JS LEWIS LTD

Circular Economy Statement

Enderby Place

Revision A

Maritime View Ltd

December 2023

Applicant:	Maritime View Ltd
Report:	Circular Economy Statement - Enderby Place
Date:	December 2023
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CONTENTS

1 EXECUTIVE SUMMARY

The Applicant is seeking planning permission for the Enderby Place site (the "Site"). The scheme's design represents an evolution of a long design process that has involved a series of pre-application meetings with the Council and the Greater London Authority. The proposals are for three buildings rising to 3, 23 and 35 storeys respectively, and extensive landscaping and public open space. This document, a combined energy and sustainability strategy, forms one of a suite of documents that form a planning application to be submitted to the Royal Borough of Greenwich ("the Council").

The scheme has to address national, regional and local planning policy on the Circular Economy. It also has to address the regulatory framework at the post-planning detailed design stage. This document sets out the results of the planning stage estimates.

It should be recognised that as schemes are developed post-planning, some of the details may change as the detailed design considerations are resolved in more depth. Accordingly, any related planning conditions should be worded to allow flexibility in how the details are resolved.

Section 2 of this report sets out the purpose and scope of the report, the context within which it sits, and the description of development.

Section 3 sets out the planning policy framework against which the development will be assessed.

Sections 4, 5 and 6 set out the strategic approach, targets and principles to be followed.

Section 7, 8 and 9 address materials and waste, and a conclusion is provided in section 10.

The assessment has been undertaken using OneClick LCA, an internationally recognised lifecycle and circular economy assessment tool, and one that has plug-ins that allow assessments to be undertaken using the RICS and GLA methodologies. The output is appended to this report. The supporting GLA template is provided separately.

2 INTRODUCTION

2.1 Background

The Applicant is seeking planning permission for the Enderby Place site (the "Site"). The scheme's design represents an evolution of a long design process that has involved a series of pre-application meetings with the Council and the Greater London Authority. The proposals are for three buildings rising to 3, 23 and 35 storeys respectively, and extensive landscaping and public open space. This document, a combined energy and sustainability strategy, forms one of a suite of documents that form a planning application to be submitted to the Royal Borough of Greenwich ("the Council").

The basement provides cycle storage, refuse, plant space and some commercial space. There is more commercial space to ground and first floors, together with residential provision. The upper floors are all residential with the floor plans repeating.

The client has appointed a design team to develop the proposals that address local, regional and national policy, and to submit the planning application. This document addresses the Circular Economy policy within the London Plan. It should be noted that at the planning stage, information regarding the detailed build-up of different elements of the building are not generally available. Accordingly, this document sets out a strategy for addressing the circular economy guidance but is inevitably limited by these considerations.

2.2 Scheme Location and Description

The site sits on the Western part of the Greenwich Peninsula, and the proposed scheme includes "*The erection of part-3, part-23, part-35 storey buildings, providing up to 564 residential apartments (Class C3), light industrial (Class E(g)(iii)) and community / café use (Sui Generis), and associated highways, landscaping and public realm works*".

2.3 Associated Documentation

This report is submitted with and supported by the following documents:

- CES GLA template
- Whole Life Cycle Carbon Assessment + Template
- Energy and Sustainability Strategy

3 POLICY CONTEXT

3.1 London Policy

The London Plan (2021)

Policy SI7 reflects the current adopted position on circular economy statements, and the circular economy hierarchy for building approaches is set out in London Plan Figure 3.2:

Policy SI 7 Reducing waste and supporting the circular economy

A Resource conservation, waste reduction, increases in material re-use and recycling, and reductions in waste going for disposal will be achieved by the Mayor, waste planning authorities and industry working in collaboration to:

1) promote a more circular economy that improves resource efficiency and innovation to keep products and materials at their highest use for as long as possible

2) encourage waste minimisation and waste prevention through the reuse of materials and using fewer resources in the production and distribution of products

3) ensure that there is zero biodegradable or recyclable waste to landfill by 2026

4) meet or exceed the municipal waste recycling target of 65 per cent by 2030

5) meet or exceed the targets for each of the following waste and material streams: a) construction and demolition – 95 per cent reuse/recycling/recovery b) excavation – 95 per cent beneficial use

6) design developments with adequate, flexible, and easily accessible storage space and collection systems that support, as a minimum, the separate collection of dry recyclables (at least card, paper, mixed plastics, metals, glass) and food.

