O2 Masterplan Site, Finchley Road

Circular Economy Statement

Version 1, January 2022

Prepared for LS (Finchley Road) Limited by Buro Happold

Landsec

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P07	Hybrid CES – final report	NM/JA	31/01/22	

https://burohappold.sharepoint.com/sites/048201/Shared Documents/Circular Economy/CES Drafts/220117_Hybrid CES draft_O2 P03_ Finchley Road.docx

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author	**Nicoletta Michaletos**
date	31/01/22
approved	**Joshua Apperley**
signature	
date	31/01/22

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1 Executive Summary

This Circular Economy Statement has been prepared by Buro Happold on behalf of Landsec ('the Applicant') in support of the submission of a full planning application for the redevelopment of land at O2 Finchley Road ('the Site') within the London Borough of Camden.

The statement establishes the project's aspirations regarding the circular economy and based on discussions and workshops with the design team, sets out initial goals and opportunities for the scheme.

As the scheme is developed beyond planning and into detailed design, it is proposed, in accordance with Greater London Authority (GLA) pre-consultation draft guidance, that this statement be reviewed and progressed to a more detailed state, providing clear targets and guidance for the procurement, construction and operation of the scheme.

With this statement, the design team presents a thorough approach to reuse by undertaking multiple reuse studies, feasibility studies, scenario testing, deconstruction techniques, and integrations of the reuse aesthetic, all at the early stages of the design. The proposal will aim to define best practice with the detailed plots, which can then inform and expand through the reserved matters stages. The best practice will be underpinned by the core strategies in this CES, especially relating to designing residential spaces for longevity and with robustness in mind, and designing flexible and adaptable spaces (especially in community and public realm areas). There are a number of project-specific opportunities that have been identified with the project and design team, to be explored further in later design stages. These include:

- Supporting a secondary materials market or linking up the Applicant's existing sites for materials transfer and reuse
- Considering the links between circular economy and social value, and supporting co-benefits
- Working with the phased nature of the development, and integrating meanwhile uses in a way that supports the circular economy (e.g. storage space provisions, or introducing experimental programmes)

Overall, the CES recognises a well-rounded approach to enabling the circular economy, which considers both existing materials and assets, and engages with the bigger picture by including an additional column for Community and City (Key Commitments Table), recognising this aspect as a key area for influence in the transition to a Circular Economy.

2 Introduction

This Circular Economy Statement has been prepared and submitted by Buro Happold on behalf of LS (Finchley Road) Limited (the 'Applicant') to support an application made part in detail and part in outline (the 'Application') for the demolition and redevelopment of land encompassing the O2 Centre and associated car park, Homebase store, car wash, car showrooms and a Builder's Merchant (the 'Site') within the London Borough of Camden ('LBC').

The Site will be known as 'the O2 Masterplan Site'.

The document describes the Circular Economy strategy for both outline and detailed aspects of the development as agreed with the Applicant and their design team and is produced to address relevant planning policy regarding the transition away from a linear "take-make-dispose" economic model. The statement is structured according to the Greater London Authority's (GLA) Circular Economy Guidance document (pre-consultation draft) and represents a level of detail and consideration in line with a "Detailed Circular Economy Statement (Step 2)", as is required to accompany at pre-application stage or to accompany an outline planning submission. The statement is required to be expanded to cover further detail in future design phases (for detailed planning or RIBA Stage 3 onwards).

The new London Plan 2021 has now been published. The accompanying pre-consultation draft Circular Economy Guidance, upon which this statement is based, remains an unpublished draft at time of writing, with consultation due to be completed in Autumn/Winter 2021.

2.1 Development description

Application for Planning Permission:

> *"Part full and part outline planning permission comprising the following:*
>
> ***Detailed planning permission*** *for Development Plots N3-E, N4, and N5 including demolition of existing above ground structures and associated works, and for residential development (Class C3) and commercial, business and service (Class E) uses in Development Plot N3-E, residential development (Class C3) and local community (Class F2) and commercial, business and service (Class E) uses in Development Plot N4, and residential development (Use Class C3) and commercial, business and service uses (Class E) uses in Development Plot N5 together with all landscaping, public realm, cycle parking and disabled car parking, highway works and infrastructure within and associated with those Development Plots."*
>
> ***Outline planning permission*** *for Development Plots N1, N2, N3, N6, N7 ,S1 and S8 including the demolition of all existing structures and redevelopment to include residential development (Class C3) commercial, business and service uses (Class E), sui generis leisure uses (including cinema and drinking establishments) together with all landscaping, public realm, cycle parking and disabled car parking, highway works and infrastructure within and associated with those Development Plots."*

Plot breakdown

The application will be a hybrid application and will include the following elements:

Detailed Proposals – Plots N3-E, N4 and N5.
Outline Proposals – Plots N1,N2,N3,N6,N7,S1 and S8

Area breakdown

- Site area: 5.77ha (approx. 57,791sq.m)
- Detailed Proposals Site 1.79ha
- Outline Proposals Site: 3.98ha
- Total Public Realm (O2 Masterplan Site area excluding Building footprints): 31,484 sq.m.

The application will include the following residential space allocation:

The Detailed Proposals *will include a total of 55,180sq.m GIA of residential floorspace including an allowance for car parking. The Detailed Proposals will include 608 no of dwellings.*

The Outline Proposals *will include up to 115,000sq.m GIA of residential floorspace including an allowance for car parking and basements.*

Therefore, the total residential use across the Site, including residential parking in podiums could be up to 170,180sq. m GIA which for the sake of the Environmental Impact Assessment has assumed that this equates to around 1,800 residential units.

2.2 Policy context

The reduction of waste and the support of a Circular Economy form one of the key policies in the GLA's recently published London Plan 2021. The plan also includes the requirement for a Circular Economy Statement for all referable applications, however the Guidance for Circular Economy Statements remains in pre-consultation draft form at the time of writing. The key policy points, as written in the London Plan 2021, are reproduced here for convenience and to provide context to the body of the report that follows.

Policy SI 7 – Reducing waste and supporting the circular economy

A Resource conservation, waste reduction, increases in material reuse 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% by 2030
5) Meet or exceed the targets for each of the following waste and material streams:
    a) Construction and demolition – 95% reuse, recycling or recovery
    b) Excavation – 95% 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 and 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 reused 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 reused 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 reuse
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.

As noted, the GLA have produced supplementary planning guidance (SPG) to support the production of Circular Economy Statements. This guidance considers the key policies outlined above and assists in interpreting them for the writing of a clear and coherent statement. At time of writing, the Circular Economy Statement SPG is in post-consultation draft form, yet to be fully published.

2.3 Policy drive from Camden

The London Borough of Camden have major policy documents relevant to the site. The Core Strategy Development Plan Document, which was published in June 2011, is now outdated and has been replaced by the Camden Local Plan 2017. In addition to this, in 2019 Camden announced a Climate Emergency and from that they have undertaken a Citizen's Assembly and developed an ambitious five-year programme of projects and activities for the council's operations, called Camden Climate Action Plan 2020-2025. See: https://news.camden.gov.uk/camden-approves-ambitious-five-year-climate-action-plan/. Furthermore Camden's 2025 Vision document sets out their vision for the borough in 2025, falling into 5 key calls to action. These span across economic, social and environmental issues relevant to the borough with the aim of creating a place that works for everyone, and where everybody has a voice.

West End Lane to Finchley Road, Supplementary Planning Document (SDP), published September 2021, states that the redevelopment of this site could achieve:

- *higher quality outcomes for the site and community;*
- *integrate new development seamlessly with the wider area;*
- *deliver benefits in terms of new spaces; and*
- *Help allow for new walking routes.*

The West End Lane to Finchley Road, Supplementary Planning Document, 2021 also states:

"Proposals which involve demolition of existing buildings and justified in supporting other planning objectives and public benefits should follow the Mayor of London's whole life carbon guidance and build in the key principles of a low carbon circular economy: to reclaim, recycle and reuse materials, minimise waste and divert waste from landfill and to utilise materials with low embodied carbon content."

2.4 Method statement

The requirement for a CES is still in the early stages. Buro Happold has coordinated with the project team to understand the pre-existing brief for the development and to assess where the development design aligns with the principles of a Circular Economy, and where additional aspirations may still be worked into the project at future design stages.

An initial circular economy workshop was held to ensure general understanding of the Circular Economy principles and agree the strategic approach for the project. During the workshop and a series of follow-up meetings, the scheme's opportunities were assessed against the principles of the Circular Economy and the commitments agreed upon are written up in this statement. These will be developed during the detailed design stage (post-planning) and will be distributed to all parties involved in the future design, procurement, construction and operation of the scheme, so that these aspirations and commitments may be translated to clear targets and measurable outcomes.

The following parties were present at the workshop:

- Buro Happold (circular economy, whole life carbon, energy and sustainability consultancy)
- Landsec (the Applicant, developer)
- AHMM Architects (architect)

- East Architecture Landscape (landscape architect)
- Pell Frischmann (structural engineer)
- Gerald Eve (planning consultant)

The meeting notes from this workshop are attached as Appendix A, for reference.

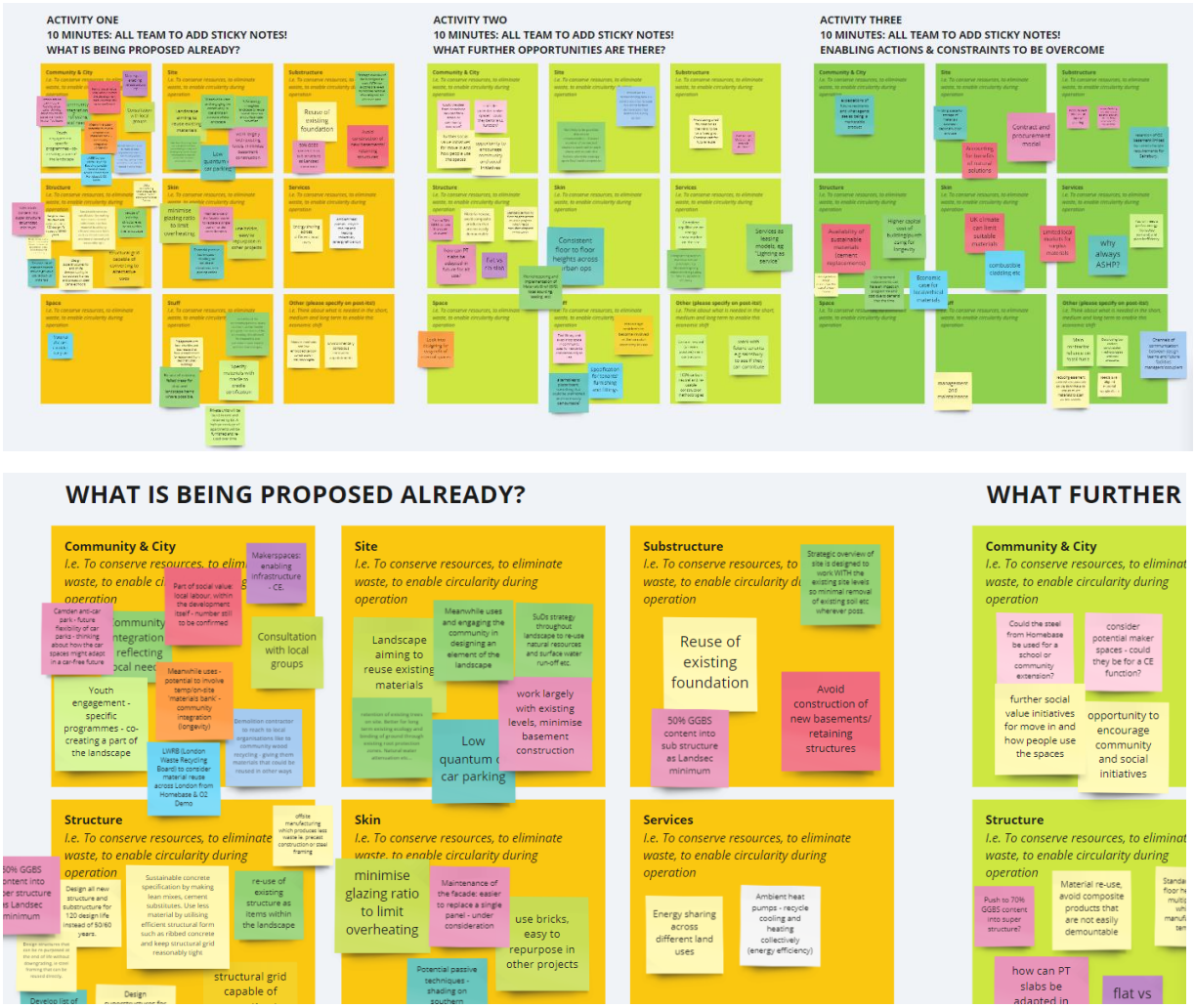


Figure 2-1 Two screenshots from the first Circular Economy workshop, illustrating the interactive Miro boards used to brainstorm and discuss CE potential for the project via three activities.

