-manufacturing, process improvements and technology applications": https://www.london.gov.uk/sites/default/files/cast_-_mmc_-_december_2020.pdf

No.	Principle	Description	Relevant life-cycle modules
		with parallel savings. Lightweight construction can also be easier to design for future disassembly and reuse. The benefits of lighter construction should be seen in the context of other principles such as durability.	
16	**Circular economy**	The circular economy principle focuses on a more efficient use of materials which in turn leads to financial efficiency. Optimising recycled content, reuse and retrofit of existing buildings; and designing new buildings for easy disassembly, reuse and retrofit, and recycling as equivalent components for future reuse are essential. The use of composite materials and products can make future recycling difficult. Where such products are proposed, the supplier should be asked for a method statement for future disposal and recycling.	A1-A5, B1-B5, C1-C4, D

2.2 When to submit a WLC assessment

2.2.1 For planning applications that are referable to the Mayor, a WLC assessment should be submitted at the following stages:

- pre-application (where relevant)
- planning application submission (i.e. RIBA stage 2/3)
- Post-construction (i.e. prior to occupation of the development. Generally, it would be expected that the assessment would be received three months post-construction)

2.3 Reporting to the GLA

2.3.1 A WLC assessment template has been developed that includes all of the information applicants will need to submit at each stage; it is available on the

GLA's website.[7] This template should be completed and submitted as an Excel document to the GLA to ensure clarity and transparency. Section 3 explains what is included in the assessment template at each stage (that is, pre-application, planning application submission and post-construction stages), and gives further detail on submitting the template to the GLA.

2.3.2 The assessment should be aligned with the project brief, and with the latest available cost plan for the scheme.

Ensuring data quality

2.3.3 Applicants and developers should adopt third-party quality assurance mechanisms to ensure accuracy in their submissions. The mechanisms used should be reported at the planning application submission and post-construction stages using the template. Allocating the same person, team or organisation to oversee the WLC assessment process from design to post-construction, where possible, would provide consistency in reporting.

2.4 Methodology

2.4.1 WLC assessments should demonstrate the actions that have and will be taken to reduce WLC emissions. The assessment should cover the development's carbon emissions over its lifetime, accounting for:

- any carbon emissions associated with pre-construction demolition
- any carbon savings associated with the retention, reuse and recycling of existing structures and materials that are already on-site
- its operational carbon emissions (both regulated and unregulated)
- its embodied carbon emissions
- any future potential carbon savings post end-of-life, including savings from reuse and recycling of building structure and materials.

2.4.2 WLC assessments should be carried out using BS EN 15978: 2011 (Sustainability of construction works — Assessment of environmental performance of buildings — Calculation method). This is the standard UK framework for appraising the environmental impacts of the built environment. It sets out the principles and calculation method for the whole-life assessment of the environmental impacts from built projects.

[7] https://www.london.gov.uk/what-we-do/planning/planning-applications-and-decisions/pre-planning-application-meeting-service-0

2.4.3 The RICS Professional Statement: Whole Life Carbon assessment for the built environment (the RICS PS)[8] is a useful guide to the practical implementation of the BS EN 15978 principles. It sets out technical details and calculation requirements.

2.4.4 In developing a WLC assessment, applicants should follow BS EN 15978. The RICS PS should be used as the methodology for assessment, except where noted in Box 1, which lists the key areas where compliance with Policy SI 2 takes a different approach to the RICS PS.

Box 1: Key requirements of this guidance that differ from the RICS PS methodology

1. Operational carbon emissions should be reported following the GLA's approach to carbon emission factors – see section 2.8.
2. Operational carbon emissions for non-residential uses should be reported using CIBSE TM54 - see paragraph 2.5.14.
3. All life-cycle modules (A-D) should be reported to comply with the WLC policy – see section 2.5 for further details.
4. Carbon emissions from pre-construction demolition should be reported– see section 3 for further details.
5. Reporting the key actions undertaken to reduce WLC emissions and the associated carbon savings, including those associated with the retention, reuse and recycling of existing structures and materials that are already on-site – see section 3 for further details.

2.4.5 This guidance and the assessment template have been developed with residential projects and non-residential projects such as offices, retail, hotels and educational institutions in mind. They may also be used to assess the WLC emissions of infrastructure projects, but we would recommend that such projects also refer to PAS 2080 – carbon management in infrastructure framework, in completing their assessment.

2.5 Life-cycle modules

2.5.1 BS EN 15978 and the RICS PS set out four stages in the life of a typical project, described as life-cycle modules:

- Module A1 – A5 (product sourcing and construction stage)
- Module B1 – B7 (use stage)

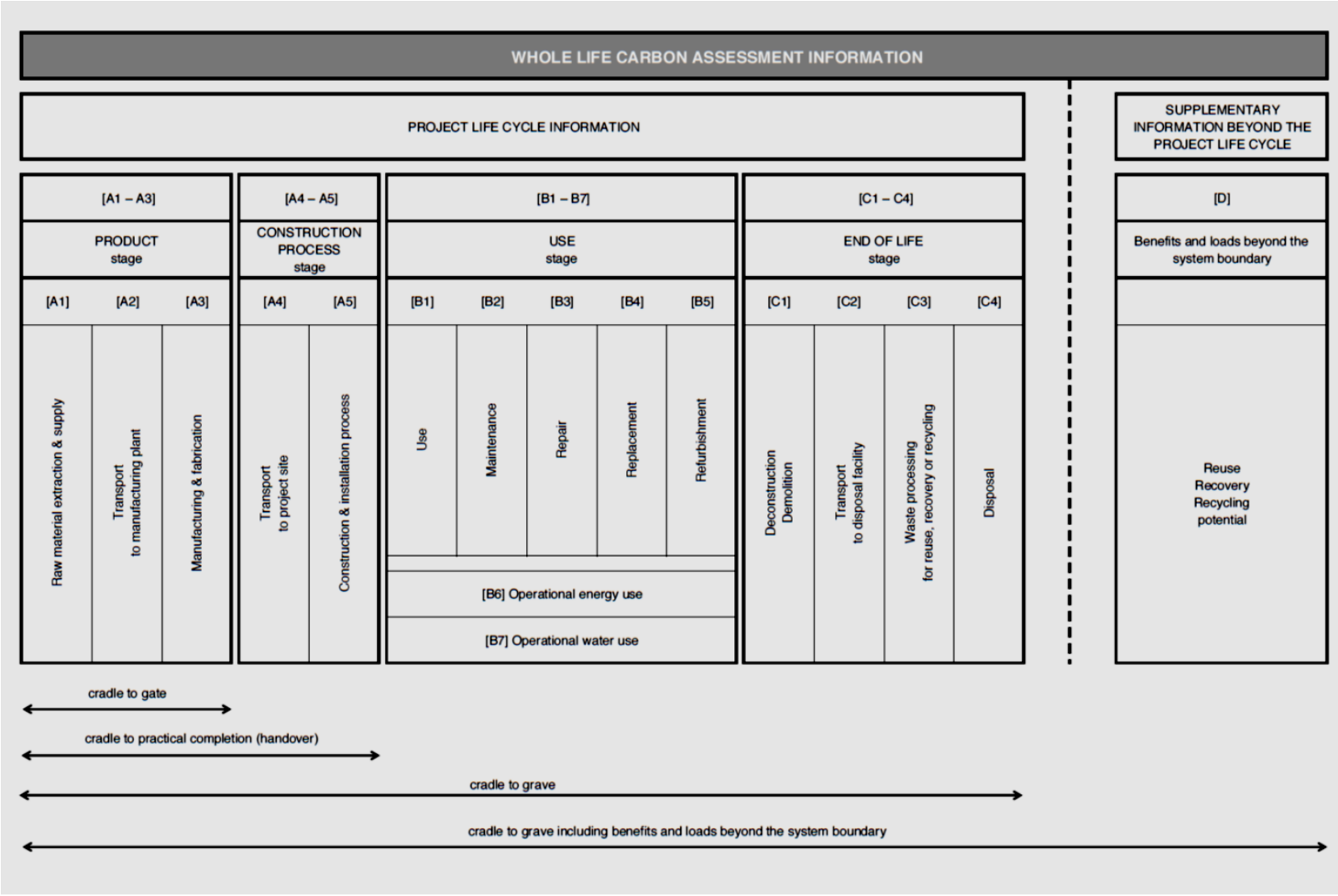
[8] https://www.rics.org/globalassets/rics-website/media/news/whole-life-carbon-assessment-for-the--built-environment-november-2017.pdf

- Module C1 – C4 (end-of-life stage)
- Module D (benefits and loads beyond the system boundary)

2.5.2 A WLC assessment needs to cover the entirety of modules A, B, C and D, rather than just the minimum requirements identified in the RICS PS. Figure 2.1 outlines what is captured under each module. Further detail is provided from 2.5.4 onwards.

2.5.3 Each module should be presented separately, as identified in the WLC assessment template. The reference study period (that is, the assumed building life expectancy) for the purposes of the assessment is 60 years. Where the design life of the project exceeds or is less than 60 years, the assessment should still be done to 60 years but with an accompanying explanation of the life cycle and end-of-life scenarios for the actual design life.

Figure 2.1 Life-cycle modules (BS EN 15978)



Module A (Product sourcing and construction stages)

2.5.4 The objective of this module is to report carbon emissions from the sourcing, transportation, fabrication and construction of all materials and products (A1-A5).

2.5.5 To ensure that the choices that are made will also help reduce future carbon emissions through subsequent life-cycle stages (B, C, D), a close understanding of the supply chain is needed. For example:

- whether virgin or recycled material sources are being used (A1)
- the energy sources and local energy grid associated with the manufacture of products (A1)
- the location of manufacturing plants in relation to the site, the transport methods and travel distances from material sources to fabrication plants (A2), and from fabrication to site (A4)
- the level of waste associated with the manufacture of the product (A1, A3)
- the on-site assembly of products into the finished scheme (A5).

2.5.6 The processes used in fabricating products (A3) are also important, as well as the methods used to construct the building, including contractor-related items such as temporary works, shuttering type and energy use (A5). MMC can have significant benefits in reducing waste (A1, A3, A5) and the extent of repair and maintenance required as part of the 'snagging' process (A5).

2.5.7 Whilst the focus of module A is on the materials and processes up to project completion, the selections made should also take account of the future life cycle of the building (modules B, C, D).

Module B (Use stage)

2.5.8 The objective of this module is to understand, at the design stages, how the building will perform post-construction; and how to ensure that in-use emissions (B1-B7) will be minimised. This includes the in-use emissions of some products, for example, some refrigerants[9] and paints (B1).

2.5.9 With the increasing uptake of mechanical, electrical and plumbing engineering (MEP) equipment using refrigerants, particularly heat pumps, applicants will be expected to report on the environmental impact from

[9] It is recommended that CIBSE TM65 is used to calculate emissions from refrigerants (including leakage) and that the following guidance is referred to: Refrigerants & Environmental Impacts: a Best Practice Guide https://www.integralgroup.com/news/refrigerants-environmental-impacts/

refrigerants over the building's lifespan. The WLC assessment will require the applicant to report the refrigerant type, its global warming potential (GWP), initial quantity/charge, assumed annual leakage rate, maintenance regime and end-of-life recovery rate. Further guidance on calculating the carbon emissions associated with module B1 is available in CIBSE TM65.[10] There are materials and products that are capable of being 'regenerative', in that they absorb carbon dioxide from the atmosphere (B1) over the life cycle of the building, and these should also be accounted for in the assessment.

2.5.10 Designing to minimise future emissions from maintenance (B2), repair (B3) and replacement (B4) across all building element categories over the future life cycle of the building will have long-term carbon (and financial) benefits. Reasonable maintenance scenarios should be developed based on facilities management information, maintenance strategy reports, façade access and maintenance strategy, life-cycle cost reports, Operation and Maintenance manuals and professional guidance, e.g. CIBSE Guide M, RICS New Rules of Measurement (NRM) 3.

2.5.11 Emissions from maintenance, repair and replacement should be estimated using manufacturers' recommendations and environmental product declarations (EPDs) where possible. Alternatively, warranty periods for the replacement of major systems such as windows, cladding, services and plant should be used unless scenarios are provided, supported by evidence, for periods longer than the provided warranties. Where warranty periods are unavailable, reasonable lifespan periods should be assumed supported by suitable evidence (e.g. Table 9 of the RICS PS). See item 3.5.3.4 of the RICS PS for details of replacement assumptions that should be made. Lifespan data for MEP equipment not included in Table 9 is available in CIBSE Guide M[11] or from the Building Cost Information Service.[12]

2.5.12 During the design stage, modules B2 and B3 will be more challenging to estimate. Applicants can estimate how much electricity may be used multiplied by the expected number of days of planned maintenance each year. Alternatively, for module B2 emissions, a total figure of 10 $kgCO_2e/m^2$ gross internal area (GIA) may be used to cover all building element categories, or 1 per cent of modules A1-A5, whichever is greater. For module B3 emissions, these may be estimated as 25 per cent of module B2, as per the RICS PS (item 3.5.3.3).

2.5.13 If there is an alteration or refurbishment (B5) planned from the outset of the project, then steps can be taken during the design stages to ensure that this will be facilitated with minimum or zero waste, or damage to existing fabric.

[10] https://www.cibse.org/knowledge/knowledge-items/detail?id=a0q3Y00000IPZOhQAP

[11] https://www.cibse.org/knowledge/knowledge-items/detail?id=a0q20000008I7oZAAS

[12] https://www.rics.org/uk/news-insight/latest-news/news-opinion/bcis-component-life-expectancy-update-for-2018/

Specific future alterations or improvements that are known and planned at the point of practical completion should be included.

2.5.14 Operational energy use (B6) should be minimised by considering the overall resource efficiency of the building. Applicants should report regulated and unregulated carbon emissions separately, and include all emissions as described in the RICS PS. In reporting regulated emissions, applicants should use the estimate of carbon emissions from operational energy use provided in the energy assessment and insert this figure directly into the WLC assessment. This should reflect the estimated figures calculated as part of the SAP and CIBSE TM54 analyses for domestic and non-domestic uses respectively. This differs to the approach in the RICS PS but is in line with section 3 of the 'Be Seen' – energy monitoring guidance. In reporting unregulated emissions, this should include carbon emissions from non-building-related systems, such as ICT equipment, and from the operation of building-integrated systems, such as lifts. Modules A1-A5 and module B6 should be considered together. Any energy use and emissions associated with the distribution of water within the building should be captured under operational energy use (B6).

2.5.15 Module B7 covers the carbon emissions related to water supply and wastewater treatment before it enters the building. Estimates of anticipated water consumption at early design stages may be made using Table 22 of the BSRIA Rules of Thumb – guidelines for the building services (fifth edition).[13] The estimated water consumption should be replaced by figures provided by the public health and/or MEP consultant and landscape architect as they become available. Carbon conversion factors for water use and treatment as published by the local water supplier should be used.

Module C (End-of-life stage)

2.5.16 This module captures the emissions from when the building has reached the end of its useful life, i.e. at the end of the 60-year reference study period. It covers deconstruction and demolition (C1), transport (C2), waste processing for reuse, recovery or recycling (C3) and disposal (C4), until the site is cleared, level and ready for further use.

2.5.17 Suitable project-specific scenarios should be used to establish the anticipated end of life scenarios for each building element and the associated carbon emissions (C1-C4). The potential end-of-life scenario for each building element should be reported in the module C column of the 'material quantity and end-of-life scenarios' table of the WLC assessment

13 https://www.bsria.com/uk/product/Ln3Q4B/rules_of_thumb_guidelines_for_building_services_5th_edition_bg_92011_a15d25e1/

template. The carbon emissions associated with these activities should be reported in the 'GWP for all life cycle modules' table of the WLC assessment template. Applicants should ensure that the end of life scenarios and GWP results reported in the WLC assessment match the end-of-life scenarios reported in the Circular Economy Statement. See the Circular Economy Statement Guidance for further information.

2.5.18 Designing to enable future disassembly and dismantling will reduce the likely carbon emissions of these activities and support potential carbon savings in the future (see module D). Proposed solutions and technologies should be based on those that are proven to be technically and economically viable, as per EN 15978.

Module D (Benefits and loads beyond the system boundary)

2.5.19 Deciding what will happen to a building after it has been dismantled or demolished many years in the future is clearly speculative. However, in order to transform London to a resource-efficient, zero-carbon economy, it is essential that these issues are given careful consideration at the design stage. The potential carbon savings associated with these activities should be calculated and included in module D of the WLC assessment, based on the end-of-life scenarios reported for module C and in the Circular Economy Statement. The objective is to facilitate future reuse, recovery and recycling at the highest possible level. Due to the speculative nature of these scenarios this module is reported separately.

2.5.20 To complete module D of the 'material quantity and end-of-life scenarios' table, applicants should repeat the estimates of the percentages of reusable and recyclable materials reported in the Bill of Materials template from the Circular Economy Statement. To complete module D of the 'GWP of all life-cycle modules' table applicants should use the results from the software tool they are using. If the tool does not include module D, refer to the guidance in paragraph 3.2.13.

2.5.21 The principle is that for a project that follows the 'end of life' of the applicant's project, the future carbon emissions from making a component (for example – an appropriately specified steel beam or an entire structural frame) will be avoided and the saving will be equivalent to providing a new component or system. As the potential future carbon savings are the result of a design decision made today, it is recorded in this module.

2.6 Building elements

2.6.1 The WLC assessment should, in line with the RICS PS, cover all building elements listed in Table 2.2 that are applicable to the project and are to be included in the finished area of the completed project, including temporary works.

2.6.2 The building elements are broken down according to the RICS NRM classification system level 2 sub-elements. The unit of area measurement to be used is GIA m^2. Floor areas should be measured in accordance with RICS Property Measurement standards.

Table 2.2 Building elements (RICS PS)

Building element group	Building element (NRM level 2)
Demolition	0.1 Toxic/hazardous/contaminated material treatment 0.2 Major demolition works
0 Facilitating works	0.3 and 0.5 Temporary/enabling works 0.4 Specialist groundworks
1 Substructure	1.1 Substructure
2 Superstructure	2.1 Frame 2.2 Upper floors incl. balconies 2.3 Roof 2.4 Stairs and ramps 2.5 External walls 2.6 Windows and external doors 2.7 Internal walls and partitions 2.8 Internal doors
3 Finishes	3.1 Wall finishes 3.2 Floor finishes 3.3 Ceiling finishes
4 Fittings, furnishings and equipment (FFE)	4.1 FFE including building-related* and non-building-related**
5 Building services/MEP	5.1–5.14 Services including building-related* and non-building-related**

Building element group	Building element (NRM level 2)
6 Prefabricated buildings and building units	6.1 Prefabricated buildings and building units
7 Work to existing building	7.1 Minor demolition and alteration works
8 External works	8.1 Site preparation works 8.2 Roads, paths, pavings and surfacings 8.3 Soft landscaping, planting and irrigation systems 8.4 Fencing, railings and walls 8.5 External fixtures 8.6 External drainage 8.7 External services 8.8 Minor building works and ancillary buildings

* Building-related items: building-integrated technical systems and furniture, fittings and fixtures built into the fabric or included in the shell and core specification. Building-related MEP and FFE typically include the items classified under Shell and Core and Category A fit-out.

** Non-building-related items: loose furniture, fittings and other technical equipment like desks, chairs, computers, refrigerators, etc. Such items are usually part of Category B fit-out. Therefore, for Shell and Core construction this is not part of the assessment scope.

N.B. Scope comparison with BREEAM 2018: items 2.1 to 2.6 is mandatory for BREEAM Mat01 assessment and items 1 and 5 are optional.

2.6.3 The total quantities for the project should be used (including temporary works), as provided or approved by the project Quantity Surveyor, to inform the project cost appraisal at planning application submission stage of the WLC assessment. At the post-construction stage of the WLC assessment, the 'as built' information should be used, with quantities approved by the project Quantity Surveyor. A minimum of 95 per cent (EN 15804; 6.3.5) of the capital cost allocated to each building element category should be accounted for at each stage of the assessment and this should also be approved by the project Quantity Surveyor as part of the third-party review of each submission. Items excluded should each account for less than 1 per cent of the total capital cost of that building element category. It is good practice to include the carbon emissions from the excluded items. If the software tool used does not do this automatically, then applicants are

encouraged to calculate and report this by multiplying the carbon emissions of each building element category by the following adjustment factor to account for the impacts of the items not quantified:

Coverage adjustment factor = (100 per cent / per cent of cost covered in the given category).

Building services/MEP

2.6.4 The following box lists the suggested building services/MEP elements that should be included in the assessment. This is not an exhaustive list but a guide for applicants to use.

Box 2: Building services/MEP elements to be included in the WLC assessment

1. Distribution ductwork and extract; including grilles and diffusers
2. Distribution pipework to and within risers
3. Air-handling unit and fans
4. Grey water harvesting tanks (if applicable)
5. Waste pipes and stacks
6. Hot water and cold water: supply and distribution pipework including insulation
7. Sprinkler system (sprinklers, pipes etc.)
8. Drenching system
9. Cabling, containment, trunking and cable trays
10. Materials of light fittings
11. Air conditioning units
12. Heat and cooling emitters (fan coil units, radiators etc)
13. Pumps (including heat pumps)
14. Valves
15. Dampers
16. Mechanical ventilation and heat recovery (MVHR) system
17. Lifts and escalators

2.7 Materials and products

Acceptable sources of carbon data for materials and products

2.7.1 The following are acceptable sources of carbon data for materials and products (or the latest available versions) in order of preference:

- verified Type III EPDs in accordance with BS EN 15804 2012+A1:2013 or A2:2019
- verified Type III EPDs in accordance with ISO 21930: 2017
- verified Type III EPDs in accordance with ISO 21930: 2007
- third-party (independently) verified, or peer-reviewed, carbon emissions to ISO 14067. EN 15804 or ISO 21930:2017 should be used as a CFP-PCR where relevant.
- verified Type III EPDs in accordance with ISO 14025
- peer-reviewed Life-cycle Carbon Assessment studies in accordance with ISO 14044
- independently verified or peer-reviewed carbon emissions to PAS 2050:2011. EN 15804 should be used as the product sector specific requirements where relevant.

2.7.2 Applicants should use data from the manufacturer of the actual materials and products being used, following the order of preference above. If the manufacturer has not provided data or it is too early in the design process for the manufacturer to be known, then sector level data (e.g. EPDs that use data covering several manufacturers) should be used. Further guidance on sourcing data for specific materials, products and life-cycle modules is provided here:

- **Structural elements:** Where EPDs are not available for structural elements, e.g. concrete, it is recommended that applicants use IStructE's guide, 'How to calculate embodied carbon',[14] to source default values.

- **MEP:** The embodied carbon emissions of MEP systems may be difficult to calculate in detail due to a lack of EPDs or other data sources. In these cases, it is recommended that applicants use the calculation methodology in CISBE TM65 Embodied carbon in building services which provides guidance for the calculation at each life-cycle stage at product level: A1-A4, B1, B3, C1-C4. The "mid-level calculation" method should be used but

[14] https://www.istructe.org/IStructE/media/Public/Resources/istructe-how-to-calculate-embodied-carbon.pdf

if there is not enough information available then the "basic calculation" method can be used instead. Applicants using the CIBSE TM65 methodology are also encouraged to report their results to CIBSE via their reporting form.[15] Applicants should use the default material carbon data in TM65 if product-specific carbon data is not available. For any materials that are not covered by TM65, applicants should use generic data sources which follow the EN15804 methodology e.g. the ICE Database v3.[16] If data following this methodology is not available then other generic data sources should be used e.g. older versions of the ICE Database v2. The final resort would be to use specific data from other manufacturers for similar products.

- **Module C3:** To calculate the carbon emissions for module C3 of materials and products i.e. their end-of-life, relevant EPDs such as a manufacturer or sector EPD should be used in the first instance. Applicants should ensure that the end of life scenario modelled aligns with the Circular Economy Statement and is relevant to the building and the typical fate of construction and demolition waste in London. If EPDs are not available other relevant sources which follow EN15804 should be used[17]. The data provided by the software tool being used may also be appropriate, but applicants should check the end-of-life scenario assumed to ensure it is appropriate.

- **FFE:** For projects where FFE is included in the scope of the planning application (e.g. lockers, benches, desks, etc.) applicants can refer to the Furniture Industry Research Association's data[18] if specific product information is not yet known.

- **Timber:** Sequestered carbon from the use of timber should be assessed in accordance with Clause 3.4.1 of the RICS PS. Sequestered carbon should be reported separately in the relevant part of the WLC assessment template.

2.8 Grid decarbonisation

2.8.1 The UK's electricity grid is decarbonising and this will have an impact on the WLC emissions of a development. It will be important for consistent decarbonisation assumptions to be built into the available software tools and

[15] The form is available here: https://www.cibse.org/knowledge/knowledge-items/detail?id=a0q3Y00000IPZOhQAP

[16] https://ghgprotocol.org/Third-Party-Databases/Bath-ICE

[17] For example: https://woodforgood.com/lifecycle-database and https://www.steelconstruction.info/End_of_life_LCA_and_embodied_carbon_data_for_common_framing_materials#Whole_life_embodied_CO2e_emissions_data

[18] https://www.fira.co.uk/technical-information/sustainability/study-into-the-feasability-of-benchmarking-carbon-footprints-of-furniture-products

industry's progress with this will be monitored. However, at present, the data is not reliable to do so accurately for embodied carbon emissions. Applicants are therefore not required to account for the long-term decarbonisation of the electricity grid in their WLC assessments, in line with EN 15978.

2.8.2 Any applicants who wish to account for grid decarbonisation in their WLC assessment should discuss and agree their proposed approach with the GLA.

2.8.3 Applicants should ensure that in reporting module B6 results, the carbon emission factors used align with those used in the energy strategy for the development. See the GLA's Energy Assessment Guidance[19] for further information on the GLA's approach to carbon emission factors in energy strategies.

3 Content of a WLC assessment by stage

3.1 Pre-application stage

3.1.1 At pre-application stage, applicants are required to complete the pre-application tab of the WLC assessment template. This should be submitted to the GLA at pre-application along with all other pre-application documentation. Applicants who are not completing a pre-application are still encouraged to undertake the pre-application assessment to inform their planning application.

3.1.2 The pre-application assessment should include the information listed in Box 3.

Box 3 – Pre-application stage information requirements

1. A description of the proposed development.
2. Confirmation that options for retaining existing buildings and structures have been fully explored before considering substantial demolition, including incorporating the fabric of existing buildings into the new development.
3. The carbon emissions associated with pre-construction demolition.
4. An estimate of the percentage of the new build development which will be made up of existing façades, structures, buildings.

[19] https://www.london.gov.uk/sites/default/files/gla_energy_assessment_guidance_april_2020.pdf

5. The WLC principles that are informing the development of the site.

3.1.3 If substantial demolition is proposed, applicants will need to demonstrate that the benefits of demolition would clearly outweigh the benefits of retaining the existing building or parts of the structure. Retention should be seen as the starting point; this will usually be the most sustainable option as it can make an immediate contribution toward the Mayoral objective of London becoming a zero carbon city by 2030, as well as reflecting the need to both move towards a low-carbon circular economy (set out in Good Growth objective GG6 – Increasing efficiency and resilience) and to push development up the waste and energy hierarchies (see Policy SI 2 – minimising greenhouse gas emissions; and Policy SI 7 – reducing waste and supporting the circular economy).

3.1.4 To calculate the carbon emissions associated with pre-construction demolition, actual figures should be used where possible. If actual figures are not available, applicants can apply a standard assumption of 50kgCO_2e/m^2 to the GIA of the existing areas being demolished that fall within the boundary line.

3.1.5 The WLC principles are listed in Table 2.1. Applicants should consider all of the principles and, subject to each development's unique characteristics, provide examples of how the design of the development is taking each principle into account. Reasons for not considering certain principles should also be provided in the template. Applicants are encouraged to keep returning to the WLC principles throughout each stage of the WLC assessment so that they continue to inform the design of the development as it evolves.

3.2 Planning application submission stage (outline and detailed)

3.2.1 At the planning submission stage (RIBA stage 2/3), applicants should complete the applicable tab of the WLC assessment template (depending on whether it is an outline or detailed application) and submit it as part of the planning application. This stage of the process requires a WLC assessment against each life-cycle module to be undertaken.

3.2.2 The WLC assessment template for both outline and detailed planning applications should include the information listed in Box 4.

Box 4 – Planning application submission stage information requirements

1. Project and assessment details e.g. brief description of the project, software tool used, type of EPDs used.

2. Confirmation that the assessment accounts for a minimum of 95 per cent of the capital cost allocated to each building element category (or an explanation of any omissions).
3. An explanation of the third-party mechanisms that have been adopted to quality assure the submission.
4. Estimated total WLC emissions (kgCO2e and kgCO2e/m^2 GIA) for each life-cycle module, which will form the baseline for the development, and will automatically populate based on the 'GWP of all life-cycle modules' table. The applicant will be required to report on how the total WLC emissions compare against the WLC benchmarks (see paragraph 3.2.4 for further information on the benchmarks).
5. Confirmation that options for retaining existing buildings and structures have been fully explored before considering substantial demolition, including incorporating the fabric of existing buildings into the new development. See paragraph 3.1.3 for further guidance.
6. The carbon emissions associated with pre-construction demolition.
7. The percentage of the new build development that will be made up of existing façades, structures, buildings.
8. Summary of key actions to achieve the WLC emissions reported and the emission reductions they are expected to achieve, including from the retention, reuse and recycling of existing structures and materials that are already on-site
9. Opportunities to reduce the development's WLC emissions further.
10. Completion of the 'material quantities and end-of-life scenarios' table covering all building element categories. This should be aligned with the Bill of Materials table produced as part of the Circular Economy Statement. If specific lifespan information is not available, the default values provided in Table 9 of the RICS PS are recommended; and for any MEP equipment not covered, CIBSE Guide M or the Building Cost Information Service component life expectancy are recommended.
11. Completion of the 'GWP of all life-cycle modules' table. Modules C3 and D of the GWP reporting table should also be informed by the Circular Economy Statement. Module B6 should be informed by the methodology outlined in the 'Be Seen' energy monitoring guidance.

3.2.3 Applicants should ensure the information they submit is as accurate as possible at the time of reporting. Any changes in design following the submission of the planning application stage submission should be

accounted for in the post-construction assessment. Applicants are also encouraged to submit their WLC assessments to the Built Environment Carbon Database[20] to help develop consistency in how carbon emissions are reported and measured across the built environment.

Using the WLC benchmarks

3.2.4 WLC benchmarks have been developed for the most typical typologies, and can be found in Appendix 2 together with an explanation of how they have been developed.

3.2.5 The estimated total WLC emissions form the baseline for the development. All developments, regardless of their scope, are expected to compare their WLC baseline against the most relevant benchmark. If the WLC emissions of a development falls outside the range of the benchmarks (whether they are higher or lower), applicants should explain why in the relevant text box of the template.

3.2.6 Mixed-use developments should compare their WLC baseline with the benchmark of the typology which makes up the greatest proportion of the development in GIA. If the uses are relatively equally split, then the highest WLC benchmark should be used for comparison.

3.2.7 It is good practice to set targets for WLC emissions reductions and to track progress against them throughout the project. Applicants can use the benchmarks as a basis for this but are encouraged to go further, where possible.