B Referable applications should promote circular economy outcomes and aim to be net zero-waste. A Circular Economy Statement should be submitted, to demonstrate:

1) how all materials arising from demolition and remediation works will be re-used and/or recycled;

2) how the proposal's design and construction will reduce material demands and enable building materials, components and products to be disassembled and re-used at the end of their useful life;

3) opportunities for managing as much waste as possible on site;

4) adequate and easily accessible storage space and collection systems to support recycling and re-use;

5) how much waste the proposal is expected to generate, and how and where the waste will be managed in accordance with the waste hierarchy;

6) how performance will be monitored and reported.

C Development Plans that apply circular economy principles and set local lower thresholds for the application of Circular Economy Statements for development proposals are supported.

3.2 Supporting Guidance Documents

3.2.1 GLA Circular Economy Guidance (March 2022)

The guidance document published in 2022 sets out the core principles and aims of a circular economy statement. It suggests statements should be undertaken with a 3 step process:

1. Step 1: draft statement at pre-application/outline planning stage;
2. Step 2: detailed statement at full application stage;
3. Step 3: post-completion updates.

For a full planning application, the expectations are set out as follows:

- Circular Economy Targets
- Circular Economy Design Approaches
- Circular Economy Principles
- Circular Economy Principles by Layer
- Pre-Redevelopment Audit
- Pre-Demolition Audit
- Bill of Materials
- End of Life Strategy
- Operational Waste Management Plan
- Recycling and Waste Reporting(estimated)

3.3 Policy and Guidance Analysis

Circular economy statements are expected of referable applications, and encouraged for smaller non-referable applications. It is also notable that within the GLA's guidance document, there are significant assumptions regarding the level of information available at the different stages of planning that do not necessarily reflect the realities of when and how design decisions are made. All relevant information that is available at this stage for the scheme has been incorporated into this document.

4 STRATEGIC APPROACH AND PRINCIPLES

4.1 Principles

The environmental impacts of construction are substantial, not just with regard to embodied energy and embodied carbon emissions. Resource consumption is substantial and that has its own implications globally. There is now a pressing need to address how resources can be used sustainably to reduce the associated lifecycle impacts, including how waste streams are dealt with. The diagram below represents visually the progression from a linear economy to a circular economy:

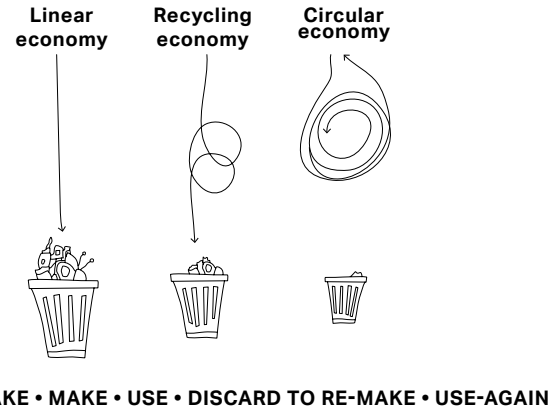


Figure 1 - Progression to a Circular Economy (GLA Guidance, 2022)

The end goal is to retain the value of materials and resources indefinitely, although this will take transformational change throughout the economy. The principles that sit behind the circular economy are:

- Building in layers – ensuring that different parts of the building are accessible and can be maintained and replaced where necessary
- 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
- Designing for longevity
- Designing for adaptability or flexibility
- Designing for disassembly
- Using systems, elements or materials that can be reused and recycled.

4.2 Circular Economy Hierarchy and Approaches

In addition to the principles set out above, the hierarchy for Circular Economy approaches is as follows:

- Retain
- Refit
- Refurbish
- Reclaim/Reuse
- Remanufacture
- Recycle/compost

The approach to the circular economy principles is also closely linked with the Whole Life Cycle Carbon Assessment. In this instance the two reports have been done in conjunction and have shared the same bill of quantities.

4.2.1 New Development

The proposed scheme is a new-build scheme that does not propose any demolition of existing buildings. The decision tree is as follows:

