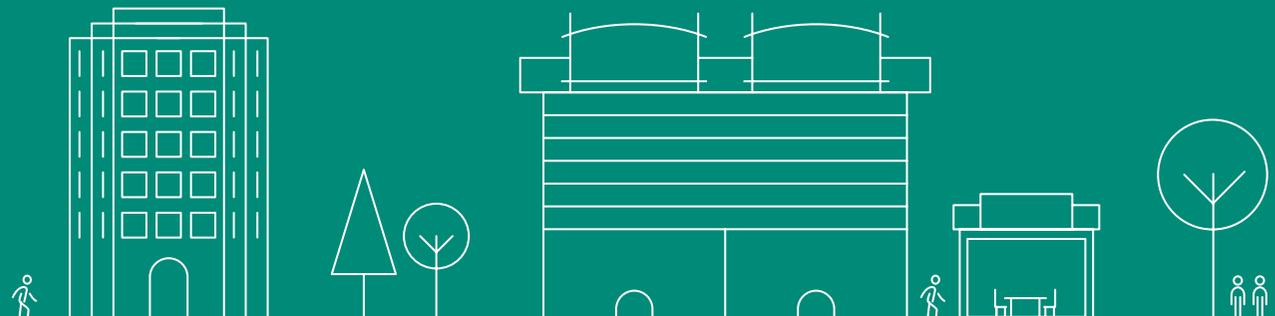
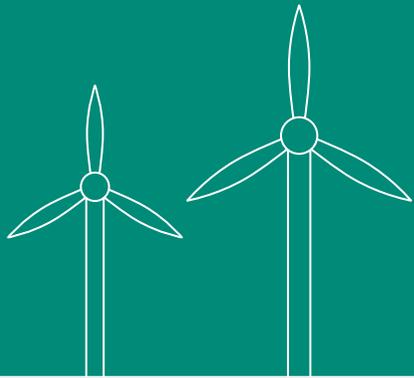


Development and Project Management

Development Sustainability Principles

Version 3 | April 2019



“

We are a long-term business which is inspired by our purpose, creating brilliant places through conscious commercialism. It informs everything we do and comes to life in how we integrate sustainability into all aspects of the built environment.

With this updated version of our Development Sustainability Principles, we are renewing our focus on ensuring the resilience of our business and our places, and to working with the changing needs of our customers.

We will make the most impact by working together with you to bring these principles to life in how we design, build and operate brilliant places which deliver positive benefit for our customers, communities and everyone who experiences them.

”

Dame Alison Nimmo
Chief Executive Officer, The Crown Estate

1.0

Introducing the DSP

Introduction	4
Outcomes	5
Application of the DSP	6
Requirements by Work Stage	9

2.0

Performance requirements

Major projects	12
Moderate projects	15
Minor projects	18

3.0

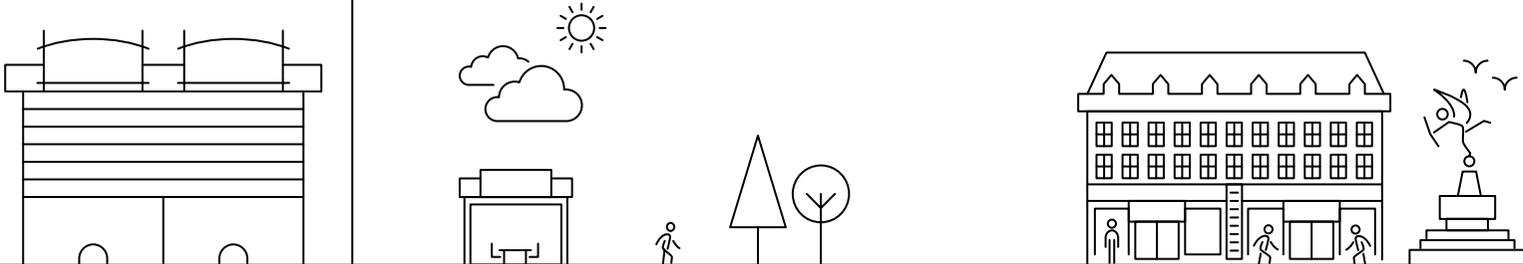
Detailed Work Stage requirements

Customer-centric focus	20
Resilience	21
Operational efficiency	23
Communities	25

4.0

Appendices

Appendix A	28
Circular business requirements	
Appendix B	30
The Crown Estate's Materials Principles	
Appendix C	31
Operational energy modelling requirements	
Appendix D	34
The Crown Estate's supporting documents	

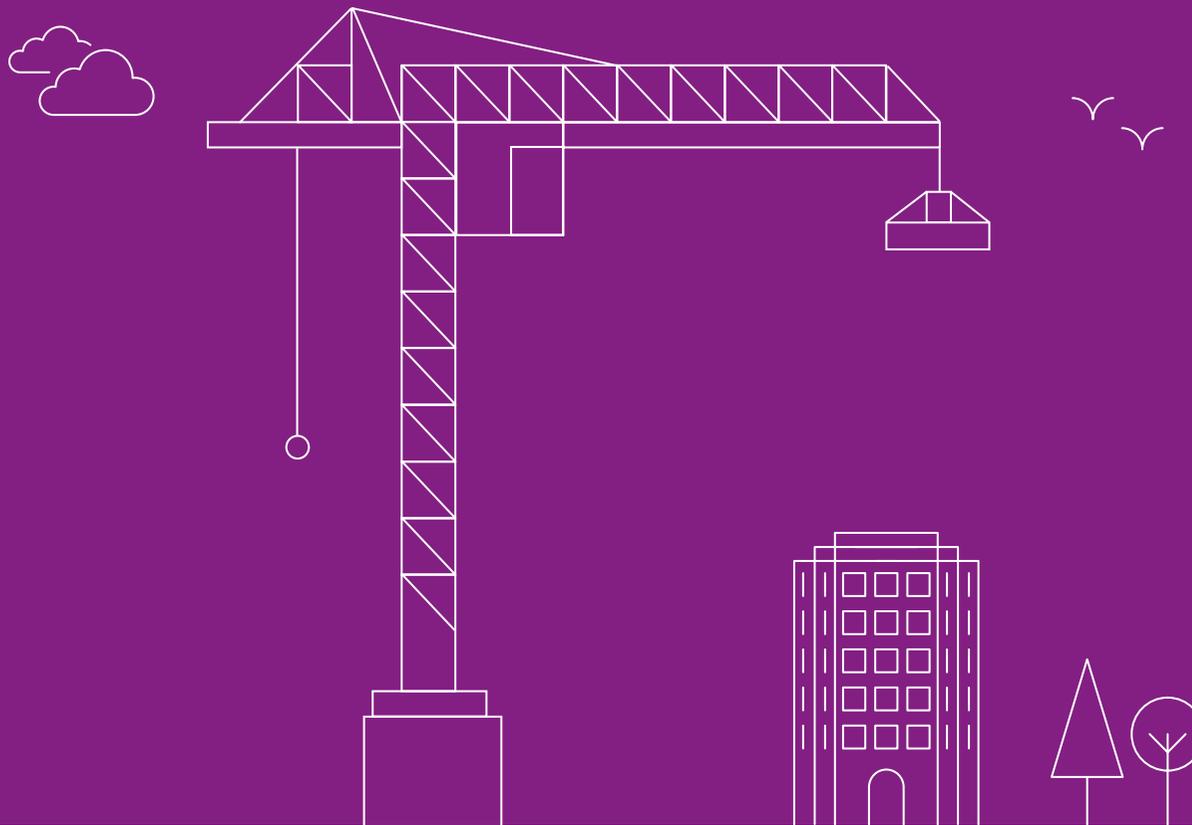


1.0

Introduction

In this section

Introduction	4
Outcomes	5
Application of the DSP	6
Requirements by Work Stage	9



Introduction

The Crown Estate is a UK real estate business with a portfolio unlike any other. It includes some of Central London's best places to work, shop and visit; brilliant destinations across the country and, in our role as manager of the seabed around England, Wales and Northern Ireland, offshore wind.

In everything we do, we are driven by a clear purpose: creating brilliant places through conscious commercialism. This means taking a long-term view, considering what we do from every perspective, and working in partnership.

To deliver against our purpose into the future, we recognise that we must continue to challenge ourselves over how we do business and the impact we have on the environment, our communities and customers, employees and suppliers. We believe our buildings and the spaces in between, should help our customers, our visitors, and our stakeholders to achieve their goals. By putting people at the heart of our developments, we will ensure that we create resilient destinations that retain their value for the long-term.

This latest version of our Development Sustainability Principles (DSP) sets out our expectations on how key sustainability considerations should be integrated into decision-making throughout the design and construction process.

Ultimately, we believe that a sustainable destination is one where people want to be, where our customers are more successful, and where we improve the environment and communities around us.

Document structure

This document is structured as follows:

Introduction: outlining the application of the DSP.

Performance requirements: presenting the expected performance for Major, Moderate and Minor projects.

Detailed Work Stage requirements: including the requirements, inputs, deliverables and responsibilities for each work stage.

Appendices: supporting information as referenced throughout the document.



Outcomes

To support the delivery of our purpose and our long-term strategy for the business, we want all our developments in Central London and Regional to deliver against a series of outcomes and expectations:

Customer-centric focus – Our places must be somewhere people want to be, offering a seamless experience and help them achieve their goals

- Our spaces should be designed with the consumer in mind. We want to create healthy, productive and accessible environments for our customers and visitors to enjoy.

Resilience – We need to ensure our assets retain their value in the long term

- Our assets should be physically resilient against changes such as climate change, the energy demands of our customers and circular business practices. Our buildings and spaces should be adaptable for the long term.

