B0992 161 Drury Lane Development

Circular Economy and Whole Life Cycle Analysis Statement

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Contents

Version	Date	Reason for issue	Prepared By	Checked By
1.0	May 2023	Accompanying planning submission	HI/AG	AG
2.0	May 2023	Minor Amendments	HI/AG	AG

1 Executive Summary

1.1 Brief description of development

This development comprises of:

> *"Demolition of existing fourth floor, replacement of fourth floor and erection of an additional storey to the building, ground floor alterations including new entrances, single storey extension to the rear, removal of existing external fire escape stair to the rear, reconfiguration of existing external plant equipment and introduction of additional plant at roof level, including associated works. Planning use class E throughout the building."*

A Whole Life Carbon Assessment has been undertaken in line with the London Plan 2021.

This document is split into a life cycle assessment and a circular economy analysis, which overall shows the benefits of reusing the external structure of the building regarding the carbon reduction as well as the benefits towards a circular economy.

1.2 *Summary of the approach, key commitments, and targets*

The design team's strategic approach for the proposed development is longevity and adaptability.

To achieve their objectives the design team is committed to monitor their waste arising from demolition, excavation and construction and promote reuse on site where possible. The materials used for the construction containing higher recycled rate will be prioritised. The majority of the building is to be retained.

The chart below shows that the decision to refurbish the building rather than knock down and replace has a direct impact on the lifetime equivalent carbon emission by 16% (including energy running costs). Figure 2 shows the comparison between the design proposal which has retained much of its material against if this had been an entirely new building.

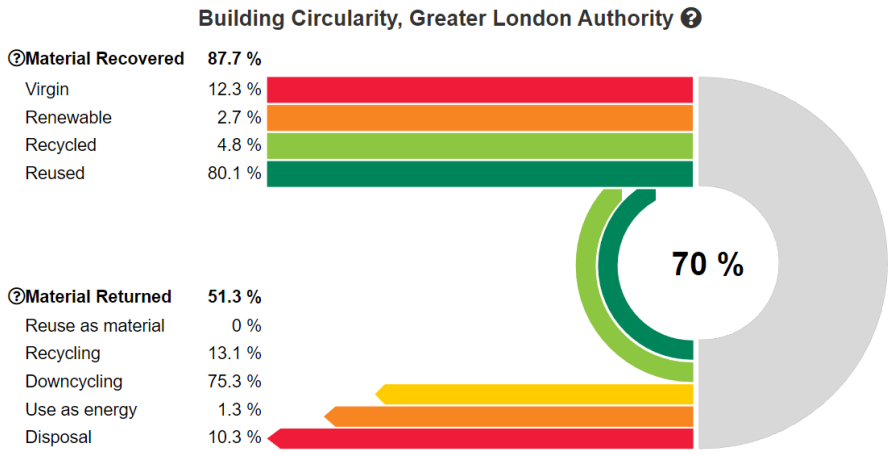

FIGURE 1 – GLA BUILDING CIRCULARITY

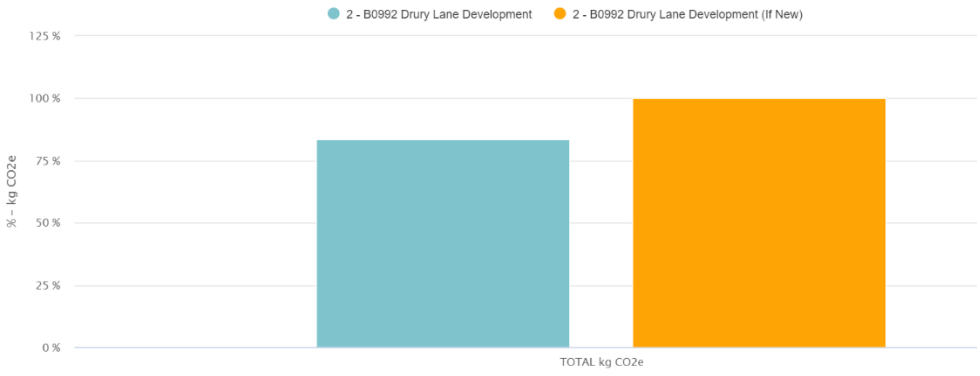

FIGURE 2 – WHOLE LIFE CARBON ASSESSMENT

2 Introduction

This Circular Economy and Whole Life cycle Analysis has been prepared on behalf of McAleer & Rushe Contracts UK Ltd. in support of their full planning application for 161 Drury Lane.