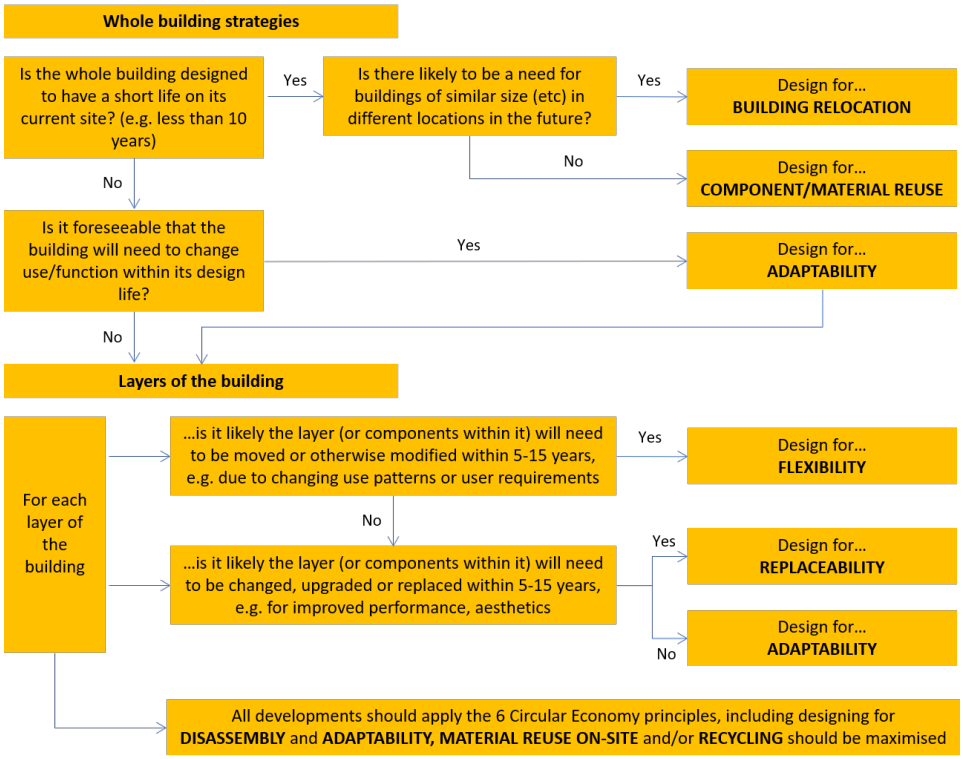


Figure 2 - Decision Tree for New Development

- Is it a short design life?
  - No
- Is it foreseeable that the building will change use?
  - Highly unlikely
- Layers
  - Only finishes, appliances etc are likely to be modified within 5-15 yrs. These are designed to be replaceable typically as redecorating/renewing is a common process for many households.
- Apply the 6 Circular Economy principles.

In this instance, the building is designed for long-term use as residential accommodation and therefore the approach will be to address the layers of the building for flexibility, replacability and adaptability and apply the 6 circular economy principles.

5 TARGETS

The proposed redevelopment maintains and reuses the extant building whilst extending it to increase productivity. The targets are therefore:

1. Develop only that part of the site that is necessary;
2. There is no demolition, so no need to undertake a pre-demolition audit;
3. Target 20% recycled material for new-build by value;
4. Maximise cut and fill onsite to minimise excavation waste going off site;
5. Put in place site waste management plan;
6. Put in place operational waste management plan;
7. 95% reuse/recycling/recovery of demolition and construction waste;
8. 95% beneficial use of excavation waste;
9. 75% recycling of business waste by 2030.

6 APPLYING THE PRINCIPLES

6.1 Whole Life Carbon and Material Resource Efficiency

An assessment of circularity has been undertaken using OneClick LCA's Building Circularity tool., the results of which are appended. At this stage, many of the decisions regarding structures and material selection have not yet been taken. The results are set out in the GLA template. As the data used is by necessity generic, the levels of circularity are lower than if specific materials/suppliers were used. The results provide a high-level overview as to the circularity only.

Energy consumption and carbon emissions in use are addressed in detail in the supporting Energy and Sustainability Strategy and Whole Life Cycle Carbon Assessment. The scheme demonstrates the use of renewable energy and substantial carbon emissions savings.

Waste management during operation has been considered during the design process including the provision of adequate servicing and space provision for waste segregation, storage and collection at ground floor.

6.2 Offsite Construction

Again, whilst the majority of decisions regarding materials have yet to be made, there are various opportunities for offsite construction including:

- Possible modular construction of apartments/parts thereof;
- External cladding;
- Balconies;
- Bathroom pods.

6.3 Standardisation and Modularisation

The nature of the design means that floor plates are repetitive and efficiency can be achieved through repeated elements. Modularisation is touched upon in the previous section noting that there are options for modular elements of the building to be built offsite. Different systems have already been considered, but no decisions have been made.