Operational efficiency – We must create buildings that have a positive impact on the world around us by minimising costs and resource use

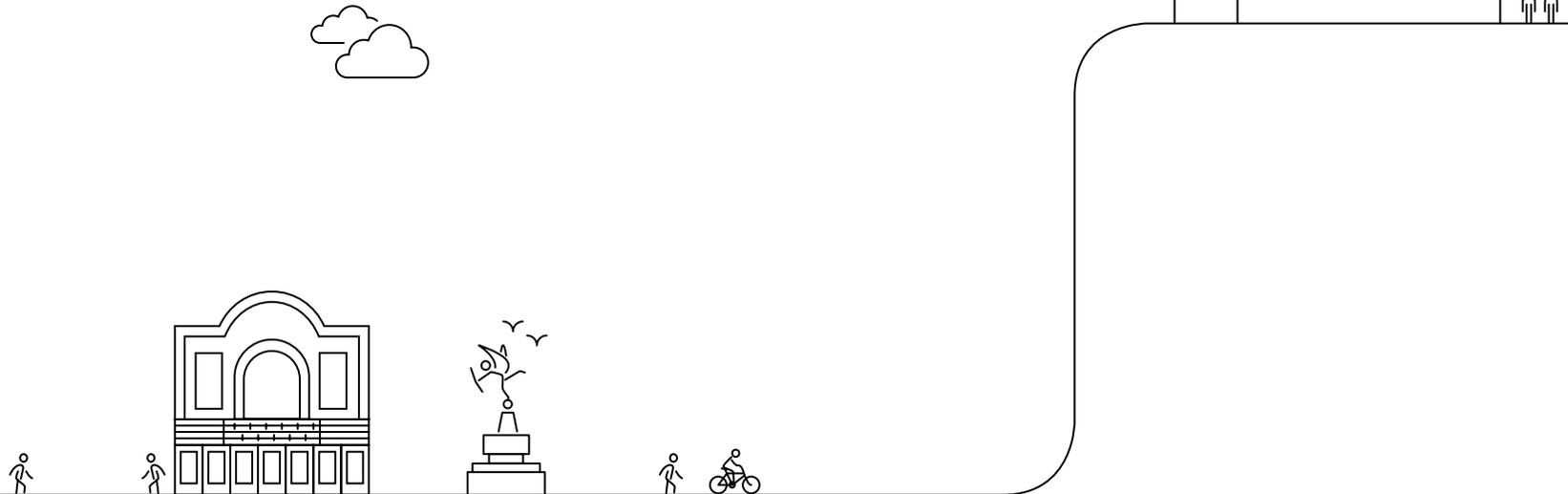
- We should deliver high-quality products that optimise operational performance. This should be incorporated in the way that we design, construct and operate our spaces, and through working collaboratively with our supply chain.

Communities – We want our developments to play a positive role in the communities they serve

- Our developments should fully integrate within the local community to maximise the benefits. This should include community engagement, responsible procurement of services and goods that promote skills, development and education within the construction sector.

Innovation and continuous improvement – Inspire our project teams to identify opportunities to continually innovate and improve

- We seek to work in partnership with our supply chain to continually identify opportunities for innovation and sharing best practice to inform future projects.



Application of the DSP

The DSP is applicable to a wide range of development projects that are undertaken within the Central London and Regional portfolios.

The DSP will be considered across a range of different use classes within the portfolios, including office and commercial uses, retail and leisure, residential, industrial uses, as well as public realm activities.

Developments also differ on the type and scale of works undertaken, described as 'Major', 'Moderate' and 'Minor' (Table 1). Performance requirements against each of these projects are outlined in Section 2.0.

In collaboration with The Crown Estate, Project Design Teams are required to determine the project-specific performance requirements that take into consideration of the appropriate use class and works undertaken. Design Teams should aim to achieve and exceed these performance requirements where possible to deliver strong sustainability outcomes.

The DSP is supported by and corresponds with a number of other documents from The Crown Estate. Reference to these documents are included in Appendix D.

Major, Moderate and Minor criteria		
Major project criteria (apply where any of the following criteria are met)	Moderate project criteria (apply where any of the following criteria are met)	Minor project criteria (apply where any of the following criteria are met)
<p>Central London:</p> <ul style="list-style-type: none"> – Capital expenditure in excess of £10 million construction spend. – New developments or refurbishments (including public realm) with an overall floor area greater than 1,000 sq m (10,000 sq ft). – Residential schemes of scale, 10 units or above. <p>Regional</p> <ul style="list-style-type: none"> – Capital expenditure in excess of £5 million construction spend. – New developments or refurbishments (including public realm) with an overall floor area greater than 1,000 sq m (10,000 sq ft). – Residential schemes of scale, 10 units or above. <p>Public realm</p> <ul style="list-style-type: none"> – Capital expenditure in excess of £1 million. 	<p>Central London:</p> <ul style="list-style-type: none"> – Capital expenditure less than £10 million construction spend. – New developments or refurbishments (including public realm) with an overall floor area less than 1,000 sq m (10,000 sq ft). – Residential schemes below 10 units. – More than 6 weeks construction duration. <p>Regional</p> <ul style="list-style-type: none"> – Capital expenditure less than £5 million construction spend. – New developments or refurbishments (including public realm) with an overall floor area less than 1,000 sq m (10,000 sq ft). – Residential schemes below 10 units. – More than 6 weeks construction duration. <p>Public realm</p> <ul style="list-style-type: none"> – Capital expenditure between £0.5 – £1 million. 	<p>Central London</p> <ul style="list-style-type: none"> – External repair and decoration to building fabric or public realm. – Service charge recoverable landlord works. – Non service charge recoverable works undertaken on behalf of The Crown Estate. – Less than 6 weeks duration. <p>Regional</p> <ul style="list-style-type: none"> – External repair and decoration to building fabric or public realm. – Service charge recoverable landlord works. – Non service charge recoverable works undertaken on behalf of The Crown Estate. – Less than 6 weeks duration.

Table 1: Major, Moderate and Minor project criteria

Application of the DSP continued

This is a summary table of the detailed Work Stage requirements in Section 3 and explains the desired outcomes for the four topics

	Set objectives		Integrate into design		Implementing and monitoring		Validate and review performance
	Strategic definition, preparation and brief	Concept design	Concept design	Developed design	Technical design	Construction	In use
Outcomes	Typical Activities by Stage						
							
General requirements							
Embedding sustainability considerations into key design and construction decision-making	<ul style="list-style-type: none"> – Incorporate sustainability objectives within Strategic Brief – Identify project sustainability aspirations and objectives, and assigning Roles & Responsibilities – Identify opportunities for innovation in design and construction 	<ul style="list-style-type: none"> – Engage with project teams through Sustainability workshops and DTMs – Set Project Specific Sustainability Requirements and included within Viability Assessments – Identify local and regional planning policy requirements and applicability to scheme 	<ul style="list-style-type: none"> – Continue to engage with project team through Sustainability workshops and DTMs – Embed requirements into design and performance specifications 	<ul style="list-style-type: none"> – Include sustainability requirements in tender documentation in line with Main Contractor's standard Employer's Requirements on Sustainability (Appendix D) – Review and weight tender responses of sustainability requirements – Engage with contractor 	<ul style="list-style-type: none"> – Embed requirements during construction – Monitor: <ul style="list-style-type: none"> – Construction performance – Procurement activities – As built data – Engage with site teams on performance – Verify/Audit of Data 	<ul style="list-style-type: none"> – Handover to Asset and Property Management of relevant sustainability requirements – Review of performance and process – Initial Lessons Learned with Project Team and Main Contractor 	<ul style="list-style-type: none"> – Undertake independent Post Occupancy Evaluation (first three years of occupation) – Lessons Learned with Project Team and Main Contractor – Assess outcomes against objectives and report lessons learned to The Crown Estate
Customer-Centric Focus							
Customer Wellbeing							
Supporting and enhancing customer wellbeing through adoption of a healthy design approach and integration of green infrastructure	Establish core areas of wellbeing focusing on indoor air quality, thermal comfort, biodiversity and accessibility	Identify opportunities to integrate wellbeing features into design and specification		Demonstrate how the design and specification integrates the wellbeing features, and identify ongoing maintenance and monitoring requirements		Include the maintenance and monitoring of all wellbeing features into the handover documentation	Monitor and assess the effectiveness of the measures implemented
Resilience							
Climate Resilience							
Ensuring resilience measures against climate change risk factors are incorporated to enable business continuity and retain asset value	Understand and ensure key climate change risks focusing on flood risk, thermal comfort and utility resilience are identified	Design in resilience measures to manage and mitigate identified climate risks		Demonstrate through specification and installation of resilience measures and expected performance requirements		Incorporate the management and maintenance of resilience measures within handover documentation	Monitor effectiveness of measures and assess outcomes
Circular Business							
Incorporating circular principles to reduce resource use and ensure reusability of existing materials	Identify opportunities for reducing and reusing resources, and the adaptability of the building in the future	Ensure the design integrates the opportunities identified and sets specific targets to achieve circularity	Embed circular measures into the design and specification, and include as part of tender requirements		Measure and monitor the adoption of circular business activities against project targets	Include all circular information and objectives in handover documentation	Assess the project outcomes against the objectives and report lessons learned

Application of the DSP

continued

	Set objectives		Integrate into design		Implementing and monitoring		Validate and review performance
	Strategic definition, preparation and brief	Concept design	Concept design	Developed design	Technical design	Construction	In use
Outcomes	Typical Activities by Stage						
							
Operational Efficiency							
Operational Performance							
Ensuring that the design enables efficient operation of the building, minimises resource usage and maximises long-term lifecycle	Identify opportunities for resource efficiency (i.e. energy, water and waste)	Set targets for operational performance	Incorporate resource efficiency measures within the design and specification	Demonstrate how the design and specification enables operational performance targets to be achieved	Include operational performance targets in handover documentation	Monitor operational performance data against targets and continue to optimise building performance	
Supply Chain Management							
Incorporating responsible practices into the construction process to optimise resource use		Ensure design and procurement enable responsible construction activities and opportunities for consolidation to be adopted		Incorporate requirements for Main Contractor to adopt responsible construction practices and consolidation in tender process	Report against how responsible construction practices including consolidation is being adopted	Review performance against targets and identify any lessons learned	
Communities							
Community Engagement							
Engaging with communities and stakeholders to inform the way in which we design, procure and construct our developments, that maximises the benefits to local communities	Understand local needs and local authority priorities to inform the design and local employment opportunities	Identify opportunities and engage with relevant stakeholders in early planning to inform design	Integrate identified priorities into the design process	Include project specific community targets within the tender documents	Continue to engage with stakeholders in the community during construction	Assess outcomes against objectives and identify any lessons learned	
Accessibility							
Enabling access via sustainable transport modes and consolidation opportunities to reduce congestion and carbon emissions in operation	Identify site accessibility needs and requirements and set strategic requirements for freight and waste consolidation	Design in appropriate facilities that enable sustainable accessibility options and consolidation in use. Identify ongoing management responsibilities for ensuring sustainable transport options and consolidation in-use requirements are met		Demonstrate how the design and specification achieves the requirements	Incorporate ongoing management responsibilities for ensuring sustainable transport needs and consolidation in-use requirements are met within handover documentation	Monitor and review the effectiveness of accessibility measures implemented	

Requirements by Work Stage

Overview of process

The DSP is structured around the project detailed Work Stage requirements, as defined within The Crown Estate Plan of Work. It is essential that these principles are integrated by The Crown Estate and the project Design Team from the outset to inform decision-making both strategically and throughout the rest of the design process. The detailed Work Stage requirements, milestones and key activities are summarised in Figure 1 below.