Outline, reserved matters and hybrid applications

3.2.8 Less information will be available for outline planning applications, but applicants are expected to provide as much information as possible in line with the above requirements. All building elements should be included in the assessment. While specific materials and products may not be known at this stage, applicants should (as far as possible) follow the order of preference set out in section 2.7 to provide the information.

3.2.9 Applications for reserved matters will require a WLC assessment in accordance with the planning application submission requirements. Applicants will be required to review the information provided at outline stage and update any default values used as far as possible.

3.2.10 For hybrid applications, applicants should complete one WLC assessments for the outline application and one for the detailed application.

[20] https://www.becd.co.uk/

Software tools

3.2.11 A list of suitable software tools has been provided in Appendix 1. This list is not exhaustive as software tools are regularly updated. Applicants wishing to use an alternative tool to those listed should ensure that it meets the requirements of this guidance and that:

- it covers the assessment scope from BS EN 15978
- the scope covers modules A-C. Module D must still be assessed but as the majority of available tools do not include module D by default at the moment, this can be done outside the software (see paragraph 3.2.13)
- the database from which the life-cycle assessment information is sourced is based on data sources that reflect the country of origin of the material selected.

3.2.12 Regardless of which software tool is used, MEP equipment should be estimated at product level using CIBSE TM65 where possible during planning application stage. If detailed information is not available at the time of planning submission for certain items, default values in the software tools could be used to calculate the carbon baseline. For the post-construction assessment it is mandatory to update the calculation of MEP systems emissions following CIBSE TM65 and using details provided by MEP suppliers.

Calculating module D

3.2.13 If the selected software does not automatically calculate figures for module D, the figures should be reported as potential savings under module D, reported in $kgCO_2e/m^2$ and calculated as follows (see also RICS PS Section 3.5.5 for more examples):

- For a particular component that is being re-used on a new site (e.g. a steel beam), the figures for modules A1-A3 should be used plus an allowance for transport to the future site.
- If the structural frame is kept, the figures from both the product and construction stages should be used (modules A1-A5), plus an allowance against any avoided deconstruction, using the figures for modules C1, C2 and C4.

3.3 Post-construction stage

3.3.1 The post-construction WLC assessment should be appropriately secured via planning condition or legal agreement between the local authority and the applicant at planning stage. Draft wording has been shared with local

authorities for this purpose and is also available on the WLC pages of the GLA's website.[21]

3.3.2 At this final stage of the WLC assessment process, applicants should complete the post-construction tab of the WLC assessment template and submit it to the GLA at: ZeroCarbonPlanning@london.gov.uk prior to occupation of the development. This should be submitted along with any associated evidence. The subject line of the email should read: WLC assessment for [insert planning reference]. Applicants are also encouraged to submit their WLC assessments to the Built Environment Carbon Database.[22]

3.3.3 The post-construction WLC assessment will require the information listed in Box 5.

Box 5 – Post-construction stage information requirements

1. An update of the information provided at planning submission stage (see paragraph 3.2.2) using the actual WLC carbon emission figures. Applicants will need to update the WLC calculation results for all modules based on the actual materials, products and systems.[23] For example, for modules A1-A5 the actual transportation emissions from the delivery of materials, removal of waste and site work emissions. The 'material quantities and end-of-life scenarios' table and modules C3 and D of the 'GWP for all life-cycle modules' table should align with the post-construction Circular Economy Statement.
2. A comparison of the post-construction results with the WLC emissions baseline reported at planning submission stage and an explanation for the difference, including any design changes that may have impacted on the results. A text box has been provided in the template for this purpose.
3. A comparison of the post-construction results with the WLC benchmarks with an explanation for the difference. A text box has been provided in the template for this purpose.
4. A summary of the lessons learnt that will inform future projects. This should include what went well and what could be improved next time to achieve WLC reductions. For example, early engagement with the client on the WLC objectives of the

[21] https://www.london.gov.uk/what-we-do/planning/london-plan/london-plan-guidance/whole-life-cycle-carbon-assessments-guidance

[22] https://www.becd.co.uk/

[23] it is mandatory to update the calculation of MEP systems emissions following CIBSE TM65 and using details provided by MEP suppliers

scheme went well, and an improvement would be agreeing across project teams a set of WLC targets for the biggest carbon impacts of the scheme.

5. To support the results provided in the template, the following minimum evidence requirements should be submitted at the same time:

a) site energy (including fuel) use record

b) contractor confirmation of as-built material quantities and specifications

c) record of material delivery including distance travelled and transportation mode (including materials for temporary works)

d) waste transportation record including waste quantity, distance travelled and transportation mode (including materials for temporary works) broken down into material categories used in the assessment

e) a list of product-specific EPDs for the products that have been installed. The data collected at this stage will provide an evidence base that could help inform future industry-wide benchmarks or performance ratings for building typologies.

3.4 Scrutiny of assessments

3.4.1 The GLA (and local authorities, as appropriate) will scrutinise assessments for:

- Completeness – has the WLC assessment template been completed in full?
- technical quality – does the assessment use the appropriate baseline, assessment tools and methodology?
- reduction in WLC emissions – has the applicant demonstrated that actions have been taken to reduce WLC emissions?
- level of ambition – do the estimated and actual WLC emissions fall within, or improve upon, the benchmarks?

Appendix 1 Software tools

Tool	Country of origin	Applicable to UK?	Project type	Online/offline	Scope	Data source
One Click LCA	Finland	Yes	Buildings and infrastructure	Online software	Modules A-C (+D)	Built-in with access to some of the most widely spread local EPD databases, including Ecoinvent which contains generic LCA data.
eToolLCD	Australia	Yes	Buildings and infrastructure	Online software	Modules A-C (+D)	Uses Ecoinvent database (EPDs) which includes data by the Building Research Establishment (BRE) in the UK.
Tally	USA	Yes	Buildings	Both	Modules A-C	Uses Gabi database which contains EPDs and US generic data.
Sturgis Carbon Calculator	UK	Yes	Buildings	Offline software	Modules A-C	EPD database built over more than 10 years of practice in the UK. It allows the possibility to input additional EPDs manually.

Appendix 2 Benchmarks

A2.1.1 The WLC benchmarks are based on previous project assessments carried out by Cundall and Targeting Zero and have been cross-referenced with data provided by LETI, eTool, One Click, Hilson Moran, Price & Myers, and Arup. These assessments were Shell and Core, and CAT A finishes; and followed the RICS PS in terms of the scope of assessment, and material baseline assumptions and specifications. All life-cycle modules apart from B6, B7 (operational energy and operational water) and module D are included. The analysis underpinning the WLC benchmarks is set out in the table below.

Figure A2.1 Details of the assessments underpinning the WLC benchmarks

Method of assessment	BS EN 15978
Life-cycle modules	A1-A5, B1-5, C1-C4
Assessment scope (> 95 per cent of the cost allocated to each building element category has been accounted for in the assessment)	Substructure Superstructure: Frame Superstructure: Upper floors Superstructure: Roof Superstructure: Stairs and ramps Superstructure: External walls Superstructure: Windows and external doors Superstructure: Internal walls and partitions Superstructure: Internal doors Internal finishes FFE Services (MEP) External works
Material carbon data quality	EPD in accordance with EN 15804
Material specification assumption	RICS Professional Statement

Material lifespan assumption	RICS Professional Statement
Material end-of-life scenarios	RICS Professional Statement
Grid decarbonisation	Not accounted for

A2.1.2 The WLC benchmarks should be used as a guide by all applicants. The benchmarks provide a range rather than a set value and are broken down into life-cycle modules. Projects with higher WLC emissions than the benchmarks should carefully examine how they can reduce WLC emissions. The WLC assessment template provides space for applicants to explain how and why any variations exist.

A2.1.3 A further set of aspirational WLC benchmarks have been developed which are based on a 40 per cent reduction in WLC emissions on the first set of WLC benchmarks. This is based on the World Green Building Council's target to achieve a 40 per cent reduction in WLC emissions by 2030. Applicants who wish to go further are encouraged to consider how they can achieve reductions in line with the aspirational benchmarks.

A2.1.4 Module B6 has not been included in the benchmarks as it is regulated through Part L and subject to the Mayor's net zero target. Modules B7 and D have also not been included in the benchmarks, due to a lack of available data. Applicants will therefore not be able to compare their module B6, B7 or D estimates. Over time, as more data is collected by the GLA and by industry more widely and as data quality improves, these benchmarks will evolve to become more accurate and comprehensive.

Table A2.1 WLC benchmarks (excluding modules B6, B7 and D)

Offices*			
Modules	**WLC benchmark ($kgCO_2e/m^2$ GIA)**	**Aspirational WLC benchmark ($kgCO_2e/m^2$ GIA)**	**Breakdown of a typical development**
A1-A5 (excluding sequestration)	<950	<600	Substructure: 19 per cent Superstructure: 36 per cent Façade: 17 per cent Internal finishes: 10 per cent FFE: 2 per cent Services/MEP: 14 per cent External works: 2 per cent
B-C (excluding B6 & B7)	<450	<370	Substructure: 1 per cent Superstructure: 4 per cent Façade: 21 per cent Internal finishes: 27 per cent FFE: 9 per cent Services/MEP: 35 per cent External works: 3 per cent

Offices*			
Modules	**WLC benchmark ($kgCO_2e/m^2$ GIA)**	**Aspirational WLC benchmark ($kgCO_2e/m^2$ GIA)**	**Breakdown of a typical development**
A-C (excluding B6 & B7, including sequestration)	<1400	<970	Substructure: 13 per cent Superstructure: 25 per cent Façade: 18 per cent Internal finishes: 16 per cent FFE: 5 per cent Services/MEP: 21 per cent External works: 2 per cent

Residential			
Modules	**WLC benchmark ($kgCO_2e/m^2$ GIA)**	**Aspirational WLC benchmark ($kgCO_2e/m^2$ GIA)**	**Breakdown of a typical development**
A1-A5 (excluding sequestration)	<850	<500	Substructure: 21 per cent Superstructure: 33 per cent Façade: 18 per cent Internal finishes: 10 per cent FFE: 1 per cent Services/MEP: 16 per cent External works: 1 per cent
B-C (excluding B6 & B7)	<350	<300	Substructure: 6 per cent Superstructure: 6 per cent Façade: 34 per cent Internal finishes: 19 per cent FFE: 3 per cent Services/MEP: 30 per cent External works: 2 per cent

Residential			
Modules	**WLC benchmark ($kgCO_2e/m^2$ GIA)**	**Aspirational WLC benchmark ($kgCO_2e/m^2$ GIA)**	**Breakdown of a typical development**
A-C (excluding B6 & B7, including sequestration)	<1200	<800	Substructure: 17 per cent Superstructure: 25 per cent Façade: 23 per cent Internal finishes: 12 per cent FFE: 1 per cent Services/MEP: 20 per cent External works: 2 per cent

Schools, universities etc.			
Modules	**WLC benchmark ($kgCO_2e/m^2$ GIA)**	**Aspirational WLC benchmark ($kgCO_2e/m^2$ GIA)**	**Breakdown of a typical development**
A1-A5 (excluding sequestration)	<750	<500	Substructure: 33 per cent Superstructure: 30 per cent Façade: 13 per cent

Schools, universities etc.			
Modules	**WLC benchmark ($kgCO_2e/m^2$ GIA)**	**Aspirational WLC benchmark ($kgCO_2e/m^2$ GIA)**	**Breakdown of a typical development**
			Internal finishes: 6 per cent Services/MEP: 11 per cent External works: 7 per cent
B-C (excluding B6 & B7)	<250	<175	Substructure: 2 per cent Superstructure: 4 per cent Façade: 37 per cent Internal finishes: 14 per cent Services/MEP: 29 per cent External works: 14 per cent
A-C (excluding B6 & B7, including sequestration)	<1000	<675	Substructure: 25 per cent Superstructure: 24 per cent Façade: 19 per cent Internal finishes: 9 per cent Services/MEP: 15 per cent External works: 8 per cent

Retail*			
Modules	**WLC benchmark ($kgCO_2e/m^2$ GIA)**	**Aspirational WLC benchmark ($kgCO_2e/m^2$ GIA)**	**Breakdown of a typical development**
A1-A5 (excluding sequestration)	<850	<550	Substructure: 35 per cent Superstructure: 38 per cent Façade: 9 per cent Internal finishes: 5 per cent FFE: 1 per cent Services/MEP: 6 per cent External works: 6 per cent
B-C (excluding B6 & B7)	<200	<140	Substructure: 0 per cent Superstructure: 5 per cent Façade: 18 per cent Internal finishes: 22 per cent FFE: 8 per cent Services/MEP: 40 per cent External works: 7 per cent

Retail*			
Modules	**WLC benchmark ($kgCO_2e/m^2$ GIA)**	**Aspirational WLC benchmark ($kgCO_2e/m^2$ GIA)**	**Breakdown of a typical development**
A-C (excluding B6 & B7, including sequestration)	<1050	<690	Substructure: 28 per cent Superstructure: 32 per cent Façade: 11 per cent Internal finishes: 8 per cent FFE: 2 per cent Services/MEP: 13 per cent External works: 6 per cent

* Separate use classes for commercial uses including retail and offices have now been replaced by use class E. The most relevant building typology or use should be selected in providing data. Amendments to the assessment template will be considered once the related changes to Building Regulations are published.

Appendix 3 Further guidance

- Energy Assessment Guidance
- Circular Economy Statement Guidance
- 'Be Seen' Energy Monitoring Guidance
- BS EN 15978
- BS EN 15804
- RICS Professional Statement: Whole Life-Cycle Carbon Assessment for the Built Environment – 2017
- RIBA Guidance: Embodied and Whole Life-Cycle Carbon assessment for architects.
- CIBSE TM65 Embodied carbon in building services: A calculation methodology
- Targeting Zero: Embodied and Whole Life-Cycle Carbon explained – RIBA Publishing
- PAS 2080 – carbon management in infrastructure framework
- Advancing Net Zero; Net Zero Carbon Buildings: UKGBC
- Bringing embodied carbon upfront: World Green Building Council
- LETI Embodied Carbon Primer
- A full list of Historic England's technical guidance on energy efficiency and historic buildings can be found here: https://historicengland.org.uk/content/docs/advice/technical-conservation-guidance-and-research-brochure-pdf/

MAYOR OF LONDON

London Plan Guidance

Circular Economy Statements

March 2022

Copyright

Published by:
Greater London Authority
City Hall
Kamal Chunchie Way
London E16 1ZE

www.london.gov.uk
Enquiries 020 7983 4100
Minicom 020 7983 4458

ISBN 978-1-84781-735-8

Copies of this report are available
from www.london.gov.uk

Other formats and languages
For a large print, Braille, disc, sign language video or audio-tape version of this document, please contact us using the details above. You will need to supply your name, your postal address and state the format and title of the publication you require. If you would like a summary of this document in your language, please phone the number or contact us at the address above.

Table of contents

London Plan policy	Policy D3: optimising site capacity through the design-led approach; Policy SI 7: reducing waste and supporting the circular economy (CE); and Policy SI 2: minimising greenhouse gas emissions. This London Plan Guidance (LPG) should be read in conjunction with London Plan Policy SI 2: minimising greenhouse gas emissions and the Whole Life-Cycle Carbon Assessments LPG.
Planning application type	London Plan 2021 Policy SI 7(B) requires applications that are referred to the Mayor[1] to promote CE outcomes, and to aim to be net-zero-waste. All applications for referable development (outline, detailed and/or hybrid applications) are required to submit a CE statement. Local planning authorities may require CE statements for other development in local Plans or other Development Plan Documents.
Who is this guidance for?	Planning authorities, applicants, developers, architects, designers, consultants, engineers, contractors, building owners, operators and facilities managers.
Submitting CE statements	CE statements should be submitted at each stage to the GLA at: circulareconomystatements@london.gov.uk with an email subject line: Circular Economy statement for [insert planning reference].

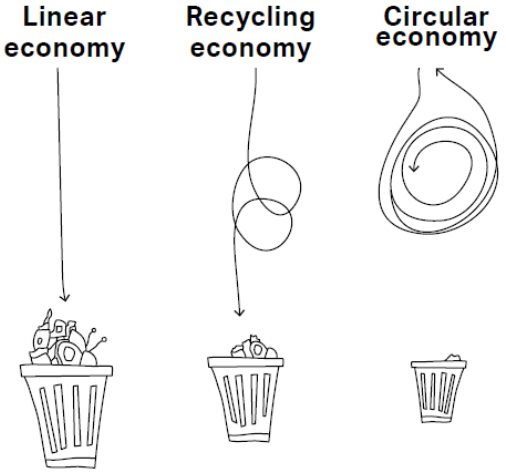
[1] As defined in the Town and Country Planning (Mayor of London) Order 2008. See www.london.gov.uk/what-we-do/planning/planning-applications-and-decisions/what-powers-does-mayor-have-planning-applications for more details.

1. About this document

1.1. What is the circular economy?

1.1.1. London Plan Policy SI 7 defines a circular economy (CE) as '…one where materials are retained in use at their highest value for as long as possible and are then reused or recycled, leaving a minimum of residual waste.' It is a move away from the current linear economic model, where materials are mined, manufactured, used and thrown away, as shown in Figure 1.

Figure 1: CE model, compared to the linear and recycling economies



FROM TAKE • MAKE • USE • DISCARD TO RE-MAKE • USE-AGAIN

Diagram courtesy of Circular Flanders

1.1.2. To demonstrate how this will be achieved, applicants are required to submit a CE statement.

1.1.3. This guidance explains how to prepare a CE statement to comply with Policy SI 7, including the information that must be submitted under Policy SI 7(B). It also includes guidance on how the design of new buildings, and prioritising the reuse and retrofit of existing structures, can promote CE outcomes.[2] Further, London Plan Policy D3 requires all development to aim for high sustainability standards, and to take into account the principles of the circular economy.

[2] The London Plan 2021 defines reuse as the:

'operation or process of checking, cleaning or repairing materials that have been discarded and are waste so that they can be used again for their original purpose as non-waste without any other pre-processing.'

Recycling is defined in the London Plan as involving:

'the reprocessing of waste, either into the same product or a different one. Many non-hazardous wastes such as paper, glass, cardboard, plastics and metals can be recycled. Hazardous wastes such as solvents can also be recycled by specialist companies, or by in-house equipment'.

1.1.4. How these concepts relate to the built environment is further explored in the Design for a Circular Economy Primer; and further information on applying CE principles to developments and good practice examples can be found on the GLA website.[3]

1.1.5. This section of the London Plan Guidance (LPG) sets out how CE principles, the concept of building in layers and appropriate design approaches should inform referable applications.

1.2 Relationship to other London Plan Guidance

1.2.1. There is a close relationship between this guidance and the Whole Life-Cycle Carbon (WLC) LPG [add link], which should be addressed as follows:[4]

- the same Bill of Materials should be used for CE and WLC assessments
- the promotion of CE outcomes should also reduce the WLC of the development (modules A-C of BS EN 15978), or provide additional benefits beyond the development's life (module D)[5]
- the end-of-life scenarios developed through the CE statement process should be used to inform the assumptions made in the WLC assessment (see sections 4.7.8, 4.7.9 and 4.8)
- design decisions should be informed by the principles and results of both studies
- the CE statement should cross-reference relevant parts of other documents submitted as part of the planning application.[6]

[3] Add link

[4] London Plan Policy SI 2(F) requires WLC assessments to be submitted as part of referable planning applications.

[5] BS EN 15978 and the RICS PS set out four stages in the life of a typical project, described as life-cycle modules:

- Module A1 – A5 (Product sourcing and construction stage)
- Module B1 – B7 (Use stage)
- Module C1 – C4 (End of life stage)
- Module D (Benefits and loads beyond the system boundary)

Refer to section 2.5 of the WLC assessment guidance for further information on the life-cycle modules.

[6] Such as the WLC assessment; Site Waste and Operational Waste Management (OWM) plans or similar; Design and Access Statements; Energy Statements; and other environmental or sustainability statements.

2. Applying the circular economy principles

2.1. Circular Economy principles

2.1.1. The six circular economy (CE) principles, which should be a fundamental part of the building design process, are:[7]

1. building in layers – ensuring that different parts of the building are accessible and can be maintained and replaced where necessary
2. designing out waste – ensuring that waste reduction is planned in from project inception to completion, including consideration of standardised components, modular build, and reuse of secondary products and materials
3. designing for longevity
4. designing for adaptability or flexibility
5. designing for disassembly
6. using systems, elements or materials that can be reused and recycled.

2.1.2. The principles support the application of the waste hierarchy[8] in that avoiding or reducing waste is prioritised.

2.2 Building in layers framework

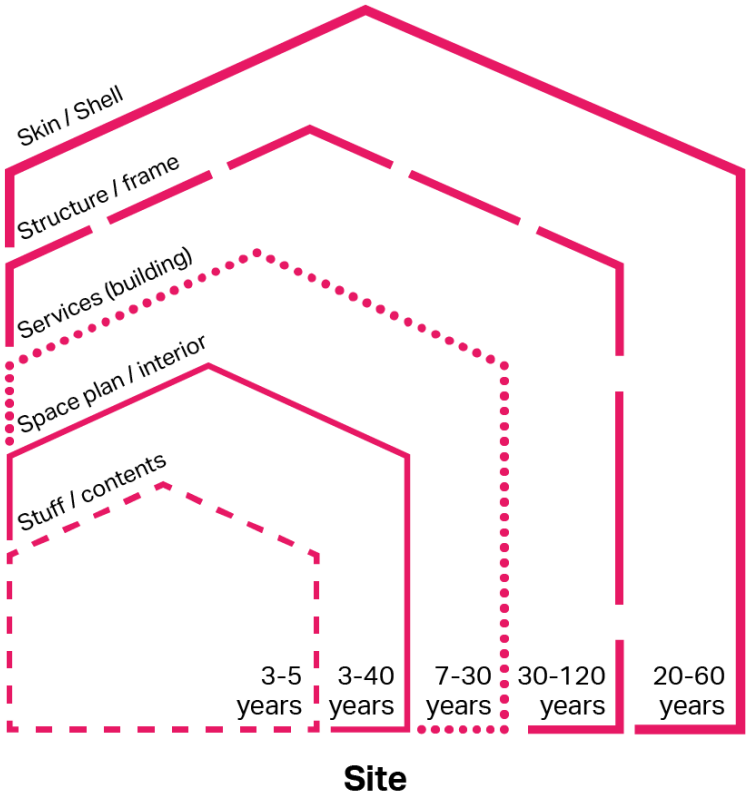
2.2.1. A useful way to understand a building or development is in terms of 'layers', where each layer has its own life cycle, life span, and relevant CE design approaches (see sections 3.4 – 3.6) and solutions as shown in Figure 2 below.[9]

2.2.2. To support reuse and recycling, the different layers should be independent, accessible and removable whilst maintaining their value, where possible. This is especially important for layers that may need more frequent replacement, such as building services and internal fit-outs.

2.2.3. CE design approaches will be applicable to each layer depending on its function and expected lifespan.

[7] Paragraph 3.3.10 of the London Plan.
[8] The waste hierarchy is described in DEFRA (2011) Guidance on applying the Waste Hierarchy.
[9] See Frank Duffy's 'Shearing Layers' concept described in Brand, S. (1994), *How Buildings Learn*.

Figure 2: Building layers and their indicative lifespans[10]



2.2.4. A standard list of layers is defined in Table 1 below, with reference to the Royal Institute of Chartered Surveyors (RICS) New Rules of Measurement (NRM) (2012)[11] building elements where relevant. The NRM building elements form the basis of CE statement reporting, particularly from outline application stage in the Bill of Materials.

Table 1: Building layer summary and equivalent building element/RICS reference

Building layer	Summary and constituent elements	RICS reference
Site	The geographical location, context, external works, earth works and landscaping.	NRM 8 – External works
Skin/shell e.g. façade	The layer keeping out water, wind, heat, cold, direct sunlight and noise. Includes exterior surfaces such as the roof, siding, sheathing and windows. This layer includes the façade (front or face of a building).	NRM 2.3, 2.5, 2.6 – Superstructure (roofs, external walls, windows

[10] The lifespans in Figure 2 are for illustration purposes and will be specific to each development.
[11] The RICS New Rules of Measurement 2012 classification system is a standard set of measurement rules and essential guidance for the cost management of construction projects and maintenance works.

	This layer often has biggest impact on long-term durability, occupant comfort and building-energy performance.	and external doors)
Structure/ structural frame/ superstructure	Load-bearing elements above plinth including roof-supporting structure. Generally, it is the longest-lasting building element. Insulation and services may be embedded here.	NRM 2.1, 2.2 and 2.4 and 7 – Frame, upper floors, stairs and ramps, work to existing building
Substructure	Excavations, foundations, basements and ground floors.	NRM 1 Substructure
Services (building)	Installations to ensure comfort, practicality, accessibility and safety, including plumbing, heating, cooling, ventilation and electrics. Distribution systems can be hard to change.	NRM 5 Services (MEP)
Space/space plan/interior/ interior space	The layout, internal walls and partitions, ceilings, floors, surface finishes, fixtures, doors, fitted furniture. Changeable without changing structure, services or skin.	NRM 2.7, 2.8 and NRM 3 (Finishes, superstructure – internal walls and partitions, internal doors)
Stuff/contents	Anything that could fall if the building was turned upside down. Not permanent, easily movable, most frequently changed by occupant, e.g., appliances, lamps, electronics, furniture, art.	Fittings, furnishings and equipment
Construction materials	Any temporary installations/works/materials, packaging and equipment.	NRM 0

2.3. Circular Economy design approaches

2.3.1. CE design approaches are set out in section 2.4 for sites that have buildings on site; and section 2.5 for sites that do not. These approaches support the implementation of the six CE principles. The design approaches should inform the initial land-use planning and design stage.

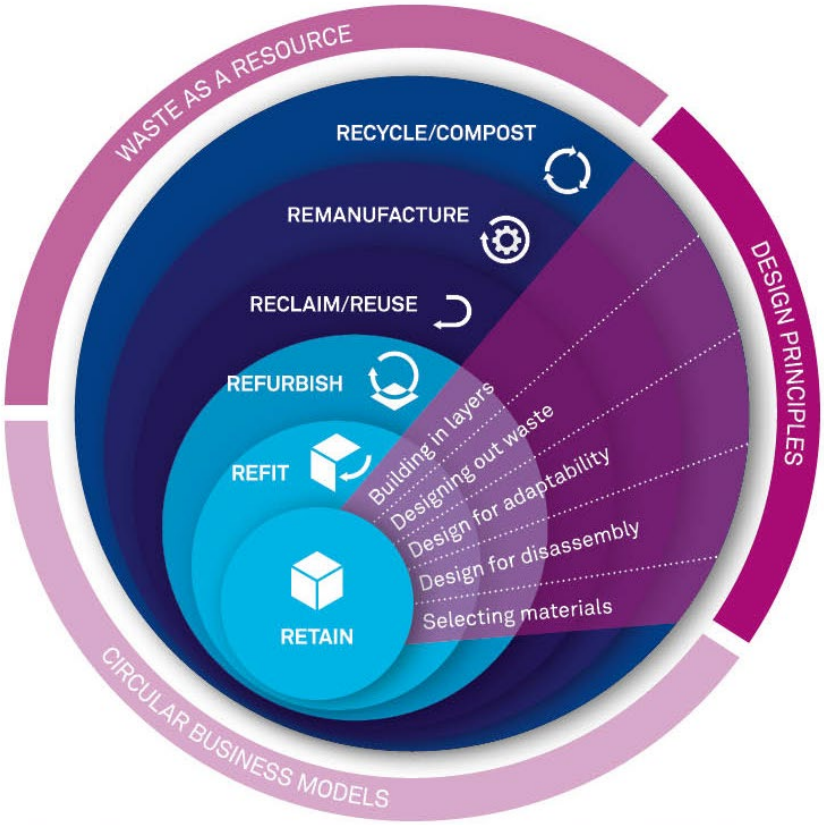
2.3.2. CE design approaches are not mutually exclusive. Multiple approaches are expected to be adopted for each project, development aspect, layers or uses, particularly for larger developments.

2.3.3. CE principles and design approaches should be applied to the whole development, including external spaces and structures and internal ancillary spaces.

2.3.4. Figure 3 sets out a hierarchy for building approaches that maximises the use of existing materials. Diminishing returns are gained by moving through the hierarchy outwards, working through refurbishment and reuse through to the

least preferable option of recycling materials produced by the building or demolition process. This provides an overall strategy for the redevelopment of buildings, with retention as the starting point. The decision trees in the following sections (Figures 4 and 5) expand on this, setting out a hierarchy of CE design approaches for development.

Figure 3: CE hierarchy for building approaches (from London Plan Policy D3 Figure 3.2)

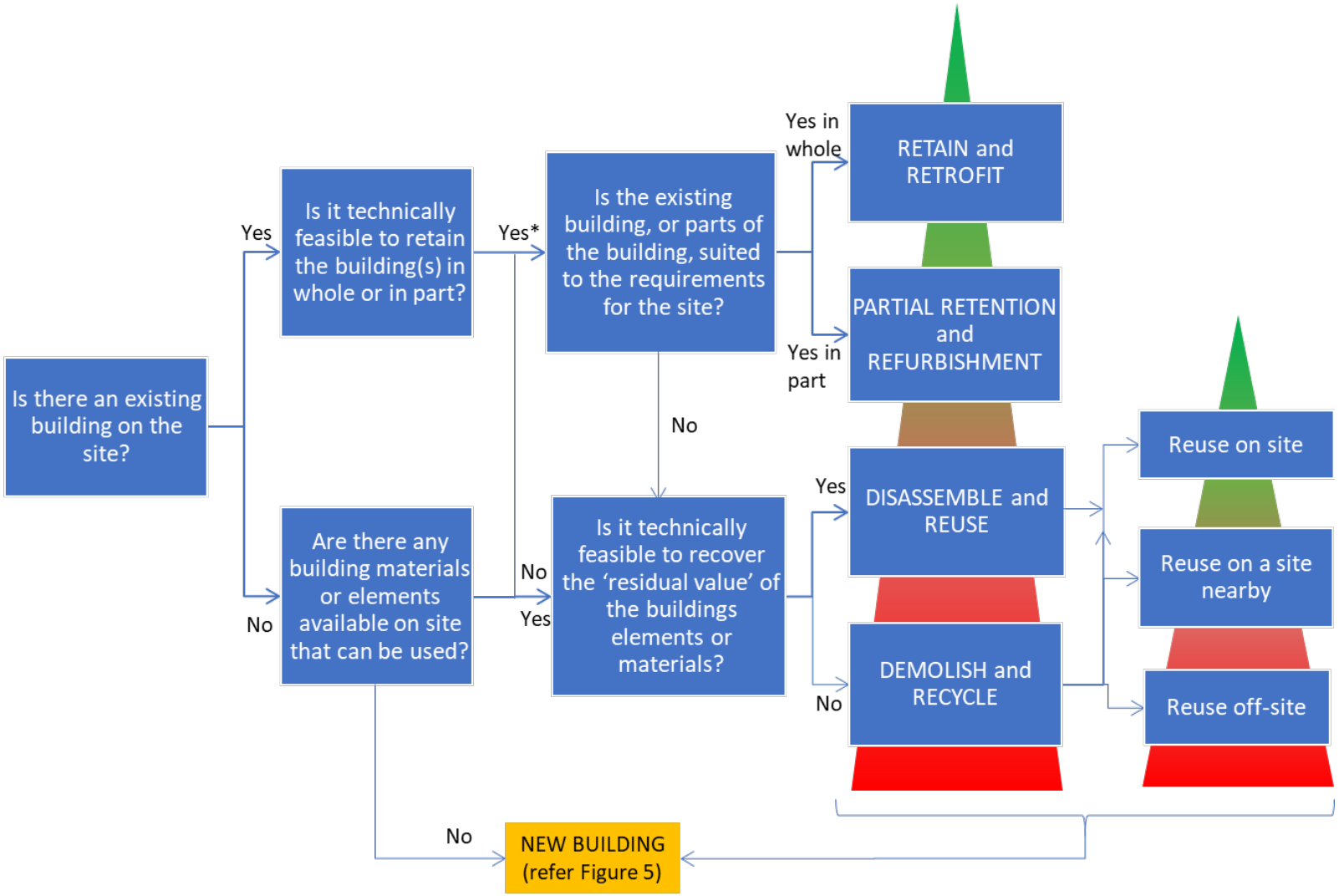


Source: Building Revolutions (2016), David Cheshire, RIBA Publishing ©

2.4. Circular Economy design approaches for existing buildings

2.4.1. The decision tree (Figure 4) should be followed to inform the design process for the development from the outset. It should be informed by the pre-redevelopment and pre-demolition audits where possible (see section 4.6 for more information) and WLC assessment, with the outcomes from these aligning.