6.4 Designing Out Waste

Design approaches have a substantial impact upon material efficiency. The scale of the project and the level of repeated elements, simplification and standardisation, choice of materials/components and how materials choices affect the dimensions of buildings/window openings all feed into the resource efficiency of a scheme. These considerations have to be overlayed in the design process which must take into account all of the other constraints and considerations of a particular site.

Whilst the design has not reached a level of detail that defines all of the materials and structures, some information is known and has been used to achieve an efficiency of design:

- With respect to the building structure the design team have sought to minimise material by using lean design principles and lightweight materials;
- The scheme is highly efficient in its level of repetition;
- The use of concrete frame at least in part is likely due to the height of the building and the structural requirements. Maximising the sustainability of any concrete utilised should be a priority for the development as the scheme progresses;
- The scale of the project means that the various elements achieve a level of repetition and efficiency, maximising the utility of the site whilst again serving to minimise site waste arising.

As the design proceeds post-planning, the following can be used to inform decision-making on material and product selection:

- Designing out unnecessary components and materials;
- Using reclaimed materials;
- Using certified products/materials (e.g. NaturePlus);
- Using products/materials that can be reused at the end-of-life;
- Using products/materials with recycled content;
- Using products/materials that can be disassembled at end of life;
- Using products/materials that can be recycled at end of life.

6.5 Designing for Longevity

The proposals have had to consider longevity throughout the design process up to planning, including the following measures:

- Sizing drainage based upon future climate scenarios;
- Assessing overheating using future climate scenarios.

A schedule should be drawn up for both planned and preventative maintenance.

6.6 Design for Assembly, Disassembly and Recovery

The scheme lends itself to an element of offsite construction and assembly onsite. The extent of this will be determined by the materials choices that are yet to be made. Immediately following the granting of planning permission, a workshop should be run specifically on circular economy considerations to ensure that they form part of the decision-making process.

Building information modeling can be used to prepare an inventory of materials and products used to create the building, allowing for full access to the original design if an any point in the future alternations are proposed, or if disassembly is proposed. Elements that lend themselves to disassembly include:

- Balconies;
- Cladding panels;
- Doors and windows;
- Internal partitions.

Where possible, biological components should be preferred over non-biological to allow for return to the biosphere. Where not the case, materials should be designed to return to the manufacturer where feasible.

Take-back schemes on short-lifespan products should be used, and low toxicity materials should be preferred throughout to avoid contamination and the resulting waste implications arising. Wherever possibly, fixings should be reversible, and bonding/gluing should be avoided.

6.7 Adaptability and Flexibility

The spaces proposed are designed to provide the building with flexibility in its proposed uses, which in turn will provide flexibility in the future. Access has been carefully considered to allow for servicing and suitable accessibility designed in for wheelchair users.

The M+E system design will consider how zoning might improve the potential for flexible use later in the building life.

6.8 Using Systems, Elements or Materials that can be Reused and Recycled.

Many of the materials used will have the potential to be recycled and potentially reused. Concrete will form a major component due to the structural requirements, and this represents the largest challenge in terms of recycling and reuse. There is now a substantial and growing market for recycled concrete as hard core and ballast, whilst the rebar elements are reclaimed and recycled at the same time. It would be expected that at the end of life the concrete would be crushed and recycled in this format.

Cladding panels, steel structures, and glazing, all have potential to be disassembled for high quality recycling at the end of life. The aim will be to achieve the highest quality reuse/recycling feasible for building elements when they reach their end of life.

7 BILL OF MATERIALS

A formal bill of materials was prepared to inform the planning stage assessment. The material summary is set out below:

Section	Result category	Material quantity kg	Material intensity kg/m2 Gross Internal Area	Recycled content by value %	Reused content by value %	Estimated reusable materials kg/m2	Estimated recyclable materials kg/m2
1	1 Substructure	82,947,506	2,190	17	-		2,190
21	2.1 Superstructure: Frame	52,417,506	1,384	43	-		1,384
2	2.2 Superstructure: Upper Floors	40,717,248	1,075	3	-		1,075
2	2.3 Superstructure: Roof	1,368,341	36	97	-		36
2	2.4 Superstructure: Stairs and Ramps	1,039,658	27	28	-		27
3	2.5 Superstructure: External Walls	604,835	16	0	-		7
3	2.6 Superstructure: Windows and External doors	1,944,454	51	30	-		51
3	2.7 Superstructure: Internal Walls and Partitions	831,319	22	18	-		20
3	2.8 Superstructure: Internal doors	216,576	6	-	-		6
3	3 Finishes	607,204	16	0	-		8
4	4 Fittings, furnishings & equipments	197,084	5	-	-		
5	5 Services (MEP)	819,350	22	23	-		19
6	6 Prefabricated buildings and building units						
7	7 Work to existing building						
8	8 External works	9,928	0	-	-		0
-	0 Unclassified / Other						
total	Total	183,721,009	4,851	25	-		4,825

Figure 3 - Summary of Materials

The materials assessment has been based upon generic build-ups. The estimated recycled content is 25%.

