PADDINGTON GREEN
POLICE STATION

Circular Economy Statement

Circular Economy Statement–
November 2022 - GLA0711

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BURO HAPPOLD

Paddington Green Police Station, Westminster

Circular Economy Statement

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Executive Summary

This Circular Economy Statement has been prepared by Buro Happold on behalf of Berkeley Homes ('the Applicant') in support of a submission of a full planning application for Paddington Green Police Station (the Proposed Development) in Westminster City Council (WCC) London.

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.

This Circular Economy Statement aims to respond to opportunities and constraints specific to this scheme including the GLA circular economy commitments:

1. DESIGN OUT WASTE

The Proposed Development has been designed to ensure that material and resources are effectively used, managed, and reduced as far as possible, in accordance with the GLA first principle of the circular economy. The development has also ensured that material quantities and other resources are minimized, responsibly and local sourced throughout the development process.

- A **Whole Life Carbon Assessment** has been undertaken, taking a holistic view to help reducing buildings embodied and operational carbon emissions.
- This will be instructed as part of the **Sustainable Procurement Plan** in the Contractor Prelims.
- A site-specific **Site Waste Management Plan**, has be carried out to help set a target, manage, and divert construction waste from the landfill.
- Moreover, an **Operational Waste Management Strategy** has been developed to help with the operational waste of the building during occupation. Sufficient and compliant bin areas and appropriately sized bins have been provided to help maximise recycling and the reuse of municipal waste in accordance with the local and GLA requirements.
- A **BREEAM Pre-assessment workshop** took place during RIBA Stage 2, where Waste and Material requirements were discussed and associated BREEAM credits targeted (e.g. Wst. 1, Mat 05 & Wst.06).

2. DESIGN FOR LONGEVITY

Design protection measures and robust finishes will ensure longevity of design, reducing the maintenance and replacement cycle of the building of each building layer.

Replacement of major items of plant at basement and roof levels should not be required during the normally anticipated life expectancy of the plant. However, consideration has been given to how these services can be replaced without significant impact on the building structure.

3. DESIGN FOR ADAPTABITLITY

The Proposed Development's design supports adaptability and flexibility. The core, bracing shear wall and columns are the only fixed elements internally, allowing for maximum flexibility of the internal space.

The drainage strategy has been developed considering future climatic changes. Flexible floorplate layouts/structural grids and generous floor to ceiling heights in the non-residential areas allow for adaptability of use.

4. DESIGN FOR DISASSEMBLEY

Modularity and supplier 'take-back scheme' will be encouraged to allow for disassembly and reuse at the end of their useful life. Building information will be stored to allow for end-of-life strategy, future reuse, disassembly, waste reduction/avoidance.

5. USING SYSTEMS, ELEMENTS OR MATERIALS THAT CAN BE REUSED OR RECYCLED

A **Pre-demolition Audit** has been completed with recommendations for material salvaging and recycling rates. A 95% waste diversion from landfill will be set in compliance with the GLA requirement.

The next stages will inform more detailed specification and material choice to incorporate reusable and recyclable systems.

Introduction

Buro Happold has prepared this Circular Economy Statement to support the planning application for the redevelopment of Paddington Green Police Station, London, and referred to hereafter as "the Site". The Site is to be developed by Berkeley Homes, referred to hereafter as "the Applicant", on behalf of whom this document is produced.

The document describes the Circular Economy strategy for the development as agreed with the Applicant and their design team and is produced in order 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 – both draft guidance (2019) and published guidance (2022) documents – and represents a level of detail and consideration in line with a "Full Circular Economy Statement", as is required to accompany a planning submission. The statement is required to be expanded to cover further detail in future design phases.

The new London Plan 2021 has now been published and the GLA's latest Circular Economy Guidance has now been published too. The drafting of this report commenced at a time when only the pre-consultation draft guidance was available. As a result, the work herein is a result of work done in support of both of those guidance documents as much as possible.

Existing site

The existing site comprises of masonry construction throughout with external glazed windows and doors. Its extent is predominantly made up of an open plan basement car park, ground floor courtyard area and high security custody suites with two multi-story blocks, seven and fourteen floors in height respectively.

Development description

The Applicant is submitting a full detailed planning application for the redevelopment of the former Paddington Green Police Station site to provide three buildings extending between 17 and 39 storey including commercial space (Class E use), 556 residential units (including 219 affordable housing homes), landscaping and associated car and cycle parking.

Figure 1 Paddington Green Police Station proposed development

Table 1 Area Schedule

Typology	NIA (m^2)	GIA (m^2)	GIA (ft^2)
Residential	43,024	59,068	635,799
Commercial/Community Space	1,122	1,212	13,045
Other - Circulation & Basement	-	5,494	59,137
Total	**44,146**	**65,774**	**707,981**

Buro Happold has been commissioned by Berkeley Homes (Central London) Ltd. to develop and prepare a Circular Economy Statement for Paddington Green Police Station (the Proposed Development) in the Westminster City Council (WCC) London.

The client's ambition for the site is to deliver a high quality residential led mixed-use development that will complete the West End Gate masterplan. The scheme will complement and enhance the local environment including the Paddington Green and the wider Church Street area, improve the quality of life for local people and provide a sustainable development for new residents. The proposals will regenerate this part of the Edgware Road providing active frontages on Edgware Road and Harrow Road, in hand with an improved public realm and townscape.

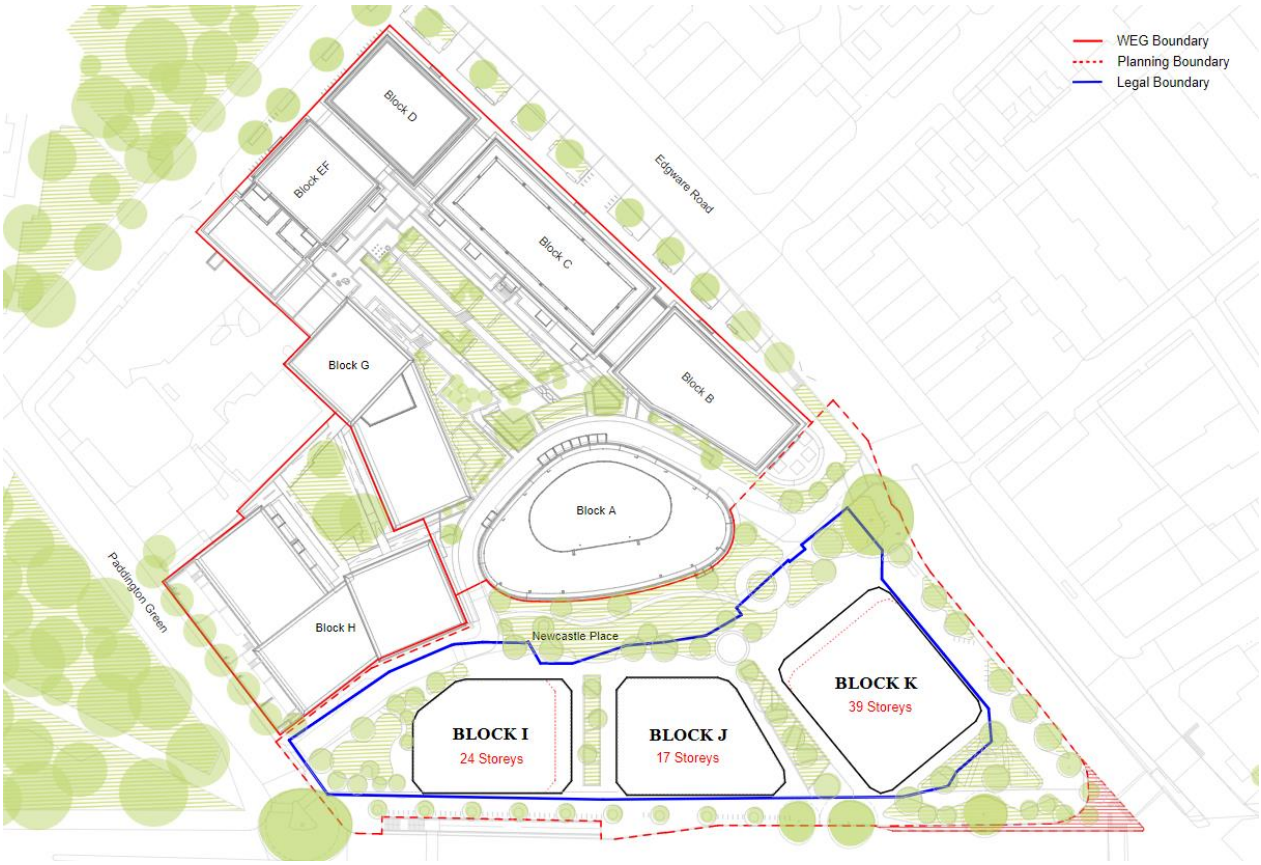

Figure 2 Roof View showing the West End Gate Masterplan with the Proposed Development

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.

London Plan 2021

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.

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.

London Borough of Westminster

Westminster circular economy policies includes:

- The London Plan supports the shift to circular economy and contributing to London's net self-sufficiency targets by 2026
- The City Plan Policy 37 supports the London Plan by ensuring councils and stakeholders work collaboratively with other boroughs, ensure developers incorporate waste management and recycling facilities as well as safeguarding and improving waste management sites and services (Household and commercial waste).
- The Municipal Waste Management Strategy 2016-2031 aims to achieve a 65% recycling target of municipal waste by 2030.
- The Resources and Waste Strategy aims to bring changes to the way waste is managed in Westminster by working with residents, businesses, and stakeholders to accommodate these changes

The Circular Economy is described by the London Plan as 'An economic model in which resources are kept in use at the highest level possible for as long as possible to maximise value and reduce waste, moving away from the traditional linear economic model of 'make, use, dispose' in which the intrinsic value of products and materials reduce overtime.

Putting the circular economy into action in Westminster's built environment means in the first instance exploring retention and refurbishment of buildings rather than demolition and re-build. If this is not possible, then incorporating reused materials into a new development. Reusing materials from that of demolition processes gains:

- Preservation and enhancing green infrastructure and city greening
- Maximising opportunities for renewable energy
- Waste minimising and reduction

To comply with policy 37 B when a planning application is submitted, the City Council would expect details of the proposed storage accommodation for waste and recyclable material to be specified and agreed. This requirement would be essential for the following types of application:

- New developments
- Residential conversions
- Major extensions to existing buildings
- Redevelopments
- Most changes of use, especially those providing hospitality services

It normally costs less to recycle waste and proposed waste management systems should therefore be designed to maximise recycling. Therefore, to maximise recycling, large scale or major developments (both residential and commercial) should have a minimum of one waste management operative on full time or part time basis to ensure proper segregation of different waste streams. Also, mixed recycling storage for this kind of developments are not acceptable as there is a requirement under the Waste Regulation 2011 to keep materials fully segregated to avoid dry mixed recycling. In other words, there should be a separate bin for different recyclable material waste streams.

- Food waste facilities (if the major development includes many restaurants)
- Cardboard balers
- Compactors (only general waste should be compacted)
- Public Micro Recycling Centre

Policy 37 C, Waste Management requires developers to submit a Circular Economy Statement, Site Environment Management Plan and/or associated Site Waste Management Plan. Circular Economy Statements should be submitted for referable applications in line with London Plan policy SI7 to demonstrate how construction, demolition, and excavation (CD&E) recycling and beneficial use targets will be met. Compliance with the Council's Code of Construction Practice should also be shown:

1. How all materials arising from demolition and remediation works will be re-used and/or recycled.
2. How the proposal's design and construction will reduce material demands and enable building materials, components, and products to be disassembled and re-used at the end of their useful life.
3. Opportunities for managing as much waste as possible on-site
4. Adequate and easily accessible storage space and collection systems to support recycling and re-use.
5. How much waste the proposal is expected to generate, and how and where the waste will be managed in accordance with the waste hierarchy; and
6. How performance will be monitored and reported. (London Plan)

Method

Buro Happold have 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 and the future RIBA design stages. It is proposed that the CES is further developed in the post-planning stage if required to provide additional detail on commitments, targets, and implementation.

- Change in GLA guidance

The GLA's updated Circular Economy guidance was published in March 2022. As such, the method and resulting report are an amalgamation of both frameworks and the team has considered both guidance documents, and the reports endeavour to follow the more recent GLA guidance (2022) wherever possible.

The processes of progressing requirements for a GLA-compliant CES according to 2022 requirements has been supported through the following:

1. A Circular Economy session with the team (May 2022) to outline new requirements set by 2022 guidance and understand the team's aspirations relating to the Circular Economy.
2. Follow-up correspondence with various teams, during October 2022.

- Workshops and engagement

The purpose of holding workshops is to ensure general understanding of the circular economy concepts and agree on strategic approaches for the project. During the workshop and a series of follow-up correspondence, the design and priorities of the scheme 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 in the future design, procurement, construction, and operation of the scheme.

The following parties were present at the workshop:

- Buro Happold (circular economy, whole life carbon, energy, and sustainability consultancy)
- Berkeley Homes (developer)
- Squire & Partners
- Walsh

During this workshop an update the team on the new guidance and new requirements were provided and discussion around this. Following the workshop, follow-up meetings were held, and ongoing correspondence was maintained, so that ideas from the first workshop could be developed and more specific information from other consultants could be acquired.

Overall, it is agreed that further workshops will be held following the planning process and prior to the commencement of detailed design, to agree key objectives and any additional surveys, studies and analyses that need be carried out as part of the ongoing development of the scheme, and to establish an implementation strategy for the next stages.

Implementation Approach

The CES will be reviewed throughout all the design stages of the Project, alongside the following reports:

- Environmental Statement
- Site Waste Management Plan
- BREEAM Pre-assessment (Excellent rating target)
- Pre-Demolition Audit
- Sustainable Procurement Plan
- Operational Waste Management Plan

Progress will be reported at practical completion, as requested by the GLA against each of the key commitments.

Circular Economy aspirations and strategic approach

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

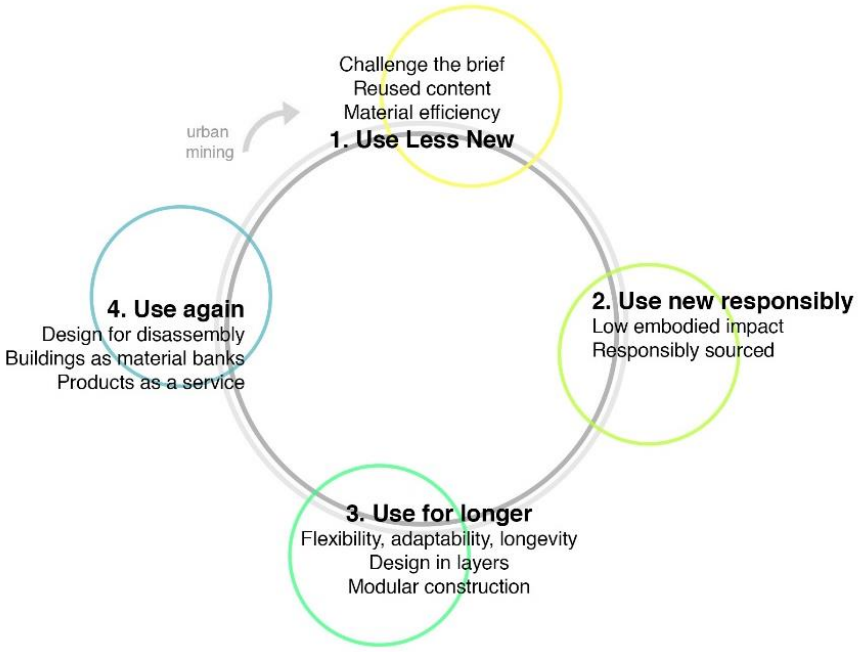

Figure 3 A diagram used to illustrate circular design thinking through four steps

With these principles in mind, this statement sets out the intentions for the Paddington Green Police Station scheme, and the ways in which its design can begin to aid this 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 adaptability, flexibility, and long-term value retention of materials wherever possible, to use resources ethically, to minimise pollution, to improve the longevity of the structure, to reduce waste produced during construction and operations, as well as apply principles of 'design for disassembly' to the development's end-of-life strategy and aim to support regenerative systems where possible.