Figure 1: Summary of work stage requirements

Requirements by Work Stage continued

Reporting

All projects are required to demonstrate how the performance requirements of the DSP are being considered and delivered, proportionate to the scope of works undertaken.

For all Major and Moderate projects, Projects Teams should ensure through the project sustainability co-ordinator the following:

- Across Work Stage 0-1 agree and set out project specific performance requirements within The Crown Estate's proforma
- Across Work Stage 2-4 demonstrate through design, specification and procurement progress against the agreed project performance requirements using The Crown Estate's proforma
- Across Work Stage 5-6 quarterly reporting against the performance requirements completed and submitted within three weeks of the end of each financial quarter
- All stages should incorporate a summary and track progress against key sustainability targets in line with the DSP, to be signed off by the project Sustainability Co-ordinator

Data verification and assurance

In addition to project monitoring, Project Teams are required to collect and make available auditable evidence to demonstrate how performance requirements have been achieved for the duration of the project and liability period. Independent audits against specific performance requirements will be conducted to support data verification and assurance.

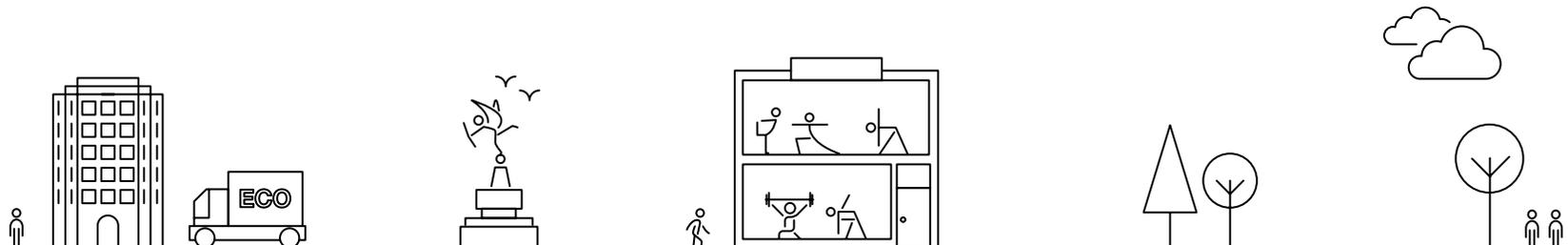
Document history

This document is Version 3 of the DSP and represents a major revision to Version 2.1, which was launched in 2016. The DSP was first launched in September 2013.

Key changes:

- A focus on delivering better sustainability outcomes, customer experience and long-term resilience against changing physical factors.
- A greater emphasis on integrating key sustainability considerations into the relevant detailed Work Stage requirements to influence decision-making over the design, procurement and construction of projects.
- An update and inclusion of material areas such as:
 - **Health and wellbeing:** focusing on core areas of health and wellbeing outcomes, and minimum performance outcomes of our developments.
 - **Energy and carbon:** integrating Design for Performance principles and adopting Whole Life Carbon considerations.
 - **Communities:** emphasising the need for early and meaningful community engagement to shape how we build, design and operate our buildings so they are integral to their local community.
 - **Resilience:** Incorporating how climate change may be considered in the design and operation of our developments with a focus on flood risk and temperature variations.
 - **Building certificates:** clarity on our approach to targeting building certifications.

The DSP is reviewed regularly and updated in order to reflect evolving customer expectations, as well as changes to legislation (including planning policy) and within industry to ensure that The Crown Estate continues to adopt a progressive approach to delivering a more sustainable built environment.



2.0

Performance requirements

In this section

Major projects	12
Moderate projects	15
Minor projects	18



Major projects – performance requirements

Major project criteria (apply where any of the following criteria are met)

Central London:

- Capital expenditure in excess of £10 million construction spend.
- New developments or refurbishments (including public realm) with an overall floor area greater than 1,000 sq m (10,000 sq ft).
- Residential schemes of scale, 10 units or above.

Regional:

- Capital expenditure in excess of £5 million construction spend.
- New developments or refurbishments (including public realm) with an overall floor area greater than 1,000 sq m (10,000 sq ft).
- Residential schemes of scale, 10 units or above.

Public realm

- Capital expenditure in excess of £1 million.

Application of the performance requirements will be determined based on the type of project as not all requirements will universally apply. Project teams should strive to demonstrate how performance requirements are achieved, where possible and as far as practicable. Where performance requirements are not deemed suitable or achievable, alternative performance requirements should be proposed and discussed with The Crown Estate

Requirements	Performance requirements	Application					
		Type		Use class			
		New build	Refurbished	Residential	Office	Retail/Industrial	Public realm
General							
Detailed Work Stage requirements reporting	Incorporate sustainability requirements within each detailed Work Stage requirements Report, and respond to The Crown Estate DSP Reporting requirements	•	•	•	•	•	•
Roles and responsibilities	Clearly identify roles and responsibilities of Project Team and Main Contractor across each detailed Work Stage requirements	•	•	•	•	•	•
Sustainability ratings/certification schemes							
Considerate Constructor's Scheme	CCS Score of 37 or above	•	•	•	•	•	•
BREEAM (against most current and relevant scheme)/Home Quality Mark	Excellent Rating (Offices/Residential), Very Good Rating (Retail/Industrial), Home Quality Mark pre-assessment	•	•	•	•	•	
WELL Building Standard	WELL Ready or Gold rating where certification is sought	•	•		•		
Customer-centric							
Customer wellbeing							
Healthy design approach	Performance requirements should be consistent with the WELL certification standard (or equivalent) unless otherwise stated below	•	•	•	•	•	
Internal air quality	Total VOCs – 8-hour mean: 500µg/m ³ (testing in line with relevant ISO standard) Formaldehyde – 8-hour mean: 33.7 µg/m ³ PM ₁₀ – 24-hour mean: 50 µg/m ³						
		PM _{2.5} – 24-hour mean: <15 µg/m ³ NO ₂ – 1-hour mean: 200 µg/m ³	•	•			•
	Total VOCs – 8-hour mean: 500µg/m ³ (testing in line with relevant ISO standard) Formaldehyde – 8-hour mean: 33.7 µg/m ³ PM ₁₀ – 24-hour mean: 50 µg/m ³ PM _{2.5} – 24-hour mean: <15 µg/m ³	NO ₂ – 1-hour mean: 200 µg/m ³ CO – 8-hour mean: 10mg/m ³ CO ₂ – 8-hour mean: 9,150 mg/m ³ , 15min mean: 27,400 mg/m ³	•	•		•	
Internal air quality	Total VOCs – 8-hour mean: 500µg/m ³ (testing in line with relevant ISO standard) Formaldehyde – 8-hour mean: 33.7 µg/m ³ PM ₁₀ – 24-hour mean: 50 µg/m ³ , annual mean: 40µg/m ³ PM _{2.5} – 24-hour mean: <15 µg/m ³ , annual mean: 25µg/m ³						
		NO ₂ – 1-hour mean: 200 µg/m ³ , annual mean: 40µg/m ³ CO – 8-hour mean: 10mg/m ³ CO ₂ – 8-hour mean: 9,150 mg/m ³ , 15min mean: 27,400 mg/m ³	•	•	•		
			•	•			

Major projects – performance requirements
continued

Requirements	Performance requirements	Application					
		Type		Use class			
		New build	Refurbished	Residential	Office	Retail/ Industrial	Public realm
Customer wellbeing continued							
Internal thermal comfort	Minimum 2 out of 3 CIBSE TM52 criteria are complied with (naturally ventilated)	•	•		•		
	Residential overheating risk assessment should be assessed in accordance with CIBSE TM59 criteria	•	•	•			
	Operational temperature of 28°C is not exceeded (for residential – internal communal corridors)	•	•	•			
	All occupied rooms should not exceed 26°C for more than 3% of occupied hours (for residential – mechanically ventilated)	•	•	•	•	•	
Green space design	All green space achieve two or more functions in line with The Crown Estate Ecology Documents (Appendix D)	•	•	•	•	•	•
	15% of development area to be valuable green space (significant net gain)	•	•	•	•	•	•
Resilience							
Climate resilience							
Climate resilience	Adopt approach and guidance set out under BREEAM 2018 Wst 05 as applicable	•	•	•	•	•	
Flood risk	Compliance with BREEAM 2018 Pol 03 Req 1-24 based on site conditions	•	•	•	•	•	•
Utility resilience	Compliance with BS7543:2015 and BREEAM 2018 Mat 05 Req 2-4	•	•	•	•	•	
Circular Business							
Procurement routes and responsible sourcing	Report % material spend on reused and refurbished content (Appendix A)	•	•	•	•	•	•
	Report % of spend on local procurement of goods in line with project target	•	•	•	•	•	•
	100% compliance with The Crown Estate Materials Principles (Appendix B) and project Sustainable Procurement Plan (as defined in BREEAM 2018 Mat 03)	•	•	•	•	•	•
Embodied Carbon and Whole Life Carbon	15% reduction from embodied carbon baseline and report in kgCO ₂ e/sq m (Appendix A)	•	•	•	•	•	•
	Report whole life carbon in kgCO ₂ e/sq m	•	•	•	•	•	
Disassembly and adaptability	Compliance with BREEAM 2018 Wst 06	•	•	•	•	•	
Operational efficiency							
Operational performance							
Operational energy performance	Top quartile within relevant REEB benchmark (in terms of Energy Intensity expressed kWhe-eq/m ² NIA)	•			•	•	
	Top 50% within relevant REEB benchmark (in terms of Energy Intensity expressed kWhe-eq/m ² NIA)		•		•	•	
	Minimum EPC rating of A	•		•	•		
	Minimum EPC rating of B	•				•	
	Minimum EPC rating of C		•	•	•		
	DfP (NABERS) 4 Star rating (LER kWhe-eq/m ² NIA) (Appendix C)	•	•		•		
	Independent Audit of BMS & EMS data completed and corrective actions implemented.	•	•	•	•	•	
	Specification of energy efficient fixtures and fittings (external lighting) and white goods (A or A+ rated or equivalent)	•	•	•	•	•	•
Operational water performance	40% reduction against baseline water consumption in line with BREEAM 2018 Wat 1 including opportunities for recycling and reuse	•	•		•	•	
	105 l/person/day target water consumption in line with BREEAM Domestic Refurbishment Wat 1	•	•	•			
Energy and water metering	Compliance with The Crown Estate's Metering Strategy for Central London projects (Appendix D)	•	•	•	•	•	
Operational waste	Provision of space (in line with relevant certification requirements) and agreed management solution for segregation, storage and collection of operational recycled waste	•	•	•	•	•	

