Sustainability and Energy Statement

Former GSK Site, Stockley Park, Hillingdon

Prologis UK Ltd

July 2020

Turley
Sustainability

Contents

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1. Introduction

This Sustainability Statement sets out the various measures incorporated into the proposed development at Iron Bridge Road to ensure sustainability performance in accordance with planning policy requirements.

1.1 Introduction

This Sustainability 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 logistics / warehouse space on the site of the former GSK offices.

The planning application description is as follows:

"Redevelopment of the site to provide two industrial units (Use Class B1c/B2/B8) and ancillary officers together with associated parking, access arrangements, landscaping and infrastructure."

1.2 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. **Figure 1** overleaf shows the proposed site plan for the proposed development.

1.3 Document Structure

Chapter 2 of this Statement sets out the planning policy context for the proposals in relation to sustainable development at the national, Greater London Authority (GLA) and London Borough of Hillingdon. **Chapter 3** reports the approach Prologis takes to sustainable development at the corporate level and to which the development proposals also respond. The various sustainability measures that are proposed during construction and operation of the Iron Bridge Road proposals are discussed in **Chapter 4**, and the Whole Life Carbon Study is presented within Chapter 5. A summary of key sustainability performance and how this accords with planning policy is provided in **Chapter 6**.

This Sustainability Statement should be read in conjunction with other documents submitted in support of the planning application, particularly the Planning Statement, and Design & Access Statement.

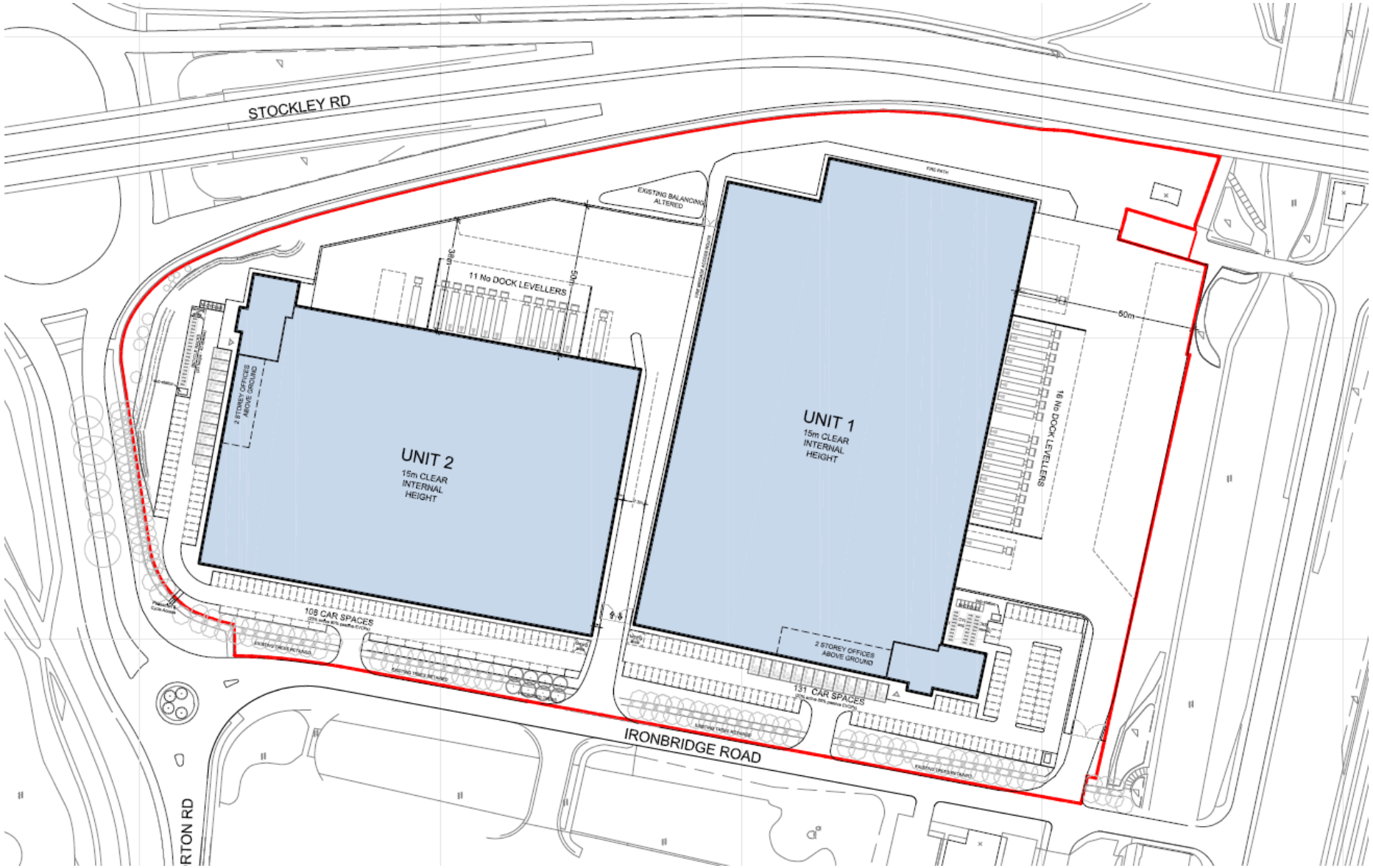


Figure 1: Proposed Site Plan

2. Planning Policy Context

2.1 Introduction

This Chapter summarises the key planning policy context and related guidance for the Proposed Development in relation to sustainability, energy and climate change at the national, GLA and LB Southwark level. For full details, please refer to the Planning Statement that accompanies the application.

2.2 National Policy

Planning policy is set at the national level by the National Planning Policy Framework (NPPF) and associated Planning Practice Guidance (PPG) as summarised below.

2.2.1 National Planning Policy Framework

Most recently updated in February 2019, the National Planning Policy Framework (NPPF) sets out the Government's planning policies for England.

NPPF paragraph 7 states *"the purpose of the planning system is to contribute to the achievement of* ***sustainable development****"*.

The planning system is required to jointly perform three objectives aligned to the 'three pillars' of sustainability (see **Figure 3**) as follows:

An **economic** objective to build a strong and competitive economy by ensuring sufficient land of the right type is available in the right places and at the right time to support growth, innovation and improved productivity; and by identifying and coordinating the provision of infrastructure;

A **social** objective supporting strong, vibrant and healthy communities by providing the supply of housing required to meet the needs of present and future generations; and by creating a high quality built environment with accessible local services that reflect the community's needs and support its health, social and cultural well-being;

An **environmental** objective to protect and enhance our natural, built and historic environment; help to improve biodiversity, use natural resources prudently, minimise waste and pollution, and mitigate and adapt to climate change as we transition to a low carbon economy. This Sustainability Statement focuses on this environmental aspect of sustainable development.

2.2.2 Planning Practice Guidance

Planning Practice Guidance (PPG) underpins policies within the NPPF and provides guidance on their implementation. As such PPG is a material consideration in planning decisions and should generally be followed unless there are clear reasons not to.

2.2.3 National Design Guide (2019)

The National Design Guide published in October 2019 and is based on the national planning policy practice guidance and objective for good design as set out in the NPPF. The Guide introduces ten characteristics of well-designed places which work together to create developments Character and Community, while positively addressing environmental issues affecting climate.

2.2.4 Sustainable Development Strategy

Government published an updated Strategy in 2005 for implementing sustainable development across the UK. This Strategy is an overarching document from which a range of policies and

legislation has subsequently been derived. A key aim of the Strategy is to increase recognition of the threats of climate change and ensure the UK mitigates and adapts to this change.

The Strategy establishes five key principles:

- Living within environmental limits;
- Ensuring a strong, healthy and just society;
- Achieving a sustainable economy;
- Promoting good governance; and
- Using sound science responsibly.

2.3 Greater London Authority

The Greater London Authority (GLA) in in the process of updating the London Plan which provides strategic guidance and policy for development in London.

The current London Plan adopted in 2016 set out a wide range of sustainable design requirements, including the need to reduce carbon emissions, make use of renewable energy and climate resilience requirements.

2.3.1 London Plan (2016)

The London Plan is the statutory spatial development strategy for the Greater London area that is written by the Mayor of London and published by the Greater London Authority (GLA). Key sustainability policies of the current London Plan are summarised below.

Policy 5.2 Minimising CO_2 Emissions - Development should contribute to minimising CO_2 emissions in accordance with the following energy hierarchy ("be lean", "be clean", "and be green"). A minimum 35% on-site CO2 reduction beyond current (2013) Building Regulations Part L standards is required, with any shortfall to be provided off-site or through a cash in lieu contribution to the relevant Borough.

Policy 5.3 Sustainable Design & Construction - Development should demonstrate that sustainable design standards are integral to its construction and operation, and ensure that they are considered from the beginning of the design process.

Policy 5.6 Decentralised Energy - Major development proposals should select energy systems in accordance with the following hierarchy:

1. Connection to existing heating or cooling networks;
2. Site wide CHP network; and
3. Communal heating and cooling;

Where future network opportunities are identified, proposals should be designed to connect to these networks.

Policy 5.7 Renewable Energy - Within the framework of the energy hierarchy (Policy 5.2) and where feasible, major development proposals should provide a reduction in CO_2 emissions through the use of on-site renewable energy generation.

Policy 5.9 Overheating & Cooling - Major development should reduce potential overheating and reliance on air conditioning systems in accordance with the cooling hierarchy. New development should as far as possible be designed to avoid the need for energy intensive air conditioning systems.

Policy 5.10 Urban Greening - Development should integrate green infrastructure to contribute to urban greening, including the public realm. Examples include tree planting, green roofs / walls, and soft landscaping.

Policy 5.11 Green Roofs and Development Site Environments - Development should be designed to include roof, wall and site planting, especially green roofs and walls where feasible.

Policy 5.13 Sustainable Drainage - Development should utilise sustainable drainage systems (SuDS) unless there are practical constraints, and should aim to achieve greenfield run-off rates and ensure surface water run-off is managed as close to its source as possible in line with the GLA's drainage hierarchy.

Policy 5.15 Water Use & Supplies - Development should minimise the use of mains water by incorporating water saving measures and equipment.

2.3.2 Sustainable Design & Construction Supplementary Planning Guidance (2014)

The Sustainable Design and Construction SPG provides guidance on the implementation of London Plan Policy 5.3, together with other policies in London Plan Chapters 5 and 7 that deal with matters relating to environmental sustainability.

2.3.3 The Emerging London Plan

The latest version of the emerging London Plan was published in December 2019 and is considered to carry significant weight. In that context the sustainability policies of the emerging London Plan are summarised below.

The new London Plan is more ambitious than previous London Plans and introduces the concept of 'Good Growth' – growth that is socially and economically inclusive and environmentally sustainable – which underpins the London Plan and ensures it is focused on sustainable development.

Key sustainable development policies are summarised below.

Policy GG2 Making the best use of land - To create successful high-density, mixed-use places that make the best use of land, those involved in planning and development must:

(A) prioritise the development of brownfield land;

(B) proactively explore the potential to intensify the use of land;

(C) understand what is valued about existing places and use this as a catalyst for growth;

(D) protect and enhance London's open spaces, and promote the creation of new green infrastructure and urban greening;

(E) plan for good local walking, cycling and public transport connections; and

(F) maximise opportunities to use infrastructure assets for more than one purpose.