The following design measures/principles were considered during the design of the Proposed Development, in no order of importance:

- Minimisation of demolition / excavation waste
- Re-use of materials on-site
- Design for Manufacture and Assembly (DfMA)
- Offsite / modular construction
- Material efficiency
- Recycled content
- Material circularity
- Structural and fabric resilience
- Life-cycle assessments
- Low carbon construction
- Lean design principles
- Adaptability
- Flexibility
- Responsible procurement
- Sustainable sourcing
- Local sourcing
- Supply chain engagement
- Material procurement via leasing frameworks
- Tenant engagement

Site-wide sustainability strategy

The Circular Economy aspirations fit into larger sustainability strategies being applied to the site.

The accompanying Sustainability Statement produced by Buro Happold outlines the sustainability strategy for the Site. The sustainability strategy builds on local policy requirements as well as the Applicant's own corporate sustainability targets and requirements, and aspirations to BREEAM Excellent ratings. The Circular Economy features as one of the key headliners in the Sustainability Statement. The headliners are as follows:

- **Holistic Sustainability**: On track to achieve at least BREEAM Excellent considering social, economic, and environmental sustainability.
- **Carbon Neutrality**: Achieve net zero carbon dioxide emissions through lean, clean and green measures before offsetting
- **Climate Change Adaption**: Development of robust and resilience to prepare for anticipated forecast changes including the reduction of overheating, flooding and water availability.
- **Pollution**: Commitment to minimising significant impacts to the wider community from air pollution, light pollution, noise and vibration.
- **Biodiversity**: On track to achieve biodiversity net gain, through planting strategies and urban greening
- **Low Carbon Mobility**: Encourage sustainable transport through provision of cycling facilities.
- **Materials**: Assess and minimise embodied carbon through reuse and reduce impact of new materials
- **Water efficiency**: Integration of low flow fixtures and fittings and explore water recycling.
- **Waste Management**: strategies have been developed to consider longevity, adaptability and flexibility of materials to reduce risk of contamination and pollution.

Strategic approach

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.

Writing of this statement commenced after the project brief was established; the team is committed to seeking opportunities to aid the transition to the circular economy during the forthcoming stages of the scheme.

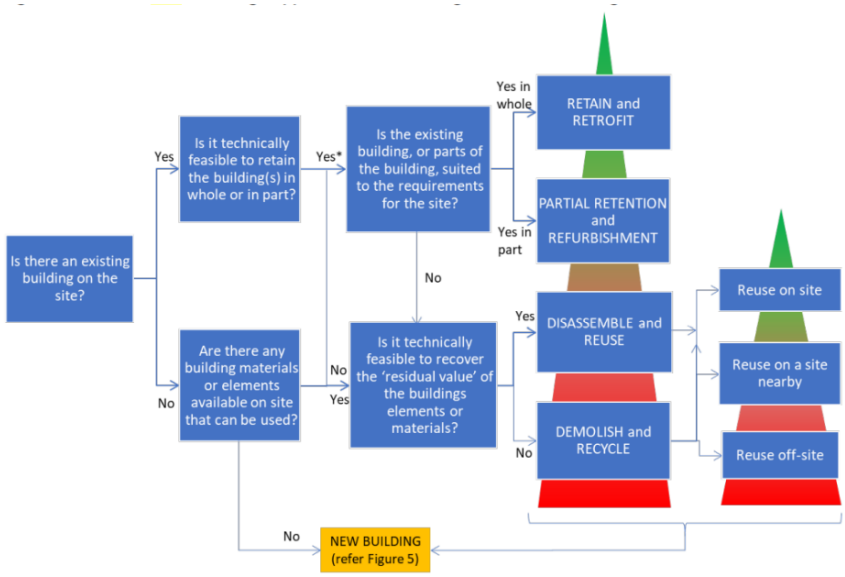

Figure 4 GLA decision tree

Strategic responses

Approach to the existing elements

The existing site comprises of masonry construction throughout with external glazed windows and doors. Its extent is predominantly made up of an open plan basement car park, ground floor courtyard area and high security custody suites with two multi-story blocks, seven and 16 floors in height respectively.

For the proposed development, the project team concluded it was not commercial feasible or desirable to retain the existing building on site through using the GLA flow diagram. Using the GLA decision tree the main strategic response is de-construct and reuse components materials on and off site.

However, a Pre-demolition audit determines as far as reasonably practicable, the volume and/or quantity of key demolition products (KDP) that have the potential to be reused, recycled or disposed. Its aim is to maximise the recovery of materials from the proposed redevelopment of the site for subsequent high grade/value applications as per the waste hierarchy: Prevention; Preparing for Reuse; Recycling; and Other Recovery.

For the new elements include

The Applicant is submitting a full detailed planning application for the redevelopment of the former Paddington Green Police Station site to provide three buildings between ground, fourteen stories and ground thirty-one storeys including commercial space (Class E use), 556 residential units (including 219 affordable housing homes), landscaping and associated car and cycle parking. It is important to understand that different use types have different strategic responses as well as the layers within.

- With regards to the commercial buildings, they are likely to change more frequently according to changing commercial needs/tenants and therefore have shorter life. As a result, these layers have been designed for adaptability in terms of shell, services, replaceability and layout flexibility.
- Residential buildings are likely to keep the same use type during the building's life, therefore the need for longevity and durability of materials is prioritised as home dwellers use these as spaces to live and work. This will be informed mainly by material choice and specification during the next stage of design.

Circular economy commitments

Circular Economy narrative

The following subsections provide narrative to demonstrate how the proposal supports each of the GLA's Design Principles. The accompanying CES Template includes a table titled *Circular Economy Design Principles by Building layer*, which similarly reports against each of the principles but tabulated by building layer. This narrative provides details and references from other reports. The two sections can be read in parallel.

Design Out Waste

The first principle is designing out waste. This can be done across the buildings' life cycle use of materials within building design, procurement, construction, maintenance and end of life; and the aim is to reduce the quantities of new materials used in the development materials.

A Modules

Material efficiency is a priority for the Design Team and one of the key considerations during detailed design. Potential measures for reducing the material demand and for designing out waste have been and will even be further explored by all key design team disciplines at each design stage. A Whole Life Carbon (WLC) Assessment has been carried out as part of the planning process to help identify and manage the carbon emission arising from the material specification of the development.

The responsible sourcing of materials will be a key consideration in the selection of suppliers, and a sustainable procurement strategy will be produced for the development prior to construction. Materials from suppliers who participate in responsible sourcing schemes such as the BRE BES 6001:2008 Responsible Sourcing Standard will be prioritised. All timber specified will be sourced from schemes supported by FSC or PEFC only – which ensures that the harvest of timber and non-timber products maintains the forest's ecology and its long-term viability. Where viable the design team will specify materials that are grown or made locally. Likewise, the appointed contractor will be asked to prioritise local sourcing of materials and a sustainable procurement plan will be developed as part of BREEAM credit requirements. Natural resource depletion will be minimised throughout the development, and materials such as peat and natural weathered limestone will not be used in the buildings or landscape features.

The Proposed Development has also focussed on minimising the use of other resources such as land, ecosystems, energy and water. It has maximised the utilization of the site, which includes utilising 100% of the previously developed land and increasing the density of the development while maintaining the footprint of the existing site and ensured that it minimises its visual impacts on existing views and the existing townscape. During the construction stage the Principal Contractor will be required to set targets for energy and water used on site and ensure measures are put in place to minimise consumption of these resources. These could consist of:

1. Low carbon energy source used during construction phase (Renewable sources of energy and offset of main utilities),
2. Use of highly efficient plant and battery power energy storage,
3. and 'offsite construction'.

The Pre-demolition waste audit has estimated key demolition products to total 11950.81m2 and 26,437.11 tonnes. The key demolition products have been categorised into groups and the estimated volumes and weights of the key

demolition products have then been calculated. The suitability of these key demolition products for reuse, recycling and recovery subsequently been considered, in accordance with the recommended waste hierarchy. The audit has determined that all key demolition products identified have the potential to be reused, recycled or relocated subject to confirmation by qualified persons, therefore achieving in diverting key demolition products from landfill. It is estimated that 96% of key demolition products have the potential to be diverted from landfill by either its reuse on and/or off site, or by recycling. Table 2 describes the material breakdown of materials found on site and potential uses for these materials.

Table 2 Recommendation targets for the Division of Materials from Landfill

Material	Volume (m^3)	Reuse/recycle target (%)	Current condition of existing material	Potential uses for existing waste materials
Asphalt/Macadam /Bitumen	88.49	90%	The overall condition of the roof surfaces is in a fair condition and could potentially be left in situ if being built on top of (subject to confirmation by qualified persons).	It is advised a specialist contractor is employed to advise on the potential for reuse or recycle.
Metals	137.33	100% (On or off site)	The structural beams may potentially be left in-situ depending on inspection by qualified persons and the scope of redevelopment.	For advice on reuse and recycling of lift infrastructure, further information should be provided by a qualified lift engineer.
Concrete/Cement	10414.50	100% (On or off site)	Key demolition concrete and cement products on site consist of structural floors/ceilings, external linings, beams and columns, brickwork/blocks to walls and hardstanding areas throughout.	Concrete/cement not remaining in-situ can be downcycled and broken up on and/or off site to use as recycled subbase aggregates, however it is unclear if there will be available space for crushing plant or stockpiling.
Wood	83.27	95% (On or off site)	An inspection of materials is necessary to determine their condition and the meeting of fire safety rating where requires.	Doors could potentially be reused on or off site. Inspection of materials during strip out should be made to determine if it can be stockpiled/ segregated and reused as part of the new construction.
Plasterboard/Gypsum	28.15	95%	Given its method of removal, plasterboards are unlikely to be reused, however, metal studs/frames may be salvageable for reuse on or off site subject to inspection by a qualified person.	Plasterboard waste can be recycled into new plasterboard products via a closed loop recycling service. Waste plasterboard should be stockpiled separately and not be mixed with other waste products to avoid contamination. Waste Render can be stockpiled separately, downcycled and broken up on and off site to use as recycled sub-base aggregates.

Ceramics	810.32	100%	The condition of ceramics is subject to their removal. Given the amount of vandalism and condition/age, the WC's and basins require inspection by a qualified person.	If removed in a good condition, clean ceramic tiles could potentially be recycled and reused. Alternatively, ceramic products can be downcycled crushed and used for drainage products or within subbase aggregates.
Carpet/Vinyl	64.32	90%	The carpets/carpet tiles are in good condition.	The carpets/carpet tiles and vinyl flooring if removed in good condition can be donated to charity or recycled via a suitable waste recycling company or takeback scheme.
Insulations	288.92	90% (On or off site)	The condition of the foam and /or mineral wool insulation (MMMF) that may be presented within plasterboard wall and/or ceiling cavities as well as external wall and roof cladding cannot be visually identified.	Subject to it condition, ceiling tiles as well as their frames can be removed and safely stored for reuse off site. Alternatively, subject to meeting the required criteria, unsuitable ceiling tiles can be collected and upscale recycled into new tiles.
Plastics	7.55	100%	The key plastic materials that have been identified as uPVC window frames, wall sheets and PVCu drainage pipes are suitable for recycling.	uPVC and PVCu products are suitable for closed loop recycling to be transformed into new plastic materials.
Glass	27.96	100%	The condition of glass products is subjected to inspection by a qualified person.	Subject to meeting the necessary safety rating, glass window panels and doors may be suitable for reuse off site. Glass those deemed less suitable should be recycled via closed loop recycling and turned back into glass products. Alternative options are to break up and use as subbase aggregates, however this should not be the preferred option.

CONSTRUCTION WASTE

- Exploring the potential for using prefabricated and standardised modulation components
- A pre-demolition audit has been produced to understand the potential for salvaging components and recycling of demolition waste

A Construction Environmental Management Plan (CEMP) or Site Environmental Management Plan, will be drafted and later completed by the appointed contractor, including the following:

- Setting of a target benchmark for Construction Site Waste Management (in line with BREEAM Wst 01)
- Procedures and commitments for minimising non-hazardous waste in line with the benchmark.
- Procedures for minimising hazardous waste
- Procedures for monitoring, measuring and reporting hazardous and non-hazardous site waste
- Procedures for sorting, reusing and recycling construction waste into defined waste groups.
- 80% per volume or 90% by tonnage non-hazardous construction waste generated by the development
- will be diverted from landfill and reused or recycled. (In line with BREEAM Wst 01)
- At least 95% of the demolition waste will be recovered for recycling and diverted from landfill.

As discussed previously, all concrete materials will be recovered from the demolition process, they will be crushed (onsite or offsite, depending on size of machinery) graded and stockpiled, where they can be used as concrete infill or pilling. Moreover, 100% of the rebar steel, structural steel, copper will be recovered and recycled.

The Contractor will be encouraged to utilise demolition materials directly on site if and where feasible in line with recommendation from the pre-demolition audit, e.g. the use of crushed bricks and concrete for blinding concrete and mass concrete fill. In the event contaminated materials are identified onsite, as part of the ground contamination inspection, the contaminated material will be segregated and disposed of accordingly. Otherwise, most of the demolition waste will be diverted from landfill. The current aspiration is to divert circa 95% of weight of material or more.

B Modules

As seen from the Energy and Sustainability Statement, the energy demand of the Proposed Development has followed the London Plan Energy Hierarchy (BE LEAN – BE CLEAN – BE GREEN – BE SEEN). Moreover, a 'fabric first' approach was considered to reduce energy demand and carbon emissions, with the aim of meeting the GLA carbon reduction. As stated previously a WLC has been carried out for the development and it includes the impact of the decarbonization of the grid for both operational energy and material replacement/repair cycle.

As outlined in the accompanying Sustainability Statement, the Proposed Development will be fitted with water efficient fixtures and fittings, and water meters will be provided to enable the monitoring of water use.

1. For the residential units, a daily water consumption of 105l/p/day will be targeted, as per the GLA requirements, through the installation of low/dual flow sanitary fixtures and fittings.
2. While the non-residential areas will target at least a 25% - 50% water reduction in the correspondent water use BREEAM credit (Wat 01). Additionally, in non-residential areas water meters will be linked to a central

Building Management System which will enable monitoring and evaluation of water usage by the building management team.

3. Systems will be specified to detect a major water leak on the mains supply both within the building and between the building and the utilities water meter. Proximity controls will be installed in the non-residential toilet blocks to ensure that water supply is turned off when toilets are not in use.

Another method that encourages waste reduction during the operation is the 'supplier take-back schemes' where the supplier is responsible for collecting and recycling/dismantling/remanufacturing of said product/element once it has reached its end of life or faulty and needs to be replaced. This method will reduce municipal waste and encourage waste to be diverted from landfill. This will also help the supplier reduce the use of raw material for manufacturing new product as they can easily dismantle and reuse elements that are still in good condition from the element/product collected from the development.

Other methods include, but not limited to:

- Design for Manufacturing and Assembly (DfMA)
- Modular Construction
- Offsite construction
- Suppliers take-back scheme
- Just-in-time delivery
- Larger pack sizes to reduce amount of package per unit. (e.g. Paints delivered in tanks than containers)
- Excavation waste arising from the development will be removed from site, treated where necessary,
- And re-used as fill on suitable projects.

These methods have been discussed during various sustainability workshops and will be investigated at during the start of the next stage.