The development comprises:

> *"Demolition of existing fourth floor, replacement of fourth floor and erection of an additional storey to the building, ground floor alterations including new entrances, single storey extension to the rear, removal of existing external fire escape stair to the rear, reconfiguration of existing external plant equipment and introduction of additional plant at roof level, including associated works. Planning use class E throughout the building."*

This report is to accompany planning application required by London Plan Policy SI7 'Reducing waste and supporting the Circular Economy'.

This report will demonstrate how the proposed development will incorporate Circular Economy measures.

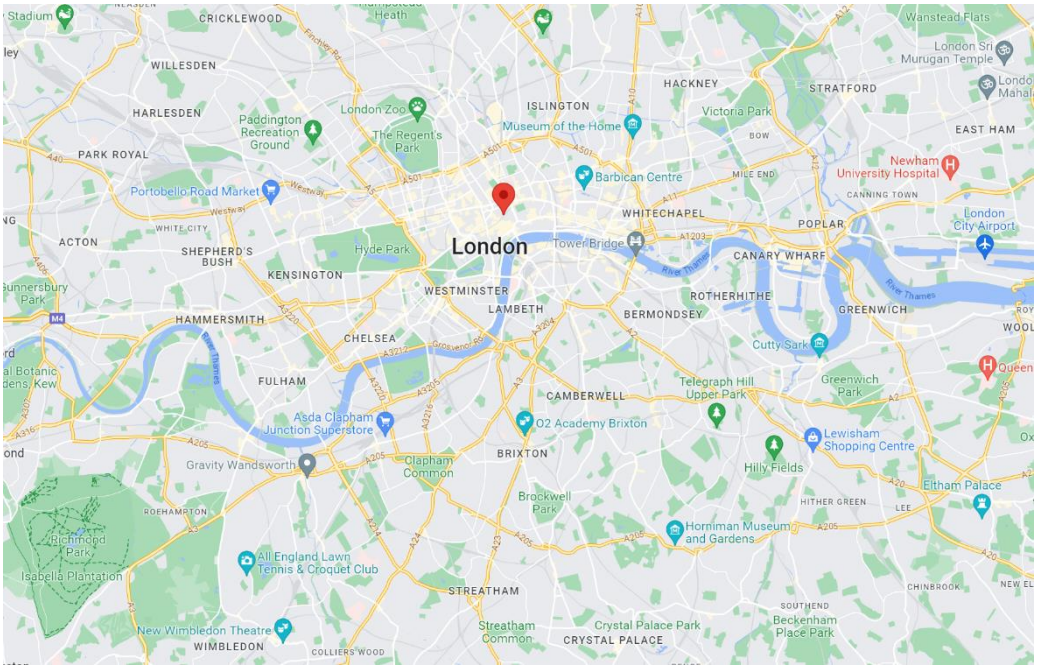

FIGURE 3 – GENERAL LOCATION OF DEVELOPMENT

2.1 Method statement (including key outcomes from workshops/meetings)

A summary of the process followed up to the point of submission and how the team approached the application of circular economy principles and the production of the Statement.

Workshops have been held with the design teams to discuss and raise awareness of the circular economy.

2.2 Circular economy aspirations

The design team has engaged with the circular economy principles. The development had already in place Environmental Management Plan therefore attention was already made on recycling/ reusing materials. With the help of circular economy statement all aspects and stages have been looked at to avoid creating waste not only during construction but also during occupancy and end of life of the development.

This shall minimise the waste associated with all stages and areas of the development from site selection to disposal and improve sustainable development outcomes.

The team has looked at the following aspects and strategies to address circular economy principles:

- Reuse as much of the building as possible to limit the extent of demolition.
- Materials arising from demolition and remediation works shall be reused or recycled where possible.
- The design proposal and construction shall reduce material demands and enable building materials, components and products to be disassembled and re-used at the end of their useful life.
- Identify opportunities for managing as much waste as possible on site.
- Provide adequate and easily accessible storage space and collection systems to support recycling and reuse.
- Predict how much waste the proposal is expected to generate and how and where the waste will be managed in accordance with the waste hierarchy.
- How performance will be monitored and reported.

3 Whole Life Cycle Analysis

A Whole Life Cycle Analysis (WLCA) assessment has been carried out using One Click LCA software which follows the BS EN 15978 and RICS PS scope. Refer to the accompanying GLA spreadsheet for details of the WLCA.

The below Figure 4 represents the total materials circularity both in use of materials for the project as well as end of life handling. It is calculated as the average of materials recovered and materials returned.