8 RECYCLING AND WASTE REPORTING

8.1 Waste Hierarchy

All waste will be prioritised using the Waste Hierarchy. The key London Plan targets will be sought include:

- 95% reuse/recycling/recovery of demolition and construction waste;
- 95% beneficial use of excavation waste;
- 65% recycling of municipal waste by 2030/75% business waste.

8.2 Reuse and Recovery

8.2.1 Masterplanning and Designing for Waste Minimisation

There is no demolition work previewed as the site is clear. A pre-demolition audit is therefore superfluous in this case. A detailed waste management strategy will be prepared that will look to interpret the waste hierarchy and its application to the site for construction and operational phases of the building. An outline site and operational waste strategy is in the appendices.

8.2.2 Construction Waste Strategy

This section considers the options for waste reduction during the construction phase within the development as a whole. At the planning stage it is appropriate that a strategy is put in place that sets out the principles. A detailed Site Waste Management Plan will be drawn up as noted above that sets out specific benchmarks, targets, measures for achieving the targets, and mechanisms for monitoring progress post-planning. Provision has been made at ground floor level for recycling storage and segregation for operational waste streams. An outline site and operational waste strategy is in the appendices.

8.3 Excavation Material

No cut and fill is anticipated, but excavation for the basement is required. The waste implications are set out in the appendices. Where this material cannot be used onsite, the waste contractor will be tasked to ensure that the 95% beneficial target overall is met through appropriate take-away and recycling services.

8.4 Recycling of Waste

(see next section)

8.5 Reporting

Once a contractor has been appointed and the waste strategy has been detailed out, the destinations of the final waste streams can be reported. A suitable waste management tool will be employed by the main contractor for measuring, monitoring and reporting the waste arising.

9 OPERATIONAL WASTE

9.1 Targets

The policy target is 65% recycling of municipal waste. This is largely controlled via the local authority. Waste and recycling segregation and collection facilities have been designed into the ground floor plan.

9.2 Management Plan

An outline site and operational waste strategy is in the appendices. A more detailed operational waste management plan will be prepared post-planning when the main contractor has been appointed. The key sections of the plan for delivering the recycling target will include:

- Provision of internal recycling facilities in each apartment;
- Provision of communal recycling at ground/lower-ground floor level.

9.3 Plan for Implementation

The plan for implementing the strategy will be as follows:

1. Set out circular economy expectations within the contractor tender package;
2. Develop the site waste management plan with waste sub-contractor;
    a. 95% reuse/recycling/recovery of demolition and construction waste;
    b. 95% beneficial use of excavation waste;
3. Review design considerations with the architectural design team via a series of workshops;
    a. Maximising cut and fill onsite where required;
    b. Lean design;
    c. Design for disassembly and recovery;
    d. Design for offsite construction;
    e. Design for adaptability and flexibility.
4. Contractor to undertake circular economy workshops:
    a. Procurement of lower impact materials with recycled content;
    b. Develop a layer by layer approach to sustainable procurement;
    c. Set out strategy for monitoring and reporting of all CES components throughout the construction period.
5. Contractor to set out a detailed end-of life plan for major building components;
6. A completed post-construction CES report will be provided.

9.4 End-of-Life Strategy

The scheme have an end-of-life, and in this case the aim will be to disassemble as many of the components as possible for reuse. Those that are not readily disassembled will go to specialist recovery centres to help reclaim those materials for reuse and recycling. Part of this process will be keeping accurate records of the construction and evolution of the stand. Another part will be to allow time for high quality audits and also to allow time for disassembly wherever possible in preference to demolition.

10 CONCLUSION

10.1 Circular Economy Assessment

The Applicant is seeking planning permission for the Enderby Place site (the "Site"). The scheme's design represents an evolution of a long design process that has involved a series of pre-application meetings with the Council and the Greater London Authority. The proposals are for three buildings rising to 3, 23 and 35 storeys respectively, and extensive landscaping and public open space. This document, a combined energy and sustainability strategy, forms one of a suite of documents that form a planning application to be submitted to the Royal Borough of Greenwich ("the Council").