A Waste Management Strategy, by Arup (Sept 2022), has been produced separately to support the planning application of the Proposed Development, please refer to the report for full information. A summary is provided below:

RESIDENTIAL WASTE

- Residential units will incorporate sufficient internal waste storage containers to promote the separation of recyclable materials at source.
- Three residential waste storage areas will be provided at basement level and will be located in close proximity to each of the blocks' service cores.
- Residents within Block K will be provided with a waste chute that serves each residential floor and discharges into a waste chute room at basement level.
- Residents within Blocks I and J will transport their own waste directly to the waste storage areas at basement level. Sufficient space within each of the waste storage areas has been provided to

accommodate the required number of refuse, recyclables, and food waste containers assuming a weekly waste collection frequency.

- Container numbers have been quantified using residential waste generation metrics source from the Guidance.
- On collection days, the on-site FM team will be responsible for transporting the bins from each waste storage areas to the waste presentation area at basement level. The on-site FM team will return the bins to the waste storage areas once emptied.

RESIDENTIAL AMENITY SPACE

The proposed residential amenity space within the Proposed Development will be for the exclusive use of the residents and therefore it is assumed that it will be classified as mixed municipal waste, and that these areas will generate minimal waste levels. Any waste generated within the Proposed Developments residential amenity space will be stored in domestic type bins and will be removed by the on-site FM team during cleaning activities and will be placed in the Block K residential waste storage area for disposal.

COMMERCIAL WASTE

As above, all retail units will store their waste within their unit demise, each day at the end of the retail unit's operation the respective unit's staff will transfer the waste to the B2 level waste store. Waste included streams including recycling food and specialist waste streams (Refer to OWMP for more details) The waste store and individual zones within the store shall be clearly labelled at all times. Prior to collection time, the FM Team will move full bins from the waste presentation area at level B2 to the refuse truck collection zone as per the existing situation.

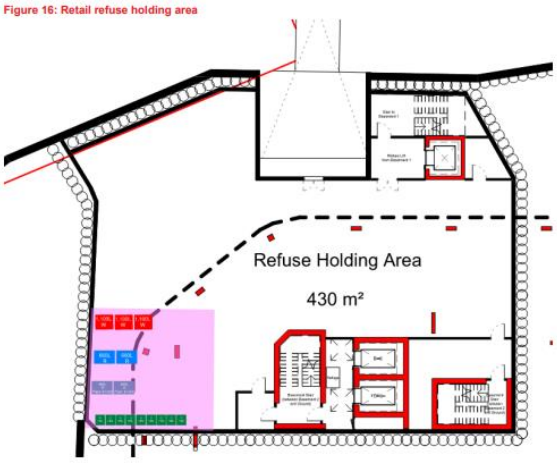

Figure 5 Refuse holding area

C Modules

It has been acknowledged in the wider industry that the best way for the developments to design out waste (for both construction and demolition waste) is for the development to use 'material standardisation and modularity' of building component; this will help minimise waste of materials during construction and elements can easily be dissemble after the end of life of the building and reused or repurposed depending on their lifespan. Through the next stages functional adaptability and modularity will be investigated.

According to the WRAP case study (WAS031), as seen from Figure 6, there was circa 50% savings in material waste when a site base construction is compared to a volumetric construction.

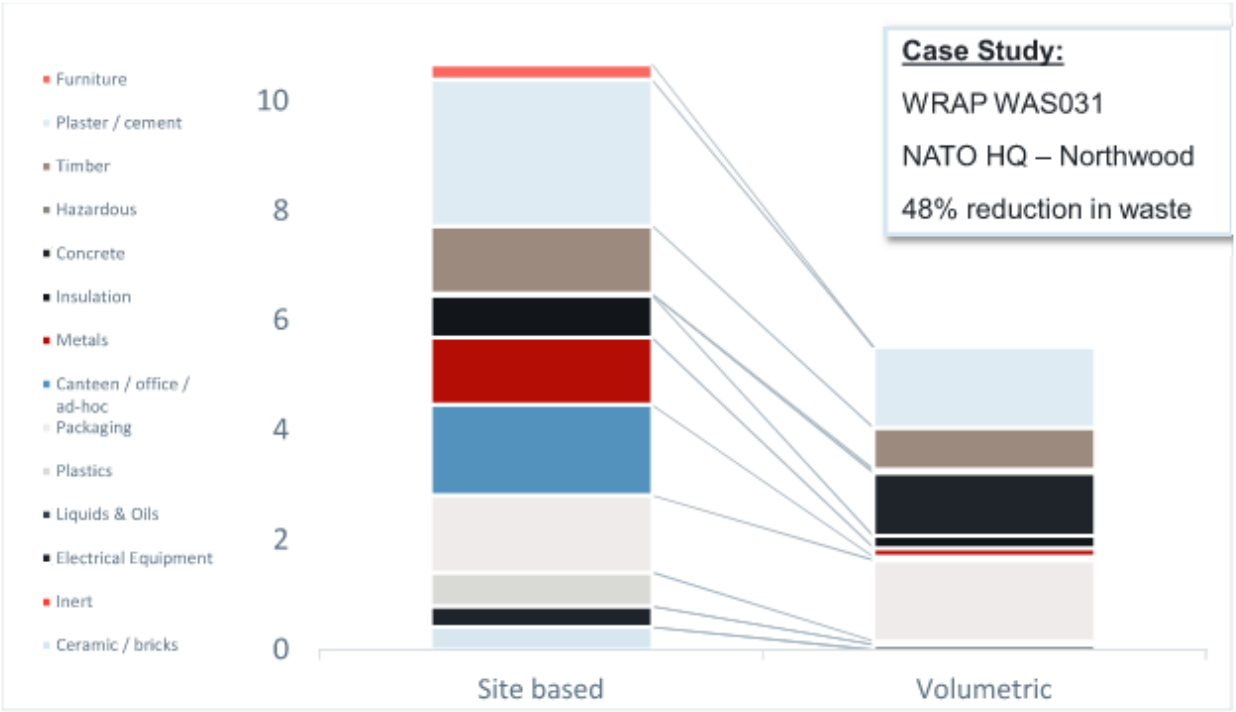

Figure 6 WRAP Case Study - waste reduction by using Volumetric method of construction

Design for Longevity

Designing for longevity is important for the residential buildings specifically as the use type of these will not change and therefore having long lasting core elements is crucial to reduce replacement. For the services layer, replacement of major items of plant at basement and roof levels should not be required during the normally anticipated life expectancy of the plant. However, as the anticipated life of the building is in excess of the life of the plant (typically 20-25 years) consideration has been given as to how these services can be replaced without significant impact on the building structure. A detailed plant replacement strategy will be developed at the next design stage. Finally, design protection measures and robust finishes will ensure the maintenance and replacement cycle of the building is reduced and therefore reducing the opportunity to generate waste and reduce carbon emission.

Design for Adaptability or Flexibility

The Proposed Development has been designed with functional adaptability and flexibility in mind throughout the design stages.

SERVICES

Major items of plant are located at basement and roof levels. The plant replacement strategy is such that normal periodic plant maintenance activities and minor equipment replacement can be carried out using normal access routes such as the lifts and staircases.

The drainage strategy has been developed considering future changes in terms of temperature and precipitation. While the SuDS strategy incorporates an allowance for climate change related increases in peak runoff, the plant replacement strategy ensures that cooling equipment with increased capacity can be brought in when required. The development will include measures for water sustainable urban drainage strategy that considers climate change impacts.

STRUCTURES / INTERNAL LAYOUT

Core, bracing shear wall and columns are the only fixed elements internally, which allows maximum adaptability of the internal layout. Moreover, generous floor to ceiling heights allows for adaptation to different uses of the non-residential areas. Internal partitions are to be of lightweight construction that could be easily modified to allow for alternative configuration within the use of the Proposed Development, specifically important for the changing use of the commercial areas.

Design for Disassembly

The Proposed Development has been designed and constructed to reduce material demands and as far as practicable, enable components or element to be disassembled and/or reused/recycled at the end of their useful life.

Structural longevity is key to supporting an adaptable commercial building. A thorough maintenance strategy will be developed and implemented to ensure the long-life structural elements are well maintained during operations; a plant replacement strategy will also be developed and implemented to ensure that any replacement of plant will not impact or damage structural elements. The structure can therefore be expected to last between 60-100 years, while designed for a 50-year design life per British Standards and Eurocodes.

The internal partitions are lightweight and designed for easy replacement will be designed through whole building layer and will according to design for disassembly approaches.

Modularity and supplier ‘take-back scheme’ will be encouraged to allow for disassembly and reuse at the end of their useful life. Building information will be stored to allow for end-of-life strategy, future reuse, disassembly, waste reduction/avoidance and shared with future building owners.

Using systems, elements, or materials that can be reused or recycled

During the next stage design teams will investigate opportunities for material selection and detailed system selection, with reference to the pre demo audit to see which material already on site, working with construction teams to understand the reusability and recycled content of materials specified and purchased.

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 upon completion of the development

Appendix A Operational Waste Generation on site

2.4 Block I waste generation

Table 4: Block I residential waste generation

Block I – Residential waste generation (L)				
Waste Stream	**Affordable**	**Intermediate**	**Private**	**Total**
Residual	-	3,870	2,970	**6,840**
Paper & card	-	2,580	1,980	**4,560**
Glass	-	2,580	1,980	**4,560**
Plastic & metal	-	2,580	1,980	**4,560**
Food	-	1,290	990	**2,280**
Total	-	**12,900**	**9,900**	**22,800**

2.5 Block J waste generation

Table 5: Block J residential waste generation

Block J – Residential waste generation (L)				
Waste Stream	**Affordable**	**Intermediate**	**Private**	**Total**
Residual	5,880	1,230	-	**7,110**
Paper & card	3,920	820	-	**4,740**
Glass	3,920	820	-	**4,740**
Plastic & metal	3,920	820	-	**4,740**
Food	1,960	410	-	**2,370**
Total	**19,600**	**4,100**	-	**23,700**

2.6 Block K waste generation

Table 6: Block K residential waste generation

Block J – Residential waste generation (L)				
Waste Stream	**Affordable**	**Intermediate**	**Private**	**Total**
Residual	-	-	16,980	**16,980**
Paper & card	-	-	11,320	**11,320**
Glass	-	-	11,320	**11,320**
Plastic & metal	-	-	11,320	**11,320**
Food	-	-	5,660	**5,660**
Total	-	-	**56,600**	**56,600**

PGPS Commercial - Two day waste generation (m^3)			
Waste Stream	**A1 Retail (m^3)**	**A3 Restaurant & Café (m^3)**	**Total (m^3)**
Residual	2.39	39.79	**42.18**
Paper	5.37	0.00	**5.37**
Cardboard	7.96	3.32	**11.27**
Plastic	2.59	1.99	**4.58**
Aluminium	0.00	1.99	**1.99**
Glass	0.60	3.32	**3.91**
Food Waste	0.99	15.92	**16.91**
Total	**19.90**	**66.32**	**86.21**

Appendix B Workshop presentation

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Paddington Green

Whole Life Carbon and Circular Economy – GLA requirements

May 2022

Contents

WHOLE LIFE CARBON

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

Achieving the maximum WLC reductions for a proposed building begins early on in a development's design.

Applicants should work closely with design teams at the earliest stages of project development to identify the priorities for the WLC assessment, and the opportunities and likely constraints in reducing WLC emissions.

These should be built into the project brief, and should be aligned with the energy strategy for the site and with the **Circular Economy Statement**.

Methodology
Whole Life-Cycle Carbon (WLC) Assessment

WLC assessments should demonstrate the actions that have and will be taken to reduce WLC emissions.

The assessment should cover the development's carbon emissions over its lifetime, accounting for:
any carbon emissions associated with pre-construction demolition
any carbon savings associated with the retention, reuse and recycling of existing structures and materials that are already on-site
its operational carbon emissions (both regulated and unregulated)
its embodied carbon emissions
any future potential carbon savings post end-of-life, including savings from reuse and recycling of building structure and materials.

Main changes summary
Whole Life-Cycle Carbon (WLC) Assessment

Element	New requirements
Circular Economy Statement	WLC assessment targets to be aligned with the Circular Economy Statement
Demolition	If actual figures are not available, applicants can apply a standard assumption of 50kgCO2e/m2 to the GIA of the existing areas being demolished that fall within the boundary line
Grid decarbonisation	Applicants are not required to account for the long-term decarbonisation of the electricity grid in their WLC assessments, in line with EN 15978.
Refrigerants	The WLC assessment will require the applicant to report the refrigerant type, its global warming potential (GWP), initial quantity/charge, assumed annual leakage rate, maintenance regime and end-of-life recovery rate.
B modules early-stage calculation guidance	Guidance for early-stage calculation of stages previously left out of scope because of lack of information provided.
Benchmarks	Updated benchmarks provided. Ranges have been removed

April 2021 GLA Spreadsheet by WSP

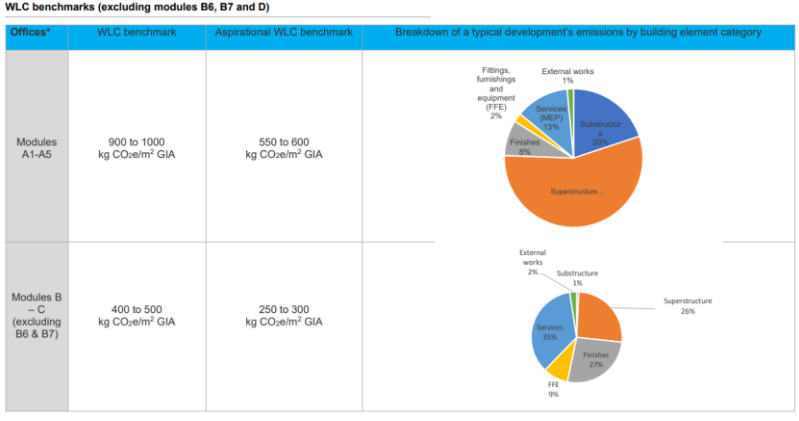
A-C= 927.24 kg CO_2e/m^2 GIA
B-C= 413.48 kg CO_2e/m^2 GIA

Estimated WLC emissions (Assessment 1) N.B. This forms the WLC baseline for the development. The results from Assessment 1 below are automatically populated here.					
	Module A1-A5	**Module B1-B5**	**Module B6-B7**	**Module C1-C4**	**Module D**
TOTAL kg CO_2e	32,931,447 kg CO2e	23,305,192 kg CO2e	77,222,811 kg CO2e	3,249,758 kg CO2e	-6,701,864 kg CO2e
TOTAL kg CO_2e/m^2 GIA	512.767	362.879	1202.417	50.601	-104.353
Comparison with WLC benchmarks (see Appendix 2 of the guidance) if Assessment 1 was used to inform design decisions	Module A1 - A5:- Carbon figures are lower than the GLA WLC benchmark but within the aspirational benchmark. Material efficiency was used as the basis of design for this development therefore carbon emissions are lower than average. Module B1-B5 & C1-C4:- Carbon figures are around the same as the GLA WLC benchmark and slightly higher than the Aspirational benchmark. The Design team will investigate ways on how to further reduce of the replacement/repair cycle of selected material/elements as design progresses, which will also feed into the 'Conserve of Resources: Minimising the quantities of materials used' as detailed in the Circular Economy Statement submitted as part of the planning application.				