Policy GG3 Creating a healthy city - To improve Londoners' health and reduce health inequalities, those involved in planning and development must:

(A) ensure the wider determinants of health are addressed in an integrated and co-ordinated way;

(B) promote more active and healthy lives;

(C) prioritise health in all planning decisions;

(D) assess the potential impacts of development proposals and development plans on the mental and physical health and wellbeing of communities;

(DA) plan for appropriate health and care infrastructure;

(DB) seek to improve London's air quality;

(E) plan for improved access to and quality of green spaces, and the provision of new green infrastructure, and spaces for play, recreation and sports;

(F) ensure that new buildings are well-insulated and sufficiently ventilated; and

(G) seek to create a healthy food environment.

Policy GG6 Increasing efficiency and resilience - To help London become a more efficient and resilient city, those involved in planning and development must:

(A) seek to improve energy efficiency and support the move towards a low carbon circular economy, contributing towards London becoming a zero carbon city by 2050;

(B) ensure buildings and infrastructure are designed to adapt to a changing climate;

(C) create a safe and secure environment; and

(D) take an integrated and smart approach to the delivery of strategic and local infrastructure.

Policy SI1 Improving air quality - London's air quality should be significantly improved and;

1. development proposals should not:
    a) lead to further deterioration of existing poor air quality
    b) create any new areas that exceed air quality limits;
    c) reduce air quality benefits;

d) create unacceptable risk of high levels of exposure to poor air quality.

2. development proposals should use design solutions to prevent or minimise increased exposure to existing air pollution and make provision to address local problems of air quality.
3. masterplans and development briefs for large-scale development proposals subject to an Environmental Impact Assessment should propose methods of achieving an Air Quality Positive approach through the new development.
4. 3a. major development proposals must be at least air quality neutral and be submitted with an Air Quality Assessment.
5. development proposals must demonstrate how they plan to comply with the Non-Road Mobile Machinery Low Emission Zone; and
6. development proposals should ensure that where emissions need to be reduced, this is done on-site.

Policy SI2 Minimising greenhouse gas emissions – Sets out the GLA's requirements for reducing the carbon emissions of new development.

(A) Major development should be net zero-carbon. This means reducing greenhouse gas emissions in construction and operation, and minimising both annual and peak energy demand in accordance with the following energy hierarchy:

a. be lean: use less energy and manage demand during construction and operation.
b. be clean: exploit local energy resources (such as secondary heat) and supply energy efficiently and cleanly.
c. be green: maximise opportunities for renewable energy by generate producing, storing and using renewable energy on-site.
d. be seen: monitor, verify and report on energy performance.

(B) Major development proposals should include a detailed energy strategy to demonstrate how the zero-carbon target will be met within the framework of the energy hierarchy;

(C) A minimum on-site reduction of at least 35% beyond Building Regulations Part L 2013 is required for major development. Residential development should achieve 10%, and non-residential development should achieve 15% through energy efficiency measures. 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, and/or

2) off-site provided that an alternative proposal is identified and delivery is certain.

(D) Boroughs must establish and administer a carbon offset fund.

(DA) Major development proposals should calculate and minimise carbon emissions from any other part of the development, including plant or equipment, that are not covered by Building Regulations, i.e. unregulated emissions.

(DB) Development proposals referable to the Mayor should calculate whole life-cycle carbon emissions through a nationally recognised Whole Life-Cycle Carbon Assessment and demonstrate actions taken to reduce life-cycle carbon emissions.

Policy SI4 Managing heat risk – states;

(A) Development proposals should minimise impacts on the urban heat island through design, layout, orientation, materials and the incorporation of green infrastructure.

(B) Major development proposals should demonstrate through an energy strategy how they will reduce the potential for internal overheating and reliance on air conditioning systems in accordance with the cooling hierarchy.

Policy SI5 Water infrastructure – states:

(C) Development proposals should:

1. 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)
2. achieve at least the BREEAM excellent standard for the 'Wat 01' water category or equivalent (commercial development)
3. 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.

(E) Development proposals should seek to improve the water environment and be designed to ensure that misconnections between foul and surface water networks are eliminated.

Policy SI7 Reducing waste and supporting the circular economy – states referable applications should promote circular economy outcomes and aim to be net zero-waste. A Circular Economy Statement should be submitted to support applications.

Policy G4 Open space – states development proposals should where possible create areas of publicly accessible open space, particularly in areas of deficiency, and resist the loss of protected open space in areas of deficiency.

Policy G5 Urban greening – states:

(A) Major development proposals should contribute to the greening of London by including urban greening.

(B) Boroughs should develop an Urban Greening Factor (UGF) to identify the appropriate amount of urban greening required in new developments.

(BA) Existing green cover retained on site should count towards developments meeting the interim target scores set out in (B).

Policy G6 Biodiversity and access to nature – states:

(D) Development proposals should aim to secure net biodiversity gain and be informed by the best available ecological information which should be considered from the start of the development process.

(E) Proposals which reduce deficiencies in access to wildlife sites should be considered positively.

Policy G7 Trees and woodland – states development proposals should ensure that, wherever possible, existing trees of quality value are retained.

2.3.4 GLA Energy Assessment Guidance (2018)

The guidance document explains how to develop an assessment to accompany major applications referred to the Mayor to demonstrate how the development will include climate change mitigation measures reducing carbon emissions to comply with the London Plan.

The CO_2 saving must aim to meet London Plan Policy requirements of zero carbon, with at least 35% reduction achieved on site.

2.4 London Borough of Hillingdon

2.4.1 Local Plan: Part 1 Strategic Policies (2012)

The Hillingdon Local Plan: Part 1- Strategic Policies is the key strategic planning document for Hillingdon and sets out the long-term vision and objectives for the Borough. Key planning policies relating to sustainable development are summarised below.

Policy BE1: Built Environment - The Council requires all new development to achieve reductions in carbon dioxide emission in line with the London Plan targets. The Council seeks to merge a suite of sustainable design goals such as the use of SUDS, water efficiency and energy efficiency into a requirement measured against the Code for Sustainable Homes and BREEAM.

Policy EM1: Climate Change Adaptation & Mitigation – states the Council will ensure that climate change mitigation is addressed at every stage of the development including:

- Promoting a modal shift away from private car use and requiring new development to include innovative initiatives to reduce car dependency;
- Ensuring development meets the highest possible design standards whilst still retaining competitiveness within the market;
- Encouraging the installation of renewable energy for all new development in meeting the carbon reduction targets savings set out in the London Plan;
- Locating and designing development to minimise the probability and impacts of flooding;
- Requiring major development proposals to consider the whole water cycle impact which includes flood risk management, foul and surface water drainage and water consumption; and
- Giving preference to development of previously developed land to avoid the loss of further green areas.

2.4.2 Local Plan: Part 2 Development Management Policies (2020)

Adopted in January 2020 the Local Plan Part 2 document provides detailed policies for development in the Borough and includes a chapter on Environmental Protection and Enhancement. The following sustainability policies are relevant to the proposed development.

Policy DMEI 1: Living Walls and Roofs and on-site Vegetation – states all major development should incorporate living walls and/or walls.

Policy DMEI 2 – Reducing Carbon emissions – states all developments are required to make the fullest contribution to the London Plan targets and major development must be accompanied by an energy assessment showing how these reductions will be achieved.

Policy DMEI 3 – Decentralised Energy – states all major development are required to be able to connect to existing decentralised energy where possible or in the future.

Policy DMEI 10 – Water Management, Efficiency and Quality – sets out requirements for the incorporation of sustainable drainage systems, water efficiency measures, and water and wastewater infrastructure.

2.5 Pre-Application Advice

Prior to the submission of the planning application for the proposed development consultation on the plans has been undertaken with both the GLA and Hillingdon Council.

2.5.1 GLA Pre-application advice

As part of the pre-application discussions regarding the proposed development the GLA has provided a response related to a draft of this Sustainability Statement and the energy strategy proposed. While the GLA welcomed the energy strategy proposed additional information on energy performance modelling was requested alongside a Whole Life Carbon assessment.

2.6 Planning Policy Summary

Central to the vision for sustainable development, energy efficiency and climate resilience at the national, county and local level is the approval of development that jointly promotes economic, social and environmental benefits.

The current London Plan requires development to achieve a 35% reduction on carbon emissions, where possible, onsite and the emerging London Plan extends this target to require development to be net zero carbon which secures as a minimum 35% reduction in on site CO_2 emissions, and recognises the need to adapt to potential climate change effects such as overheating.

The Local Borough requirements complement the London Plan requirements in relation to carbon emissions and other key sustainable design requirements.

The following Chapters of this Sustainability Statement reflect Prologis' commitment to, and strategy for sustainable development and how this meets the requirements of the Local Development Framework and London Plan and GLA comments on the pre-application draft report.

3. Prologis Corporate Sustainability

Prologis operates a market-leading Corporate Sustainability Strategy which delivers low carbon and functional distribution buildings with a range of additional environmental, social and economic benefits.

3.1 Prologis

Prologis is a leading global provider of industrial real estate, offering customers approximately 585 million square feet of distribution space in markets across the Americas, Europe and Asia.

This represents over 2,800 industrial facilities in 21 countries which are leased to manufacturers, retailers, transportation companies, third party logistics providers and other enterprises with large scale distribution needs.

Prologis is one of the few real estate companies that operate both in the UK and globally and therefore has an opportunity to take a leading role as a responsible developer, owner and manager of industrial property.

Prologis has a proactive approach to sustainability, energy use and carbon dioxide emissions. In this context Prologis has invested heavily in the development of a market leading Global Corporate Sustainability Strategy updated in 2018 which aims to:

- Reduce its global operational Scope 1 and 2 carbon emissions by 21% by 2025;
- Design 100% of new buildings in accordance with recognised sustainable building certification schemes;
- Upgrade to 100% energy efficient lighting; and
- Ensuring all new development includes cool roofs.

The strategy also considers additional sustainability metrics such as; water and waste reduction, smart metering, and low carbon renewable energy technologies.

Prologis' proactive approach to sustainability was recognised in 2019 with the company being listed in the top 100 Global Most Sustainable Corporations in the World.

3.1.1 A Culture of Resilience

The Environmental and Social Governance (ESG) programmes at Prologis are designed to augment resilience, on behalf of the business itself and the customers and communities it serves. Key examples include:

- Adaptability to rise to new opportunities;
- A culture that advances talent through inclusion and diversity, learning, development and leadership, benefits and health and wellbeing programs;
- Committed employees who do the right thing for customers, communities and stakeholders;
- Quality properties that are durable, reliable, efficient to operate, desirable and beneficial for communities and the environment; and
- Financial strength that enables the company to respond to changes and opportunities in the marketplace.

3.1.2 Environmental Stewardship

Prologis' environmental stewardship focuses on establishing goals and objectives including science-based targets, aligning with international commitments, tracking emerging trends, emphasising resilient design and construction, investing in renewable energy and energy-efficiency projects and implementing measures to reduce water use and carbon emissions.

Prologis set global goals that build on past success, further improving business processes and practices. Key sustainability goals and progress against them are noted in **Table 1**.