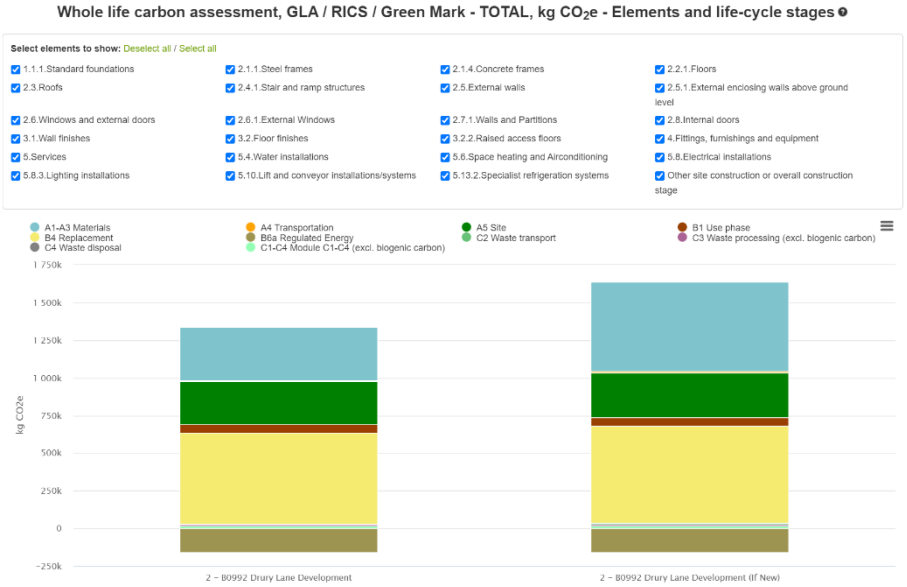

FIGURE 5 – ELEMENTS AND LIFE CYCLE STAGE WITH SERVICES FOR COMPARISON TO A NEW BUILDING

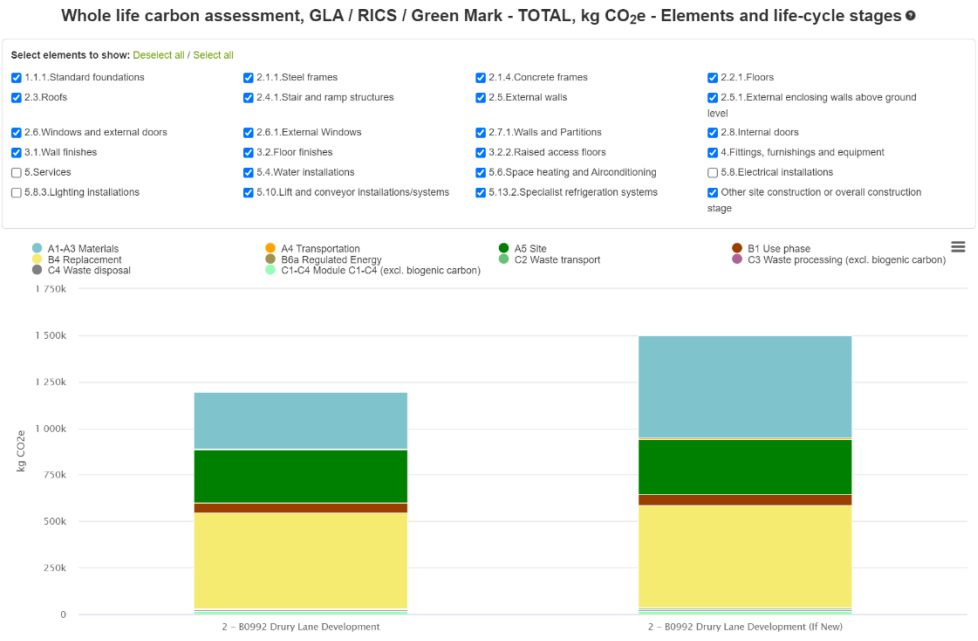

FIGURE 4 – ELEMENTS AND LIFE CYCLE STAGE WITHOUT SERVICES FOR COMPARISON TO A NEW BUILDING

4 Circular economy goals and strategic approach

4.1 Strategic approach(es)

The following sections provide a summary of the strategic approach:

4.1.1 Circular economy approach for the refurbishment development

PHASE/ BUILDING/ AREA	Frame	Facade
STEERING APPROACH	Reuse and refurbish	Reuse and refurbish
EXPLANATION	This includes roof and floors	
TARGET	95% diversion from landfill at end of life	95% diversion from landfill at end of life
SUPPORTING ANALYSIS	Life Cycle Assessment	Life Cycle Assessment

4.1.2 Circular economy approach for the existing site

PHASE/ BUILDING/ AREA	Partial remodelling of areas no major demolition.
STEERING APPROACH	Maximise reuse of the existing building
EXPLANATION	Waste classification of demolition works and construction works
TARGET	95% diversion from landfill
SUPPORTING ANALYSIS	Pre-Demolition report / Site Waste Management Plan

4.1.3 Circular economy approach for municipal waste during operation

PHASE/ BUILDING/ AREA	In use phase
STEERING APPROACH	Reusability
EXPLANATION	Segregation of operational waste
TARGET	65% diversion from landfill
SUPPORTING ANALYSIS	Operational waste management

4.2 Explaining the strategic approach(es)

An early workshop has been carried out with the design team on the 25th of April 2023 which identified the strategic approach to 'Longevity' and 'Durability' depending on the areas of the development.