Major projects – performance requirements continued

Requirements	Performance requirements	Application					
		Type		Use class			
		New build	Refurbished	Residential	Office	Retail/ Industrial	Public realm
Supply chain management							
Responsible construction practices	100% compliance with the Main Contractor's Standard Employer's requirements on sustainability and BREEAM 2018 Man 03	●	●	●	●	●	●
	Measure, report and reduce of all energy use from site activities (including demolition and construction works) against project-set target in kWh.	●	●	●	●	●	●
	Report on % (by value) of local procurement of goods in the supply chain	●	●	●	●	●	●
	Measure, report and reduce of all water use from site activities (including demolition and construction works) against project-set target in m ³	●	●	●	●	●	●
	Measure and report waste by weight (including during demolition and construction) in kg split into reuse, recycling, energy from waste	●	●	●	●	●	●
	3.2 tonnes/100m ² GIA of non-hazardous construction waste generated	●	●		●	●	
	4.9 tonnes/100m ² GIA of non-hazardous construction waste generated	●	●	●			
	98% of non-hazardous of all CDE waste (including fit-out) waste diverted from landfill	●	●	●	●	●	●
95% of non-hazardous CDE waste (including fit-out) waste reused or recycled	●	●	●	●	●	●	
Consolidation during construction	Measure and report against identified opportunities for consolidation during construction	●	●	●	●	●	
Impact on local community							
Community engagement							
Community engagement	Report the number of stakeholder including community groups engaged	●	●	●	●	●	●
	Community satisfaction with process and positivity towards the final scheme	●	●	●	●	●	●
	Compliance with BREEAM 2018 Man 01 demonstrating how teams have considered public space, local heritage, amenity uses, inclusive design and diverse uses, alongside local priorities into design	●	●	●	●	●	●
Employment and skills	100% of staff employed directly by Main Contractor paid at or above London Living Wage (Central London) or Real Living Wage (Regional)	●	●	●	●	●	●
	2.5% of apprentice and traineeship starts over the whole supply chain workforce	●	●	●	●	●	●
	80% of all apprentices supported beyond six months	●	●	●	●	●	●
	Report % of local ¹ workers in site teams	●	●	●	●	●	●
Accessibility							
Consolidation in-use	Consideration of and where practicable, adoption of an appropriate consolidation scheme (e.g. waste, freight, deliveries), as agreed with The Crown Estate	●	●	●	●	●	
Sustainable transport	Adoption of identified measures for sustainable transport	●	●	●	●	●	

¹ Local – prioritising local authority boundaries, followed by city, county, and regional as appropriate and in agreement with TCE community team.

Moderate projects – performance requirements

Moderate project criteria (apply where any of the following criteria are met)

Central London:

- Capital expenditure less than £10 million construction spend.
- New developments or refurbishments (including public realm) with an overall floor area less than 1,000 sq m (10,000 sq ft).
- Residential schemes below 10 units.
- More than 6 weeks construction duration.

Regional:

- Capital expenditure less than £5 million construction spend.
- New developments or refurbishments (including public realm) with an overall floor area less than 1,000 sq m (10,000 sq ft).
- Residential schemes below 10 units.
- More than 6 week construction duration.

Public realm

- Capital expenditure between £0.5 – £1 million.

Application of the performance requirements will be determined based on the type of project as not all requirements will universally apply. Project teams should strive to demonstrate how performance requirements are achieved where possible and as far as practicable. Where performance requirements are not deemed suitable or achievable, alternative performance requirements should be proposed and discussed with The Crown Estate

Requirements	Performance requirements	Application						
		Type	Use class					
		New build	Refurbished	Residential	Office	Retail/Industrial	Public realm	
General								
Detailed Work Stage requirements reporting	Incorporate sustainability requirements within each detailed Work Stage requirements Report, and respond to The Crown Estate DSP Reporting requirements	•	•	•	•	•	•	
Roles and responsibilities	Clearly identify roles and responsibilities of Project Team and Main Contractor across each detailed Work Stage requirements	•	•	•	•	•	•	
Sustainability ratings/certification schemes								
BREEAM (against most current and relevant scheme)/Home Quality Mark	Undertake a pre-assessment feasibility study to determine application of certification	•	•	•	•	•	•	
Considerate Constructor's Scheme	CCS Score of 37 or above	•	•	•	•	•		
WELL Building Standard	WELL Ready	•	•		•			
Customer-centric								
Customer wellbeing								
Healthy design approach	Performance requirements should be consistent with the WELL certification standard (or equivalent) unless otherwise stated below	•	•	•	•	•		
Indoor air quality	Total VOCs – 8-hour mean: 500µg/m ³ (testing in line with relevant ISO standard) Formaldehyde – 8-hour mean: 33.7 µg/m ³ PM ₁₀ – 24-hour mean: 50 µg/m ³		•			•		
	Total VOCs – 8-hour mean: 500µg/m ³ (testing in line with relevant ISO standard) Formaldehyde – 8-hour mean: 33.7 µg/m ³ PM ₁₀ – 24-hour mean: 50 µg/m ³ PM _{2.5} – 24-hour mean: <15 µg/m ³	PM _{2.5} – 24-hour mean: <15 µg/m ³ NO ₂ – 1-hour mean: 200 µg/m ³		•			•	
	Total VOCs – 8-hour mean: 500µg/m ³ (testing in line with relevant ISO standard) Formaldehyde – 8-hour mean: 33.7 µg/m ³ PM ₁₀ – 24-hour mean: 50 µg/m ³ , annual mean: 40µg/m ³ PM _{2.5} – 24-hour mean: <15 µg/m ³ , annual mean: 25µg/m ³	NO ₂ – 1-hour mean: 200 µg/m ³ , annual mean: 40µg/m ³ CO – 8-hour mean: 10mg/m ³ CO ₂ – 8-hour mean: 9,150 mg/m ³ , 15min mean: 27,400 mg/m ³	•	•	•			

Moderate projects – performance requirements
continued

Requirements	Performance requirements	Application					
		Type		Use class			
		New build	Refurbished	Residential	Office	Retail/ Industrial	Public realm
Customer wellbeing continued							
Thermal comfort	Minimum 2 out of 3 CIBSE TM52 criteria are complied with (naturally ventilated)	●	●		●		
	Residential overheating risk assessment should be assessed in accordance with CIBSE TM59 criteria	●	●	●			
	Operational temperature of 28°C is not exceeded	●	●	●			
	All occupied rooms should not exceed 26°C for more than 3% of occupied hours (mechanically ventilated)	●	●	●			
Green space design	All green space achieve two or more functions in line with The Crown Estate Ecology Documents (Appendix D)	●	●	●	●	●	●
	7% of development area to be valuable green space (significant net gain)	●	●	●	●	●	●
Resilience							
Climate resilience							
Climate resilience	Adopt approach and guidance set out under BREEAM 2018 Wst 05	●	●	●	●	●	
Flood risk	Compliance with BREEAM 2018 Pol 03 Req 1-24 based on site conditions	●	●	●	●	●	●
Utility resilience	Compliance with BS7543:2015 and BREEAM 2018 Mat 05 Req 2-4	●	●	●	●	●	
Circular business							
Procurement routes and responsible sourcing	Report % material spend on reused and refurbished content (Appendix A)	●	●	●	●	●	●
	Report % of spend on local procurement of goods in line with project target	●	●	●	●	●	●
	100% compliance with The Crown Estate Materials Principles (Appendix B) and project Sustainable Procurement Plan (as defined in BREEAM 2018 Mat 03)	●	●	●	●	●	●
Embodied Carbon and Whole Life Carbon	Report in kgCO ₂ e/sq m (Appendix A)	●	●	●	●	●	
Operational efficiency							
Operational performance							
Operational energy performance	Top 50% within relevant REEB benchmark (in terms of Energy Intensity expressed kWh-eq/m ² NIA)	●	●		●	●	
	Minimum EPC Rating of A	●		●	●		
	Minimum EPC Rating of B	●				●	
	Minimum EPC Rating of C		●	●	●	●	
	Specification of energy efficient fixtures and fittings (external lighting) and white goods (A or A+ rated or equivalent)	●	●	●	●	●	●
Operational water performance	Specification of water efficient sanitary appliances including opportunities for recycling and reuse	●	●	●	●	●	
Energy and water metering	Compliance with The Crown Estate's Metering Strategy for Central London projects (Appendix D)	●	●	●	●	●	
Operational waste management	Ensure appropriate consideration of either provision of space, or management for segregation and storage of operational recyclable waste on or near site	●	●	●	●	●	

Moderate projects – performance requirements continued

Requirements	Performance requirements	Application					
		Type		Use class			
		New build	Refurbished	Residential	Office	Retail/Industrial	Public realm
Supply chain management							
Responsible construction practices	100% compliance with the Main Contractor's Standard Employer's requirements on sustainability and BREEAM 2018 Man 03	●	●	●	●	●	●
	Measure, report and reduce of all energy use from site activities (including demolition and construction works) against project-set target in kWh.	●	●	●	●	●	●
	Report on % (by value) of local procurement of goods in the supply chain	●	●	●	●	●	●
	Measure, report and reduce of all water use from site activities (including demolition and construction works) against project-set target in m ³	●	●	●	●	●	●
	Measure and report waste by weight (including during demolition and construction) in kg split into reuse, recycling, energy from waste	●	●	●	●	●	●
	3.2 tonnes/100m ² GIA of non-hazardous construction waste generated	●	●		●	●	
	4.9 tonnes/100m ² GIA of non-hazardous construction waste generated	●	●	●			
	98% of non-hazardous of all CDE waste (including fit-out) waste diverted from landfill	●	●	●	●	●	●
	95% of non-hazardous CDE waste (including fit-out) waste reused or recycled	●	●	●	●	●	●
Impact on local community							
Community engagement							
Community engagement	Report the number of stakeholder including community groups engaged	●	●	●	●	●	●
	Community satisfaction with process and positivity towards the final scheme	●	●	●	●	●	●
	Compliance with BREEAM 2018 Man 01 with evidence on how teams has specially considered public space, local heritage, amenity uses, inclusive design and diverse uses, along side local priorities into design	●	●	●	●	●	●
Employment and skills	100% of staff employed directly by Main Contractor paid at or above London Living Wage (Central London) or Real Living Wage (Regional)	●	●	●	●	●	●
	2.5% of apprentice and traineeship starts over the whole supply chain workforce	●	●	●	●	●	●
	Report % of local ¹ workers in site teams	●	●	●	●	●	●
Accessibility							
Consolidation in-use	Consideration of and where practicable, adoption of an appropriate consolidation scheme (e.g. waste, freight, deliveries), as agreed with The Crown Estate	●	●	●	●	●	
Sustainable transport	Adoption of identified measures for sustainable transport	●	●	●	●	●	

¹ Local – prioritising local authority boundaries, followed by city, county, and regional as appropriate and in agreement with TCE community team.