Table 1: Prologis Global Sustainability Goals & Objectives[1]

	Goal	Progress
Sustainable Building Certifications	100% of new development	374 building certifications in 18 countries
Scope 1 and 2 GHG emission reduction	21% by 2025	New Science Based Targets
	15% by 2025	
Energy Efficient Lighting	100% across our operating portfolio	88% of operating portfolio
Solar Power Generation	200 MW by 2020	93%
Cool Roofs	100% of new development	42%

[1] Prologis 2018 ESG Impact Report

3.1.3 Social Responsibility

Social responsibility at Prologis involves a commitment to all stakeholders – employees, customers, communities, suppliers and investors by investing time and resources into organisations that promote education, the environment, social progress and well-being.

Through schemes such as the employee volunteer programs, Prologis Foundation and Space for Good, as well as supporting non-profits and charitable organisations, Prologis demonstrates its commitment to give back to the communities and environments it operates within.

Internally, Prologis aims to foster a positive work environment, prioritising learning and development, wellness initiatives, equal pay and inclusion and diversity.

3.1.4 Governance

Prologis is committed to upholding strict ethical standards and compliance, ensuring accountability and transparency, managing corruption and bribery risks and safeguarding the integrity of the supply chain.

3.1.5 GRI Materials

Prologis have reported to the Global Reporting Initiative's (GRI) Sustainability Reporting Guidelines for 13 years, and continue to demonstrate support for GRI's mission to empower decisions that create social, environmental and economic benefits for everyone.

3.1.6 Global Real Estate Sustainability Benchmark (GRESB)

GRESB is a rigorous benchmark which assesses the sustainability performance of commercial real estate portfolios globally. Participating organisations must respond to a survey that focuses on and assesses 50 indicators across the following aspects:

- Management;
- Policy and disclosure;
- Risks and opportunities;
- Monitoring and EMS;
- Performance indicators;
- Building certifications; and
- Stakeholder engagement.

In 2018, Prologis earned a clean sweep of Green Stars across all eight Prologis participants, many of which were in the top ten out of 61 peers in the global industrial group. A Green Star is the highest level of achievement in recognition of outstanding performance in ESG.

In addition to the eight Green Stars and regional and country leadership rankings, Prologis earned first place in two pilot modules that were not included in the main scores, including first place

in Health and Wellbeing and first place in Resilience, amongst all 114 GRESB participants.

3.3 Prologis UK Sustainability Strategy

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.

Prologis assesses the environmental impact associated with all phases of a new building 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 sustainable building certification; measurement, reduction and mitigation of construction stage and operational stage emissions; and environmentally responsible design.

The following chapter sets out Prologis' Sustainability Strategy for the development of the former GSK site Hillingdon.

4. Sustainability Strategy for Iron Bridge Road

This Sustainability Strategy has been developed to demonstrate how the applicant will deliver high quality, sustainable and low carbon buildings at Iron Bridge Road.

4.1 Approach to Sustainable Development at Iron Bridge Road

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.

Prologis assesses the environmental impact associated with all phases of a new building 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 including those summarised below.

BREEAM – Confirming how Prologis will target a BREEAM Very Good rating for the proposed buildings to deliver sustainable buildings which provide long term benefits to occupiers.

Mitigated Embodied Carbon Emissions – Demonstrating how Prologis aims to reduce and mitigate the embodied carbon of development through partnership with the charity, Cool Earth.

Reduced Operational Carbon Emissions – Demonstrating the energy efficient design measures and renewable energy technologies incorporated into the buildings to reduce energy use and carbon emissions.

In addition Prologis is now trialling the **mitigation of the residual operational carbon emissions** of some new developments to further minimise this impact.

Managing Environmental Impacts - Mitigating the potential impact of the development by addressing key sustainability issues such as; transportation, ecology and biodiversity, flooding and drainage, green infrastructure, waste management and resource efficiency. This includes ensuring the development includes measures to adapt to the effects of climate change.

The following sections set out how this strategy has been applied to the development at Iron Bridge Road.

4.2 Environmental Certification - BREEAM

BREEAM is a widely recognised metric for assessing the sustainability performance of non-domestic buildings.

As a commitment to sustainable development Prologis ensures that all of its buildings are designed in accordance with BREEAM.

A BREEAM pre-assessment will be undertaken at the appropriate stage to confirm the credits required to achieve 'Very Good' as a minimum, where possible targeting Excellent mandatory credits in energy and water efficiency.

4.3 Embodied Carbon Mitigation

Embodied carbon emissions are those emissions associated with the manufacture of the building materials, transport of these materials to site, construction, demolition and recycling and contribute a significant proportion of a buildings whole life carbon.

A report previously published by the Zero Carbon Hub[2] considers investment in Embodied Carbon as one possible mechanism to reducing carbon emission from new development and has identified that there is huge potential of large scale, 'actual' and immediate reductions within the UK.

This report suggests that investments in embodied carbon initiatives are cost effective and have the potential to be deployed at a large scale highlighting that during a total building lifetime much of the lifecycle carbon is emitted even before the building is occupied, as embodied carbon.

While there is currently no mandatory requirement for any organisation to calculate and mitigate embodied carbon Prologis takes a proactive approach to sustainable development and targets a reduction in embodied carbon through the use of low embodied carbon materials such as recycled aggregates and steel.

4.3.1 Prologis Embodied Carbon Strategy

Building Regulations and planning policy have focused on regulated operational carbon emissions (such as heating and lighting) however, the embodied carbon of a building can account for a significant percentage of its lifecycle carbon emissions.

For truly sustainable development, Prologis recognise that the impacts of any new building should be measured over its lifetime. That is why Prologis commit to producing a whole-life carbon lifecycle assessment for all new developments in the UK.

Over 10-years, Prologis has gathered extensive data to show the critical importance of reducing embodied carbon as well as operational carbon emissions in buildings. They are the only UK logistics developer to commit to a strategy of whole-life carbon reduction.

Analysis shows that embodied carbon can be as much as 70% of the lifetime carbon emissions of a logistics centre / warehouse. As the UK energy grid is decarbonised through the adoption of renewable energy, the percentage of embodied carbon may increase in coming years.

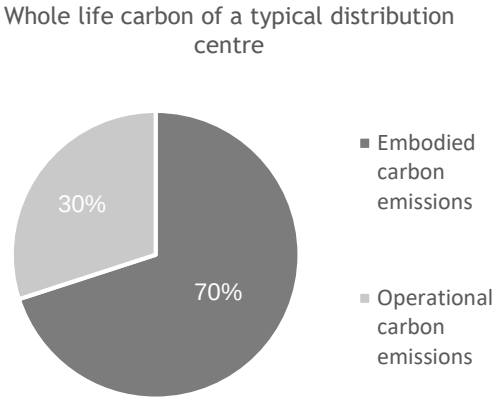


Figure 2: Typical distribution centre embodied carbon

Implementing a strategy to reduce and mitigate this embodied carbon will therefore result in much greater carbon reductions than by simply focusing on operational emissions alone. When applied on a global scale, this approach has the potential to mitigate large quantities of carbon emissions.

The development and construction industry, as well as local planning authorities, including the GLA are increasingly recognising the impact of embodied carbon arising from the production of building materials and the construction process, by mitigating embodied carbon Prologis will

[2] Zero Carbon Hub, Allowable Solutions – Evaluating Opportunities and Priorities, 2012

significantly improve the sustainability performance of their buildings.

Whilst its primary focus is on lifetime carbon reduction, Prologis chooses to go further by mitigating 100% of all embodied carbon emissions in all its new developments in the UK. It does this through a carbon mitigation programme in partnership with an award-winning charity called Cool Earth.

4.3.2 Embodied Carbon Assessment

As a commitment to reducing the embodied carbon of buildings Prologis carries out a Cradle to Grave Life Cycle Assessment (LCA) of materials to calculate the carbon emitted for all new developments. This forms part of a wider Whole Life Cycle (WLC) assessment which is a requirement of the emerging London Plan.

In accordance with the GLA pre-application guidance a WLC assessment has been carried out and is set out in **Chapter 5** of this report.

The LCA includes:

- Manufacture of raw materials;
- Delivery of materials to site and use of energy during construction;
- Use and maintenance of the building; and
- Energy use during the demolition and recycling of a building.

Based on the WLC in **Chapter 5, Table 1** sets out the estimated embodied carbon of the development based on Prologis' enhanced building specification.

Table 2: Embodied Carbon Assessment

Building	Baseline Embodied Carbon (tonnes CO_2)	Enhanced Specification Embodied Carbon (tonnes CO_2)	Reduction in Embodied Carbon (tonnes CO_2)
Total	***16,694***	***15,673***	***421***
Reduction in Embodied Carbon			***2.6%***

To further enhance the sustainability of the development Prologis will mitigate the calculated embodied carbon through a donation to the Cool Earth Project.

4.3.3 Prologis carbon mitigation with Cool Earth

Prologis is a long-term supporter of the charity Cool Earth through its unique strategy of carbon mitigation linked to protecting the world's most at risk rainforest. All of the embodied carbon for each new development is mitigated by donating funds to Cool Earth for use in their work.

For each acre of rainforest that is cleared, 260tCO_2 are emitted. Through the LCA Prologis can determine the embodied carbon for each new development so that, as soon as each project breaks ground, a donation is made to Cool Earth to protect sufficient acres to mitigate all of the embodied carbon emissions of the new development.

The cumulative results of this programme have delivered significant benefits in terms of carbon reduction and mitigation and wider positive social and environmental impacts. Through its partnership with Cool Earth since 2008 Prologis has protected over 10,000 acres of Peruvian Amazon and Papua New Guinea, this is an areas larger than Zone 1 of London.

4.3.4 What is Cool Earth?

Cool Earth is a UK registered charity that works alongside indigenous villages to halt rainforest destruction. HM Queen Elizabeth II chose Cool Earth to be the lead partner for The Queen's Commonwealth Canopy (QCC), a pan-Commonwealth network of forest conservation projects and save one of the world's most important natural habitats.

The QCC will mark Her Majesty The Queen's service to the Commonwealth while conserving indigenous forests for future generations. Rainforests are critically important ecosystems and tools in the context of global climate change for a number of reasons including:

- Cool Earth estimates that rainforest destruction accounts for as many CO_2 emissions as that emitted by the USA – approximately six billion tonnes per annum.
- 1.6 billion people depend on rainforests for their welfare and livelihood with over 350

million people living within rainforest communities.

Cool Earth works with rainforest communities to provide investment that directly prevents deforestation thereby avoiding the release of sequestered atmospheric carbon emissions. The projects operate to strict guidelines to ensure that local communities benefit directly from the carbon mitigation projects.

Cool Earth works in 6 Countries around the world and is involved in 13 community led partnerships. As part of the projects in the Amazon approximately 85,000 hectares of land are under community stewardship. Through the Peruvian partnerships over 30m trees have been protected protecting nearly 14m tonnes of carbon.

Cool Earth is aiming to develop at least 30 partnerships by 2030, expanding globally to address deforestation.

4.3.5 Certification and Verification

The embodied carbon reduction and mitigation strategy is monitored and certified by Planet First who validate the final carbon footprint reports for all of Prologis' building. This is undertaken as part of The Planet Mark New Development sustainability certification.