A further workshop was held following the pre-application stage, prior to the commencement of detailed design, to agree key objectives and any additional surveys or studies that need be carried out as part of the ongoing development of the scheme, and to establish an implementation strategy for the next stages. This second workshop was held during November 2021; the design team updated Buro Happold on any progress since the first workshop, and three project specific aspects were discussed as focus points: the opportunity to support a secondary materials market, circular economy crossovers with social value drivers for the project, and the phased development and meanwhile uses.

The following parties were present at the workshop:

- Buro Happold (circular economy, whole life carbon, energy and sustainability consultancy)
- Landsec (the Applicant, developer)
- East Architecture Landscape (landscape architect)
- Pell Frischmann (structural engineer)
- Mace (construction consultant)

Following the second workshop, a number of follow-up calls were held with specific design teams to clarify and finalise the key commitments as well as the further studies and explorations needed to support integration of the circular economy in later design stages. Calls were held with: Pell Frischmann (structural engineers), EAST (landscape and public realm), and internally with the Buro Happold sustainability team (responsible also for the Whole Life Carbon and Sustainability statement for the proposal).

RIBA Stage	Planning Stage	Draft	Hybrid CES (Outline + detail)	Detailed CES	Post completion updates
1 & 2	Pre-app				
2 & 3	Application				
3 +	RMA				
5 & 7	Following consent				

Draft submitted
Final submission
In progress...
Future stages

2.5 Circular economy aspirations

The current linear, "take-make-dispose" model for the economy is inherently unsustainable, and in London it is becoming increasingly problematic in the level of waste it is producing, and equally in the amount of resource value that is being lost. Action is required across all levels of the economy and society in the city to reduce the amount of material being sent to environmentally damaging landfills and incinerators, and to begin to transition towards a more circular model, in which the intrinsic value of material is realised and retained.

UK Green Building Council (UKGBC) guidance on the circular economy in the built environment (2019) offers three main principles to steer this transition:

1. Design out waste and pollution
2. Keep products and materials in use
3. Regenerate natural systems

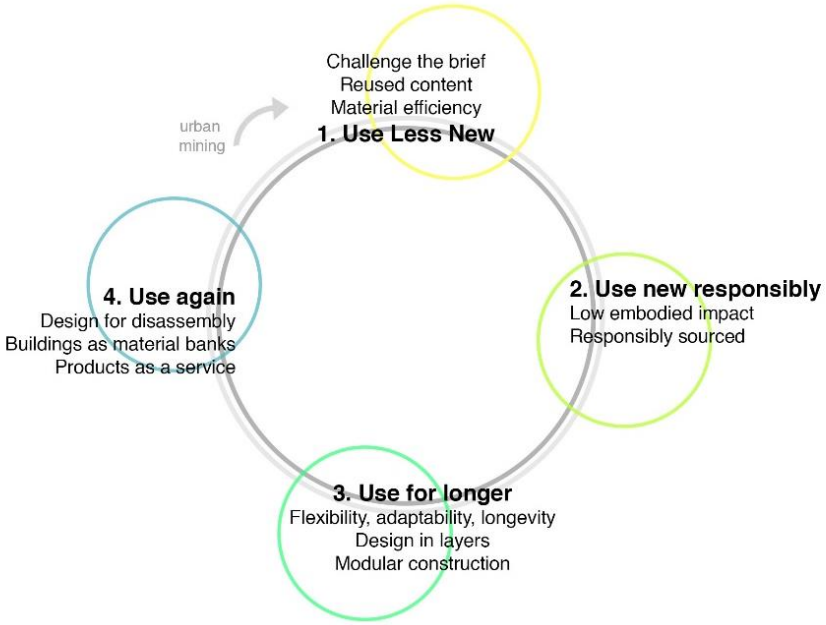


Figure 2-2 A diagram used to explain Circular design thinking in four steps.

With these principles in mind, this statement sets out the intentions for the O2 Finchley Road scheme, and the ways in which its design can begin to aid the transition from linearity to circularity in London's economy. The scheme will look to consider the full life cycle of the building and its component parts, finding opportunities to enable flexibility of spaces and long-term value retention of materials wherever possible. It will look to use resources ethically, to minimise pollution, to improve the longevity of the structure, to reduce waste produced during construction and operations, and to apply principles of 'design for disassembly' to the development's end-of-life strategy, aiming for regenerative systems where possible.

One of the Circular Economy Statement's key aspirations for this project is to capture the project-specific opportunities within this scheme, rather than apply universal techniques. As such, the strategies and commitments aim to reflect priorities and capacities of this project.

2.6 Site wide sustainability strategy

The site wide sustainability strategy, outlined in the Sustainability Statement for the scheme, responds to several local and national policy plans. These include: The Camden Local Plan 2017, Camden Climate Action Plan (2020-2025), the West End Lane to Finchley Road Supplementary Planning Document 2021, the Fortune Green & West Hampstead Neighbourhood Plan, the London Plan, National planning policy, and the Paris Agreement, to which the UK is signatory. Following the policy requirements, a series of design, construction, and operational commitments have been made to ensure the scheme remains a sustainable community. The sustainability headlines align with the development vision, which is:

"A place that connects and creates communities, where everyone has space – to live, to walk, to shop, to work, to relax – and that is about people rather than cars."

An overall sustainability strategy for the scheme is developed around ten key themes and will set ambitious targets for the new neighbourhood. The themes are as follows:

- Embodied carbon
- Operation energy and carbon
- Climate change resilience
- Biodiversity
- Water and surface water run-off
- Health and wellbeing
- Mobility
- Air quality
- Materials, circular economy, and waste
- Social value

Some of the headlines are as follows:

- Sustainable building design: for example, a fabric first approach, all-electric strategy, BREEAM certifications
- Water use and sustainable urban drainage: for example, water efficient fittings, holistic storm water management
- Biodiversity and landscape design: for example, site massing maximising daylight, a biodiversity net gain, UGF
- Sustainable transport: for example, a site wide sustainable transport strategy, dedicated 'fast' cycle routes

3 Circular economy goals and strategic approaches

This section describes the outcomes of the initial workshop and discussions within the design team, and the ways in which the scheme proposes to address and assist the transition to a circular economy. The strategic approach is set out and summarised in Table 3-1.

Preliminarily agreed targets and commitments against which the team will report on in later stages and Reserved Matters Applications are summarised, along with recommendations for additional surveys and studies that should be considered.

3.1 Strategic approach

Overarching strategic aspirations were agreed with the team and are expanded upon in Table 3-1 of this statement. Discussions of the project approach in the context the CES commenced after the project brief was established, but the team is committed to seeking further opportunities to aid the transition to a Circular Economy during the current and forthcoming stages of the scheme. Members of the design team, notably the landscape architects (East Architecture Landscape), had already started work internally on integrating Circular Economy principles into their early-stage design process by the time of the first Circular Economy workshop. As such, the strategic aspirations are an amalgamation of pre-existing goals and studies completed within the proposal and new approaches that may feasibly be considered as the design is developed. The strategies are subject to change depending on the development of the scheme.

Table 3-1 Strategic approach

Aspect	Phase / building / area	Steering approach	Explanation	Target	Supporting analysis, studies, surveys or audits
Circular economy approach for the new development	Residential	Longevity	•Residential schemes support a longevity approach as they typically aim to form part of a community and require little alterations between residents.	95% diversion from landfill at end-of-life, with disposal to be considered in more detail and in line with the waste hierarchy (Source: GLA guidance)	Optioneering from structural team that considers longevity, flexibility or adaptability as a key variable.
	O2 centre & detailed plots	Minimise material used	•For detailed plots, structural design supports lean design principles and the structural engineers have conducted several studies for this. •For the O2 centre, retention scenarios have been conducted along with structural feasibility studies, which have allowed for parts of substructure to be retained in the new development.		Structural optioneering studies (e.g. column size studies, and facade optioneering studies) Sustainability Statement
	Open and green space (car parks, communal space, etc.)	Flexibility	•Flexibility of outdoor, civic, and communal space has been designed into the masterplan. •This flexibility offers potential for meanwhile uses during operation (land-use efficiency) •Meanwhile uses during phased construction: aim for any temporary facilities to be designed in line with circular economy principles (eg design for disassembly)		Meanwhile-uses plan Design explorations of meanwhile uses and multi-use games spaces and outdoor furniture.
	Overall	Sourcing materials responsibly and sustainably	•Landsec Prohibited Materials List outlines guidance for sustainable material choices through the design process (Appendix C). •Team will explore maintenance options for larger, longer term building layers, such as the skin/shell (façade •Recognition of uses that have higher rates of change, with the ambition to design with material choice that support easy retrofit of these spaces.		Maintenance Plan and implementation strategy Facade optioneering studies that consider repair / replacement options as a key variable.
Circular economy approach for	Site wide	Reuse	•Aim to deconstruct, repurpose and/or reuse elements from the existing buildings as much as possible.	95% diversion from landfill at end-of-	Sustainability Statement (Embodied Carbon and reuse studies)

the existing site			•Deconstruction techniques for material reuse on site has been initially developed by Buro Happold.	life, with disposal to be considered in more detail and in line with the waste hierarchy (Source: GLA guidance)	Material audits from design teams (architecture, landscape architecture, sustainability team) Deconstruction techniques, e.g. building on Buro Happold reuse studies
	O2 Centre	Reuse and recycling	•Ambition to retain as much of the substructure as possible, mostly with regard to the O2 centre - a 'deconstruction approach' is recommended as opposed to full demolition.		Structural engineers surveys and optioneering studies - further structural technical testing required at later stages. Sustainability Statement Pre-development/demolition audit, materials audit, and technical feasibility studies Materials reuse plan and/or design drawing
	Landscape, gardens, and public realm	Landscape – circular design	• The landscape design team are engaged in circular economy design thinking, developing a convincing, contemporary reuse aesthetic or model for reuse in the local context. Their materials palette and meanwhile uses integrate circular economy principles. •Ambition to create gardens that are self-sustaining and regenerative systems		Landscape design studies Meanwhile-uses plan
Circular economy approach for municipal waste during operation	Community & city	Developing a circular economy network	•The Applicant is considering opportunities for linking up their other project sites for materials transfer, as well as linking up with local organisations that support reuse, eg ReLondon	65% diversion from landfill by 2030, with disposal to be considered in more detail and in line with the waste hierarchy (Source: GLA guidance)	
	Detailed plots (residential and non-residential)	Supporting ease of waste separation and collection	•The segregation of waste streams and consideration of the accessibility and ease of use of these spaces. •Waste management will be considered according to the waste hierarchy.		Waste Management Strategy, Arup

	Detailed plots (residential and non-residential)	Maintenance strategy and implementation plan	Consideration will be given at the next stage to a repair and replacement strategy for shorter-life building layers ('space' and 'stuff'). MEP components, such as pipework and ducting will be designed with access for maintenance and repair, in accordance with Building Regulations.		Maintenance plan Design studies and options to be considered during detailed design phase for MEP components.

4 Circular economy commitments

This section will expand on the initial strategic approaches as they might be applied to different scales and areas of the proposal and site, as well as considering any additional enablers or constraints that might surface during implementation stages. The key opportunities and commitments that have been agreed on by the design team are summarised in the Table 4-2 below, and then further detailed in the following Circular Economy Narrative section. These were based on the design team's technical understanding of the project and its activities and design features, and on review of the other design documentation produced as part of the planning application: the Sustainability Statement, Structural design studies, Landscape Design studies, and Whole Life Carbon Assessment.