At the planning stage of any project, there remain a lot of design decisions that have not yet been answered, leaving limited information upon which to undertake a circularity assessment. Nevertheless, various design measures have already been adopted to increase the building circularity. Accordingly, this document sets out a strategy for addressing the circular economy guidance but is inevitably limited by these considerations. It is considered that this Circular Economy Statement appropriately addresses the requirements of the London Plan 2021 and the Mayor's Guidance.

10.2 Statement of Policy Compliance

In the development of the proposals, the design team has reviewed, interpreted and addressed the relevant planning policy on the circular economy. It is compliant with the following documents:

The National Planning Policy Framework (2021)
The London Plan (2021)
The Mayor's Guidance on Preparing Circular Economy Statements (2022)
The Mayor's Guidance on Preparing Whole Lifecycle Carbon Assessments (2022)

10.3 Supporting Documentation

The following documents are appended to this document or provided separately:

- GLA CES Template

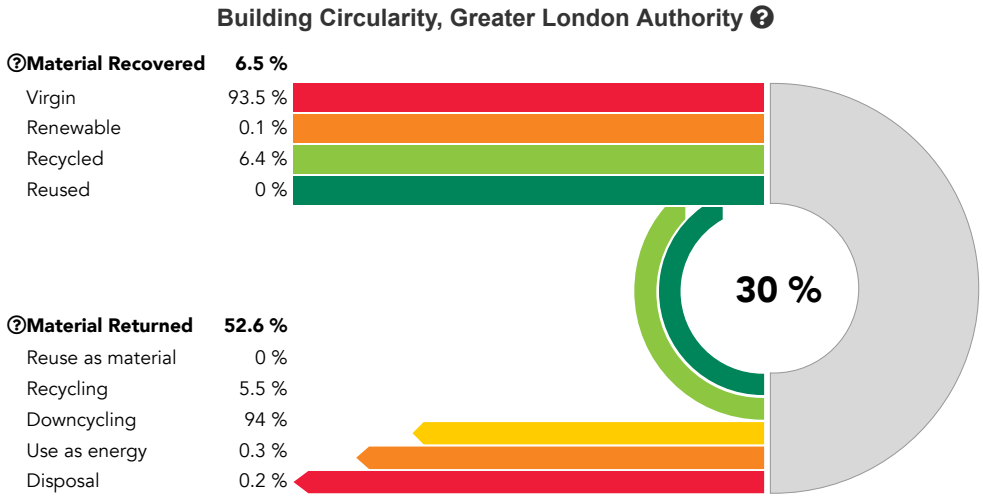
APPENDIX 1 - CES OUTPUT FROM ONECLICK LCA

Planning Design - Building Circularity, Greater London Authority

Project basic information

Result report: Planning Design

Project	Enderby Place - Planning Design
User	Jonathan Lewis - 30.11.2023
Tool	Building Circularity, Greater London Authority
Details	Material efficiency and circular economy - for BREEAM MAT 06, GLA and GRI G4 reporting as well as other purposes
General information	
Type	Apartment buildings
Country	United Kingdom
Gross Floor Area (m²)	37874
Number of above ground floors	35
Frame type	concrete



Results

Bill of materials

Download Results Summary

Result category	Material quantity kg	Material intensity kg/m2 Gross Internal Area	Recycled content by value %	Reused content by value %	Estimated reusable materials kg/m2	Estimated recyclable materials kg/m2
1 Substructure	82 947 505,6	2 190,09	17,48	0		2 190,09
2.1 Superstructure: Frame	52 417 505,98	1 384	42,62	0		1 384

2.2 Superstructure: Upper Floors	40 717 248	1 075,07	3	0	1 075,07
2.3 Superstructure: Roof	1 368 340,73	36,13	97	0	36,13
2.4 Superstructure: Stairs and Ramps	1 039 658,09	27,45	28,08	0	27,45
2.5 Superstructure: External Walls	604 835,03	15,97	0,07	0	7,2
2.6 Superstructure: Windows and External doors	1 944 454,3	51,34	30	0	51,34
2.7 Superstructure: Internal Walls and Partitions	831 319,43	21,95	17,99	0	20,02
2.8 Superstructure: Internal doors	216 576	5,72	0	0	5,72
3 Finishes	607 203,88	16,03	0,25	0	8,19
4 Fittings, furnishings & equipments	197 084,16	5,2	0	0	
5 Services (MEP)	819 350,09	21,63	22,97	0	19,13
6 Prefabricated buildings and building units					
7 Work to existing building					
8 External works	9 928	0,26	0	0	0,26
0 Unclassified / Other					
Total	183 721 009,29	4 850,85	25,14	0	4 824,6