The design should meet the long-term needs while being durable and resilient or able to cope with change with little modification, readiness for alternative technologies, different ways of living/working and a changing climate.

The design is considering the needs of the present but with consideration of how those needs might change in the future and designed for change in the forms of periodic remodelling including alterations or replacement on non-structural parts.

4.3 Draft Circular Economy Statements

The team has reached an agreement that the following targets and commitments shall be reported against at the full application stage. The following sections outline the potential targets and commitments based on the nine principles:

4.3.1 Minimise the quantities of materials used.

A Pre-demolition report will be carried out before any demolition is taking place on the site to maximise the reuse or recycling of the materials. Maximize use of existing building.

4.3.2 Minimise the quantities of other resources used (energy, water, land)

The site is located on a brownfield land and not using virgin land for the development. The reuse of the structure will lower demand on energy and water from construction. The energy statement introduces elements such as new double glazing and Heat Pump technology to minimise operational energy.

4.3.3 Specify and sourcing materials and other resources responsibly and sustainably

The development will be using the Sustainable Procurement Plan principles to ensure best practice in relation to procurement and resourcing procedures.

4.3.4 Design for longevity, adaptability or flexibility and reusability or recoverability

The refurbishment will extend the life and further small modifications could be made in the future to revert to other similar applications.

4.3.5 Design out construction, demolition, excavation and municipal waste arising

The Construction Environmental Waste Management will include the hierarchy of material disposal and shall be monitored on Smartwaste portal or similar.

4.3.6 Manage demolition waste

The Pre-demolition report shall include a demolition strategy and segregation of the materials to maximise reuse or recycling of the materials and divert them from landfill. This report is also used for Wst 01 credit for BREEAM assessment. The predicted and actual demolition waste shall be reported in the Site Waste Management Plan.

4.3.7 Manage excavation waste

Excavation waste is not anticipated for this project due to the extensive reuse of the building.

4.3.8 *Manage construction waste*

The construction waste shall be segregated and monitored on Smartwaste portal, and the predicted and actual waste shall be reported in the Site Waste Management Plan. This is part of the BREEAM assessment Wst 01 credit. Functional Adaptability studies shall be completed for construction waste occurred during operational phase due to maintenance, refurbishment and at the end of life.

4.3.9 *Manage municipal waste*

The development shall provide area for recycling waste and recycling bins within the occupied area to enhance recycling rates. Operational Waste Management Plan shall be developed.

5 Circular economy commitments

5.1 Key commitments

These are based on the 9 principles set out in the 'Circular Economy statement guidance' document. The 'layers' are described as follows:

- Site – The geographical setting, urban location and external works
- Substructure – Excavation, foundations, basements and ground floors
- Superstructure – Load-bearing elements above plinth including roof supporting structure
- Shell/skin – The layer keeping out water, wind, heat, cold, direct sunlight and noise
- Services – Installations to ensure comfort, practically
- Space – The layout, internal walls, ceilings, floors, finishes, doors, fitted furniture
- Stuff – Anything that could fall if the building was turned upside down
- Construction Stuff – Any temporary installations/ works/ materials, packaging and equipment
- Summary – Brief summary of how well the measures will work in contributing to achieve requirements, targets, aspirations
- Challenge – Any potentially conflicting measures re noted here
- Counter Actions – Addresses the challenges identified
- Plan to prove and quantify – How performance will be quantified and monitored

5.1.1 Section A Conserve Resources

TABLE 1 – SECTION A - MINIMISING THE QUANTITIES OF MATERIALS USED

Layers	Comment
Site	Extensive reuse of the existing building
Substructure	Existing to be retained.
Superstructure	Existing be retained with some new elements for the new upper floors.
Shell/skin	Existing to be retained with new façade added to fourth and new fifth floor with a new roof and replacement of all glazing.
Services	Examination of service pipework location and cabling to reduce materials used in the construction. Services have been upgraded.
Space	The existing spaces have been remodelling efficiently to meet the requirements of an office block and fire requirements.
Stuff	Furniture layouts have been examined to improve efficiency of the manufacturing process and maximise functionality.
Construction Stuff	Limited construction site area
Summary	Extensive reuse of existing building, minimising material use where possible through design and layout.
Challenge	To retain as much of the existing building as possible.
Counter Actions	Detailed specification, efficient communications
Plan to prove and quantify	Whole Life Cycle Assessment / Functional Adaptability / Material Efficiency / Pre-demolition report