The feasibility of these opportunities will continue to be reviewed as this statement is updated during the detailed design stage.

4.1 Key commitments

In developing the key circular economy commitments for the development, the team has assessed the scheme against the main circular economy principles. The principles are set out in the GLA's Circular Economy SPG. As of the pre-consultation draft version of the guidance, the three main principles and nine sub-principles are as follows:

1. Conserve resources and source ethically
    1.1. Minimising the quantities of materials used
    1.2. Minimising the quantities of other resources used (energy, water, land)
    1.3. Specifying and sourcing materials responsibly and sustainably
2. Design to eliminate waste (and for ease of maintenance)
    2.1. Designing for reusability / recoverability / longevity / adaptability / flexibility
    2.2. Designing out construction, demolition, excavation, industrial and municipal waste arising
3. Manage waste sustainably and at the highest value
    3.1. Demolition waste (how waste from demolition will be managed)
    3.2. Excavation waste (how waste from excavation will be managed)
    3.3. Construction waste (how waste arising from construction will be reused or recycled)
    3.4. Municipal and industrial waste (how the design will support operational waste management)

The following table provides the key points for headline commitments. Please refer to the Narrative section for more details or recommendations following these commitments.

Table 4-1 Key commitments	City & Community	Site	Substructure	Super-structure	Shell/Skin	Services	Space & Stuff	Challenges	Actions
SECTION A: CONSERVE RESOURCES									
Minimising the quantities of materials used	The Applicant's ambition is to develop a list of organisations, ideally in/near Camden, that make high value use of surplus materials not being used on site. The Applicant to explore materials transfer between their various building sites around London to support material reuse.	Pre-development or pre-demolition audits will be undertaken for both the Homebase and O2 buildings. These will sim to follow BREEAM guidance. The Homebase audit is to happen pre-commencement. The O2 building audit is to happen at the time of RMA submission for that phase. Landscape architects committed to using existing materials in new landscape design, as much as possible. The areas, types of materials, and amounts of reuse have been explored as high-level opportunities and will be further in detailed design stages. Design drawings for the Linear Park and neighbourhood lanes use repurposed landscape elements. East Landscape architects have provided initial meanwhile uses in response to the phasing Proposed development - these support a circular economy (Narrative for details). Landsec and East Architecture Landscape have had discussions with London Wildlife Trust regarding existing trees on site. Where these trees are not suitable for replanting, it is proposed that timber is harvested for use on site, as well as in developing an on-site nursery for future site landscaping Chapter 5 of the Environmental statement states that any construction materials that are stored on-site would be protected to minimise damage by vehicles, vandalism, weather or theft.	Reuse of existing assets and materials is a priority by the structural engineers. For the O2 centre, feasibility studies and retention scenarios have been undertaken to determine what might be able to be reused and repurposed at this stage. Recommendations have been made for both substructure and superstructure - these are intended to inform the design process in future design stages. For detailed elements, efficiency studies for the superstructure have reduced weight of the structure overall, which results in less material needed for substructure. A foundation study was undertaken: the study considered different pile sizes, aiming for structural efficiency in design of the foundations, informed by the site investigation results, and lower the embodied carbon value (informed by the sustainability targets, e.g., LETi). Ramp at north of shopping centre to be kept if possible following more detailed testing and studies. Testing will happen on the concrete structures within the next few months.	Reuse of existing assets and materials is a priority. For the O2 centre, feasibility studies and retention scenarios have been undertaken to determine what might be able to be reused and repurposed at this stage. The outline elements will continue to use the best practice methods developed for the detailed plots. In addition, the structural engineers have the ambition to explore further grid and floor typology studies for the detail elements, and consider demountable solutions. The design team will aim to go beyond the traditional options, as far as possible. Studies have been undertaken by the Structural Engineers, Pell Frischmann, to understand the feasibility of retention of the concrete superstructure, and the reuse of some of the steel elements of the O2 centre building. Buro Happold has produced a report on reuse studies following various retention scenarios for existing and new build structures over the site. The report includes strategies for deconstruction of on-site elements. Reuse and repurposing of structural elements within the landscape design is being explored at both detailed and outline levels. For detailed plots, lean structures using less material are being explored.	The Facade team have conducted optioneering studies for the facade, which support circular economy design thinking, e.g., weight considerations, and 'bolt-on' vs lightweight balcony systems. Landsec will be exploring opportunities for materials transfer between their current urban sites - this could support potential reclaimed brickwork for the facade or other outdoor buildings / pavilions. Buro Happold has produced a report on reuse studies following various retention scenarios for existing and new build structures over the site. The report includes strategies for deconstruction of on-site elements (See Appendix B)		Landscape objects are being explored to engage material reuse or recycling in their production.	There is a limited local market for surplus materials. The strength and quality of salvaged materials is sometimes challenging to test, and may form a barrier to reuse. The composite nature of the Ground Level slab of the O2 centre may threaten potential for deconstruction and reuse of structural elements. There is currently no standard way of deconstructing a concrete/metal deck on steel frame composite structure. A harvest map has been identified as important, but there is no obvious responsible party to conduct this work. Finding a team to do this work may be a challenge.	Structural elements: further material testing and surveys will be required to identify the full extent of the retention of the existing structure. Harvest map and/or pre-development audit to be conducted.

Minimising the quantities of other resources used (energy, water, land)	An opportunity has been identified by the design team to involve meanwhile uses that encourage the community to get involved in gardening and communal landscape design (eg tree planting). This will be explored further in the later stages.	The landscape design provides a new topography for the collection and storage of surface water run-off. The landscape team has the ambition to design for rainwater harvesting, most likely for areas on the podiums and blue roofs. This water can be used for planting in those areas. The planting palette is seasonal, and a 'Natural Landscaping' or 'Native Gardening' approach is used – i.e. planting that requires little human intervention and is relatively self-maintaining. This is a car-free development (with blue badge provision). The landscape team has put forward plans to explore regenerating the car park area of the existing site. This will include reintroducing greenery and biodiversity to these areas, on meanwhile or permanent basis. The ambition to retain as many trees as feasible on site, along with binding of ground through root potential zones, offers a passive water attenuation capacity. Water efficiency: On appointment of the Contractor the appropriate strategy for the sustainable management of water use across the Site would be developed. Energy efficiency: All relevant contractors would be required to investigate opportunities to minimise and reduce the use of energy.	Reducing amount of materials used (above) will reduce resources used for concrete elements.	Reducing amount of materials used (above) will reduce resources used for concrete elements. For detailed plots, structural engineers will explore the use of precast elements in relation to resource efficiency and embodied carbon targets.	Passive design techniques will be employed where possible to ensure passive energy efficiency with regard to overheating and daylighting.	For energy efficiency, there is an ambition to explore energy sharing across different land-uses and the use of ambient heat pumps.		Services: the energy requirements of various land-uses may pose a challenge for energy sharing options.	

Specifying and sourcing materials responsibly and sustainably			To quantify the sustainability performance of design decisions, the structural engineers include LETI targets as KPIs. 50% GGBS content into structure as a Landsec minimum. There is opportunity to aim for up to 70% GGBS content in substructure. At the next stage, there is an ambition to consider alternative cements, aggregates, and curing processes that support sustainability targets.	To quantify the sustainability performance of design decisions, the structural engineers include LETI targets as KPIs. For detailed plots, aim for sustainable concrete specifications by exploring and making lean mixes, using cement substitutes, exploring sustainable aggregates, and alternative curing methods. As an initial specification, 50% GGBS content is specified for the Concrete slab and walls, and concrete columns, as per Landsec minimum. There is opportunity to aim for up to 70% GGBS content in superstructure. There is an ambition to explore design life of over 100 years for key structural elements.	The Applicant's Prohibited Materials List provides corporate ambitions and guidance for material choices (see Appendix C). Local material selection and procurement would be explored with the Principal Contractor and would be a sustainability target for the design team. Sustainable procurement tools such as Sedex would be used to investigate the full sustainability background to materials supplied by subcontractors (See EIA Chapter 5). There is an ambition to explore design life of over 100 years for key structural elements.	Explore specifications of services/materials as a leasing models ('user of services') rather than purchasing models. For example, lighting suppliers with circular principles, like Whitecroft lighting where the fittings allow for future upgrades in efficiency.	Landsec Prohibited Materials List provides corporate ambitions and guidance for material choices.	Fire regulations discourage use of timber floors. Using cement replacements can have an impact on programmes and cost due to demand at that time. Novel cements might not be as commercially attractive as CEM 1. The procurement of GGBS at the time of pouring might be a challenge. Local sustainable material sourcing may be challenging as sources and products are still being established.	
SECTION B: DESIGN OUT FUTURE WASTE									
Designing for reusability / recoverability / longevity / adaptability / flexibility	Community integration: this can be supported by consultations with local groups; there is also an ambition to provide work opportunities for local needs, interests, skills and demographics (part of social value aims), and the team will explore co-creation opportunities with youth groups.	"Resilient landscapes" is part of the landscape architects 'Public Realm and Landscape Principles'. To do this, - The landscape team are taking a 'natural landscape' or 'native planting' approach to landscape design, which supports a micro ecosystem that is resilient, works with the changing seasons, and requires less human intervention i.e. regenerative and self-maintaining to an extent. The public realm and communal outdoor areas are designed for flexibility.	There is the opportunity to consider how different foundation systems may allow for more generous adaptable structural systems: both piled foundations and raft foundations have been considered, flexibility/adaptability featured as a variable in these studies. Based on current massing and site investigation, it is unlikely that a raft solution will be feasible. Piled foundations tend to result in a fixed grid, which can support adaptability between residential and commercial uses.	In later stages, structural engineers have the ambition to explore how post-tension slabs can be designed for adaptability / to be adapted into the future alternative uses. The adaptability of the structure will be explored in tandem with the study on the demountablity of the structure - the design team will explore design and detailing of structural elements that can be re-purposed at the end of life without downgrading. Structural engineers, Pell Frishmann have conducted grid studies which consider flexibility of use amongst other variables such as embodied impact. Structural grid is deemed capable of adapting to alternative uses.	Longevity and building for robustness: will be prioritised and inform material decisions. Vulnerable areas of the buildings and wider scheme would be identified to ensure impact protection features are incorporated (for example, effects of climate change such as flooding) and durable materials would be specified, to reduce the degradation and use of additional materials over the lifetime of the development (EIA, Chapter 5). The Facade team have conducted optioneering studies for the facade, which support circular economy design thinking, eg prefabricated systems, and 'bolt-on' vs lightweight balcony systems.		Aim to design for easy retrofit of internal spaces where possible, ie design in layers. This is especially important for uses with higher rates of change like commercial uses, workshops, retail, or light industrial uses. Consideration will be given how new additions (eg pavilion and street furniture) will be recovered at the end-of-life. This will be implemented through aim to design easy assembly/de-assembly processes for street furniture and landscape objects. There is an ambition for a meanwhile tree strategy – including options for a 'Community carpet' and 'Moveable landscape'. Brent Cross is referenced as a precedent for this.	Building for longevity may have higher costs.	An LCC may support decision-making for designing for longevity. To be considered.

Designing out construction, demolition, excavation, industrial and municipal waste arising	Enabling infrastructure: Aim to include 'maker' spaces or workshops in the development.	Meanwhile uses plan will aim to ensure materials used for temporary facilities have a home in the permanent scheme.	The aim to minimise site foundations will help to avoid excavation waste.	Outline: aim to explore potential demountablity of structural elements, with the goal to design superstructures for end-of-life demountability. This will have to be weighed up against lean design priorities.	There is an aim to use bricks with intention that they are easy to repurpose at end-of-life, for use in other projects. Design to explore detailing for ease of brick removal for repurposing or reuse elsewhere.		Opportunity identified to include a tool library/repair workshop/swap shop in the development for residents to use. By providing space and tools, this will support more reuse and repair within the community.		
SECTION C: MANAGE WASTE SUSTAINABLY									
Demolition waste (how waste from demolition of the layers will be managed)	Demolition contractor to explore connections with local organisations like community wood recycling – with the potential of providing them materials that could be repurposed.	Pre-development or pre-demolition audits will be undertaken. These will aim to follow BREEAM guidance.							
Excavation waste (how waste from excavation will be managed)	Aim to meet or exceed London Plan policy SI 7 target of using 95% of excavation waste for beneficial uses. Beneficial use includes placement to land in a way that provides environmental benefits such as restoration of priority habitat or flood alleviation.	Strategic overview aims to work with the existing site levels so that minimal additional soil removal will be required. A 'cut and fill' balance is being approached as much as possible for excavation waste. Estimate how much excavation waste might arise and assess how to maximise reuse on site if feasible and, if not, how to maximise recovery.	Strategic aim to minimise basement construction where possible.	Lighter superstructure and skin elements will allow for smaller substructure and less excavation.					
Construction waste (how waste arising from construction of the layers will be reused or recycled)		The Detailed CMP prepared by the Principal Contractor prior to the commencement of works would contain the measures to manage and dispose of waste.							
Municipal and industrial waste (how the design will support operational waste management)	Explore methods to encourage residents to become involved in the circular economy, day to day, eg through more repair rather than replacing items, composting and organic waste separation, etc.						Explore methods to encourage residents to become involved in the circular economy, day to day, eg through more repair rather than replacing items, composting and organic waste separation, etc.		