Building Circularity - Materials Recovered

Result category	Total kg	Virgin kg	Renewable kg	Recycled kg	Reused kg	
Construction Materials	176 449 379,48	164 932 050,28	184 645,02	11 332 684,18	0	Details
Earth masses, asphalt and stones						Hide empt
Construction site - material wastage	7 271 629,81	6 742 768,8	7 463,63	521 397,38	0	Details
Material replacement and refurbishment	2 619 478,82	1 436 468,22	736 340,37	446 670,23	0	Details
Total	186 340 488,11	173 111 287,3	928 449,02	12 300 751,8	0	Details

Building Circularity - Materials Returned

Result category	Reuse as material kg	Recycling kg	Downcycling kg	Use as energy kg	Disposal kg	
Construction Materials		9 645 596,04	165 877 311,2	556 678,6	369 793,64	Details
Earth masses, asphalt and stones						Hide en
Construction site - material wastage		565 439,33	6 638 431,72	35 514,24	32 244,51	Details
Material replacement and refurbishment		1 323 072,95	58 211,2	986 447,55	251 747,12	Details
Total		11 534 108,32	172 573 954,12	1 578 640,39	653 785,28	Details

Building Circularity - Key Material Groups

Result category	Total kg	Virgin %	Materials Recovered %	Disposal %	Downcycling and use as energy %	Recycling and reuse as material %	Materials returned %	Circularity %
Concrete	165 819 100	97	3		100		50	26,5
Metal	7 609 719,66	18,65	81,35			100	100	90,67
Bricks and ceramics	58 211,2	100	0		100		50	25
Gypsum-based	1 263 150,43	97,88	2,12	15,62		84,38	84,38	43,25
Insulation	287 908	97,17	2,83	23,55	76,45		38,23	20,53
Glass	84 930	70	30			100	100	65
Wood and biogenic	55 992,45	99	1		100		50	25,5

	Earth masses and asphalt								
	Other materials	1 270 367,75	76,98	23,02	8,25	22,09	69,67	80,71	51,86

Transport carbon intensity

Transport carbon intensity values are based on the transport figures from associated LCA tool. They are not rendered in the input forms of the circular economy tool to maintain the tool readable. Use these
Performance Economie Circulaire for example.

	Result category	Global warming kg CO2e	Payload distance tkm	
+	Transport	1 414 823,41	11 763 561,41	Details