TABLE 2 – SECTION A - MINIMISING THE QUANTITIES OF OTHER RESOURCES USED (ENERGY, WATER, LAND)

Layers	Comment
Site	Existing site being reused to avoid any damage to the site that may need remedial action.
Substructure	Existing foundations being reused avoid any damage to the foundations that may need remedial action.

Layers	Comment
Superstructure	Existing superstructure being reused avoid any damage to this when remodelling to avoid unexpected works.
Shell/skin	The majority of the shell will be maintained, with anew façade on the top two floors, and new double glazed windows to improve energy efficiency.
Services	Energy efficient heating and cooling systems / energy efficient lighting and zoning / water flow restrictions
Space	Designing for fit for purpose
Stuff	Refer to Table 2
Construction Stuff	Local work force/ use reclaimed water for the construction
Summary	Minimising energy, water and land use
Challenge	Higher initial capital costs associated with specific manufacturers or technology. Use in keeping with the historic nature of the building
Counter Actions	Ensure the decisions are not solely driven by lowest capital cost
Plan to prove and quantify	Monitoring construction waste & transport (BREEAM Wst 01). Life cycle analysis

TABLE 3 – SECTION A - SPECIFYING AND SOURCING MATERIALS RESPONSIBLE AND SUSTAINABLY

Layers	Comment
Site	No site boundary required
Substructure	Minimal as reuse of existing.
Superstructure	Minimal as reuse of existing new element will try and source locally.
Shell/skin	Minimal as reuse of existing new element will try and source locally.
Services	Refer to Table 3
Space	Refer to Table 3
Stuff	Locally produced furniture when included in the scope.
Construction Stuff	Minimal as reuse of existing.
Summary	Locally sourced materials and work force
Challenge	Gathering all documentations and aware of all of the local material providers
Counter Actions	Extensive research of the local area
Plan to prove and quantify	EPD certificates, Manufacturer's specification

5.1.2 Section B: Design to Eliminate Waste (And for Ease of Maintenance)

TABLE 4 – SECTION B - DESIGNING FOR REUSABILITY RECOVERABILITY/ LONGEVITY/ ADAPTABILITY/ FLEXIBILITY

Layers	Comment
Site	No site modification anticipated.
Substructure	Refer to Table 2
Superstructure	Protection measures at exposed areas
Shell/skin	Cleaning maintenance strategy
Services	Regular maintenance to increase life expectancy
Space	Ceiling is washable, durable and easy clean floor finishes
Stuff	Furniture that meets the need of the building users
Construction Stuff	Organise skips to minimise road trips
Summary	Design and maintain the development in such way that material waste is minimised through increasing life span of the materials and services
Challenge	Identifying vulnerable and exposed parts of materials
Counter Actions	Research and studies

Layers	Comment
Plan to prove and quantify	Designing for durability and resilience (BREEAM Mat 05); Operational manual

TABLE 5 – SECTION B - DESIGNING OUT CONSTRUCTION, DEMOLITION, EXCAVATION AND MUNICIPAL WASTE ARISING

Layers	Comment
Site	Attention to techniques that clean and enable reuse of excavation materials if any
Substructure	As above
Superstructure	Optimising the load bearing structure mass
Shell/skin	Just in time delivery and secure on-site storage avoiding damage to the materials thus replacement
Services	The services are designed as per best practise and standards to minimise energy usage during building operation
Space	Easy replacement of damaged materials and fitted furniture
Stuff	Minimisation of packaging, off cuts and damage
Construction Stuff	Secure on-site storage is limited which will encourage usage of Just in Time (JIT) for construction equipment to avoid damage
Summary	Maintenance and lean design
Challenge	Lack of research and innovation
Counter Actions	Undertake precedent searches, modelling etc.
Plan to prove and quantify	Lean design option appraisal, Construction Environmental Waste Management,

5.1.3 Section C: Manage Waste

TABLE 6 – SECTION C - DEMOLITION WASTE (HOW WASTE FROM DEMOLITION OF THE LAYERS WILL BE MANAGED)