4.2 Reporting numerical targets and commitments

4.2.1 Bill of materials

An outline bill of materials is available for the project at this stage, and it is proposed that this is updated in the next iteration of the Circular Economy Statement during detailed design, with a view to including all the following information for the major building layers and elements, as set out in the GLA Circular Economy Statement Guidance 2020:

- Material quantities
- Recycled content
- Reused content (optional)
- Estimated reusable material (optional)
- Estimated recyclable material (optional)

Material intensities have been provided at this stage where a sufficient level of detail is available. This will be updated at later stages.

Estimated recycled content for each material is limited at this design stage. A minimum of 20% reused or recycled content is targeted in line with the GLA's requirement, and the design team and the building contractor are committed to continuing to seek out opportunities to increase reused and recycled material use throughout the design and construction process. The optional details, reused content (%), estimated reusable and recyclable materials (kg/m^2), are not available at this stage in design, but will be available at detailed design stages. Table 4-2 is intended to be updated as planning stages progress to include these additional details or any changes.

Table 4-2 Bill of materials

Layer/Element	Material	Quantity	Unit	Material intensity (kg/m^2 GIA)	Reused or recycled content (min. 20%)
Substructure	Steel rebar reinforcement	1227624.1	kg	21.367822	20% ambition
	Ready-mix concrete, 50% GGBS	11208480	kg	10648056	20% ambition
Superstructure: Frame	Steel rebar reinforcement	1447689.38	kg	25.198242	20% ambition
	Ready-mix concrete	5628624	kg	97.970897	20% ambition
	Ready-mix concrete, 50% GGBS	8269200	kg	143.93233	20% ambition
Superstructure: Upper Floors	Steel rebar reinforcement	1781520	kg	31.008842	20% ambition
	Ready-mix concrete, 50% GGBS	32889624	kg	572.47135	20% ambition
Superstructure: Roof	Insulation	50400	kg	0.8772541	20% ambition
	Concrete paving	432360	kg	7.5255866	20% ambition
	Crushed rock / gravel mix	665834.4	kg	11.589403	20% ambition
	Extensive green roof system	210316.74	kg	3.6607384	20% ambition
	Floor screed mortar, cement screed	297247.5	kg	5.1738408	20% ambition
	Foamglass insulation	140530	kg	2.4460419	20% ambition

	Geotextile	2248.26	kg	0.0391328	20% ambition
	Polyurethane waterproofing membrane	30481.38	kg	0.5305539	20% ambition
	XPS insulation with flame retardant	23427.3	kg	0.4077717	20% ambition
Superstructure: Stairs and Ramps	Precast concrete part, staircase	214185	kg	3.7280686	20% ambition
Superstructure: External Walls	Aluminium balcony system	376040	kg	6.54529	20% ambition
	Plasterboard	378176	kg	6.5824688	20% ambition
	Galvanised steel profiles	62643	kg	1.0903537	20% ambition
	Plastic vapour control layer	6960	kg	0.1211446	20% ambition
	Screws, self-tapping, stainless steel	2320	kg	0.0403815	20% ambition
	Single leaf brick-faced concrete cladding	11298887	kg	196.66656	20% ambition
	Structural steel hollow sections	27842	kg	0.4846132	20% ambition
Superstructure: Windows and External Doors	Aluminium frame window, triple glazing	367624.6	kg	6.3988129	20% ambition
Superstructure: Internal Walls and Partitions	Aerated concrete block	3413400	kg	59.413075	20% ambition
	Plasterboard	887250.78	kg	15.44334	20% ambition
Superstructure: Internal Doors	Rock wool/mineral wool insulation	705323.2	kg	12.276739	20% ambition
	Steel stud per m^2 of wall area	70645.97	kg	1.2296521	20% ambition
Finishes	Carpet tiles	164960.42	kg	2.8712738	20% ambition
	Emulsion matt paint	19278.08	kg	0.3355511	20% ambition
Fittings furnishings & equipment (FFE)	3-seater sofa	213.6	kg	202.92	20% ambition
	Cabinet with drawers and doors	36573	kg	34744.35	20% ambition
	Conference table	306.37	kg	291.0515	20% ambition
	Dining table	33357.25	kg	31689.388	20% ambition
	Kitchen cabinet door	20036.5	kg	19034.675	20% ambition
	Laminate acrylic countertop surfaces	72131.4	kg	68524.83	20% ambition
	Polyester fabric for roller blinds	1119.93	kg	1063.9335	20% ambition
	Sit-sit desk	31672.04	kg	30088.438	20% ambition
Services (MEP)	Air handling unit	16266.98	kg	0.2831404	20% ambition
	Autonomous fire alarm system	10.69	kg	0.0001861	20% ambition
	Blank copper domestic installation piping	56274	kg	0.9794959	20% ambition
	Brass fixtures	5839.68	kg	0.1016445	20% ambition
	Cable 3-wire	1540.46	kg	0.026813	20% ambition
	Cable 5-wire	2635.08	kg	0.0458658	20% ambition
	Ceramic shower tray	22740	kg	0.3958087	20% ambition
	Ceramic sink	11715	kg	0.2039094	20% ambition
	Circulator pump	192.3	kg	0.0033471	20% ambition

	Closed-cell elastomeric foam (FEF) insulation	24955	kg	0.4343626	20% ambition
	Cold water storage tank	170987	kg	2.9761714	20% ambition
	Consumer Unit 6 way with door	1513.4	kg	0.026342	20% ambition
	Electric heat pump (air-water)	48114	kg	0.8374643	20% ambition
	Electric heat pump (air-water)	90250	kg	1.5708766	20% ambition
	Electric meter	244.68	kg	0.0042589	20% ambition
	Emergency exit light with two functions	302.15	kg	0.0052592	20% ambition
	Flow meter with bendable plate	621.24	kg	0.0108132	20% ambition
	Heated water storage tank, for collective use,	39453.26	kg	0.6867169	20% ambition
	Hot dip galvanized steel	125044	kg	2.1764952	20% ambition
	Large LED lighting	12602.44	kg	0.219356	20% ambition
	Small LED lighting	12195.65	kg	0.2122755	20% ambition
	LED strip lighting	9522	kg	0.1657384	20% ambition
	Low voltage copper cable	296.8	kg	0.0051661	20% ambition
	Passenger elevator	46962	kg	0.8174128	20% ambition
	Plate heat exchanger	24198.3	kg	0.4211916	20% ambition
	Porcelain WC kit (toilet and tank)	28648.4	kg	0.4986493	20% ambition
	Radiator, French average	17490.07	kg	0.3044293	20% ambition
	Rooftop exhaust fan	907.03	kg	0.0157876	20% ambition
	Sewer pipe, PVC	39915	kg	0.6947539	20% ambition
	Smoke extraction control valve	776.1	kg	0.0135087	20% ambition
	Steel pipes for heating and cooling system	8809	kg	0.153328	20% ambition
	Thermometer, for heating network	206.67	kg	0.0035973	20% ambition
	Ventilation ducting	119195.2	kg	2.0746919	20% ambition
External works	Concrete paving	120360	kg	-	20% ambition
	Crushed rock / gravel mix	4151616	kg	-	20% ambition
	Generic aggregate for concrete, asphalt	43120	kg	-	20% ambition
	Parquet from hardwood	522.63	kg	-	20% ambition
	Ready-mix concrete	72120	kg	-	20% ambition
	Natural stone, slabs and tiles	241334.8	kg	-	20% ambition
	Resin bound aggregate decorative paving system	60552.5	kg	-	20% ambition
	Terracota clay tile	36960	kg	-	20% ambition
	Granite paving slabs	495180	kg	-	20% ambition
	Terrazzo slabs and tiles	19552.76	kg	-	20% ambition
	Asphalt, average	371400	kg	-	20% ambition
	Asphalt, wearing layer, gravel and bitumen binder	2841880	kg	-	20% ambition

4.2.2 Recycling and waste reporting

The table below sets out the scheme estimated waste material generation and targeted reuse and recycling rates. These are in line with the policy targets in the London Plan 2021. Further detail on municipal waste can be found in the Waste Management Strategy (WMS) submitted as part of this planning application, as well as the CMP, to be drafted at a later stage in the project.

The London Borough of Camden (LBC) waste policy and guidance is available through the Camden Planning Guidance (CPG): Design, Section 8 (2021), Camden's Environment and technical guidance for recycling and waste; the council also suggests the following advisory guidance: Resource London's guidance for waste in the rental sector, and National planning policy for waste. Their website also offer guidance on what residents of Camden can and can't recycle domestically, as well as services such as bulky waste, garden waste, and hazardous waste collection. They support composting at home by providing guidance ('Veolia's guide to home composting') as well as subsidised compost bins delivered to your home. Overall, the Council's waste management is aligned with the London Plan and explicitly aims to meet London-wide targets for waste diversion, management, and collection.

Most of Camden's waste is managed by the council's Environment Service. Waste is collected and taken to North London Waste facility, where it is recycled. The waste that can't be recycled is turned into energy through an Energy from Waste system – none of Camden's waste is sent to landfill. Camden's Environment Service is responsible for various waste management tasks around Camden, including rubbish collection, street cleansing, door-step recycling services (including food and garden waste), gritting streets in icy conditions, providing snow shovels for community groups, managing abandoned vehicles, clinical waste, and others.

LBC also has a reuse and recycling centre for residents and local businesses – the Regis Road Reuse and Recycling Centre. The centres accept a number of different materials, including aerosol cans, batteries, bikes, clothes, fridges and freezers, cooking oil, polystyrene, furniture, light bulbs, mattresses, and others.

A Waste Management Strategy (WMS) will be submitted as part of the planning application for the Proposed Development, as completed by Arup. The report considers residential, commercial, and public waste streams. The non-residential uses are proposed to be a mix of flexible E and F use classes and it has been noted that food retail is expected to include a provision of a Sainsbury as well as one or more other food retail units (see: WMS, 2021). The following documents have been used as policy or guidance when developing the WMS: Revised planning policy framework (2021), The waste (England and Wales) Regulation (2021), DEFRA Government Review of Waste Policy in England (2011), BS5906 Waste Management in Buildings – code of practice (2005), the London Plan (2021), the Freight and Servicing plan (2019), Camden local policy, Camden planning guidance for design and transport (2019, 2021), Camden's Environment Service technical guidance for recycling and waste (2018), Camden's website (commercial and residential recycling and rubbish), and guidance provided by LBC waste officers.

The WMS applies the waste hierarchy, considers waste reduction interventions, and offers design guidance. For the waste hierarchy, the WMS recommends strategies relating to packaging, supply chains (eg green logistics), and behaviour change (eg data collection).