All Prologis developments commit to The Planet Mark certification which is achieved in stages covering design, construction, community engagement, carbon mitigation and occupier engagement. The certification is delivered with a number of expert partners. These include some of the UK leaders in lifecycle analysis in buildings, Cool Earth and the Eden Project, who provide social sustainability engagement programmes to communities local to each development.

4.3.6 Iron Bridge Road Cool Earth Contribution

Table 2 sets out the estimated embodied carbon of the development at Iron Bridge Road and the level of carbon protection committed to through the Cool Earth scheme.

In a commitment to mitigating climate change Prologis chooses to go significantly further than just mitigating the embodied carbon of development, and chooses to apply a 5 times multiplier for each donation made to Cool Earth.

This robust approach is based on their deep understanding of the issues regarding deforestation and the concept of displacement, acknowledging that not every acre would have been lost without intervention, and that logging can move to other rainforest locations which have less controls.

The approach therefore means that the amount donated could avert emissions equivalent of up to 5 times the embodied carbon footprint of each development.

As the Cool Earth scheme protects rainforest through a range of social livelihood schemes, by robustly funding the scheme, as well as protecting an enlarged area of rainforest greater community benefits will be provided.

Table 3: Embodied carbon mitigation

	Embodied Carbon (tonnes CO_2)
Baseline embodied carbon	15,673
Embodied carbon mitigation equivalent	78,365

The carbon mitigation of Iron Bridge Road will protect up to 301 acres of endangered rainforest in Papua New Guinea, a Commonwealth Country and part of the Queen's Commonwealth Canopy programme. The main risk to the rainforest is palm plantations and Prologis is supporting a 7-

year project to achieve zero deforestation and to double community incomes.

4.4 Operational Carbon Reduction

Prologis aims to reduce operational emissions by utilising enhance building design to lock in carbon savings.

Prologis' Sustainability Strategy is continually developing in tandem with amendments to Part L of the Building Regulations which since 2006 has required substantial reductions in regulated carbon emissions of new buildings and particularly distribution buildings.

The amendments to 2010 Part L2A targeted an aggregate 25% improvement in efficiency compared to 2006 Building Regulations for non-domestic buildings in recognition of the variation in energy demand profiles for different building types.

Evidence gathered by Prologis has found that, on average, the 2010 Part L regulations required B8 development to reduce its carbon emissions by as much as 50% above previous Part L 2006 standards.

The 2014 changes to Part L2A of the Building Regulations require a further 9% aggregated reduction in regulated CO_2 emissions across the new non-domestic building mix.

The current London Plan and New London Plan both require new development to achieve a 35% reduction in carbon emissions on-site through the use of energy efficiency and low carbon renewable energy technology.

Looking forward the emerging London Plan and national guidance is moving towards requiring new development to be net zero carbon to mitigate the effects of climate change and Prologis aims to be at the forefront of minimising emissions from warehouse development.

4.4.1 Prologis' Approach to Carbon Reduction

Prologis has invested heavily in the development of energy efficient buildings which utilise a number of measures to reduce and manage energy consumption following the principles of the Energy Hierarchy.

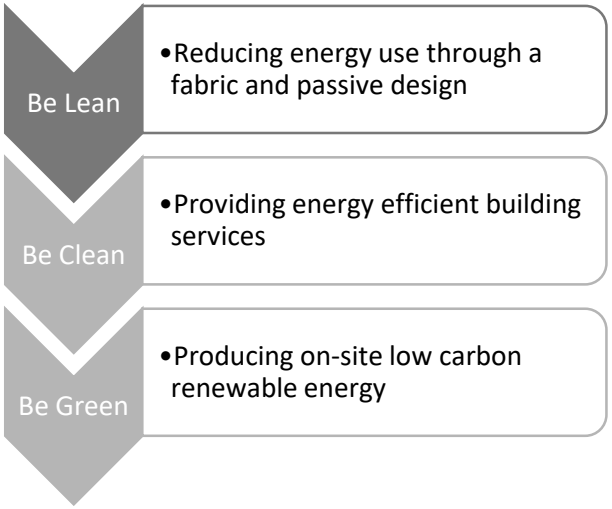


Figure 3: The Energy Hierarchy

Following the energy hierarchy set out in **Figure 3** Prologis aims to deliver sustainable new buildings which go beyond the requirements of national and local policy.

The following sections set out how the development at Iron Bridge Road will be designed to reduce carbon emissions. **Appendix 1** includes an Energy Assessment of the proposed development with key figures summarised below.

4.4.2 Be Lean – Reducing Energy Use

Reducing the primary energy demand of a building through the use of an efficient fabric and services is widely regarded as best practice and is therefore the first and most important step to reducing carbon emissions.

The new buildings have been designed in accordance with a fabric first approach to create high efficiency buildings which reduce primary energy demand and therefore carbon emissions.

In new distribution warehouse buildings the majority of the building is unlikely to require heating or cooling, with the main heating and cooling requirement limited to the small office space provided. As a result the predominant energy consumption in these buildings will be electrical energy for lighting.

In the first instance to create an efficient fabric and minimise energy use and lighting requirements the following measures are used;

- Provision of roof lights to cover 15% of the unit roof spaces to prioritise natural daylighting, minimising artificial lighting and energy requirements;
- Improved air tightness values which will be significantly lower than the Building

Regulations standard of 10m^3/ m^2/hr targeting <2.5m^3/m^2/hr; and

- Appropriate glazing provided on elevations to enhance daylight to offices with U-values targeted at <1.4W/m2K.

Investing in improved fabric and construction techniques to create a more airtight building dramatically reduces the loss of energy to the external environment, thereby reducing energy needed for heating and cooling requirements.

In addition to the fabric efficiency measures proposed the new buildings will include a range of energy efficiency measures to further reduce their energy demand, these include:

- Provision of new, high efficiency LED lighting throughout;
- Automatic controls for all lighting; and
- Installation of a sophisticated building energy monitoring system (BEMS) together with a number of energy sub-meters. This system will constantly monitor the existing building and extensions energy use in a number of locations and report any excess energy use.

Additional energy systems and plug in loads such as office equipment or machinery will be the responsibility of the buildings tenants.

Through the fabric first approach and use of energy efficient services the new buildings have secured a significant reduction in regulated carbon emissions beyond the baseline of Part L 2013.

4.4.3 Be Lean - Energy Efficient Plant and Services

Once the need for energy has been minimised, the next step in the energy hierarchy is to ensure that the demand for energy is met as efficiently as possible through the consideration of:

- The installation or connection to District Heating systems; and
- The use of efficient heating systems.

District Heating – The London Plan requires development to consider the installation or connection of new development to district heating networks.

District Heat Networks (DHN) are suited to development with a high annual heat demand where there may be one or more large anchor loads which enables the connection of smaller more intermittent loads. Typically DHN consists of a centralised energy plant generating heat provided to connected buildings via a network of insulated heat pipes. Most commonly DHNs use gas fired Combined Heat and Power (CHP) which simultaneously generate electricity and heat.

The new London Plan published in December 2019 notes the reducing potential for these systems to generate carbon dioxide savings due to an overall decarbonisation of the national electricity network.

The London Heat map sets out the heat density of London and includes details of existing and proposed heat networks. The following extract from the London Heat Map[3] shows the location of the proposed development and shows there are no existing or planned networks near to the site.

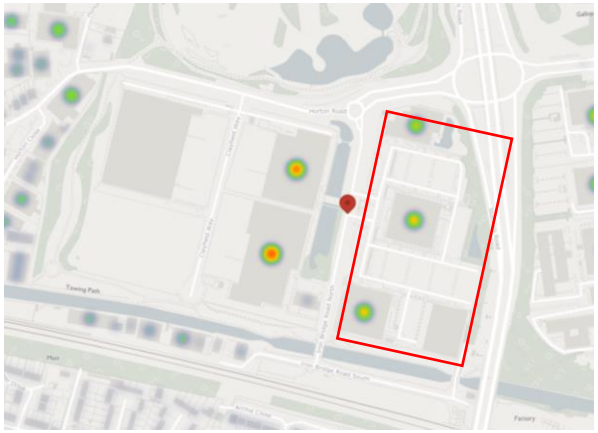


Figure 4: London Heat Map Extract

As noted the warehouse logistics buildings are predominantly unheated with heating limited to the office and ancillary spaces, consequently the overall heat load of the buildings is relatively low.

[33] https://www.london.gov.uk/what-we-do/environment/energy/london-heat-map/view-london-heat-map

In this context given the units heating demand is limited to the small office spaces provided, combined with a lack of existing network, it is considered there is insufficient demand within the new development for a DH Network or CHP system to be feasible.

Energy Efficient Heating Systems – Where heating is required in the building office spaces this will be provided by high efficiency gas boilers with ultra-low NOx emissions.

These systems include variable speed pumps, controls and connection to the building BEMS to control and manage energy use.

4.4.4 Be Green - Low Carbon Renewable Energy

Prologis supports the use of renewable energy technologies where they provide a cost effective and sustainable solution to meeting specific energy needs and can make positive contributions to carbon emission reduction.

Prior to the consideration of low carbon renewable energy the fabric and energy efficiency measures are anticipated to reduce carbon dioxide emissions beyond the requirements of the Building Regulations.

Where appropriate low carbon renewable energy systems will be considered to reduce residual operational emissions to meet a 35% reduction in emissions on-site.

Solar PV – Solar PV systems can generate electricity for use in buildings and is suitable on south facing or shallow pitched, unobstructed roof spaces. These systems can provide energy for use inside of the buildings to offset regulated and unregulated energy requirements. The buildings on the neighbouring Prologis Park West include Solar PV systems and would therefore be applicable on the proposed development at Iron Bridge Road.

Solar Thermal Hot Water – Solar thermal systems are used to generate hot water and work in a similar manner to Solar PV. While hot water demand is limited to the office toilets and kitchen areas solar thermal systems have been installed in all of the buildings to provide hot water for these areas.

Heat Pump Systems – Heat pumps provide low grade heat from the ground (Ground Source Heat Pumps, GSHP) or air (Air Source Heat Pumps, ASHP) suitable for heating highly efficient buildings which would be well suited to the proposed office spaces. These systems will be considered as part of the detailed design of the buildings taking into account the latest SAP10 carbon emissions factors.

4.4.5 Estimated Carbon Emissions

Table 4 sets out the design stage regulated carbon dioxide emissions for the proposed development as set out in the Energy Assessment in Appendix 1. The figures are set out in the context of the 2013 Building Regulations baseline but in accordance with the GLA Energy Assessment Guidance 2020 the use the SAP10 carbon factors.

Table 4: Regulated and Unregulated Carbon Dioxide Emissions

	Carbon emissions (tonnes CO_2 /year)		
Building	Regulated emissions	Carbon Savings	(%) reduction
Baseline Part L 2013 of the Building Regulations	211		
After energy demand reduction	144	67	32%
After heat network / CHP	1443	0.0	0%
After renewable energy	99	45	21%
Total Cumulative Savings		***112***	***53%***

4.4.6 Iron Bridge Road – As Built Carbon Emissions Summary

Tables 5 and 6 below set out the estimated regulated and unregulated carbon emissions of the development, demonstrating how emissions will be reduced through fabric and energy efficiency measures, and installation of low carbon renewable energy technologies. These tables have been prepared in accordance with the GLA Energy Assessment guidance 2020.

