

Detailed Circular Economy Statement

Last Mile Logistics Centre

Former GSK Site, Stockley Park, Hillingdon

Prologis UK Ltd

July 2021

Turley
Sustainability

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1. Executive Summary

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

A circular economy (CE) will save resources, increase the resource efficiency of businesses, and help to reduce carbon emissions. So that circular principles can be successful at this new last mile delivery centre, a whole building lifecycle approach is being applied on the site of the former GSK office.

The site comprises the former GSK offices, to the east of Iron Bridge Road, Hillingdon which is adjacent to Prologis Park West London. The proposals comprise the construction of a new warehouse unit for use within Class B8, as a last mile delivery facility for operation by a national occupier.

The proposed warehouse building will be located along the eastern boundary of the site and comprise circa 17,877 sqm floorspace in total.

The proposal also comprises the erection of a decked, multi storey building for the storage of delivery vans. This will be a 4 storey structure with space for approx. 800 vans. The remainder of the site will include surface car parking for staff working within the main warehouse. The project will be carried forward as a Design and Build (D&B) contract.

This Detailed Circular Economy Statement has been prepared in support of the full application to demonstrate how the proposed development at Iron Bridge Road, Hillingdon will deliver the principles of circularity in accordance with the GLA's Circular Economy Pre-consultation Guidance (Oct 2020) and Policy SI 7 of the London Plan.

Approach

Prologis has a proactive approach to sustainability with a range of corporate goals to reduce the amount of materials required, increase recycling and limit the amount of waste sent to landfill.

The development aims to reuse as much of building elements such as possible in order to minimise waste generated from the site clearance and construction. The reuse of elements such as

the block paved car parking which will be crushed and used onsite as aggregate will provide significant reductions in waste produced and disposed to landfill as well as carbon reductions.

As the existing buildings on the site are no longer fit for purpose, the buildings will not be refurbished or repurposed.

Where possible, the building and associated infrastructure will be disassembled with individual components directly used onsite or elsewhere. As mentioned, the construction of the development will aim to re-use as many suitable materials on site as possible. Where materials cannot be re-used, they will be sent off-site for re-use and refurbishment elsewhere if possible, instead of being taken by waste carriers

Commitments

This circular approach to development includes assessment of design and materials at key stages of the development in order to promote a flexible and adaptable design that also promotes longevity. This approach which also includes a Whole Life Carbon (WLC) Assessment in order to reducing emissions associated with construction and construction materials. Furthermore, Prologis

mitigate emissions through the protection of rain forest through the Cool Earth scheme.

In this context some of the key circular economy commitments incorporated into the design of the development include the following.

- Prologis has invested heavily in a construction specification that maximises energy and resource efficiency. The customer has also invested in sustainability and an efficient specification.
- Prologis and the future occupier seeks to specify the use of recycled materials wherever viable including steel content and aggregates
- Many of the main construction materials required achieve an A rating in the Building Research Establishment's (BRE) Green Guide to Specification.
- A commitment to deliver a circular building that achieves the BREEAM 2018 Very Good environmental assessment rating and where possible targeting 'Excellent' minimum standards within energy and water sections.
- Through a contribution to the Cool Earth scheme, an aim to protect 510 acres of

endangered rainforest, averting emissions equivalent to 5 times of the embodied carbon of the development.

- Targets and commitments will be refined on an ongoing basis as this is a D&B Contract. During State 4 and 5, the primary contractor will include the Circular Economy targets as agenda item within regular meetings.

Implementation

The various commitments will be driven forward by Prologis and the customer as the eventual occupier. An engaged design and project team including the contractor will enable specific implementation of the various principles across the development, design and delivery. Contractor specifications will aim to include requirements relating to specific circular economy targets.

The circular economy narrative section identifies the primary and secondary team member responsible for implementing the details of each circular economy principle.

While some of the principles have been or are in the process of being implemented, as part of the D&B Contract, the primary contractor will aim to ensure that the principles will be carried through the remaining design and eventual construction.

A Pre-demolition Audit will be carried out to inform the project team which site specific components can be reused, either directly on site or donated / sold elsewhere.

End of Life

Where possible and appropriate the team will specify and select materials that can be recycled or composted at end of life. This is further described below in the End of Life Strategy.

This Strategy was discussed during the Circular Economy Workshop held with the client and project team and the D&B Contractor will continue to examine elements and materials where appropriate as part of this.

Outcomes & Lessons Learned

Actual performance against these targets will be submitted at practical completion. Lessons learned will also be captured throughout the design and construction process and used to inform circularity principles of future projects.

2. Introduction

2.1 Introduction

This Circular Economy Statement has been prepared by Turley Sustainability on behalf of Prologis UK Ltd ('the Applicant'). It supports a full planning application to the London Borough of Hillingdon regarding the proposed development of new last mile delivery centre on the site of the former GSK offices.

This Statement responds to the requirement within the London Plan (adopted 2021) that a Circular Economy Statement should be produced to follow the criteria set out in Policy SI 7 and the Circular Economy Statements Guidance (Oct 2020).

This statement also aligns with the principles relating to circular economy set out in the Sustainability Statement - in particular the materials, recycling and waste criteria and the separate WLC Assessment.

2.2 Proposed Development

2.2.1 Application Site

The site comprises the former GSK offices, to the east of Iron Bridge Road, Hillingdon which is

adjacent to Prologis Park West London, within the wider Stockley Park employment area. The site plan can be seen in Appendix A for the proposed development.

The site measures approximately 6.3 ha in size and is broadly rectangular in shape. The site is located between Iron Bridge Road North and Stockley Road (A408). To the south, the site is bound by the Grand Union Canal and towpath which is managed by the Canal and River Trust. Stockley Park Country Park and Golf Course, an extensively landscaped public park provided on a historic landfill site, is immediately to the north of the site, across Horton Road.

The site currently comprises 3 large office buildings totalling approx. 31,575 sqm of Class B1(a) floorspace, formerly occupied by GSK but now vacant. The buildings are surrounded by a substantial amount of ancillary surface level car parking. In the south eastern corner of the site there is also a large multi-storey car park. The site is bordered by trees and landscaping along each of the site boundaries

2.2.2 Description of Proposed Development

Prologis have received interest from a potential occupier to use this site as a last mile delivery

centre. The proposal comprises the construction of a new warehouse unit for use within Class B8, as a last mile delivery facility for operation by a national occupier. The proposed warehouse building will be located along the eastern boundary of the site and comprise circa. 17,877 sqm floorspace in total.

The proposal also comprises the erection of a decked, multi storey building for the storage of delivery vans. This will be a 4 storey structure with space for approx. 800 vans. The remainder of the site will include surface car parking for staff working within the main warehouse. The provision of decked van storage will allow the operator to safely store and manage its delivery fleet on site, and in time will help to facilitate its move to a fully electric delivery vehicle fleet, in line with the company's own sustainability targets

2.2.3 Method statement

Since the publication of the updated Circular Economy Guidance, the team have familiarised themselves with the specific requirements. Liaison and correspondence on circular economy topics has occurred and coordination, where appropriate with the WLC Assessor and the

Circular Economy Consultant has occurred. The client and project team also attended a Circular Economy workshop to confirm the principles, commitments and targets of the scheme.

The team have worked together to ensure principles of circularity are incorporated into the project. Sustainable development objectives have been incorporated from Stage 1 as part of the Client Brief.

Stage 2 saw the development of the Sustainability and Energy Statement which highlighted the specific waste and recycling requirements for the project. A BREEAM pre-assessment of the warehouse building will be undertaken at the appropriate stage to confirm the credits required to achieve 'Very Good' as a minimum, where possible targeting 'Excellent' minimum standards within energy and water sections. As the vehicle park is not appropriate for BREEAM certification, it will not be assessed, however any site wide considerations within sections such as Management, Materials, Waste and Land Use and Ecology will be applied across the. A WLC Assessment was also carried out at Stage 2 with the aim of reducing the embodied carbon of materials and elements.

The production of these documents required the Sustainability Team to liaise closely with the rest of the project and design team. This input has influenced the sustainability objectives for the project design and construction.

For the Circular Economy Statement, virtual meetings / telephone calls occurred between the Planning Team, Client, and with the Sustainability team who developed the Sustainability Statement and Whole Life Carbon Assessments.

A Circular Economy / Designing out Waste Workshop was held and reporting requirements and processes set up using the principles and targets below.

2.3.4 Circular Economy Aspirations

The circular economy goals for the project have been set below. The goals are for the project to align with the:

- Waste Hierarchy
- Circular Economy Hierarchy.

Incorporating the associated targets and commitments within materials and elements will help to ensure the principles of circularity are incorporated into the design and construction of the project.