Construction waste management is considered in the EIA by Mace, submitted as part of the planning application. In the EIA (Chapter 5: Materials and Resources), the Construction Management Plan (CMP) for the Proposed Development is referred to in the 'Construction waste management' sub section. The report states:

"The Detailed CMP prepared by the Principal Contractor prior to the commencement of works would contain the measures to manage and dispose of waste. The CMP, in terms of waste management, would contain:

- *Classification of all wastes;*
- *Performance measures and target setting against estimated waste forecasts;*
- *Measures to minimise waste generation;*
- *Opportunities for reuse and recycling;*
- *Provision for the segregation of waste streams on site that are clearly labelled;*
- *Recording of proposed carriers and licences for disposal sites;*
- *Identification of disposal sites and routes to and from the Development Site, in consultation with LBC;*
- *An audit trail encompassing waste disposal activities and waste consignment notes;*
- *Measures to avoid fly tipping by others on land being used for construction;*
- *Measures to provide adequate training and awareness through toolbox talks; and*
- *Consider alternative means of removing waste other than by road (eg by train)."*

The EIA Chapter 5's 'Construction waste management' subsection also considers deconstructed or demolished materials, and states:

"The disposal of waste or other materials removed from the Development would be in accordance with the requirements of all relevant legislation, including:

- *The Environmental Permitting (England and Wales) (Amendment) Regulations 2016;*
- *The Waste (England and Wales) (Amendment) Regulations 2011 (as amended) 2014;*
- *Clean Neighbourhoods and Environment Act 2005; and,*
- *Contractors would be encouraged to adopt the principals of The Site Waste Management Strategy's Regulations 2008 (repealed) as good working practice."*

Table 4-3 Recycling and waste reporting form

Category	Total estimate	Of which…			Source of information
	t/m² Gross Internal Area (GIA)	% reused or Recycled on-site	% reused or recycled off-site	% not reused or recycled	
Excavation waste	More detailed estimates will be available at later stages, co-ordinated by Pell Frischmann.	Minimum 95% to beneficial use in line with policy targets. Target 95% diversion from landfill in line with BREEAM. Not specified whether this is on or off-site at this stage (on-site preferred).		Target minimum 5% in line with policy requirements, to be confirmed by Contractor	London Plan BREEAM
Demolition waste	Estimates to become available with the CMP / SWMP, co-ordinated by Mace.	Minimum 95% reused or recycled in line with policy targets. 95% diversion from landfill in line with BREEAM. Not specified whether on or off-site at this stage (on-site preferred).		Target minimum 5% in line with policy requirements, to be confirmed by Contractor	London Plan, BREEAM EIA Chapter 5: Materials and Resources by Mace (2021) BRE waste benchmarking data
Construction waste	Estimates to become available with the CMP / SWMP, co-ordinated by Mace. Anticipated that construction waste would be generated based on a rate of 0.181m³ waste per m² of development.	Minimum 95% reused or recycled in line with policy targets. >90% of non-demolition waste diverted from landfill (BREEAM). Not specified whether on or off-site at this stage (on-site preferred). Anticipated waste generation is based on the use of the Building Research Establishment's (BRE) (Ref. 5.13) waste benchmarking data for primarily residential development.		Target 5% or less in line with London Plan	
Category	**t/annum**	**% reused on or off site**	**% recycled or composted, on or off site**	**% not reused or recycled**	**Source of information**
Municipal waste	3,410 (Adapted from Arup waste generation volumes using WRAP standard density benchmarks)	Target minimum 65% of operational waste to be recycled, in line with London Plan requirements. Residential: Residential waste storage requirements are set out in the WMS (Arup, 2021). Compaction has not been proposed. Camden-Veolia will provide a weekly collection service for residential waste. Commercial: Commercial contractor has not been appointed. A commercial waste storage strategy is available in the WMS (Arup, 2021).		Target maximum 35% in line with London Plan	London Plan WMS, Arup (2021), which refers to: -Camden Planning Guidance (CPG): Design, Section 8 (2021) -Camden's Environment and technical guidance for recycling and waste

		General public: Waste will be collected from any general public bins by the on-site team. Entrances and fire exits will be cleared of all leaves. Litter picking will be conducted by the on-site team to allow for both a safe and clean environment.		
Industrial waste	n/a			

4.3 Circular economy narrative

This section aims to add some context and narrative detail to the ideas and commitments assembled in the Key Commitments table, above. Once again, the ideas are broken down into subsections that reflect the key circular economy principles from the GLA's guidance. Reference is made to architectural and engineering reports submitted as part of the planning application for further detail on lean design, reuse studies, and material audits.

Minimise the quantities of materials used

This principle has been thoroughly explored in the early stages of design for the Proposed Development, especially by the landscape architects, structural engineers, and sustainability consultants in the design team. Material reuse is not only regarded quantitatively, as there are also ambitions for reuse to form part of the development's aesthetic character and social value contributions.

Landscape design in support of minimising material use:

- The landscape architect, East, have integrated Circular Economy as a core design principle into their design work (See Appendix B).
- The linear park has been designed using re-used elements in the landscape. The neighbourhood lanes will explore use of play and soft boundaries to negotiate public and private; re-used and repurposed materials are considered in the design of these landscape elements as well.
- The Applicant is interested in exploring meanwhile uses that could support a circular economy. The landscape architects have optioned various circular meanwhile uses for the proposal, which can be explored and developed in later design stages, including:
    - A tree nursery (with potential educational social value benefits)
    - Cracking the tarmac and opening areas for greenery
    - Temporary stages and play facilities for community gatherings
    - Portable MUGA with temporary markings on the tarmac
    - Sample's house and other light structures to host events
    - Trees on wheels which can be re-planted in the development at later phases
- Landscape design studies (Appendix B) demonstrate a commitment to develop and integrate a 'reuse' aesthetic in new developments around London. They include precedent studies and case studies for harvest maps, mixed or reuse aesthetic character, and other forms of material audits.

Structural design in support of minimising material use:

- A study was produced by Buro Happold sustainability team to study various policy drivers and opportunities for reuse in relation to embodied carbon (See Appendix B). The report considers policy drivers from Camden council and the GLA, deconstruction scenarios and a Whole Life Carbon assessment of the O2 Centre, in comparison to a new-build scenario, as well as targets for re-use quantities of on-site materials, and materials strategies to be explored.
- The Sustainability Statement accompanying this planning submission, by Buro Happold, summarises material reuse, recycling, and deconstruction scenario modelling for the O2 building, and also shows evidence of the materials audits that have been undertaken so far (See Appendix B).
- Material reuse and repurposing is considered one of the key sustainability targets for the structural engineers, Pell Frischmann. They have stated that reuse of existing assets and materials is a priority; in cases where the reuse of existing assets and materials is not feasible, they have outlined a range of alternative options to minimise material use.
- Studies have been undertaken by the Structural Engineers to understand the feasibility of retention of the concrete superstructure and substructure, and the reuse of some of the steel elements of the building (See Appendix B).
- The redevelopment of the O2 building is planned for the last phase of the Proposed Development, allowing time to conduct studies in support of more material reuse or engage in discussion around the reuse of other elements. To date, the structural engineer, Pell Frishmann, has conducted initial feasibility studies and recommended the reuse of the existing secant piled wall, and highlighted the potential to reuse the existing pile foundations and concrete substructure through the use of an additional podium slab to transfer the loading from the new residential superstructures (see Appendix B). Further material testing and surveys will be required into the following design stages, to identify the full extent of the retention of the existing structure.
- Superstructure studies have been conducted and will support leaner design options (See Appendix B).
- A heavier facade will result in more material being used in the structure. The facades team have conducted studies into the facade and the optioneering exercises have included considerations of weight of various facade systems, including a prefabricated module option.

Minimise the quantities of other resources used

Overall, the project will use a mix of passive and active techniques to minimise quantities of resources used. Passive techniques include the use of seasonal planting, which supports less need for water in the dryer hot months, for example, working with the natural climatic patterns of water and sun. Active techniques may include energy and water metering to support more efficiency.

It is recommended that Whole Life Carbon analyses for each detailed element support more detailed approaches to this principle. For example, the kinds of processing used for deconstruction processes, or engagement with the supply chain to ensure more local procurement where possible, will be very beneficial to minimising other resources in the proposal.

Specify and source materials responsibly and sustainably

Overall, design teams are interested to explore less traditional options in support of sourcing and specifying sustainable materials. The structural engineers will explore various cement substitutes and alternative aggregates in the following stages; likewise, the landscape architects have specified materials with a large variety of recycled and reused elements.

The Applicant's Landsec Prohibited Materials List (Appendix C) aligns with reputable sustainability frameworks, referring to guidance from BREEAM, WELL, and LEED. It offers guidance on materials that are prohibited in the design and is in support of more sustainable sourcing, guided by the following four aspects:

- Health impacts
- Responsible sourcing (environmental and ethical)
- Embodied impact
- Resource efficiency

Design for reusability / recoverability / longevity / adaptability / flexibility

The residential spaces will focus on designing for longevity, in line with the slow rate of change typical of residential buildings. This key strategy will inform the residential uses of the detailed plots and will need to be considered in detailed design stages with regard to material choices, structural longevity (building for 100-year life), building in layers, and thorough long-term maintenance plans. The public realm and landscape elements of the proposal will be built following two principles: robustness and flexibility. At this stage in the design, the flexibility has already underpinned much of the design moves. The robustness will be determined by material choices and maintenance considerations in later detailed design stages.

The landscape and public realm design has the ambition to include various flexible facilities and spaces with multiple uses, including the following:

- Multi-Games areas (MUGA) – offering multiple entrances, integrate stages and multiple markings to allow a single space to host a variety of games.
- Community gardens – designed to support a variety of uses, both throughout the day and across different seasons.
- A garden pavilion – a metal structure with flexible uses; 'designed for disassembly' to ensure material reuse in future.
- Parking areas – can hold a variety of uses and can transform from car park to garden space. The proposal will only provide blue badge parking space.

The structural engineers, Pell Frishmann, have conducted several superstructure studies, including for floor options and grid studies (See Appendix B). The aim of this exercise was to consider various options for the structure according to variables such as embodied impact and designing for flexibility.

The facades team have conducted studies into the facade. The optioneering exercises have included considerations of various facade systems, including a prefabricated module option and a hand laid brick option. The use of brick has been noted as a material which weathers well in the local climate, and is a robust material in support of longevity. The exercises have considered different options for balconies. There are options for lightweight balconies, as well as 'bolt-on' balconies for the prefabricated modules, both of which will support circular economy principles - disassembly for the latter, and less material used in the structure for the former. These will be developed in the detailed design stages.

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

Design for longevity and robustness has been identified as a key strategy for the development, especially the public realm design and residential buildings. This will need to be developed in detailed design stages; it is recommended that the architects use this principle to inform material choices as well as any opportunity to 'design in layers'.

Design for disassembly will be explored for temporary (meanwhile) facilities as well as landscape objects, such as furniture or any outdoor pavilion spaces. This will enable less waste generation through the life of the proposal. It is recommended that the design team engage with further opportunities for design for disassembly, in cases of interior features and fixings, at later design stages for both residential and non-residential uses.

An opportunity has been identified to include a tool library, repair workshop or swap shop in the development for residents to use. This will provide enabling infrastructure for day-to-day circularity of resident's materials. This has social value co-benefits; the Proposed Development is supporting an inclusive economy and allowing for space to repair and reuse will support more affordable lifestyles as well.

Manage demolition waste

Pre-development or pre-demolition audits will be undertaken for both the Homebase and O2 buildings to understand what can be reused and repurposed, on site or off site, of the existing buildings. These audits will aim to follow BREEAM guidance. The audits can happen in response to the phasing of the proposal: the Homebase audit is to happen pre-commencement, while the O2 building audit is to happen at the time of RMA submission for that phase.

It is recommended that Applicant will explore, in collaboration with the demolition contractor, reaching out to local organisation that support a secondary materials market or reuse networks within the community to distribute salvaged materials that cannot be used again on site.

Manage excavation waste

An overarching strategy for minimising excavation and excavation waste throughout the proposal is for the design to work with the existing levels of the site as much as possible. This principle is underpinning design work completed to date.

The structural engineers have completed initial, rough studies to estimate excavation material for the Proposed Development, including the few small basements that are required for attenuation tanks. These studies will need to be developed in the next design stage to gather more detailed estimates so that excavation material can be re-distributed to beneficial uses on site or off site, as much as possible.

Manage construction waste

The EIA refers to construction waste management in the Chapter 5: Materials and Resources. This report anticipates a Construction Management Plan (CMP) for the project, and outlines requirements for the CMP in line with sustainable construction waste management practices (see: Recycling and Waste Reporting section; and the EIA, CH.5 for details).

Manage municipal and industrial waste

The municipal waste management, for both residential and non-residential uses, has been planned according local best practice and Camden Council guidance. For details, please see the Recycling and Waste reporting section as well as the Waste Management Strategy for the proposal, by Arup (2021).