GLA 2022 benchmarks

WLC benchmark	**A1-A5**	**B-C (excl B6 & B7)**	**A-C (excl B6 & B7)**
Offices	<950	<450	<1400
Residential	<850	<350	<1200
Retail	<850	<200	<1050
Aspirational WLC benchmark	**A1-A5**	**B-C (excl B6 & B7)**	**A-C (excl B6 & B7)**
Offices	<600	<370	<970
Residential	<500	<300	<800
Retail	<550	<140	<690

GLA Previous benchmarks



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April 2021 GLA Spreadsheet by WSP

Key site opportunities and constraints in reducing WLC emissions	- Unfortunately, at the time of this assessment we have assume that it is not possible to reuse or recycle any material from the existing site. - However, once a pre-demolition audit has been carried out, the demolition contractor will be able to determine if there are any opportunities to either recycle and/or reuse any material from the existing development which will reduce the amount of new material required for the new development and therefore, reduce the overall embodied carbon emissions. - Material efficiency is a priority for the Design Team and one of the key considerations during detailed design. Potential measures for reducing the material demand and for designing out waste has been explored and will continue to be explored by all key design team disciplines at each design stage. - At least 20% of the materials used in the Proposed Development will be derived from recycled and reused content. This can be made up of demolition material from the site and/or specification of materials with high recycled content. However, it is difficult to state exactly what percentage of reused materials will be utilised or what level of recycled content will be possible at this stage in the design. - During design development, significant consideration has been given to how the building fabric will respond to its environment in order that the energy consumption of the building is reduced as far as possible through passive means. The building fabric will be designed to significantly exceed the minimum fabric requirements of Part L1A and L2A (2013) of the Building Regulations - WSP has undertaken a desktop assessment of the WEG Energy Centre which suggested that there is sufficient capacity to serve the majority of PGPS. In line with the GLA heating hierarchy, main heating to the development will be provided through connection to the existing area-wide West End Gate network fed by no.1 CHP and no. 4No. highly efficient gas fired boilers.

	Action	WLC reduction (kg CO_2e/m^2 GIA)
Summary of key actions to reduce whole life-cycle carbon emissions that have informed this assessment, including the WLC reductions	BE LEAN (based on the Energy strategy)	90.06
	BE CLEAN (based on the Energy strategy)	126.21
	BE GREEN (based on the Energy strategy)	19.05
	Specifying on average of 20% recycled content (GGBS) in concrete (Superstructure)	46.7
	Specifying on average between 30% (steel) to 90% (reinforcement steel) recycled content in steel specification (Whole Building)	34.87

	Further potential opportunities	WLC reduction potential (kg CO_2e/m^2 GIA)
Specify further opportunities to reduce the development's whole life-cycle carbon emissions. including the WLC reduction potential	Specifying on average of 50-75% recycled content (GGBS) in concrete (whole building)	116.78
	Specifying on average between 35% (steel) to 100% (reinforcement steel) recycled content in steel specification (Whole Building)	12.45
	Material efficiency measures:- Total of material used is lower than Stage 2 design - assume an average of 10% less material	93

Stage 2+ Report October 2021

1.4. Stage 2+ Report Summary

1.4.13. Structural and Civil Engineering

1.4.13.5. Embodied Carbon Assessment

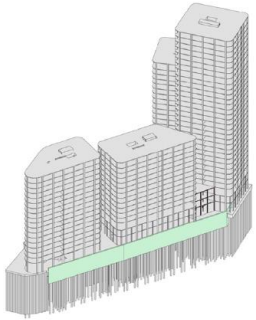
The table below summarises the Royal Institute of British Architects (RIBA) 2030 climate challenge targets:

Building Type	RIBA Targets, Modules A-C (excl. B6-7), Whole Building (kgCO2e/m2 GIA)		A1-A5 as % of A-C (%)	Assumed Structural Carbon as % of Whole-Building Carbon (%)
	2020 Target	2030 Target		
Domestic	600	300	75	65
Non-Domestic	800	500	52	60

Walsh have undertaken an embodied carbon assessment of the structure currently shown at Stage 2 with the following assumptions made with regards to cement replacement materials:

- Superstructure – Ground Granulated Blast-Furnace Slag (GGBS) – 25 %
- Substructure – Ground Granulated Blast-Furnace Slag (GGBS) – 50 %

Note: The embodied carbon of the ground bearing piles has been omitted as this will be designed by a specialist contractor.



Embodied Carbon Assessment

The project consists of three high-rise Reinforced Concrete (RC) towers ranging in height from 14 to 39 storeys, and a low-rise podium. The new development will be residential-led and will provide approximately 556 new dwellings in a mix of units and tenures.

Project Name:	Paddington Green Police Station
Project No.:	5362
Stage:	Stage 2
Date of Assessment:	27/09/2021
Calcs. by:	KM
Checked by:	KM

Assessment Results

Project Carbon Footprint:
197 kgCO₂/m²

Typical Carbon Footprint of a 2015 WRAP Project: 257 kgCO₂/m²

This represents:

% 23.2% reduction vs. typical 2015 industry good practice

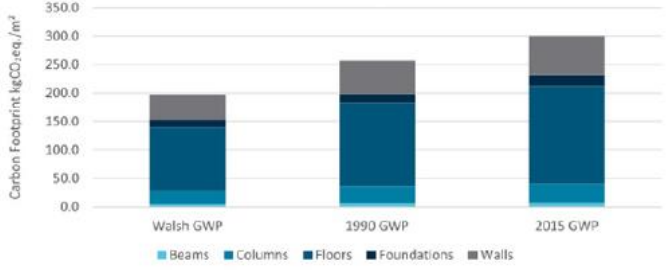
Which is equivalent to:

The embodied carbon of 324 three-bedroom houses

Or alternatively:

£ £7.46 million of investment in carbon offset schemes

Project Embodied Carbon Footprint by Building Element compared with 1990 and 2015 industry benchmarks



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Stage 2+ Report October 2021

1.4.13.1 Summary

Walsh have prepared this summary report in accordance with the instruction of our client: St Edwards, Berkeley Group.

The summary report is for the sole and specific use of the client, and Walsh shall not be responsible for any use of the report or its contents for any purpose other than that for which it was prepared and provided. The summary report must be read in conjunction with the Walsh Stage 2+ report. Should the Client require to pass copies of the summary report to other parties for information, then no professional liability or warranty shall be extended to other parties by Walsh in this connection without the explicit agreement thereto by Walsh.

1.4.13.2. Structural Differences

The table below summaries the main structural differences between WSP's Stage 2 report and the proposed contained within Walsh's Stage 2+ report:

Reference	WSP Stage 2	Walsh Stage 2+	Comments
Temporary Works	A series of raking props across the basement providing support to the existing diaphragm wall. Sequenced/Staggered demolition of the existing and construction of the new basement.	A series of buttress piles along the perimeter of the existing diaphragm wall. Thus omitting the requirement for sequenced/ staggered demolition and construction of the existing and new basement and the removal and relocation of the props through different stages of the work.	This change would result in a less complex temporary works and sequnce of works required. Further investigations are required into the structural capacity of the existing diaphragm wall. Preliminary desktop studies have been carried out to date. The findings of this study can be seen in Appendix A of the Stage 2+ Report.
Basement Demolition Sequence	Sequenced/Staggered demolition of the existing structure is required due to the use of flying props to stabilise the existing diaphragm wall	No Sequenced/Staggered demolition of the existing structure is required due to the utilisation of of buttress piles.	Please see Appendix B of the Stage 2+ Report.
RC Liner Wall	350mm thick liner/retaining wall required along the entire perimeter of the retained diaphragm wall.	No liner wall required along the perimeter of the existing diaphragm wall.	The removal of the liner wall means that other methods of waterproofing will need to be considered. The current proposal is for a waterproofing tanking membrane and drained cavity.
Post Tensioned Slab	225mm Post-Tensioned Reinforced Concrete Slabs	210mm Post-Tensioned Reinforced Concrete Slabs	
Stability Structure	Core walls and link beams	All link beams across central core structure have been omitted.	To facilitate the removal of the link beams the floor slab local to the core has been increased to 280mm. This omits the requirement for any M&E coordination for horizontal service risers.
Concrete Material Properties	Standardised concrete grades adopted across all three towers.	Consideration has been taken to specifying concrete grades appropriate for each tower and the respective structural elements.	Varying the concrete material properties for specific structural requirements. This typically results in reduced section sizes.
Retained Diaphragm Wall	Diaphragm wall only used as temporary works. New liner/ retaining wall to be constructed in front of wall in the permanent state.	Diaphragm wall to be retained along Harrow Road, Edgware Road and Newcastle Place.	This will save in the concrete and reinforcement required for the new wall.
Transfer Structure	Extensive 2500mm transfer beam structures at ground floor due to orientation of car park within basement	Less intrusive transfer structure at ground floor due to continued co-ordination and optimisation of the car park arrangement with the architect.	Further development required to ensure there will be no head room height issues.

Stage 2+ Report October 2021

1.4.13.3. Structural Risks

The table below summarises the main risks associated with the progression of the project that Walsh have identified:

Risk Reference	Risk Description	Risk Mitigation
Diaphragm Wall	Structural capacity of existing diaphragm wall	To date we only have access to historical information and have carried out some local inspections to the diaphragm wall. But to verify the desktop study assumptions the following intrusive investigations are required: • Parallel Seismic Test – Used to establish the as-built toe depths of the wall. • Ferroscan and GPR Reinforcement Mapping – Used to establish the reinforcement bar diameter, spacings, number of layers, and the overall thickness of the wall. • Laboratory Testing – Used to establish the concrete mix design, steel grade of reinforcement and carbonation of concrete • Local Breakout – Used to determine the overall condition of the reinforcement and the depth of concrete cover
Pile Capacities	Structural capacity of proposed bearing piles	To date we only have access to the interpretive soil investigation report and pile contractors design information for the neighbouring plots (WEG). Using this information the following pile capacities have been assumed for an approximate pile length of 25m: • 600mm Diameter Pile = 2100 kN – SI Report • 750mm Diameter Pile = 2700 kN – SI Report • 900mm Diameter Pile = 3200 kN – SI Report • 900mm Diameter Pile = 2500 kN – WEG Piling Contractor • 1200mm Diameter Pile = 3500 kN – WEG Piling Contractor Therefore, pile load tests should be carried out across the site to get an appropriate representation of pile capacities for the given ground conditions.
Paddington Green Police Station (PGPS) Existing Foundations/ Obstructions	Location of existing foundations/pile and its effect on the proposed location of new foundations and bearing piles.	To date no coordination has been carried out to mitigate the probability of new bearing piles clashing with existing ones. There is one information on piling shown on the reinforcement drawings however this can't a accurately positioned, therefore, a full survey of existing PGPS bearing piles will be required once demolition has been completed.
UXO Ordnances	UXO report concluded that the site should be considered as High Risk for all types of intrusive engineering activities.	Adopt and implement the recommendations stated within the UXO report
London Underground Limited Assets	Construction consent from London Underground Limited with regards neighbouring Bakerloo underground line and Edgware Road station box.	Early co-ordination with London Underground Limited with regards to adopting an acceptable Tunnel Monitoring Package.
Thames Water Assets	Construction consent from Thames Water with regards neighbouring foul water sewers and fresh water tunnels.	Early co-ordination with Thames water with regards to adopting an acceptable Monitoring Package.
Temporary Works	The findings of the intrusive investigations of the existing diaphragm wall may directly effect the scale and quantity of temporary works required/ buttress piles.	All intrusive investigations of the existing diaphragm wall must be carried out at the earliest possible opportunity to close out the temporary works package.
Demolition of Paddington Green Police Station	Harmful materials and soil contaminants, such as asbestos and petroleum.	To-date the proposal is for the demolition material to be reused on site, to form the piling mats. Therefore, all harmful materials will need to be removed from the existing structure prior to demolition. Furthermore, there is the possibility of soil contamination from buried storage tanks. Therefore, an appropriate action plan must be set in place to mitigate possible cost and time implications.

Stage 2+ Report October 2021

1.4.13.4. Structural Opportunities

The table below summarises the main opportunities and their associated risks with the progression of the project that Walsh have identified:

Opportunity Reference	Opportunity Description	Associated Risks
Prefabricated Reinforced Concrete Twin Wall	The main opportunities associated with prefabricated elements: • Limited on-site material wastage e.g. form-work • Elements can be produced outside of a traditional program and be delivered to site when required. • Reduces overall construction time.	The main risks associated with prefabricated elements: • Earlier design freeze required • Logistical Issues • Crane strategy and time requirements • Lead in times • Possible damage of elements during transportation • Limited opportunities to large scale changes of M&E and services stratergies at a later date.
Prefabricated Reinforced Concrete Columns	The main opportunities associated with prefabricated elements: • Limited on-site material wastage e.g. form-work • Elements can be produced outside of a traditional program and be delivered to site when required. • Reduces overall construction time.	The main risks associated with prefabricated elements: • Earlier design freeze required • Logistical Issues • Crane strategy and time requirements • Lead in times • Possible damage of elements during transportation
Reinforcement Mesh and Shear Rails	The main opportunities associated with the use of reinforcement mesh: • Reduce fixing times, and so accelerate program. • The main opportunities associated with the use of shear rails: • Elements can be produced outside of a traditional program and be delivered to site when required.	The main risks associated with the use of reinforcement mesh and shear rails: • Higher quantities of materials. • Earlier design freeze required • Lead in times • Additional trades
Reinforced Concrete Riser Cupboards and AOV's	The main opportunities associated with constructing riser cupboards and AOVs in RC: • Inherent fire protection properties • Air tightness properties • Fixing of M&E and services using embedded c-channels.	The main risks associated with constructing riser cupboards and AOV's: • Earlier design freeze required • Limited opportunities to large scale changes of M&E and services strategies at a later date.
Wind Tunnel Analysis	The main opportunities associated with wind tunnel testing: • Accurate wind loads determined • Possible reduction in core sizes and materials	The risks opportunities associated with wind tunnel testing: • Lead in time • Cost
Prefabricated/Permanent Form-work Stairs	The main opportunities associated with Prefabricated/Permanent Form-work Stairs: • Limited on-site material wastage e.g. form-work • Elements can be produced outside of a traditional program and be delivered to site when required. • Reduces overall construction time. • Edge barrier protection pre-installed	The main risks associated with Prefabricated/Permanent Form-work Stairs: • Earlier design freeze required • Logistical Issues • Crane strategy and time requirements • Lead in times • Possible damage of elements during transportation
Concrete Mix Design	The main opportunities associated with using earth friendly concrete/CEMFREE concrete in foundations: • Reduces the embodied carbon of the structural frame • More environmentally friendly when compared to traditional concrete mixes	The main risks associated with using earth friendly concrete/CEMFREE concrete in foundations: • Limited number of suppliers within the market • Longer curing times when compared to traditional concrete mixes. • Lead-in time

2. Basement

2.7. D-Wall

2.7.2. Reduction of Basement Extent

As discussed in section 2.7.1, it is proposed to reduce the area of the basement in the Western side of Basement B1 to ease construction logistics surrounding a high voltage cable under Newcastle Place and proximity to the junction of Paddington Green and Harrow Road.

The position of the proposed D-Wall has been tested in several positions to determine how far the basement line can be reduced whilst still meeting spatial and cycle requirements. The proposed position aligns to the perimeter columns of Block I around the Western and North-Western boundaries whilst the most northern line aligns with Basement B2 piling line below.