Minor projects – performance requirements

Minor project criteria (apply where any of the following criteria are met)

Central London:

- External repair and decoration to building fabric or public realm.
- Service charge recoverable landlord works.
- Non service charge recoverable works undertaken on behalf of The Crown Estate.
- Less than 6 weeks duration.

Regional:

- External repair and decoration to building fabric or public realm.
- Service charge recoverable landlord works.
- Non service charge recoverable works undertaken on behalf of The Crown Estate.
- Less than 6 weeks duration.

Application of the performance requirements will be determined based on the type of project, as not all requirements will universally apply.

Requirements	Performance requirements
General	
Project reporting	Completed report against performance requirements within six weeks of project completion
Resilience	
Circular business	
Procurement routes and responsible sourcing	100% of all site timber to be from certified source, e.g. FSC or equivalent as defined in The Crown Estate Materials Principles (Appendix B)
	Report % of spend on local procurement of goods
	100% compliance with The Crown Estate Materials Principles (Appendix B) where applicable
Operational efficiency	
Operational performance	
Operational energy performance	Minimum EPC Rating of C
	Specification of energy efficient white goods (A or A+ rated or equivalent)
Operational water performance	Specification of water efficient sanitary appliances
Operational waste	Ensure appropriate consideration of either provision of space, or management for segregation and storage of operational recyclable waste on or near site
Supply chain management	
Responsible construction practices	100% compliance with the Main Contractor's Standard Employer's requirements on sustainability
	Report on % (by value) of local procurement of goods in the supply chain
	100% compliance with Responsible Construction Management as defined by BREEAM 2018 Man 03 Req 7
	Measure and reduce all on site energy consumption in kWh through meter reads at start and end of projects
	Measure and reduce all on site water consumption in m ³ through meter reads at start and end of projects
	Measurement/reporting of waste by weight (including strip-out) in kg, split into reuse, recycling, energy from waste
	100% diversion of all waste from all site-related activities (including strip-out) from landfill
	Measurement/reporting of total non-hazardous waste from all site-related activities (including strip-out and fit-out) (tonnes)
Impact on local community	
Community engagement	
Employment and skills requirements implementation	100% of staff employed directly by Main Contractor paid at or above London Living Wage (Central London) or Real Living Wage (Regional)
	Report % of local ¹ workers in site teams

¹ Local – prioritising local authority boundaries, followed by city, county, and regional as appropriate and in agreement with TCE community team.

3.0

Detailed Work Stage requirements

In this section

Stage requirements

Customer-centric focus	20
Resilience	21
Operational efficiency	23
Communities	25



Detailed Work Stage requirements

This table should be read in conjunction with the performance requirements set out for Major, Moderate and Minor projects. The application of specific performance requirements must be determined on a project-by-project basis, and where applicable, dependant on the scale and scope of the works undertaken.

		Set objectives		Integrate into design		Implementing and monitoring		Validate and review performance
		Strategic definition, preparation and brief	Concept design	Developed design	Technical design	Construction	Handover and close out	In use
Topics	Applicability	Typical Activities by Stage						
	Minor Moderate Major							
General requirements								
	● ● ●	<ul style="list-style-type: none"> – Incorporate sustainability objectives within the strategic brief – Identify project sustainability aspirations, objectives and certificate requirements – Assign and agree roles and responsibilities within project team – Identify opportunities for innovation in design and construction – Refer to BREEAM pre-approvals 	<ul style="list-style-type: none"> – Engage with project teams through sustainability workshops and DTMs – Set project specific sustainability requirements and include within viability assessments – Identify local and regional planning policy requirements and applicability to scheme 	<ul style="list-style-type: none"> – Continue to engage through sustainability workshops and DTMs – Embed requirements into design and performance specifications 	<ul style="list-style-type: none"> – Include sustainability requirements in tender documentation in line with Main Contractor's standard Employer's Requirements on Sustainability (Appendix D) – Review and weight tender responses of sustainability requirements – Engage with main contractor 	<ul style="list-style-type: none"> – Embed requirements during construction – Monitoring of: <ul style="list-style-type: none"> – Construction performance – Procurement activities – As built data – Engage with site teams on performance – Verify/audit data 	<ul style="list-style-type: none"> – Handover to Asset management and Property Management on relevant sustainability requirements – Review of performance and process – Initial Lessons Learned with Project Team and Main Contractor 	<ul style="list-style-type: none"> – Independent Post Occupancy Evaluation (first three years of occupation) – Lessons Learned with Project Team and Main Contractor – Assess outcomes against objectives and report lessons learned to The Crown Estate
Customer-centric focus								
Customer wellbeing								
Healthy design approach	● ● ●	<ul style="list-style-type: none"> Adopt a Healthy Design Approach, focusing on: indoor air quality, thermal comfort, active design, accessibility and acoustics Identify the different accessibility needs of those accessing the asset Determine whether wellbeing assessment scheme to be applied 	<ul style="list-style-type: none"> Develop design in accordance with the Healthy Design Approach, and agree performance requirements against key focus areas outlined Ensure that users are provided adequate control through appropriate application of technology Clearly identify ongoing operational management requirements including monitoring requirements 	<ul style="list-style-type: none"> Demonstrate how the design achieves the requirements set out within the Healthy Design Approach set out in Stage 1 with as-built drawings and specification for handover Clearly identify ongoing operational management requirements including monitoring requirements 	<ul style="list-style-type: none"> Include details of the Healthy Design Approach reference to relevant performance targets and ongoing monitoring requirements within handover and O&M documentation 	<ul style="list-style-type: none"> Ongoing demonstration of performance targets are achieved through monitoring and surveys, including indoor air quality, thermal comfort and occupier satisfaction following 12 months of representative occupancy (defined as occupancy rate above 80%) 		
Green space and soft landscaping	● ● ●	<ul style="list-style-type: none"> Understand the current ecological value of the site, and ensure no additional surveys are required beyond portfolio-wide ecology surveys (Appendix D) 	<ul style="list-style-type: none"> Project team to work with The Crown Estate Ecologist to identify opportunities to improve/increase the quality and quantum of green space in line with the objectives of the The Crown Estate Ecology documentation 	<ul style="list-style-type: none"> Develop green space design and assess compatibility with The Crown Estate and BREEAM requirements for sign-off by The Crown Estate Ecologist 	<ul style="list-style-type: none"> Incorporate requirements within Main Contractor Employer's Requirements, in line with all The Crown Estate Ecology documentation. Demonstrate how the design will achieve the objectives set out in Stage 2 	<ul style="list-style-type: none"> Implementation of selected measures and preparation of Landscape and Habitat Management Plan, Landscape Specification, and as-built drawings and specifications for handover 	<ul style="list-style-type: none"> Assess outcomes against objectives, including site walkover, and report lessons learned to The Crown Estate 	

Detailed Work Stage requirements continued

		Set objectives			Integrate into design		Implementing and monitoring		Validate and review performance	
		Strategic definition, preparation and brief	Concept design	Developed design	Technical design	Construction	Handover and close out	In use		
Topics	Applicability			Typical Activities by Stage						
	Minor	Moderate	Major							
Resilience										
Climate resilience										
Climate change resilience		●	●	Ensure climate change risk considerations are identified with a focus on: flood risk and temperature/weather variation resulting in issues around utility resilience, thermal comfort and urban heat island effect	Incorporate resilience and durability measures into the design that mitigates against key climate risks through adoption of flood risk resilience measures, operational energy performance, thermal comfort and green infrastructure Measures incorporated should limit long- and short-term degradation from environmental incidences and protect vulnerable parts of a building or public realm to reduce physical damage and ensure convenient access and business continuity	Demonstrate how design has considered and mitigated against key and any other identified climate risk through as-built drawings and specification Clearly identify ongoing operational management requirements including monitoring requirements	Incorporate management and maintenance of resilience measures within O&M documentation	Monitor effectiveness of resilience measures, and assess outcomes for reporting back to The Crown Estate		
Flood risk	●	●	●	Understand risk of flooding from all sources with reference to portfolio/asset level FRA where available (Appendix D)	Design in features that minimise the risk of localised flooding from all sources and to limit the volume of water leaving the site as far as practicable by minimising impermeable surface, prioritising on-site capture and reuse (e.g. rainwater harvesting) and water infiltration	Demonstrate how the development is resilient against flood risk through design and specification set in Stage 2 with as-built drawings and specification for handover	Incorporate management and maintenance of resilience measures within O&M documentation	Monitor effectiveness of resilience measures, and assess outcomes for reporting back to The Crown Estate		
Utility resilience		●	●		Incorporate measures within the design to future proof the development to maintain energy and water security, and business continuity during potential periods of disruption to supplies e.g. droughts and power cuts	Demonstrate how resilient energy and water supplies have been integrated into the design with as-built drawings and specification for handover	Incorporate management and maintenance of resilience measures within O&M documentation and Emergency/Incident Response Plans	Monitor effectiveness of resilience measures, and assess outcomes for reporting back to The Crown Estate		