4.4 Plans for implementation

Plans for implementation will continue to be considered and included at future design stages. The project team will monitor the progress of the development and maintain records of key milestones against the targets and commitments set out in this Circular Economy Statement, to then be included in the final update to the report upon completion of the development. Record keeping should be updated, reviewed and handed forward at each stage ensuring consistent messaging and communication, and should be done mindful of the project's circular economy aspirations and the end-of-life strategy.

The design and construction teams will continue to look for opportunities to meet and improve upon the aspirations set out here, as the project progresses. The post-completion report will also include a strategy for monitoring and reporting of ongoing operations of the development.

Listed below are a few recommendations made by the author, Buro Happold, that will support of circular economy considerations for the next stages:

Retaining and re-using structural elements:

Surveys have been conducted and recommendations have been made for both substructure and superstructure. Further testing has been stated as a requirement in the following design stages, in order to grasp the feasibility of current retention recommendations.

Supporting a secondary materials market:

The Applicant will explore opportunities and approaches to linking up their corporate sites around London or linking up with local organisations to support a secondary materials market in the area.

Enabling infrastructure for residential development:

The Applicant will explore the network and reach of on-site circular facilities: for example, a 'tool library' to support repair, a 'swap shop', or 'makers'' workshops have been mentioned during circular economy workshops. Tool libraries could be included in the residential blocks, as they will relate to domestic needs – similar to bicycle facilities. The Applicant will also aim to explore how these facilities might grow in the future when there will be more demand for such facilities as the circular economy becomes mainstream.

Longevity

Longevity and material robustness have been identified as leading strategies for the residential uses and public realm design. To enable this process, the following is suggested:

- Follow-up discussions with the detail design architects to brainstorm, expand on, and find realistic methods for ensuring longevity at the scale of the detailed components, whole buildings, and the masterplan.
- Additional thinking on how the development may have to change in response to policy and climatic changes.

Circular design that supports Whole Life Carbon reductions

The Whole Life Carbon assessment, which accompanies this planning submission, presents a variety of carbon reduction techniques that are also circular economy design techniques, e.g. designing for deconstruction and promoting reuse as much as possible.

In addition to the WLC assessment, the following recommendations can be considered in later design stages to support co-benefits with carbon reductions:

- Local sources should be prioritised for bulky materials. It will be crucial to investigate availability and reliable sources in proximity in good time, to ensure local sourcing can be achieved for part or all of the development.
- Design for disassembly: a key consideration for embodied carbon is to ensure they can be easily dismantled and reused/recycled where possible. This is important for interior finishes and MEP kit as these elements are likely to be replaced more often than structural elements, which are designed for long life. 'Chemical fixing', like use of adhesives and welding, should be avoided where possible.
- No unnecessary finishes: using less material on finishes will result in lower material use overall, as well as less need to replace and maintain additional layers. Choosing robust materials will support keeping materials in use at their highest value for the longest possible time.

4.5 End-of-life strategy

Consideration of what happens to the scheme at the end of its life has been referred to throughout this Circular Economy Statement. By taking on board the aspirations, ideas and commitments set out above, the Applicant is moving towards a scheme that considers the value of the materials used. Thorough records and models will be kept, and these will be developed in the detailed design and construction stages so that they might act as a guide for the repurposing or disassembly and recovery of the layers and elements of the scheme. This will allow the future custodians to prolong the life of the building and maintain the value of materials it contains.

4.6 Post completion report

A post-completion report will be included with an updated Circular Economy Statement when the proposed development is at full build out. This stage is part of the wider 'reporting outcomes' portion which will include the targets, commitments and outcomes that have been achieved. This will include updates of all tables included so far in this report, such as the Bill of Materials and the Recycling and Waste Reporting form taking actual performance into account. It is anticipated that the commitment to produce this update will be secured via a suitably worded planning condition.

Updates will be supported where necessary with evidence, including audits, correspondence, record drawings and images, specifications, and product certifications. Clear indication will be made where targets have been exceeded or have not been made, and important lessons learned captured and communicated. Any ongoing suggestions for the operational life of the development will also be highlighted for handover to the building operators.

The post-completion report will be shared with the GLA (to be issued by e-mail to the GLA at ce&wastestatement@london.gov.uk) upon completion of the development

Appendix A Workshop Notes

BURO HAPPOLD

Agenda

Subject	O2 Finchley Road Circular Economy Statement | Workshop	Job no	0048201
Place	MS Teams	Date	19 August 2021
Distribution	*Landsec* (LSG) Theresa Brewer Alexandra Farrant Callum Robins Timothy Trillo *Buro Happold* (BH) Joshua Apperley Jon Gregg Nicoletta Michaletos Loic Weisser *AHMM Architects* (AHMM) Ryan McCrudden Pell Frischmann (PF) Alexandru Gaftea Mike Hitchens Chinnie Lau *East Architecture Landscape* (EA) Liam Wright *Gerald Eve* (GE) Luke Davies	Time	15.30-17.00

Objective of meeting: Establish strategy and gather information required for completion of CES as per GLA guidance

Item	Action
1. Introductions amongst the team 2. BH presented an introduction to CE and purpose of the CES 3. LSG gave an introduction to the projects aims and objectives, site constraints, phasing a. Reviews are being carried out to agree phasing of the site b. Current proposal is for central third to be presented in detail, with west and east thirds to follow in that order	

   c. Studies have started, by EA, to establish opportunities for material reuse from existing building, and by PF to establish opportunities with existing structure

   d. Consideration also of meanwhile use opportunities within the phasing

4. PF outlined consideration within outline design for reusing O2 substructure; contiguous pile retaining wall has been inspected and is considered suitable for reuse, material testing is required, there is an objective to keep footings where compatible. Ramp at north of shopping centre to be kept if possible following testing as well
5. PF also suggested aim to design for longer (eg 120 year) life rather than 50-60 year
6. PF to assess feasibility of using steel (at value, avoiding downgrading) from existing, either on site or elsewhere. The drawings and fabrication details are available and will be reviewed
7. BH suggested engaging eg ReLondon to begin searching for a home for these deconstructed components where on-site is not possible
8. LSG are considering opportunities for linking up their four current urban opportunity sites (Lewisham Gateway, Southside Wandsworth, West 12 Shepherds Bush) for materials transfer
9. O2 is to be the first to come forward, and holds the most potential for material capture and reuse
10. LSG and EA have had discussions with London Wildlife Trust regarding existing trees on site. Where these trees are not viable or suitable for replanting, it is proposed that timber is harvested for use on site, as well as in developing an on-site nursery for future site landscaping
11. Community gardens included and designed to be malleable and develop alongside the buildings
12. SuDS are being considered and incorporated throughout the site
13. BH raised the need for independent pre demolition audits
    a. Record drawings are available for O2 and Homebase (foundations only)
    b. BH advised audits should be provided asap, and will provide high level specification for these
14. Team moved on to use whiteboards to brainstorm ideas for opportunities across all layers of the development, as well as actions and constraints. Outcomes from this will be captured in the strategy and key commitments tables
15. BH to go away after the workshop and aggregate thoughts and approaches and feedback to the team for comment and to present next steps and key actions
16. BH to write up Draft CES for submission to the GLA for comment at this pre-app stage
17. BH is going to look into engaging with local CE organisations including ReLondon
18. BH is going to circulate details of information that will be required for the next stages of the report, including elements regarding CD&E waste, operational waste, materials quantities, etc
19. BH invited comments and engagement invited from any team members not present at the workshop; whiteboard to be left open for further input and interaction for a period

20. BH advised that a follow up workshop should be held prior to submission of full planning application	

Appendix B Supporting Studies

4.7 Design studies to consider opportunities for reuse:

This selection of design studies demonstrates the design team's work in support of considering opportunities for material reuse and recycling within the site. The studies come from the landscape architect's surveys and design work as well as engineering methods for potential deconstruction (for reuse) of existing elements.

4.7.1 Landscape design studies

The landscape architect, East, produced design studies that directly highlight potential to integrate Circular Economy principles into their design process (see selected pages from the studies below). Their studies demonstrate a willingness to engage with Circular Economy design thinking and, importantly, the inclusion of these principles in the early stages of design. Below are examples from the studies:

There is an ambition for the following materials used in the landscape proposal will have part or full reused contents:

- For soft landscape, stone dust, wood mulch, ceramic waste, and dry riverbeds will be full- or part-reused material.
- For hard landscape, the wood slates, rubber play surfaces, concrete raft, stones, clay tiles, granite cobblestones, reused raft in poured surface, poured concrete, exposed aggregate, polished concrete objects, and other surfaces will all have full- or part-reused content.

Figure 4-1 An example of precedent studies supporting circular economy and re-use for the proposal, by Landscape Architects East

Figure 4-2 An example of precedent studies looking at the 're-use' aesthetic, by landscape architects East