Prologis has invested heavily in a construction specification that maximises energy and resource efficiency. Similarly, the potential future occupier has also a specification that drives many sustainability objectives. For commercial reasons, the future potential occupier cannot be identified at this stage.

The Prologis specification require that many of the main construction materials for instance are required achieve an A rating in the Building

Research Establishment's (BRE) Green Guide to Specification. An A rated material has a proven low environmental impact. Thus the principles of circularity compliment the brief and approach undertaken by Prologis.

2.3 Strategic Approach

Prologis aims to mitigate the potential impact of the development by addressing key sustainability issues and incorporate a range of procedures to maximise resource efficiency and minimise waste during all stages of the development. The Strategic Approach for this is set out within the section below.

2.4 Document Structure

The content of the CE Statement aligns with that required as set out by the CE Guidance 2020. As such:

Chapter 1 and 2 set out the Executive Summary and Introduction, the content of both aligns with the requirements set out in the Guidance from the GLA.

Chapter 3 communicates the Circular Economy Statement for the development, in accordance with in accordance to the London Plan policy SI 7. It includes:

- CE Goals and Strategic Approach
- CE Commitments (see Appendix).

Chapter 4 lists the Circular Economy Narrative in table format listing targets, metrics and timeframes.

Chapter 5 concludes the Statement.

Appendices include the information such as Bill of Materials as required by the new Guidance.

These will be updated as appropriate by the Design and Build Contractor.

This Circular Economy Statement should be read in conjunction with other documents submitted in support of the planning application, namely the Sustainability Statement - in particular the

materials, recycling and waste criteria and the separate WLC Assessment.

3. Circular Economy Principles

This chapter has been prepared to set out how the development proposals promote circular economy principles.

3.1 Introduction

A circular economy is one where materials are retained in use at their highest value for as long as possible and are then re-used or recycled, leaving a minimum of residual waste. A circular economy will save resources, increase the resource efficiency of businesses, and help to reduce carbon emissions.

For circular principles to be successful, a whole building lifecycle approach is required. Therefore, the goals of the circular economy statement are closely entwined with the approach of the Sustainability Statement and Whole Life Carbon Assessment developed for the proposed development.

This chapter aims to address Policy SI 7 of the London Plan as well as the requirements within the Mayor of London's Circular Economy Statement Guidance.

The Mayor of London's Circular Economy Statement Guidance sets out the requirements at different stages for the topic area. The core principles of the Guidance document are:

1. Conserve resources, increase efficiency and source sustainably
2. Design to eliminate waste (and for ease of maintenance)
3. Manage waste sustainably and at the highest value.

Each of these principles incorporate a number of commitments to manage quantities of materials, resources and waste. These principles underpin the structure and content requirements of this Circular Economy Statement.

3.2 Goals and Strategic Approach

3.2.1 Goals

In line with these principles and Policy SI 7, the applicant at this former GSK site wants to demonstrate their clear commitment to designing and building an exemplar development which considers the impacts of circularity in relation to materials and waste.

The following goals have therefore been set.

Goal 1. Waste and Resource Management through adoption of principles of Waste Hierarchy

Follow the principles set out in the Waste Hierarchy with the goal to conserve resources; design to eliminate waste to landfill; and increase recycling rates. In accordance with their corporate sustainability strategy, Prologis aims to incorporate a range of procedures to maximise resource efficiency and minimise waste during all stages of the development.

As this is a Design and Build contract, the future occupier will also have a large role to play in

designing out waste and ensuring construction practises on site minimise waste production in the first instance as well as limit the amount of waste to landfill.



Figure 1: Waste Hierarchy

Goal 2. Adopt principles of Circular Economy Hierarchy

Deeper analysis of the Waste Hierarchy enables the circular economy hierarchy and avoidance of the linear “take-make-dispose” economy. The goal is therefore to manage waste sustainably and at the highest value. In this way, a circular economy will help to build overall system health by decoupling economic activity from the consumption of finite resources.

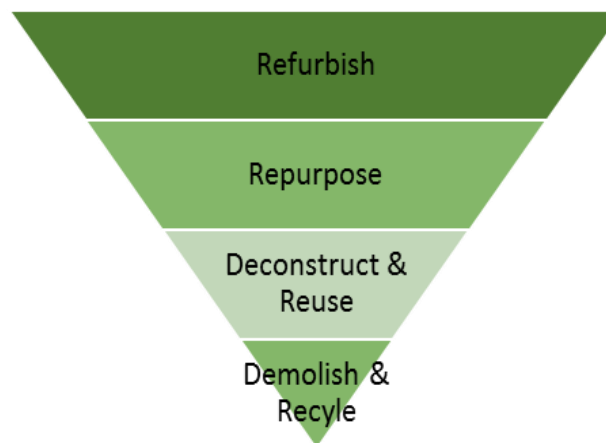


Figure 2: Circular Economy Hierarchy

3.2.2 Strategic Approach

The client acknowledges that the proposed development requires the use of land and natural resources in construction and operation. However, in accordance with their corporate sustainability strategy, Prologis aims to mitigate the potential impact of the development by addressing key sustainability issues and incorporate a range of procedures to maximise resource efficiency and minimise waste during all stages of the development.

In the UK Prologis is pioneering an approach to the design, construction and operation of more sustainable new commercial buildings that is innovative and allows Prologis to mitigate and adapt to climate change.

In order to do this, Prologis will assess the environmental impact associated with all the phases of the new buildings’ life cycle, from the manufacture of the building materials through to the operation of the building and how it will be demolished and replaced, focusing on a range of sustainability metrics.

The proposed distribution facility for ‘last mile’ deliveries to the local area is an excellent opportunity to improve the efficiencies of the proposed occupier’s operations and to bring about a step change in sustainable patterns of transport locally. It would also help to support the provision of employment opportunities in the Borough.

Where practical, the strategic landscaping proposals will seek to ensure that key features of the Stockley Park masterplan will be incorporated into the scheme in order to preserve and enhance the interest of the registered park and garden. That is, landscaping proposals seek to retain and enhance existing planting within the site, particularly along Stockley Road to the west, the Grand Union Canal to the south, and Iron Bridge Road to the east. Additional tree planting and landscaping features will be provided along the site boundaries.

In addition, Prologis will target a BREEAM Very Good rating for the proposed buildings to deliver sustainable buildings which provide long term benefits to occupiers. Waste, recycling, and

material credits have been targeted in order to help promote the circular economy.

Furthermore, Prologis aims to reduce and mitigate the embodied carbon of development through partnership with the offset charity, Cool Earth.

The following sections set out further detail on the strategic approach in line with the requirements of the Mayor's Circular Economy Guidance.

Table 1.1: Circular Economy Strategic Approach

Aspect	Phase / Building Area	Steering Approach	Explanation	Target	Supporting Analysis / Studies
Circular economy approach for the new development	RIBA Stage 2, 4	Deconstruct and reuse & Demolish and recycle	The development aims to reuse as many existing building elements as possible to minimise waste generated from the site clearance and construction. The reuse of large building elements such as the paved carparking area will provide significant cost savings, reductions in waste produced and disposed to landfill, and carbon reductions. However, in general the existing buildings on the site are no longer fit for purpose and the buildings will not be refurbished or repurposed. Where possible, the building and associated infrastructure will be disassembled with individual components directly used onsite or elsewhere. The construction of the development will aim to re-use as many suitable materials on site as possible. Where materials cannot be re-used, they will be sent off-site for re-use and refurbishment elsewhere if possible, instead of being taken by waste carriers. Recovery of materials and products onsite could include: - Concrete: crushed and recycled to be used as sub-base below hard landscaping - Tarmac: Tarmac is melted and re-used as asphalt on site.	Construction and demolition – 95% reuse/recycling/recovery (in line with London Plan requirements)	Site Waste Management Plan to provide details on the diversion from landfill targets and procedures to be followed on site to ensure that maximum waste is diverted from landfill. Pre-demolition Audit to inform the project team on which site specific components can be reused, either directly on site or donated / sold elsewhere. Prologis Corporate Objectives