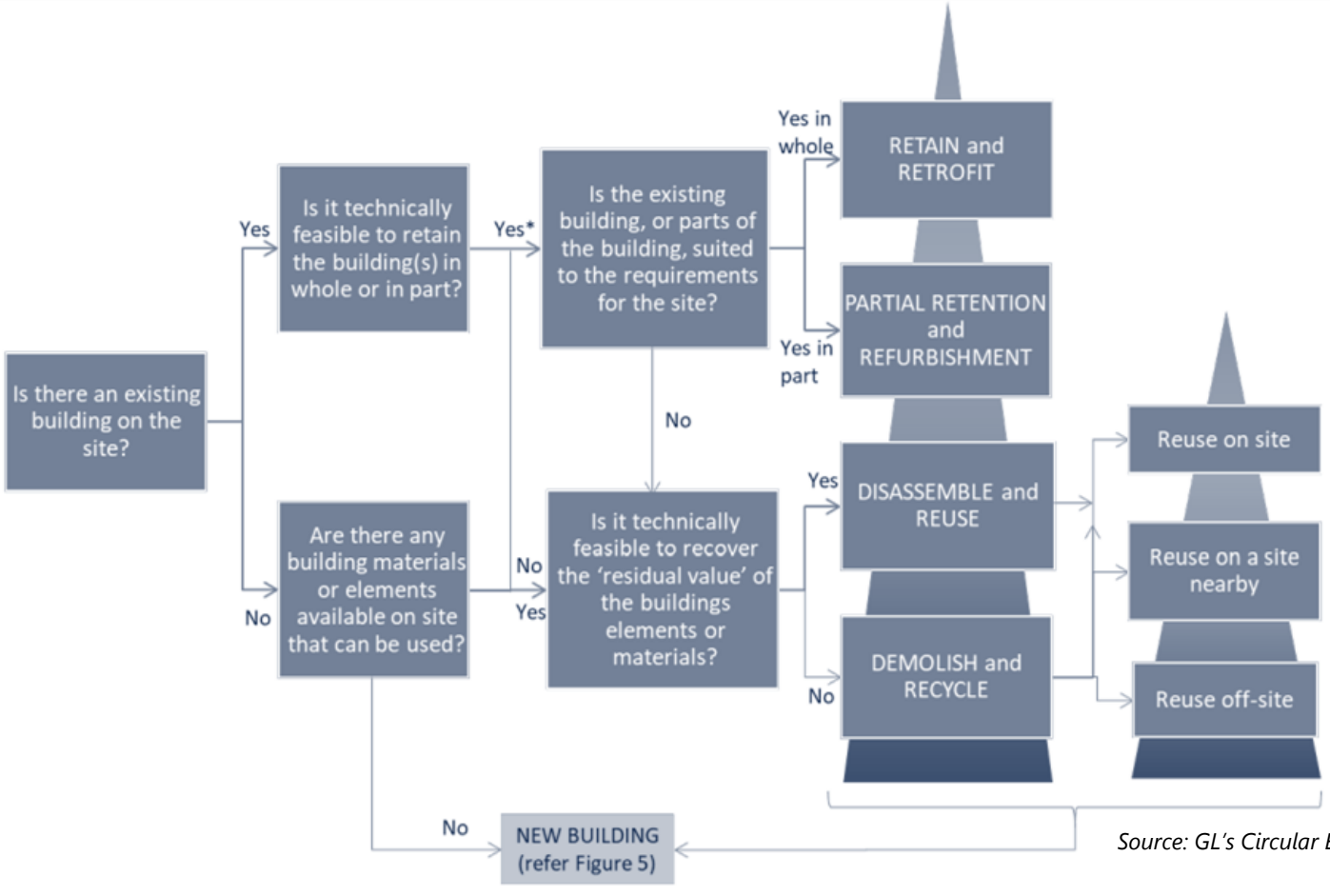
This would reduce the basement by 285m^2 which consequentially reduces the quantity of excavation required, the build costs, the build time and the overall embodied carbon of the scheme.

CIRCULAR ECONOMY

Full Application requirements
New GLA Guidance (2022)

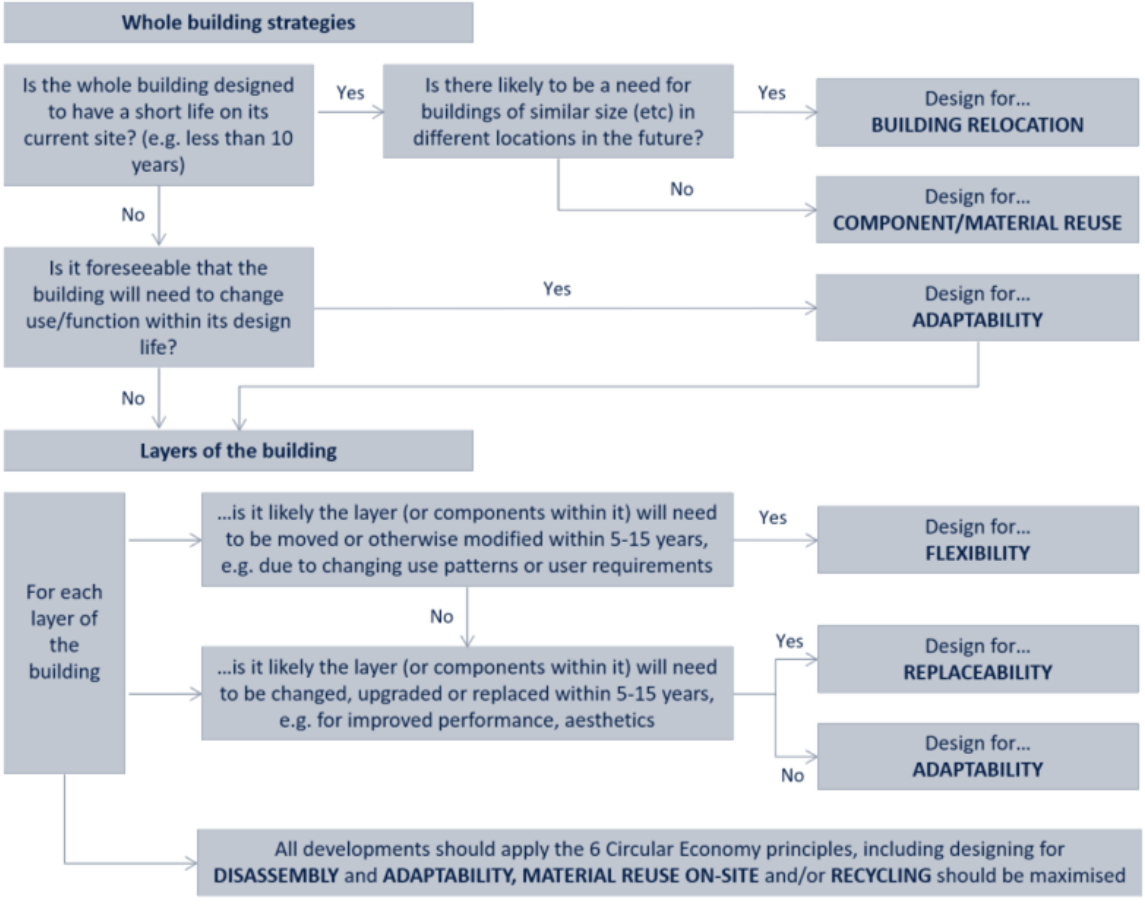
- Both a written report and a GLA template to be submitted
- Report against CE core principles, per design layer
- Application of Circular Economy Design approaches
  - *Justification for any material flows that are not high-value reuse (recycling, demolition)*
- Circular Economy Targets – explanation of target, how it will be met and monitored
  - *London Plan Policy SI 7 targets are min compliance; draw from BREEAM where possible*
- **Pre-development audit** (external appointment – *if there are existing buildings on site*)
- **Pre-demolition audit (external appointment)**
- Bill of Materials (from the WLCA, estimates)
- Implementation plan, for key actions (*who, what where, when*)
- **An end-of-life strategy (client driven)**
- **Operational Waste Management plan (external appointment)**
- Waste reporting form (estimates, t/m^2 GIA)

Step 1: Approach to the existing (GLA)



Source: GL's Circular Economy Guidance, 2022

Step 2: Approach to new buildings (GLA)



Source: GL's Circular Economy Guidance, 2022

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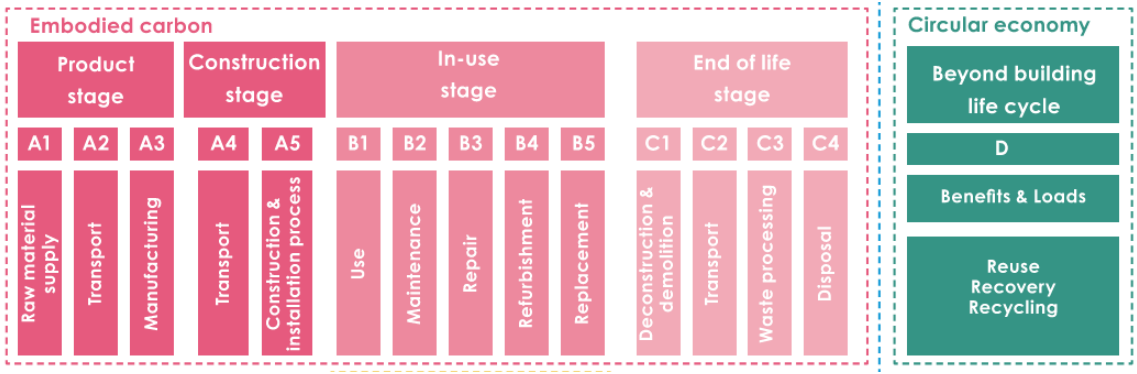
Report against principles

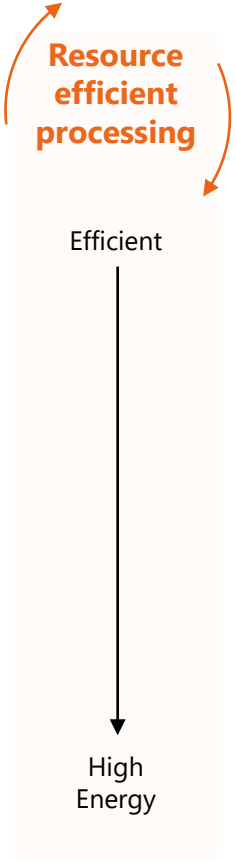
In particular, we will need to **report against each of the following, for each building layer:**

1. **Designing out waste** – ensuring that waste reduction is planned in from project inception to completion, including consideration of standardised components, modular build, and reuse of secondary products and materials



2. **Designing for longevity**
3. **Designing for adaptability or flexibility**
4. **Designing for disassembly**
5. **Using systems, elements or materials that can be reused and recycled**

GLA's Circular Economy **Design Approaches**



Repair

Refurbish

Repurpose

Flexibility

Longevity

Adaptability

Reusability

Recoverability

Deconstruct

Recycle (demolish)

**GLA expectation - go beyond standard practice*

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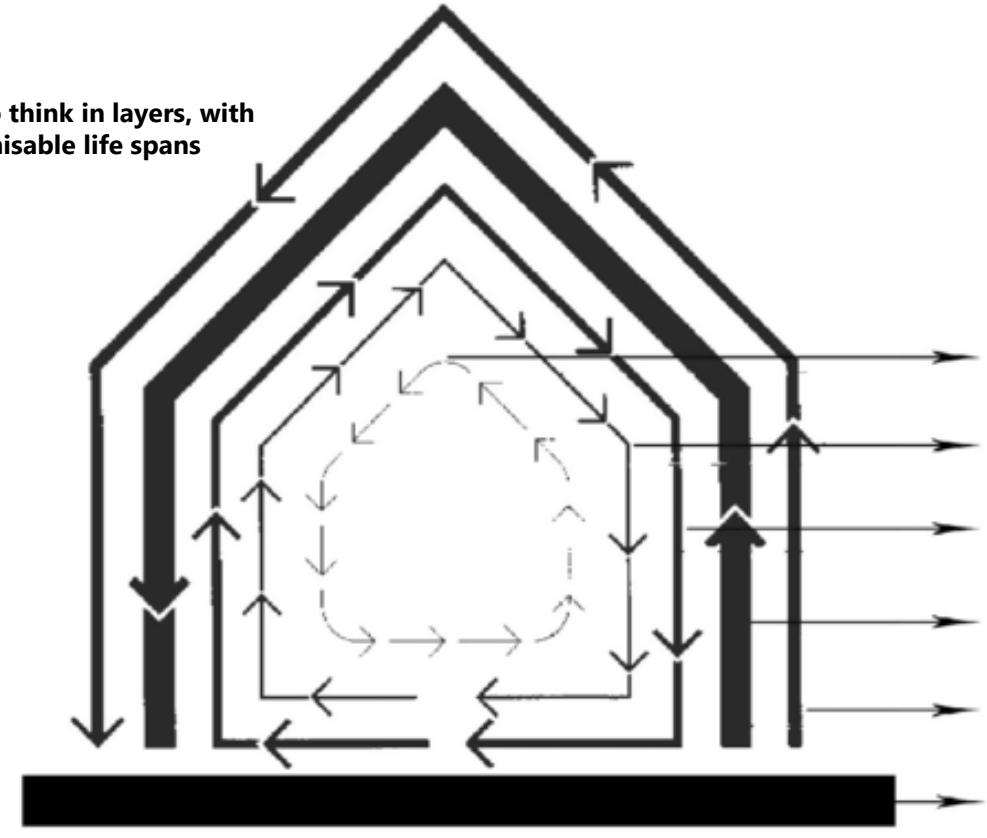
Aim to think in layers, with recognisable life spans



Layer	*Expected lifetime*
Stuff	***Daily, annually, +***
Space plan	***3 - 30***
Services	***10 – 25 +***
Structure	***50 - 300***
Skin	***15 - 60***
Site	***Eternal***

GLA's Template

Circular Design Approaches: this table describes the strategic response, explaining which design approaches (e.g. Longevity, Adaptability, etc) are applied to existing and/or new build elements of a proposal, in relation to each building, phase, area, or building layer, as necessary.

Circular Economy Design Principles per Layer: this table describes the key commitments made in relation to the 6 key CE Principles

- Inputs required from all design teams and project teams

Bill of Materials: this table will align with material quantities and targets derived from the Whole Life Carbon Assessment for the proposal.

- Input required from the WLC assessment

Recycling and Waste reporting table: this table requires inputs of waste estimates and reuse/recycling estimates for excavation, construction, and demolition waste, as well as operational waste streams. This information will be drawn directly from the Operational Waste Management Plan and Site Waste Management Plan for the project.

- Input required from the OWMP and SWMP, as well as any cut/fill calculations

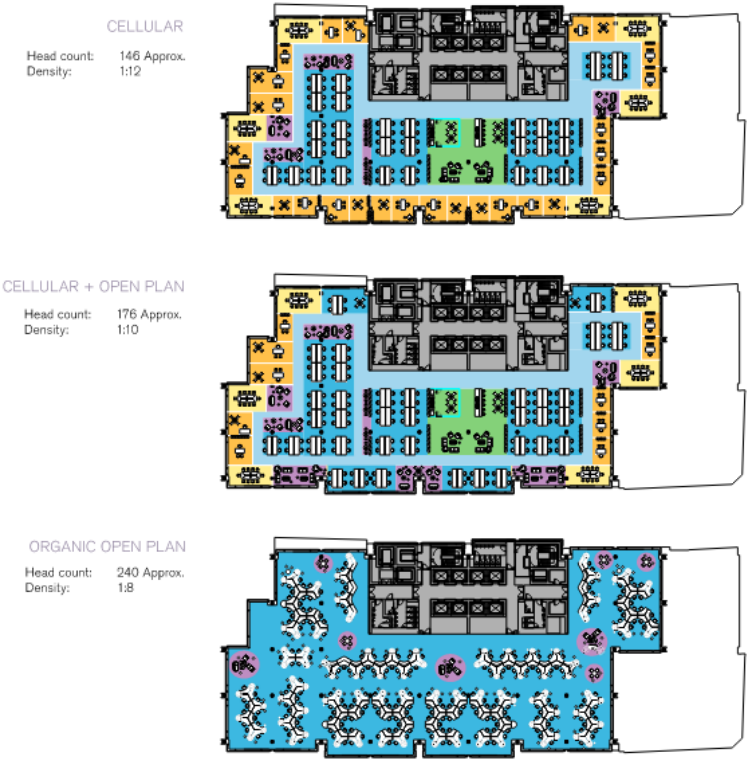
Circular Economy Targets: this table requires targets to be set for demolition waste (nan-hazardous), excavation waste, construction waste, municipal waste, and recycled content, and requires a commitment for a CE Statement as post-construction (i.e upon commencement of RIBA Stage 6 and prior to the building being handed over). The table sets out the policy requirement for waste diversion from landfill, the target set (%) and an explanation for how performance will be monitored and the metric met through design, implementation and monitoring.

- Input required from the OWMP and SWMP. Client to confirm targets for the proposal.