Figure 4: Decision tree for design approaches for existing structures/buildings



* With exceptions, refer to paragraph 2.5.5 below.

Table 2: CE design approaches for existing structures

Existing structures approaches	Definition
Retain and retrofit	The vast majority of the building's fabric is retained, with the building refurbished for the same or new uses through restoring, refinishing and future-proofing. This also encompasses retrofitting, where new technology or features are added to existing buildings to make them more efficient and to reduce their environmental impacts.
Partial retention and refurbishment	Significant quantities of carbon-heavy aspects of the building are retained in place, such as the floors and substructure, with replacement of some elements of the building, such as walls or roofing. More significant refurbishment can involve adding floors or extensions.
Disassemble and reuse	Disassemble sections of a building and enable their direct reuse ideally on the site or, where this is not possible, off site (with nearby sites preferred). This approach also includes careful selective deconstruction of the building and material types i.e. taking apart each layer and material type as much as possible, minimising damage to parts and maintaining their value, and then reusing those elements and materials. If reuse is not possible, materials may be carefully and selectively separated for processing and recycling into new elements, materials and objects.
Demolish and recycle	Traditional demolition, with elements and materials processed into new elements, materials and objects for use on the site or on another site.

2.4.2. To follow the approach set out in London Plan Policy D3 (Figure 3.2), retaining existing built structures totally or partially should be prioritised before considering substantial demolition, as this is typically the lowest-carbon option.

2.4.3. The CE statement should set out the justification for whichever of the four approaches set out in Table 4, above, is being proposed for the development.[12] Proposals that are further down the hierarchy will require more detailed and compelling justification.

2.4.4. There may be other planning reasons that necessitate the demolition or retention of existing buildings, such as heritage considerations, which the process set out in Figure 4 cannot and does not override.

[12] This should go into the relevant 'circular economy design approaches' table, with further explanation in the pre-demolition audit.

2.4.5. When assessing whether existing buildings are suited to the requirements for the site, applicants should robustly explore the options for retaining existing buildings (either wholly or in part). Where disassembly or demolition is proposed, applicants should set out how the options for retaining and reconstructing existing buildings have been explored and discounted; and show that the proposed scheme would be a more environmentally sustainable development.

2.4.6. Local planning authorities should be involved in this process from an early stage, along with other stakeholders. A dialogue is strongly encouraged early on between CE statement authors and local planning authorities on the retention or demolition of existing buildings, and making the best use of land.

2.5. Circular Economy design approaches for new developments

2.5.1. All developments should be designed so that buildings can be adapted to extend their life. They should also be designed so they can be deconstructed and reconstructed to allow components and materials to be salvaged for reuse or recycling, whilst maintaining their economic and environmental value.

2.5.2. The appropriate design approach for new buildings and infrastructure, or new additions to existing buildings, should be informed by the decision tree in Figure 5 and the seven CE design approaches in Table 3. The decision tree should be applied for each aspect of a proposal.

Figure 5: Decision tree for design approaches for new buildings, infrastructure and layers over the lifetime of development

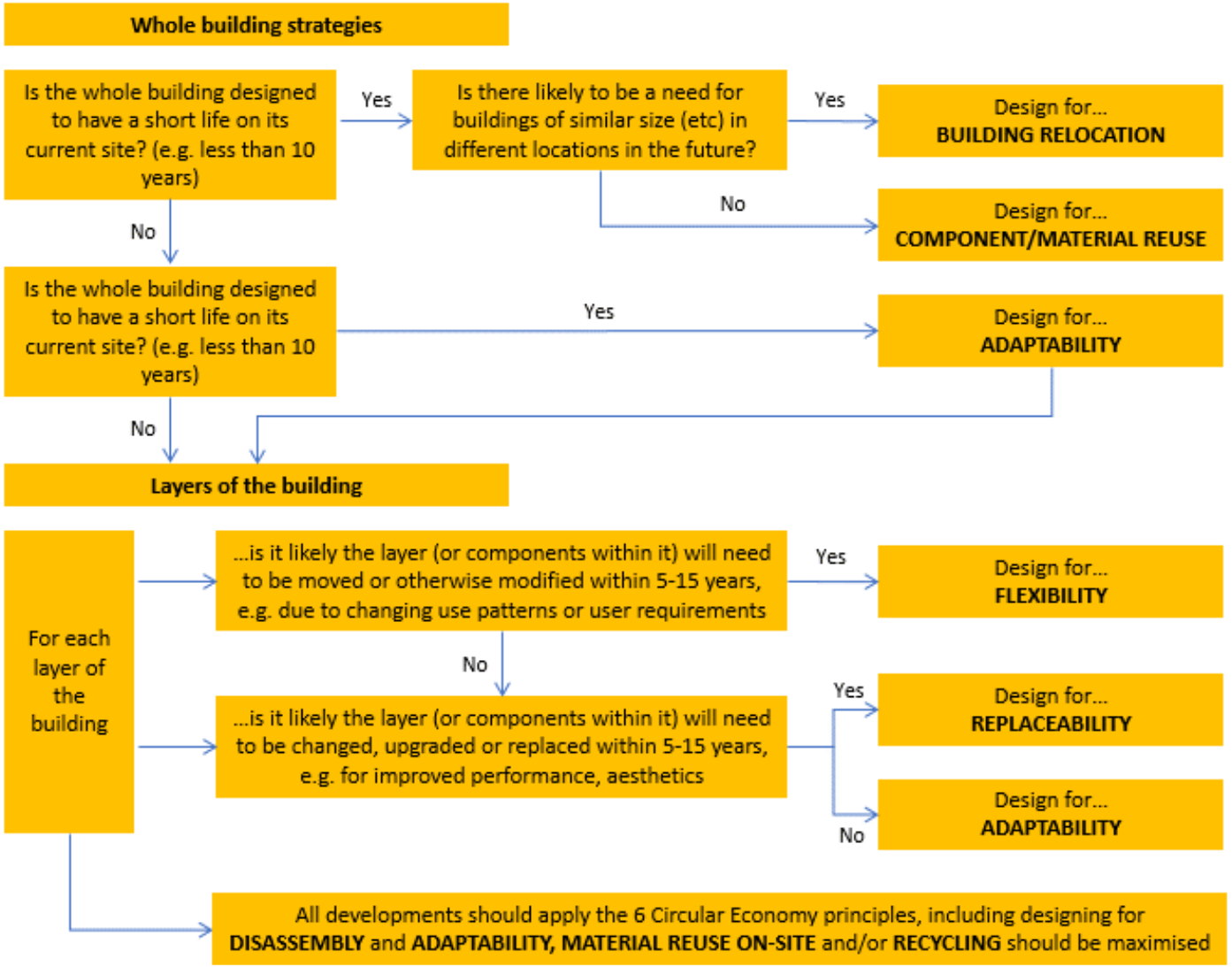


Table 3: CE design approaches for new buildings and definitions

New building CE design approaches	Definition
Building relocation	Designing to allow the whole building to be used on a different site, either by moving as a whole or disassembling into large modules.
Component or material reuse	The use of a product in its original form with minimal reprocessing. Preparation for reuse involves checking, cleaning or repairing materials so that they can be used again for their original purpose. Materials can be reused as a whole; redeployed as modules; or reused as a kit of parts on one or more different sites.
Adaptability	A building that has been designed with thought of how it might be easily altered to prolong its life, for instance by alteration, addition, or contraction, to suit new uses or patterns of use.[13] Often used interchangeably with flexibility; however, it relates more to building structural changes.
Flexibility	A building that has been designed to allow easy rearrangement of its internal fit-out and arrangement to suit the changing needs of occupants.[14] Often relates to floorplates rather than structural changes (see **Adaptability**).
Replaceability	Designing to facilitate easy removal and upgrade, and ideally to be reused, remanufactured or recycled on a part-by-part basis.
Disassembly	Designed to allow the building and its components to be taken apart with minimal damage to facilitate reuse or recycling. If designed well, it should be possible to replace any component.
Longevity	Designing to avoid a premature end of life for all components through considering maintenance and durability.

[13] Addis and Schouten (2004), *Design for deconstruction: Principles of design to facilitate reuse and recycling*
[14] Addis and Schouten (2004), *Design for deconstruction: Principles of design to facilitate reuse and recycling*

3. Circular Economy statement process

3.1. Requirements for Circular Economy statements

3.1.1. Planning applicants for proposals referred to the Mayor are required to submit a Circular Economy (CE) statement at the following stages:

- pre-application (where relevant)
- planning application submission (both outline and detailed)
- post-construction (i.e. upon commencement of RIBA Stage 6 and prior to the building being handed over, if applicable. Generally, it would be expected that the assessment would be received no more than three months post-construction).

3.1.2. Tables 4 and 5 outline the information required at each planning stage and the approaches recommended for pioneering CE statements (see section 3.4.3 and section 4). The Application Flowchart in Appendix 2 sets out the information and actions required at each stage of the planning process, and the roles and responsibilities of different stakeholders.

3.1.3. The CE statement must include two parts: a written report and the CE template spreadsheet.

3.1.4. Early collaboration between the people outlined in Table 4 can support CE outcomes being achieved and embedded. Compiling the required information is likely to need at least one workshop during the pre-application phase of the development between the people outlined in Table 4. Applicants are encouraged to set out how the CE workshop has informed the design of the development.

Table 4: People to involve at different stages

Requirement by application stage	Pre-application (suggested)	Outline application[15]	Full application/ reserved matters[16]	Post-construction
RIBA stages	0 – 2	0 – 2	2 – 3	4 – 7
Critical people to involve	• Planner • Developer • Design Team • Sustainability adviser	• Planner • Developer • Design Team • Sustainability adviser	• Developer • Design Team • Sustainability adviser	• Developer • Design Team • Contractor • Sub-contractors • Suppliers • Facility Manager • Waste operators
Other people to involve (desirable)	Construction Adviser or Contractor	Construction Adviser or Contractor	• Subcontractors • Suppliers • Facility Manager	Occupants/tenants

[15] Also applicable to the outline and detailed part of hybrid applications.
[16] Also applicable to the outline and detailed part of hybrid applications.

Table 5: Minimum submission requirements at different stages

Requirement by application stage	Pre-application (suggested)	Outline application[17]	Full application/ reserved matters[18]	Post-construction	Evidence in CES template spreadsheet
RIBA stages	0 – 2	0 – 2	2 – 3	4 – 7	N/A
Targets and commitments (see section 4.2)	Encouraged	Yes	Yes	Yes (Performance reported)	Yes
CE design approaches (see sections 3.4 – 3.6 and 4.3 – 4.4)	Yes	Yes	Yes	N/A	Yes
CE design principles	Yes	No	No	No	Yes
CE design principles by building layer	No	Yes	Yes	No	Yes
Pre-redevelopment audit (see section 4.6)[19]	Encouraged	Yes	Yes	N/A	No
Pre-demolition audit (see section 4.6)	Encouraged	Yes	Yes	N/A	No
Bill of materials (including calculations – see section 4.7)	No	Yes (Estimated)	Yes (Estimated)	Yes (Actual)	Yes
End of life strategy (see section 4.7)	No	No	Yes	Encouraged	No[20]
Operational waste management plan (see section 4.9)	No	No	Yes	Encouraged	No
Recycling and waste reporting (see section 4.10)	No	Yes (Estimated)	Yes (Estimated)	Yes (Actual)	Yes
Lessons learnt and key achievements (see section 4.11)	N/A	N/A	N/A	Yes	Yes

Outline, reserved matters, and hybrid applications

3.1.5. All building elements should be included in the CE statement. Less information will be available for outline planning applications and information may be high-level, with gaps (for example, specific materials and products

[17] Also applicable to the outline and detailed part of hybrid applications.
[18] Also applicable to the outline and detailed part of hybrid applications.
[19] Example of supporting evidence. Detailed technical studies or calculations underpinning the CE statement should be submitted as appendices at each stage. Further supporting evidence may be requested depending on the project to support the applicant's CE statement. This list is not exhaustive; the applicant should use their judgement as to what supporting information will be necessary to undertake an informed assessment of the CE statement.
[20] The End of Life strategy should be submitted in a separate written report. However, the Bill of Materials includes information that is relevant to the End of Life Strategy (for example, on designing for disassembly and end of life scenarios by material type).

may not be known). However, it is expected that information on certain materials will be available at outline stage, for example, based on experience from previous schemes, and to estimate costs. Applicants are expected to provide as much information as possible to ensure CE principles and targets are embedded early in the design process. Particularly important to include at outline stage are building layers or elements (see section 2.1) that are likely to be decided early on (for example site, structure and skin/shell) and which have the longest lifespans or will be changed less frequently.

3.1.6. A condition should be attached to an approval of a referable outline planning permission, securing the submission of a CE statement with each reserved matters application. Applications for reserved matters should review and address the information provided at outline stage and update any default values used as far as possible.

Roles and responsibilities

3.1.7. At planning application stage, it should be confirmed who will be providing the information at post-construction stage. Prior to planning permission being granted, it is the applicant's responsibility to ensure that the relevant people are aware of their responsibilities to provide information at different stages, and to ensure that the information is provided at each stage. Planning applicants should pass on the previous assessments to the developer and their contractors to allow for a smooth transition of responsibility. After planning permission is granted, it is the developer's responsibility to ensure that the correct information is provided at each stage (for example, at post-construction stage).

3.2. What should Circular Economy statements contain?

3.2.1. The CE statement consists of a written report and a spreadsheet, with the relevant tab(s) filled in at each stage.[21] Each tab contains a number of tables where information should be recorded.

3.2.2. Applicants should also submit an accompanying written narrative for aspects not captured in the spreadsheet (such as calculations, studies or other supporting evidence); or, where an achievement is not adequately captured by quantitative metrics, the applicant should highlight the achievement within the CE statement written report, explaining:

- how it reflects the objectives of London Plan 2021 policies relating to the CE (D3, SI 2 and SI 7)
- any other benefits, for example to occupants, neighbourhoods, and local authorities. These may be qualitative or quantitative but will need to be backed up by evidence (for example reports, calculations, or specification documents). Early engagement with stakeholders, ideally at pre-application stage, is encouraged, for example with boroughs (who may need to seek input from wider teams e.g., waste, design,

[21] INSERT LINK TO SPREADSHEET

environmental health), to ensure that the proposed benefits align with wider strategies or objectives.

3.2.3. Where the application consists of multiple buildings, and/or where different CE design approaches are being adopted or different targets are being set, this should be reflected in the in the Project Details table (number of use types, and floor area by use class/type must be provided). The spreadsheet should include details on different CE design approaches being adopted for different building parts, for example in the CE Design Approaches table in the phase/area/type column. The written report should explain the different approaches being adopted for different buildings or aspects, with reference to a site plan.

3.2.4. Any changes in design following the submission should be accounted for in the post-construction CE statement.

3.2.5. Appendix 3 sets out how the information required by different tables in the CE statement spreadsheet aligns with the requirements of Policy SI 7(B).

3.3. How should Circular Economy statements be submitted?

3.3.1. The CE statement should be submitted at each stage to the GLA at: circulareconomystatements@london.gov.uk. The subject line of the email should read: Circular Economy statement for [insert planning reference].

3.3.2. Post-construction CE statements and any associated evidence should be submitted upon commencement of RIBA Stage 6; and prior to the building being handed over and occupied, if applicable. Generally, it would be expected that the CE statement would be received three months post-construction and prior to the final occupation of the development. Details on how this can be secured are provided in section 5, below.

3.4. Level of ambition

3.4.1. CE statements, or elements of the statement, can be submitted as compliant or pioneering. To demonstrate the promotion of CE outcomes in line with Policy SI 7, all CE statements should aim to set out best practice, rather than recording business-as-usual activities.

3.4.2. A compliant CE statement is one that meets the requirements set out in Policy SI 7 and the requirements of this guidance.

3.4.3. To encourage innovation, and maximise the economic and environmental value of materials, developers are encouraged to go beyond the ‘compliant’ standard and demonstrate a ‘pioneering’ level of commitment to the CE by:

- showing **depth** – for example, by:

- exceeding the minimum policy requirements, or going above and beyond standard practice by setting higher targets than required by policy, including for building layers or elements[22]
- using innovative and creative techniques to refurbish and repurpose all existing buildings and structures on site
- including innovative and creative measures to reuse all or nearly all materials on-site
- investing in and testing experimental and innovative design approaches for building layers and elements

- showing **breadth** – for example, by setting additional targets (for example, by providing separate targets for reuse and recycling, and for on-site and/or local and off-site reuse), demonstrating that a broad range of measures have been investigated.:

3.4.4. 'Pioneering' statements should look beyond the technical challenges and analyse structural and other issues to be addressed to achieve significant CE goals. The use of circular business models as part of the construction and operation of the development, such as 'product as a service,'[23] are also strongly encouraged.

3.4.5. More detail on the options for pioneering statements for relevant elements of CE statements are provided in section 4.

[22] Best practice examples will be shared on the GLA website and via the ReLondon wiki page. Examples can also be found in footnote number 14

[23] As noted in the Mayor's Designing for a Circular Economy Primer, instead of an occupier owning carpets, for example, the carpets could be owned by the manufacturer and the occupier pays a rent for their use. The manufacturer would have an incentive to make the carpets last as long as possible and then recycle them.

4. Elements of Circular Economy statements

4.1 Overview

4.1.1. This section sets out what information needs to be submitted in each of the tables in the Circular Economy (CE) statement template spreadsheet. The requirements below demonstrate how to meet Policy SI 7(B).

4.2. Circular Economy targets

4.2.1. For all applications, applicants should complete the 'CE targets and commitments' table in the CE statement template spreadsheet in the relevant application stage tab.

4.2.2. In the table, applicants should outline the targets that they are committing to.[24] The London Plan Policy SI 7(A) targets should be set as a minimum level of compliance with that part of the policy. Applicants should provide an explanation for the target that they are committing to and how they intend to meet these targets and monitor performance, including the metrics to be used.

4.2.3. Policy SI 7 requires the management of excavation waste to be focused on-site or within local projects. Where partial or complete demolition is proposed, the materials already on-site should be reviewed for their potential retention and inclusion into the proposed scheme before off-site options are considered. To maximise the potential for the reuse of materials on-site, an area for the potential processing and storing of these materials should be identified on or close to the development site.

4.2.4. After on-site opportunities have been exhausted, applicants should refer to the London Waste Map[25] to consider opportunities for using local sites to manage materials and waste. Sourcing materials locally is also encouraged, particularly for reprocessed materials, to meet the Mayor's 100 per cent net waste self-sufficiency target by 2026[26] and to comply with Policy SI 10.[27]

Options for pioneering

4.2.5. For pioneering statements, targets by each building layer or element (see section 3.3) could be provided at pre-application, outline, and full application stages.

---

[24] All waste streams should be reported in tonnes, and targets should be presented as percentage by weight/tonnes. BREEAM Wst 01 credits expect reporting of the percentage of waste diverted by volume. Depending upon the waste stream type, this will not equate to the same percentage by tonnage. The BREEAM New Construction 2018 methodology (see point 4) shows the difference in metrics. Applicants that are targeting BREEAM Wst 01 credits are encouraged to demonstrate consistency in reporting.

[25] London Waste Map

[26] London Plan 2021 Policy SI 8: Waste capacity and net waste self-sufficiency

[27] London Plan 2021 Policy SI 10: Aggregates notes '…the best option is the use of local materials where feasible'.

4.2.6. Applicants are encouraged to go further than the London Plan Policy SI 7(A) targets, where possible – for example, by committing to percentages for reused materials on-site; separating reused and recycled targets; and committing to higher targets than that required by policy, for example, for recycled content.

4.3. Circular Economy design approaches

4.3.1. The six CE principles, and the decision tree in Figures 4 and 5, should inform the design of the development and be used to determine the design approaches adopted (see sections 3.1 to 3.6 for further details).

4.3.2. At pre-application, outline and full application stages, applicants should complete the CE design approaches table in the relevant tab of the CE statement template spreadsheet. Applicants should confirm which of the CE design approaches listed in the table are being adopted for the existing building and new development, and provide an explanation for the approach chosen.

4.3.3. Applicants should set out where they are retaining and refurbishing a building that might otherwise be demolished.

4.3.4. Where adaptability is selected as a design approach, information should be submitted showing how the building can be adapted for different uses.

4.4. Circular Economy design principles

4.4.1. At pre-application stage, applicants should demonstrate in the 'circular economy principles' table the CE principles that will be adopted (see section 3.3), with reasons explained.

4.4.2. Applicants should outline how the proposal will design out waste (in terms of how waste materials will be reduced, treated as a resource, and managed) at each module stage (see 1.2.3 for further details on life-cycle modules).

4.5. Circular Economy design principles by building layer

4.5.1. For all applications, applicants should complete the 'circular economy design principles by building layer' table.

4.5.2. Multiple CE design approaches will often be needed for each building layer or element.

4.5.3. This table should align with the two tables above – for example, if a commitment is shown to designing for replaceability, this should be reflected in this table, highlighting the building layers or elements that will be designed for replaceability. The metrics to be used to quantify or monitor performance should be included.

4.6. Pre-redevelopment audit and pre-demolition audit

4.6.1. Pre-redevelopment and pre-demolition audits are important tools to establish whether building components can be reclaimed and how any demolition materials will be managed.

Pre-redevelopment audit

4.6.2. A pre-redevelopment audit is a tool for understanding whether existing buildings, structures and materials can be retained, refurbished, or incorporated into the new development.[28] The audit should be carried out early on (at pre-application stage) and should inform the design.

4.6.3. If there are existing buildings on a site, a third-party, independently verified or peer-reviewed pre-redevelopment audit is strongly encouraged, including analysis that fully explores options for retaining existing structures, materials and the fabric of existing buildings into the new development; and the potential to refurbish buildings before considering substantial demolition.

4.6.4. Applicants should complete and submit a pre-redevelopment audit as supporting evidence to their CE statements, where a robust in-depth assessment has not already been completed.

4.6.5. Applicants should outline in a pre-redevelopment audit an explanation of the existing buildings on the site and brief description of state of their repair. Details should include: the building's age, key materials, photos of typical internal spaces and facades, and site plans.

Pre-demolition audit

4.6.6. A pre-demolition audit is a detailed inventory of the materials in the building that will need to be managed upon demolition.

4.6.7. At pre-application stage, applicants are strongly encouraged to submit an independent pre-demolition audit with all applications where demolition is proposed, as supporting evidence to their CE statement.

4.6.8. If substantial demolition is proposed, the pre-demolition audit should include the following core information:

- An explanation as to why it is proposed that the building(s) be demolished. Applicants should explain the different considerations for developing the site. This should go beyond simply saying that the buildings are of 'low quality'. Justification for demolition should be provided, in line with the approach set out in sections 2.5.5 and 2.5.6, above. An assessment of carbon impacts should be highlighted and, where relevant, the WLC assessment should be cross-referenced. It should be explained how any negative impacts resulting from demolition,

[28] A resource for developing pre-redevelopment audits can be found in Code of Practice: Pre-development audits, BRE, July 2017.

such as the loss of embodied carbon in existing buildings, would be mitigated and offset.

- A summary of the key components and materials present in the existing buildings, with an estimate of the quantities and associated embodied carbon and whether they are suitable for reclamation.

- An explanation and drawings that show the extent of the proposed demolition and whether any parts of the building are being considered for retention.

- Opportunities for reuse and recycling either within the proposed development or off-site nearby/locally or further afield.

4.6.9. Where possible, the following best practice information should also be included:

- how the value of existing building elements or materials can be recovered

- the amount of demolition waste (cross-reference the Recycling and Waste reporting table – refer to section 4.10 for further details)

- a schedule of practical and realistic providers who can act as brokers for each of the reclaimed items

- target reuse and reclamation rates.

4.6.10. An audit that simply lists out the likely waste arisings and the routes for treating those waste streams (i.e., crushing and shredding) is not suitable.

4.6.11. The audit should be undertaken by a third-party independent specialist with expertise in reclamation of components and materials and experience in preparing these types of reports.

4.6.12. Applicants should justify reasons for adopting less preferred approaches or moving down the hierarchy of CE design approaches in London Plan Figure 3.2, and the decision tree in Figures 4 and 5. Refer to sections 3.1–3.6 and 4.6.8 for further information.

4.6.13. In limited circumstances it may be appropriate to secure a pre-demolition audit by condition – for example, where there is limited demolition proposed.

4.7. Bill of Materials

4.7.1. London Plan Policy SI 7 (B)(2) requires CE statements to demonstrate how a development's material demands will be reduced and how building materials, components and products will be disassembled and reused at the end of their life.

4.7.2. Applicants should complete the Bill of Materials table in the CE statement template to demonstrate how material demands have been minimised and on-site reuse and recycling maximised.

4.7.3. Applicants should submit a draft Bill of Materials, based on estimated figures, at outline and full-planning-application stages.

4.7.4. The template will use this information to: automatically calculate the material and waste quantities throughout the building's life cycle; and calculate the intensity of these indices, where relevant, using the gross internal area (GIA). The table has links to the WLC assessment; consistent information should be used for both. Appendix 4 provides an overview of the information that should be provided, where this information must also be submitted for the WLC assessment, and the information that is automatically calculated in the CE template spreadsheet.

4.7.5. The building weight calculations used in calculating material intensity should be submitted in the written report accompanying the CE statement.

Recycled content

4.7.6. Applicants should identify opportunities for the use of reused or recycled materials; and aim for at least 20 per cent recycled or reused content, by value, for the whole building. This target requires both an estimate of the quantities of materials and the capital cost of that material. Appendix 4 provides an example of the recycled content by value calculation from previous guidance from the Waste and Resources Action Programme (WRAP); applicants may find this useful when calculating reused and recycled content by value in the Bill of Materials table.

4.7.7. In the Bill of Materials table, applicants will be expected to detail how each building element or material type contributes to achieving the recycled content target. When reporting by material type, calculations should focus on those with the highest economic and environmental value. If all materials cannot be accounted for in the calculation, the materials that make up at least 80 per cent of the cost (i.e., 80 per cent by value) should be accounted for.

4.7.8. Reused and recycled content calculations should be submitted as accompanying supporting evidence.

End-of-life scenarios

4.7.9. The Bill of Materials should include assumptions on the end-of-life scenarios for each building element or material. Based on the approaches adopted and how the building and its elements have been designed to facilitate reuse or recycling, an end-of-life scenario should be described. For example, 'assumed 90 per cent reusable', 10 per cent 'business as usual (BAU)'.

4.7.10. For any buildings or elements where, after careful consideration, there is no potential to reuse or recycle, and no specific design changes have been

made to influence the recoverability of the materials, then the end-of-life scenario should be assumed to be 'BAU', using the industry average reuse, recycling, other recovery and disposal rates.[29]

4.7.11. The written report element of the CE statement should also set out an end-of-life strategy for the development, including how this will be communicated to future building owners, managers and occupiers; and how the building information will be stored, for example, by using Building Information Modelling or material passporting during the building's life to facilitate disassembly and identify any key challenges. This will support the recovery of components and materials at the end of the life of the building.

Options for pioneering

4.7.12. A Pioneering Bill of Materials could include:

- reused and recycled content by value (percentage)
- additional targets for specific parts of the building(s)
- separate targets for the minimum amounts of reused materials.

4.7.13. Environmental Product Declarations offer supporting evidence of recycled content, healthy materials, renewable energy used in the manufacturing process, etc.

4.7.14. A pioneering end-of-life strategy could include, for example, a disassembly plan for each building element or layer; or the specification of materials and products that have been specifically designed for disassembly, or are certified as having met circularity criteria such as C2C certification.

Post-construction-stage reporting

4.7.15. Post-construction, an update to the Bill of Materials should be provided based on actual materials used. There will need to be engagement with all parties, including interior designers, suppliers and occupants to collate as-built information and compare against the design-stage assessment, confirming whether targets have been met.

4.7.16. At post-construction stage, developers are encouraged to submit an updated end-of-life strategy. In addition to updating the relevant sections of the planning stage submission, it could also include:

- full as-built drawings
- details of how the building can be disassembled (a deconstruction plan)

[29] For further information, see section 3.5.4 and table 10 (page 25) of the RICS guidance, Whole life carbon assessment for the built environment (November 2017), or any update. OneClick software uses default end-of-life scenarios.

- manufacturers' warranties, details, and any opportunities to return to manufacturer.

4.8. Operational waste management plan

4.8.1. An operational waste management (OWM) plan should be submitted in the written report/appendix to CE statements to demonstrate that the proposed development will: achieve the relevant targets (depending on the operational activity) set out in London Plan Policy SI 7;[30] and include shared, adequate, flexible, and easily accessible storage space and collection systems, as required by London Plan policies D3, SI 7 and D6. Applicants should also note that both the 65 per cent municipal waste recycling target by 2030 (as required in London Plan Policy SI 7 and London Environment Strategy Policy 7.2.2) and 75 per cent minimum target for business waste recycling by 2030 (as required by London Environment Strategy Policy 7.2.2) may apply depending on the nature of the operations of the building.

4.8.2. At planning application stage, applicants can submit a draft OWM plan, since some waste information may be estimates as the proposed land uses may not be known at this stage – for example, where the final end use is not defined. The OWM plan should demonstrate:

- how much operational and municipal waste the proposed development (resulting from occupants) is expected to generate (where the final land use is not known, some scenarios for potential land uses should be provided)[31]
- how and where (on-site versus offsite) operational waste will be managed in accordance with the waste hierarchy
- that the proposed development has adequate, flexible, easily accessible and shared storage space and collection systems
- that the proposed development supports the separate collection of dry recyclables (at least card, paper, mixed plastics, metals and glass), food waste and other waste.
- how operational performance will be monitored and reported
- that measures such as consolidated, smart logistics and community-led waste minimisation schemes have been explored.

[30] See London Plan Policy SI 7 (A) parts 3-5.
[31] London Plan SI 7 A(4) footnote 163 notes:

'Based on the EU definition of municipal waste being household waste and other waste similar in composition to household waste. This includes business waste collected by local authorities and by the private sector.'

4.8.3. The Site Waste or Resource Management Plan(s) and OWM plan should refer to relevant aspects of the Recycling and Waste reporting table (see section 4.10) and the estimates provided should align.