Aspect	Phase / Building Area	Steering Approach	Explanation	Target	Supporting Analysis / Studies
			Recovery of materials and products off-site could include: - Flooring: carpet tiles can be re-furnished and re-used, providing low-cost flooring to households and charities. Examples of used carpet suppliers include 'Carpet Tile Wholesale' and 'Envirocycle London'. - Furniture: Electrical items such as white goods, in good condition can be donated to charities or sold on sites such as 'Globechain' (a broker service for unwanted resources). - Furniture: As per electrical items, unwanted furniture can be donated to local charities or community uses.		
	RIBA Stage 2, 3, 4	Longevity	In order to ensure that circular economy principles are embedded within the design process, the team considered the lifetime and use of the building. This will continue to be refined as the design and build contract progresses. In relation to longevity, the development must meet long term needs while being durable and resilient. It should be able to cope with change from examples such as climate change or different ways of living.	- The team are progressing the BREEAM Mat 01 evidence alongside the LCA - BREEAM Mat 05 credit 'Designing for Durability and Resilience' will be targeted for the development within the Pre-assessment - Achieve durability standards (such as BS 7543:2015)	BREEAM Pre-assessment
	RIBA Stage 2, 3, 4	Adaptability & Flexibility	Adaptability and flexibility is a key component of the design and construction brief for the team. The design has and as it evolves will continue to take into account		Prologis Design Brief and Occupier Requirements

Aspect	Phase / Building Area	Steering Approach	Explanation	Target	Supporting Analysis / Studies
			the needs of the present with consideration of how those needs might change in the future.		Design and Access Statement
	RIBA Stage 2, 3, 4	Longevity Adaptability & Flexibility	For the new construction elements Prologis is committed to designing out waste, recognising that the planning and design stage of development plays an important role in reducing waste and associated environmental impact of the materials in accordance with the waste and circular economy hierarchies. Prologis has invested heavily in a construction specification that maximises energy and resource efficiency. All of the main construction materials required achieve an A rating in the Building Research Establishment's (BRE) Green Guide to Specification. An A rated material has a proven low environmental impact. Prologis seeks to specify the use of recycled materials wherever viable including steel content and aggregates. In addition, a Whole Life Carbon Assessment was developed. One of the objectives of this LCA was to reduce the amount of embodied carbon within materials. As part of the Design and Build Contract, the future occupier will play a large role in ensuring their requirements are specified prior to construction so that minimal changes and adjustments are needed once the building is completed.	All materials will also be sourced in accordance with a sustainable procurement strategy which includes the following measures: - all timber will be sourced from sustainable sources; - recycled materials with low embodied carbon will be preferred; and, - Materials suppliers that have an established Environmental Management System. - 'A' rating BRE Green Guide to Specification	Sustainability & Energy Strategy Whole Life Carbon Assessment & LCA Outputs BREEAM Pre Assessment

Aspect	Phase / Building Area	Steering Approach	Explanation	Target	Supporting Analysis / Studies
	RIBA Stage 2, 3, 4	Longevity Adaptability & Flexibility	Off-site prefabrication and design for modularisation will be promoted and maximised where possible to minimise the potential for on-site construction waste and consideration will be given to use prefabricated solutions to minimise waste during the construction phase. The cladding for instance will be demountable.	<5% 'special' components across standardised and/or modular designs	Section of Specifications
	RIBA Stage 2, 3, 4	Longevity Adaptability & Flexibility	Whole Life Carbon Assessment: Materials - were considered and life cycle reported on within Whole Life Carbon Assessment. This includes raw material supply, transport of material to production lines and production impacts.	The major building elements (substructure, superstructure, services etc.) will be assessed within a WLC Assessment	Whole Life Carbon Assessment LCA – one click Outputs and
			LCA: Replacement - The environmental impacts of material replacements include environmental impacts from replacing building products after they reach the end of their service life.		
			LCA: End of Life - The impacts of deconstruction include impacts for processing recyclable construction waste flows for recycling or the impacts of pre-processing and landfilling for waste streams that cannot be recycled.		
Circular economy approach for the existing site	RIBA 4 & 5	Deconstruction and Reuse & Demolition and Recycle	The development aims to retain as many of the existing building elements as possible to minimise waste generated from the site clearance and construction. The reuse of large building elements will provide significant reductions in waste produced and disposed to landfill. During site clearance and construction, a Site Waste Management Plan will be developed which will include	95% diversion from landfill	Site Waste Management Plan & Pre-demolition Audit

Aspect	Phase / Building Area	Steering Approach	Explanation	Target	Supporting Analysis / Studies
			procedures for maximising recycling, minimising construction waste to landfill and promoting waste segregation and recycling. A pre-demolition Audit will be undertaken to inform where materials may be re-used and improve material efficiency. The main contractor will be required to implement a range of procedures to minimise waste and environmental impact during the construction phase.		
Circular economy approach for municipal waste during operation	RIBA Stages 4 – 7	Flexibility & Adaptability	Appropriate waste management facilities will be provided in accordance with the Waste Hierarchy to enable segregation and recycling. As required by the London Plan, the development will be designed with adequate, flexible, and easily accessible storage space and collection systems that support, as a minimum the separate collection of dry recyclables (at least card, paper, mixed plastics, metals, glass) and food. During operation, the future occupier will align with the local authority requirements for recycling and waste disposal. The occupier, in line with London Plan requirements will encourage waste minimisation and waste prevention through the reuse of materials and using fewer resources in the production and distribution of products.	As per London Plan requirements: - ensure that there is zero biodegradable or recyclable waste to landfill by 2026; - Meet or exceed the municipal waste recycling target of 65% by 2030	Tenant Guidelines

3.2.3 Circular Economy Commitments

Key commitments have been developed for the proposed development. These can be seen in Appendix B Circular Economy Key Commitments Table.

The table highlights the commitment of the client, project team and contractor(s) to ensuring principles of the circular economy are incorporated into the design, construction and operation of the proposed development.

The table will be updated as the design progresses. This will occur through ensuring the topic of Circular Economy is on the agenda at regular Design Team Meetings during the D&B process. A commitment to developing a Site Waste Management Plan and Pre-demolition Audit are contained within the table. These reports will help ensure continuity from design through construction. Tenant guidelines will be produced at the appropriate stage and will promote principles of circular economy, waste minimisation and recycling throughout the operation of the proposed development.

3.3 Reporting Forms

The following Reporting Forms are being submitted as part of the Circular Economy Statement. Outstanding details within these appendices will be updated by the contractor (once appointed) for updating during the pre-construction/construction period.

3.3.1 Bill of Materials

A Bill of Materials is contained within Appendix C. This Bill of Materials demonstrates that the team have considered opportunities to conserve resources and have set targets where possible at this stage for the minimum amount of recycled content to be used within different elements.

3.3.2 Recycling and Waste Metrics

The Recycling and Waste Metrics reporting are listed in Section 5 below. At RIBA Stage 5, these will be updated and placed into Appendix D by the principal contractor. This Appendix D will be used to estimate the total amount of waste / material to be generated during excavation, demolition, and management methods construction.

This will be updated by the Contractor before, during and again after construction in order to provide actual monitored figures. This

requirement will be incorporated into the Contractor Specification and evidence logs will be kept. Evidence to be provided at the appropriate stage will include:

- Cut and fill calculations;
- Reused or recycled content calculations, including supporting details such as Environmental Product Declarations, specification documents, etc.; and
- Relevant extracts from the Site Waste / Resource Management Plan / Operational Management Plan.

As required by the London Plan, before sending waste to landfill, applicants must provide written confirmation the receiving landfill has the capacity to deal with waste over the lifetime of the development. This should be supported by the calculations / estimates of waste arising. The figures sent to landfill must align with the Waste Metrics form (Appendix D).

4. Circular Economy Narrative

4.1 Circular Economy Narrative

As per the Guidance requirements, this section provides a more detailed description of how the targets and commitments presented in aforementioned tables and reporting forms will be achieved. The structure follows that suggested by the Guidance and provides a response to each of the principles.

For each principle, the narrative includes a short summary of the proposed approach, along with metric(s) and target(s) itemised. Commitments and measures that will be adopted are also listed along with key information about how each measure will be implemented and at what stage. Anticipated challenges and counter-actions is also included where relevant.