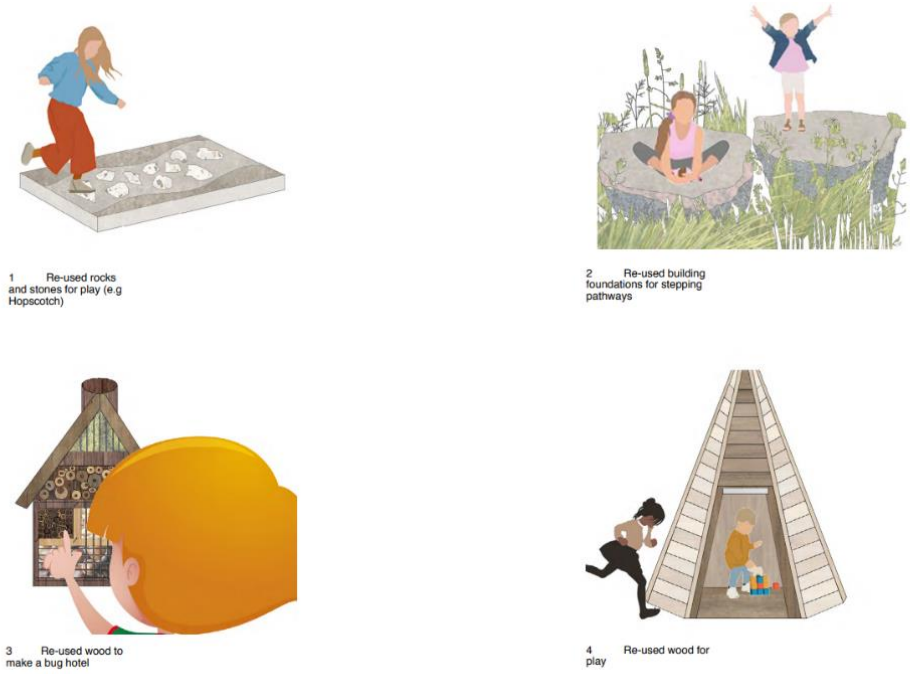


Figure 4-3 Study for designing with reuse, by landscape architects East

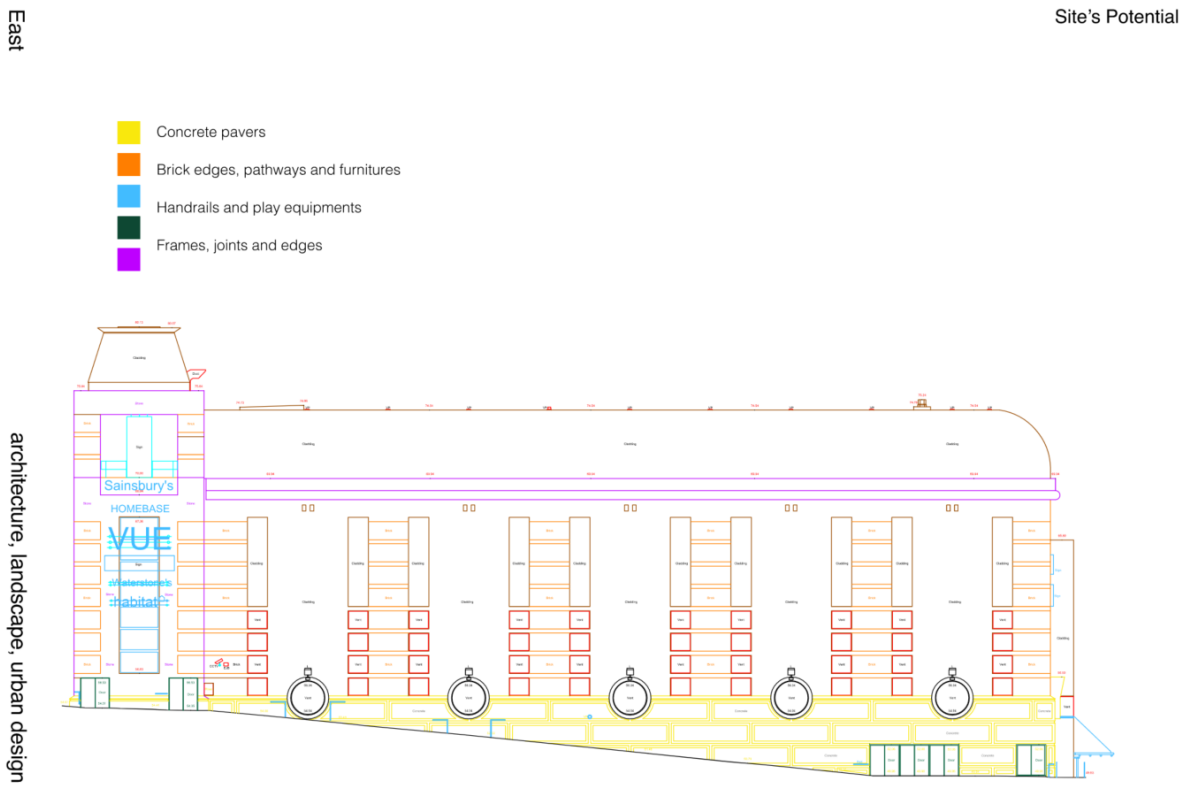
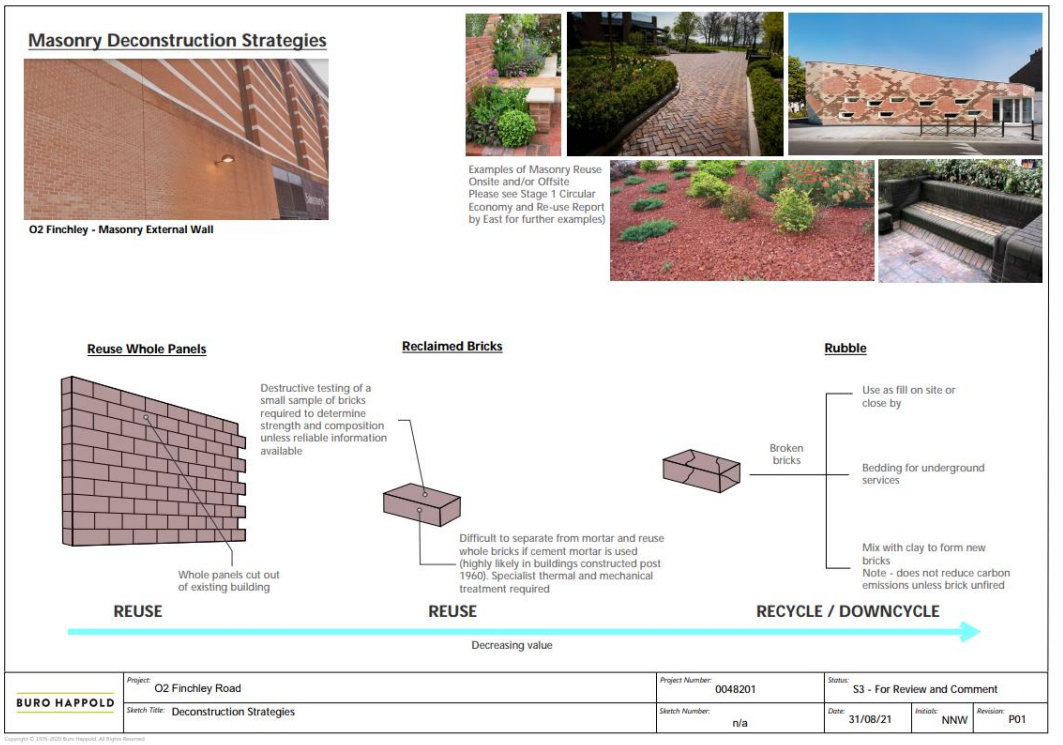


Figure 4-4 Mapping facade of the O2 building for reusable materials, by landscape architects East

4.7.2 Engineering studies for reuse options:

Various engineering studies have been conducted to explore opportunities for material reuse and recycling. It should be noted that material deconstruction is yet to be mainstreamed in London and techniques are still in the process of being established and standardised. This poses a challenge to deconstruction as an aspiration.



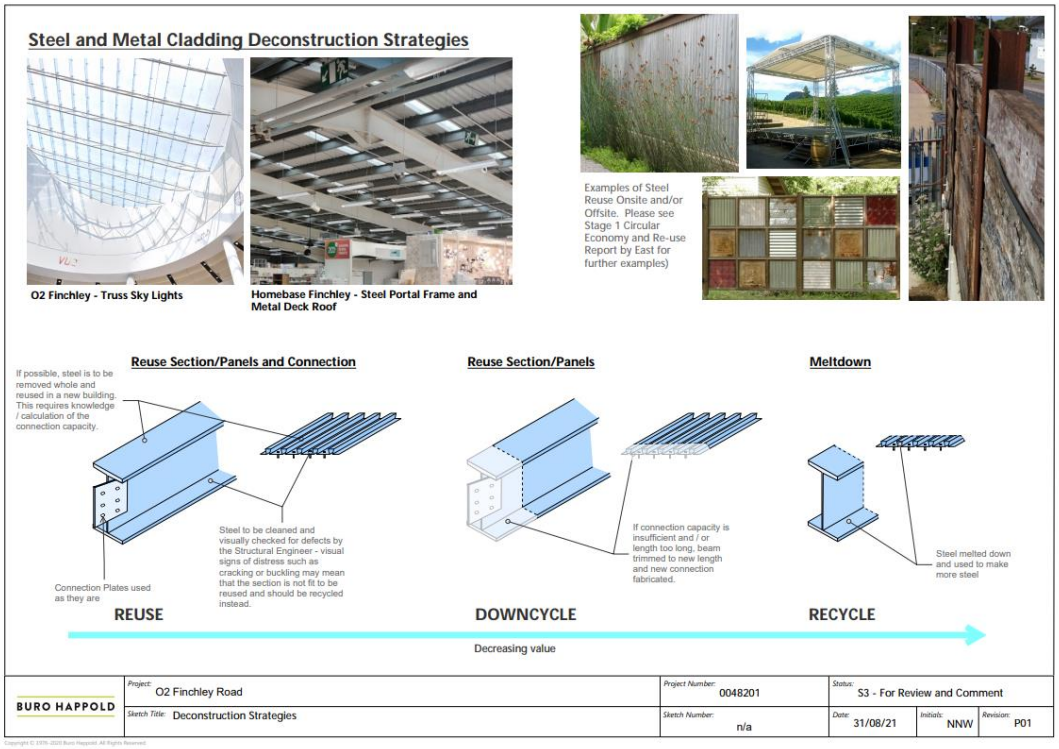


Figure 4-5 Selection of 'deconstruction' techniques outlined in a material reuse study by Buro Happold. These were outlined for a variety of materials existing within the O2 Centre.

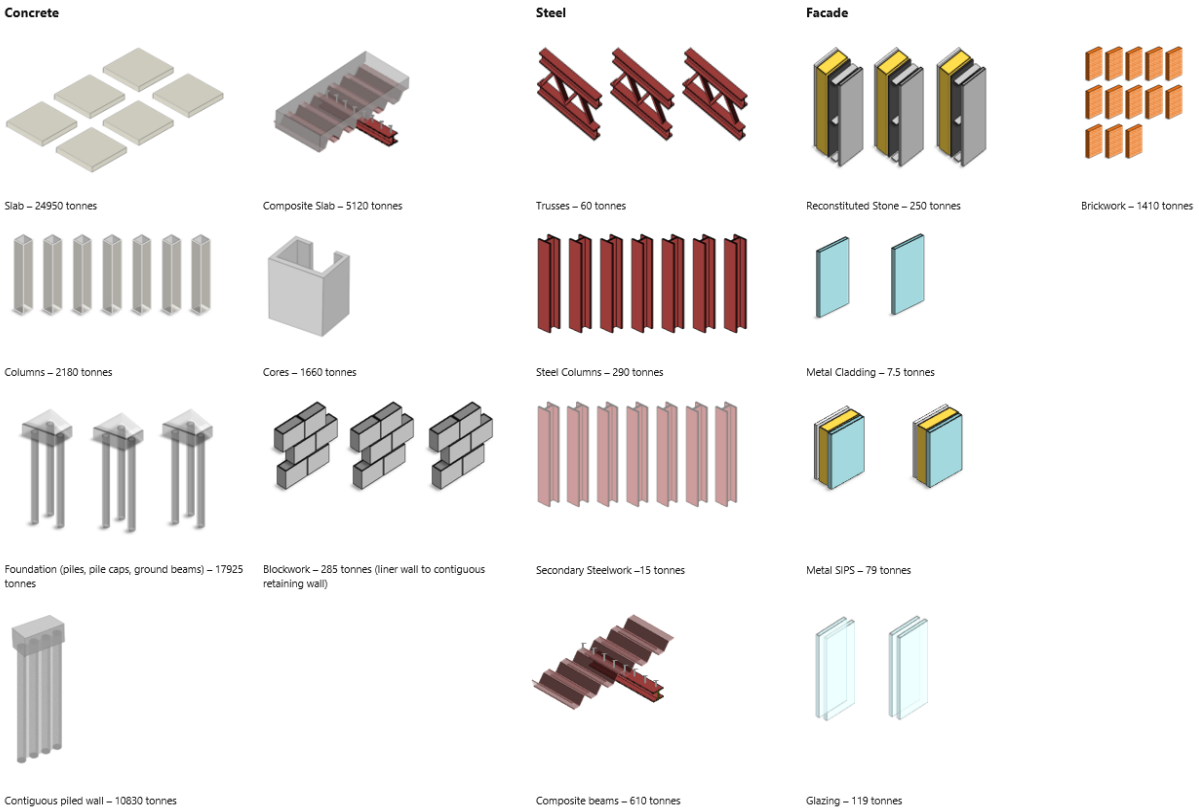


Figure 4-7 Illustrative materials audit of the O2 building, by Buro Happold

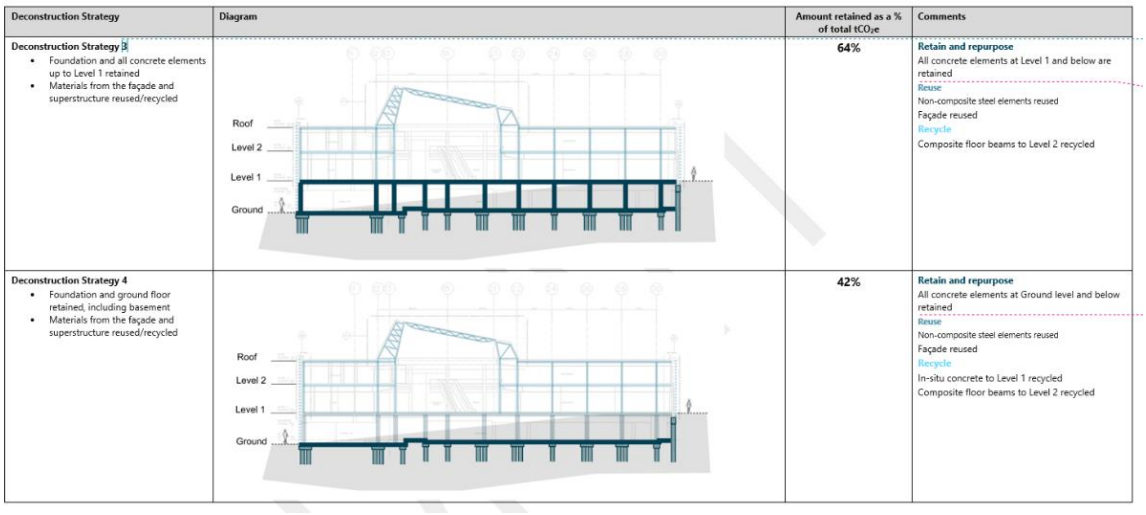


Figure 4-6 Two re-use scenarios by Buro Happold, which will undergo further detailed investigation by the structural engineers, Pell Frischmann. Drawings by Buro Happold

Material Re-use is considered one of the key sustainability targets for the structural engineers, Pell Frischmann. In cases where the reuse of existing assets and materials is not feasible, they have suggested exploring, amongst other options,

> *[T]he design of the new structure needs to cater for as many of the following:*

- *Longevity, flexibility or adaptability;*
- *Ability to be disassembled and reused somewhere else;*
- *Potential for elements to be standardised and modularised;*
- *Usage of low impact materials, that either have a high recycled content or make use of secondary material;*
- *Minimise waste, both during construction and at the end of life; and*
- *Reduce construction impacts, by prefabricating as many elements as possible in a factory*

Studies have been undertaken by the Structural Engineers to understand the feasibility of retention of the concrete superstructure and substructure, and the reuse of some of the steel elements of the building. These studies are intended to inform design process and aid retention of existing structure where possible.