Detailed Work Stage requirements continued

		Set objectives			Integrate into design		Implementing and monitoring		Validate and review performance	
		Strategic definition, preparation and brief	Concept design	Developed design	Technical design	Construction	Handover and close out	In use		
Topics	Applicability			Typical Activities by Stage						
	Minor	Moderate	Major							
Circular business										
Sustainable materials procurement	●	●	●	Agree high level aspirations and targets focusing on Procurement (Appendix A) and The Crown Estate Materials Principles (Appendix B) to deliver improved whole life value and reduced whole life cost	Initiate and conduct supplier engagement as appropriate to identify opportunities for alternative procurement routes as set out in Appendix A Create project specific Sustainable Procurement Plan to be developed in accordance to The Crown Estate Materials Principles (Appendix B)	Continue to engage with supply chain on procurement options of building materials Formalise and embed within specification the building elements that will adopt the responsible sourcing requirements set out in Stages 1 and 2	Continue to engage with supply chain on procurement options of building materials Ensure specification and requirements for procurement of materials are included within the Main Contractor's Employer's Requirements Once appointed, Main Contractor to adapt project specific Sustainable Procurement Plan to optimise sustainable materials procurement and circular economy opportunities throughout construction	Procure materials in line with the requirements set out within the Main Contractor's Employer's Requirements and as agreed in Stages 3 and 4 Main Contractor to continue to explore further opportunities to optimise sustainable materials procurement in collaboration with suppliers	Include all applicable information in relation to maintenance, repair and replacements of materials, including any performance-based or lease contracts within O&M documentation and/or customer guides	Review and as appropriate, renew performance based and lease contracts when required Implement identified circular procurement routes for new or replacement materials and components
Embodied Carbon and Whole Life Carbon		●	●	Ensure embodied carbon implications are identified and considered for each scenario identified as part of optioneering Based on the preferred option, prepare an embodied carbon baseline (Appendix A)	In collaboration with the Project Team, calculate embodied carbon for substructure, superstructure and landscaping and identify opportunities to reduce embodied carbon (Appendix A) Identify and adopt opportunities to minimise 'whole life carbon' (Appendix A)	Ensure embodied carbon calculations are updated and discussed for element variants for substructure, superstructure and building services. Set targets and requirements within the design and specification, and within the Main Contractor's Employer's Requirements Continue to identify and adopt opportunities that consider 'whole life carbon' (Appendix A)	Forecast embodied carbon quantities over construction programme, and report as-built embodied carbon on a quarterly basis	Prepare a final whole life carbon figure based on as-built figures for embodied carbon and operational carbon (in line with operational energy targets)	Assess the project outcomes to evaluate the embodied carbon figures and report any lessons learned, good practice and further opportunities back to The Crown Estate	
Disassembly and adaptability		●	●	Consider the adaptability of the asset against each scenario identified as part of optioneering and the implications for each building layer (Figure 1: Appendix A)	Highlight and agree likely future uses of the asset (Appendix A) Identify and incorporate design measures on how the shell & core (building fabric and structure), building services and fit-out can be adapted for potential uses identified	Ensure design measures on the adaptability of the shell & core (building fabric and structure), building services and fit-out as outlined in Stage 2 are embedded into the design and specification, and set out within the Main Contractor's Employer's Requirements	Include all applicable information on the adaptability of the building layers within O&M documentation		Ensure that any future PPM or refurbishment works are undertaken to ensure ongoing adaptability and where appropriate, disassembly of the different building layer	

Detailed Work Stage requirements continued

		Set objectives			Integrate into design		Implementing and monitoring		Validate and review performance	
		Strategic definition, preparation and brief	Concept design	Developed design	Technical design	Construction	Handover and close out	In use		
Topics	Applicability			Typical Activities by Stage						
	Minor	Moderate	Major							
Circular business continued										
BIM model		●	●	Adopt requirements set in The Crown Estate's Asset Information Modelling Requirements (Appendix D), and agree approach for adopting operational BIM Model at Stage 7	Project Team to identify and provide rationale for additional assets beyond those set out within The Crown Estate's Asset Information Modelling requirements to incorporate within BIM Model based on the scope of works	Ensure BIM Model is updated as appropriate to reflect as-designed information and specification	Ensure BIM Model is updated as appropriate to reflect as-built information through physically tagging materials and components	Handover BIM Model with training and handover to property management team, including clear definitions of Roles & Responsibilities	Ongoing use and upkeep of BIM Model	
Designing out waste	●	●	●	Undertake initial assessment of highest-value uses for site materials and components for reuse on site, reuse elsewhere or remanufacturing/repair and set requirements	Project team (with contractor representative where available) to consider and document opportunities to Design out Waste in line with the WRAP Principles at each detailed Work Stage requirements (Appendix A). Design in opportunities within design and specification for inclusion into Main Contractor's Employer's Requirements Undertake a pre-demolition/strip-out audit to identify and inform Designing out Waste requirements	Ensure opportunities within design and specification are included within the Main Contractor's Employer's Requirements	Main Contractor to measure and report against each of the WRAP Principles agreed requirements for reuse and waste avoidance	Assess outcomes against objectives and report lessons learned to The Crown Estate		
Operational efficiency										
Operational performance										
Operational energy performance	●	●	●	Determine energy performance certification targets and requirements based on landlord/customer energy procurement For Design for Performance projects, set base building rating target in Project Agreement and in Contractual documentation (Appendix C)	Identify requirements for energy use (landlord and customer), and opportunities for energy efficiency. Confirm target for landlord controlled operational energy use For all major office developments (and moderate schemes as agreed), develop operational energy performance model in line with Operational Energy Modelling Requirements (Appendix C)	Ensure design of scheme achieves appropriate operational energy targets Update energy model to reflect developing design to confirm energy performance targets	Demonstrate how the design and specification will achieve the target set in Stage 2 against any potential changes to design Update energy model to reflect developing design to confirm energy performance target. Include requirements within the Main Contractor's Employer's Requirements and included within tender documentations	Demonstrate how the design and specification achieves the agreed operational energy target set in Stage 2 with as-built drawings and specification for handover Update energy model to reflect final equipment selections and ensure that operational performance targets remain attainable	Ensure all operational performance targets are fully documented in the Building User Guide and L&M Documentation, with performance demonstrated in the final as-built model All commissioning to be undertaken in line with The Crown Estate's supporting documents (Appendix D)	Track base building rating/energy target, using mix of actual and forecast energy use through annual independent Energy Performance Reviews Monthly monitoring reports comparing sub-meter performance to simulated predictions to identify any ongoing performance gaps and remedial actions Carry out independent BMS performance reviews no later than within four months prior to the end of Defects Liability

Detailed Work Stage requirements continued

					Set objectives		Integrate into design		Implementing and monitoring		Validate and review performance
					Strategic definition, preparation and brief	Concept design	Developed design	Technical design	Construction	Handover and close out	In use
Topics		Applicability			Typical Activities by Stage						
		Minor	Moderate	Major							
Operational performance continued											
Operational water performance		●	●	●		Identify requirements for internal and external water use and opportunities for water efficiency through demand reduction, reuse and recycling. Set project target for operational water use	Design and specify water efficient appliances that achieve the operational water target	Demonstrate how the design and specification achieves the agreed operational water target set in Stage 2 with as-built drawings and specification for handover		Ensure all operational performance targets are fully documented in the Building User Guide	Following 12 months of representative occupancy (i.e. occupancy rate above 80%) carry out a review of operational water performance
Energy and water metering			●	●		Ensure that the metering strategy enables automatic, timely and accurate monitoring of operational energy and water use, and is in accordance with the The Crown Estate Metering Strategy and Design for Performance Requirements where applicable (Appendix D)		Demonstrate how the design and specification achieves the metering requirements set in Stage 2		Carry out independent Metering/EMS Validation	Carry out an independent Metering /EMS performance review prior to the end of Defects Liability
Operational waste management			●	●	Set strategic requirements for operational waste management that incorporates due consideration of space requirements, enables on site segregation, sustainable waste management (e.g. recycling) easy access and waste consolidation (where appropriate). Document within project Maintenance and Operational Strategy	Develop and design in accessible operational waste facilities in line with requirements set out within the Maintenance and Operational Strategy		Demonstrate how the design achieves the Operational Waste Management requirements set in Stage 1 and 2 with as-built drawings and specification		Ensure the final O&M documentation incorporates operational waste management regime	Following 12 months of representative occupancy (defined as occupancy rate above 80%), carry out a review of operational waste performance
Supply Chain Management											
Responsible construction practices		●	●	●		Where possible, ensure that the design and procurement routes enable responsible construction practices including 'Designing out Waste', local procurement	Embed requirements of responsible construction practice in line with the Main Contractor's Employer's Requirements and include within tender documentation	Demonstrate compliance and performance against Main Contractor's Employer's Requirements through measuring, monitoring and reporting on responsible construction practices		Review performance of responsible construction practices in line with the Main Contractor's Employer's Requirements and identify any lessons learned, good practice and further opportunities	

Detailed Work Stage requirements continued

Topics	Applicability			Set objectives		Integrate into design		Implementing and monitoring		Validate and review performance
				Strategic definition, preparation and brief	Concept design	Developed design	Technical design	Construction	Handover and close out	In use
Typical Activities by Stage										
	Minor	Moderate	Major							
Supply Chain Management continued										
Consolidation during construction		●	●		Identify opportunities for consolidation of material during construction (e.g. pre-fabrication, procurement methods including local sourcing)	Review opportunities for consolidation during construction and incorporate in the Main Contractor's Employer's Requirements	Incorporate requirement for Main Contractor to respond to consolidation opportunities during construction in tender process	Identify opportunities and provide details of consolidation activities undertaken during construction	Review consolidation activities with Main Contractor and project team and identify any lessons learned, good practice and further opportunities	
Communities										
Community Engagement										
Community engagement & collaboration		●	●	Develop understanding of local needs and demands including local authority requirements and priorities. Undertake community mapping and agree initial approaches to community engagement. Ensure community priorities are included in the overall project objectives	Undertake early community engagement to inform concept design. Identify opportunities to incorporate public space, local heritage, amenity uses, inclusive design and diverse uses, alongside local priorities, into the design concept	Integrate the community priorities into the design and development process. Undertake further community engagement on the developed design		Develop and implement construction community engagement and communication plan with The Crown Estate Community		Assess outcomes against objectives and report any lessons learned, good practice and further opportunities back to The Crown Estate
Construction employment, skills and local procurement	●	●	●	Develop understanding of local needs and demands including local authority requirements with respect to employment and skills needs (education, local employment, apprenticeships and traineeships) and local procurement of goods and services	Set out an Employment and Skills approach, and engage with The Crown Estate Community team in early planning to maximise opportunities from existing schemes Ensure Sustainable Procurement Plan is updated to reflect requirements for local procurement of goods	Engage with local authority and other stakeholders and review draft S106/ planning conditions with The Crown Estate Community Team	Ensure project-specific targets on employment, skill and local procurement are included and weighted in the Main Contractor (and sub-contractor) tender documentations and Main Contractor's Employer's Requirements	Working with The Crown Estate's Community Team, continue to engage with the Local Authority on the delivery of the Employment and Skills Strategy		Assess outcomes against objectives and report lessons learned to The Crown Estate