CES Supporting Documents

Statements can include:

- Scenario modelling demonstrating adaptability
- Scenario modelling demonstrating flexibility
- Lean design options appraisal
- Space optimisation optioneering drawings
- Project brief which supports CE approaches or principles
- Materials Brief with:
  - Product declarations (e.g. Cradle to Cradle)
  - Material Circularity Index values
  - Reused or recycled content targets
- Disassembly study
- Cut and fill calculations
- Building weight calculation (load take-down)
- Replacement and repair estimates



Scenario modelling demonstrating adaptability

April 2021 CE by WSP

8. KEY CIRCULAR ECONOMY COMMITMENTS

Building "Layer" (as per GLA guidance)	Site	Substructure	Superstructure	Shell/ skin	Services	Space	Stuff	Construction
	SECTION A: CONSERVE RESOURCES							
Minimising the quantities of materials used	Circular Economy Principles will be considered and at Practical Completion Circular Economy will help quantity the total material used on site.		The specified materials should meet the following requirements where possible: Responsible sourcing certificates, Environmental Product Declarations (EPD) and Low emitting materials. More than three of the key elements of the buildings' envelope will achieve a rating of A+ to D in the BRE's Green Guide 2. 100% of the timber used will be sourced from accredited Forest Stewardship Council (FSC) or Programme for the Endorsement of forestry Certification (PEFC) source. Products holding responsible sourcing certification (EMS/ISO14001 for the key process as per minimum) will be specified for the main building elements (walls, floors, roof).				To be considered with tenant as part of incoming fit- outs.	Suppliers should agree to: - reduce packaging, - use reusable packaging, or - operate a packaging take- back scheme; - 'just-in-time' material delivery to minimise stockpiling and related risk of damage and disposal as waste; - particular attention to material quantity requirements to avoid over- ordering and generation of waste; - reuse of materials where feasible.
Minimising the quantities of other resources used (energy, water, land)	It has maximised the utilization of the site, which includes utilising 100% of the previously developed land and increasing the density of the development while maintaining the footprint of the existing site and ensured that it minimises it visual impacts on existing views and the existing townscape.	The energy demand of the Proposed Development has following the London Plan Energy Hierarchy (BE LEAN – BE CLEAN – BE GREEN – BE SEEN). Moreover, a 'fabric first' approach was considered to reduce energy demand and carbon emissions, with the aim of meeting the GLA carbon reduction. WLC has been carried for the development and it includes the impact of the decarbonization of the grid for both operational energy and material replacement/repair cycle. The Development will be fitted with water efficient fixtures and fittings, and water meters will be provided to enable the monitoring of water use. ☐ For the residential units, a daily water consumption of 105l/p/day will be targeted, as per the GLA requirements, through the installation of low/dual flow sanitary fixtures and fittings. ☐ While the non-residential areas will target at least a 25% - 50% water reduction in the correspondent water use BREEAM credit (Wat 01). Additionally, in non-residential areas water meters will be linked to a central Building Management System which will enable monitoring and evaluation of water usage by the building management team. ☐ Systems will be specified to detect a major water leak on the mains supply both within the building and between the building and the utilities water meter. Proximity controls will be installed in the non-residential toilet blocks to ensure that water supply is turned off when toilets are not in use.				To be considered with tenant as part of incoming fit- outs.	During the construction stage the Principal Contractor will be required to set targets for energy and water used on site and ensure measures are put in place to minimise consumption of these resources. These could consist of: ☐ Low carbon energy source used during construction phase (Renewable sources of energy and offset of main utilities) ☐ Use of highly efficient plant and battery power energy storage.

April 2021 CE by WSP

Building "Layer" (as per GLA guidance)	Site	Substructure	Superstructure	Shell/ skin	Services	Space	Stuff	Construction
Specifying and sourcing materials responsibly and sustainably	The responsible sourcing of materials will be a key consideration in the selection of suppliers, and a sustainable procurement strategy will be produced for the development prior to construction. Materials from suppliers who participate in responsible sourcing schemes such as the BRE BES 6001:2008 Responsible Sourcing Standard will be prioritised. All timber specified will be sourced from schemes supported by the Central Point of Expertise for Timber Procurement such as Forest Stewardship Council (FSC) accreditation – which ensures that the harvest of timber and non-timber products maintains the forest's ecology and its long-term viability. Where viable the design team will specify materials that are grown or made locally. Likewise, the appointed contractor will be asked to prioritise local sourcing of materials. Natural resource depletion will be minimised throughout the development, and materials such as peat and natural weathered limestone will not be used in the buildings or landscape features. Additionally, a WLC has been undertaken and it will be used to guide the material selection of product						To be considered with tenant as part of incoming fit- outs.	Sustainable Procurement Plan will be commissioned/ developed.
	SECTION B: DESIGN TO ELIMINATE WASTE (AND FOR EASE OF MAINTENANCE)							
Designing for reusability / recoverability / longevity / adaptability / flexibility			The following aspects have been considered: - Flexible floorplates layouts / structural grids - Avoidance of toxic treatments and finishes. - Floor to ceiling heights - Placement of the core. - Standardised components (Mat 05/Wst 06)*				To be considered with tenant as part of incoming fit- outs.	
Designing out construction, demolition, excavation, industrial and municipal waste arising	The following methods have been considered: ☐ Design for Manufacturing and Assembly (DfMA) ☐ Modular Construction ☐ Offsite construction ☐ Supplier take-back scheme ☐ Just-in-time delivery ☐ Larger pack sizes to reduce amount of package per unit. (e.g. Paints delivered in tanks than containers) ☐ Excavation waste arising from the development will be removed from site, treated where necessary, and re-used as fill on suitable projects. ☐ All concrete materials will be recovered from the demolition process, they will be crushed (onsite or offsite, depending on size of machinery) graded and stockpiled, where they can be used as concrete infill or pilling. Moreover, 100% of the rebar steel, structural steel, copper will be recovered and recycled. (Wst 01/06)*						To be considered with tenant as part of incoming fit- outs.	A Site Waste Management Plan will be prepared/commissioned
	SECTION C: MANAGE WASTE							
Demolition waste (how waste from demolition of the layers will be managed)	To meet the GLA requirement >95% demolition waste diverted from Landfill	N/A					Some ferrous and non ferrous metal, suitable for reuse can be sold and reused.	Pre-Demolition Audit SWMP to be submitted prior to above-ground works.
Excavation waste (how waste from excavation will be managed)	To meet the GLA requirement >95% demolition waste diverted from Landfill	N/A						
Construction waste (how waste arising from construction of the layers will be reused or recycled)	To meet the GLA requirement >95% diversion from landfill.							
Municipal and industrial waste (how the design will support operational waste management)	Refuse storage planned according to the local and GLA waste requirement (Wst 03)*	N/A			Space will be provided for segregation of recyclables and bulk items so that they can be collected for recycling.			N/A

April 2021 CE by WSP

5. STRATEGIC APPROACH SUMMARY

Aspect	Steering approach	Strategy implemented	Target	Supporting analysis / studies / surveys / audits
Existing Site	Maximise recovery, reuse and recycling of demolition waste.	A pre-demolition audit will be undertaken to help identify opportunities for reuse, recycling or recovery, disposal and opportunities for reuse within development works. **Potential opportunities for reuse within the development:** – Excavated material for filling. - Concrete could be crushed, stockpiled and reused on site for pilling platforms or landscape areas.	Waste targets for non-hazardous construction waste generated from the building (excluding demolition and excavation waste) need to be set at no more than 3.4m3 or 3.2tonnes per 100m2 of gross internal floor area. In addition at least 70% by volume or 80% by tonnage for non-hazardous construction waste and 80% by volume or 90% by tonnage for demolition waste will need to be diverted from landfill. 95% diversion from landfill (Based on the GLA Waste target).	BREEAM Wst. 01 Credit Pre-Demolition Audit Site Waste Management Plan
New Building	Sustainable Sourcing of Materials Manage Construction Waste Optimise Material Use Functional Adaptability Reuse, Recycling & End of Life	Local Sourced Materials will be priorites 100% of material should be Responsible Sourced Main Contractor to develop and operate a Sustainable Procurement Plan Conctractor should record, monitor and manage constuction waste. Waste target should be set in the Site Waste Management Plan before work commence on site Material are efficiently and procured to reduce wastage on site Desing for Adaptability and Flexibility which in result will increase buildign lifespan Design for Disassembly and deconstruction - This is to ensure all materials have been ultilized to their maximum potential	Materials from suppliers who participate in responsible sourcing schemes such as the BRE BES 6001:2008 Responsible Sourcing Standard will be prioritised. All timber specified will be sourced from schemes supported by the Central Point of Expertise for Timber Procurement such as Forest Stewardship Council (FSC) accreditation – which ensures that the harvest of timber and non-timber products maintains the forest's ecology and its long-term viability. Where viable the design team will specify materials that are grown or made locally. Likewise, the appointed contractor will be asked to prioritise local sourcing of materials. Natural resource depletion will be minimised throughout the development, and materials such as peat and natural weathered limestone will not be used in the buildings or landscape features. < 6.5 tonnes of construction waste (excluding excavation waste) / 100m2 GIA	Sustainable Procurement Plan Pre-Demolition Audit Sustainability strategy Operational Waste Management Strategy BREEAM Pre-assessment Pre-construction engagement with main contractor and supply chain.
Municipal Waste Arising during operation	Compliant Bin storage and segregation of operational waste	A project-specific Operational Waste Management Strategy has been prepared in accordance with relevant requirements, in order to embed and enable sustainable waste management in operation. Bin sizes and storage have been calculated to provide sufficient storage for recycled, non recycled waste and food waste.		Operational Waste Management Strategy BREEAM Pre-assessment

NEXT STEPS

Next Steps

- Berkeley, Squire & P. and Walsh to confirm 2022 WLC and CE strategies and aspirations
- BH to circulate RFIs for WLC and CE
- Squire & P. and Walsh to review and populate BH RFIs
- Draft WLC and CE reports

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Race to zero

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Appendix C Pre-demolition Audit

AESG

Berkeley Group

Paddington Green Police Station

Pre-Redevelopment Waste Audit

Project Name	Paddington Green Police Station
Report Title	Pre-Redevelopment Waste Audit
Description	Pre-demolition and pre-refurbishment audit report for PGPS project.
Ref. No.	BER – PGB – PDA - 00
Issue	01
Revision	00
Date	29 June 2022
Prepared by	John Wootton - SWECO
Reviewed by	Ara Nik
Approved by	Sam Luker

Contents

1 Executive Summary

This Pre-Redevelopment Waste Audit (PWA) has been undertaken on the former Paddington Green Police Station, Newcastle Place, London by Sweco UK Ltd, on the instructions of AESG Ltd.

The PWA has been prepared to accompany a planning application and/or attain BREEAM Credits for the following redevelopment at the site:

"Demolition and redevelopment of the site to provide three buildings (1x 32 storey, 1 x 18 storey and 1 x 15 storey), providing 556 residential units (including 210 affordable units) (Class C3), commercial uses (Class E), flexible community/affordable workspace (Class E/F.1). Planning reference 20/06527/FULL.

The existing building comprises of masonry construction throughout with external glazed windows and doors. Its extent is predominantly made up of an open plan basement car park, ground floor courtyard area and high security custody suites with 2 No. separate 7 and 14 floor multi-story blocks.

The PWA has been undertaken to determine as far as reasonably practicable, the volume and/or quantity of key demolition products (KDPs) that have the potential to be reused, recycled or disposed.

Its aim is to maximise the recovery of materials from the proposed redevelopment of the site for subsequent high grade/value applications as per the waste hierarchy:

Prevention; Preparing for Reuse; Recycling; and Other Recovery.

The PWA has estimated KDP to total 11950.81m3 and 26,437.11 tonnes. The KDPs have been categorised into groups and the estimated volumes and weights of the KDPs have then been calculated.

The suitability of these KDPs for reuse, recycling and recovery has subsequently been considered, in accordance with the recommended waste hierarchy.

The audit has determined that all KDPs identified have the potential to be reused, recycled or relocated subject to confirmation by qualified persons, therefore achieving in diverting key demolition products from landfill.

It is estimated that 96% of key demolition products have the potential to be diverted

from landfill by either its reuse on and/or off site, or by recycling.

2 Limitations and Exceptions

This report and its findings should be considered in relation to the terms and conditions proposed and scope of works agreed between Sweco UK Ltd (Sweco) and the Client.

The copyright in this report and other plans and documents prepared by Sweco is owned by them and no such report, plan or document may be reproduced, published or adapted without their written consent. Complete copies of this report may, however, be made and distributed by the Client as an expedient in dealing with matters related to its commission.

This report was prepared only for our Client and was not intended to be relied on by any other party. Third parties should not rely on the facts, matters or opinions set out in this report without the express written permission of Sweco.

The estimation of material types and quantities is based on the visual observations at the time of the survey and does not take account of future usage or clearance of the site.

All actions set out in this report are recommendations only and alternative uses or disposal actions may be undertaken by the demolition contractor.

The report provides an estimation of material quantities for guidance only. It is the demolition/main Contractor's responsibility to record and report actual materials present and accurate volumes of each material.

3 Introduction

3.1 General

This Pre-Redevelopment Waste Audit (PWA) has been undertaken at the former Paddington Green Police Station by Sweco UK Ltd on the instructions of AESG Limited.

The PWA has been undertaken to meet the requirement of the BREEAM Wst01 Construction Waste Management standard and carried out in line with the BRE Code of Practice Pre-redevelopment Audits (July 2017).

The PWA was undertaken on during 13-17 June 2022.

3.2 Terms of Reference

The terms of reference for this report were presented in Sweco proposal reference: 65206844-SWE-ZZ-XX-CP-J-0001 dated 26 May 2022 and accepted in an emailed instruction to proceed, dated 07 June 2022, from AESG Limited.

3.3 Site Information

The former Paddington Green Police Station site is a large multi-story building located within the Edgeware area of London. It is positioned adjacent the crossroads to the A5 Edgeware Rd to the east, the A404 Harrow Rd to the south and Newcastle place to the north. Its footprint is approximately 1.15 acre/4658m2.

Constructed during the late 1960s - early 1970s and closing in 2018 due to being unsuitable for its current use, the building is primarily of masonry construction throughout with external glazed windows and doors. Its extent is predominantly made up of an open plan basement car park, ground floor courtyard area and high security custody suites with 2 No. separate 7 and 14 floor multi-story blocks.

The external areas of the site are predominantly made up of hardstanding surfaces.

No areas of shrubbery or landscaping are present.

The location and outline of the site is presented under Appendix A.

The National Grid reference for the approximate centre of the site is TQ 26952 81740.

3.4 Proposed Development

It is understood the former Paddington Green Police Station site is to be redeveloped into a purpose-built city living accommodation, to include affordable homes, community spaces as well as retail and office spaces.

The Planning application (Reference 20/06527/FULL) includes the following description of proposed redevelopment:

"Demolition and redevelopment of the site to provide three buildings (1x 32 storey, 1 x 18 storey and 1 x 15 storey), providing 556 residential units (including 210 affordable units) (Class C3), commercial uses (Class E), flexible community/affordable workspace (Class E/F.1), provision of private and public amenity space, landscaping, tree and other planting, public realm improvements throughout the site including new Pre-Redevelopment Waste Audit, Former Paddington Green Police Station – Newcastle Place, London N2 65206844-SWE-ZZ-XX-RP-J-0001, Rev.: C01, 28/06/2022 4 pedestrian and cycle links, provision of public art and play space, basement level excavation to provide associated plant, servicing and disabled car and cycle parking."

4 Pre-demolition Audit Methodology

4.1 Pre-demolition Audit Targets

The PWA has been undertaken to determine as far as reasonably practicable, the volume and/or quantity of key demolition products (KDP) on site that have the potential to be reused, recycled or disposed.