Table 5: Iron Bridge Road - As built regulated and unregulated carbon emissions

	Carbon dioxide emissions (Tonnes CO_2 per annum)	
Building	Regulated	Unregulated
Baseline Part L 2013 of the Building Regulations	211	253
After energy demand reduction	144	253
After heat network / CHP	144	253
After renewable energy	99	253

Table 6: Iron Bridge Road - As built carbon savings

	Regulated non-domestic carbon dioxide savings	
	Tonnes CO_2 per annum	(%)
Savings from energy/demand reduction	67	32%
Savings from heat network/ CHP	0.0	0%
Savings from renewable energy	45	21%
Total Cumulative Savings	***112***	***53%***

Appendix 1 includes an Energy Assessment carried out for the site which includes details of the energy modelling summarised above, which also includes assessment of the development using the SAP 2012 carbon factors which shows the development achieving a 53% carbon reduction.

In accordance with the London Plan the residual operational emissions will be offset via the Council's carbon offset fund, details of the cost of offsetting are set out in **Appendix 1.**

The final carbon emissions will be subject to the detailed design of the individual buildings and may vary, as a minimum buildings will meet the requirement of the emerging London Plan and achieve a 35% on-site carbon reduction through a combined fabric, energy efficiency and renewable energy specification.

4.4.7 Lifecycle Carbon Summary

When considered together the savings achieved through the use of fabric, energy efficiency, low carbon renewable energy and embodied carbon reduction measures ensure the buildings perform significantly beyond the requirements of the local and national policy and the Building Regulations.

Table 8 sets out the overall carbon dioxide anticipated to be saved through the lifetime of the development at Iron Bridge Road through the use of Prologis' enhanced building specification including onsite embodied carbon enhancements.

Considered over a 30 year lifespan Prologis' enhanced building specification and carbon mitigation strategy at Iron Bridge Road is estimated to reduce embodied and operational carbon dioxide emissions by 340% above the baseline, delivering development which is carbon positive and goes well beyond current and emerging local and national policies setting industry leading performance and climate leadership.

Table 7: Lifecycle carbon summary

	Embodied Carbon (Tonnes CO_2)	Operational Emissions (lifetime emissions - 30 years) (tonnesCO_2)	Total emissions (tonnes CO_2)	Carbon reduction (tonnes CO_2)	% Reduction
Baseline Emissions - Baseline embodied carbon and Part L 2013 operational emissions	16,694	6,330	23,024		
Enhanced Specification - Enhanced material specification and enhanced fabric and energy efficiency measures	15,673	4,320	19,993	3,031	13%
Low carbon renewable energy		2,970	2,970	17,023	85%
Carbon offsetting - Offsetting of 500% of the embodied carbon and residual operational emissions	-78,365	2,970	-75,395	78,365	2639%
Overall Carbon Reduction					340%

4.5 Environmental Responsibility

Prologis' approach to sustainability extends beyond just meeting BREEAM certification standards and its commitment to sustainable energy and reducing operational and embodied carbon emissions.

Whilst a commitment to BREEAM and the proposed energy and carbon reduction strategy addresses some of the key sustainability issues Prologis also seeks to positively support sustainable development in all areas of its development activities.

At a corporate level, the company is certified to the ISO 14001 series of international standards on environmental management. The standard provides a framework for the development of an environmental management system and a supporting audit programme and demonstrates the Prologis commitment to environmental stewardship. The ISO 14001:2004 certification for all Prologis UK project management activities falls broadly into the following categories:

- Assessing the environmental issues associated with land purchased for development;
- Procuring construction contracts for the development of land;
- Monitoring the progress and quality of construction works through to completion.

At Iron Bridge Road, Prologis proposes a comprehensive set of sustainable design initiatives that support its goal of delivering sustainable and environmentally responsible development and reflects the requirements of the NPPF in the context of the refurbishment of an existing, historic building.

Whilst the energy and carbon reduction strategy addresses some of the key sustainability issues Prologis also seeks to positively influence on other key sustainability issues which include:

- Building a strong and competitive economy;
- Sustainable transportation;
- Protecting and enhancing the natural environment; and,
- Meeting the challenge of climate change.

During the outline design process, sustainability has been integrated into each of these issues as summarised below.

4.5.1 Building a Strong and Competitive Economy

The proposed development at Iron Bridge Road will result in a number of economic benefits supporting the aims of the national planning policy framework and the adopted local planning policy.

The office and logistics sector provides a steady source of job growth and the sector offers a range of well-paid employment opportunities across the occupational spectrum and the local economy is in need of additional jobs so as to keep pace with population growth and reduce unsustainable levels of out-commuting for work.

The proposed development will support local employment in the area. The jobs available are likely to consist of a variety of employment roles including professional, technical and managerial, skilled and elementary occupations.

Indirect jobs are also likely to be created through an increase in the use of nearby shops and other amenities as well as the supporting supply chain during construction.

Prologis is a long-term investor in the site, and aims to ensure its developments are beneficial to local communities. Prologis hosts site visits for local schools, and encourages its tenants to carry out their own outreach and local employment programmes.

4.5.2 Sustainable Transportation

In support of the proposed development a Transport Assessment has been prepared which is supported by a Travel Plan, Construction Logistics Plan and Delivery and Service Management Plan to set out how the development will work to minimise its traffic impact.

The site forms part of the wider Stockley Business Park and is located north of Drayton Garden Village and Heathrow airport, access off Iron Bridge Road North.

The change of use of the site from offices to commercial use is anticipated to provide an improvement in site traffic reducing traffic during peak periods.

Walking and Cycling

The site is connected to the wider area via the Grand Union Canal Walk located to the south of the site which provides a continuous segregated route for pedestrians and cyclists to nearby residential neighbourhood and local facilities in Yiewsley, West Drayton, Hayes. This includes the West Drayton, and Hayes and Harlington train stations.

Pedestrian and cycle access for Unit 1 will be via Iron Bridge Road North with Unit 2 having segregated access via the north west of the site.

In addition Prologis is to provide contributions to the improvement of the Stockley Park Roundabout to improve cycle and pedestrian provision.

Public Transport

Horton Road bus stops are located 170m from the site and is served by local services with links to the local area including Uxbridge, Yiewsley and Hayes.

West Drayton station is located 1.4km to the west of the site and is served by the Great Western Mainline and Crossrail line providing regular connections into London and to Reading in the west.

Encouraging Sustainable Travel

To encourage sustainable travel the development will include a range of measures including:

- Pedestrian and cycle access;
- Local highways improvements;
- The provision of changing facilities showers and storage lockers to facilitate cycling and walking;
- Installation of 94 secure cycle storage spaces; and
- Provision of 20% active Electric Vehicle charging spaces with the remaining spaces with passive provision.

Further details on sustainable transport are set out in the Transport Assessment, Travel Plan, Construction Logistics Plan and Delivery Service Management Plan which accompany the site application.

4.5.3 Protecting and Enhancing the Natural Environment

To support the application an Ecology Assessment has been carried out to determine the impact of the development ton existing site habitats and species and opportunities for enhancing the sites biodiversity.

The site is dominated by a large area of hard standing and buildings with some small areas of amenity grassland and planting through the site, with a man-made pond in the north of the site.

The development will involve the demolition of the existing buildings which will also impact on the existing on-site habitat areas.

To minimise the impact of the development and enhance site biodiversity the landscape plan includes:

- The retention of existing trees and scrub which spate the site from the Grand Union Canal, with adjacent grassland areas will be sown with an ecological grassland mix to increase biodiversity.
- The majority of the woodland along the eastern boundary of the site will be retained. New thicket planting will be interspersed along the boundary and across the north of the site to buffer the woodland and increase biodiversity.
- An existing attenuation basin in the east of the site will be enhanced through clearance and sowing of new grassland mix and native planting providing opportunities for bats, birds, reptiles, amphibians and invertebrates.
- Where trees are cut down the trunks will be kept to create long piles providing opportunities for reptiles and amphibians.

Further information on the ecological impact of the development and measures to mitigate and enhance site biodiversity are set out in the Ecology Assessment which accompanies the application.

4.5.4 Meeting the Challenge of Climate Change

To ensure the proposed development is resilient to the effects of climate change it incorporates a number of key design measures in response to the climate predictions set out in the UKCP18 projections.

The UKCP18 projections demonstrate that over time the UK will experience increased summer and winter temperatures with significantly increased maximum temperatures, reduced summer rainfall, increased winter rainfall and an increase in extreme weather events.

The UK Climate Change Risk Assessment updated in 2017 identifies key risks associated with the effects of climate change and in relation to the built environment and the proposed development these include reduce summer water availability, increased winter rainfall and increased summer temperatures.

This section identifies key measures which will be incorporated into the design of new buildings and the proposed development to adapt to climate change.

Water Use, Flooding and Drainage

The Flood Risk Assessment prepared by WSP reviews the potential risk of flooding to the site and the proposed measures to mitigate potential risks of surface water flooding in accordance with national guidance.

The Assessment confirms the site is in Flood Zone 1 and is therefore at a low risk of fluvial flooding. As part of the application work the surface water strategy has been reviewed with surface water currently draining via a private network into an onsite surface water system.

As part of the development the surface water drainage will be enhanced to restrict surface water to the greenfield runoff rate with attenuation provided via below ground storage under each unit before discharging via the existing outfall. The onsite attenuation will include consideration of a 1 in 100 year storm event including a 40% allowance for climate change.

Further information is available in the Flood Risk Assessment which accompanies the application.

Water Efficiency

Prologis has a corporate sustainability target of reducing potable water usage by 50% in all new and refurbished warehouse developments. To conserve water at Iron Bridge Road, Prologis will specify water efficient appliances including dual flush toilets and PIR sensors for taps. Water meters combined with leak detection equipment will also be specified.

In addition Prologis will install a rain water harvesting collection tank to collect rain water from the roof to be used to provide cold water to the WCs and urinals in the office areas.

Inclusion of rainwater harvesting would provide a significant reduction in onsite potable water use as WC and urinal flushing typically makes up over 50% of water usage within an office warehouse facility.

Overheating

With increasing summer temperatures there is an increasing risk of overheating in buildings which could adversely affect building occupants and users.

In recognition of this, Part L 'Conservation of Fuel & Power' of the Building Regulations are scheduled to be updated in 2020 to take better account of potential summertime overheating risks as a result of future climate change.

To minimise the risk of overheating an overheating assessment will be carried out to identify potential overheating of the offices areas and provide mitigation in accordance with the cooling hierarchy.

Through the provision of mitigation measures to reduce the risk of surface water flooding, reduce water consumption, and reduce the risk of overheating buildings will be able to adapt to and be resilient to future climatic changes.

4.5.5 Waste and Resource Management

Development requires the use of land and natural resources in construction and operation. In accordance with the corporate sustainability strategy, Prologis has developed a range of procedures to maximise resource efficiency and minimise waste during all stages of the development.

Design Stage Resource Management

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.

For the remaining 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 in accordance with the waste hierarchy.