Options for pioneering

4.8.4. A pioneering OWM plan could include the following:

- A Reuse, Recycling and Waste plan and summary, which covers the five different stages of recycling and waste management: occupier separation; occupier deposit points and storage; collection method; servicing (removal/on-site treatment method); end destination; and ongoing monitoring (see Tower Hamlets Supplementary Planning Document p75-76 for a template and p80-83 for an example).

- A Communications Plan detailing how all occupants across the site will be helped to access and use deposit points to reduce, reuse and recycle as much waste as possible. This Communications Plan will include information on how, when and where occupiers should store and deposit recyclables and dispose of waste; what resources and information will be made available (e.g., clear signage, printed and online noticeboards, in-home storage, resident induction); and how the sharing and reuse of materials could be promoted.[32]

- An Operations and Maintenance Plan that outlines how on-site systems will be monitored and maintained during the expected life of the development, including parties responsible for maintenance and management of the systems, on-site operations and maintenance, and resident engagement.

- Evidence that the different parties are aware of their responsibilities.

Post-construction-stage reporting

4.8.5. At post-construction stage, developers are encouraged to submit a final OWM plan with updated information. This could indicate how the OWM plan will be updated on an ongoing basis and/or how the building owner (if different) has been involved in developing the plan.

4.9. Recycling and waste reporting

4.9.1. London Plan Policy SI 7(B) includes a requirement for CE statements to demonstrate:

- how all materials arising from demolition and remediation works will be reused and/or recycled

[32] For information on writing Communication Plans, see ReLondon's guidance Making recycling work for people in flats and Toolkit for the Flats Recycling Package (January 2020).

- opportunities for managing as much waste as possible on site
- how much waste the proposal is expected to generate
- how and where the waste will be managed in accordance with the waste hierarchy.

4.9.2. To comply with London Plan Policy SI 7(B), applicants should complete the Recycling and Waste reporting table in the CE statement template at outline and full planning application stages for module stages A to C (refer to 1.2.3).

4.9.3. In terms of where waste will be managed, applicants should distinguish between onsite versus offsite.

4.9.4. Where a site is large enough, applicants should set out in the supporting evidence (such as the pre-demolition audit) where waste materials arising will be sorted or treated during each phase to maximise the potential for the reuse of materials on-site. For the use stage (Module B – refer to 1.2.3), the location of bin storage should be highlighted.

4.9.5. The Recycling and Waste Reporting table should contain:

- the overall/total amount of non-hazardous/contaminated waste material arising (tonnes) for excavation, demolition and construction (report separately); if contamination is present, indicate the amount
- non-contaminated material reused on-site (percentage), recycled on-site (percentage), reused off site (percentage) and recycled off-site (percentage)
- landfill amount (percentage)
- recovery amount (percentage)
- clearly defined targets that, as a minimum, meet London Plan policy targets:[33]
    - 95 per cent reuse/recycling/recovery of construction and demolition waste
    - 95 per cent beneficial use of excavation waste[34]

[33] London Plan Policy SI 7 Reducing waste and supporting the CE.
[34] The stricter definition of 'landfill' post-*Methley Quarry* judgment, and recent changes to the regulatory regime for excavated materials, mean some permitted sites that are defined as 'landfill' by the Environment Agency can be included in the definition of 'beneficial use' by the GLA. The developer should explain in detail why a proposed site may be regarded as 'beneficial' in these circumstances. Every effort should then be made to use the material in other innovative ways, and to find markets for the products produced from it, in accordance with the waste hierarchy, without causing harmful impacts on the natural environment.

- 65 per cent recycling of municipal waste by 2030.

4.9.6. In line with London Plan Policy SI 7 (paragraph 9.7.10), where there are no reasonable alternative options but to send waste to landfill, applicants are strongly encouraged to submit evidence to the GLA that all receiving waste handling or landfill facilities have the capacity to deal with the waste over the lifetime of the development.[35] This information may be made available through the London Datastore to help plan for future needs.

4.9.7. The reporting of the final destination of all waste streams (beyond the Materials Recycling Facility) should be provided as soon as possible once a contractor has been appointed.[36] If this information is not available at application stage, the LPA should consider securing this by condition. The table should be updated with the relevant information once the contractors have been appointed.

4.9.8. During construction, applicants should record the source of all waste arising and monitor using a waste management tool (such as SmartWaste). The end-of-life (and next-life) plan for the elements of the building should be provided with a calculation of the percentages of waste that can be reused or recycled at end of life.

4.9.9. At outline and full planning application stages, estimates should be provided for:

- total waste arising for key streams (tonnes) (for demolition/strip-out, it should be the quantities of waste arising during the replacement and repair of parts of the building)
- percentage reuse on-site
- percentage recycled or composted on-site
- percentage reuse off-site
- percentage recycle or composted off-site
- percentage to landfill
- percentage to recovery

[35] The UK Department for Environment, Food & Rural Affairs Waste Duty of Care Code of Practice (2018) states:

'You have a responsibility to take all reasonable steps to ensure that when you transfer waste to another waste holder that the waste is managed correctly throughout its complete journey to disposal or recovery.'

[36] London Plan Policy SI 7 Reducing waste and supporting the CE, paragraph 9.7.5

- for demolition/strip-out and construction, description of design measures to reduce the likely waste arising (to be submitted in supporting document).

4.9.10. Estimates should align with the Site Waste or Resource Management Plan(s). The waste arising for key streams (t/m^2 GIA) will be automatically calculated in the template. Applicants should submit excavation waste or cut and fill calculations in the written report/appendix accompanying the CE statement.

Options for pioneering

4.9.11. Applicants are encouraged to go further than meeting the London Plan policy SI 7(A) targets, where possible. For example, by committing to percentages for reused materials on-site, setting higher recycled content targets (for example, above 20 per cent for the whole building and/or for individual layers or elements), separating reused and recycled targets, and committing to higher targets than required by policy.

4.9.12. To evidence pioneering measures, applicants could submit as evidence product Material Circularity Index values and supporting information.[37]

Post-construction-stage reporting

4.9.13. Post-construction, an update to the Recycling and Waste reporting table should be provided based on actual (demolition, construction, excavation, municipal and industrial) materials handled; and actual amounts and destinations for reused and recycled materials, materials sent to landfill, and materials sent to other management (for example, figures from recycling facilities by recycling percentage). The final destinations of all waste streams (beyond the Materials Recycling Facility) should be provided in a supporting document. It should be confirmed that the ultimate receiver of material (for example another site) had capacity to deal with the waste.

4.10. Lessons learned and key achievements

Post-construction-stage reporting

4.10.1 At post-construction stage, applicants should complete the 'key achievements' and 'lessons learnt' tables. This should:

- highlight actual performance against quantitative and qualitative targets/commitments
- describe reasons for any differences

[37] The Material Circularity Index gives an indication of the raw material used in a product. The more a product contains recycled or reused materials and the less waste is used the higher the circularity index becomes.

- share key learnings that could inform best practice in the future. Lessons learned should include what went well or better than expected, what went wrong, and what could be done differently in the future.

Options for pioneering

4.10.2 Analysis could be included of structural issues that have to be addressed to achieve significant CE goals, and ideas or suggested solutions provided.

5. Monitoring

5.1.1. To enable transparency of information and monitoring, post-construction reports and any appendices will be made available to the public through the London Datastore.

Securing post-construction reports

5.1.2. The submission of a post-construction report should be secured by local planning authorities (LPAs) either by condition or obligation. As the LPA approves the discharge of conditions and obligations, it is responsible for verifying that reports have been received for referable applications; and for submitting these to the GLA for review.

5.1.3. Suggested wording for securing post-construction monitoring reports is available on the GLA's website.[38] This wording may be adapted over time to improve the submission process and ensure it is robust.

5.1.4. LPAs are free to adapt this wording and/or the mechanisms for securing post-construction monitoring reports, provided that these are always submitted to the GLA for referable applications.

5.1.5. LPAs should check reports to confirm that the minimum information requirements set out in Tables 1 and 2 (see sections 3.2 and 3.3) have been met before approving any conditions or obligations.

[38] Link to be added

Appendix 1: Analysis of data collected to date for key Circular Economy statement metrics

Table 1 below provides the results of an analysis of the data collected for all Circular Economy (CE) statements submitted up to and including January 2022. The table shows the upper, median and lower quartile figures for all key CE metrics, along with the sample size for each metric. This data can be used for comparison and it is expected that applications will tend towards the median and lower quartile figures in the future.

Table 1. CE statements: valid data from applications reviewed 2020-22

Metric		Upper quartile	Median	Lower quartile	Sample size	Notes (if needed)
Demolition waste arisings (**tonnes**/m^2 GIA)		0.958	0.480	0.138	48	
Excavation waste arisings (**tonnes**/m^2 GIA)		0.770	0.410	0.150	47	
Construction waste arisings (**tonnes**/m^2 GIA)		0.113	0.093	0.065	56	
Municipal waste (**tonnes**/m^2 GIA) (annum)		0.080	0.031	0.014	31	
Kg/m^2 for each element	Foundations	907.73	572.5	222.51	77	
	Frame	368.89	208.04	92.38	70	
	Upper floors	702.27	542.33	294.75	72	
	Roof	77.09	42.37	17.52	63	
	Fabric	192.48	102.00	42.29	78	
	Partition	118.37	60.22	18.05	75	

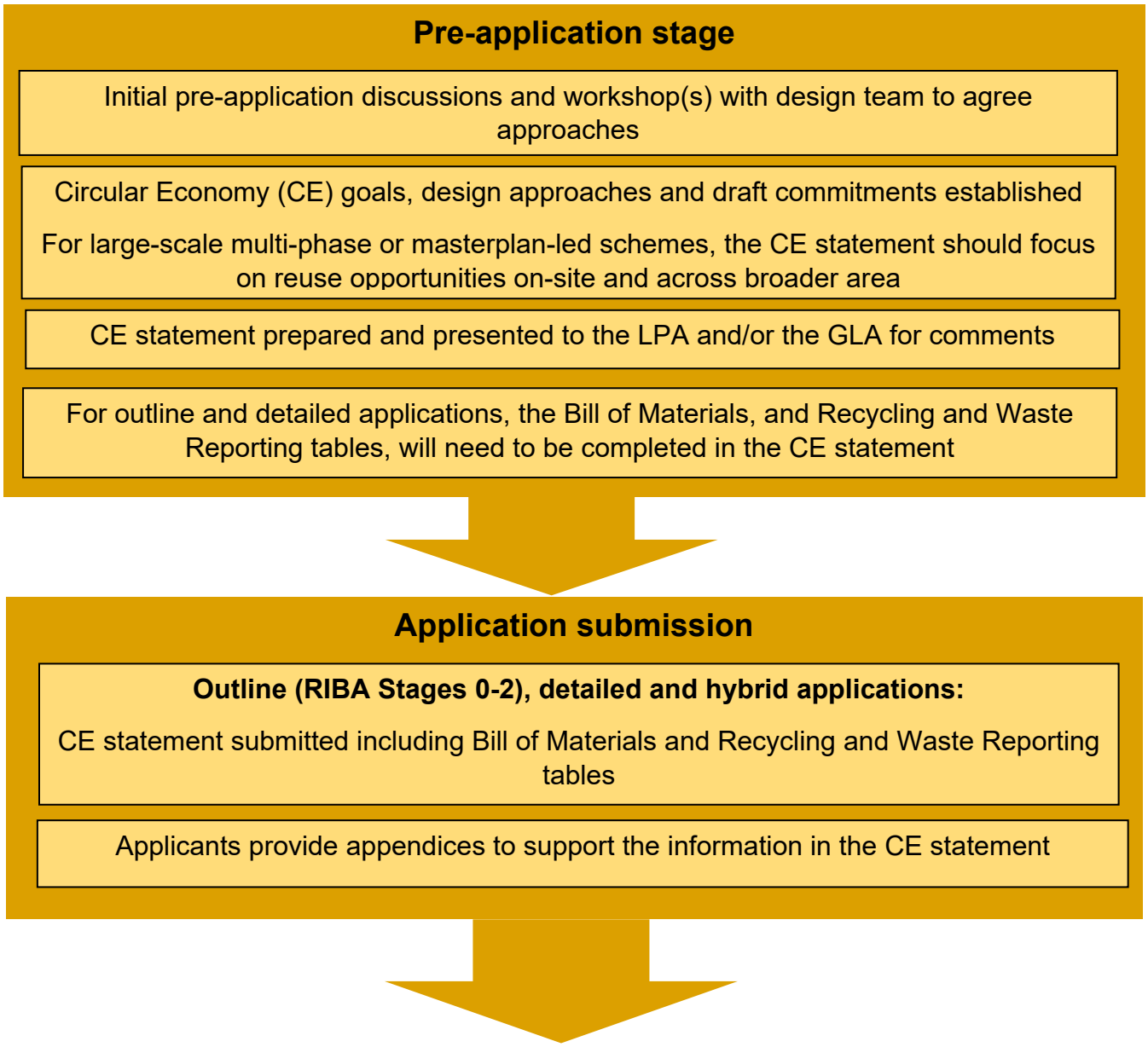
Table 2. BREEAM construction waste benchmarks

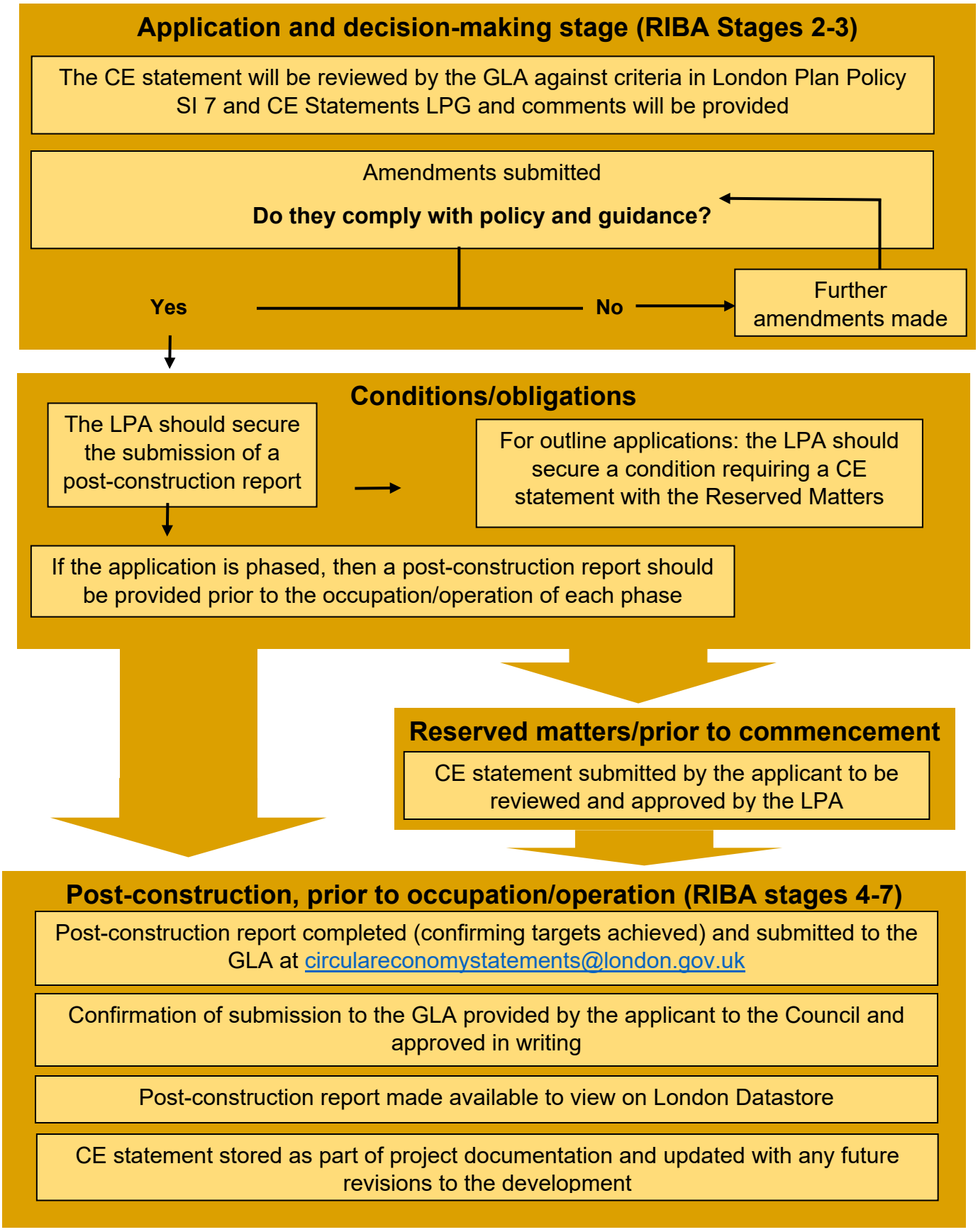
BREEAM credit	
No. of credits	Tonnes/m^2
1	≤ 0.110
2	≤ 0.065
3	≤ 0.032
Exemplary	≤ 0.019

Table 3. Home Quality Mark (HQM) construction waste benchmarks

HQM credit allocation	
No. of credits	Tonnes/m^2
2	≤ 0.085
4	≤ 0.049
6	≤ 0.029
8	≤ 0.019

Appendix 2: Application flowchart




Application and decision-making stage (RIBA Stages 2-3)
The CE statement will be reviewed by the GLA against criteria in London Plan Policy SI 7 and CE Statements LPG and comments will be provided
Amendments submitted
Do they comply with policy and guidance?
Yes
No
Further amendments made
Conditions/obligations
The LPA should secure the submission of a post-construction report
For outline applications: the LPA should secure a condition requiring a CE statement with the Reserved Matters
If the application is phased, then a post-construction report should be provided prior to the occupation/operation of each phase
Reserved matters/prior to commencement
CE statement submitted by the applicant to be reviewed and approved by the LPA
Post-construction, prior to occupation/operation (RIBA stages 4-7)
Post-construction report completed (confirming targets achieved) and submitted to the GLA at circulareconomystatements@london.gov.uk
Confirmation of submission to the GLA provided by the applicant to the Council and approved in writing
Post-construction report made available to view on London Datastore
CE statement stored as part of project documentation and updated with any future revisions to the development

Appendix 3: Essential elements of CE statements

CE statement requirement from Policy SI 7(B)	How this should be demonstrated
How all materials arising from demolition and remediation works will be reused and/or recycled.	Pre-demolition audit (see section 4.6)* Recycling and waste reporting, targeting 100 per cent reuse or recycling (see section 4.10)
How the proposal's design and construction will reduce material demands and enable building materials, components and products to be disassembled and reused at the end of their useful life.	CE design approaches (see sections 3.4 – 3.6 and 4.3) Bill of Materials (see section 4.7) End-of-life strategy (see section 4.8)* CE design principles (see section 4.4) CE design principles by building layer (see section 4.5) Targets and commitments (see section 4.2)
Opportunities for managing as much demolition, excavation, construction, and operation waste as possible on-site.	Pre-demolition audit (see section 4.6)* Bill of Materials targeting recycled and reused content (see section 4.7) Recycling and waste reporting maximising on-site management (see section 4.10)
Adequate and easily accessible storage space and collection systems to support recycling and reuse during operation.	Operational waste management plan (see section 4.9)*
How much waste the demolition, construction and operation phase of the proposal is expected to generate, and how and where the waste will be managed in accordance with the waste hierarchy.	Recycling and waste reporting (see section 4.10) Operational waste management plan (see section 4.9)*
How performance will be monitored and reported, during the demolition, excavation, construction, and operation phases.	Targets and commitments (see section 4.2) Operational waste management plan (see section 4.9)*

* To be submitted in separate written report

Appendix 4: Recycled content by value example calculation

Recycled content by value is a function of the material value of a component, the quantity used and the percentage of the component by mass that is derived from recycled content. Thus, if a material costs £100 per m2 and has 20 per cent recycled content by mass, the recycled content by value of 10m2 would be:

£100 (per m2) x 10 (m2) x 20 per cent = £200

By summing the recycled content by value of all the components of a building and dividing this by the total material value of all the components in the building, it is possible to estimate the total percentage recycled content by value for the building, or for an element (or layer) of the building.

Table 4 below (an extract from previous WRAP guidance[39]) provides an example of how recycled content by value would be calculated for a whole building.

Table 4: Recycled content by value example calculation

Component	Quantity	Material rate (excluding labour)	Material value	Recycled content by mass	Recycled content by value
Bricks	2,000	£250/1000	£500	15%	£75
Dense blocks	50m^2	£8/m^2	£400	50%	£200
Plasterboard	50m^2	£2/m^2	£100	80%	£80
Insulation	20m^2	£10/m^2	£200	80%	£160
Type I fill*	100m^3	£10/m^3	£1,000	100%*	£1000
Other items			£2,000	0%	£0
Total (£)			£4,200		£1,515
Total (%)					36% (£1,515/£4,200)
Note * in this example, the Type I fill used in the project is from reused demolition waste; it is therefore considered to be 100% 'recycled' and its cost is taken as being equal to the purchase price of an equivalent quantity of product from the open market. (units and prices are purely illustrative).					

[39] Delivering Higher Recycled Content in Construction Projects – Guidance for clients, design teams and contractors (September 2009).

GLA Planning

Whole Life-Cycle Carbon Assessments LPG

Consultation summary report

March 2022

Copyright

For more information about this document, please contact:

The London Plan Team, GLA Planning

Greater London Authority

City Hall

Kamal Chunchie Way,

London E16 1ZE

www.london.gov.uk

Tel 020 7983 4100 OR 020 7983 4000

Email planningsupport@london.gov.uk

Minicom 020 7983 4458

Other formats and languages

For a large print, Braille, disc, sign language video or audio-tape version of this document, please contact us using the details above.

You will need to supply your name, your postal address and state the format and title of the publication you require.

If you would like a summary of this document in your language, please phone the number or contact us at the address above.

Table of contents

1. Introduction

On 19 October 2020, the Greater London Authority (GLA) launched a consultation on the Mayor's draft Whole Life-Cycle Carbon (WLC) Assessment London Plan Guidance (LPG) and WLC assessment template. The consultation closed on 15th January 2021. An online seminar was held during the consultation, attended by 243 people.

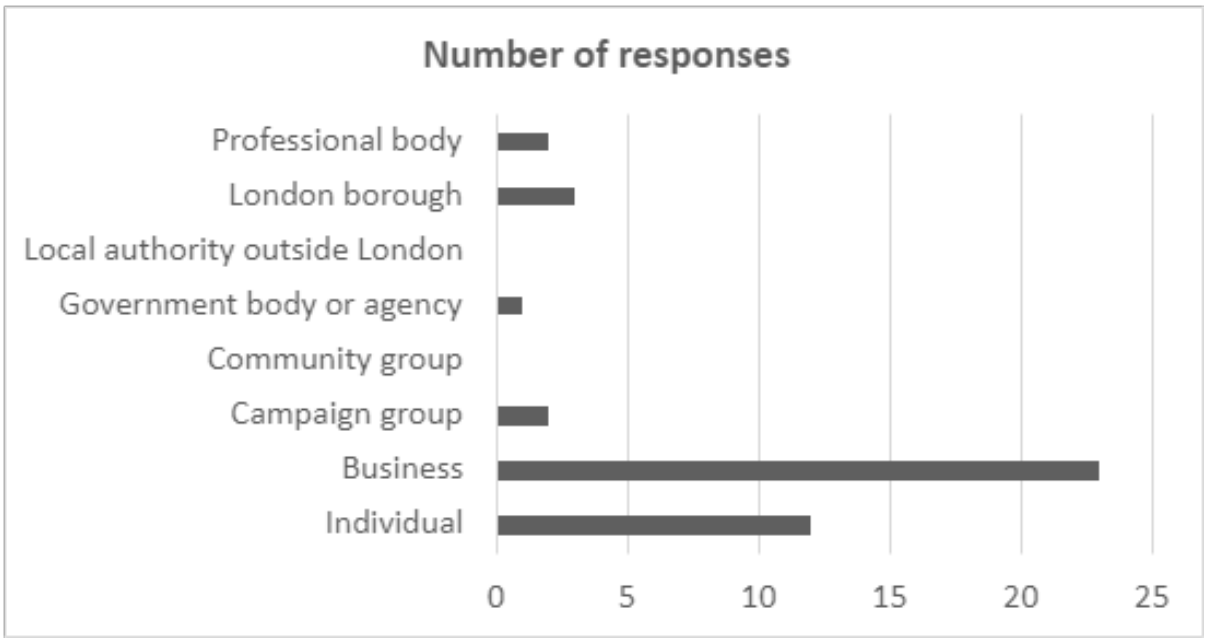
Fifty written responses were received. This document provides a summary of the consultation responses received. The Mayor would like to thank everyone who took part for engaging with the guidance.

2. Who took part?

Formal consultation survey

Respondents were asked what type of organisation they represent or whether they were responding as an individual. Forty-three respondents answered this question.

Respondent type	Number	Percentage
Individual	12	28%
Business	23	54%
Campaign group	2	5%
Community group	-	-
Government body or agency	1	2%
Local authority outside London	-	-
London borough	3	7%
Professional body	2	5%
Total	**43**	



Respondents were also asked equality monitoring information in order to assess how representative survey respondents were compared to the demographics of Londoners. The number of responses received on those questions was limited and therefore the relevant analysis has not been included in this consultation summary report.

Other engagement

Other engagement was undertaken prior to the formal consultation, including:

- Technical meetings with London boroughs
- Technical meetings with industry representatives
- A technical seminar with Planning Inspectors and members of the public

Equality monitoring information was not collected for these engagements.

3. Consultation feedback and GLA response

As part of the engagement on the draft guidance, respondents to the formal consultation survey were asked to submit responses to specific questions, which are summarised here.

This section also includes responses through the **other engagement channels** noted above. However, the key issues that arose from these were also raised in response to the formal consultation survey so, to avoid repetition, **are marked with a *** within this report.

3.1. Overall approach

Q1 To what extent do you agree or disagree with the approach set out in the draft guidance?

Forty-three respondents answered this question. Eighty-six per cent agreed with the approach set out in the guidance and eleven per cent somewhat or strongly disagreed.

Response	Number	Percentage
Strongly agree	19	44%
Somewhat agree	18	42%
Neither agree or disagree	1	2%
Somewhat disagree	4	9%
Strongly disagree	1	2%
Total	**43**	

3.2. Process and methodology

Q2 To what extent do you agree or disagree that the process and methodology in the guidance is clear?

Forty-three respondents answered this question. Seventy-nine per cent agreed with the process and methodology and fourteen per cent somewhat disagreed.

Response	Number	Percentage
Strongly agree	8	19%
Somewhat agree	26	60%
Neither agree or disagree	3	7%
Somewhat disagree	6	14%
Strongly disagree	0	0%
Total	**43**	

Q3 Please tell us if you have any comments on the process and methodology and/or if you have any suggestions for how this could be improved.

Thirty-six respondents provided comments. Respondents suggested that:

- More guidance is needed on the best available data sources, particularly when Environmental Product Declarations (EPDs) are not available.
- There is a lack of data available for mechanical, electrical and plumbing engineering (MEP) products, but CIBSE's TM65 document provides a consistent approach that the guidance should reference.
- Refurbishment, instead of new construction, should be prioritised where it is appropriate by including the carbon emissions from pre-construction demolition in the assessment, as well as the carbon savings from the retention of existing buildings, structures and materials.*
- Standardised assumptions for the life-cycle modules with a lower carbon impact – for example, modules B2 and B3, should be provided in the guidance, allowing applicants to focus attention on modules with a higher carbon impact.
- Clarity is needed on the scope of assessment for shell only and shell and core buildings, including the scope of fixtures and fittings and services that should be included.
- The guidance should confirm that planning conditions should be secured for the WLC post-construction assessment and example wording provided.
- A requirement for a third party review could be introduced.
- Clarification is needed on whether the guidance applies to infrastructure projects.

GLA response

We have reviewed the suggestions on improving the list of **data sources** and have updated the guidance accordingly.

References to the **CIBSE TM65** document have been included in the updated guidance.

The WLC policy is intended to prioritise **refurbishment and the retention of existing buildings, structures and materials** where this is appropriate, as explained in the guidance. However, we agree that this could be made clearer by including a requirement for developers to fully consider options for retaining existing buildings before substantial demolition is proposed and capturing pre-construction demolition emissions in the assessment. The guidance and assessment template have been updated accordingly.

Standardised assumptions can be helpful, but they do not take into account the individual circumstances of a development. For example, emissions from module B1

can be very high for developments where, for example, refrigerant leakage is expected. The GLA would therefore expect this and other sources of emissions to be considered carefully for each development. The guidance has been updated with further information on how to calculate carbon emissions for different modules, including modules B2 and B3.

The **scope of the assessment** should be aligned with what is included in the project brief and cost plan. We have updated the guidance to confirm this. In addition, we have provided an indicative list of elements that we would expect to be included as a minimum.

The guidance has been updated to confirm that **local authorities should secure post-construction assessments by condition or through a legal agreement with the planning applicant**. Draft wording has been shared with local authorities and is available on our website.

As stated in the guidance, the GLA scrutinises all WLC assessments submitted with referable applications, similar to our scrutiny of energy statements. However, we expect planning applicants to submit high quality data and undertake due diligence to ensure it is accurate. **Third party review** is an important aspect of this and applicants will now need to confirm via the updated template that the submission has been quality assured by a third party.

Infrastructure projects that are referred to the Mayor should also comply with the WLC policy and guidance with reference to the PAS 2080 – carbon management in infrastructure framework. This has been referenced in the updated guidance.

3.3. Grid decarbonisation

Q4 To what extent do you agree or disagree with the approach to grid decarbonisation?

Forty-two respondents answered this question. Forty-eight per cent agreed with the approach and forty-three per cent disagreed.

Response	Number	Percentage
Strongly agree	7	17%
Somewhat agree	13	31%
Neither agree or disagree	4	10%
Somewhat disagree	10	24%
Strongly disagree	8	19%
Total	**42**	

Q5 If you disagree with our approach to grid decarbonisation, please tell us why and if you have any ideas for how it could be improved.

Thirty-two respondents provided comments. Respondents suggested that:

- The principle of requesting two assessments (one based on the current status of the electricity grid and a second based on its expected decarbonisation) was generally supported, but many felt that the approach was too complicated and may not be possible to implement. Respondents suggested that to reduce the reporting burden only one assessment should be required.
- As Standard Assessment Procedure (SAP) is intended for operational emissions not embodied emissions, it would be more appropriate for module B6 only to use SAP emission factors.
- The decarbonisation assumptions used for Assessment 2 should be updated in the guidance regularly, with several respondents suggesting alternatives to the proposed use of the Future Energy Scenarios 2050 ‘steady progression’.
- Heat will be decarbonised, not just electricity, and this needs to be accounted for in the assessment, with more detailed guidance on how to calculate the decarbonised values.

GLA response

We recognise the impact that a decarbonising electricity grid will have on WLC assessments. However, we agree with many of the issues raised on the complexity of the proposed approach and, in response, we have simplified it. Specifically, the guidance (and assessment template, where necessary) have been updated as follows:

- **Applicants now only need to provide Assessment 1.** In reporting module B6, this should align with the emissions reported in the energy strategy and using the same carbon emission factors in line with the Energy Assessment Guidance (EAG).
- **Assessment 2 will no longer be required**. We accept that requiring this additional assessment at this time would result in complex manual workarounds and that instead accounting for the decarbonisation of the electricity grid should be built into the available software tools. Industry is seeking to address this issue and any updates will be considered as part of future guidance updates. Applicants wishing to account for long-term grid decarbonisation in their WLC assessment should discuss and agree their proposed approach with the GLA.
- The **decarbonisation of heat** over time is complex and uncertain and is largely dependent on decisions national government will make in the coming years. There is currently no clear guidance on how to account for the decarbonisation of heat in decision-making and so we do not think it is appropriate to request it at this time.