Detailed Work Stage requirements continued

Topics	Applicability			Set objectives		Integrate into design		Implementing and monitoring		Validate and review performance
				Strategic definition, preparation and brief	Concept design	Developed design	Technical design	Construction	Handover and close out	In use
Typical Activities by Stage										
	Minor	Moderate	Major							
Accessibility										
Consolidation in-use		●	●	Set strategic requirements for delivery of goods and services to identify opportunities to consolidate waste, freight and deliveries, and ensure cohesion with any existing portfolio-wide approaches. Consider the practicalities of delivering, including access, frequency and type of delivery/vehicle	Design in appropriate facilities for enabling different forms of consolidation. Identify the operational requirements for adopting a consolidation scheme for the asset		Demonstrate how the design and specification delivers against the requirements set out in Stages 1 and 2 with as-built drawings and specification for handover		Include details of the operation of the consolidation scheme within O&M documentation	Engage with customers on the participation of available and appropriate consolidation schemes. Monitor and report on the effectiveness of the adopted consolidation scheme to The Crown Estate
Sustainable transport		●	●	Understand local transport needs with respect to occupier/ staff journeys (accessibility, car parking, cycle storage) and requirements for sustainable transport methods in line with existing portfolio/asset Travel Plans (Appendix D)	Identify opportunities to incorporate and encourage sustainable transport options into the design	Design and specify how sustainable travel options, and how occupier/staff journey requirements are met. Develop ongoing requirements and objectives for sustainable travel of occupier/staff travel within site/building Travel Plans	Demonstrate how the design and specification delivers against the requirements set out in Stages 1 and 2 with as-built drawings and specification for handover		Include Travel Plans and/or details of sustainable transport options within handover and O&M documentation	Issue all customers and staff with Travel Plan and/or brief on sustainable transport options Following 12 months of representative occupancy (defined as occupancy rate above 80%), carry out a review of travel, comparing actual performance to the target values

4.0

Appendices

In this section

Appendix A	28
Circular business requirements	
Appendix B	30
The Crown Estate's Materials Principles	
Appendix C	31
Operational energy modelling requirements	
Appendix D	34
The Crown Estate's supporting documents	



Appendix A

The Crown Estate considers circular business in four main strands:

- Procurement.
- Embodied carbon and whole life carbon.
- Disassembly and adaptability.
- Designing out waste.

This appendix provides further definition for these concepts and sets out the methods to be followed to meet the requirements set out in this DSP.

Procurement (Major and Moderate projects)

The Crown Estate encourages the adoption of circular procurement practices, which focuses on eliminating the waste in the construction process and incentivising the supply chain to deliver long-term performance for the consumer. The following circular procurement practices should be explored for all projects where appropriate:

- **Reuse, refurbished and/or recycled materials¹** – Project teams shall seek procurement practices which prioritise reused refurbished and recycled materials. Where reused, refurbished and recycled materials are procured, project teams shall report on their percentage material spend on reused and refurbished content. This refers to the spend on reused and refurbished materials as a proportion of the total project spend on materials. Spending on labour, plant, contractor preliminaries and other fees is excluded from this calculation.

- **Product-as-a-Service²** – Project teams shall explore opportunities to procure building materials through Product-as-a-Service (PaaS) contracts. The PaaS contract should contain clauses on the required performance specification and the option to periodically update this to account for latest specification improvements. Payment by the lessee should only be made when performance meets a required standard that is specified within the contractual agreement for each procured item.

This is in addition to the requirements for responsible sourcing set out in Appendix B – The Crown Estate's Materials Principles.

¹ Reused materials comprise materials that are used in their same state for the same purpose for which they are designed. Refurbished materials comprise materials that have undergone repair and/or aesthetic upgrade to be used again without mechanical or chemical reprocessing. Recycled materials comprise materials made with reprocessed waste material content.

² PaaS is a lease-based procurement approach where the suppliers retain ownership of their building materials during use. It incentivises suppliers to design products for reuse, repair and disassembly, increasing their residual value at end of use. This enables the recovery and redeployment of building materials back into the supply chain.

**Embodied Carbon & Whole Life Carbon
(Major and Moderate projects)**

Project teams shall seek to adopt the most cost-effective low whole life carbon solutions by considering implications of design decisions on both embodied and operational carbon¹. In doing so, project teams shall adopt consistent assumptions and tools to ensure the quality and precision of embodied carbon calculations and enable benchmarking of performance. Where clarifications are not given in this appendix, calculations, construction-stage forecasts and as-built records shall be consistent with the RICS Professional Statement Whole Life Carbon Assessment for the Built Environment (2017).

Calculation tools compliant with BRE's IMPACTv5 database and methodology shall be used. Choosing IMPACT compliant tools ensures alignment with the BRE's benchmarks and ensures adequate coverage of life-cycle stages, as defined in BS EN 15978:2011.

The project-specific embodied carbon benchmark shall be determined as per the RICS Professional Statement, in particular Table 6.

The scope of the calculation shall consider:

- Substructure elements are to include the elements defined in BREEAM 2018 Mat 01: Table 9.2 Substructure and hard landscaping;
- Superstructure elements are taken to include the elements defined in BREEAM 2018 Mat 01: Table 9.1 Superstructure;
- Building services as defined in Table 9.3 Core building Services – In-scope, BREEAM 2018 New Construction; and
- Fit-out as defined in the RICS New Rules of Measurement (NRM) classification system:
 - 2.7.1 Walls and partitions
 - 3.1 Wall finishes
 - 3.2 Floor finishes
 - 3.3 Ceiling finishes

What constitutes significantly different options is defined in BREEAM 2018 New Construction Mat 01.

**Disassembly and adaptability
(Major projects)**

As described in the stage requirements, the project team shall consider how the assets are able to adapt over time to maintain its value. The questions below are provided to guide the project team to consider what constitutes an adaptable development:

- What are the long-term trends that will impact the local market?
- How will the asset respond to the changing market conditions driven by those trends?
- What is the likely economic lifespan for the development?
- How many different possible uses could there be for the building?
- How does the strategic business plan for the asset allow for change?
- How can design allow for those responses without building in unnecessary redundancy or conservatism?

The above questions can be used to inform between two and four significantly different scenarios for how the asset will adapt to market changes by changing use.

The project team should acknowledge that different layers of the built asset (Figure A1: The 'shearing layers') are likely to need to respond to changing market requirements at different times of the building life-cycle. Designing assets in consideration of potential future uses will help ensure future adaptations of the asset can be undertaken in an economically viable way. This has the added benefit of maximising the residual value of building materials and components once specified. Residual value is maximised using material passports facilitated by BIM models.

**Designing out waste
(Major projects)**

The project teams shall seek to minimise waste by favouring waste prevention, followed by reuse, recycling and recovery. At each detailed Work Stage requirements (from Stage 2), the project team should identify around the five WRAP designing out waste principles:

1. Design for reuse and recovery.
2. Design for off-site construction.
3. Design for materials optimisation.
4. Design for waste efficient procurement.
5. Design for deconstruction and flexibility.

For each opportunity identified, consideration should be given to the benefits and trade-offs. The project sustainability co-ordinator should work with the project team to identify opportunities to drive forward the above principles and demonstrating how the principles have been adopted through reporting and evidencing (e.g. drawings, specification). Where opportunities are not identified, a clear justification should be provided to The Crown Estate.

Discussions should be held between project team members including, but not limited to, architects, engineers, quantity surveyors and construction managers throughout the design and construction of projects.

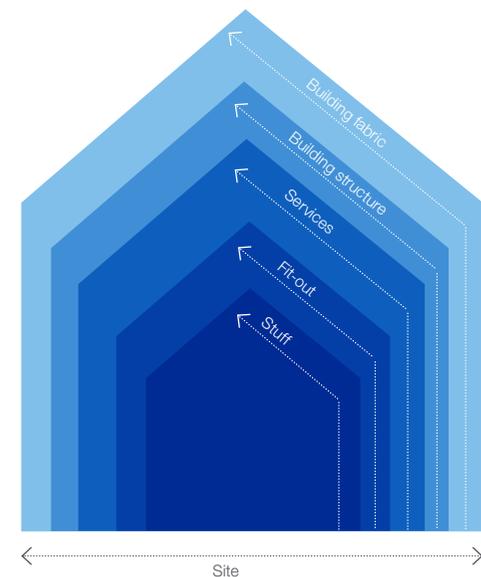


Figure A1 6S model for shearing layers (Source: Stuart Brand's Shearing Layers, from How Buildings Learn: What Happens After They're Built, 1994). Adapted by Arup, 2018).

¹ Embodied carbon is that associated with materials, transport, waste arisings and construction, while operational carbon is that associated with the building's use of energy and water. Together they constitute a project's whole life carbon (WLC) footprint. Design decisions should be influenced by consideration of both embodied and operational carbon, as often there is a trade-off between the two; efforts to minimise the operational carbon footprint can sometimes lead to a net increase in footprint due to additional embodied carbon, and vice versa.

Appendix B

The Crown Estate is committed to the sustainable and responsible procurement and use of materials. This policy sets out the key principles and specific commitments to be followed by our supply chain.

Key principles:

We aim to select materials that are:

Safe – Avoiding worker risks such as child/bonded labour and unsafe working conditions in the supply chain in line with relevant legislation.

Healthy – Supporting the health of both building occupants and the workers who install, maintain and decommission them.

Low-impact – Avoiding habitat destruction and damage to the natural environment as a result of material sourcing and production.

Non-polluting – Avoiding release of harmful substances that damage the surrounding environment (including the air and water sources) as a result of material extraction, processing, or use in operation.

Low-emitting – Minimising CO₂ and other greenhouse gas emissions resulting from material sourcing and production, including emissions released from mining and processing.

Traceable – Ensuring high visibility and/or traceability through the supply chain.