Principle	Develop commitments to...
1. Conserve resources, increase efficiency and source sustainably	1.1 Minimise the quantities of materials used
	1.2. Minimise the quantities of other resources used
	1.3. Specify and source materials and other resources responsibly and sustainably
2. Design to eliminate waste (and for ease of maintenance)	2.1. Design for longevity, adaptability or flexibility and reusability or recoverability
	2.2. Design out construction, demolition, excavation and municipal waste arising
3. Manage waste sustainably and at the highest value	3.1. Manage demolition waste
	3.2. Manage excavation waste
	3.3. Manage construction waste
	3.4. Manage municipal waste

Figure 3: Principles and Commitments from GLA CE Guidance 2020

Principle 1: Conserve resources, increase efficiency and source sustainably**Commitment 1.1: Minimise the quantities of materials used**

Responsibility	Primary: Client Secondary: Architect, Structural Engineer
Timeframes	Commenced at Stage 2, refined at Stage 3 & 4
Proposed Approach	The development aims to retain as much as the existing site fabric as possible to minimise use of new materials. In addition, the Client, Architect and Engineer will aim to ensure efficient materials procurement and reduced waste management costs by designing for standard product dimensions. Furthermore, they will aim to specify robust materials for elements that historically required regular replacement. Off-site prefabrication and design for modularisation will be promoted and maximised where possible to minimise the potential for on-site construction waste and consideration will be given to use prefabricated solutions to minimise waste during the construction phase. The standardisation or modularisation of key components such as windows, lighting and cladding will simplify maintenance, part repair and replacement for the operations, asset management and maintenance team. Furthermore, the standardised or modular elements may be able to be demounted or dis-assembled, relocated and refurbished thereby extending the lifespan of these building elements and reducing the demand for new raw materials. This includes the cladding elements which will be demountable.
Metrics	Cost / Number of high cost elements agreed
Targets	Specification of cladding that is fully recyclable.
Commitments & Measures	Twin Therm cladding has been specified within the external walls and roof elements of the buildings. Twin Therm is covered by an independently assessed EPD, and consists of glass wool insulation between inner and outer steel sheets. All materials within the system are fully recyclable which lowers their carbon footprint associated with end of life.
Implementation	Designers have considered standardisation and modularity in design and will identify 'specials' on design drawings. Procurement models for standardised components should be reviewed with the main contractor. Transportation and construction details of modular components should be reviewed by the contractor and supply chain as early as possible to determine if low carbon solutions are available.

Challenges / Counter-actions	Some modular elements may have higher embodied carbon than regular construction due to transportation and lifting dictating the limiting structural state of the unit. / Solutions to reduce the embodied carbon, such as localised reinforcement for lifting, can be realised through early engagement with the supply chain. Production capacity for modular / standardised components within the UK supply chain can fluctuate. / Early commitment to a fabricator is encouraged to secure the fabrication slot and maintain programme.
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Principle 1: Conserve resources, increase efficiency and source sustainably**Commitment 1.2. Minimise the quantities of other resources used**

Responsibility	Primary: Client Secondary: Architect, MEP and Structural Engineers
Timeframes	Commenced at Stage 2, refined at Stage 3 & 4, monitored and reported on regularly as part of DTMs / regular construction meetings
Proposed Approach	In accordance with their corporate sustainability strategy, Prologis aims to mitigate the potential impact of the development by addressing key sustainability issues and incorporate a range of procedures to maximise resource efficiency and minimise waste during all stages of the development. In the UK Prologis is pioneering an approach to the design, construction and operation of more sustainable new commercial buildings that is innovative and allows Prologis to mitigate and adapt to climate change. In order to do this, Prologis will assess the environmental impact associated with all the phases of the new buildings' life cycle, from the manufacture of the building materials through to the operation of the building and how it will be demolished and replaced, focusing on a range of sustainability metrics. In addition, Prologis will target a BREEAM Very Good rating for the proposed buildings to deliver sustainable buildings which provide long term benefits to occupiers. Waste, recycling, and material credits have been targeted in order to help promote the circular economy. Furthermore, Prologis aims to reduce and mitigate the embodied carbon of development through partnership with the offset charity, Cool Earth.
Metrics	t/co2 (embodied carbon) Water – l/p/d Energy - % improvement over Part L Building Regulations
Targets	Carbon: - Up to 10% in Embodied Carbon reduction – in line with the current results from the WLC Assessment (this target will be refined as the D&B project progresses); - 10% Cement Alternative - 20% Recycled Steel Frame

	Water: - Achieving mains water consumption of 105 litres or less per head per day Energy: - A minimum on-site reduction of at least 35% beyond Building Regulations Part L 2013 - Non-residential development should achieve 15% through energy efficiency measures.
Commitments & Measures	The project will endeavour to meet the following commitments and measures: BREEAM: 1. The Project is committed to achieving a BREEAM very good rating and a Pre Assessment will be developed. Embodied Carbon – in line with Policy SI 2 Minimising greenhouse gas emissions, the project aims to ensure: 2. A Whole Life Cycle Carbon Assessment has been produced and that the project can demonstrate actions taken to reduce life-cycle carbon emissions. Water Resources - in line with London Plan Policy SI 5 Water infrastructure, the project aims to: 3. minimise the use of mains water in line with the Optional Requirement of the Building Regulations (residential development), achieving mains water consumption of 105 litres or less per head per day (excluding allowance of up to five litres for external water consumption) 4. achieve at least the BREEAM excellent standard for the 'Wat 01' water category or equivalent (commercial development) 5. Incorporate measures such as smart metering, water saving and recycling measures, including retrofitting, to help to achieve lower water consumption rates and to maximise future-proofing. Energy Strategy: 6. An energy strategy has been produced to meet the requirements of the London Plan. 7. A minimum on-site reduction of at least 35% beyond Building Regulations is required for major development. 8. Non-residential development should achieve 15% through energy efficiency measures. 9. Where it is clearly demonstrated that the zero-carbon target cannot be fully achieved on-site, any shortfall should be provided, in agreement with the borough, either: 1) through a cash in lieu contribution to the borough's carbon offset fund, or 2) off-site provided that an alternative proposal is identified and delivery is certain Supply Chain:

	10. To reduce packaging waste on site and promote closed-loop recycling of key construction products, through pro-active engagement with the supply chain.
Implementation	A WLC Assessment and Sustainability & Energy Strategy have been completed and submitted as part of the Planning Application. The team have discussed feasibility to integrate products with known closed-loop recycling properties (Glass; Plastic; Aluminium) into the standardisation strategy and discuss potential logistics with 3 or 4 key supply chain partners. The Therma-quilt Insulation used within the building envelope systems is manufactured from c.80% recycled glass. For instance, Twin Therm cladding has been specified within the external walls and roof elements of the buildings. Twin Therm is covered by an independently assessed EPD, and consists of glass wool insulation between inner and outer steel sheets. All materials within the system are fully recyclable which lowers their carbon footprint associated with end of life. Also, the project Stage 2 WLC Assessment has demonstrated that the embodied carbon reductions with the incorporation of 20% recycled content within steel frame elements. Contractors are required to explore reusable packaging solutions with key product manufacturers at the earliest opportunity and for instance, the chosen cladding company have a strong record on sustainability and are currently examining how to minimise single use plastics in packaging of finished goods. Requirement to be incorporated into specifications.

Challenges / Counter-actions	Solutions with key supply chain partners can lead to a significant reduction of site waste management and disposal costs. However, the supply chain is only likely to invest in reusable packaging solutions for large product orders. / Scale may be helped through the implementation of a standardisation strategy including off-site/modular components. Suppliers need time to respond to requests for re-usable packaging and develop suitable solutions. / Discussions should start during the earliest phase. Requirements to be written into specifications.
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Principle 1: Conserve resources, increase efficiency and source sustainably**Commitment 1.3. Specify and source materials and other resources responsibly and sustainably**

Responsibility	Primary: Architect, Structural Engineer Secondary: Main Contractor.
Timeframes	Commenced at Stage 2, refined at Stage 3 & 4, monitored and reported on regularly as part of DTMs / monthly construction meetings
Proposed Approach	For the new construction elements Prologis is committed to designing out waste, recognising that the planning and design stage of development plays an important role in reducing waste and associated environmental impact of the materials in accordance with the waste and circular economy hierarchies. BIM has been used by the project team in part because of its benefits in reducing waste by co-ordinating all elements in a 3D environment. Prologis has invested heavily in a construction specification that maximises energy and resource efficiency. All of the main construction materials required achieve an A rating in the Building Research Establishment's (BRE) Green Guide to Specification. An A rated material has a proven low environmental impact. The building envelope system specified for the base building achieves an A+ rating within the BRE BREEAM Green Guide to Specification. The system is supplied with Therma-quilt as standard. Therma-quilt is a glass mineral wool insulation which achieves a reaction to fire classification; Euroclass A1 (no contribution to fire) when tested to BS EN 13501-1: 2007. Therma-quilt is made from natural materials and a minimum of 80% re-cycled glass, it is free from CFC's & HCFC's and recognised as having a zero Ozone Depletion Potential (ODP) & zero Global Warming Potential (GWP) in both its manufacture and its content. Prologis seeks to specify the use of recycled materials wherever viable including steel content and aggregates. In addition, a Whole Life Carbon Assessment was developed. One of the objectives of this LCA was to reduce the amount of embodied carbon within materials
Metrics	TBD on specific target: recycled content by total material mass or cost
Targets	At the CE / Designing out Waste Workshop, the following targets have been reviewed and cross checked against BREEAM requirements and other Corporate policy / Prologis Specification. Where possible the following will be targeted. This will be confirmed by the D&B contractor at the appropriate stage. - Recycled piling mat / sub base: Approximately 15,000m³ material from the demolition and excavation will be re-used on site to form the piling mat. This material will be kept in-situ and form part of the sub base.