3.4. Whole life-cycle carbon assessment template

Q6 To what extent do you think that the whole life-cycle carbon assessment template is clear and easy to use?

Forty-two respondents answered this question with fifty per cent agreeing that the template is very, or somewhat, easy to use. Twenty-three per cent thought it was difficult to use.

Response	Number	Percentage
Very easy	8	19%
Somewhat easy	16	38%
Not sure	8	19%
Somewhat difficult	9	21%
Very difficult	1	2%
Total	**42**	

Q7 Please tell us if you have any comments on how the template could be improved and/or what additional or alternative things could be included.

Thirty-one respondents provided a response. Respondents suggested that:

- Improvements could be made to make the template more user-friendly and reduce the reporting burden, including clearer guidance on the steps to follow to complete it.
- A worked example of the template could be provided as well as technical webinars.
- The requirement set out in the guidance for a minimum of 95 per cent of the cost to be allocated to each building element category should be integrated into the template with the addition of a separate tab for the Quantity Surveyor to provide quality assurance. In addition, clarity is needed on what the 95 per cent cost includes, for example – materials, transport of the materials.
- An accurate calculation of module D is challenging at planning stage and further guidance is needed.*
- As material quantities in kilograms are not always available, for example – concrete is typically measured in m^3, this needs to be accounted for in the guidance.

- The template should require refrigerant leakage and assumptions to be reported separately as the impact can be significant.

GLA response

The template has been designed to **reduce the reporting burden** as far as possible, but it is important that all life-cycle stages are captured to allow for the full carbon impact of the development to be understood. We have taken on board a number of suggestions to make the template more user-friendly, such as removing the requirement to produce two assessments (see Grid Decarbonisation section for further information). The changes have been listed in the template.

Provision of a **worked example of the template** will be kept under review as more assessments are received. At this early stage there are a limited sample available and there is the potential that providing a worked example could limit ambitions in reducing WLC emissions if this were treated as a minimum standard or set approach. The template provides an email address that applicants can use for queries and which has also been added to the guidance document. We will consider what additional support applicants may need on an ongoing basis.

The **minimum 95 per cent cost requirement** has been integrated into the template and the guidance has been updated to confirm the scope of the assessment. The guidance also now recommends that, as part of the third-party review of the submitted WLC assessment, a Quantity Surveyor should approve the information submitted to fulfil the 95 per cent cost requirement.

Applicants should use the information from their Circular Economy Statement to report against **module D**. The guidance has been updated to make this clearer.

The mass of each material is required to ensure a common metric is used to report the **quantity of materials** and allows a material intensity (kg/m^2 GIA) to be estimated also. Where materials are measured in alternative metrics, such as m^3, these should be converted into kilograms by applying material densities.

The template now includes a new row to disclose what assumptions have been made relating to **refrigerants** including refrigerant type, initial charge, assumed leakage rate, end of life recovery rate and Global Warming Potential (GWP).

Q8 To what extent do you agree or disagree with the reporting requirements at each planning stage: pre-application, application submission and post-construction?

Forty-one respondents answered the pre-application element of this question. Fifty-four per cent of respondents agreed with the pre-application stage reporting requirements and twenty-four per cent disagreed.

Forty-one respondents answered the application submission element of this question. Sixty-eight per cent agreed with the application submission stage reporting requirements and twenty per cent disagreed.

Forty respondents answered the post-construction element of this question. Eighty-five per cent of respondents agreed with the post-construction stage reporting requirements and thirteen per cent somewhat disagreed. No one strongly disagreed.

Response	Pre-application	Application submission	Post-construction
Strongly agree	14 (34%)	10 (24%)	16 (40%)
Somewhat agree	8 (20%)	18 (44%)	18 (45%)
Neither agree or disagree	9 (22%)	5 (12%)	1 (2%)
Somewhat disagree	6 (14%)	7 (17%)	5 (13%)
Strongly disagree	4 (10%)	1 (3%)	0 (0%)
Total	**41**	**41**	**40**

Q9 Please tell us if you have any comments on the reporting requirements for the pre-application stage?

Thirty-one respondents provided comments. Respondents suggested that:

- The list of principles should be reduced so that it is less prescriptive. Additional guidance on how to use them should be provided including confirmation of whether applicants have a choice as to which principles to apply.
- The information sought at pre-application should also be requested at subsequent stages to allow for progress to be monitored.
- The information being requested is too detailed as design details will not be available at this early stage. It was also suggested that asking for commitments to specific materials at this stage, which may only be selected purely due to EPD availability at the time, would prevent applicants from choosing newer, better materials later on in the design and construction process.
- As pre-application submissions can't be enforced because the pre-application process is voluntary; how will the GLA ensure the requested information is submitted?

GLA response

The **list of principles** serves as a checklist for design teams, encouraging them to consider WLC in its entirety starting from the earliest stages of design and throughout the project. No principles have been removed as each has a function and there was no general agreement among respondents as to how the list could be narrowed down. However, further guidance has been provided on how the principles should be used from the earliest stages and throughout detailed design to identify where further carbon savings can be found.

The guidance has been updated to encourage applicants to **utilise the principles** before submitting a WLC assessment, at pre-application stage and throughout the assessment process as the design of the development progresses.

A detailed assessment is not required at pre-application stage and it is not expected that the final materials that will be used will be known at this stage. The information submitted will be based on estimates and assumptions that may be altered as the design progresses and as an understanding of the WLC opportunities are identified and acted upon. Applicants are not prevented from selecting newer, lower carbon materials later down the line.

The pre-application process is voluntary and therefore this stage of the WLC assessment will only be required for developments utilising the pre-application process. Any planning application that doesn't go through the pre-application process is encouraged to use the WLC principles to support the development of their WLC assessment in the earliest stages of design and at the planning application submission post-construction stages.

Q10 Please tell us if you have any comments on the reporting requirements for the application submission stage?

Thirty-one respondents provided comments. Respondents suggested that:

- The level of information requested is too detailed as design is usually not sufficiently progressed at this point meaning the assessment will be based on estimates and assumptions that will change as the project progresses.
- The guidance should advise planners and design teams of the inevitable variations that will result between different stages of the assessment as design progresses and decisions on materials, for example, are taken. It should note that the reported predictions should not be used to formulate conditions and legal requirements.
- It can be difficult to decide the end use of a building and therefore assumptions could be provided to standardise this, along with case studies to share best practice.*

- The full list of expected lifespans (that is – Table 9 of the Royal Institution of Chartered Surveyors Professional Statement: Whole Life Carbon assessment for the built environment (RICS PS)) for all building elements and components should be included in the reporting requirements, including at post-construction stage.
- The guidance needs to provide further information on sources of data for default values.
- Further guidance is needed for different application types, for example – for an outline masterplan application that will be developed in phases the design details for individual plots will not be available.

GLA response

We will continue to require **a complete WLC assessment** against the criteria set out in the guidance and the template. Planning applicants have been submitting WLC assessments to us since summer 2020 and this indicates that enough information is available to make assumptions and estimates to inform the assessment. The guidance has been updated to confirm that assumptions and estimates made at planning stage can be expected to change as the design develops.

We agree that **planners and design teams** should be aware that results are likely to change throughout each stage of the assessment and that conditions (or legal agreements) should not enforce these predictions. It is widely recognised that WLC assessment and reporting is at the early stages of adoption and consistency between tools and assessment methods are needed. The GLA's policy is intended to support this necessary evolution of WLC assessment over time. As stated above, the guidance has been updated to recognise that variations between stages are to be expected.

The Circular Economy Statement will contain the required information to inform the assumptions about the **end use of a building**. Planning applicants should refer to the associated guidance. The WLC guidance has been updated to make this link clearer.

The guidance already specifies that, prior to the post-construction stage, Table 9 of the RICS PS should be used to estimate **lifespans for building elements and components** unless specific lifespan values for building elements and components are available. This has been confirmed in the guidance and the template has been updated to clarify where lifespan information should be inserted.

We have updated the guidance to include more information on the best sources to use to obtain **default values** and the template has been updated to allow applicants to record the source of the values used.

The guidance has been updated to provide information on how and when to submit a WLC assessment for **other types of planning application.**

Q11 Please tell us if you have any comments on the reporting requirements for the post construction stage?

Thirty-two respondents provided comments. As the information requirements at this stage are similar to the application submission stage many of the same issues were raised and so we have not repeated those here. Respondents also suggested that:

- They were supportive of the proposal to require a post-construction stage submission and recognised the multiple benefits in doing so, including understanding the performance gap between design and reality and the benefits of having data that will improve industry understanding of how to design to reduce WLC emissions.*
- Explicit requirements could be introduced about which building materials or products (as a minimum) must be accompanied by Type III externally verified EPDs. Such a requirement will drive change in the industry and facilitate the collation of robust datasets for the post-construction stage assessments.
- The GLA should explain what it will do with the data submitted. It will be a highly valuable resource for the construction industry to use and learn from across the UK and it should be shared publicly.*

GLA response

We are encouraged to see the level of **support for the post-construction stage assessment**. The comments received indicated a strong understanding among respondents of the importance of this part of the assessment.

We understand the request for more explicit requirements on **building products which should be accompanied by an EPD**. However, this would be too prescriptive to set out in practice. Ideally all products would be accompanied by an EPD, however we know that EPDs are lacking in some areas (in particular for MEP elements) and so we encourage applicants to identify EPDs for as many products as possible. Where they aren't available the revised hierarchy of acceptable data sources that we have set out in the updated guidance should be followed.

The **data submitted** at pre-application and planning stages will be available publicly on local authority planning portals as is the case for all planning application-related documents. The post-construction data will be stored securely by the GLA. We understand the benefits of sharing the data and we are in discussions with industry about how this might be done.

3.5. Benchmarks

Q12 To what extent do you agree or disagree with the proposed benchmarks in the guidance?

Thirty-nine respondents answered this question. Sixty-two per cent agreed with the benchmarks and fifteen per cent somewhat disagreed. No one strongly disagreed.

Response	Number	Percentage
Strongly agree	7	18%
Somewhat agree	17	44%
Neither agree or disagree	9	23%
Somewhat disagree	6	15%
Strongly disagree	0	0%
Total	**39**	

Q13 Please tell us any comments you have on the proposed benchmarks and suggestions you have for additional or alternative benchmarks.

Thirty-four respondents answered this question. Respondents suggested that:

- Benchmarks are needed for the full range of residential uses, including houses and flats and could also be developed for: shell and core developments, module D and for mixed-use typologies.
- Further information is needed on the project data underpinning the benchmarks, for example – building height, structural system, basement levels etc. and where assessment boundaries are drawn.
- The benchmarks should be informed by more data, though there was a general understanding that there is currently a lack of data available and the WLC policy will be a valuable tool in filling this data gap.
- It will be important to keep the benchmarks under review as data availability increases and for there to be consistency with other initiatives that have been progressing work in this area since the draft guidance was published.*
- Different software tools and the varying quality of EPDs will affect WLC results and their comparison to the benchmarks. To address this, software tools should be harmonised.
- The benchmarks should be based on Net Internal Area (NIA) not GIA (Gross Internal Area) to align with RICS and should align with the latest carbon emission factors.
- The guidance should confirm whether carbon sequestration is included in the benchmarks.

- Further clarity is needed on whether the benchmarks hold any planning weight, and whether planning permission will depend on meeting the benchmarks either now or in the future.*

GLA response

The benchmarks have been updated, including re-naming the 'apartment/hotel' benchmark a 'residential' benchmark. Benchmarks for shell and core developments and for module D have not been provided due to a lack of available data at the current time. Benchmarks have also not been developed for mixed-use typologies due to the wide variety of potential developments that this category could contain. Explanation has been provided in the guidance on how shell only and mixed-use developments are treated against the benchmarks.

The **project data underpinning the benchmarks** is based on shell and core and CAT A finishes. This has been confirmed in the guidance. While we appreciate that this will create some inconsistency in how developers with a shell only scope, for example, report against the benchmarks, this does not put them at a disadvantage and will be noted during the review process.

As part of their consultation response Cundall (who we commissioned to produce the original benchmarks) have, in conjunction with the London Environment Transformation Initiative (LETI), identified **additional project data** which has been used to update the original benchmarks. Following a review of the data underpinning the updated benchmarks we have decided to adopt them in the updated guidance.

We understand the importance of **keeping the benchmarks under review**. We intend to do so, but to allow industry time to adapt to the updated benchmarks and guidance we don't anticipate that this will be needed for at least 2-3 years. We will continue to work closely with industry and other initiatives and organisations that are developing benchmarks during this time.

The GLA does not have control over the development of **software tools** and does not consider it appropriate to mandate one particular tool. There is work to do to create more consistency between tools and we encourage software tool developers along with industry to address this challenge. We have already begun to see this happen since the draft guidance was published. Quality standards exist for EPDs and carbon data and the updated hierarchy of data sources in the guidance clarifies what data we consider to be appropriate.

The data underpinning the benchmarks uses **GIA**, therefore the benchmarks also use GIA to ensure consistency. Carbon emission factors are defined within the software tools and EPDs used. We do not have control over these factors but encourage the latest available carbon factors to be used.

Sequestered carbon is included in the combined module A-C benchmarks. This has been confirmed in the guidance.

The WLC benchmarks are not policy targets. However, our expectation is that the data gathered can be used to inform targets in the future to drive performance. We would expect most developments to be able to meet, and ideally exceed the WLC benchmarks. However, there may be exceptions and this will be reviewed case by case.

3.6. Omissions and further comments

Q14 Are there any omissions or areas where additional guidance would be helpful?

Thirty-one respondents answered this question. The following omissions were noted:

- A definition of Modern Methods of Construction (MMC) should be provided, along with information on how it should be estimated.
- The WLC policy should be applied to major developments as soon as possible as these developments account for significant carbon emissions.*
- Guidance is needed on the calculation of emissions for modules B1, B7 and D to standardise the process.
- A mandatory list of MEP elements that should be reported against should be included in the guidance.
- The role of boroughs needs to be clarified and training and support should be provided to boroughs, particularly those that intend to apply the WLC policy to non-referable developments.*

GLA response

A **definition of MMC** has been included. MMC is one potential solution that developers can use to reduce embodied carbon, however we do not require any estimates of the proportion of a development that uses MMC as it will not be suitable for all types of development. Applicants could provide this as part of the assessment and we have allowed for that in the template.

As stated in the guidance, we encourage local authorities to request WLC assessments for **major development** applications. However it is important that local authorities have sufficient resource to be able to assess WLC assessments and recognise this is a fast-moving area in which new research, tools and approaches are being developed. We have not set specific requirements for how non-referable developments could meet the guidance to allow local authorities to take their own approaches.

Further information on how to calculate the emissions associated with **modules B1, B7 and module D** has been included in the guidance.

A suggested (but not exhaustive) **list of MEP elements** has been included in the guidance.

Boroughs will be expected to ensure that WLC assessments are submitted as part of referable applications and that a post-construction WLC assessment is secured through a condition or a legal agreement. Where possible we would also encourage boroughs to review the information submitted. The GLA will be reviewing WLC assessments for referable applications, similar to the review we undertake of energy strategies. Boroughs that are intending to require WLC assessments from non-referable applications will need to scrutinise the information submitted in addition to securing the post-construction assessment through a condition or legal agreement and storing the information received. We hold regular workshops for local authorities on the Mayor's energy and carbon policies and intend to hold a specific session on WLC assessments.

Q15 Do you have any further comments to make on the guidance?

Thirty-six respondents answered this question. Respondents suggested that:

- London is leading the way through the development of the WLC policy and guidance and respondents expect that developers and architects will use this policy to materially reduce carbon from construction and the built environment. It was suggested that the approach we have developed could be followed by other UK regions and councils.*
- If a project performs well on the WLC this should reduce the carbon offset payment needed to reach operational net zero carbon.
- Additional guidance documents relating to historic buildings should be referenced in the guidance.
- Planning applicants will incur additional costs in completing the assessment process and this should be recognised.
- Information should be provided on how this document be applied locally for non-referable major planning applications and in the development of Local Plans.

GLA response

We are keen to ensure our **leadership on reducing WLC emissions** is replicated in other regions and will continue to engage with other UK authorities and councils on how our approach can be replicated elsewhere.

As explained in the guidance, the net zero carbon target is based on operational carbon emissions only. **Offset payments** should therefore not be waived based on performance against the WLC policy, which does not currently include formal targets.

Reference to the guidance documents relating to **historic buildings** has been included.

The WLC requirement is established in London Plan policy and should be factored into the **costs of the planning application process** by the planning applicant. The assessment process and guidance has been developed to ensure the assessment

process is as streamlined and cost-effective as possible taking into account stakeholder engagement, including as part of this consultation.

As stated in the guidance, we encourage WLC assessment for **major applications** and the guidance can be used for this purpose. We would also encourage inclusion of policies that require the calculation and reduction of WLC emissions via a WLC assessment in Local Plans.

4. Equality Impact Assessment (EqIA)

The EqIA undertaken for the Whole Life-Cycle Carbon policy showed no impact and no responses to the consultation identified any equality impacts.

5. Next steps

There was a significant level of interest in the development of the WLC policy at pre-consultation stage and throughout the consultation and we would like to thank everyone who took the time to contribute. All views that were shared with us have been considered in the development of the final WLC guidance document and we have aimed to summarise the key points raised in this report.

For the latest information on the WLC policy, guidance and assessment template please visit the GLA's WLC webpage: https://www.london.gov.uk/what-we-do/planning/london-plan/london-plan-guidance/whole-life-cycle-carbon-assessments-guidance. For any queries please email: ZeroCarbonPlanning@london.gov.uk.

Appendix 1 Summary of engagement

Informal and/or early engagement

Activity Type	Participation	Representation
Workshops	Industry professionals including energy consultants and mechanical engineers, developers, housing associations, BRE, UKGBC	39 attendees
Webinar	London boroughs	50 attendees (approx.)
Technical seminar	Planning Inspectors (PINs), public	30-40 attendees (approx.)

Formal engagement

Date	Activity Type	Participation	Representation
13 Oct – 15 Jan 2021	Consultation survey and written responses	All	50 responses
17 Nov 2020	Webinar	All	243 attendees

GLA Planning

Circular Economy Statements LPG

Consultation summary report

March 2022

Copyright

For more information about this document, please contact:

The London Plan Team, GLA Planning
Greater London Authority
City Hall
Kamal Chunchie Way,
London E16 1ZE
www.london.gov.uk

Tel 020 7983 4100 OR 020 7983 4000
Email planningsupport@london.gov.uk
Minicom 020 7983 4458

Other formats and languages

For a large print, Braille, disc, sign language video or audio-tape version of this document, please contact us using the details above.

You will need to supply your name, your postal address and state the format and title of the publication you require.

If you would like a summary of this document in your language, please phone the number or contact us at the address above.

Table of contents

1. Introduction

On 19 October 2020, the Greater London Authority (GLA) launched a consultation on the Mayor's draft Circular Economy Statements London Plan guidance (LPG). The consultation closed on 15th January 2021. Online seminars were held during the consultation, attended by 100 people.

Thirty-three written responses were received. This document provides a summary of the consultation responses received. The Mayor would like to thank everyone who took part for engaging with the guidance.

2. Who took part?

Formal consultation survey

Respondents were asked what type of organisation they represent or whether they were responding as an individual.

Respondent type	Number	Percentage
Individual	5	15%
Business	16	48%
Campaign group	2	6%
Community group	0	-
Government body or agency	3	9%
Local authority outside London	0	-
London borough	5	15%
Professional body	0	-
Other	2	6%
Total	**33**	

Respondents were also asked equality monitoring information in order to assess how representative respondents were compared to the demographics of Londoners. The number of responses received on those questions was limited and therefore the relevant analysis has not been included in this consultation summary report.

Other engagement

During the consultation, several events were held with stakeholders to promote awareness of the guidance and consultation, and to answer questions, with over 100 attendees across the different events. This included a webinar for borough officers, which was attended by representatives from 19 different boroughs.

Other engagement was undertaken prior to the formal consultation, including technical meetings with consultants. Equality monitoring information was not collected for these engagements.

3. Consultation feedback and GLA response

As part of the engagement on the draft guidance, respondents to the formal consultation survey were asked to submit responses to specific questions, which are summarised here.

3.1. Core principles

Q1: To what extent do you agree or disagree with the three core principles?

Thirty respondents answered this question. One hundred per cent agreed with the three core principles set out in the guidance. Ninety per cent strongly agreed with core principle 3.

Principle 1: Conserve resources, increase efficiency and source sustainably

Response	Number	Percentage
Strongly agree	21	72%
Somewhat agree	8	28%
Total	**29**	

Principle 2: Design to eliminate waste (and for ease of maintenance)

Response	Number	Percentage
Strongly agree	23	77%
Somewhat agree	6	20%
Total	**29**	

Principle 3: Manage waste sustainably and at the highest value

Response	Number	Percentage
Strongly agree	26	90%
Somewhat agree	3	10%
Total	**29**	

Q2: Please tell us if you have any comments on the core principles and commitments set out in Section 2.1 and/or if you have any changes you would like to suggest?

Nineteen responses were received to this question. Respondents made the following points:

- The guidance should emphasise conserving primary materials, using secondary materials and reducing material demand, and should prioritise refurbishment over demolition. The guidance should encourage better use of existing buildings, including retrofitting for energy performance. The principles and commitments in the guidance should link better to the strategic approaches.

- There should be greater focus in the guidance on reusing and recycling materials onsite or locally, rather than sustainable sourcing.
- The guidance should emphasise Circular Economy (CE) approaches being embedded early on in the design process and at all life cycle stages. Pre-demolition audits should be mandatory, and a template audit should be provided with the guidance.
- The guidance should include best practice approaches and examples (for example – refurbishment, reuse and recycling) including for excavation and contaminated sites.
- The guidance should recognise more clearly that waste is not inevitable, and should shift the focus to materials being treated as a resource, using this term instead of 'waste'. The guidance should emphasise eliminating and managing waste during operation, maintenance, refurbishment, adaptation and at end-of-life. Positive feedback was received on strategic approaches that are further up the Waste Hierarchy. It was suggested that the Waste Hierarchy should be referred to more in the guidance.
- The guidance should cover the qualities of reusable materials (not just quantities).
- There are potential conflicts that could arise from the application of the guidance – for example, designing for longevity vs. minimising the quantity of materials and transport emissions.
- There should be clearer links between the guidance and other submission requirements, including the Whole Life-Cycle Carbon assessment (WLC).
- The guidance should require and provide examples of evidence and justification to avoid developments only achieving the bare minimum.
- The guidance should make better use of data, and should be supported by the development of databases, markets and material passports to encourage reuse and high-quality recycling. The use of construction waste management certifications should be considered.
- There are a number of barriers to implementing the guidance, particularly contamination and achievability.

GLA response

The **principles and commitments** have been aligned to the Policy D3 circular economy principles to make the process simpler, simplify the guidance, make the reporting and assessment process easier and ensure reporting against the policy principles. All principles and commitments are still covered by the reporting requirements - for example, designing out waste is reflected in the CE targets table. The CE principles emphasise reuse of materials.

The decision tree has been developed to include a hierarchy of circular economy design approaches, which emphasises retention and refurbishment over demolition, and **reuse of materials** on-site.

Emphasis has been added on **sourcing materials locally**, particularly for reprocessed materials.

Pre-redevelopment audits are now required early on in the development and design process, and **pre-demolition audits** are strongly encouraged at pre-application stage and required at later stages.

Further detail on the circular economy design approaches has been included in the guidance. ReLondon (a strategic body of the Mayor of London and London Councils) through the Circular Constructure in Regenerative Cities (CIRCuIT) project, are developing further information for boroughs and industry, including **examples and best practice**.[1] Where appropriate, lessons learned and best practice examples from submitted CE Statements will be shared to encourage innovation.

To emphasise material value, the terms '**resources'** and/or 'materials' are used more (rather than 'waste'). The guidance emphasises the need to design buildings in ways that will minimise waste throughout a building's lifecycle. The waste hierarchy has been emphasised more in the guidance.

Designing for longevity is included as a circular economy principle, in line with London Plan Policy D3. The guidance emphasises using secondary materials, with re-use on-site or locally preferred.

More links and references have been made to the **other submission requirements**, such as the WLC assessment.

The need for **evidence and justification,** where retention and refurbishment are not selected, is now emphasised.

Material passporting is now referred to in the guidance. We will continue to work with ReLondon and others to explore how innovative approaches and **greater use of data** can improve CE outcomes, informed by the information received on CE statements.

It is recognised that there may be barriers such as dealing with **contaminated sites**. The guidance is flexible enough to allow for these scenarios, and they can be taken into account as material considerations by decision-makers.

3.2. 'Building in layers'

Q3: To what extent do you agree or disagree that the concept of 'building in layers' is useful for applying circular economy principles to development?

Twenty-eight responses were received to this question, of which 96 per cent somewhat or strongly agreed that the concept is useful.

Response	Number	Percentage

[1] https://www.designingbuildings.co.uk/wiki/Circular_economy_case_studies

Strongly agree	17	61%
Somewhat agree	10	36%
Neither agree or disagree	1	4%
Total	**28**	

Q4: Please tell us if you have any comments on the concept of 'building in layers' and/ or if you have any changes you would like to suggest?

Thirteen responses were received to this question. Most respondents were supportive of the approach. Respondents suggested that:

- More guidance is needed on sustainable design approaches and building in design implications.
- Barriers to meeting the requirements of the guidance include infrastructure for CE uses and application to residential buildings with multiple owners.
- The guidance should give greater emphasis to building in layers at the pre-application stage. The guidance should provide ideas and examples for how building in layers can be achieved. Some examples were provided.
- The guidance should refer to application types, such as change of use.
- The guidance should consider a different approach for short-lived buildings.
- The guidance should require monitoring by layer.
- Figure 1 in the guidance should align with the layer definition table.

GLA response

The layers concept has been included in the decision tree, as well as a hierarchy of circular economy **design approaches**. Emphasis has been added on applying different and multiple circular economy design approaches for different layers.

In terms of **infrastructure**, London Plan policies aim to safeguard sufficient industrial capacity, which could potentially be used for storing materials to encourage more reuse, upcycling and recycling. ReLondon's CIRCuIT project includes storage and logistics requirements to facilitate more reuse.

Emphasis has been added on considering **building in layers** from pre-application stage to support innovation. Lessons learned and best practice examples will be shared by the GLA and partners.

Application types have been expanded on, including hybrid applications (for example, see Table 5 Minimum Submission requirements by planning application stage). The decision tree includes a hierarchy of circular economy design approaches. This hierarchy prioritises approaches where minimal changes are made to the fabric of buildings, regardless of whether a scheme proposes change of use or not.

Different circular economy design approaches are emphasised depending on the nature of the development, including schemes where development will have a **shorter life**.

In terms of **monitoring**, reporting CE principles by building layer is now required for outline and full planning applications. The Bill of Materials now requires reporting by material type for consistency with the WLC assessment. The guidance highlights how building layers relate to material types (see Table 1).

Figure 1 has been amended and aligned to the layer definition table. For example, skin/shell is now the outer most layer.

Q5: Do you have any further comments to make on Section 2?

Eleven responses were received to this question. Respondents suggested that:

- The guidance should explain the relationship between embodied carbon and designing for longevity.
- Reducing transport emissions and cleaner modes of transporting waste should be encouraged.
- Innovative ideas should be explored, such as creating ID references for interior fixtures and making data available to potential users.
- Pre-demolition audits should capture material qualities.

GLA response

Designing for longevity is included as a circular economy principle, in line with Policy D3. Greater links have been made to the WLC assessment (see Section 1.2). The promotion of circular economy outcomes should also reduce the whole life-cycle carbon of the development or provide additional benefits beyond the development's life. Design decisions should be informed by the principles and results of both studies.

London Plan policies include supporting **cleaner modes of transport** (e.g. Policy SI 10 and SI 15 (part I)). The guidance emphasises the importance of local sourcing, especially for reprocessed materials.

The GLA will look to use levers and seek to influence wherever possible. **Ideas** suggested have been shared with partners.

Further information has been added on **pre-demolition audits**. Opportunities for reuse and recycling should be highlighted.

3.3. Development of CE Statement

Q6: To what extent do you agree or disagree that the steps set out in Section 3.1 will result in the effective development of Circular Economy Statements?

Twenty-nine responses were received for this question, of which 76 per cent somewhat or strongly agreed that the steps set out in Section 3.1 would result in the effective development of Circular Economy Statements. Twenty-one per cent neither agreed nor disagreed and three per cent somewhat disagreed with this statement.

Response	Number	Percentage
Strongly agree	7	24%
Somewhat agree	15	52%
Neither agree or disagree	6	21%
Somewhat disagree	1	3%
Total	**29**	

Q7: Please tell us why?

Twenty-three responses were received to this question. Respondents suggested that:

- The guidance should emphasise providing information early on at pre-application stage.
- The guidance should emphasise benchmarks, targets, existing certifications, and industry-wide standards.
- There are some barriers to complying with the guidance, including information being unavailable until later in the process.
- Commitments made in the guidance can be easily reversed.
- The guidance should clarify how feedback will be provided, by whom and when.
- Resource and expertise is needed to assess CE statements.

GLA response

The guidance has been revised to require information early on. **Pre-application stage** is however voluntary but developments utilising the pre-application process are encouraged to provide the relevant information.

The guidance refers to existing **certification** such as Cradle to Cradle (C2C). Appendix 1 includes data collected to date for key CE Statement metrics. Further metrics and targets are likely to be introduced as the evidence base develops. There are overlaps with BREEAM but the related credits are not mandatory and may not be pursued or achieved.

We recognise the challenge of obtaining some information early in the design process. A detailed assessment is not required at pre-application stage, and it is not expected that final materials will be known. The information submitted will be based on estimates and assumptions that may be altered as the design progresses and as opportunities are identified and acted upon. However, by including requirements early on, we expect to see circular economy principles embedded in proposals from the outset and greater innovation. Design teams are often able to make changes in response to new opportunities. The guidance includes information to support applicants and teams to overcome **barriers**. An email address has been added to the guidance and template that applicants can use for queries. We will consider what additional support applicants may need on an ongoing basis.

The guidance outlines the importance of **justification** and **evidence** being provided if for example the hierarchy of circular economy design approaches in the decision tree is not followed.

Information on how and when **feedback** will be provided on CE Statement has been included (for example in the Appendix 2 Application Flowchart).

Good practice **resources** are shared on the Circular Economy wiki[2] and will continue to be shared by the GLA and partners. The GLA will be provide training on assessing CE Statements for local authority officers.

3.4. Strategic approach

Q8: To what extent do you agree or disagree that defining a strategic approach to the circular economy (as outlined in Section 3.2) will be useful in developing a Circular Economy Statement?

Twenty-nine responses were received for this question, of which 89 per cent somewhat or strongly agreed that defining a strategic approach to the circular economy will be useful in developing a CE Statement. Seven per cent neither agreed nor disagreed and three per cent somewhat disagreed.

Response	Number	Percentage
Strongly agree	12	41%
Somewhat agree	14	48%
Neither agree or disagree	2	7%
Somewhat disagree	1	3%
Total	**29**	

Q9: Please tell us if you have any comments on the guidance relating to defining a strategic approach to the circular economy (Section 3.2) and/or if you have any changes you would like to suggest?