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.

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.

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.

These procedures and commitments are in line with the Mayor of London's Sustainable Design and Construction (2014) SPD.

Construction Waste Management

During site clearance and construction, a waste management strategy will be implemented which will promote waste segregation and recycling. A pre-demolition audit will be undertaken to inform where materials may be re-used and improve material efficiency.

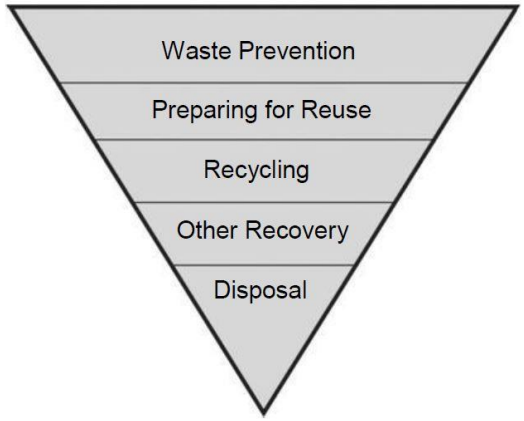
The main contractor will be required to implement a range of procedures to minimise waste and environmental impact during the construction phase. These measures include:

- Develop a Site Waste Management Plan which will include procedures for maximising recycling and minimising construction waste to landfill. A diversion from landfill target of 70% is recommended, in line with BREEAM criteria.
- Keeping detailed records to indicate the types and quantities of materials recycled which shall include a minimum of 5 different types of construction waste.
- All timber used on site shall be responsibly sourced from either certified sources (FSC) or from reclaimed or reused sources.
- 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.
- Registration with the Considerate Contractors Scheme.
- Provision and use of suitable and secure methods and types of storage for all materials including those that may cause a potential environmental impact following accidental spillage (such as hydrocarbons).

Operational Waste Management

During the operational phase of the building, Prologis will work with their customers to provide appropriate waste management facilities in accordance with the Waste Hierarchy shown in **Figure 5** to enable segregation and recycling.

Figure 5: Waste Hierarchy



4.5.6 Air Quality

An Air Quality Assessment will be undertaken to address the potential air quality impacts during

both construction and operational phases of the proposed development.

In accordance with the requirements of the London Plan the proposed design will provide 20% active provision of EV van charging spaces, with an additional 20% provision in the future, to encourage the use of non-combustible engine vehicles.

5. Whole Life Carbon Study

5.1 Introduction

A Whole Life Carbon Study including embodied carbon has been undertaken to meet the requirements within new London Plan Policy SI 2: Minimising Greenhouse Gas Emissions.

A whole life carbon approach identifies the overall best combined opportunities for reducing lifetime emissions associated with a building. To acquire an overall understanding of a built project's total carbon impact, it is necessary to assess both the anticipated operational and embodied emissions over the whole life of the asset.

Considering operational as well as embodied carbon emissions together over a project's expected life cycle constitutes the whole life approach.

5.2 What is Embodied Carbon?

Embodied carbon is the total GHG emissions generated to produce a building which includes emissions caused by extraction, manufacture/processing, transportation and assembly of each product and element in the asset.

The RICS Professional Guidance: Methodology to Calculate Embodied Carbon (2014)[4] defines embodied carbon as:

"Carbon emissions associated with energy consumption (embodied energy) and chemical processes during the extraction, manufacture, transportation, assembly, replacement and deconstruction of construction materials or products. Embodied carbon can be measured from cradle-to-gate, cradle-to-site, cradle-to-end of construction, cradle-to-grave, or even cradle-to-cradle. The typical embodied carbon datasets are cradle-to-gate. Embodied carbon is usually expressed in kilograms of CO_2e per kilogram of product or material."

From a building owner / user perspective, embodied carbon would fall under Scope 3 (other indirect) emissions according to the GHG Protocol Corporate Standard[5].

5.3 Aims of the Assessment

The key aims of the assessment are as follows:

- Estimate embodied carbon within the key building and external realm materials;
- Estimate carbon associated with the transport of materials and construction activities on site; and
- Identify opportunities for the use of materials with a lower carbon footprint.

The following sections provide detail on the scope of the assessment, including guidance and software tools utilised.

[4]RICS Professional Guidance, Global Methodology to calculate embodied carbon 1st Edition (2014)
[5]WRI Institute & WCSBD, 2001. The Greenhouse Gas (GHG) Protocol Corporate Value Chain (Scope 3) Accounting and Reporting Standard.

5.4 Relevant Guidance and Standards

A number of national and international standards and guidance notes have informed the assessment, these are described below.

5.4.1 RICS Guidance

The RICS Guidance on Whole Life Carbon Assessment for the Built Environment (2017)[6] seeks to provide greater clarity and technical guidance on whole life carbon assessments.

The document notes that the built environment industry has so far been addressing mainly operational emissions via reduction targets in building regulations, planning requirements by local authorities and sustainability assessment rating schemes with the embodied aspect of carbon emissions not being fully addressed.

Considering operational as well as embodied carbon emissions together over a project's expected life cycle constitutes the whole life approach.

The RICS Guidance takes into account the EN 15978: 2011 framework which sets out the principles for whole life assessment of the environmental impacts from built projects based on life cycle assessment (LCA). It has been noted by RICS that aspects of the EN 15978 methodology have been subject to varying interpretations by practitioners and clients which resulted in substantial disparities and variations in carbon figures among similar projects.

The Guidance provides a matrix of required items which should be reported within the carbon assessment. As a minimum this includes:

- Substructure; and
- Superstructure (including frame, upper floors, roof, external walls, windows, external doors and stairs).

Impacts must be measured for product stage [A1-A3], construction process stage [A4 and A5] and replacement stage [B4] as a minimum.

5.4.2 BREEAM Requirements

Both units are seeking BREEAM certification under the New Construction 2018 'industrial' scheme. Options appraisal to reduce environmental impacts in superstructure, substructure and hard landscaping in line with Construction Mat 01 guidance[7] will be undertaken once the design has progressed further.

5.4.3 New London Plan

Policy SI 2 Minimising Greenhouse Gas Emission within the London Plan requires development proposals to include a Whole Life Carbon Study. The assessment must also show what actions have been undertaken to minimise the embodied carbon of the development.

5.5 One Click LCA Software

To accurately calculate the embodied carbon produced by the new development, One Click LCA software has been utilised.

The One Click LCA tool is based on the EN 15978 standard, which is in line with the ISO 14040 / 44 standards for Life Cycle Assessment. Furthermore, the One Click database is IMPACT compliant, which means it uses manufacturer specific environmental product declaration (EPD) data licensed by the Building Research Establishment (BRE).

A number of assumptions are made by the software (which can be overridden by the user), these are outlined further within **Section 5.6.4**.

[6]RICS Full Guidance on Whole Life Carbon Assessment for the Built Environment 1st edition, November, 2017
[7]BREEAM UK New Construction, Non-domestic Buildings, Technical Manual, SD5076:5.0 - 2014

5.6 Scope of Assessment

5.6.1 Data Sources

Michael Sparks Architects have provided information on the specification and quantities of material proposed for the scheme.

Where information was not available, due to the early stage within the design, assumptions were made by Turley Sustainability based on similar warehouse and logistics projects. These assumptions are stated within **Appendix 2**.

5.6.2 Life Cycle Stages

The following life cycle stages have been considered and are reported within this chapter:

A1-A3 Materials – includes raw material supply, transport of material to production lines and production impacts.

A4 Transportation - includes exhaust emissions resulting from the transport of building products from manufacturer's production plant to building site as well as the environmental impacts of production of the used fuel.

A5 Construction - covers the exhaust emissions resulting from using energy during the site operations, the environmental impacts of production processes of fuel and energy and water as well as handling of waste until the end-of-waste state.

B4-B5 Replacement - The environmental impacts of material replacements include environmental impacts from replacing building products after they reach the end of their service life.

B6 Operational Energy Use - The use phase energy consumption impacts include exhaust emissions from any building level energy production as well as the environmental impacts of production processes of fuel and externally produced energy. Energy transmission losses are also taken into account.

C1-C4 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.

5.6.3 Elements Included Within the Assessment

As highlighted within **Section 5.4.1**, the RICS Guidance on Whole Life Carbon Assessment states that, as a minimum, superstructure and substructure must be modelled. Ideally, 95% of the estimated cost for each building element category (substructure, superstructure, services etc.) should be assessed where possible.

The Whole Life Carbon Study includes the building elements shown in **Table 8** overleaf. This accounts for all components making up the finished building covering a cradle to grave scope (modules [A–C]) over a 60-year life cycle.

Each building has been modelled separately, including allocated service yard and associated hard landscaping.

Table 8: Whole Life Carbon Scope

Element	Included?	Comments
SUBSTRUCTURE		
Foundations	*Yes*	Basic foundation of ready-mix concrete, steel rebar, 5m piling and gravel fill*
Lowest Floor	*Yes*	Reinforced ground floor slab with sub base
Basement	*No*	No basement present
SUPERSTRUCTURE		
Frame	*Yes*	Steel portal frame and steel beams with intumescent paint*
Upper floors	*Yes*	Composite metal deck
Roof	*Yes*	Twin Therm roof
Stairs	*Yes*	Reinforced concrete stairs, steel staircase
External Walls	*Yes*	Twin Therm cladding, aluminum cladding, concrete 'Prowall' surrounding dock levelers and polycarbonate cladding
Windows & External doors	*Yes*	Steel fire escape doors, glazed office entrance door
Internal Walls and Partitions	*Yes*	Metal stud plasterboard walls, glazed partitions, aluminum composite panels
Internal Doors	*Yes*	Wooden interior doors
INTERNAL FINISHES		
Wall Finishes	*Yes*	Plaster and paint, ceramic tiles*
Floor Finishes	*Yes*	Ceramic tiles, carpet, raised access flooring system
Ceiling Finishes	*Yes*	Ceiling tiles with metal frame
FITTINGS & FURNISHINGS	*No*	Not included due to speculative 'base build only' nature of the building
SERVICES		

Element	Included?	Comments
Sanitary Fittings	*Yes*	WCs, taps, urinals
Services Equipment	*No*	No services equipment present in base build*
Disposal Installations	*No*	No disposal installations present in base build*
Water Installations	*Yes*	Cold, hot and drinking water supplies, water meter*
Heat Source	*Yes*	Air source heat pumps and domestic hot water boiler*
Space Heating and Air Treatment	*Yes*	Ceiling heating and cooling system and electric radiators*
Ventilation Systems	*Yes*	Air exchanger and heat recovery units and ventilation ductwork*
Electrical Installations	*Yes*	Electric cabling, electrical meters and electrical control box*
Gas Installations	*Yes*	Gas meter*
Lift Installations	*Yes*	Lifts and dock levelers
Protective Installations	*No*	Assumed less than 5% of cost and therefore excluded
Communication Installations	*Yes*	Building Management system*
Specialist Installations	*No*	No specialist installations present*
EXTERNAL WORKS		
Site works	*Yes*	
Drainage	*Yes*	Foul water drainage included*
External services	*Yes*	External lighting included
Notes - *assumptions made, further details provided within **Appendix 2**		

Table 8 demonstrates that the minimum elements (substructure and superstructure) required within an embodied carbon assessment have been included within the model for each unit. Furthermore, to improve accuracy and robustness, as much additional information as possible has been included within the assessment.