	- Concrete (up to 10% cement alternative) - 20% Recycled Steel Frame - Blockwork and concrete paving (up to 50% recycled content) - Asphalt roads (up to 40% recycled content) - All timber will be sourced from sustainable sources; - Recycled materials with low embodied carbon will be preferred; - Materials suppliers that have an established Environmental Management System. - 'A' rating BRE Green Guide to Specification.
Commitments & Measures	1. Design team participated in CE / Designing out Waste Workshop; the D&B contractor will aim to include CE as an agenda item in regular project meetings. 2. Include specific reference to minimum recycled content in key specifications. 3. Include requirements in contractor contracts
Implementation	Refine and confirm targets during regular meetings throughout the D&B contract as appropriate. Implement monitoring and reporting procedures to ensure opportunities are realised by contractors and their supply chain partners.
Challenges / Counter-actions	Possible issue with recycled content not explicitly communicated to sub-contractors. / Requirements to be incorporated into specifications for subcontractors. Lead in times / availability. / Increased recycled content is often available in mainstream products by large suppliers and does not incur a cost premium, but it does require project team awareness to ensure the correct products are selected. The design team & contractor may not be aware of products with increased recycled content, nor be familiar with including requirements in specifications. / Additional sustainability workshops may be needed to engage the design team.

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

Commitment 2.1. Design for longevity, adaptability or flexibility and reusability or recoverability

Responsibility	Primary: Client Secondary: Architect and Structural Engineer
Timeframes	Commenced at Stage 2, refined at Stage 3 & 4, monitored and reported on regularly as part of DTMs / regular construction meetings within D&B contract
Proposed Approach	In order to ensure that circular economy principles are embedded within the design process, the team considered the lifetime and use of the building at Stage 2. This will continue to be refined as the design progresses. In relation to longevity, the development must meet long term needs while being durable and resilient. It should be able to cope with change from examples such as climate change or different ways of living. The base building design concept includes provision of flexibility in the layout in order to permit the development to cater for different building configurations. The specification also includes Tata Steel's Confidex Sustain Guarantee which enables the project to deliver a Carbon Neutral Building Envelope system. This Building Envelope System is covered by independently assessed Environmental Product Declarations (EPD's), calculated in accordance with EN 15804 and provide a full Life Cycle Analysis (LCA) on a Cradle-to-Cradle basis, assessing the environmental impact of the complete cladding system during; - Raw material supply & steel manufacturing - Cladding system manufacture & installation - Building use, maintenance & repair - End-of-life - Reuse, recycling & recovery. In relation to the entire cladding system, the external weather sheets of the roof & wall cladding systems (manufactured from Colorcoat HPS200 Ultra® & Prisma®) are supplied with the Confidex® guarantee from Tata Steel, which covers corrosion of the factory cut edges for a period of up to 40 years as standard.
Metrics	Various – see targets

Targets	- BREEAM Mat 01 – where appropriate targeting construction materials with a low environmental impact (including embodied carbon) over the full life cycle of the building - BREEAM 05 credit ‘Designing for Durability and Resilience’ will be targeted for the development within the Pre-assessment (BREEAM UK New Construction 2018 Version 3.0 - under which the ‘Industrial’ sub-scheme). - Achieve durability standards (such as BS 7543:2015) All materials will also be sourced in accordance with a sustainable procurement strategy which includes the following measures: - all timber will be sourced from sustainable sources; - recycled materials with low embodied carbon will be preferred; and, - Materials suppliers that have an established Environmental Management System. - ‘A’ rating BRE Green Guide to Specification
Commitments & Measures	For the base building, Prologis is committed to designing out waste, recognising that the planning and design stage of development plays an important role in reducing waste and associated environmental impact of the materials in accordance with the waste and circular economy hierarchies. Prologis has invested heavily in a construction specification that maximises energy and resource efficiency. All of the main construction materials required achieve an A rating in the Building Research Establishment’s (BRE) Green Guide to Specification. An A rated material has a proven low environmental impact. Prologis seeks to specify the use of recycled materials wherever viable including steel content and aggregates. The incoming future occupier will also aim to promote the above targets where viable. In addition, a Whole Life Carbon Assessment was developed to assist in identification of appropriate material substitutes, this will be updated at Practical Completion.
Implementation	Adaptability and flexibility is a key component of the design brief for the team. The design has and as it evolves will continue to take into account the needs of the present with consideration of how those needs might change in the future. For example, ensuring flexibility within the design to allow for potential different layouts depending on occupier requirements.
Challenges / Counter-actions	During the D&B process, designers and contractor may need to re-examine certain elements or material to reduce waste and incorporate circular economy principles. For example, consider cutting patterns for elements such as plasterboard when locating windows and doors. / Contractor to ensure CE is on the agenda on regular project meetings.

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

Commitment 2.2. Design out construction, demolition, excavation and municipal waste arising

Responsibility	Primary: Architect, Structural Engineer Secondary: Main Contractor, Waste Contractor
Timeframes	Commenced at Stage 2, refined at Stage 3 & 4, monitored and reported on regularly as part construction meetings
Proposed Approach	In general the existing buildings on the site are no longer fit for purpose and the buildings will not be refurbished or repurposed. Where possible, the building and associated infrastructure will be disassembled with individual components directly used onsite or elsewhere. In relation to the site, the existing slab and block paved car park will be crushed and reused on site as aggregate – approximately 15,000m³ material from the demolition and excavation will be re-used on site to form the pilling mat. This material will be kept in-situ and form part of the sub base. The base build team have worked together to maximise the value and quantity of materials recovered for potential reuse and recycling. This will include encourage efficient use of materials by applying lean design principles, using reclaimed materials, and components, and substituting high replacement cycle materials with more robust materials. For example, EPDs can be provided for the cladding, steel and insulation to demonstrate their recycled content. The architects and engineers have already evaluated the potential for modularisation and product standardisation as well as examining the structural frame solutions for efficiency and future flexibility. The D&B contractor will aim to continue the approach where possible.
Metrics	weight / mass
Targets	Aim for waste quantities equal to achieving one credit in the construction waste resource efficiency benchmarks BREEAM 2018¹: - 11.1 tonnes of waste / 100m² of Gross Internal Floor Area (GIFA) - Divert 95% of waste from landfill

¹ https://www.breeam.com/NC2018/content/resources/output/10_pdf/a4_pdf/print/nc_uk_a4_print_mono/nc_uk_a4_print_mono.pdf

	- No biodegradable or recyclable waste sent to landfill by 2026.
Commitments & Measures	The construction of the development will aim to re-use as many suitable materials on site as possible. Where materials cannot be re-used, they will be sent off-site for re-use and refurbishment elsewhere if possible, instead of being taken by waste carriers Recovery of materials and products on-site could include: - concrete: crushed and recycled to be used as sub-base below hard landscaping - Tarmac: Tarmac is melted and re-used as asphalt on site. Recovery of materials and products off-site could include: - Flooring: carpet tiles can be re-furnished and re-used, providing low-cost flooring to households and charities. Examples of used carpet suppliers include 'Carpet Tile Wholesale' and 'Envirocycle London'. - Furniture: Electrical items such as white goods, in good condition can be donated to charities or sold on sites such as 'Globechain' (a broker service for unwanted resources). - Furniture: As per electrical items, unwanted furniture can be donated to local charities or community uses. Demolition contractor should endeavour to salvage natural stone, bricks, and good quality items of furniture, timber and top soil. Plasterboard, carpets, vinyl flooring, concrete, asphalt and mixed masonry should all be carefully segregated to maximise recycling potential. Salvaged materials can be donated to local businesses, construction colleges and community groups where appropriate.
Implementation	The D&B contractor will include waste, recycling and CE topics to meetings in order to ensure: - the contract is responding to the existing site topography to minimise cut and fill; - Review the existing site to identify potential materials that may be salvaged and incorporated into the design; and - Evaluate structural frame solutions for efficiency and future flexibility A pre demolition audit will be carried out to identify potential materials for salvage or on-site recycling and use. The contractor will where possible, identify potential sites for safe storage and on-site reprocessing.
Challenges / Counter-actions	Identification, specification and reuse of salvaged materials.