For substructure reuse, the engineer's recommendations for the O2 centre include:

- *There is some potential to reuse the existing piled foundations within the proposed development.*
- *While the new proposed column grids might not match the existing ones, there is an opportunity to create a podium slab that could transfer the new columns onto the existing foundations and therefore reducing the number of new foundations required. This is will be explored in more detail during the next design stage when this part of the site is further developed.*
- *It is also recommended that the existing secant piled wall retaining the ground under Finchley Road is kept in place and reused as part of the new development.*
- *Further material testing will be required in order to fully assess the capacity and durability of the existing elements that are to be retained and reused.*

For superstructure reuse on site or beyond, the engineer's recommendations for the O2 centre include:

- *One potential option is to retain as much as possible of this existing floor structure and integrate it within the design of the new development. The existing transfer beams could be reused to support the columns of the new residential blocks, subject to design capacity checks. This will be explored in more detail in the next design stage…*
- *The existing 2nd floor structure is a composite metal deck with steel beam construction… it is likely that the steel is still in good condition and could potentially be reused, either on this development or somewhere else.*
- The deconstruction of the 2nd floor structural elements will need to be considered, as, due to the composite nature of the structure, it might prove difficult to deconstruct without damaging the pieces, as well as being time consuming.
- *The existing roof structure is generally comprised of standard steel beams or trusses within the circular glazed atrium… these elements could be dismantled and reused as much as possible, subject to adequate checks being undertaken to ensure that they are in acceptable conditions.*

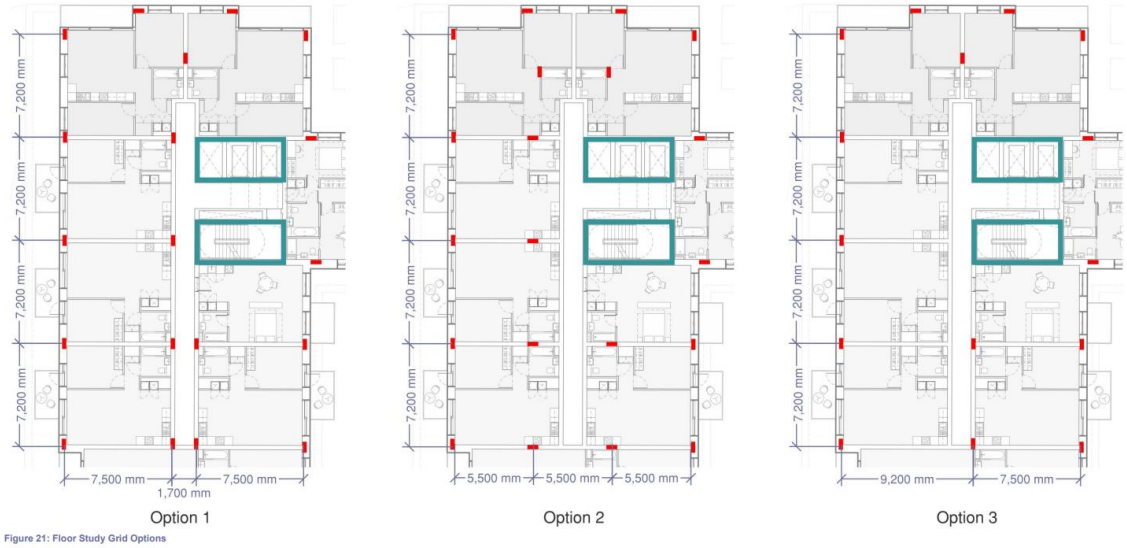


Figure 4-10 Superstructure studies - an example from floor study grid options.

Appendix C Landsec Prohibited Materials List

Prohibited Materials List

February 2020

Introduction

This list of prohibited materials has been put together in consideration of four aspects of sustainable sourcing of materials:

- Health impacts
- Responsible sourcing (both environmental and ethical)
- Embodied impact
- Resource efficiency

The requirements of this list are aligned with sustainability assessment schemes including BREEAM, LEED and WELL. For example, where “product manufacture” and “raw material extraction/production” are used, these terms align with the BREEAM 2018 Mat 03 methodology.

Any deviation from this list must have prior approval by Landsec and would only be permitted from a safety (e.g. fire proofing), structural or other critical perspective, and where it can be evidenced that no suitable alternatives are available.

Landsec expect that their contractors and suppliers are committed to addressing the human rights challenges within the industry and expects that they collaborate and engage with stakeholders to stay informed about workers’ issues and concerns, and find solutions to address modern slavery. Landsec expect their contractors, as a minimum to:

- Have a due diligence process which determines human rights risks in the supply chain and takes appropriate actions as a result.
- Have a training programme, which is implemented to all relevant decision-makers within the company (including procurement teams) on risks, policies and standards related to modern slavery, human trafficking and forced labour. For the rest of the staff, implement awareness raising of the signs of modern slavery, and information on how to raise complaints within the company.
- Publish clear policies on modern slavery.
- Implement company-level grievance mechanisms (such as an anonymous hotline that all workers have access to).
- Include clauses on modern slavery in contracts and processes of selecting contractors, suppliers, and agencies, that demonstrate consideration for practices regarding labour rights.

To enable us to assess geographical areas at higher risk of modern slavery, this list is based on the *Walkfree Foundation Global Slavery Index* and the *Trafficking Victims Protection Act (TVPRA) 2018 List of Goods Produced by Child Labor or Forced Labor*. We've identified countries at risk for each relevant raw material or product. Landsec will not tolerate any material sourced from a supplier at risk of modern slavery. To minimise risk, materials proposed from high risk areas are subject to prior approval from Landsec and must actively demonstrate compliance with each point listed above.

In addition to the requirements stated below, all products must comply with relevant legislation, including but not limited to legislation prohibiting asbestos, the EU Paints Directive, and the Registration, Evaluation, Authorisation and Restriction of Chemicals Regulations (REACH).

In finished products, either the finished product or the constituent parts must comply with the requirements. For example, where furniture items contain finished timber, the timber must comply with the timber requirements and the finishes must comply with the paints and coatings requirements.

Where the labels "Acutely Toxic" and "Serious Health Hazard" are referred to in this document, they refer to labelling as per the Classification, Labelling and Packaging Regulation (CLP Regulation), which implements the United Nations' Globally Harmonised System of Classification and Labelling of Chemicals (GHS). The CLP Regulation classifications can be identified by the following red and white diamond labels on product packaging and literature:

Acutely Toxic

Serious Health Hazard

The following sections of this document set out materials prohibited on Landsec projects by material category.

All materials are to be sourced from the UK or European Union unless approved by Landsec.

1 Adhesives and Sealants

Products labelled as Acutely Toxic.

Products labelled as Serious Health Hazard.

2 Aluminium

Products manufactured with Chromium (VI) pre-treatment.

Products without BES 6001 certification, or ISO 14001 certification for the product manufacture and raw material extraction/manufacture.

3 Blockwork

Products without BES 6001 certification, or ISO 14001 certification for the product manufacture and raw material extraction/manufacture.

4 Bricks

Products without BES 6001 certification, or ISO 14001 certification for the product manufacture and raw material extraction/manufacture.

Countries at high risk of modern slavery for raw materials or finished products are: Afghanistan, Argentina, Bangladesh, Bolivia, Brazil, Burma, Cambodia, China, Colombia, Ecuador, Egypt, India, Iran, Nepal, North Korea, Pakistan, Paraguay, Peru, Russia, Uganda, and Vietnam (clay bricks).

5 Concrete

In-situ concrete without BES 6001 Very Good/Excellent certification.

Pre-cast concrete without ISO 14001 certification for the product manufacture and raw material extraction/manufacture.

6 Flooring

Products labelled as Acutely Toxic.

Products labelled as Serious Health Hazard.

PVC backing for carpets.

Antimicrobial treatments where the active ingredients are classified as Persistent Bio-accumulative Toxic (PBT).

Fly ash in carpet backing.

Rubber and vinyl flooring made from post-consumer recycled content.

Countries at high risk of modern slavery for carpets are: Afghanistan, India, Iran, Nepal and Pakistan.

7 Furniture

Products labelled as Acutely Toxic.

Products labelled as Serious Health Hazard.

Rayon.

Animal hides.

Countries at high risk of modern slavery for finished products are: Bangladesh (steel furniture), Turkey and Vietnam.

Countries at high risk of modern slavery for fabrics are: Bangladesh, Cambodia, China, Ethiopia (hand woven), North Korea and Vietnam.

8 Glass

Cadmium and other heavy metals (for fritting or other treatment).

Products without BES 6001 certification, or ISO 14001 certification for the product manufacture and raw material extraction/manufacture.

Countries at high risk of modern slavery for finished products are: Bangladesh.

9 Gypsum

Plasterboard products without BES 6001 Very Good/Excellent certification.

10 Insulation (Thermal and Acoustic)

Products labelled as Acutely Toxic.

Products labelled as Serious Health Hazard.

Products with blowing agents containing Ozone Depleting Substances or Global Warming Potential over 10.

Products without BES 6001 certification, or ISO 14001 certification for the product manufacture and raw material extraction/manufacture.

11 Natural stone

Stones containing asbestos, for example some green serpentines.

Products without BES 6001 certification, or ISO 14001 certification for the product manufacture and raw material extraction/production.

12 Paints and Coatings (applied on site)

Products labelled as Acutely Toxic.

Products labelled as Serious Health Hazard.

Antimicrobial coatings where active ingredients are classed as PBT.

Products without BES 6001 certification or ISO 14001 certification for the product manufacture.

13 Plastic

The requirements for plastic apply where plastic is the key material in a product.

Products labelled as Acutely Toxic.

Products labelled as Serious Health Hazard.

Plastic lumber containing wood-plastic composites, multiple comingled recycled consumer plastics, fibreglass, polystyrene and polyvinyl chloride (PVC).

Products without BES 6001 certification or ISO 14001 certification for the product manufacture.

14 Steel

Structural steel without BES 6001 Pass/Good certification.

Steel plates and steel used in cladding or other key elements without ISO 14001 certification for the product manufacture and raw material extraction/production.

Reinforcement steel without BES 6001, Eco-reinforcement, or CARES Sustainability certification.

15 Timber

Products not meeting emission class E1 Formaldehyde.

Non-FSC or PEFC certified timber (full Chain of Custody) for structural timber.

Non-FSC certified timber (full Chain of Custody) for non-structural timber.

Countries at high risk of modern slavery for finished products are: Burma (teak), Brazil, Cambodia, North Korea, Peru, Russia and Vietnam.

16 Other Materials

Mercury (in illuminated exit signs, thermostats, switches, electrical relays and lighting).

Lead (in drinking water systems).

Countries at high risk of modern slavery for electronics are: China and Malaysia

In finished products or composite products, either the finished product or the constituent parts must comply with the requirements. For example, where furniture items contain finished timber, the timber must comply with the timber requirements and the finishes must comply with the paints and coatings requirements.

Nicoletta Michaletos
Buro Happold Limited
17 Newman Street
London
W1T 1PD
UK

T: +44 (0)207 927 9700
F: +44 (0)870 787 4145
Email: Click here to enter text.