Circular – Minimising resource use and selecting materials that are reused, recycled, and are also durable, reusable, recyclable or rapidly renewable.

Commitments:

In seeking to meet these principles, we will:

- Promote use of sustainable products with industry recognised third party accredited certifications¹, and products manufactured by suppliers with ISO 14001 or BES 6001 certified management systems. All claims shall be backed up by current third party certificates of compliance or other justification.
- Specific requirement for all projects:
 - 100% of all timber² to be from certified source, e.g. FSC or equivalent³.
- Specific requirement for Major and Moderate projects:
 - 100% of blockwork BES 6001 Good.
 - 100% of structural steel ISO 14001, ISO 18001, OHAS 9001.
 - 100% of reinforcing steel BES 6001 Good.
 - 100% of glass ISO 14001, ISO 18001, OHAS 9001.
 - 100% of plasterboard ISO 14001, ISO 18001, OHAS 9001.
 - 100% of concrete BES 6001 Good.
- Stone that can demonstrate strong responsible sourcing credentials⁴. At a minimum, all stone shall be from companies that comply with International Labour Organization and Human Rights Standards.
- Use materials with low VOC content that do not affect the Indoor Air Quality Standards. For Major and Moderate projects, this should be in accordance with the relevant sustainability rating scheme¹ where applicable.
- Use materials with a high percentage recycled content. Specific requirements for our Major and Moderate projects where applicable:
 - 50% blockwork recycled content (% by weight).
 - 80% plasterboard recycled content (% by weight).
 - 70% chipboard recycled content (% by weight).
 - 20% concrete paving slabs/blocks and reconstituted stone paving blocks recycled content (% by weight).
- Follow guidance from building assessment methodologies, labelling schemes and databases¹. A strategy of what can reasonably be achieved should be considered and adopted on a project-by-project basis, and the requirements included in project preliminaries. Material selection may be impacted on the need to achieve operational performance requirements, or the availability of suitable materials dependant on the scope of works undertaken.
- Consider the specification of materials set out within The Crown Estate Natural Resources: Catalogue of materials for timber, aggregates and stone, where possible.

This appendix is supported by a standalone The Crown Estate's Materials List.

1 Schemes include: BREEAM, WELL, LEED, EU Ecolabel, Blue Angel, Nordic Ecolabel, Nature Plus, GUT, Emicode, CARB, French Decret, AgBB, Belgian Decret, Declare, Cradle to Cradle, Pharos, Quartz, Healthy Materials Lab, Health Product Declaration; Environmental Product Declaration; GreenScreen.

2 This applies to all timber used within the project (including temporary site timber used during construction and timber materials installed within the building elements).

3 Timber to be procured in line with UK Government's Central Point of Expertise on Timber (CPET) report www.cpet.org.uk.

4 Credentials include BES 6001, the Stone Federation Ethical Standards Register, EPD scheme according to the ISO 14025 and BS EN 15804 and EMAS – EU Eco-Management and Audit Scheme, BS EN ISO 9001, BS EN ISO 14001 and BS EN ISO 18001.

Appendix C

(Commercial offices – Major and Moderate projects)

This appendix is applicable to Major and Moderate scale commercial office developments only.

Modelling methodology

Major projects

For all new-build commercial office developments, operational energy performance modelling shall be undertaken in accordance with the principles set out within the Design for Performance process www.betterbuildingspartnership.co.uk/our-priorities/measuring-reporting/design-performance

Until UK specific guidance is available, project teams shall follow the requirements of the Australian NABERS rating scheme (NABERS Commitment Agreements, Handbook for estimating NABERS ratings: Version 1.1, February 2019, www.nabers.gov.au)

The objectives of the modelling include:

- To confirm that the proposed design is capable of meeting the target base building energy performance rating¹.
- To inform the optimisation of HVAC controls and the writing of a draft 'Description of Operations' (DesOps) at the detailed design stage to underpin the specification of the BMS and its initial setting up.
- To review the suitability of the specified plant capacities of the HVAC system.
- To provide a framework for post occupation monitoring and verification.

Moderate projects

For moderate commercial office schemes, where major plant requirements are undertaken (e.g. new chillers, air handling units) and as agreed by The Crown Estate, design teams shall adopt the principles set out within the Design for Performance process, and as appropriate, produce an estimate of the impact of the project on the overall energy consumption of the building. Design teams shall be responsible for identifying an appropriate modelling methodology applicable to the context of the project. For office refurbishment projects, the CIBSE TM54 methodology shall be adopted, with input data on predicted use established in coordination with operational teams, as part of the Soft Landings process.

¹ Typically the building should simulate to at least a quarter star better than target to engender confidence the actual operation will achieve the target.

Scenarios and assumptions

Operational energy modelling shall include a single central ‘typical’ scenario. Where project-specific information is not available, all Central London commercial office developments shall be based on the below operational assumptions. These are intended to represent the typical operation of an office building in The Crown Estate’s Central London portfolio, based on analysis of historic data. For Regional commercial office developments, these operating parameters should be reviewed to reflect the typical operation reflective of its locality.

A range of ‘off-axis’ scenarios shall be explored in agreement with The Crown Estate. These will be determined as appropriate for the project to represent

a realistic range of potential outcomes. These shall determine the sensitivity of the base building energy performance rating to a range of factors representing plausible outcomes. These scenarios should aim to capture:

- A range of usage intensities (high and low).
- A range of operating hours, particularly focusing on how the building responds to differentials in operating hours between office tenancies, and between offices and other uses (where these are serviced from office central plant).
- Effectiveness of operation (management factor)¹.

It is expected the target rating should be achieved under all plausible scenarios.

Central scenario operating parameters

Parameter	Estimated value
– Occupancy density (design)	– 9m ² per person
– Occupancy diversity (average % of design occupancy)	– 70%
– IT load	– 18 W/m ² (based on NCM median, including server load)
– Core operating hours	<ul style="list-style-type: none"> – Office tenancies: <ul style="list-style-type: none"> – 7 am to 7 pm Monday to Friday – 9 am to 6 pm Sunday – Retail tenancies: <ul style="list-style-type: none"> – 9 am to 10 pm Saturday – 10 am to 7 pm Sunday – Reception: <ul style="list-style-type: none"> – 24 hours
– Turn-down out of hours	– 30% of peak load

¹ A better rating will be achieved if the HVAC is designed so that different zones can be serviced independently and only occupied zones are serviced. The NABERS base building rating defines energy efficiency using the principle that a building should receive no benchmark ‘allowance’ from lettable space for any period it is unlet or unoccupied.

**Reporting of energy modelling outcomes
(Major projects)**

All project teams shall produce a report documenting the output of the energy modelling at detailed Work Stage requirements 2. This report shall be updated at each design stage, and shall include:

- A description of the modelling methodology and tools employed.
- A description of the building modelled, including key characteristics.
- A schedule of building floor areas (GIA and NIA per floor and use), making it clear which floor areas have been used to derive energy intensities.
- A list of key modelling assumptions and parameters, including but not limited to those listed above.
- A description of the modelling scenarios, including the central scenario and all off-axis scenarios.

- Predicted energy consumptions for all scenarios, including:
 - Overall building energy intensity, broken down by fuel type.
 - Landlord Energy Rating/DfP Rating where applicable.
 - End use energy intensities, as per CIBSE TM22.
 - Energy consumption by meter or group of meters, stating specifically which meter relates to which TM22 end use.
 - Predicted monthly consumption per TM22 end use.
 - Hourly predicted energy use for a 24 hours period (examples to demonstrate seasonal variations).
- A methodology for evaluating energy performance in operation and comparing to the modelled estimate. This shall include a matrix mapping individual energy meters to TM22 end uses, indicating which meters shall be summed to calculate each end use.

Project teams shall ensure that all meters are referenced using a series of unique reference tags, and that it is a requirement of the construction contract that the same reference tags are used in the O&M manuals, on-site for physical tags and in the EnMS system.

The Energy Modelling Report and the simulation model itself will be part of the design package made available to the Independent Design Review conducted as part of the Design for Performance process, where formal accreditation is sought.

Verification of energy modelling outcomes

Once the building is in occupation, measured energy use data shall be collected, in accordance with the validation plan, and monthly monitoring reports prepared comparing sub-metered performance to simulated predictions. The expected base building energy rating for a year of operation should be predicted, with each month of forecast data being replaced by measured data as time proceeds. The monthly monitoring reports should highlight any risks the base building rating will fail to meet the target, and identify potential remedial actions.

The Crown Estate's supporting documents

This table sets out The Crown Estate's key documents that support the implementation of the DSP.

Appendix D

		Set objectives		Integrate into design		Implementing and monitoring		Validate and review performance
		Strategic definition, preparation and brief	Concept design	Developed design	Technical design	Construction	Handover and close out	In use
Input		Stages						
		0-1	2	3	4	5	6	7
General								
BREEAM Pre-approvals (Central London and Regional)		•	•	•	•	•		
Customer Focus								
Customer Wellbeing								
The Crown Estate Ecology Documentation	The Crown Estate BREEAM File Note (Central London)	•	•	•	•	•		
	The Crown Estate Phase 1 Habitat Survey (Central London)	•	•					
	The Crown Estate Urban Greening Strategy (Central London)	•	•	•	•			•
	The Crown Estate Landscape Handbook (Regional)	•	•	•	•	•	•	•
	The Crown Estate Monitoring & Maintenance Strategy (Central London)				•	•	•	•
Resilience								
Climate Resilience								
The Crown Estate Flood Risk Assessment (FRA) (Central London)		•	•					
The Crown Estate Site-specific Flood Risk Assessment (FRA) (Regional – where available)		•	•	•				
Circular Business								
The Crown Estate Asset Information Modelling Employers' Requirements		•	•	•	•	•	•	•
Operational Efficiency								
Operational Performance								
The Crown Estate Metering Strategy (Central London)			•	•	•	•	•	•
The Crown Estate Commissioning Management and Commissioning Services scopes of services		•	•	•	•	•	•	•
Supply Chain Management								
Main Contractor's Standard Employer's Requirements on Sustainability				•	•	•	•	
Health and Safety Client Standards					•	•	•	
The Crown Estate Materials List			•	•	•	•		
The Crown Estate Natural resources catalogue of materials			•	•	•	•		
Community Engagement								
Accessibility								
The Crown Estate Central London Travel Plan Strategy		•	•	•	•	•	•	•
The Crown Estate Travel Plans (Regional – where available)		•	•	•	•	•	•	•

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