-
- Deconstructing buildings rather than demolishing requires more time, space (for an increased number of segregated skips) and commitment from the demolition contractor, possibly increasing the cost of demolition (although subsequent savings may be realised in construction phases).
 - Safe storage space for salvaged materials, particularly where materials are intended for use in future construction phases.
-

Principle 3. Manage waste sustainably and at the highest value

Commitment 3.1. Manage demolition waste

Responsibility	Primary: Architect, Structural Engineer Secondary: Main Contractor, Waste Contractor
Timeframes	Commenced at Stage 4, metrics and progress monitored and reported on regularly as part of regular construction meetings
Proposed Approach	The scheme proposes to maximise the value and quantity of materials recovered for potential reuse and recycling during demolition.
Metrics	weight / mass
Targets	Divert 95% of waste from landfill (London Plan requirement) No biodegradable or recyclable waste sent to landfill by 2026.
Commitments & Measures	Resources will be required to brief contractors and monitor demolition works. - Quantity of materials recovered may differ significantly from pre-demolition estimates. - On-site reprocessing of concrete and other inert materials requires a crushing license and technical expertise. - On-site reprocessing may create a dust nuisance if not carefully managed. - Regular reports from demolition contractors stating progress against the suggested targets
Implementation	Demolition contractor to undertake a pre-demolition audit to accurately quantify waste streams and prepare a deconstruction statement which details how the buildings will be deconstructed to maximise the value of waste material resources. The deconstruction statement should detail the onward reuse, recycling or disposal routes for all waste streams, with the associated tonnage. These documents will form part of the SWMP to be developed by the main contractor.
Challenges / Counter-actions	Safe storage space for salvaged materials, particularly where materials are intended for use in future construction phases. / Additional resources and space on site may be required for storage of salvaged materials.

Quantity of materials recovered may differ significantly from pre-demolition estimates. / Updates to SWMP to monitor totals.

On-site reprocessing may create a dust nuisance if not carefully managed. / Site manager to ensure careful management and mitigate any issues.

Principle 3. Manage waste sustainably and at the highest value

Commitment 3.2. Manage excavation waste

Responsibility	Primary: Main Contractor & Waste Contractor Secondary: Site Manager
Timeframes	From Stage 4, metrics and progress monitored and reported on regularly as part of regular construction meetings
Proposed Approach	The proposed development will encourage on-site reuse and recycling of excavation waste where possible. Excavated materials will also follow the waste hierarchy. Only if excavated material is not required or is unsuitable / considered hazardous for the construction of the Proposed Scheme would it be considered waste
Metrics	Weight (t)
Targets	95% of waste will be diverted from landfill (as per London Plan requirements)
Commitments & Measures	Forecast volumes for excavated material will be calculated and refined as part of the D&B contract. An integrated approach will be promoted to aim to use excavated material to satisfy the fill material requirements wherever reasonably practicable. This includes reuse of all topsoil / subsoil as practicable. The reuse of excavated material within the proposed development would be managed in accordance with the Definition of Waste: Code of Practice Page 6 published by CL:AIRE.² This involves the preparation of a Materials Management Plan that would set out how the suitable excavated material is to be used as a resource within the construction of the Proposed Scheme. This will need to be written into contractor specifications. The Contractor should ensure that contaminated material (if present and requiring removal from the site) would be collected by suitable waste carriers and sent for disposal at appropriately licensed hazardous waste facilities. For the excavated material which could not be beneficially reused for the earthworks of the proposed development, the waste contractor would seek timely opportunities for such material to be used in other local construction projects or the restoration of mineral sites, provided that the transportation of that material does not result in significant environmental effects.

² <https://www.claire.co.uk/projects-and-initiatives/dow-cop>

Implementation	- Incorporate excavation requirements into contractor specification to help assign ownership of waste within the supply chain and minimise excavation waste. - Establish excavation requirements within the SWMP which excavation waste totals will need to be updated by the contractor at regular intervals. - Ensure the site induction to staff and sub-contractors includes awareness of good waste management and the specific measures used at the site. - Use regular tool box talks to make sure that everyone who comes to site knows how to reduce, re-use and recycle at the site. - Implement good housekeeping throughout the site to promote good waste segregation and re-use opportunities.
Challenges / Counter-actions	Safe storage space for excavated materials required. / Site manager to dedicate space as needed or ensure logistics allow for swift removal as necessary. Additional resources and space required to brief contractors and monitor demolition works. Quantity of materials recovered may differ significantly from pre-excavation estimates. / Updates to SWMP to monitor totals excavated.

Principle 3. Manage waste sustainably and at the highest value

Commitment 3.3. Manage construction waste

Responsibility	Primary: Main Contractor Secondary: Project Managers
Timeframes	Commenced at Stage 4, metrics and progress monitored and reported on regularly as part of regular construction meetings
Proposed Approach	The proposed approach to management of construction waste is to follow the waste and circular economy hierarchies. The proposed development will aim to minimise the total amount of construction waste produced on-site through best practice material handling procedures. The contractor will be tasked with maximising site segregation of construction waste to enable local reuse of waste materials and increase the quality of recyclable materials. The onsite team will also need to work together to improve the transparency of the waste management supply chain. For this to occur, appropriate materials storage and handling onsite will help to reduce the amount of waste produced at source. Careful segregation of waste generation target in tonnes waste per 100m2 of GIFA materials will occur which enables higher quality recycled materials and encourages local reprocessing. This will help to improve the transparency of waste processing and confidence in the end use of waste materials.
Metrics	waste / 100m2 of GIFA
Targets	- 95% waste diverted from landfill - 11.1 tonnes of waste / 100m2 GIFA (aim for waste quantities equal to achieving one credit in the construction waste resource efficiency benchmarks BREEAM 2018³).
Commitments & Measures	Training staff in waste reduction techniques and proper segregation in order to ensure a cultural shift in attitudes towards waste. Multiple skips for segregated streams will be provided. A dedicated area for reusable material may also be provided (this is likely to have a greater initial outlay and will require more space on site).

³ https://www.breeam.com/NC2018/content/resources/output/10_pdf/a4_pdf/print/nc_uk_a4_print_mono/nc_uk_a4_print_mono.pdf

	A dedicated waste manager will be appointed if appropriate in order to manage the waste compound and ensure appropriate segregation of waste.
Implementation	The project managers will identify potential space for storage of reusable materials and allocate appropriate space to allow extensive segregation of waste materials. The main contractor will carry out a Pre-demolition Audit and develop a comprehensive Site Waste Management Plan (SWMP), prior to starting on site. The SWMP must detail actions and initiatives to reduce construction waste and ensure the legal disposal of waste. The SWMP should include: – How quality management procedures will be used to accurately order materials and minimise rework; – Identification of key supply chain partners that could be approached to develop re-usable packaging solutions and supplier takeback and recycle schemes; – How key sub-contracts will be managed to incentivise waste reduction and segregation; – Detail how site waste will be managed to maximise segregation at site; – Identify how reusable materials will be stored and distributed; – Detail off-site waste recycling, disposal routes and how legal waste disposal will be verified; – Detail frequency of waste-related site team meetings, toolbox talks and progress reviews; – Set project waste targets and KPIs; and – State the method of reporting and monitoring, including responsibilities and frequency of reporting. – These requirements will be included in main contractor contracts.
Challenges / Counter-actions	Many contractors do not evaluate waste disposal further than the first-tier waste handler, the subsequent journey and final disposal or recycling site of waste is often unknown. A majority of plastic waste is shipped overseas, where it may not be recycled, even though it was segregated for recycling at the material handling facility and would have been recorded as diverted from landfill. / Research required into local waste handling facilities and their onward disposal routes to understand opportunities for legal, transparent waste disposal.

Principle 3. Manage waste sustainably and at the highest value

Commitment 3.4. Manage municipal waste

Responsibility	Primary: Client and Architect Secondary: Property Manager / Future Tenant
Timeframes	Design elements commenced at Stage 2. Ongoing waste requirements commence at Stage 7, tenant guidelines to be produced and will establish timeframes.
Proposed Approach	As part of the base build, Prologis have provided appropriate waste management facilities in accordance with the Waste Hierarchy to enable segregation and recycling. Waste storage provision will meet the requirements set out within local planning policy. It is assumed at this stage that collection of non-domestic waste will be undertaken via external waste management contractors. It will be the responsibility of the future occupiers / tenants to arrange for refuse and recycling to be collected from their premises, the type of collection will be dependent on the nature of the businesses. Waste collection frequency will be dependent upon the volume of waste generated, the storage method (i.e. whether balers and waste compactors are used) and the schedule of the appointed waste contractor.
Metrics	Weight (t)
Targets	Meet or exceed the municipal waste recycling target of 65% by 2030 No biodegradable or recyclable waste sent to landfill by 2026.
Commitments & Measures	Appropriate recycling and waste facilities are provided within the base building to facilitate and maximise recycling opportunities. The council will collect dry mixed recycling and general waste. While the council does not a separate collection for business food waste, garden waste or textiles, the tenant can liaise with the Harefield Civic Amenity Site to understand if this type of waste can be recycled. Dry mixed recycling is sorted, separated and baled at a materials recovery facility. They are then sent to a range of re-processors. The general waste that is collected is processed at an energy from waste facility. In line with regulations and for the purposes of health and safety and hygiene best practice, some wastes will be handled separately from others.
Implementation	The D&B contractor will need to ensure that the design includes the appropriate spaces required for management of waste and recycling.