Layers	Comment
Site	Independent pre-demolition audit, implementing demolition strategies, segregation of materials, monitoring waste flows to maximise reuse/recycling
Substructure	Refer to Table 8
Superstructure	As 'Site' comments
Shell/skin	As 'Site' comments
Services	As 'Site' comments
Space	As 'Site' comments
Stuff	As 'Site' comments
Construction Stuff	Any demolished materials for potential temporary construction road works (crushed stones)
Summary	An independent third-party pre-demolition report is required
Challenge	Noise, vibration, dust, vehicle movements or congestion
Counter Actions	Different working hours, screens covers
Plan to prove and quantify	Pre-demolition audit, Site waste management plan (BRREAM Wst 01)

TABLE 7 – SECTION C - EXCAVATION WASTE (HOW WASTE FROM EXCAVATION WILL BE MANAGED)

Layers	Comment
Site	Using excavation waste as a resource within the construction site or other local construction projects before sending it to the landfill
Substructure	As above
Superstructure	As above
Shell/skin	As above
Services	As above
Space	As above
Stuff	As above
Construction Stuff	As above
Summary	Prioritise reuse of excavation waste over sending it to landfill
Challenge	Logistical/ space constraints/ supply delay
Counter Actions	Identify vacant sites
Plan to prove and quantify	Site Waste Management Plan (BREEAM Wst 01)

TABLE 8 – SECTION C - CONSTRUCTION WASTE (HOW WASTE ARISING FROM CONSTRUCTION OF THE LAYERS WILL BE REUSED OR RECYCLED)

Layers	Comment
Site	Construction waste measures go above and beyond standards.
Substructure	As above
Superstructure	As above
Shell/skin	Construction waste can occur after the construction phase during operational phase due to maintenance, refurbishment and at the end of life
Services	As above
Space	As above
Stuff	As above
Construction Stuff	Construction waste measures go above and beyond standards.
Summary	Monitoring and managing construction waste
Challenge	Health & Safety concerns, attitude
Counter Actions	Increase awareness of the brief, tool box talks
Plan to prove and quantify	Site Waste Management Plan, (BREEAM Wst 01) Site sustainability manager, Functional adaptability studies (BREEAM Wst 06) Considerate Construction Scheme

TABLE 9 – SECTION C - MUNICIPAL AND INDUSTRIAL WASTE (HOW THE DESIGN WILL SUPPORT OPERATIONAL WASTE MANAGEMENT)

Layers	Comment
Site	Provide sufficient space for waste collection lorries for manoeuvring and collection. Advocate space for recycling bins in refuse area
Substructure	As above
Superstructure	As Above
Shell/skin	As above
Services	As above
Space	Provide recycling bins in every kitchen and studio
Stuff	As above
Construction Stuff	As above
Summary	Segregation of operational waste throughout the building
Challenge	Social behaviour

Counter Actions	Leaflets of appropriate recycling materials
Plan to prove and quantify	Operational Waste Management Plan (BREEAM Wst 03)

5.2 *Reporting forms for numerical targets and commitments:*

5.2.1 *Bill of Materials*

Refer to table below:

TABLE 10 - BILL OF MATERIALS

Section	Result category	Material quantity kg	Material intensity kg/m2 Gross Internal Area	Recycled content by value %	Reused content by value %	Estimated recyclable materials kg/m2
1	1 Substructure	2171.1	1.36	86.57	100	1.36
21	2.1 Superstructure: Frame	273864.44	171.53	49.87	58.48	171.53
2.2	2.2 Superstructure: Upper Floors	177433.5	111.13	29.46	97.78	34.37
2.3	2.3 Superstructure: Roof	2843.01	1.78	14.67	0	0.2
2.4	2.4 Superstructure: Stairs and Ramps	1110.36	0.7	90	0	0.7
2.5	2.5 Superstructure: External Walls	774968	485.4	0.5	74.58	479.98
2.6	2.6 Superstructure: Windows and External doors	13641.31	8.54	0	0	8.54
2.7	2.7 Superstructure: Internal Walls and Partitions	52007.99	32.58	3.21	69.79	31.93
2.8	2.8 Superstructure: Internal doors	3545.67	2.22	0	0	
3	3 Finishes	57482.48	36	0	39.83	33.48
4	4 Fittings, furnishings & equipment	10010	6.27	0	0	
5	5 Services (MEP)	23819.03	14.92	0	0	12.12
Total	Total	1392896.89	872.44	5.78	34.67	774.21

5.2.2 *Recycling and Waste Reporting*

Refer to table 11.