The results of the embodied carbon assessment are discussed further below.

5.6.4 Uncertainties and Limitations of Assessment

As with any form of carbon footprint, there are a number of limitations and uncertainties in this assessment as set out as below:

Material Specification

The material specification is not yet fixed, and key components are likely to vary as the design develops.

Transport

The One Click software assumes a default distance in kilometres and vehicle for each material category, this is based on regional typical values for the product type. Furthermore, it should be noted that transport emissions account for a very small proportion of embodied carbon emissions and therefore any manual update based on specific suppliers is unlikely to make a significant difference to the results. The transport figures exclude empty return trips as it is assumed that these serve other uses.

Recycled Elements

Unless confirmed otherwise, default UK recycled percentages have been used as recommended by One Click LCA. These defaults include an assumed recycled percentage of 97% in steel rebar, and 10% within cement binders.

Construction Site Operations

Reporting construction site impacts is challenging until final figures such as site electricity usage, diesel usage and waste collection can be confirmed by the main contractor. In recognising this, the One Click software provides a function which allows the impact of site operations to be estimated based on climate region and building area. This function has been used for both units under the selection of 'average site impacts – temperate climate (north)'.

Operational Emissions

Operational energy emissions have taken from the 'Be Green' as designed BRUKLs within the Yonder's London Plan Energy Assessment Rev 01. SAP 10.1 carbon factors have been used to convert energy consumption into carbon emissions.

Service Life

The One Click software assumes a building life and study period of 60 years. This study period is in line with the requirements of BREEAM Guidance Note 08 and guidance for non-domestic buildings.

Each product entered into the One Click tool has an assumed service life which is necessary to calculate replacement impacts of the construction material within the calculation period. The software assumes a 'technical service life' which is the amount of time in which the product maintains its function.

Generally, the majority of products have a service life which is as per the building life; 60 years. These products include structural frame, external walls, substructure and windows. However, a number of default lifespans for products with a shorter lifespans are included as default within the One Click LCA software. These products are therefore likely to have slightly higher emissions associated with maintenance and replacement.

General Assumptions

Due to the early stage in the design, some elements have been assumed using information from similar projects and online sources. There assumptions are provided within **Appendix 2**.

5.7 BREEAM

The current BREEAM UK New Construction standard is the 2018 Version 3.0 under which the 'Industrial' sub-scheme is applicable to the two units at Iron Bridge Rd.

The updated Materials section within BREEAM 2018 provides a renewed focus on environmental impacts arising from the whole

life cycle of a building. Earlier BREEAM schemes required consideration of the Green Guide to Specification[8], which uses the BRE's Environmental Profiles Methodology from 2008 and is therefore considered to be outdated.

Under the latest version of BREEAM, projects can achieve up to 7 core credits (plus 3 exemplary credits) under credit issue 'Mat 01' by using an appropriate Life Cycle Assessment tool to quantify and reduce environmental impacts.

Credits are awarded under Mat 01 for undertaking LCA and an options appraisal for the proposed buildings to determine how embodied carbon and other environmental impacts can be reduced.

The following criteria must be met to achieve the maximum number of core and exemplary credits awarded for this issue.

- An IMPACT compliant (or equivalent) software tool has been used to measure the environmental impact of the building;
- The superstructure of the proposed building(s) is compared against the BRE's 'EcoPoints' benchmark of a similar building at Concept Design (RIBA Stage 2) and Technical Design (RIBA Stage 4);
- An options appraisal of different superstructure designs is undertaken at RIBA Stages 2 and 4;
- An options appraisal of different hard landscaping and substructure designs is undertaken at Concept Design;
- An options appraisal of building services is undertaken at Concept Design;
- The LCA is aligned with a Life Cycle Costing (LCC) exercise;
- The design team demonstrates how the use of the modelling software has benefited the building in terms of measuring and reducing its environmental impact;
- The LCA modelling is verified by a third party; and,
- The building outputs and options appraisals from the software are submitted to the BRE prior to completion of RIBA Stage 2.

An options appraisal of superstructure, substructure and hard landscaping will be undertaken at the appropriate stage. Core services will not be included within the options appraisal due to the limited building service options associated with an untreated warehouse.

Turley Sustainability meet the definition of a 'Suitably Qualified Third Party' as follows:

- Received training on using Once Click LCA;
- Completed at least 3 different building LCAs for clients over the past two years; and,
- Are able to interpret construction documentation.

Therefore the requirements for the exemplary 'Third Party Verification' credit will be met.

5.8 Minimising Carbon

Prologis and the design team have taken steps to reduce embodied carbon, and will consider further measures as the design progresses.

The baseline of both buildings was modelled, based on a standard specification and information provided by the Michael Sparks Architects. Subsequently, the baselines were updated with specific products chosen by Prologis.

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.

[8] https://www.bregroup.com/greenguide/podpage.jsp?id=2126

The Twin Therm system has a global warming potential (GWP) of 40.90 $kgCO_2e$ per kg of product, compared to a standard equivalent with a GWP of 50.99 $kgCO_2e$ per m^2.

The difference between the baseline and current design models is shown within Table 9 below. **Table 9** demonstrates the benefit in terms of measuring and reducing environmental impact using the LCA software, and as such, the Policy SI 2 requirement to minimise embodied carbon has been met.

Additionally, further measures to reduce embodied carbon will be considered as the design progresses. These are likely to include:

- Use of cement alternatives such as Ground Granulated Blast Furnace Slag (GGBS) and fly ash;
- Specification of products with recycled content or low environmental impacts;
- Reuse of material from demolition and excavation;
- 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.

Table 9: Embodied Carbon Savings between Baseline and Current Design

	Units 1 & 2 Carbon (tCO_2)	Change in Carbon (tCO_2)	Percentage Change in Carbon
Baseline	16,303	--	--
Current Design	15,882	-421	-2.6%
Note – Module B6 is excluded to show embodied carbon only			

5.9 Results

The total carbon associated with the whole life of the buildings after efforts taken to reduce construction carbon is presented within **Table 10** below.

Table 10: Results Summary for the Current Design

Module		Unit 1 Carbon kg CO_2e	Unit 2 Carbon kg CO_2e
A1-A3	Construction Materials	5,989,369	4,558,304
A4	Transportation to Site	329,418	244,076
A5	Construction/Installation Process	547,669	381,357
B4-B5	Material Replacement	1,808,489	1,430,854
B6	Operational Energy use	7,049,587	5,616,238
C1-C4	Deconstruction	339,375	253,417
Whole Life Carbon Total [All Modules]		**16,063,908**	**12,484,244**
Embodied Carbon (cradle to grave) Total [A1-C4 excluding B6]		**9,014,321**	**6,868,006**
Construction Carbon Total [A1-A5]		**6,866,456**	**5,183,737**

From **Table 10** it can be seen that operational energy use [B6] is the highest single contributor to the carbon emissions of the buildings over their assumed lifetime of 60 years, followed by the materials used during construction.

The total embodied carbon of the two buildings and associated hard landscaping (cradle to grave), which represents the whole life of materials used within construction, and impacts associated with site construction is 15,882,327 kg CO_2.

There is likely to be a slight degree of inaccuracy due to assumptions made, particularly in module A4 where default transportation distances are given, and A1-A3 where a number of material details and quantities have not yet been confirmed due to the early stage within the design.

Figure and **Figure** overleaf show the breakdown of carbon by life cycle stage and by element. Unit 1 has been used as an indicative example.

Figure 6 Carbon Emissions of Each Life Stage (Unit 1)

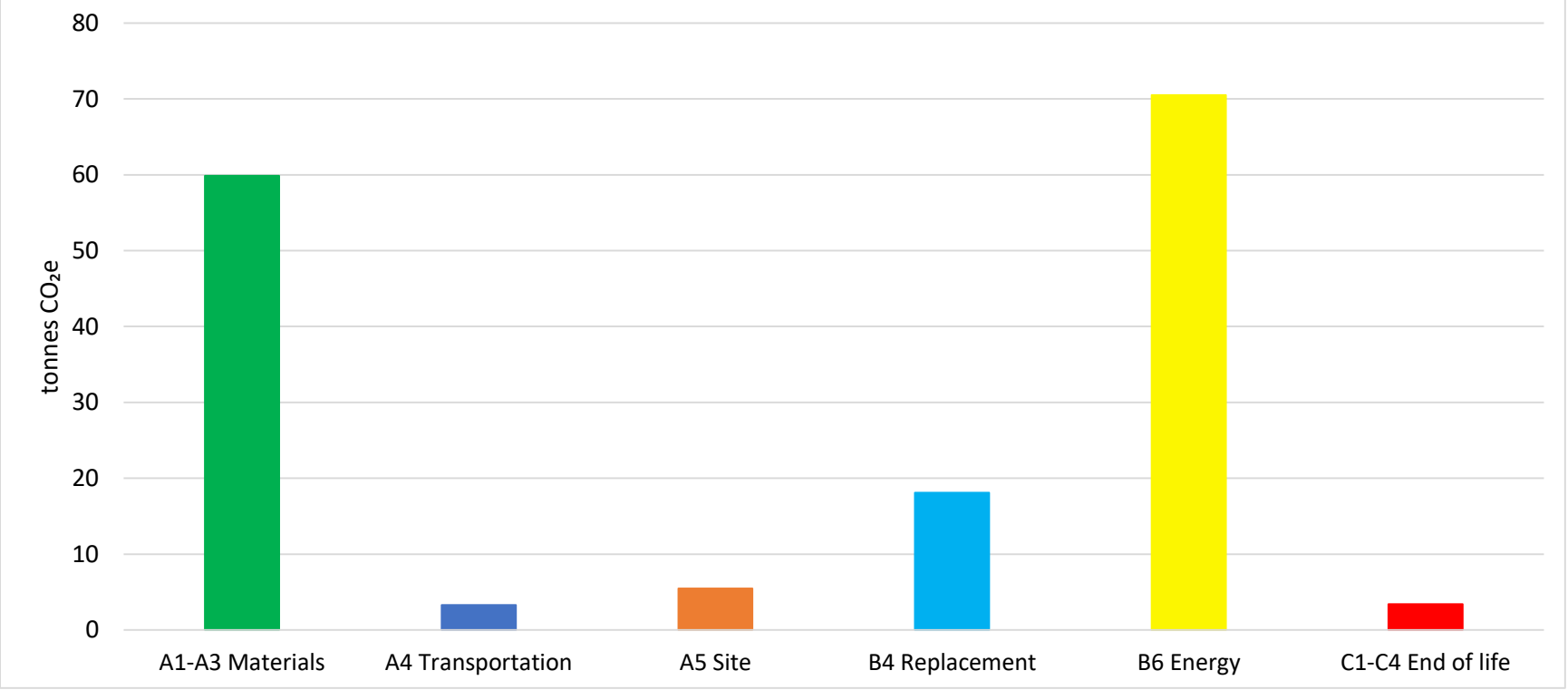


Figure 7: Carbon Emissions (tCO_2e) of Material Element (Unit 1)