Challenges / Counter-actions	Levels of recycling may be compromised by cross contamination. / Office manager to provide information on recycling and waste requirements within the space and provide training as necessary.
Timeframes	Stage 4 / 5 – finalise occupier waste management principles

4.2 End of Life Strategy

In order to promote use of materials and elements at the end the buildings' life, the team examined specification of materials and elements to assist the development of an appropriate End of Life Strategy. This included discussing the following at the CE Workshop:

- examine labels such as Cradle to Cradle (C2C) and Natureplus;
- Select products that can be remanufactured or reused at end of first life;
- Use materials with recycled content;
- Select products that are designed for disassembly;
- Select materials that can be reused at end of first life;
- Select materials that can be recycled or composted at end of life;
- Consider leasing short-lived components;
- The team investigated if project information can be made available via Building Information Modelling BIM can be applied to understand future life;
- Investigated if materials have the option to be taken apart through mechanical and reversible fixings to allow for future reuse;

- Avoid permanent fixing of products, such as by glue and cement mortar, to enable end of life deconstruction and salvage of building elements; and
- Ensure fixings are easy to access to enable disassembly.

As the Circular Economy / Designing out Waste Workshop, the client and the team discussed these end of life strategy for the materials, elements and building. The following will be brought forward:

- A full Life Cycle Analysis (LCA) on a Cradle-to-Cradle basis has assessed the environmental impact of the complete cladding system during;
 - Raw material supply & steel manufacturing
 - Cladding system manufacture & installation
 - Building use, maintenance & repair
 - End-of-life
 - Reuse, recycling & recovery
- The base building includes a specification for a building envelope system that can be delivered as carbon neutral (through offsets).
- It achieves an A+ rating within the BRE BREEAM Green Guide to Specification.
- The cladding system can be demounted at the end of the building life.

When the asset is approaching obsolescence, Prologis will aim the feasibility of options to extend end of life. If extending is not feasible, Prologis may be in a position to consider replacement scenarios where appropriate.

The D&B contractor can update the End of Life Strategy to confirm what elements will be taken forward during the progression of the design and construction.

5.3 Outcomes & Post Completion Report

The D&B Contractor will be required to produce a Post Completion Report setting out the predicted and actual performance against all agreed numerical targets.

Updated versions of the reporting tables, the Recycling and Waste Metrics form and Bill of Materials will be provided as part of this.

Changes will be indicated and explained and evidence and supporting documentation as appropriate will be provided. Such evidence may include the Pre Demolition Audit and the Site Waste Management Plan, written agreements or correspondence and performance and test certificates

5.4 Lessons Learned

In order to inform and improve the Circular Economy Statement process, lessons learned will be captured regularly.

Lessons from the base build include:

1. It is important to engage the client and project team in CE principles early. RIBA stage 1 / 2 workshops are useful for this.

2. The structural team have a large role to play alongside the architects in helping to drive forward the principles of the CE. They should be involved as early as possible in the process.

3. There is a lot of cross over with the WLC Assessment requirements within the London Plan. On this project, the WLC Assessor attended the CE Workshop and liaised with the CE consultant on a number of issues to help improve the circularity of the scheme.

During the next Stage, the D&B team will design team will aim to capture any pertinent lessons relevant to their individual disciplines. During construction the main contractor will aim to assign an individual as responsible for capturing lessons and ensure that these are fully understood and communicated to the wider team.

These lessons will be then summarised in the Post Completion Report.

5. Conclusions

Prologis has a proactive approach to sustainable development and takes a holistic view to delivering a building that embraces the principles of the circular economy.

This Detailed Circular Economy Statement has been prepared to demonstrate how the proposed development at Iron Bridge Road, Hillingdon will deliver the principles of circularity in accordance with the GLA's Circular Economy Pre-consultation Guidance and Policy SI 7 of the newly adopted London Plan.

Prologis has a proactive approach to sustainability with a range of corporate goals to reduce the amount of materials required, increase recycling and limit the amount of waste sent to landfill.

This circular approach to development includes assessment of design and materials at key stages of the development in order to promote a flexible and adaptable design that also promotes longevity. This approach which also

includes developing a WLC Assessment in order to reducing emissions associated with construction materials. Where appropriate, details will be updated by the contractor (once appointed) during the pre-construction/construction period (including the necessary appendices).

In this context, the key circular economy commitments currently incorporated into the proposed development include the following.

- Prologis has invested heavily in a construction specification that maximises energy and resource efficiency. The future occupier also has strong sustainable specification elements which aims where appropriate to specify materials with low environmental impact.
- A sustainable building envelope system has been specified for the building.
- Many of the main construction materials required achieve an A rating in the Building Research Establishment's (BRE) Green Guide to Specification as an A rated

material has a proven low environmental impact.

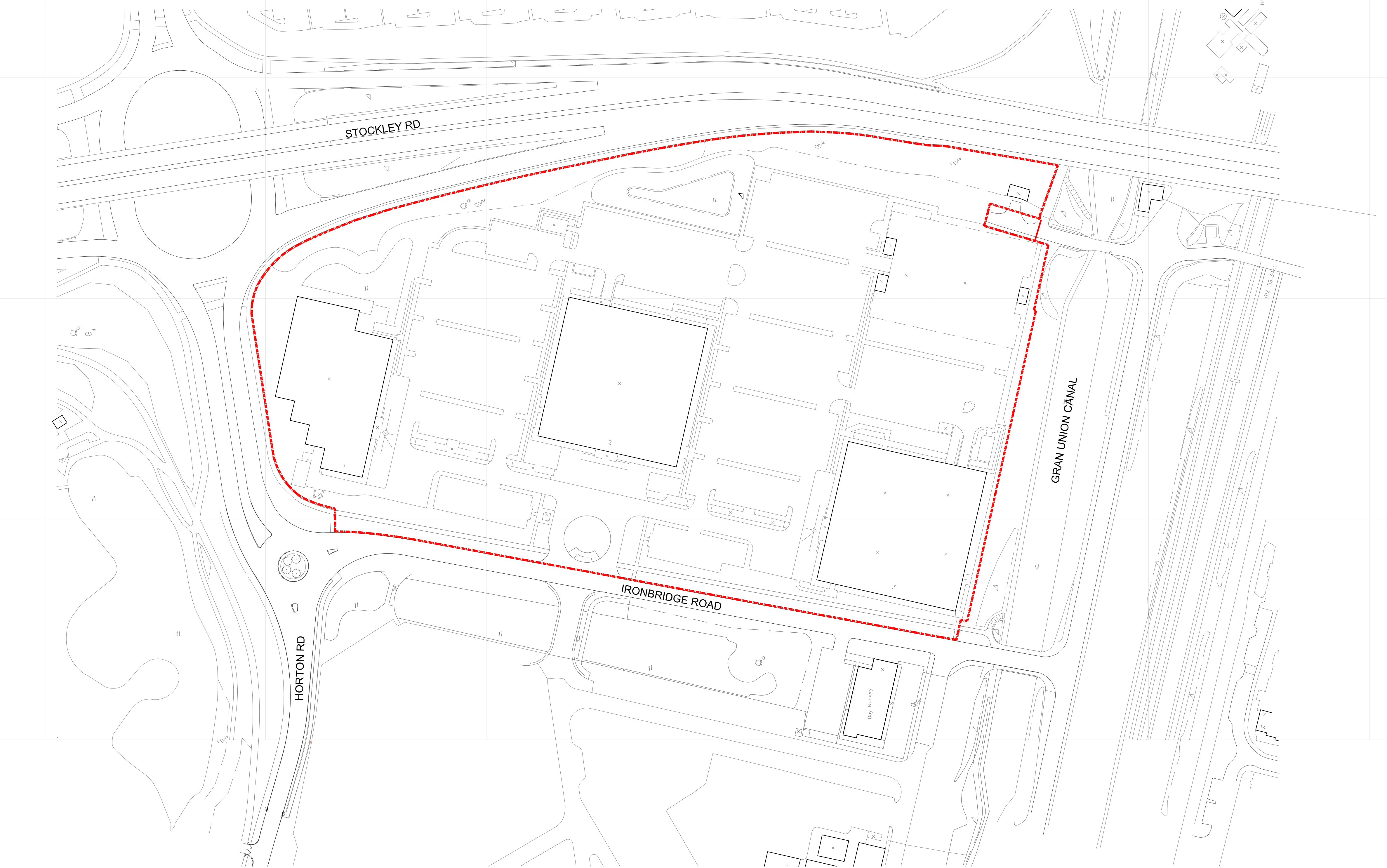
- Prologis seeks to specify the use of recycled materials wherever viable including steel content and aggregates;
 - 10% cement alternative within concrete;
 - 20% recycled steel frame.
- Targets and commitments will be refined on an ongoing basis as this is a D&B Contract. During State 4 and 5, the primary contractor will include the Circular Economy targets as agenda item within regular meetings.
- Reduction in embodied carbon – of approximately 3,052 tonnes / 10%
- 95% Diversion from Landfill and use of Use of recycled material on-site – including 15,000m³ material from the demolition and excavation will be re-used on site to form the pilling mat.