Twenty responses were received to this question. Respondents suggested that:

[2] https://www.designingbuildings.co.uk/wiki/London_Circular_Economy_Statements_LPG_-_Additional_resources

- The information required needs to be clearer.
- The strategic approaches should be linked to the CE principles.
- The decision tree should be amended – it is too simplistic, the default appears to be demolish and recycle, and it works better for short-lived development.
- Strategic approaches should be emphasised (including reuse on-site, recycling, disassembly) for different development types, and should be framed as a hierarchy.
- Multiple strategic approaches are often needed.
- The strategic approach definitions should be amended (outline the unique components) and more should be added (e.g. repositioning, upgrading with refurbishment, selective deconstruction and designing for reuse)
- Discussions and decisions on design approaches are needed early-on at pre-application stage. Pre-demolition audits are important early on – they should be made mandatory.
- Justification or evidence for not adopting strategic approaches should be required by the guidance.
- Monitoring and a robust assessment framework are important and should be included with the guidance.
- The CE principles should be applied to longer-life buildings (e.g. longevity).
- The 'building in layers' concept should be more clearly embedded in the guidance.

GLA response

The **information required** has been made clearer (for example, see Table 5 Minimum submission requirements and Appendix 2 Application Flowchart).

The circular economy principles, strategic approaches and building in layers concept have been **linked** more clearly in the guidance

The strategic approaches have been renamed 'design approaches' to make them clearer and better link them to the circular economy principles.

The **decision tree** has been revised and the **hierarchy** of design approaches made clearer (for example, re-use onsite or locally).

It has been emphasised more that **multiple strategic approaches** will often be needed.

Additional approaches were considered, and the final set chosen based on their unique components. Deconstruction is emphasised more.

A **pre-demolition audit** is strongly encouraged at pre-application stage and required at later stages. Pre-redevelopment audits are required however from an early stage, which can help to inform design approaches and encourage those further up the hierarchy to be selected.

The guidance refers to **evidence and justification** for adopting design approaches further up the hierarchy in the decision tree. The guidance emphasises the need for robust **justification** if demolition is proposed.

Appendix 3 Essential elements of CE Statements has been added to support boroughs to **assess** policy compliance.

The CE principles apply to all types of development covered by the guidance. The decision tree highlights where some design approaches could be more relevant to certain types of development. All buildings should be designed for disassembly, adaptability and reuse and recycling.

Building in layers has been added to the decision tree.

Q10: Do you have any further comments on Section 3?

Eleven responses were received to this question. Respondents suggested that:

- The reporting requirements, including timings, should be clearer.
- The potential to impose a monitoring fee or penalty mechanism for non-compliance should be explored.
- There is a need for training and resources for local authorities to assess and monitor requirements, especially if applying to all major development.
- More information is needed on the suitability of different strategic approaches in different contexts.
- The decision tree should be amended – for example, including the building in layers approach.

GLA response

The **reporting requirements** have been made clearer – see for example Tables 5, Appendix 2 and 3 (Minimum submission requirements, Application Flowchart, and Essential Elements of CE Statements). It has been made clear that post-construction reports must be received no more than three months post-construction.

The CE Statement requirement is established in London Plan policy and should be factored into the costs of the planning application process by the planning applicant. A **monitoring or penalty fee** does not fall within the remit of the guidance.

Training and **resources** will be made available to local authorities to support assessment and monitoring. A template planning condition is available on the GLA's LPG webpage.

The **decision tree** includes more detail on the suitability of **different circular economy design approaches**, including in relation to building layers. Justification for a chosen route will have to be determined on a case-by-case basis rather than through a rule-based approach. Greater links have been made to the WLC assessment to help inform the decision on the lowest carbon outcome for a project. The decision tree includes the **building in layers** approach.

3.5. What a CES should include

Q11: Section 4.4 sets out what a CES should include. To what extent do you agree or disagree with these requirements?

Twenty-nine responses were received to this question, of which 90 per cent strongly or somewhat agreed with the CE Statement requirements and 10 per cent neither agreed nor disagreed.

Response	Number	Percentage
Strongly multiple strategic approaches agree	11	38%
Somewhat agree	15	52%
Neither agree or disagree	3	10%
Total	**29**	

Q12: Please tell us if you have any comments on the requirements for what a Circular Economy Statement should include and/or if you have any changes you would like to suggest.

Twenty-nine responses were received to this question. Respondents suggested that:

- The guidance should align more closely with WLC assessment requirements (e.g. Bill of Materials) and timings. For the Bill of Materials, the guidance should add material type and include life span.
- The information required early on in the design process is too detailed and it may not be available. Contractors are often involved later. Some layers are decided later in the process.
- The guidance should provide good practice examples and solutions.
- The monitoring and assessment process should be clearer (e.g. how information will be verified and when CE Statements should be updated) and there should be support for local authorities to assess CE Statements.
- There should be greater emphasis on reuse (separate from recycling) and the Waste Hierarchy, including recovery, given the resource intensity of recycling processes and the extent to which recycling with be identified compared to downcycling. Waste to energy and incineration should be avoided.
- Pre-demolition audits are key and should be required for projects above a certain size.
- It is difficult to recycle excavated material on contaminated sites.

- Using an up-to-date London Waste Map can bring economic opportunities.
- The guidance should make clear the purpose of the data and how it can be accessed.
- There is a potential conflict between sustainable sourcing and carbon emissions, if materials are not sourced locally.
- The guidance should explain the use of recycled content by value (not volume) and provide example calculations.
- The guidance should require justification or evidence where design decisions go against circular economy outcomes.
- There should be support for standardising templates (e.g. via an online reporting form) for data comparison.

GLA response

The CE Statements guidance has been aligned to the **WLC assessments guidance**, including the Bill of Materials (both use material type), submission timings (the post-completion report needs to be submitted within 3 months of construction completion) and the level of information required for different application types (e.g. outline) is similar. The guidance now includes in Section 1.2 information on links between the CE Statements and WLC assessments.

The guidance outlines the minimum submission requirements (see Table 5) for different applications. Planning applicants are submitting CE Statements to the GLA, which indicates that enough information is available to make assumptions and estimates to inform the CE Statement at the different stages of an application, including early stages. The **information provided at pre-application stage** is voluntary. The guidance recognises that information submitted early on will be based on estimates and assumptions that may be altered as the design progresses and as an understanding of the CE Statement opportunities are identified and acted upon. Applicants are not prevented from selecting newer lower carbon materials later down the line.

It is recognised that less information will be available for outline planning applications and information may be high-level, with gaps (for example, specific materials and products may not be known). However, it is expected that information on certain materials will be available at outline stage, for example based on experience from previous schemes, and to estimate costs. Applicants are expected to provide as much information as possible to ensure circular economy principles and targets are embedded early in the design process. Particularly important to include at outline stage are building layers or elements that are likely to be decided early on (for example site, structure, and skin/shell) and which have the longest lifespans or will be changed less frequently.

We are collating good practice **examples**, which will be shared for example on the Circular Economy wiki and through training and events. ReLondon, through the CIRCuIT project, are producing a webpage to showcase the latest case studies and good practice examples.

Information on **monitoring and assessment** has been made clearer. For example, an Application Flowchart (Appendix 2) has been included and section 5 on monitoring. Training will be provided to local authorities to support CE Statement assessment. The GLA scrutinises all CE Statements submitted with referable applications. Applicants are expected to submit high quality data and undertake due diligence to ensure it is accurate.

Reuse and the **waste hierarchy** have been emphasised more in the guidance - for example, reuse on-site is included in the hierarchy of circular economy design approaches in the decision tree. In the CE Statements (Recycling and Waste Reporting table and Operational Waste Management Plan), applicants should include how and where (on-site v offsite) waste will be managed in accordance with the waste hierarchy. The guidance includes more references to the waste hierarchy and a link. Information on recovery amounts (per cent) should be provided in the Recycling and Waste Reporting table in the CE Statement spreadsheet. The hierarchy of circular economy decision approaches is outlined in the decision tree, and justification is required where those approaches at the top of the hierarchy are not selected.

More information has been added on **pre-demolition audits**, and these are strongly encouraged at pre-application stage and required at later stages.

The GLA and partners will share best practice examples, for example on dealing with **contaminated sites**, in the future via the Circular Economy wiki.

The GLA strongly encourages the use of the **London Waste Map** and will seek to understand the barriers to keeping information up to date.

The **data** will be used to assess performance, develop benchmarks and future metrics. CE Statements will be available publicly through the London Datastore.

Local sourcing of materials is encouraged, particularly for reprocessed materials. Design decisions should be informed by the principles and results of both the CE Statement and WLC assessment. Guidance on sustainable sourcing is broader than the scope of the CE Statements guidance, however the embodied carbon should be a key consideration in all design decisions. In line with Policy D3, development must aim for high sustainability standards.

Percentage by **value** is a tried and tested metric that was introduced by WRAP[3] and implemented on the 2012 Olympics very successfully. More detail has been

[3] We are aware that WRAP have discontinued this guidance, however we feel it still provides a robust tool for this calculation.

provided in the guidance on 'percentage recycled content by value', including an example calculation from previous WRAP guidance. It is intended that more metrics will be introduced in the future.

Evidence and justification are required by the guidance. Elements that are contradictory to the aims of the circular economy should be designed out of buildings.

A CE Statement **template** has been developed to support the **standardisation** of information submitted, and data comparison.

3.6. Structure

Q13: To what extent do you agree or disagree with the proposed structure for Circular Economy Statements set out in Section 4.1?

Twenty-eight responses were received to this question, of which 89 per cent strongly or somewhat agreed with the proposed structure, and 11 per cent neither agreed nor disagreed.

Response	Number	Percentage
Strongly agree	7	25%
Somewhat agree	18	64%
Neither agree or disagree	3	11%
Total	**28**	

Q14: Please tell us if you have any comments on the proposed structure and/or if you have any changes you would like to suggest.

Thirteen responses were received to this question. Respondents suggested that:

- The guidance should closely align with WLC assessment, and link more to WLC, and should refer to London Plan Policy SI 2.
- Clearer information on monitoring is needed.
- The minimum requirements, targets, responsibilities and approach to assessment against CE principles should be made clearer.
- The requirements for pioneering statements should be made clearer.
- It is difficult getting detailed information early on. Targets are less appropriate for pre-application or outline applications.

GLA response

More links have been made to the **WLC assessments** guidance and London Plan Policy SI 2.

More information is included on **monitoring** and a separate section has been added.

Table 5 has been added highlighting the **minimum requirements** for different application types. The targets have been made clearer. The Application Flowchart (Appendix 2) outlines the key stages and **responsibilities**. Appendix 3 highlights the essential elements of CE Statements against the circular economy principles.

Information on **pioneering statements** has been made clearer – for example, Section 4 Elements of Statements includes options for pioneering. Table 5 highlights which elements are expected as a minimum requirement, and which are encouraged for different application types.

It is understood that it may be difficult to get **detailed information** early on. However, applicants are expected to provide as much information as possible to ensure circular economy principles and targets are embedded early in the design process.

3.7. Assessment

Q15: Section 4.3 sets out the criteria for assessing Circular Economy Statements. To what extent do you agree or disagree with this approach?

Twenty-seven responses were received to this question, of which 74 per cent agreed with the criteria for assessing CES, 22 per cent neither agreed or disagreed and four per cent somewhat disagreed.

Response	Number	Percentage
Strongly agree	7	26%
Somewhat agree	13	48%
Neither agree or disagree	6	22%
Somewhat disagree	1	4%
Total	**27**	

Q16: Please tell us if you have any comments on the criteria for assessing Circular Economy Statements and/or if you have any suggestions for additional or alternative criteria.

Seventeen responses were received to this question. Respondents suggested that:

- The CES assessment criteria should be closely aligned with WLC guidance.
- The minimum requirements should be made clearer, including the difference between standard practice and pioneering statements and how this will be identified. Some pioneering aspects were described as standard practice.
- The guidance should make clear how CE Statements will be assessed, the need for objective assessment criteria, and how the information will be used.
- Resources will be needed to assess CES, especially if applying to lower thresholds.

GLA response

The guidance has been aligned with the **WLC guidance** as far as is practical, for example, with similar levels of information being required for different application types.

The **minimum requirements** are now outlined in Table 5, as well as information that is encouraged to be submitted. Information on level of ambition (see Section 3.4) has been updated with pioneering elements made clearer. Options for pioneering statements are included in Section 4 of the guidance.

An Application Flowchart (Appendix 2) has been added to make the **assessment process** clearer. To support assessment, Appendix 3 shows the essential elements of CE Statements and how this links to Policy SI 7. The information will be used to assess performance, develop benchmarks and future metrics.

To support assessment, training will be provided to boroughs, and **resources** provided on the Circular Economy wiki.

3.8. Pioneering statements

Q17: Section 4.3.3 and Sections 4.4.48 - 4.4.52 set out the requirements for 'pioneering' statements. To what extent do you agree or disagree that this will support the delivery of development that will achieve more ambitious circular economy outcomes?

Twenty-six responses were received to this question, of which 69 per cent strongly or somewhat agreed, 23 per cent neither agreed or disagreed and 8 per cent somewhat disagreed that the requirements for 'pioneering' statements will support the delivery of development that will achieve more ambitious circular economy outcomes.

Response	Number	Percentage
Strongly agree	5	19%
Somewhat agree	13	50%
Neither agree or disagree	6	23%
Somewhat disagree	2	8%
Total	**26**	

Q18: Please tell us if you have any comments on the requirements for pioneering statements and/or if you have any changes you would like to suggest.

Nineteen responses were received to this question. Respondents suggested that:

- The guidance should make clearer the assessment criteria and align to WLC, and it should be clear how data will be verified.

- The guidance should apply pioneering requirements to the standard approach.
- There is a need for resources and training to support assessment.
- The guidance should promote innovative examples (demonstrator projects and contractual arrangements such as 'Product as a Service' schemes) and the GLA should provide support (including funding and in-kind) to applicants.
- Worked examples and pioneering statements should be shared to encourage improvement and innovation.
- The guidance should have clearer incentives that encourage development to be pioneering.
- Materials reused on and off-site should be reported separately to waste recycled.

GLA response

The guidance has been updated to make clearer the **assessment criteria** (see for example Appendix 3 Essential elements of CE Statements). The Application Flowchart (Appendix 2) highlights that the GLA will review CE Statements for referable applications. Applicants are strongly encouraged in the guidance to submit an independent pre-demolition audit. Boroughs that are intending to require CE Statements for non-referable applications will need to scrutinise the information submitted.

The level of ambition section has been updated to make clearer **pioneering** aspects- for example, setting additional targets (for example, by providing separate targets for reuse and recycling, and for on-site and/or local and off-site reuse). Options for pioneering statements have been added to Section 4.

We hold regular workshops for local authorities on the Mayor's policies and we will hold a specific **training** session on CE Statements.

The guidance is focused on explaining how to produce a CE Statement and what is required to comply with London Plan policies, rather than providing specific examples of how to achieve circular economy outcomes. The GLA will promote good practice **examples and support**, for example, on the Circular Economy wiki. ReLondon are also developing a webpage promoting good practice examples and providing support to businesses in this area. A contact email address has been included for queries. We will consider what additional support applicants may need on an ongoing basis.

The guidance includes a **worked example** for the recycled content by value calculation (see Appendix 4) from previous WRAP guidance, and analysis of data collected from CE Statements to date (Appendix 1).

The CE primer includes information on the benefits of a circular economy and **incentives to be pioneering**.

The Recycling and Waste and Reporting table has been updated to include separate columns for **materials reused on and off-site, from materials recycled.**

3.9. Monitoring

Q19: Sections 4.463 – 4.4.70 sets out how Circular Economy Statements should be monitored and reported on post-planning/completion. To what extent do you agree or disagree with this approach?

Twenty-seven responses were received to this question, of which 77 per cent strongly or somewhat agreed with the approach to monitoring and reporting, 15 per cent neither agreed or disagreed and 7 per cent somewhat disagreed.

Response	Number	Percentage
Strongly agree	12	44%
Somewhat agree	9	33%
Neither agree or disagree	4	15%
Somewhat disagree	2	7%
Total	**27**	

Q20: Please tell us if you have any comments on the monitoring of Circular Economy Statements and/or if you would like to suggest any changes.

Nineteen responses were received to this question. Respondents suggested that:

- More information is needed on reporting indicators and requirements and monitoring.
- Use of Building Information Modelling (BIM) should be supported to improve waste estimates early on.
- Post-completion reports should be secured by condition, with penalties or actions imposed.
- Resources, expertise, and training should be provided to boroughs to assess and monitor, especially for non-referable schemes.
- An online reporting form or standard electronic format should be used to support data analysis and share lessons learned.
- Metrics or targets should be added or clarified (e.g. add a separate target for minimum amounts of reused materials; clarify 20 per cent by value target).
- The guidance should align with the WLC and Be Seen guidance in terms of securing requirements, submission timings and life-cycle approach.

GLA response

More information has been included on **reporting indicators and requirements and monitoring** (see for example Sections 3.4 and 4, Table 5 and Appendix 3).

The policy has been well received to date. Project teams are often keen to change their designs, even in small ways, to consider new opportunities. The guidance aims to drive change.

Training will be provided for boroughs and **resources**, for example on the Circular Economy wiki, will be available to support **assessment and monitoring**. We encourage CE Statements for **major development** applications. However, we recognise that local authorities need sufficient resource to assess CE Statements. Circular economy approaches are a fast-moving area in which new research, tools and approaches are being developed. We have not set specific requirements for how non-referable developments could meet the guidance to allow local authorities to take their own approaches. As the process develops, standards will be improved and we will share learning, for example via the Circular Economy wiki.

The guidance now includes a **standard template** Excel spreadsheet for applicants to complete and submit as part of their CE Statement.

Existing **targets** are set by current policies in the London Plan and London Environment Strategy. Targets may change in the future as more evidence and data is obtained. The Recycling and Waste Reporting table asks for data to be submitted separating recycled and reused materials. The guidance clarifies that the 20 per cent recycled content target is for the building as a whole, rather than for each building element or layer.

Greater consistency has been achieved between the guidance and the **WLC** and **Be Seen** Energy Monitoring guidance, for example, submission timings, benchmarks being provided and minimum information requirements

Q21: Do you have any further comments to make on Section 4?

Eleven responses were received to this question. Respondents suggested that:

- Environmental Product Declarations (EPDs) and tracking site activities should be required. It may be difficult to get information (e.g. on recycled content from manufacturers) and verify data without EPDs, quantify reused construction materials (due to difficulty tracking site activities) and record material mass (as many materials are not ordered by weight). Data may be high-level estimates.
- The guidance should make it clear how data will be collated and made accessible (e.g. to waste planners), for example via an online reporting form.
- There should be more requirements on end-of-life strategies, such as providing examples and requiring evidence early on.
- The guidance should require justification, and make clear how much should be provided.
- Measuring mass alone is onerous and a crude metric.

- Clearer benefits and incentives are needed.
- The guidance should provide examples and case studies of compliant CE Statements.

GLA response

It is recognised in the guidance that less information will be available for outline planning applications and information may be high-level, with gaps (for example, specific materials and products may not be known). However, it is expected that information on certain materials will be available at outline stage, for example based on experience from previous schemes, and to estimate costs. Applicants are expected to provide as much information as possible to ensure circular economy principles and targets are embedded early in the design process. Particularly important to include at outline stage are building layers or elements that are likely to be decided early on and which have the longest lifespans or will be changed less frequently. We recognise that EPDs may assist with providing detailed, precise information regarding materials and as such are encouraged for pioneering statements; however, these could curtail development unnecessarily if mandated by the guidance for all relevant schemes.

Section 3.3 of the guidance highlights how **data** should be submitted. The Application Flowchart (Appendix 2) highlights roles and Table 5 highlights the key stakeholders who should be involved by application type. To enable transparency of information and monitoring, post-construction reports and any appendices will be **accessible** to the public through the London Datastore. Appendix 1 in the guidance includes data analysis from CE Statements collected to date.

More information has been provided in the guidance on requirements relating to an **end-of-life strategy** (see Table 5 and Section 4.7).

Paragraph 2.3.3 and 4.6.8 of the guidance set out the **justification required** for CE Statements.

Information is required by **mass / weight (kg)** to achieve consistency and enable comparison and analysis. The same information is required in the WLC assessment. Where materials are measured in alternative metrics, such as m^3, these should be converted into kilograms by applying material densities. There is a simple conversion factor from volume to weight (multiple by density). The London Environment Strategy requires reporting of the municipal waste target by weight and London Plan policies refer to tonnes.

The CE primer sets out **benefits and examples** of circular economy design approaches. The GLA will continue promote good practice examples and share these with partners, for example via the Circular Economy wiki, to encourage innovation. ReLondon, through the CIRCuIT project, are producing implementation case studies and developing online portals and platforms, including around materials exchange, to improve the availability and visibility of data.

3.10. Resources, terms and further comments

Q22: Are there any other resources that may be useful to include in Section 5?

Fifteen responses were received to this question. Respondents suggested that:

- The GLA should share more resources*, examples and up-to-date metrics (including via a webpage).
- More guidance is needed to assess CE Statements, including what constitutes compliance.
- The GLA should clarify the relationship between LPG and the CE primer. The documents could be merged.

*The following resources were specifically recommended for inclusion in the guidance: CE primer, London Energy Transformation Initiative (LETI) guidance, Ellen MacArthur Foundation (EMF) procurement programme, CIRCuIT, UK Green Building Council (UKGBC) Circular Economy guidance, Clarion Housing Circular Economy strategy and academic research.

GLA response

The GLA will share best practice **resources** and **examples** via the Circular Economy wiki. **Up-to-date metrics** have been included in the guidance (see Appendix 1). Data from CE Statements will be available publicly via the London Datastore. Using the CE Statements data, the GLA will develop and share further metrics in the future. ReLondon, through the CIRCuIT project, are developing case studies and guidance for boroughs and industry to support implementation.

Further information is included on the minimum requirements of CE Statements (see Table 5), options for pioneering statements (see Section 4) and essential elements of CE Statements, in relation to policy (see Appendix 3).

A link to the primer has been added to the guidance, however it is not considered necessary to merge the two as they serve different purposes.

Q23: Are there any other terms used in the guidance that should be defined in the glossary?

Seven responses were received to this question. Clarification has been added in the guidance to key terms, and therefore the glossary has been removed. The following terms have been clarified, following consultation feedback:

- New Rules of Measurement (NRM) (see 2.1.3)
- Value (financial or other) (e.g. see 2.1.4)
- Demolition audit (see 4.6)
- Design for reusability - add ‘as a whole’ (Table 3 now includes this)

The following terms, which were raised in response to this question, have been removed from the guidance:

- Sustainable sourcing (it was noted that this term is too broad. It has been made clearer that local sourcing is encouraged, especially for reprocessed materials)
- 'as is practicable' (requirements have been made clearer)

Further suggestions included:

- Waste streams (e.g. AD/ Pyrolysis add to municipal definition)
- Metric could be embodied carbon of primary materials displaced by reuse/recycling of secondary materials
- Add Frequently Asked Questions (FAQs)
- Add 'repositioning' as an option, close to 'repurpose'

GLA response

The definition of **municipal** waste from the London Plan has been added (see footnote 31).

Metrics will be developed further in the future, as we receive more data.

The guidance clearly sets out the requirements for relevant development and a **FAQs** section is not believed to be needed currently. This will be kept under review as the guidance is implemented.

The circular economy design approaches and their definitions have been reviewed and made clearer. 'Repurpose' has been removed from the decision tree hierarchy of circular economy design approaches, to reflect that minimal changes should be made to the fabric of buildings, regardless of whether they are changing use or not. 'Repositioning' has not been added as this could also draw attention away from making the best use of building fabric, and also as this would not be sufficiently distinct from other design approaches.

Q24: Do you have any further comments to make on the guidance?

Twenty-one responses were received to this question. Respondents suggested that:

- Make the requirements, reporting process, roles and responsibilities (e.g. for assessment and monitoring) clearer (including LA role).
- Include a standard template to enable data comparison at different stages.
- Provide solutions/ideas and good practice examples, such as using vacant land, introducing collection services and recycling centres, manufacturer guidance (e.g. on recycled content, take back options, end of life routes), product EPDs. Good practice examples were also shared. Make clearer the benefits.

- Require evidence and justification.
- Requirements difficult to achieve, especially for lower threshold applications. Tailor methodology to project size.
- Barriers include influencing Government, industry and supply chain; logistical support for transport, storage and testing of materials; consideration early-on; data accessibility to LA planners.
- Resources, training, expertise and support for LA officers to assess, particularly for lower threshold applications.
- Securing monitoring via planning condition or Section 106 agreement (include template).
- Link to other submission requirements, in particular to WLC and embodied carbon.
- Positive feedback for reuse, recycling, resource efficiency, refurbishment and longevity as strategic approaches.

GLA response

An Application Flowchart (Appendix 2) has been added to make clearer the **reporting process**. Also, Table 5 highlights the minimum submission **requirements**, and key actors to involve.

A **standard CE Statement template** has been added and should be completed by applicants / developers as part of their CE Statement submission. This has been introduced to make the requirements clearer and standardise information collection.

The GLA will share **best practice examples** via the Circular Economy wiki and through training. ReLondon, through the CIRCuIT project, are delivering training, developing e-learning and producing case studies highlighting implementation of circular economy in London. An example of **recycled content by value calculation** has been included. The purpose of the guidance is to provide information on what is expected in a CE Statement.

The guidance refers to **justification** required.

CE Statements are being submitted. Whilst information early on may be **high-level** with gaps, as much as information should be provided to embed circular economy design approaches into the scheme. CE Statements are currently only required for referable applications.

The GLA works with partners to address **barriers** to the circular economy. The GLA is looking at safeguarding land for circular economy uses if not on-site. We are trying to retain industrial capacity and provide sufficient capacity for increased demand for more circular economy sites. ReLondon are looking at storage and logistic requirements needed to facilitate more reuse and are discussing with boroughs developing circular economy hubs centres for innovation, reuse, remanufacturing

and re-testing. Data from CE Statements will be accessible through the London Datastore.

Boroughs will be expected to ensure that CE Statements are submitted as part of referable applications and that a post-construction CE Statement report is secured. Where possible we would also encourage boroughs to review the information submitted. The GLA will be reviewing CE Statements for referable applications, similarly to the review we undertake of energy strategies. Boroughs that are intending to require CE Statements for non-referable applications will need to scrutinise the information submitted in addition to securing the post-construction statement and storing the information received. We hold regular workshops for local authorities on the Mayor's policies and we will hold a specific **training** session on CE Statements. The guidance and CE template include an email address for queries. We will consider what additional support may need on an ongoing basis.

The submission of a post-construction report should be **secured** by local planning authorities (LPAs) either by condition or obligation. As the LPA approves the discharge of conditions and obligations, it is responsible for verifying that reports have been received for referable applications and for submitting these to the GLA for review. **Suggested wording** for securing post-construction monitoring reports is available on the GLA's website. This wording may be adapted over time to improve the submission process and ensure it is robust.

More references have been included to other submission requirements, such as the **WLC guidance** and **embodied carbon.**

4. Other themes raised during engagement

25 November 2021 – all stakeholders engagement event

Additional questions raised from the consultation events (which were not highlighted above) were:

- Volume or area of materials should be used rather than kg for reporting.
- How will you challenge assertions that retention of an existing building isn't viable?
- A target for reuse is needed.
- Is there the potential for taxation to be used as a lever in favour of reuse?
- Is the minimum 20 per cent recycled content for each element (external wall) or material (brick)?
- How relevant are privately owned reclamation yards in promoting re-use? How does someone with a new reuse or remanufacturing enterprise access 'circular economy sites'?
- Does the Bill of Materials template need to be finalised before planning?

GLA response

We want to get consistent figures for analysis. We recognise that **kg** isn't always available, but we have received over 30 statements now that have included kg for the key materials.

The LPG, aims to drive more consideration of **retention** over demolition, making sure this is seen as the starting point. The requirements for pre-redevelopment and pre-demolition audits will enable the scrutiny of applications in order to ensure that the potential to retain existing buildings has been robustly explored.

With better data we would look to **targets** based on embodied carbon saved through reuse, rather than only weight. This would also help to delineate 'high value recycling' from typical downcycling.

Taxation is a Government decision. The AJ Retrofit First campaign is lobbying on this point and the Mayor has lobbied Government to equalise VAT for refurbishment and new build development.

The minimum **20 per cent recycled content** target is for the building overall.

Privately owned **reclamation yards** may be part of the picture for encouraging take-up of the circular economy. However, this is outside the scope of this guidance. Organisations such as ReLondon and resources such as the London Waste Map may be able to provide further information.

The **Bill of Materials** table needs to be finalised at full application stage.

30 November 2021 – borough engagement event

Additional questions raised from the consultation events (which were not highlighted above) were:

- Why does the guidance only apply to referable schemes instead of all major developments?
- When will evidence need to be submitted post-planning?
- Are we involving construction contractors?

GLA response

London Plan policy requires **referable applications** to produce CE Statements, but encourages boroughs to introduce lower thresholds.

The **post-completion CE Statement** must be submitted within 3 months of completion of construction.

Organisations such as ReLondon are keen to engage with **construction contractors** as part of this process.

3 December 2021 - all stakeholders engagement event

Additional questions raised from the consultation events (which were not highlighted above) were:

- What process is there to encourage design teams to design building elements to be demounted at the end of life of a building?
- How does the LPG ensure buildings are designed to reduce waste during construction (e.g. packaging waste, which can account for up to 25 per cent of construction waste by volume, temporary protection and hoardings, and temporary shuttering for concrete structures)?
- Is there any work taking place to help create the infrastructure; associated businesses; tools and logistics to support circular economy practices (e.g. digital platforms to identify sources of available resources)?
- What level of detail is required to be submitted at planning, when the design is only at RIBA Stage 3, particularly within the Bill of Materials?
- The focus appears to be on minimising waste within the building design and construction rather than considering wider circular economy business models that could be adopted, particularly during the operation of the building. Is that intentional?
- How is viability assessed in the context of Table 1?

GLA response

CE Statements are expected to demonstrate circular economy principles, including design for disassembly, provide **end of life** scenarios in the Bill of Materials, and submit an End of Life strategy.

The Recycling and Waste Reporting table includes **monitoring of construction waste** produced. Applicants and developers need to demonstrate compliance with Policy SI 7 targets.

The GLA is looking at safeguarding land for circular economy uses if not on-site. London Plan policies E4-E7 seek to retain sufficient industrial capacity, and this approach factors in the provision of sufficient capacity for circular economy sites. ReLondon are looking at storage and **logistics** requirements to facilitate reuse and are discussing with boroughs developing circular economy hubs the potential for centres for innovation, reuse, remanufacturing and re-testing. ReLondon are developing **online platforms**, including around materials exchange, to improve the availability and visibility of data. To enable transparency of information and monitoring, post-construction reports and any appendices will be made available to the public through the London Datastore.

Table 5 in the LPG sets out the minimum submission requirements by application type. Refer to the CE Statement template **Bill of Materials** table.

The guidance encourages a focus on **operational** waste, for example by requiring an Operational Waste Management Plan to be submitted at full application stage.

Applicants will be expected to provide an explanation for how they are meeting the circular economy principles, and robust **justification** where they are not following the hierarchy of circular economy design approaches outlined in the decision tree (Figures 4 and 5 in the guidance).