Its aim is to maximise the recovery of materials from demolition for subsequent high grade/value applications as per the following order of waste hierarchy:

1. Prevention
2. Preparing for Reuse
3. Recycling
4. Other Recovery
5. Disposal

4.2 Pre-redevelopment Audit Procedure

The PWA incorporates the following steps:

- Collection and examination of available information
- Site visit to collect further information.
- Estimation of types and amounts of materials/key demolition products (KDP).
- Assessment of suitability of materials for reuse/recycling/other waste
- management method.
- Recommendations for materials management and target setting

Following this, the demolition contractor will apply the following:

- Materials management and target setting.

4.3 Collection and examination of available information

The following information has been provided to Sweco which has been used in the undertaking of the PWA.

Information provided	Received Yes/No	Details
Architects Drawings	Yes	N/A
Scaled Floor Plans/Measured Surveys	No	N/A
Scaled Elevations	No	N/A
Photos	Yes	General View Photos
Asbestos Survey Report	No	N/A
Structural Engineers Survey	No	N/A
Topographical Survey	Yes	N/A
Ground Investigation Reports	No	N/A
Ecological Survey report	No	N/A
Other	Yes	Site Location Plan

4.4 Site audit to collect further information

The audit of the site was undertaken during 13-17 June 2022.

At the time of the audit the former Paddington Green Police Station was not in active use, however the courtyard and basement areas were used to store building construction materials from the adjacent site.

The following restrictions/limitations were present:

- No power/lighting throughout
- No access to the 2 No. multi story roof tops
- No access to lift shafts
- Vandalism to materials throughout

4.5 Estimation of types, weights and amounts of materials

Assumptions and estimations of key demolition product (KDP) types have been made based on the type and its condition on the site at the time of audit. These have been estimated and presented as Tonnes/m3 as per the BRE Code of Practice Pre-redevelopment Audits (July 2017).

All materials have been identified as per the categories within the European Waste Group classification (Presented in Appendix A).

Weights have been estimated as per their categories in the table of conversion factors (Presented in Appendix B).

Where the conversion factor varies for material type (e.g. metals/timbers), a calculation of the highest and lowest values has been undertaken, providing an estimated range of weights.

Where fixtures and fittings (i.e. door handles, hinges etc) constitute less than 10% of the volume of an element (i.e. door/windows etc), these have not been recorded.

For external hardstanding areas where present (e.g. Macadam/Asphalt), an assumed thickness has been used to calculate volumes. From our experience of reviewing ground investigation reports of previous car park and taking into consideration worst case scenarios, we will calculate the thickness of asphalt/macadam surfaces to be 10cm thick unless proven otherwise.

The estimation of soils and/or D&E materials have been excluded from this report.

4.6 Below ground Services

No estimates of below ground services (e.g. drainage, cables, pipework etc) have been made.

4.7 Assessment and Suitability of Material for reuse/recycling or other Waste Management Methods

For each of the types of materials identified that are likely to arise from the redevelopment or demolition of the site, an assessment of the best management options should be undertaken as per the following waste hierarchy:

- Reuse on site or off site: Reuse of the component without further processing. (Where reuse seems appropriate onsite, i.e. in the subsequent development, this should be highlighted).
- Closed Loop Recycling: Recycling/reprocessing into the same component (e.g. ceiling and carpet tile take back schemes.)
- Open Loop Recycling: Recycling/reprocessing into a different component (e.g. the shredding of a pallet to produce wood chips for particle boards.)

- Recovery: Typically used to describe generic separation and recycling of materials (usually at a waste transfer station), but there may be occasions where this could describe biological treatment such as composting.
- Energy Recovery: Incineration of waste to provide energy.
- Disposal: Disposal of waste via landfill, incineration without energy recovery or other form of treatment/encapsulation (e.g. for hazardous/difficult waste).

4.8 Recommendation for Materials Management and Target Setting

Material management and target setting is to be undertaken by the demolition contractor, who should set targets for different waste management methods to determine the overall amounts of materials to be used on or off site in their original form, recycled on site or closed/open loop recycled off site.

Section 6 has set out the following recommendation for the diversion of materials from landfill. These are recommendations and alternative actions may be agreed by the client and demolition contractor.

Where possible, local companies and/or additional website sources of information have been recommended for the purpose of reclamation and/or reuse. It should be understood that this is for information only and there may be alternative companies available. Sweco does not endorse and is not affiliated with any recommended business or information provider included within this report.

4.9 Waste Management Plan

The estimates of KDP within this report including suggestions for disposal, recycling and/or reuse is to be incorporated into the demolition contractors Site Waste Management Plan.

It should be noted that it is the demolition/main contractor's responsibility to record and report actual materials present and accurate volumes of each material via a Site Waste Management Plan (SWMP)/Resource Management Plan (RMP), for example a SMARTWASTE tool. This is normally required to demonstrate construction resource efficiency and diversion of resources from landfill.

4.10 Hazardous Materials

The identification and disposal of hazardous materials should be undertaken in line With the Hazardous Waste Regulations 2005 and the Health and Safety at Work Act 1974 (HSWA 1974).

The location, type and extent of asbestos containing materials (ACMs) have not been included within the scope of this report and should be identified via a refurbishment and/or demolition asbestos survey prior to the start of works.

Where works on or the removal of the ACMs is required, it should be noted that all work with asbestos must be carried out in accordance with the Control of Asbestos Regulations 2012. It should be understood that during the removal of ACMs, additional KDPs may also be required to be disposed of as hazardous waste in a designated landfill.

5 Summary of Site Key Demolition Materials

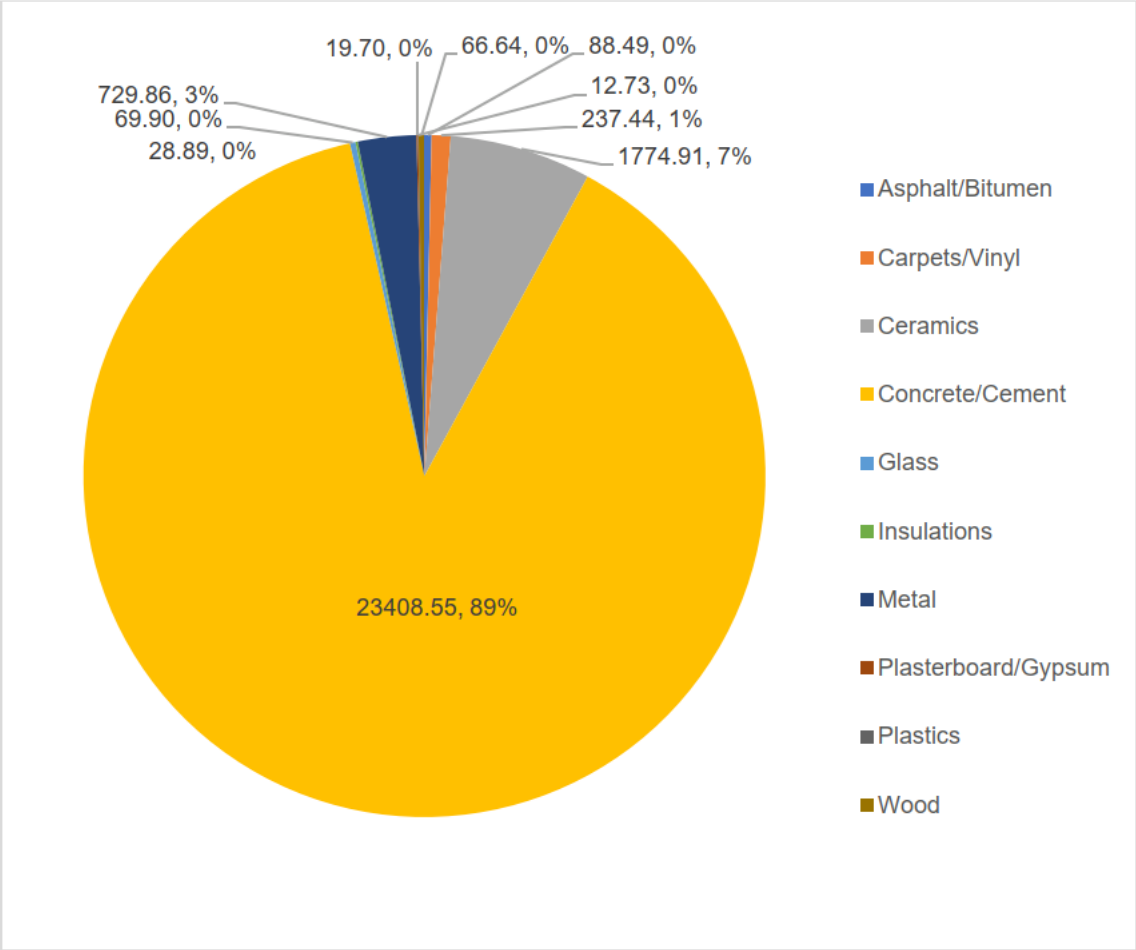
The results of the audit have estimated Key Demolition Products (KDP) to total 11950.81m3 and 26437.11 tonnes.

These are categorised as per the Wst 01 construction waste management construction waste group table in Appendix A and calculated as per the material weight factors in Appendix B.

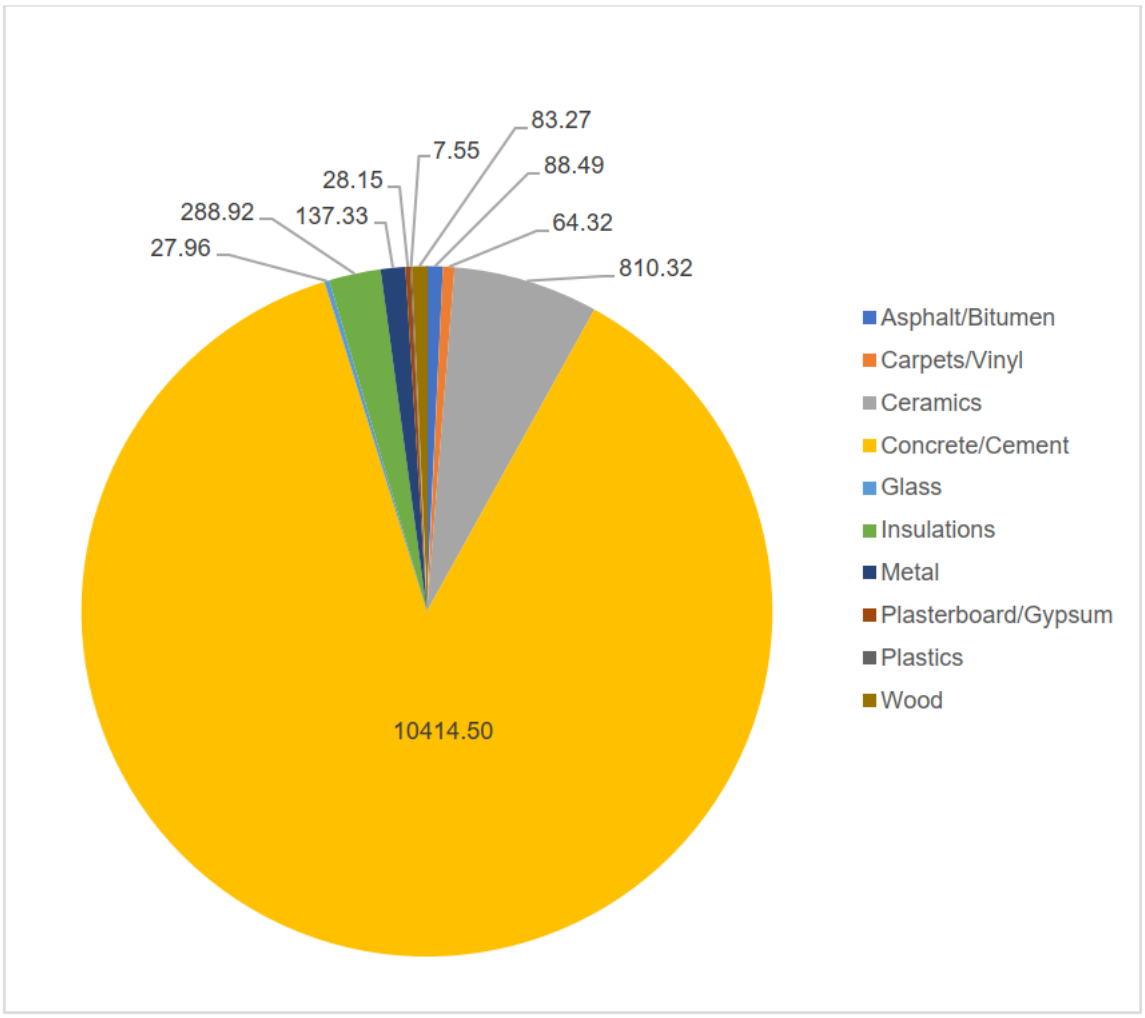
Estimated volumes and weights of key demolition materials (KDP) made throughout the former Paddington Green Police Station site are presented as follows:

Key Demolition Product (KPD)	European Waste Group	Estimated Volume (m3)	Estimated Weight (Tonnes)	Percentage by Weight (%)
Concrete/Cement	170101 170102	10414.50	23408.55	89
Metals	0714	137.33	729.86	3
Glass	17202	27.96	69.90	0
Wood	070201	83.27	66.64	0
Plasterboard/Gypsum	170802	28.15	19.70	0
Ceramics	107103	810.32	1774.91	7
Carpet/Vinyl	200111	64.32	237.44	1
Insulations	170604	288.92	28.89	0
Plastics	170203	7.55	12.73	0
OtherAsphalt /Macadam/Bitumens	1703	88.49	88.49	0
	Total	**11950.81**	**26437.11**	**100**

5.1 Total Weight by Tonnes of Key Demolition Products



5.2 Total Weight by Volume m3 of Key Demolition Products



6 Recommendations

6.1 Recommended targets for the Division of Materials from Landfill

The assessment and suitability of key demolition products for reuse, recycling and recovery have been set out as per the recommended waste hierarchy outlined in section 3.7 and should be followed as much as reasonably practicable.

MATERIAL	VOLUME (m3)	WEIGHT (TONNES)	REUSE/RECYCLE TARGET
Asphalt/Macadam/Bitumen	88.49	88.49	Reuse or Recycle 90%
RECOMMENDATIONS			
Bitumen key demolition products include linings to roofs throughout. The overall condition of the roof surfaces is in a fair condition and could potentially be left in situ if being built on top of (subject to confirmation by qualified persons). Alternatively, reclaimed bitumen materials could potentially be crushed and reused in Asphalt plants or used as C&D material. It is advised a specialist contractor is employed to advise on the potential for reuse or to recycle.			
LOCAL REFUSE CENTRES OR FURTHER INFORMATION CONTACTS			
Aggregate Industries: https://www.aggregate.com/location-finder/asphalt-small-load-and-collect/essex/purfleet/328 **Sussex Asphalt:** https://www.sussexasphalte.co.uk/wp-content/uploads/2020/12/mrk072-gn33-working-towards-zero-avoidable-waste-in-the-roofing-sector.pdf			

MATERIAL	VOLUME (m3)	WEIGHT (TONNES)	REUSE/RECYCLE TARGET
Metals	137.33	729.86	Recycle and reuse on or off site 100%
RECOMMENDATIONS			
Key demolition metal product throughout the site include structural profiled beams, pipework, railings, radiators, doors, roller shutters, lift systems, ventilation, lamp posts, crash posts, window frames and high security doors and fencing. Structural beams may potentially be left in-situ depending on inspection by qualified persons and the scope of redevelopment. Lift shafts were not accessed, however for advice on reuse and recycling lift infrastructure, further information should be provided by a qualified lift engineer/consultant.			

All metals not remaining on site can be collected by a waste management company for recycling and sold as scrap.

LOCAL REFUSE CENTRES OR FURTHER INFORMATION CONTACTS

London Scrap Metal Recycling:
https://www.londonscrapmetalrecycling.com/
London Metal and Recycling Ltd:
https://www.londonmetalandrecycling.co.uk/

MATERIAL	VOLUME (m3)	WEIGHT (TONNES)	REUSE/RECYCLE TARGET
Concrete/Cement	10414.50	23408.55	Reuse on or off site100%

RECOMMENDATIONS

Key demolition concrete and cement products on site consist of structural floors/ceilings, external linings, beams and columns, brickwork/blocks to walls and hardstanding areas throughout.