- A commitment to deliver a circular building that achieves the BREEAM 2018 Very Good environmental assessment rating.

- Mitigation of emissions through a contribution to the Cool Earth scheme to protect 510 acres of endangered rainforest,

averting emissions equivalent to 5 times of the embodied carbon of the development

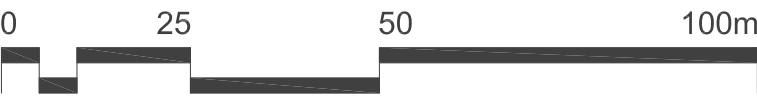
Appendix A – Proposed Site Plan



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SITE LOCATION PLAN

1:1000



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REV	DATE	NOTE	DRAW	CHK



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TITLE
IRONBRIDGE ROAD, HAYES
DRAWING
LOCATION PLAN

CLIENT
PROLOGIS UK LTD

DATE JUNE 2020	SCALE 1:1000@A1	DRAWN PF
STATUS PLANNING		CHECKED MS/GZ/SD

DRAWING NUMBER
30928-PL-200

Appendix B Circular Economy Key Commitments

Last Mile Logistics Centre - Detailed CES													
	Site	Substructure	Super-structure	Shell/Skin	Services	Space	Stuff	Construction Stuff	Summary	Challenges	Counter-Actions + Who + When	Plan to prove and quantify	
SECTION A: CONSERVE RESOURCES													
Minimising the quantities of materials used	The development aims to retain as much as the existing building fabric as possible to minimise waste generated from the site clearance and construction. The reuse of such a large building element will provide significant cost savings, reductions in waste produced and disposed to landfill, and carbon reductions	As part of the WLC Assessment, the substructure was modelled. The scope included modelling the foundations, lowest floor and basement. An options appraisal of substructure will be undertaken at the appropriate stage.	As part of an iterative design process, Prologis and the project team have taken steps to reduce embodied carbon, and will consider further measures as the design progresses.	Prologis have specified Twin Therm systems for the external walls and roofs of both units. The system consists of glass wool insulation between inner and outer steel sheets. All materials within the system are fully recyclable which lowers their carbon footprint associated with end of life.	An options appraisal of building services will not be undertaken due to the limited building service options associated with an untreated warehouse.	An options appraisal of hard landscaping will be undertaken at the appropriate stage (<i>BREEAM @ Concept / RIBA Stage 2</i>).	As part of the technical design, the team have examined the possibilities for reducing material demands and enable building materials, components and products to be disassembled and reused at the end of their useful life.						
Minimising the quantities of other resources used (energy, water, land)	Comply with all relevant legislation, codes of practice and standards and shall adopt best practice policies for the control of air, water and noise pollution.	Use of cement alternatives such as Ground Granulated Blast Furnace Slag (GGBS) and fly ash; Reuse of material from demolition and excavation;	Specification of products with recycled content or low environmental impacts			The emissions associated with construction will be fully mitigated through the Cool Earth scheme	Specification of products with recycled content or low environmental impacts	Register with Considerate Contractors Scheme (CCS) Exploring options to procure materials locally to reduce distance of materials transported to site; Exploring options to reduce emissions associated with site operation such as avoiding the use of diesel generators and implementing energy saving measures within site cabins.					
Specifying and sourcing materials responsibly and sustainably		Prologis seeks to specify the use of recycled materials wherever viable including steel content and aggregates. The project has an assumed recycled percentage of 97% in steel rebar, and 10% within cement binders	The use of steel as the major structural material, which is made of 80% recycled product				All of the main construction materials required achieve an A rating in the Building Research Establishment's (BRE) Green Guide to Specification. An A rated material has a proven low environmental impact. All timber used on site shall be responsibly sourced from either certified sources (FSC) or from reclaimed or reused sources.	All timber used on site shall be responsibly sourced from either certified sources (FSC) or from reclaimed or reused sources.					
SECTION B: DESIGN TO ELIMINATE WASTE (AND FOR EASE OF MAINTENANCE)													

[illegible]

Municipal and industrial waste (how the design will support operational waste management)	The incoming occupier will have established waste metrics, recycling and diversion targets in place. The design of the building includes waste and recycling compounds to facilitate recycling and any necessary waste disposal.														
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Appendix C – Bill of Materials

Last Mile Logistics Centre - Detailed CES

APPENDIX C - BILL OF MATERIALS TEMPLATE

Layer	Element	Material quantity (kg)	Material intensity (kg/m ² Gross Internal Area	Recycled content (% by value)	Reused content (% by value)	Estimated reusable materials (kg/m ²)	Estimated recyclable materials (kg/m ²)	Source of information <i>e.g. Building weight calculation Specification documents, Environmental Product Declarations, or other evidence of recycled content</i>
Structure	Warehouse Foundation	TBA. Currently 2 substructure options are being progressed. i) Piled Solution and ii) Ground improvement with pad foundations. Until final solution is identified values are not available.		Min. 20% ambition	OPTIONAL	OPTIONAL	OPTIONAL	
	Parking Structure Foundation	TBA. Currently 2 substructure options are being progressed. i) Piled Solution and ii) Ground improvement with pad foundations. Until final solution is identified values are not available.		Min. 20% ambition				
	Warehouse Ground Floor	TBA. Currently 2 substructure options are being progressed. i) Piled Solution and ii) Ground improvement with Ground Bearing Slab. Until final solution is identified values are not available.		Min. 20% ambition				
	Warehouse suspended Floors (Composite Deck using MD60 deck profile and 150mm thick).	1255689.6	276	Target 35%				Specification Documents
	Parking Structure Suspended Floors (Triple T pre-cast planks)	19078330.5	501	Target 35%				Specification Documents
Shell/Skin	LML Unit Roof Cladding steel (excluding insulation)							
	LML Unit Roof Cladding Insulation							
	LML Unit Wall Cladding steel (excluding insulation)							

	<i>LML Unit Wall Cladding Insulation</i>	kg / sqm	kg/m2	<i>Generally 80% of insulation is recycled</i>				
	<i>Car Park Roof Cladding steel (excluding insulation)</i>	kg / sqm	kg/m2	<i>Generally 80% of insulation is recycled</i>				
	<i>Car Park Unit Roof Cladding Insulation</i>	kg / sqm	kg/m2	<i>Generally 80% of insulation is recycled</i>				
	<i>Car Park Unit Wall Cladding steel (excluding insulation)</i>	kg / sqm	kg/m2	<i>Generally 25-50% of insulation is recycled</i>				
	<i>Car Park Unit Wall Cladding Insulation</i>	kg / sqm	kg/m2	<i>Generally 80% of insulation is recycled</i>				
Space	<i>Metal Stud Walls (possibly British Gypsum)</i>	by contractor at construction stage	not known at this stage	<i>Not known at this stage</i>				
Services								
Space								
Stuff (furniture etc)								
Site								

Appendix D Recycling and Waste Metrics

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Appendix D – Recycling and Waste Reporting Form template

CATEGORY	TOTAL ESTIMATE	OF WHICH...			SOURCE OF INFORMATION
	t/m2 Gross Internal Area (GIA)	% reused or recycled onsite	% reused or recycled offsite	% not reused or recycled max 5%	
				% to landfill	% to other management (e.g. incineration)
Excavation waste (Drainage)	1.685722662	Target 100%	Target 0%		
Demolition waste	2.286719437	Target 100%	Target 0%		
Construction waste					
	t/annum	% reused on or off site	% recycled or composted, on or off site	% not reused or recycled	
				% to landfill	% to other management (e.g. incineration)
Municipal waste				Max. 35% and no recyclable or compostable waste	
Industrial waste				Max. 35% and no recyclable or compostable waste	
(if applicable)					

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Sustainability