5. Equality impacts

As part of the consultation, a draft Equality Impact Assessment (EqIA) was undertaken, which did not identify any negative equality impacts on protected groups. A survey on the EqIA was published and consulted on as part of the overall consultation on the draft guidance.

No responses were received to the EqIA survey on the draft CE Statements guidance. No responses to the main LPG consultation survey referred to or identified any equality impacts resulting from the guidance.

The EqIA however has been updated for the published CE Statements guidance (hyperlink) and will be kept under review.

6. Next steps and monitoring

There was a significant level of interest in the development of the policy at pre-consultation stage. We would like to thank everyone who took the time to contribute, including in the context of a pandemic situation.

All views that were shared have considered in the development of the final CE Statements guidance and the key points are detailed in this report.

Data from CE Statements will be analysed by the GLA and lessons learned will be shared. CE Statements will be shared publicly through the London Datastore. Training will be provided to borough officers.

Stay informed:

Circular Economy Statements LPG consultation webpage

Circular Economy wiki and case studies

Previous GLA circular economy consultation events

The guidance will be monitored and kept under review. For any queries please email: circulareconomystatements@london.gov.uk / londonplan@london.gov.uk

Appendix 1: Summary of formal engagement

Date	Activity Type	Participation	Representation
13 Oct – 15 Jan 2021	Consultation survey and written responses	All	33 responses
25 Nov 2020	Webinar	All	40 attendees
30 Nov 2020	Webinar	Borough	20 attendees
3 Dec 2020	Webinar	All	40 attendees

Equality Impact Assessment (EqIA) for London Plan Guidance

London Plan Guidance:	Whole Life-cycle carbon assessment guidance
Teams involved:	London Plan Team, Environment Team
Date:	December 2021

1. Please provide an outline of the guidance, who it is aimed at and any key issues to be aware of.

(Refer to introduction section of guidance)

Whole Life-Cycle Carbon (WLC) emissions are the carbon emissions resulting from the materials, construction and the use of a building over its entire life, including its demolition and disposal. A WLC assessment provides a true picture of a building's carbon impact on the environment.

This guidance document explains how to prepare a Whole Life-Cycle Carbon (WLC) assessment in line with Policy SI 2 Minimising greenhouse gas emissions of the London Plan. This requirement applies to planning applications which are referred to the Mayor, but WLC assessments are encouraged for all major applications. The guidance is for anyone involved in developing WLC assessments including planning applicants, developers, designers, energy consultants and local government officers.

2. Which of the Public Sector Equality Duty aims are relevant to the guidance and the impacts identified?

No specific impacts identified for groups with protected characteristics

Assessment

List aspects of the guidance that might affect particular groups

Guidance key aspects, chapter headings, theme etc	Particular group that could be affected

* it should be noted that the general policy requirement and principles are already required through the London Plan. This London Plan Guidance is providing further detail on how the policies should be implemented, and therefore further amplifying the effects

Equality impacts, mitigating actions and justification (where applicable)

Group	Potential impact description What positive and negative impacts have been identified (known and potential) for particular groups? Refer to evidence (including engagement). Check the objectives from the IIA and the EqIA guide questions and use these where relevant to structure your answers. Check the EqIA elements from the original IIA and any subsequent assessments.	Relevant PSED aim (1, 2a, b or c, and/or 3)	Actions identified and/or justification For negative impacts, set out mitigating actions to minimise or eliminate negative impacts and any action plan. If negative impacts cannot be mitigated, provide **objective justification**. For positive impacts, consider how these could be maximised.	Assessment of equality impacts Score each impact as either: +2 Strong positive +1 Positive 0 Neutral - 1 Negative - 2 Strong negative Mixed or uncertain
Age (consider particularly children, under 21s and over 65s)	No anticipated impacts			

Disability (consider different types of physical, learning or mental disabilities)	No anticipated impacts			
Gender reassignment	No anticipated impacts			
Marriage and civil partnership	No anticipated impacts			
Pregnancy and maternity	No anticipated impacts			
Race or Ethnicity (consider refugees, asylum seekers, migrants, gypsies and travellers)	No anticipated impacts			
Religion or belief	No anticipated impacts			
Sex	No anticipated impacts			

Sexual orientation	No anticipated impacts			
People on low incomes	No anticipated impacts			

Overview of equality impacts

Using your findings from the table above, summarise the impacts for each group in the table below using the scoring listed above.

	Age	Disability	Gender reassignment	Marriage and civil partnership	Pregnancy and maternity	Race	Religion and belief	Sex	Sexual Orientation	People on low incomes
Guidance 1	No impacts anticipated	No impacts anticipated	No impacts anticipated	No impacts anticipated	No impacts anticipated	No impacts anticipated	No impacts anticipated	No impacts anticipated	No impacts anticipated	No impacts anticipated

Consider whether to break the guidance down and introduce further rows in order to make clear different equality impacts for different aspects of the guidance.

Amendments to the guidance

(only for review to the EqIA in the future)

Change	Reason for change
What changes have you made to the guidance as a result of this EqIA?	Why have these changes been made?

Recommendation

Based your assessment, please indicate which course of action you are recommending to decision makers.

Outcome Number	Description	Mark with an X (more than one box can apply)
Outcome One	**No major change to the guidance is required** This EqIA has not identified any potential for discrimination or negative impact, and all opportunities to advance equality have been taken.	x
Outcome Two	**Adjustments to the guidance are required** to remove barriers identified by the EqIA or better advance equality.	
Outcome Three	**Justify and continue with the guidance** despite having identified some potential for negative impacts or missed opportunities to advance equality.	
Outcome Four	**Stop, rethink or abandon** when the EqIA shows actual or potential unlawful discrimination	

Monitoring

Monitoring will take place through the London Plan Annual Monitoring Report and wider monitoring of the Mayor's other strategies as well as part of reviewing the London Plan.

Appendix A: Evidence Reference and Content

London Plan IIA (including EqIA) and Addendums

Evidence

Age

No evidence was found which is relevant to whole life-cycle carbon assessment guidance

Disability

No evidence was found which is relevant to whole life-cycle carbon assessment guidance

Gender reassignment

No evidence was found which is relevant to whole life-cycle carbon assessment guidance

Marriage or Civil Partnership

No evidence was found which is relevant to whole life-cycle carbon assessment guidance

Pregnancy and maternity

No evidence was found which is relevant to whole life-cycle carbon assessment guidance

Race

No evidence was found which is relevant to whole life-cycle carbon assessment guidance

Religion or belief

No evidence was found which is relevant to whole life-cycle carbon assessment guidance

Sex

No evidence was found which is relevant to whole life-cycle carbon assessment guidance

Sexual orientation

No evidence was found which is relevant to whole life-cycle carbon assessment guidance

Gaps in Evidence

None identified

Appendix B: Engagement summary

Summary of protected groups engaged

Already engaged: Engagement events during the development of the guidance has been aimed at relevant industry stakeholders who are involved in implementing the policy including developers, consultants and borough officers. Future engagement: No specific impacts on groups with protected characteristics has been identified – no EqIA specific engagement necessary.

Engagement record

Engagement undertaken which is relevant to the EqIA for example with specific community groups, or protected characteristic groupings, or to fill identified evidence gaps.

Event details	Specific groups represented	Key findings

Equality Impact Assessment (EqIA) for London Plan Guidance

London Plan Guidance:	Circular Economy Statement Guidance

1. Please provide an outline of the guidance, who it is aimed at and any key issues to be aware of.

A circular economy is defined as one where materials are retained in use at their highest value for as long as possible and are then reused or recycled, leaving a minimum of residual waste.

Circular Economy Statements are intended to demonstrate how a development will incorporate circular economy measures into all aspects of the design, construction and operation process, therefore encouraging development that is designed to eliminate waste, conserves resources, and manage waste sustainably at the highest value.

The Circular Economy Statement Guidance explains how to prepare a Circular Economy Statement as required by Policy SI7 of the Intend to Publish London Plan for development proposals that are referable to the Mayor.

2. Which of the Public Sector Equality Duty aims are relevant to the guidance and the impacts identified?

2. advance equality of opportunity between people who share a relevant protected characteristic and persons who do not share it

(a) remove or minimise disadvantages suffered by persons who share a relevant protected characteristic that are connected to that characteristic

Assessment

List aspects of the guidance that might affect particular groups

Guidance key aspects, chapter headings, theme etc	Particular group that could be affected
Improved implementation of the circular economy in London's built environment	Older adults and children; disabled people
Improvements to air quality resulting from less transportation of materials/waste	Older adults and children; disabled people; pregnant women; Black, Asian and ethnic minority communities

* it should be noted that the general policy requirement and principles are already required through the London Plan. This London Plan Guidance is providing further detail on how the policies should be implemented, and therefore further amplifying the effects

Equality impacts, mitigating actions and justification (where applicable)

Group	Potential impact description What positive and negative impacts have been identified (known and potential) for particular groups?	Relevant PSED aim (1, 2a, b or c, and/or 3)	Actions identified and/or justification.	Assessment of equality impacts Score each impact as either: +2 Strong positive +1 Positive 0 Neutral - 1 Negative - 2 Strong negative Mixed or uncertain
Age (consider particularly children,	**Positive** This guidance sets out how development proposals can effectively	2a	The positive impacts of this guidance can be maximised by encouraging applicants to produce 'pioneering' Circular Economy Statements, which go	+1

under 21s and over 65s)	implement circular economy principles, supporting the re-use and recycling of waste/materials. By reducing the demand for resource extraction/new material, the effective implementation of circular building principles should reduce carbon emissions and environmental degradation more generally. In the longer term, this is likely to have a positive impact on older and younger Londoners, who can be more at risk from the effects of severe weather associated with climate change, such as heat waves.		beyond standard practice and the minimum requirements for Statements set out in the guidance. The guidance outlines how applicants can pursue this status, which will be encouraged through the development management process.	
	By supporting the effective implementation of circular economy principles in London's built environment (through the application of the Circular Economy Statement Guidance) – including the reuse and recycling of material found on-site– the guidance should contribute to reducing emissions and concentrations of harmful pollutants.	2a	The positive impacts of this guidance can be maximised by encouraging applicants to produce 'pioneering' Circular Economy Statements, which go beyond standard practice and the minimum requirements for Statements set out in the guidance. The guidance outlines how applicants can pursue this status, which will be encouraged through the	+1

	This should have a positive impact on older and younger Londoners who may be more susceptible to the health effects or air pollution.		development management process.	
	Negative No anticipated impacts			
Disability (consider different types of physical, learning or mental disabilities)	**Positive** As described above, the guidance is likely to have a positive impact on carbon emissions and the environment, and therefore contribute to the mitigation of climate change. Disabled Londoners may be more likely to suffer the effects of severe weather associated with climate change, and so the effective implementation of the circular economy in the built environment may help to reduce these impacts.	2a	The positive impacts of this guidance can be maximised by encouraging applicants to produce 'pioneering' Circular Economy Statements, which go beyond standard practice and the minimum requirements for Statements set out in the guidance. The guidance outlines how applicants can pursue this status, which will be encouraged through the development management process.	+1

	The hierarchy of CE design approaches outlined in the decision tree encourages on-site reuse, followed by reuse nearby, and then reuse offsite. This may help to reduce the transportation of materials and waste and encourage materials to be kept at a high value and their use for as long as possible. This could help to reduce carbon emissions from new development and contribute to reducing air pollution. Respiratory conditions such as asthma can result in a person sharing the protected characteristic of disability. Any improvements to London's air quality resulting from effective implementation of the circular economy is therefore likely to positively impact on disabled Londoners.	2a	The positive impacts of this guidance can be maximised by encouraging applicants to produce 'pioneering' Circular Economy Statements, which go beyond standard practice and the minimum requirements for Statements set out in the guidance. The guidance outlines how applicants can pursue this status, which will be encouraged through the development management process.	+1
	Negative No anticipated impacts			
Gender reassignment	**Positive**			

	No anticipated impacts			
	Negative No anticipated impacts			
Marriage and civil partnership	**Positive** No potential impacts identified.			
	Negative No potential impacts identified.			
Pregnancy and maternity	**Positive** As described above, effectively implementing circular economy principles and measures can contribute to reducing air pollution. Poor air quality can have negative impacts during pregnancy that affect both mother and baby. Improvements to air quality resulting from the effective implementation of the circular economy (through application of the Circular Economy Statement	2a	The positive impacts of this guidance can be maximised by encouraging applicants to produce 'pioneering' Circular Economy Statements, which go beyond standard practice and the minimum requirements for Statements set out in the guidance. The guidance outlines how applicants can pursue this status, which will be encouraged through the	+1

	Guidance) are therefore likely to have a positive on pregnant women.		development management process.	
	Negative No potential impacts identified.			
Race or Ethnicity (consider refugees, asylum seekers, migrants, gypsies and travellers)	**Positive** People from Black, Asian and minority ethnic (BAME) backgrounds are more likely to be on lower incomes, live in deprived areas and be negatively impacted by poorer air quality. For example, 18.9% of Black households and 20.4% of Gypsy/Roma households nationally were made up of a single parent with dependent children (Census 2011), compared with 6.7% of White British households.[1] As described above, effectively implementing circular economy principles and measures can contribute to reducing air pollution.	2a	The positive impacts of this guidance can be maximised by encouraging applicants to produce 'pioneering' Circular Economy Statements, which go beyond standard practice and the minimum requirements for Statements set out in the guidance. The guidance outlines how applicants can pursue this status, which will be encouraged through the development management process.	+1

[1] Families and households - GOV.UK Ethnicity facts and figures (ethnicity-facts-figures.service.gov.uk)

	Research on air quality in London suggests that areas with higher proportions of BAME Londoners are be more likely to be exposed to above EU-limit Nitrogen Dioxide levels. Effectively implementing circular economy measures - that help to reduce pollutant emissions - through the Circular Economy Statement Guidance is therefore likely to contribute to reducing the impact of poor air quality on BAME Londoners.			
	Negative No potential impacts identified.			
Religion or belief	**Positive** No potential impacts identified.			
	Negative No potential impacts identified.			

Sex	**Positive** Women are more likely to be on lower incomes than men. Around 90% of single parents are women.[2] Single parents, due to their lower incomes, may be more likely to live in deprived areas and negatively impacted by poor air quality. As described above, effectively implementing circular economy principles and measures can contribute to reducing air pollution. By supporting the reuse of materials and potentially reducing the transportation and associated carbon emissions from new development, the Circular Economy Statement Guidance may contribute to reducing the impact of poor air quality on women.			
	Negative No potential impacts identified.			

[2] Single parents: facts and figures - Gingerbread

Sexual orientation	**Positive** No potential impacts identified.			
	Negative No potential impacts identified.			
People on low incomes	**Positive** As described above, effectively implementing circular economy principles and measures can contribute to reducing air pollution. Areas with poorer air quality are often more deprived. By implementing circular economy measures (through the Circular Economy Statement Guidance) that reduce the transport of materials and therefore reduce the emission of harmful pollutants, it is likely that low-income groups will be positively impacted.	2a	The positive impacts of this guidance can be maximised by encouraging applicants to produce 'pioneering' Circular Economy Statements, which go beyond standard practice and the minimum requirements for Statements set out in the guidance. The guidance outlines how applicants can pursue this status, which will be encouraged through the development management process.	+1

	Negative No potential impacts identified.			

Overview of equality impacts

Using your findings from the table above, summarise the impacts for each group in the table below using the scoring listed above.

	Age	Disability	Gender reassignment	Marriage and civil partnership	Pregnancy and maternity	Race	Religion and belief	Sex	Sexual Orientation	People on low incomes
Guidance 1	+1	+1	No potential impacts identified.	No potential impacts identified.	+1	+1	No potential impacts identified.	+1	No potential impacts identified.	+1

The table above highlights the protected groups who could be positively impacted by the CES guidance.

The potential impact on people with multiple protected characteristics (for example, disabled, older women from Black, Asian and Minority Ethnic backgrounds) associated with the CES guidance may be more significant, due to the multiple intersecting inequalities experienced.

Amendments to the guidance

(only for review to the EqIA in the future)

Change	Reason for change
What changes have you made to the guidance as a result of this EqIA?	Why have these changes been made?
None required as the guidance results in positive impacts on groups who share a protected characteristic.	N/a

Recommendation

Based your assessment, please indicate which course of action you are recommending to decision makers.

Outcome Number	Description	Mark with an X (more than one box can apply)
Outcome One	**No major change to the guidance is required** This EqIA has not identified any potential for discrimination or negative impact, and all opportunities to advance equality have been taken.	x
Outcome Two	**Adjustments to the guidance are required** to remove barriers identified by the EqIA or better advance equality.	
Outcome Three	**Justify and continue with the guidance** despite having identified some potential for negative impacts or missed opportunities to advance equality.	
Outcome Four	**Stop, rethink or abandon** when the EqIA shows actual or potential unlawful discrimination	

Monitoring

Monitoring will take place through the London Plan Annual Monitoring Report and wider monitoring of the Mayor's other strategies as well as part of reviewing the London Plan.

Appendix A: Evidence Reference and Content

London Plan IIA (including EqIA) and Addendums

Evidence

Age

The impacts of more intense and severe weather associated with climate change can have impacts on health across the population, however children and older people can be part.[3] Age is also an important factor in relation to the susceptibility to the health effects of air pollution, with younger and older people being more at-risk.[4]

Disability

Disabled people, particularly those who suffer from respiratory conditions may be impacted more by the health effects of air pollution and by the exacerbating impact of climate factors and climate change.[5]

Gender reassignment

No evidence was found which is relevant to Circular Economy Statements.

Marriage or Civil Partnership

No evidence was found which is relevant to Circular Economy Statements.

Pregnancy and maternity

Studies in London have shown that exposure to air pollution has a detrimental impact upon babies' health before they are born and is directly attributable to low birth weight. [6]

[3] Protecting Health in Europe from Climate Change, World Health Organisation, 2017.
[4] Updated Analysis of Air Pollution in London, Aether, 2017.
[5] Protecting Health in Europe from Climate Change, World Health Organisation, 2017.
[6] Impact of London's road traffic air and noise pollution on birth weight: retrospective population-based cohort study, British Medical Journal, 2017.

Race

Evidence on air quality suggests that places with higher proportions of some BAME communities are more likely to be exposed to levels of nitrogen dioxide that are above EU limits.[7]

Religion or belief

No evidence was found which is relevant to Circular Economy Statements.

Sex

90% of single parents are women. Single parents are more likely to have lower incomes and may be more likely to live in deprived areas with poorer air quality.

Sexual orientation

No evidence was found which is relevant to Circular Economy Statements.

Gaps in Evidence

No gaps in evidence identified.

Appendix B: Engagement summary

Summary of protected groups engaged

Already engaged: engagement with and input from industry stakeholders – primarily those who will be involved in the preparation and assessment of Circular Economy Statements - has taken place during the production of the guidance.

Future engagement: no specific engagements is proposed with groups who share protected characteristics given the technical nature of the guidance. The engagement that took place during the formal consultation on the draft guidance (which was open for 12 weeks) is highlighted below.

Engagement record

Date	Activity Type	Participation	Representation

[7] Updated Analysis of Air Pollution in London, Aether, 2017.

13 Oct – 15 Jan 2021	Survey on the draft guidance Survey on the Equality Impact Assessment (Online and paper surveys available)	All – general public	33 responses received on the draft guidance
25 Nov 2020		All – general public	Approximately 40 attendees
30 Nov 2020	Webinar	Borough	Approximately 20 attendees
3 Dec 2020	Webinar	All – general public	Approximately 40 attendees

Key findings from the consultation can be found in the associated consultation summary report (include link).

No responses were received on the draft CES LPG EqIA survey. No responses were received that referred to equality impacts.

Updates to latest Whole Life Carbon template (

Template tab
Pre-app information
Outline and Detailed planning Stage & Post-construction result
Post-Construction result

(**October 2021**)

Details
Addition of confirmation and details relating to options to retaining
Removal of Y/N option next to each WLC reduction principle.
Addition of confirmation of operational modelling process used
Addition of confirmation relating to proportion of material quantities included relating to cost
Addition of confirmation of third party mechanisms used
Addition of confirmation that the assessment has or can be submitted to the Built Environment Carbon Database
Updates assessment summary results to align with new WLC benchmarks
Addition of selection of most comparable WLC benchmark selection
Addition of details relating to retention of existing structures and buildings
Updated note/example text for module B assumptions and end of life scenarios in the 'Material Quantity and End of Life Scenarios' table
Addition of details relating to refrigerants to 'Material Quantity and End of Life Scenarios' table
Addition of option in assessment table to report A5 emissions as a single number or A5 emissions not related to a building element category
Removal of assessment 2
Colour coding to reflect cells that require inputs and cells which are updated automatically
Addition of confirmations relating to post-construction evidence submission
Addition of list of product specific EPDs from products installed in the building

Greater London Authority - Whole Life-Cycle Carbon (WLC) As

HOW TO USE THIS SPREADSHEET

This template should be used by planning applicants to fulfil the requirements of the Mayor's Whole Life out in London Plan Policy SI 2. Before completing and submitting this spreadsheet to the GLA, applican Assessment guidance:
https://www.london.gov.uk/what-we-do/planning/implementing-london-plan/planning-guidance/whole-life consultation-draft

Applicants are required to submit a WLC assessment to the GLA at the following three stages: pre-appl and post-construction. Separate tabs are provided in this spreadsheet for each stage. An outline of the submit it is provided below.

1. Pre-application stage

At pre-application stage, applicants are required to complete the pre-application information tab of this t site and to provide details of the WLC principles which are informing the development of the site. This s other pre-application material.

2. Outline/detailed planning submission stage

At this stage, applicants are required to complete the outline or detailed planning stage tab of this templ GLA along with their planning application. This stage of the process requires a baseline WLC assessme undertaken.

3. Post-construction stage

At the final stage of the WLC assessment process, applicants should complete the post-construction re GLA prior to occupation of the development. This will require an update of the information provided at p WLC carbon emission figures to be reported using actual material quantities and site emissions during

ZeroCarbonPlanning@london.gov.uk

QUERIES

Any queries or feedback on this template should be submitted to:
ZeroCarbonPlanning@london.gov.uk

ssessment template

e-Cycle Carbon (WLC) Assessment policy set
ts should read the Whole Life-Cycle Carbon

e-cycle-carbon-assessments-guidance-pre-

lication, outline/detailed planning submission
information required at each stage and how to

emplate to confirm various details about the
hould be submitted to the GLA along with all

ate (whichever is relevant) and submit it to the
ent against each life-cycle module to be

sult tab of this template and submit it to the
lanning submission stage and for the actual
construction. Information should be submitted

Project details	
Project name	
Planning application reference number (if applicable)	
Use Type	
Brief description of the project	
GIA (m^2)	
Authors (organisation or individuals)	
Date of assessment	

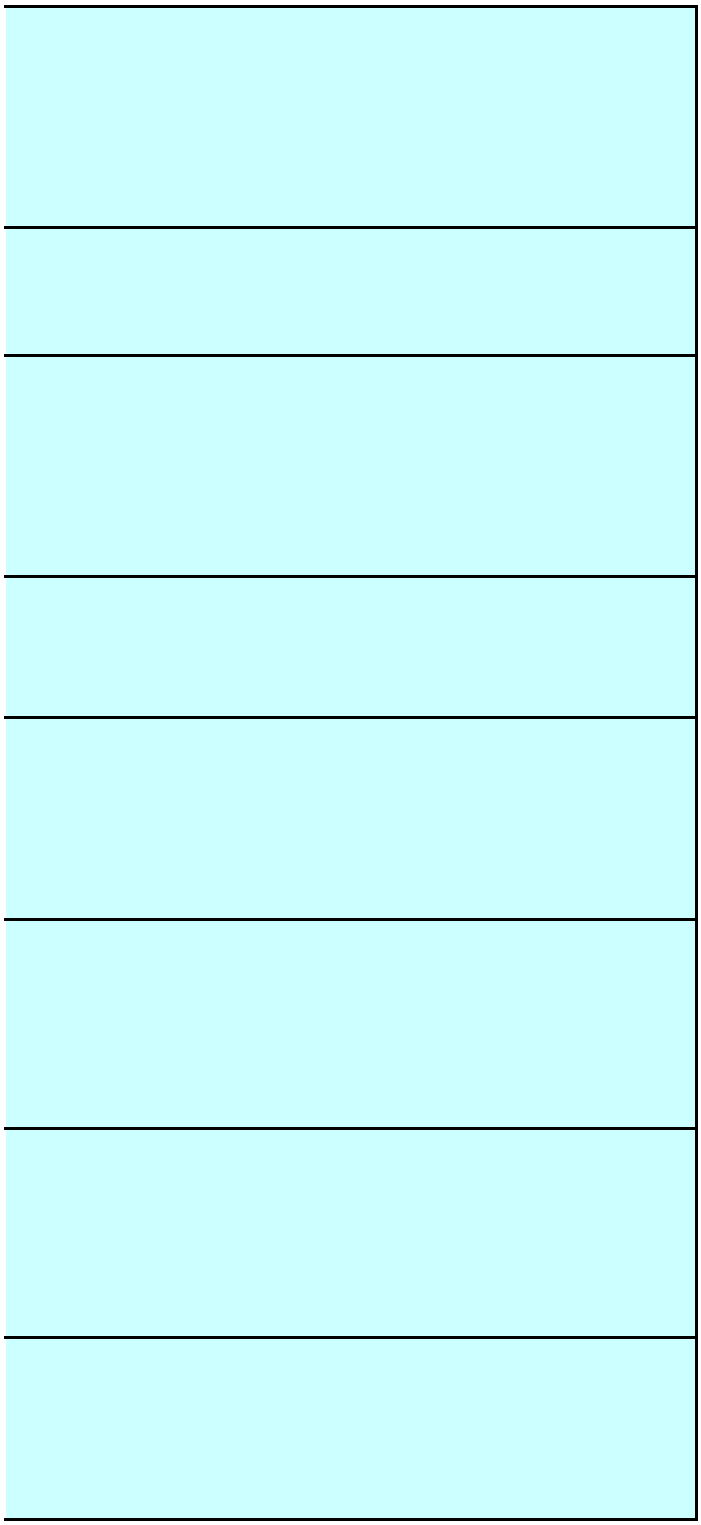
	WLC reduction principles	Key be
1	Reuse and retrofit of existing buildings	Significant retention and reuse of and reduces construction costs.
2	Use repurposed or recycled materials	Reduces waste and carbon emis
3	Material selection	Appropriate material choices are Ensuring that materials are selec planned life expectancy of the bu for replacements and the in-use
4	Minimise operational energy use	A 'fabric first' approach should be demand and reduce carbon and
5	Minimise the carbon emissions associated with operational water use	Choice of materials and durability avoid leakage and subsequent b reducing the carbon emissions o
6	Disassembly and reuse	Designing for future disassembly become future waste and that the and economic value.
7	Building shape and form	Compact efficient shapes help m embodied carbon emissions from given floor area. This leads to a r resulting in lower construction an
8	Regenerative design	Removing carbon emissions from materials and systems absorbing carbon reduction.

9	Designing for durability and flexibility	Durability means that repair and turn helps reduce life-time buildir flexibility can respond with minim future changing requirements an avoiding obsolescence which als value.
10	Optimisation of the relationship between operational and embodied carbon	Optimising the relationship betwe carbon contributes directly to res reduction.
11	Building life expectancy	Defining building life expectancy as to the most efficient choices fo aids overall resource efficiency, i helps future proof asset value.
12	Local sourcing	Sourcing local materials reduces chain lengths and has associated benefits.
13	Minimising waste	Waste represents unnecessary a Buildings should be designed to and to ease repair and replacem helps reduce initial and in-use co
14	Efficient construction	Efficient construction methods (e manufacturing and modern meth contribute to better build quality, waste and reduce the need for re the defects period (snagging).
15	Lightweight construction	Lightweight construction uses les carbon emissions of the building source, fabricate and deliver to s
16	Circular economy	The circular economy principle fo of materials which in turn leads to efficiencies.

enefits	Provide examples of how reduction princi
f structures is carbon efficient	Confirmation that options for retaining existing buildings and structures have been fully explored before considering substantial demolition
	Carbon emissions associated with pre-construction demolition ($kgCO_2e$)
	Estimate of the percentage of the new build development which will be made up of existing elements
sions.	
key to carbon reduction. cted with consideration of the uilding reduces waste, the need costs.	
e prioritised to minimise energy in-use costs.	
y of systems, which help to uilding damage, contribute to f water use.	
ensures that products do not ey maintain their environmental	
inimise both operational and n repair and replacement for a more efficient building overall d in use costs.	
n the atmosphere through g it makes a direct contribution to	

replacement is reduced which in ng costs. A building designed for um environmental impact to d a changing climate, thus o underwrites future building	
een operational and embodied ource efficiency and overall cost	
gives guidance to project teams or materials and products. This ncluding cost efficiency and	
transport distances and supply d local social and economic	
and avoidable carbon emissions. minimise construction waste, ent with minimum waste, which sts.	
.g. modular systems, precision ods of construction) can reduce construction phase epairs in the post completion and	
ss material which reduces the as there is less material to ite.	
ocusses on a more efficient use o carbon and financial	

ple has been used, or give reasons why it cannot be used.
[Outline the options that have been considered - plus an explanation of opportunities and limitations, and why demolition outweighs the benefits of retaining existing buildings/structures where applicable]
[If estimates are not possible, please apply standard assumption of 50kgCO_2e/m^2 of the existing building/s]
[e.g. X% existing facades; Y% existing foundations; Z% superstructures etc.]