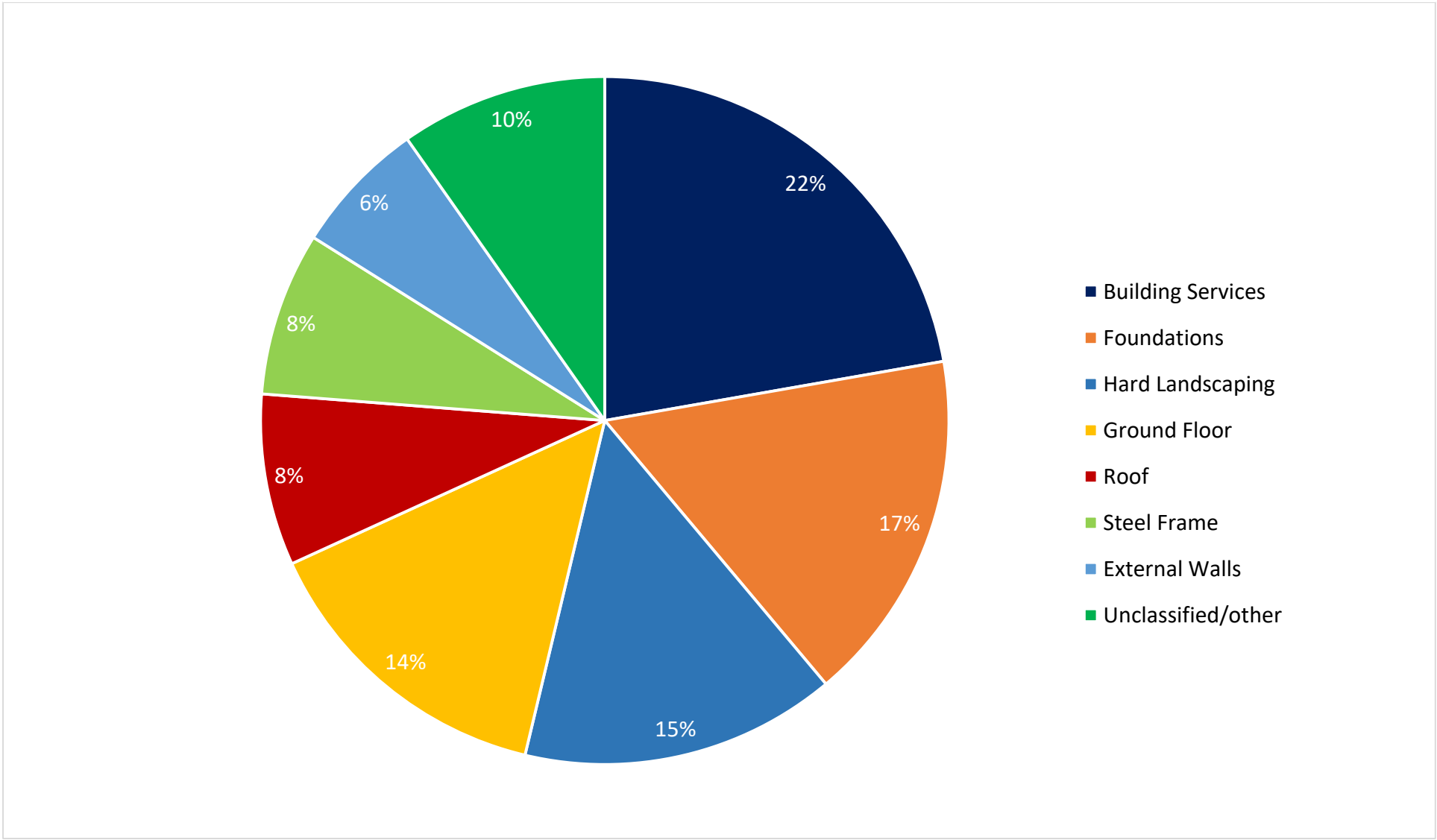


Figure shows that building services contributes to the highest amount of embodied carbon over the life of the building. Solar PV alone contributes to 3% of the total whole life carbon of the development (approximately 5% embodied), however the panels reduce the carbon associated with the building's operation.

Foundations, ground floor slab and hard landscaping together total almost half of the total embodied carbon. These elements are high contributors due to carbon hot spots such as concrete and reinforcement. Generally, the ground floor slab would tend to contribute to a higher proportion of material carbon alone, but the low volume of reinforcement specified (35kg/m^3 concrete) has reduced the overall impact.

Carbon hotspots such as concrete can be reduced by incorporating alternative cement blends such as GGBS or fly ash which will be considered by the engineers at detailed design.

5.10 Comparison against RICS Benchmark

The RICS Methodology to Calculate Embodied Carbon provides embodied carbon benchmarks for each building type, based on data collected by Atkins. For a warehousing/logistics building, the single point benchmark is 410 $kgCO_2e/m^2$, although the actual range is estimated to be between 200 – 500 $kgCO_2e/m^2$. These estimates are based on cradle to gate stage only i.e. modules A1-A3.

It should be noted however, that these benchmarks may be out of date. The size of the range also represents the different interpretation of embodied carbon assessments, and in particular BS 15978. As discussed within **Section 5.4.1** embodied carbon assessments as a minimum must report substructure and superstructure, whereas for the buildings at Iron Bridge Rd, the assessment goes above and beyond these requirements to include elements such as building services.

Based on a floor area of 18,049m^2 for Unit 1, and 12,568m^2 for Unit 2, the proposed units' cradle to gate carbon figures [A1-A3] are 380 $kgCO_2e/m^2$ and 412 $kgCO_2e/m^2$ respectively. Both units are therefore within the RICS benchmark range.

5.11 Comparison against RIBA Sustainable Outcomes Targets

In June 2019 RIBA joined the global declaration of an environmental and climate emergency. Their Sustainable Outcomes Guide[9] provides clear and measurable targets for the construction industry to achieve a sustainable outcome, contributing to the UN Sustainable Development Goals (SDGs). The documents includes embodied carbon targets for non-domestic buildings as follows:

- 2020 - <800 $kgCO_2e/m^2$
- 2025 - <650 $kgCO_2e/m^2$
- 2030 - <500 $kgCO_2e/m^2$

The targets are based on embodied carbon as defined within the RICS Whole Life Carbon Guidance (2017), and therefore reflects modules A-C, excluding B6 'operational energy use'.

The embodied carbon results of Unit 1 (499 $kgCO_2e/m^2$) goes beyond the target for 2030, and Unit 2 (546 $kgCO_2e/m^2$) goes beyond the target for 2025. Both are improvements on the target for 2020, therefore the development is ahead of the trajectory proposed by RIBA for

[9]https://www.architecture.com/-/media/GatherContent/Test-resources-page/Additional-Documents/RIBASustainableOutcomesGuide2019pdf.pdf

achieving sustainable practice in the construction industry.

5.12 Whole Life Carbon Summary

The whole life carbon of the two units and associated hard landscaping over 60 years has been modelled using One Click LCA software and is 28,548 tCO_2.

The specification of Twin Therm external wall and roof cladding contributed to a reduction in embodied carbon of 421 tonnes or 2.6%, and as such, the Policy SI 2 requirement to minimise embodied carbon has been met.

During detailed design, the architect and structural engineer will consider further measures to reduce embodied carbon such as:

- Use of cement alternatives such as Ground Granulated Blast Furnace Slag (GGBS) and fly ash;
- Specification of products with recycled content or low environmental impacts; and
- Reuse of material from demolition and excavation.

Furthermore, Prologis will engage with the main contractor (once appointed) to:

- Explore options to procure materials locally to reduce distance of materials transported to site; and
- Consider how to reduce emissions associated with site operation such as avoiding the use of diesel generators and implementing energy saving measures within site cabins.

Additionally, the emissions associated with construction will be fully mitigated through the Cool Earth scheme.

6. Summary & Conclusions

Prologis has a proactive approach to sustainable development and takes a holistic view to design to deliver low carbon resource efficient buildings.

This Sustainability and Energy Statement has been prepared to demonstrate how the proposed development at Iron Bridge Road, Hillingdon will deliver a sustainable development in accordance with national and local planning policy.

Prologis has a proactive approach to sustainability with a range of corporate goals to deliver high quality sustainable development. This whole life cycle approach to development includes assessment of carbon emissions at all stages of the development, reducing emissions, and mitigating emissions through the protection of rain forest through the Cool Earth scheme.

In this context the key sustainability measures incorporated into the design of the development include:

- A commitment to deliver sustainable distribution buildings that achieve the BREEAM 2018 Very Good environmental assessment rating;
- Construction of energy efficient and low carbon buildings which will achieve as a minimum a 35% reduction in emissions through the use of fabric, energy efficiency and renewable energy measures.
- Through a contribution to the Cool Earth scheme to protect 281 acres of endangered rainforest, averting emissions equivalent to 5 times of the embodied carbon of the development.
- Through the construction and operational stage emissions it is estimated the development could reduce the lifetime emissions by 271% going well beyond the requirements of the London Plan.
- Reduced water consumption in operation through water efficient fittings, suitable metering and rainwater harvesting in accordance with Prologis corporate policy of reducing potable water usage by 50% in all new warehouse developments.
- A commitment to providing resilience to the effects of climate change through the use of climate change allowances in the surface water system design and assessment of building overheating.
- Maximise resource efficiency and minimise waste during construction and operation of the development including registration to the Considerate Constructor scheme;
- Provision of measures to support sustainable travel including 94 cycle storage spaces and 20% active EV charging spaces; and
- The provision of ecological mitigation and enhancement measures to support biodiversity, as well as support climate change adaptation.

Overall the proposed development will deliver resource efficient buildings including measures to mitigate and adapt to climate change.

Appendix 1 – Energy Assessment

Appendix 2 – WLC assumption

Element	Assumptions
Roof	Hatch access 3m x 1.2m
Frame	Intumescent paint applied to frame at 13m^2 per tonne of steel. Paint thickness 210-690 µm
	Lift shaft C30/C37 strength concrete
Internal Walls	Steel study wall assembly
Upper Floor	C30/C37 concrete strength
Hard Landscaping	Mesh reinforcement within concrete yard at 80kg/m^3
Foundations	Crushed rock sub base, concrete ready-mix and steel rebar. Hollow steel section piles up to 5m
	Asphalt road 250mm thickness
Finishes	Ceramic wall tiles
	Mass of plaster calculated from wall area
	Ceiling insulation mineral wool with density between 25-50kg/m^3 and 100mm thickness
Services	Number and type of internal and external lighting
	Steel cleaners sinks
	Taps with electronic sensors
	General services such as electric radiators, air exchanger, heat recovery, ceiling heating and cooling systems, electric control box, heat pump and ventilation systems based on similar industrial buildings
	Solar PV – Unit 1 636m^2, Unit 2 443m^2 arrays
	Taps with electronic sensors
	Steel sink in kitchenette / warehouse area
	Building management system installed
	Electricity cables estimated by One Click software on a floor area basis
	Drinking water supply estimated by One Click software on a floor area basis
	Hot and cold water supply estimated by One Click software on a floor area basis
	Sewage water drainage estimated by One Click software on a floor area basis
	5 electric meters, 2 water meters and 1 gas meter
Other	Stair height 6m

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