TABLE 11 - RECYCLING AND WASTE REPORTING

CATEGORY	TOTAL ESTIMATE	OF WHICH			SOURCE OF ONFORMATION
	t/m2 (GIA)	% reused or recycled onsite	% reused or recycled offsite	% not reused/ recycled (max5%)	
				% to landfill	% to other management (incineration)
Excavation Waste		10%	85%	5%	-
Demolition Waste		5%	90%	5%	-
Construction Waste	3.5t/100m2	-	95%	5%	-
	t/annum	% reused on or off site	% recycled or composted on or off site	% not reused or recycled	
				% to landfill	% to other management (incineration)
Municipal Waste		-	65%	35%	-

5.3 *Circular economy narrative – structured around nine circular economy principles*

This part includes clear, strong commitments and targets, a more detailed description of how the targets will be achieved presented in table 11 and 12, the Bill of Materials and Recycling and Waste Reporting Form.

1. **Minimise the quantities of materials used**

   - Summary of the proposed approach: Minimising material use through design and layout.
   - Itemised metrics and targets: 20% Recycled aggregates where possible.
   - Commitments and measures that will be adopted: Offsite manufacturing where possible. Modular design, keep the materials as light as possible to avoid additional structural load.

- Anticipated challenges and counter-actions: Maintain quality of the offsite manufacturing process to avoid modifications on site. This can be achieved by detailed specification and efficient communication.

2. Minimise the quantities of other resources used

- Summary of the proposed approach: Minimising energy, water and land use.
- Itemised metrics and targets: Predicted yearly energy and water consumption,
- Commitments and measures that will be adopted: Building Management System, Life Cycle Assessment.
- Anticipated challenges and counter-actions: Higher capital costs associated with manufacturers or technology. Carrying out a life cycle cost analysis can make a difference at the early stages.

3. Specify and resource materials and other resource responsibly and sustainably

- Summary of the proposed approach: Sourcing materials locally where possible with manufacturers having responsible sourced certificates. Use local work force for construction to reduce travel thus carbon.
- Itemised metrics and targets: At least 80% of the materials shall come from local manufacturers.
- Commitments and measures that will be adopted: Monitoring material resources.
- Anticipated challenges and counter-actions: To have all the correct certifications, not out of date. A list of local manufacturers and their products shall be created.

4. Design for longevity, adaptability or flexibility and reusability or recoverability

- Summary of the proposed approach: Design and maintain the development in such way that material waste is minimised through increasing life span of the materials and services.
- Itemised metrics and targets: At least 20% reused at the end of life.
- Commitments and measures that will be adopted: Designing for durability and resilience report providing recommendations for protection measures.
- Anticipated challenges and counter-actions: Identifying all vulnerable and exposed materials, areas through carrying out research and studies.

5. **Design out construction, demolition, excavation and municipal waste arising**

- Summary of the proposed approach: Lean design of the development with practical maintenance.
- Itemised metrics and targets: Most practical and lowest carbon technologies to be implemented.
- Commitments and measures that will be adopted: Modelling and lean design option appraisal.
- Anticipated challenges and counter-actions: Undertake precedent searches, modelling etc. to missing out on implementing solutions at early stage.

6. **Manage demolition waste**

- Summary of the proposed approach: An independent pre-demolition report is carried out.
- Itemised metrics and targets: 95% diverted from landfill.
- Commitments and measures that will be adopted: Report predicted and actual waste arising from demolition works. Report the quantities reused or recycled from the waste.
- Anticipated challenges and counter-actions: To avoid noise and vehicle movements or congestions on site, different working hours can be proposed or using screen covers etc.

7. **Manage construction waste**

- Summary of the proposed approach: Monitoring and managing construction waste.
- Itemised metrics and targets: Minimise construction waste, segregation.
- Commitments and measures that will be adopted: Reporting predicted and actual waste arising from construction site works. Signing up for Considerate Construction Scheme.
- Anticipated challenges and counter-actions: Increase awareness of the brief between site workers through tool box talks etc.

8. **Manage municipal waste**

- Summary of the proposed approach: Segregation of operational waste throughout of the building.
- Itemised metrics and targets: At least 65% of the operational waste shall be recycled.

- Commitments and measures that will be adopted: Accessible refuse area, providing recycling bins for the building users.
- Anticipated challenges and counter-actions: Display recycling information in each kitchen, studio and common areas to inform the building user of recycling schemes.

5.4 *Plans for implementation:*

This section explains how short-, medium- and long-term targets or commitments will be implemented, monitored and reported. Actual performance against these targets shall be submitted at practical completion.

5.4.1 *Specific plans for short- and medium-term targets*

Who: Sustainability Site Manager

What: Monitor energy and water consumption and material transport to and from site.