Project details
Project name
Planning application reference number (if applicable)
Use Class
Brief description of the project
GIA (m^2)

Assessment details
Authors (organisation or individuals)
Date of assessment
Operational modelling methodology for Module B6 results
Reference study period (if not 60 years)
Software tool used
Type of EPDs and carbon database used
Please confirm if 95% of the cost allocated to each building element category has been accounted for in the assessment?
Explanation of the third-party mechanisms which have been adopted to quality assure this submission
Please confirm whether you have submitted this assessment to the Built Environment Carbon Database (https://www.becd.co.uk/) or if you give permission for the GLA to do this on your behalf by checking one of the following boxes

Estimated WLC emissions N.B. This forms the WLC baseline for the development. The green cells will automatically populate fr
TOTAL kg CO_2e
TOTAL kg CO_2e/m^2 GIA
Please select most appropriate benchmark from drop-down menu
WLC Benchmark
Aspirational WLC Benchmark
Comparison with WLC benchmarks (see Appendix 2 of the guidance)

Retention of existing buildings and structures
Confirmation that options for retaining existing buildings and structures have been fully explored before considering substantial demolition
Carbon emissions associated with pre-construction demolition ($kgCO_2e$)
Estimate of the percentage of the new build development which will be made up of existing elements

Summary of key actions to reduce whole life-cycle carbon emissions that have informed this assessment, including the WLC reductions

Specify further opportunities to reduce the development's whole life-cycle carbon emissions. including the WLC reduction potential

MATERIAL QUANTITY AND END OF LIFE SCENARIOS	
Building element category	
	Note/example
0.1	Demolition: Toxic/Hazardous/Contaminated Material Treatment
0.2	Major Demolition Works
0.3	Temporary Support to Adjacent Structures
0.4	Specialist Ground Works
1	Substructure
2.1	Superstructure: Frame
2.2	Superstructure: Upper Floors
2.3	Superstructure: Roof
2.4	Superstructure: Stairs and Ramps

2.5	Superstructure: External Walls
2.6	Superstructure: Windows and External Doors
2.7	Superstructure: Internal Walls and Partitions
2.8	Superstructure: Internal Doors
3	Finishes
4	Fittings, furnishings & equipment (FFE)
5	Services (MEP)
6	Prefabricated Buildings and Building Units
7	Work to Existing Building
8	External works
Refrigerants	
a	Refrigerants Type 1 (if applicable) - please see CIBSE TM65 for methodology
b	Refrigerants Type 2 (if applicable) - please see CIBSE TM65 for methodology
c	Refrigerants Type 3 (if applicable) - please see CIBSE TM65 for methodology

GWP POTENTIAL FOR ALL LIFE-CYCLE MODULES ($kgCO_2e$) (See Note 1 below if you entered a reference study period in cell C12)	
Building element category	
0.1	Demolition: Toxic/Hazardous/Contaminated Material Treatment
0.2	Major Demolition Works
0.3	Temporary Support to Adjacent Structures

0.4	Specialist Ground Works
0.5	Temporary Diversion Works
1	**Substructure**
2.1	Superstructure: Frame
2.2	Superstructure: Upper Floors
2.3	Superstructure: Roof
2.4	Superstructure: Stairs and Ramps
2.5	Superstructure: External Walls
2.6	Superstructure: Windows and External Doors
2.7	Superstructure: Internal Walls and Partitions
2.8	Superstructure: Internal Doors
3	Finishes
4	Fittings, furnishings & equipment
5	Services (MEP)
6	Prefabricated Buildings and Building Units
7	Work to Existing Building
8	External works
Other site construction impacts or overall construction stage [A5] carbon emissions not specific to an individual building element category	
TOTAL kg CO_2e	
TOTAL kg CO_2e/m^2 GIA	

Notes:

1 If you have entered a reference study period in cell C12 because the assumed building life expectar

e.g. SAP or TM54

[This cell should only be filled in if the reference study period, i.e. the assum
should state the reference study period in this cell. While the assessment sl
additional assessment of the modules B, C and D for the actual reference s
cycle modules' table, see below].

[If using more than one database please list all]

[Yes, or please explain any omissions]

I have submitted this assessment to the BECD ☐

I give permission for the GLA to submit this assessment to the BECD on my

om the tables below

Module A1-A5 (excluding sequestered carbon)	Modules B-C (excl B6 & B7)
0 kg CO2e	0 kg CO2e
#DIV/0!	#DIV/0!
	Residential
<850	*<350*
<500	*<300*

[Explain the reasons for any divergences from WLC benchmarks, including

[Outline the options that have been considered - plus an explanation of opp retaining existing buildings/structures where applicable]
[If estimates are not possible, please apply standard assumption of 50kgC
[e.g. X% existing facades; Y% existing foundations; Z% superstructures etc

Actions included in WLC assessment res
[This list does not need to be exhaustive but should identify the actions with needed]

Further potential opportunitie
[Insert more lines as needed]

Product and Construction Stage (Module A)	
Material type	**Material quantity (kg)**
Breakdown of material type in each category [Insert more lines if needed] e.g. Concrete	65000 kg
e.g. Reinforcement	5000 kg
e.g. Formwork	250 kg

Refrigerant name	**Initial quantity/charge (kg)**
TOTAL	0 kg
Material intensity (kg/m2 GIA)	#DIV/0!

Sequestered (or biogenic) carbon (negative value) **(kgCO_2e)**	**Product stage (kgCO_2e)**
	[A1] to [A3]

0 kg CO2e	**0 kg CO2e**
#DIV/0!	**#DIV/0!**

ıcy is greater or less than 60 years, then you will need to fill in this table usin

ned building life expectancy, exceeds or is less than 60 years. Applicants hould still be done to 60 years, applicants may, if they choose to, submit an tudy period by copying and pasting an additional 'GWP potential for all life-
y behalf ☐

Modules A-C (excluding B6-B7; including sequestered carbon)	Module B1-B5
0 kg CO2e	0 kg CO2e
#DIV/0!	#DIV/0!
<1200	
<800	

against the WLC aspirational benchmarks]

ortunities and limitations, and why demolition outweighs the benefits of
$_2$e/m^2 of the existing building/s]
.]

ults reported	WLC reduction (kg CO_2e/m^2 GIA)
the biggest impacts. Insert more lines if	

s	WLC reduction potential (kg CO_2e/m^2 GIA)

Assumptions made with respect to maintenance, repair and replacement cycles (Module B)	Material 'end of life' s
For all primary building systems (structure, substructure, envelope, MEP services, internal finishes) including assumed material/product lifespans and annual maintenance/repair %	Declare 'end of life' scenario as Statement, and used in the WLC res

Assumed annual leakage rate %	**Refrigerant GWP ($kgCO_2e/kg$)**

Construction process stage ($kgCO_2e$)	
Module A	
[A4]	**[A5]**

0 kg CO2e	**0 kg CO2e**
#DIV/0!	**#DIV/0!**

ıg a 60 year building life expectancy. If you choose to, you may create a seconc

Key	
	Data automatically ca
	Cells that require info
	N/A

Module B6-B7	Module C1-C4	Module D
#VALUE!	0 kg CO2e	0 kg CO2e
#VALUE!	#DIV/0!	#DIV/0!

scenarios (Module C)	Benefits and loads beyond the system boundary (Module D)	
	Estimated reusable materials (kg)	Estimated recyclable materials (kg)
s per project's Circular Economy assessment to produce Module C sults	0 kg	25 kg
	2 kg	8 kg
	0 kg	0 kg

End of Life recovery rate %		
	0 kg	0 kg
	#DIV/0!	#DIV/0!

[B1]	**[B2]**	**[B3]**

0 kg CO2e	**0 kg CO2e**	**0 kg CO2e**
#DIV/0!	**#DIV/0!**	**#DIV/0!**

d table below and complete it using the actual assumed life expectancy. This sh

lculated - no direct input required
rmation / data inputting

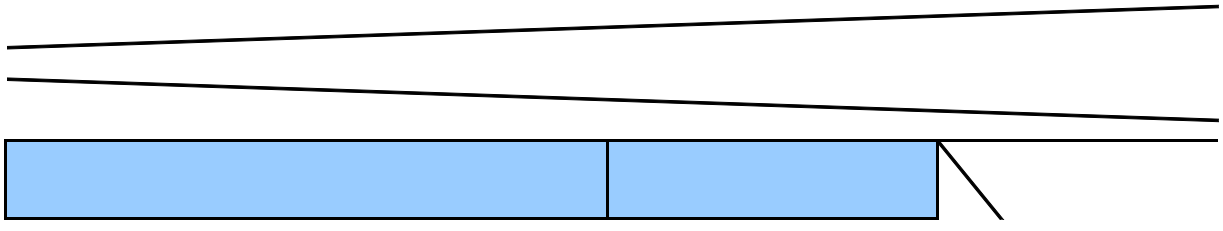
Please add rows where more than 1 material type exists per building element category

Please add rows if required

Use stage ($kgCO_2e$)

Module B

[B4]	[B5]	[B



		Regulated emissions
0 kg CO2e	**0 kg CO2e**	**#VAL**
#DIV/0!	**#DIV/0!**	**#VAL**

ɔuld be clearly labelled.

		End of Life (EoL) stage ($kgCO_2e$)		
		Module C		
6]	[B7]	[C1]	[C2]	[C3]
		[Where only a single C1-C4 is known, please include it here]		
		[Where only a single C1-C4 is known, please include it here]		
		[Where only a single C1-C4 is known, please include it here]		

		[Where only a single C1-C4 is known, please include it here]		
		[Where only a single C1-C4 is known, please include it here]		
		[Where only a single C1-C4 is known, please include it here]		
		[Where only a single C1-C4 is known, please include it here]		
		[Where only a single C1-C4 is known, please include it here]		
		[Where only a single C1-C4 is known, please include it here]		
		[Where only a single C1-C4 is known, please include it here]		
		[Where only a single C1-C4 is known, please include it here]		
		[Where only a single C1-C4 is known, please include it here]		
		[Where only a single C1-C4 is known, please include it here]		
		[Where only a single C1-C4 is known, please include it here]		
		[Where only a single C1-C4 is known, please include it here]		
Unregulated emissions	Operational Water	[Where only a single C1-C4 is known, please include it here]		
		[Where only a single C1-C4 is known, please include it here]		
		[Where only a single C1-C4 is known, please include it here]		
		[Where only a single C1-C4 is known, please include it here]		
LUE!	**Operational Water**	**0 kg CO2e**	**0 kg CO2e**	**0 kg CO2e**
LUE!	**#VALUE!**	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**

	TOTAL Modules A-C $kgCO_2e$	Benefits and loads beyond the system boundary ($kgCO_2e$)
[C4]		Module D
	0 kg CO2e	
	0 kg CO2e	
	0 kg CO2e	

	0 kg CO2e	
	0 kg CO2e	
	0 kg CO2e	
	0 kg CO2e	
	0 kg CO2e	
	0 kg CO2e	
	0 kg CO2e	
	0 kg CO2e	
	0 kg CO2e	
	0 kg CO2e	
	0 kg CO2e	
	0 kg CO2e	
	0 kg CO2e	
	0 kg CO2e	
	0 kg CO2e	
	0 kg CO2e	
	0 kg CO2e	
	0 kg CO2e	
	0 kg CO2e	
	0 kg CO2e	
0 kg CO2e	**0 kg CO2e**	**0 kg CO2e**
#DIV/0!	**#DIV/0!**	**#DIV/0!**

Project details
Project name
Planning application reference number (if applicable)
Use Class
Brief description of the project
GIA (m^2)

Assessment details
Authors (organisation or individuals)
Date of assessment
Operational modelling methodology for Module B6 results
Reference study period (if not 60 years)
Software tool used
Types of EPDs and carbon database used
Please confirm if 95% of the cost allocated to each building element category has been accounted for in the assessment?
Explanation of mechanisms which have been adopted to quality assure the submission
Please confirm whether you have submitted this assessment to the Built Environment Carbon Database (https://www.becd.co.uk/) or if you give permission for the GLA to do this on your behalf by checking one of the following boxes

Estimated WLC emissions **N.B. This forms the WLC baseline for the development. The green cells will automatically popula**
TOTAL kg CO_2e
TOTAL kg CO_2e/m^2 GIA
Please select most appropriate benchmark from drop-down menu
WLC Benchmark
Aspirational WLC Benchmark

Comparison with WLC benchmarks (see Appendix 2 of the guidance)

Retention of existing buildings and structures
Confirmation that options for retaining existing buildings and structures have been fully explored before considering substantial demolition
Carbon emissions associated with pre-construction demolition ($kgCO_2e$)
Estimate of the percentage of the new build development which will be made up of existing elements

Summary of key actions to reduce whole life-cycle carbon emissions that have informed this assessment, including the WLC reductions

Specify further opportunities to reduce the development's whole life-cycle carbon emissions. including the WLC reduction potential

MATERIAL QUANTITY AND END OF LIFE SCENARIOS	
Building element category	
	Note/example
0.1	Demolition: Toxic/Hazardous/Contaminated Material Treatment
0.2	Major Demolition Works
0.3	Temporary Support to Adjacent Structures
0.4	Specialist Ground Works

1	Substructure
2.1	Superstructure: Frame
2.2	Superstructure: Upper Floors
2.3	Superstructure: Roof
2.4	Superstructure: Stairs and Ramps
2.5	Superstructure: External Walls
2.6	Superstructure: Windows and External Doors
2.7	Superstructure: Internal Walls and Partitions
2.8	Superstructure: Internal Doors
3	Finishes
4	Fittings, furnishings & equipment (FFE)
5	Services (MEP)
6	Prefabricated Buildings and Building Units
7	Work to Existing Building
8	External works
Refrigerants	
a	Refrigerants Type 1 (if applicable) - please see CIBSE TM65 for methodology
b	Refrigerants Type 2 (if applicable) - please see CIBSE TM65 for methodology
c	Refrigerants Type 3 (if applicable) - please see CIBSE TM65 for methodology

GWP POTENTIAL FOR ALL LIFE-CYCLE MODULES ($kgCO_2e$) (See Note 1 below if you entered a reference study period in cell C12)	
Building element category	
0.1	Demolition: Toxic/Hazardous/Contaminated Material Treatment
0.2	Major Demolition Works
0.3	Temporary Support to Adjacent Structures
0.4	Specialist Ground Works
0.5	Temporary Diversion Works
1	**Substructure**
2.1	Superstructure: Frame
2.2	Superstructure: Upper Floors
2.3	Superstructure: Roof
2.4	Superstructure: Stairs and Ramps
2.5	Superstructure: External Walls
2.6	Superstructure: Windows and External Doors
2.7	Superstructure: Internal Walls and Partitions
2.8	Superstructure: Internal Doors
3	**Finishes**
4	**Fittings, furnishings & equipment**
5	**Services (MEP)**
6	**Prefabricated Buildings and Building Units**
7	**Work to Existing Building**
8	**External works**
Other site construction impacts or overall construction stage [A5] carbon emissions not specific to an individual building element category	
TOTAL kg CO_2e	

TOTAL - kg CO_2e/m^2 GIA

Notes:

1 If you have entered a reference study period in cell C12 because the assumed building life expectancy

e.g. SAP or TM54
[This cell should only be filled in if the reference study period, i.e. the assumed building life expectancy period in this cell. While the assessment should still be done to 60 years, applicants may, if they choos reference study period by copying and pasting an additional 'GWP potential for all life-cycle modules' ta
[This should align with the software tool used at outline planning stage]
[If using more than one database please list all]
[Yes / No]
I have submitted this assessment to the BECD ☐
I give permission for the GLA to submit this assessment to the BECD on my behalf ☐

te from the tables below

Module A1-A5 (excluding sequestered carbon)	Modules B-C (excl B6 & B7)
0 kg CO2e	0 kg CO2e
#DIV/0!	#DIV/0!
#N/A	*#N/A*
#N/A	*#N/A*

[Explain the reasons for any divergences from WLC benchmarks, including against the WLC aspiratior

[Outline the options that have been considered - plus an explanation of opportunities and limitations, ar where applicable]
[If estimates are not possible, please apply standard assumption of 50kgCO_2e/m^2 of the existing buildi
[e.g. X% existing facades; Y% existing foundations; Z% superstructures etc.]

Actions included in WLC assessment results repor
[This list does not need to be exhaustive but should identify the actions with the biggest impacts. Insert

Further potential opportunities

Product and Construction Stage (Module A)	
Material type	**Material quantity (kg)**
Breakdown of material type in each category [Insert more lines if needed] e.g. Concrete	65000 kg
e.g. Reinforcement	5000 kg
e.g. Formwork	250 kg

Refrigerant name	**Initial Charge(kg)**
TOTAL	0 kg
Material intensity (kg/m2 GIA)	#DIV/0!

Sequestered (or biogenic) carbon (negative value) **($kgCO_2e$)**	**Product stage ($kgCO_2e$)**
	[A1] to [A3]
0 kg CO2e	**0 kg CO2e**

#DIV/0!	**#DIV/0!**

/ is greater or less than 60 years, then you will need to fill in this table using a 60 year building life expe

, exceeds or is less than 60 years. Applicants should state the reference study
e to, submit an additional assessment of the modules B, C and D for the actual
able, see below].

Modules A-C (excl B6 & B7; including sequestered carbon)	Module B1-B5
0 kg CO2e	0 kg CO2e
#DIV/0!	#DIV/0!
#N/A	
#N/A	

nal benchmarks]

nd why demolition outweighs the benefits of retaining existing buildings/structures
ng/s]

ted	WLC reduction (kg CO_2e/m^2 GIA)
more lines if needed]	

	WLC reduction potential (kg CO_2e/m^2 GIA)

Assumptions made with respect to maintenance, repair and replacement cycles (Module B)	Material 'end of life' s
For all primary building systems (structure, substructure, envelope, MEP services, internal finishes) including assumed material/product lifespans and annual maintenance/repair %	Declare 'end of life' scenario as Statement, and used in the Module

Annual leakage rate %	**Refrigerant GWP ($kgCO_2e/kg$)**

Construction process stage ($kgCO_2e$)	
Module A	
[A4]	[A5]
0 kg CO2e	0 kg CO2e

#DIV/0!	**#DIV/0!**

ctancy. If you choose to, you may create a second table below and complete it using

Key	
	Data automatically calculate
	Cells that require informatic
	N/A

Module B6-B7	**Module C1-C4**	**Module D**
#VALUE!	0 kg CO2e	0 kg CO2e
#VALUE!	#DIV/0!	#DIV/0!

scenarios (Module C)	Benefits and loads beyond the system boundary (Module D)	
	Estimated reusable materials (kg)	Estimated recyclable materials (kg)
s per project's Circular Economy WLC assessment to produce C results	0 kg	25 kg
	2 kg	8 kg
	0 kg	0 kg

End of Life recovery rate %		
	0 kg	0 kg
	#DIV/0!	#DIV/0!

[B1]	[B2]	[B3]
0 kg CO2e	0 kg CO2e	0 kg CO2e

#DIV/0!	**#DIV/0!**	**#DIV/0!**

ı the actual assumed life expectancy. This should be clearly labelled.

ed - no direct input required
on / data inputting

Please add rows where more than 1 material type exists per building element category

Please add rows if required

Use stage (kgCO_2e)

Module B		
[B4]	**[B5]**	
		Regulated emissions
0 kg CO2e	**0 kg CO2e**	**#V**

#DIV/0!	#DIV/0!	#V

		End of L
[B6]	[B7]	[C1]
		[Where only a single C1-C4 is known, please include it here]
		[Where only a single C1-C4 is known, please include it here]
		[Where only a single C1-C4 is known, please include it here]
		[Where only a single C1-C4 is known, please include it here]
		[Where only a single C1-C4 is known, please include it here]
		[Where only a single C1-C4 is known, please include it here]
		[Where only a single C1-C4 is known, please include it here]
		[Where only a single C1-C4 is known, please include it here]
		[Where only a single C1-C4 is known, please include it here]
		[Where only a single C1-C4 is known, please include it here]
		[Where only a single C1-C4 is known, please include it here]
		[Where only a single C1-C4 is known, please include it here]
		[Where only a single C1-C4 is known, please include it here]
		[Where only a single C1-C4 is known, please include it here]
		[Where only a single C1-C4 is known, please include it here]
		[Where only a single C1-C4 is known, please include it here]
		[Where only a single C1-C4 is known, please include it here]
Unregulated emissions	Operational Water	[Where only a single C1-C4 is known, please include it here]
		[Where only a single C1-C4 is known, please include it here]
		[Where only a single C1-C4 is known, please include it here]
		[Where only a single C1-C4 is known, please include it here]
'ALUE!	**Operational Water**	**0 kg CO2e**

'ALUE!	#VALUE!	#DIV/0!

.ife (EoL) stage (kgCO_2e)

Module C			TOTAL Modules A-C kgCO_2e
[C2]	[C3]	[C4]	
			0 kg CO2e
			0 kg CO2e
			0 kg CO2e
			0 kg CO2e
			0 kg CO2e
			0 kg CO2e
			0 kg CO2e
			0 kg CO2e
			0 kg CO2e
			0 kg CO2e
			0 kg CO2e
			0 kg CO2e
			0 kg CO2e
			0 kg CO2e
			0 kg CO2e
			0 kg CO2e
			0 kg CO2e
			0 kg CO2e
			0 kg CO2e
			0 kg CO2e
			0 kg CO2e
0 kg CO2e	**0 kg CO2e**	**0 kg CO2e**	**0 kg CO2e**

#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!


the system boundary
(kgCO2e)
Module D
0 kg CO2e

#DIV/0!

Project details
Project name
Planning application reference number (if applicable)
Use Class
Brief description of the project
GIA (m^2)

Assessment details
Authors (organisation or individuals)
Date of assessment
Operational modelling methodology for Module B6 results
Reference study period (if not 60 years)
Software tool used
Type of EPDs and carbon database used
Please confirm if 95% of the cost allocated to each building element category has been accounted for in the assessment?
Explanation of mechanisms which have been adopted to quality assure the submission
Please confirm whether you have submitted this assessment to the Built Environment Carbon Database (https://www.becd.co.uk/) or if you give permission for the GLA to do this on your behalf by checking one of the following boxes

List of product specific EPDs for products that have been installed

Please confirm the following post-construction evidence has been submitted with this WLC assessment
Site energy (including fuel) use record
Contractor confirmation of as-built quantities and specifications

Record of material delivery including distance travelled and transportation mode
Waste transportation record include waste quantity, distance travelled and transportation mode

WLC emissions baseline (automatically populated from the 'detailed planning stage' tab)
TOTAL kg CO_2e
TOTAL kg CO_2e/m^2 GIA

Post-construction WLC emissions
TOTAL kg CO_2e
TOTAL kg CO_2e/m^2 GIA
Please select most appropriate benchmark from drop-down menu
WLC Benchmark
Aspirational WLC Benchmark
Commentary comparing the post-construction results against the WLC emissions baseline above
Commentary comparing the post-construction results against the WLC benchmarks (see Appendix 2)

Retention of existing buildings and structures
Confirmation of which options for retaining existing buildings and structures that were under exploration at planning stages have been implemented
Actual carbon emissions associated with pre-construction demolition ($kgCO_2e$)

Estimate of the percentage of the new build development which is made up of existing elements

Summary of key actions undertaken to reduce whole life-cycle carbon emissions, including the reductions achieved

Lessons learnt from the process of undertaking a WLC assessment that will inform future projects

MATERIAL QUANTITY AND END OF LIFE SCENARIOS	
Building element category	
	Note/example
0.1	Demolition: Toxic/Hazardous/Contaminated Material Treatment
0.2	Major Demolition Works
0.3	Temporary Support to Adjacent Structures
0.4	Specialist Ground Works
1	Substructure
2.1	Superstructure: Frame
2.2	Superstructure: Upper Floors
2.3	Superstructure: Roof
2.4	Superstructure: Stairs and Ramps
2.5	Superstructure: External Walls
2.6	Superstructure: Windows and External Doors

2.7	Superstructure: Internal Walls and Partitions
2.8	Superstructure: Internal Doors
3	Finishes
4	Fittings, furnishings & equipment (FFE)
5	Services (MEP)
6	Prefabricated Buildings and Building Units
7	Work to Existing Building
8	External works
Refrigerants	
a	Refrigerants Type 1 (if applicable) - please see CIBSE TM65 for methodology
b	Refrigerants Type 2 (if applicable) - please see CIBSE TM65 for methodology
c	Refrigerants Type 3 (if applicable) - please see CIBSE TM65 for methodology

GWP POTENTIAL FOR ALL LIFE-CYCLE MODULES ($kgCO_2e$) (See Note 1 below if you entered a reference study period in cell C12)	
Building element category	
0.1	Demolition: Toxic/Hazardous/Contaminated Material Treatment
0.2	Major Demolition Works
0.3	Temporary Support to Adjacent Structures
0.4	Specialist Ground Works
0.5	Temporary Diversion Works

1	Substructure
2.1	Superstructure: Frame
2.2	Superstructure: Upper Floors
2.3	Superstructure: Roof
2.4	Superstructure: Stairs and Ramps
2.5	Superstructure: External Walls
2.6	Superstructure: Windows and External Doors
2.7	Superstructure: Internal Walls and Partitions
2.8	Superstructure: Internal Doors
3	Finishes
4	Fittings, furnishings & equipment
5	Services (MEP)
6	Prefabricated Buildings and Building Units
7	Work to Existing Building
8	External works
Other site construction impacts or overall construction stage [A5] carbon emissions not specific to an individual building element category	
TOTAL kg CO_2e	
TOTAL - kg CO_2e/m^2 GIA	

Notes:

[1] If you have entered a reference study period in cell C12 because the assumed building life expectancy

e.g. SAP or TM54
[This cell should only be filled in if the reference study period, i.e. the assumed building life reference study period in this cell. While the assessment should still be done to 60 years, a modules B, C and D for the actual reference study period by copying and pasting an additic
[This should align with the software tool used at outline/detailed planning stage]
[If using more than one database please list all]
[Yes / No]
I have submitted this assessment to the BECD ☐
I give permission for the GLA to submit this assessment to the BECD on my behalf

	Product
[Please add rows if needed]	

[Yes / No]
[Yes / No]

[Yes / No]
[Yes / No]

Module A1-A5 (excluding sequestered carbon)	**Modules B-C (excl B6 & B7)**
0 kg CO2e	0 kg CO2e
#DIV/0!	#DIV/0!

Module A1-A5	**Modules B-C (excl B6 & B7)**
0 kg CO2e	0 kg CO2e
#DIV/0!	#DIV/0!
#N/A	*#N/A*
#N/A	*#N/A*
[Explain the reasons for any divergences from the results against the WLC emissions base	
[Explain the reasons for any divergences from WLC benchmarks, including against the WL	

[e.g. X% existing facades; Y% existing foundations; Z% superstructures etc.]

Action undertaken
[This list does not need to be exhaustive but should identify the actions with the biggest imp

i.e. Design options or materials that could be used, design principles that could be applied.
[Insert more lines if needed]

Product and Construction Stage (Module A)	
Material type	**Material quantity (kg)**
Breakdown of material type in each category [Insert more lines if needed] e.g. Concrete	65000 kg
e.g. Reinforcement	5000 kg
e.g. Formwork	250 kg

Refrigerant name	**Initial Charge(kg)**
TOTAL	0 kg
Material intensity (kg/m2 GIA)	#DIV/0!

Sequestered (or biogenic) carbon (negative value) **($kgCO_2e$)**	**Product stage ($kgCO_2e$)**
	[A1] to [A3]

0 kg CO2e	**0 kg CO2e**
#DIV/0!	**#DIV/0!**

is greater or less than 60 years, then you will need to fill in this table using a 60 year buildin

expectancy, exceeds or is less than 60 years. Applicants should state the pplicants may, if they choose to, submit an additional assessment of the nal 'GWP potential for all life-cycle modules' table, see below].
☐

	EPD reference number

Modules A-C (excl B6-B7; including sequestered carbon)	**Module B1-B5**
0 kg CO2e	0 kg CO2e
#DIV/0!	#DIV/0!

Modules A-C (excl B6-B7; including sequestered carbon)	**Module B1-B5**
0 kg CO2e	0 kg CO2e
#DIV/0!	#DIV/0!
#N/A	
#N/A	

eline above]

.C aspirational benchmarks]

	WLC reduction achieved (kg CO_2e/m^2 GIA)
pacts. Insert more lines if needed]	

Assumptions made with respect to maintenance, repair and replacement cycles (Module B)	Material 'end of
For all primary building systems (structure, substructure, envelope, MEP services, internal finishes) including assumed material/product lifespans and annual maintenance/repair %	Declare 'end of life' scenario as and used in the WLC asse

Annual leakage rate %	**Refrigerant GWP ($kgCO_2e/kg$)**

Construction process stage ($kgCO_2e$)	
Module A	
[A4]	**[A5]**

0 kg CO2e	**0 kg CO2e**
#DIV/0!	**#DIV/0!**

g life expectancy. If you choose to, you may create a second table below and co

Key	
	Data automatically calc
	Cells that require infor
	N/A

Module B6-B7	Module C1-C4	Module D
#VALUE!	0 kg CO2e	0 kg CO2e
#VALUE!	#DIV/0!	#DIV/0!

Module B6-B7	Module C1-C4	Module D
#VALUE!	0 kg CO2e	0 kg CO2e
#VALUE!	#DIV/0!	#DIV/0!

life' scenarios (Module C)	Benefits and loads beyond the system boundary (Module D)	
	Estimated reusable materials (kg)	Estimated recyclable materials (kg)
per project's Circular Economy Statement, essment to produce Module C results	0 kg	25 kg
	2 kg	8 kg
	0 kg	0 kg

End of Life recovery rate %		
	0 kg	0 kg
	#DIV/0!	#DIV/0!

[B1]	**[B2]**	**[B3]**

0 kg CO2e	**0 kg CO2e**	**0 kg CO2e**
#DIV/0!	**#DIV/0!**	**#DIV/0!**

ımplete it using the actual assumed life expectancy. This should be clearly labelled.

culated - no direct input required
mation / data inputting

Please add rows where more than 1 material type exists per building element category

Please add rows if required

Use stage ($kgCO_2e$)		
Module B		
[B4]	[B5]	[B

		Regulated emissions
0 kg CO2e	0 kg CO2e	#VAL
#DIV/0!	#DIV/0!	#VAL

		End of Life (EoL) stage (kgC	
		Module C	
6]	[B7]	[C1]	[C2]
		[Where only a single C1-C4 is known, please include it here]	
		[Where only a single C1-C4 is known, please include it here]	
		[Where only a single C1-C4 is known, please include it here]	
		[Where only a single C1-C4 is known, please include it here]	
		[Where only a single C1-C4 is known, please include it here]	

		[Where only a single C1-C4 is known, please include it here]	
		[Where only a single C1-C4 is known, please include it here]	
		[Where only a single C1-C4 is known, please include it here]	
		[Where only a single C1-C4 is known, please include it here]	
		[Where only a single C1-C4 is known, please include it here]	
		[Where only a single C1-C4 is known, please include it here]	
		[Where only a single C1-C4 is known, please include it here]	
		[Where only a single C1-C4 is known, please include it here]	
		[Where only a single C1-C4 is known, please include it here]	
		[Where only a single C1-C4 is known, please include it here]	
		[Where only a single C1-C4 is known, please include it here]	
		[Where only a single C1-C4 is known, please include it here]	
Unregulated emissions	Operational Water	[Where only a single C1-C4 is known, please include it here]	
		[Where only a single C1-C4 is known, please include it here]	
		[Where only a single C1-C4 is known, please include it here]	
		[Where only a single C1-C4 is known, please include it here]	
LUE!	**Operational Water**	**0 kg CO2e**	**0 kg CO2e**
LUE!	**#VALUE!**	**#DIV/0!**	**#DIV/0!**

CO_2e)		TOTAL Modules A-C $kgCO_2e$	Benefits and loads beyond the system boundary ($kgCO_2e$)
			Module D
[C3]	[C4]		
		0 kg CO2e	
		0 kg CO2e	
		0 kg CO2e	
		0 kg CO2e	
		0 kg CO2e	

		0 kg CO2e	
		0 kg CO2e	
		0 kg CO2e	
		0 kg CO2e	
		0 kg CO2e	
		0 kg CO2e	
		0 kg CO2e	
		0 kg CO2e	
		0 kg CO2e	
		0 kg CO2e	
		0 kg CO2e	
		0 kg CO2e	
		0 kg CO2e	
		0 kg CO2e	
		0 kg CO2e	
		0 kg CO2e	
		0 kg CO2e	
		0 kg CO2e	
0 kg CO2e	**0 kg CO2e**	**0 kg CO2e**	**0 kg CO2e**
#DIV/0!	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**

Available benchmarks
Offices
Residential
Schools, Universities etc.
Retail

WLC benchmark	A1-A5
Offices	<950
Residential	<850
Schools, Universities etc.	<750
Retail	<850

Aspirational WLC benchmark	A1-A5
Offices	<600
Residential	<500
Schools, Universities etc.	<500
Retail	<550

B-C (excl B6 & B7)	A-C (excl B6 & B7)
<450	<1400
<350	<1200
<250	<1000
<200	<1050

B-C (excl B6 & B7)	A-C (excl B6 & B7)
<370	<970
<300	<800
<175	<675
<140	<690