Those not remaining in-situ can be downcycled and broken up on and/or off site to use as recycled sub base aggregates, however with the current buildings occupying almost the entire site, it is unclear if there will be available space for crushing plant or how much stockpiling space will be available.

LOCAL REFUSE CENTRES OR FURTHER INFORMATION CONTACTS

Powerday Commercial:
https://powerday.co.uk/material-recycling-facilities/recycled-aggregates-concrete/
Hinton's Waste:
https://www.hintonswaste.co.uk/recycling-facilities/recycled-aggregates-concrete/

MATERIAL	VOLUME (m3)	WEIGHT (TONNES)	REUSE/RECYCLE TARGET
Wood	83.27	66.64	Recycle and reuse on site or off site 95%

RECOMMENDATIONS

Key demolition wood products throughout the site include doors and frames, oriented strand board ceiling and boxing panels, work surfaces, partitioning, cupboards and kitchen units.

Subject to their condition and meeting the necessary fire safety rating where required, doors could potentially be reused on or off site.

Inspection of materials during strip out should be made to determine if it can be stockpiled/ segregated and reused as part of the new construction.

Alternatively, wood products can be open loop recycled off site by a waste management company or independent business / charity that can transform timber into further products.

LOCAL REFUSE CENTRES OR FURTHER INFORMATION CONTACTS

Solo Wood Recycling:
https://solowoodrecycling.co.uk/
Community Wood Recycling:
https://communitywoodrecycling.org.uk/

MATERIAL	VOLUME (m3)	WEIGHT (TONNES)	REUSE/RECYCLE TARGET
Plasterboard/Gypsum	28.15	19.70	Recycle 95%

RECOMMENDATIONS

Key demolition plasterboard and Gypsum products have been identified throughout as wall partitioning as well as ceiling rendering.

Given the method of its removal, it is unlikely that the decision to reuse plasterboard will be made during the new construction, however the metal studs/frames may be salvageable for reuse on or off site subject to inspection by a qualified person.

Plasterboard waste can be recycled into new plasterboard products via a closed loop recycling service.

Waste plasterboard should be stockpiled separately and not be mixed with other waste products to avoid contamination.

Waste Render can be stockpiled separately, downcycled and broken up on and off site to use as recycled sub base aggregates.

LOCAL REFUSE CENTRES OR FURTHER INFORMATION CONTACTS

British Gypsum:
https://www.british-gypsum.com/sustainability/our-sustainability-services/our-plasterboard-recycling-service
Powerday Commercial:
https://powerday.co.uk/material-recycling-facilities/plasterboard-recycling/

MATERIAL	VOLUME (m3)	WEIGHT (TONNES)	REUSE/RECYCLE TARGET
Ceramics	810.32	1174.91	Recycle 100%

RECOMMENDATIONS

Ceramic key demolition products throughout consist of wall and floor tiles as well as WC's and basins.

If removed in a good condition, clean ceramic tiles could potentially be recycled and reused.

Alternatively, ceramic products can be downcycled crushed and used for drainage products or within sub base aggregates

Subject to inspection by a qualified person, WCs and basins could be recycled/reused off site, however this is unlikely given the amount of vandalism throughout and the condition/age of products.

LOCAL REFUSE CENTRES OR FURTHER INFORMATION CONTACTS

Powerday Commercial:
https://powerday.co.uk/material-recycling-facilities/recycled-aggregates-concrete/
Hinton's Waste:
https://www.hintonswaste.co.uk/recycling-facilities/recycled-aggregates-concrete/

MATERIAL	VOLUME (m3)	WEIGHT (TONNES)	REUSE/RECYCLE TARGET
Carpet/Vinyl	64.32	237.44	Recycle 90%

RECOMMENDATIONS

Carpets/Carpet tiles in good condition can be either donated to charity or recycled via a suitable waste recycling company or takeback scheme.

Vinyl flooring if removed in a good condition can also be donated to charity or recycled via a suitable waste recycling company or takeback scheme. Vinyl flooring however is commonly glued down and may therefore be damaged on removal.

LOCAL REFUSE CENTRES OR FURTHER INFORMATION CONTACTS

Carpet Recycling UK:
https://carpetrecyclinguk.com/
Recofloor Vinyl Takeback Scheme:
https://www.recofloor.org/recycling-vinyl-flooring-saves-money/

MATERIAL	VOLUME (m3)	WEIGHT (TONNES)	REUSE/RECYCLE TARGET
Insulations	288.92	28.89	Recycle and reuse on or off site 90%

RECOMMENDATIONS

Insulation Key demolition products throughout have been identified as suspended ceiling tiles, MMMF insulation to plant and pipe works and fibreglass tanks.

Whilst not visually identified, foam and /or mineral wool insulation (MMMF) may also be present within plasterboard wall and/or ceiling cavities as well as within the external wall and roof cladding.

Subject to it condition and inspection by qualified persons, ceiling tiles as well as their frames can be removed and safely stored for reuse off site. Alternatively, subject to meeting the required criteria, unsuitable ceiling tiles can be collected and upscale recycled into new tiles.

Depending on the type of mineral wool insulation, this may be suitable for upscaled recycling to be transformed into new insulation materials.

It however may be the case that unidentified insulations may not be recyclable and therefore should be disposed of as per the hazardous waste regulations 2005.

LOCAL REFUSE CENTRES OR FURTHER INFORMATION CONTACTS

Armstrong Ceiling and Wall Solutions:
https://www.armstrongceilings.com/commercial/en/performance/sustainable-building-design/ceiling-recycling-program.html
Rockwool:
https://www.rockwool.com/uk/about-us/sustainability/recycling/

MATERIAL	VOLUME (m3)	WEIGHT (TONNES)	REUSE/RECYCLE TARGET
Plastics	7.55	12.73	Recycle 100%

RECOMMENDATIONS

Plastic key demolition materials have been identified as uPVC window frames, wall sheets and PVCu drainage pipes.

uPVC and PVCu products are suitable for closed loop recycling to be transformed into new plastic materials.

Window frames should be separated from the glass panels and stockpiled separately to avoid contamination of materials.

LOCAL REFUSE CENTRES OR FURTHER INFORMATION CONTACTS

CNC Recycling:
https://www.upvc-recycling.co.uk/
Veka Recycling:
https://veka-recycling.co.uk/upvc-recycling/

MATERIAL	VOLUME (m3)	WEIGHT (TONNES)	REUSE/RECYCLE TARGET
Glass	27.96	69.90	Recycle 100%

RECOMMENDATIONS

Key demolition glass products identified throughout the site include windows, partitions and doors.

Subject to inspection by qualified person and meeting the necessary safety rating, glass window panels and doors may be suitable for reuse off site, however, those deemed less suitable should be recycled via closed loop recycling and turned back into glass products.

Alternative options are to break up and use as sub base aggregates, however this should not be the preferred option.

All glazing products not being identified for reused should be separated from its housing frames to avoid contamination and rejection from the recycling company unless specified otherwise.

LOCAL REFUSE CENTRES OR FURTHER INFORMATION CONTACTS

Bywaters:
https://www.bywaters.co.uk/services/recycle/glass
First Mile Recycling:
https://thefirstmile.co.uk/

7 Audit Summary

MATERIAL	VOLUME (m3)	WEIGHT (TONNES)	PERCENTAGE BY WEIGHT %	REUSE/RECYCLE TARGET %
Concrete/Cement	10414.50	23408.55	89	100
Metals	137.33	729.86	3	100
Glass	27.96	69.90	0	100
Wood	83.27	66.64	0	95
Plasterboard/Gypsum	28.15	19.70	0	95
Ceramics	810.32	1774.91	7	100
Carpet/Vinyl	64.32	237.44	1	90
Insulations	288.92	28.89	0	90
Plastics	7.55	12.73	0	100
OtherAsphalt /Macadam/Bitumens	88.49	88.49	0	90
TOTAL	**11950.81**	**26437.11**	**100**	**96**

The results of this audit have determined that all KDPs identified have the potential to be reused, recycled or relocated subject to confirmation by qualified persons, this will therefore achieve in the target of diverting waste from landfill.

It is estimated that unless specified otherwise by qualified persons, 96% of key demolition products have the potential to be diverted from landfill by either its reuse on and/or off site, or by recycling, which exceeds the GLA target of 95% (by tonnage).

The residual 4% of demolition waste must be disposed of via licensed waste disposal facilities and/or landfill as per the Hazardous waste regulations (England and Wales) 2005 (where relevant).

It is important that the results of this pre-redevelopment waste audit are communicated to the necessary persons or teams including the demolition contractor.

Prior to the commencement of redevelopment works, a target should be set based on the recommendations within this report and reviewed/compared on completion.

Following the comparison of actual targets achieved, a summary of the deviations from the targets along with the reasons for these deviations should be recorded to improve performance of future projects.

It is estimated that unless specified otherwise by qualified persons, 96% of key demolition products have the potential to be diverted from landfill by either its reuse on and /or off site, or by recycling.

8 References

1. The Waste (England and Wales) Regulations 2011 and amendments.
2. Environmental Protection Act 1990.
3. Environmental Permitting Regulations (England and Wales) 2010 and amendments.
4. Hazardous Waste Regulations (England and Wales) 2005.
5. The Waste Electrical and Electronic Equipment Regulations 2006.
6. The Waste Batteries and Accumulators Regulations 2009.
7. Relevant quality protocols.
8. Control of Asbestos Regulation 2012 (CAR2012)
9. BRE Pre-redevelopment Audit Guidance (2017)
10. BREEAM New Construction Manual 2018
11. BREEAM WST 01 Construction Waste Management
12. Defra PB13530 Waste Hierarchy Guidance (2011)
13. https://www.gov.uk/how-to-classify-different-types-of-waste/construction-and-demolition-waste
14. http://www.hse.gov.uk/waste/waste-electrical.htm

APPENDIX A

(FIGURES)

REV	DATE	REVISION	MADE	CHK	APP
C01	22.06.2022	-	AC	JW	JW

DRAWING STATUS
FINAL ISSUE

SUITABILITY DESCRIPTION
SUITABLE FOR INFORMATION

Sweco
Building 7200
Cambridge Research Park
Cambridge
CB25 9TL
Tel: +44 (0)1223 632 800
Web: www.sweco.co.uk

SWECO

CLIENT
AESG LIMITED

DRAWING TITLE
SITE LOCATION PLAN

PROJECT
FORMER PADDINGTON GREEN POLICE STATION, LONDON

SCALE	SWECO REF.	STATUS	REVISION
NTS @A3	65206844	S2	C01

PROJECT	ORIGINATOR	VOLUME/ SYSTEM	LEVELS & LOCATIONS	TYPE	ROLE	NUMBER
65206844	SWE	ZZ	XX	DR	J	FIG 1

APPENDIX B

(PRE-DEMOLITION WASTE AUDIT PHOTOS)

SWECO

Photographs Relating to Pre-redevelopment Waste Audit

Project Name: Former Paddington Green Police Station
Project Reference: 65206844 Date: 27/06/2022
Project Manager: John Wootton Document Reference: 65206844-SWE-ZZ-XX-SU-J-0001 Revision: C01

GENERAL VIEWS THROUGHOUT

GENERAL VIEWS THROUGHOUT

GENERAL VIEWS THROUGHOUT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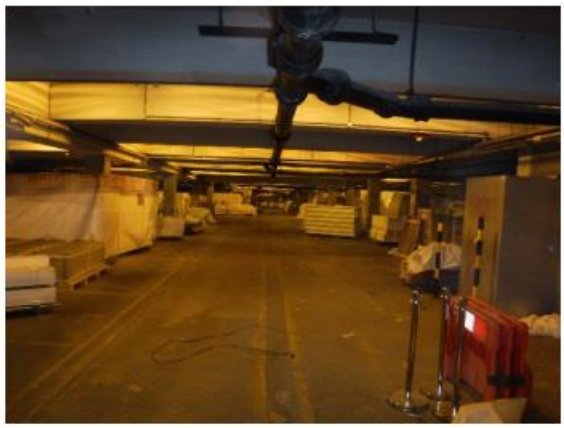

GENERAL VIEWS THROUGHOUT

GENERAL VIEWS THROUGHOUT

GENERAL VIEWS THROUGHOUT

APPENDIX C

(CONSTRUCTION WASTE GROUPS)

European Waste Catalogue	Key Group	Examples
170102	Bricks	Bricks
170101	Concrete	Pipes, kerb stones, paving slabs, concrete rubble, precast and in situ
17202	Glass	Glass (Uncontaminated)
170604	Insulation	Glass fibre, mineral wool, foamed plastic
1501	Packaging	Paint pots, pallets, cardboard, cable drums, wrapping bands, polythene sheets
170201	Timber	Softwood, hardwood, boards products such as plywood, chipboard, medium density fibreboard (MDF)
1602	Electrical and electronic equipment	Electrical & electronic TVs, fridges, airconditioning units, lamps equipment
200301	Canteen/office	Office waste, canteen waste, vegetation
1301	Oils	Hydraulic oil, engine oil, lubricating oil
1703	Asphalt and tar	Bitumen, coal tars, asphalt
170103	Tiles and ceramics	Ceramic tiles, clay roof tiles, ceramic, sanitary ware
1701	Inert	Mixed rubble/excavation material, glass
1704	Metals	Radiators, cables, wires, bars, sheet
170802	Gypsum	Plasterboard, render, plaster, cement, fibre cement sheets, mortar
170203	Plastics	Pipes, cladding, frames, non-packaging sheet
200307	Furniture	Tables, chairs, desks, sofas
1705	Soils	Soils, clays, sand; gravel, natural stone
Most relevant EWC	Liquids	Non-hazardous paints, thinners, timber treatments
Most relevant EWC	Hazardous	Defined in the Hazardous Waste List (HWL) of the European Waste Catalogue (EWC)

Most relevant EWC	Floor coverings (soft)	Carpets, vinyl flooring
Most relevant EWC	Architectural Features	Roof tiles, reclaimed bricks, fireplaces
170904 (Mixed)	Mixed/ other	Efforts should be made to categorise waste into the above categories wherever possible

*Additional information and EWC Waste Category numbers can be found on document BREEAME Wst 01 Construction waste management, and the following link (https://www.gov.uk/how-to-classify-different-types-of-waste/construction-and-demolition-waste)

APPENDIX D

(MATERIAL WEIGHT CONVERSION FACTORS)

Conversion factors for common materials arising from demolition projects

Material	Tonnes/m3
Aggregates	1.8
Aluminium	2.7
Asphalt	2.1
Bitumen	1.0
Blocks	2.0
Bricks	1.7
Cables (not hazardous)	2.3
Carpets	3.9
Cement	1.5
Chipboard	0.7
Clay roof tiles	1.9
Copper	8.9
Expanded Polystyrene insulation	0.0
Glass	2.5
Glass fibre insulation	0.1
Glass Reinforced Plastic	2.0
Hardboard	1.0
Hardwood	0.8
Internal building tiles	2.2
Iron	7.6
Lead	7.4
Low density fibre board	0.6
Medium Density Fibreboard	0.7
Mild steel	7.0

Material	Tonnes/m3
Mineral wool insulation	0.1
Mortar	1.7
Oriented Strand Board	0.6
Paving	2.3
Polyethylene	0.1
Plaster	0.7
Plasterboard	0.7
Plywood	0.8
Polypropylene	0.9
Polyurethane insulation	0.0
Poly Vinyl Chloride	1.4
Render	2.3
Ready Mix Concrete	2.3
Roof tiles	2.5
Slate	2.9
Softwood	0.4
Stainless steel	7.8
Stone	2.5
Structural Concrete	2.3
Tin	7.3
Vinyl flooring	1.4
Waste paper insulation	0.0
Wool fleece	0.0
Zinc	4.0

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