When: Energy and water monthly. Transport as applicable

How: Taking notes from the energy and water meters. Material deliveries and skips are monitored and noted at the site entrance.

Who: Site Manager

What: Monitor construction waste

When: At every skip collection

How: Smart waste portal reporting in Site Waste Management Plan

5.4.2 *Programme/method for longer-term targets*

For longer-term targets, this section describes the methods that will be used to ensure they are met and a programme of key milestones provided (completion, monitoring intervals etc.)

BREEAM Man 05.1 Aftercare Support – monitoring of water and energy use for 12 months after the building is occupied

5.5 *End-of-life strategy*

This section describes the strategy for 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.

The information shall be applied in reports such as Functional adaptability, Plant replacement strategy, Building User Guide, Operational Manual etc.

6 Reporting outcomes post-planning/completion

(placeholder for post completion stage)

6.1 State whether each target or commitment was achieved and provide evidence and supporting documentation.

(placeholder for post completion stage)

6.2 Lessons learned.

(placeholder for post completion stage)

7 Appendices

Refer to excel file B0992 WCLA Drury Lane.xlsx for the breakdown of the input information into the OneClick LCA tool.

Below are some of the headline chart outputs.

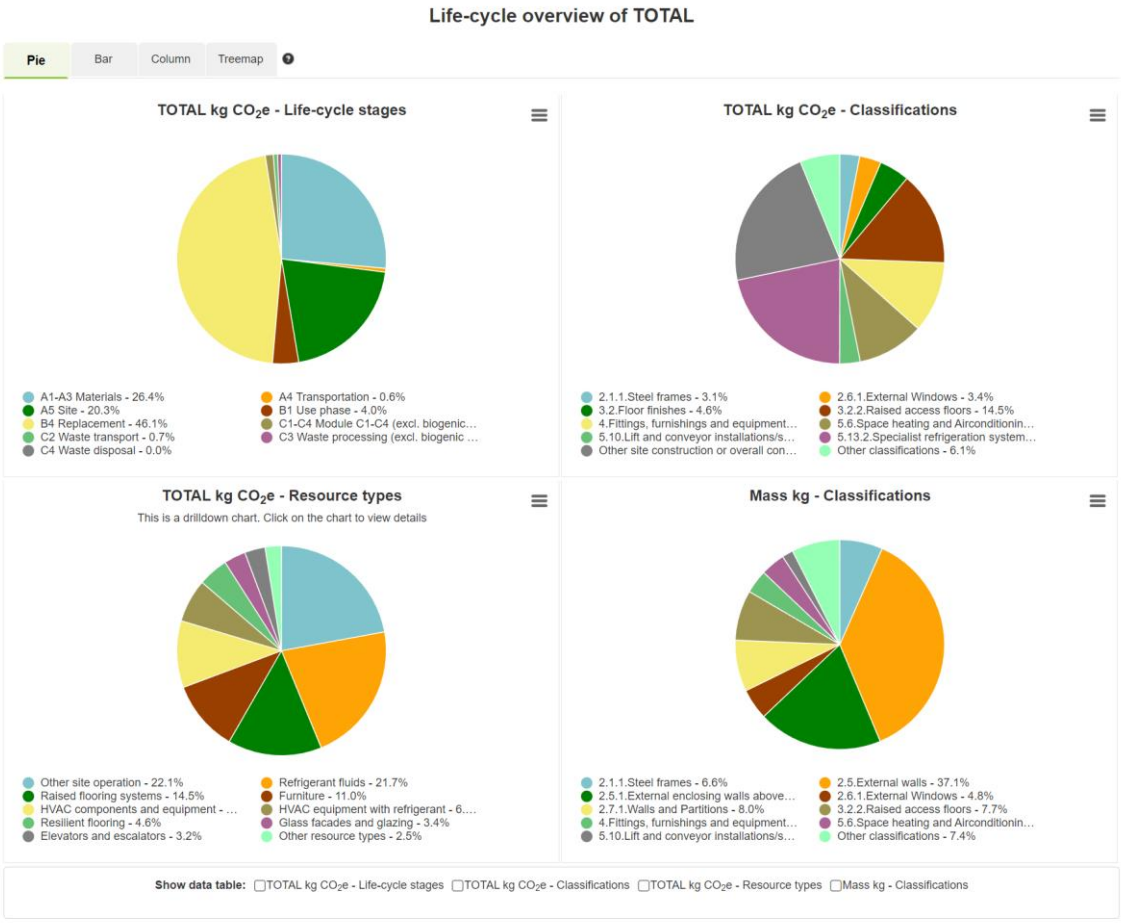

FIGURE 6 – LCA CHART OUTPUTS