+ Materials using Design for Disassembly principles

+ Materials using Design for Adaptability principles

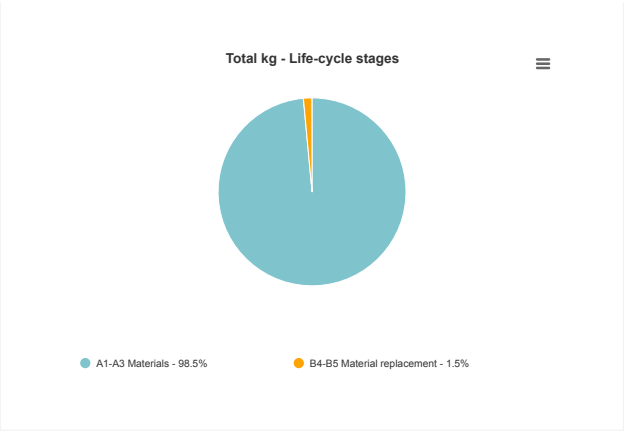
Most contributing materials

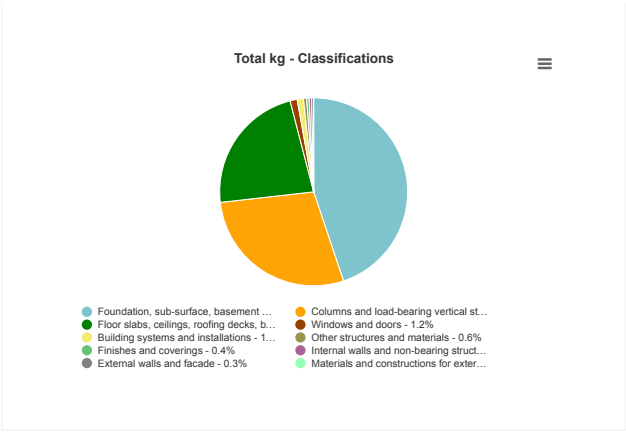
Graphs

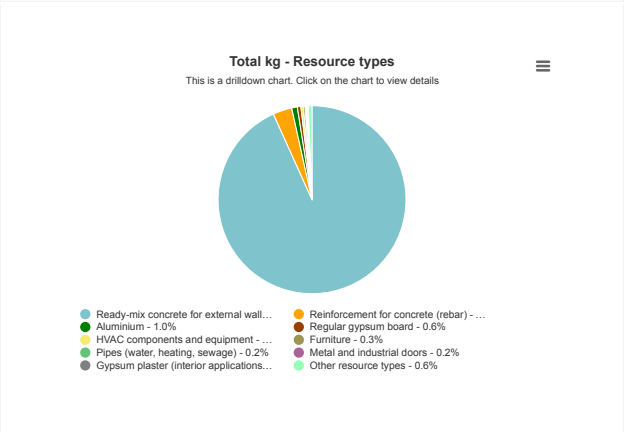
Overview | Bubble | Life-cycle stages | Classifications | All graphs

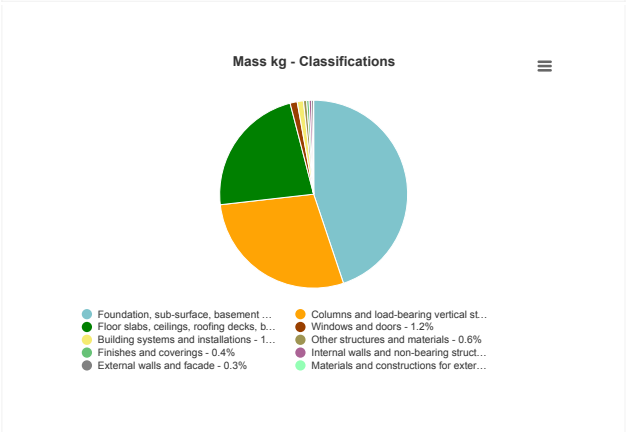
Life-cycle overview of Total

Pie | Bar | Column | Treemap









Show data table: Total kg - Life-cycle stages Total kg - Classifications Total kg - Resource types Mass kg - Classifications

Total kg - Life-cycle stages

Item	Value	Unit	Perc
A1-A3 Materials	180 000 000	kg	
B4-B5 Material replacement	2 600 000	kg	

Total kg - Classifications

Item	Value	Unit	Perc
Foundation, sub-surface, basement and retaining walls	160 000 000	kg	
Columns and load-bearing vertical structures	100 000 000	kg	
Floor slabs, ceilings, roofing decks, beams and roof	81 000 000	kg	
Windows and doors	4 400 000	kg	
Building systems and installations	3 800 000	kg	
Other structures and materials	2 000 000	kg	
Finishes and coverings	1 500 000	kg	
Internal walls and non-bearing structures	1 500 000	kg	
External walls and facade	1 200 000	kg	
Materials and constructions for external areas	20 000	kg	

Total kg - Resource types

Item	Value	Unit	Perc
Ready-mix concrete for external walls and floors	330 000 000	kg	
Reinforcement for concrete (rebar)	12 000 000	kg	
Aluminium	3 500 000	kg	
Regular gypsum board	2 100 000	kg	
HVAC components and equipment	1 500 000	kg	
Furniture	1 100 000	kg	
Pipes (water, heating, sewage)	660 000	kg	
Metal and industrial doors	650 000	kg	
Gypsum plaster (interior applications)	590 000	kg	
Other resource types	2 200 000	kg	

Mass kg - Classifications

Item	Value	Unit	Perc
Foundation, sub-surface, basement and retaining walls	160 000 000	kg	
Columns and load-bearing vertical structures	100 000 000	kg	
Floor slabs, ceilings, roofing decks, beams and roof	81 000 000	kg	
Windows and doors	4 400 000	kg	
Building systems and installations	3 800 000	kg	
Other structures and materials	2 000 000	kg	
Finishes and coverings	1 500 000	kg	

Internal walls and non-bearing structures	1 500 000	kg
External walls and facade	1 200 000	kg
Materials and constructions for external areas	20 000	kg

Data sources

Help

APPENDIX 2 - RECORD OF WORKSHOPS

Workshop Minutes

Various calls on zoom were held to address the Circular Economy Principles and to inform this document. Those meetings were as follows:

- June 2021: JSL and BGY
- November 2023: JSL and BGY

JS LEWIS LTD