



Department
for Transport

Carbon Management Plan Guidance

July 2026

Department for Transport
Great Minster House
33 Horseferry Road
London
SW1P 4DR



© Crown copyright 2026

This publication is licensed under the terms of the Open Government Licence v3.0 except where otherwise stated. To view this licence, visit

www.nationalarchives.gov.uk/doc/opengovernment-licence/version/3/ or contact,

The National Archives at www.nationalarchives.gov.uk/contact-us.

Where we have identified any third party copyright information you will need to obtain permission from the copyright holders concerned.

This publication is also available on our website at

www.gov.uk/government/organisations/department-for-transport

Any enquiries regarding this publication should be sent to us at

www.gov.uk/government/organisations/department-for-transport

Permission to reproduce extracts from British Standards is granted by BSI. British Standards can be obtained in PDF or hard copy formats from BSI Knowledge:

<https://knowledge.bsigroup.com> or by contacting BSI Customer Services for hardcopies only: Tel: +44 (0)20 8996 9001, Email: cservices@bsigroup.com.

Contents

Definitions and acronyms	5
1. Introduction	7
1.1 Establishing a Carbon Management Plan	7
1.2 Standards, guidance and supporting documents	8
2. Whole life carbon management	10
2.1 Carbon management integration	10
2.2 PAS 2080:2023 carbon management process	10
2.3 Carbon reduction hierarchy	10
3. Governance and leadership	13
3.1 Roles and responsibilities	13
3.2 Leadership	13
3.3 Carbon training	15
4. Whole life carbon assessment	16
4.1 Applying whole life carbon assessment	17
5. Carbon hotspots and reduction opportunities	21
5.1 Conducting carbon hotspot analysis	21
5.2 Carbon hotspot mitigation options	21
6. Carbon reduction targets	23
6.1 Setting carbon reduction targets	23
6.2 Risks to achieving carbon reduction targets	24
7. Procurement	25
7.1 Procurement mechanisms	25
8. Carbon monitoring and reporting	27
8.1 Monitoring approach and governance	27
8.2 Monitoring through procurement	28

Appendix A: Procurement considerations for infrastructure decarbonisation	29
Appendix B: Carbon Management Plan matrix	31
Carbon Management Plan matrix	31
Carbon Management Plan matrix (list)	35

Definitions and acronyms

Term / Acronym	Definition
Carbon	Carbon is used throughout this document as shorthand for greenhouse gas emissions, expressed as carbon dioxide equivalent (CO ₂ e)
Capital Carbon*	Greenhouse gas emissions and removals associated with the creation and end-of-life treatment of an asset, network and/or system, and optionally with its maintenance and refurbishment
CMP	Carbon Management Plan
Control (in context of PAS 2080)*	Ability to make decisions about activities that leverage carbon emissions and removals
DfT	Department for Transport
FBC	Full Business Case
Influence (in context of PAS 2080)*	Ability to support other value chain members to make low-carbon decisions
Net zero*	The reduction of anthropogenic greenhouse gas emissions to zero or to a residual level that is consistent with reaching net zero emissions in eligible 1.5 °C pathways (hence time-bound) and neutralising the impact of residual emissions (if any) by removing an equivalent volume of carbon
OBC	Outline Business Case
Operational Carbon*	Greenhouse gas emissions and removals associated with the operation of an asset, network and/or system required to enable it to operate and deliver its service
PAS 2080:2023	Publicly available specification on carbon management in buildings and infrastructure
PBC	Programme Business Case
SOBC	Strategic Outline Business Case (also referred to as SOC in other government guidance documents)
User carbon*	Greenhouse gas emissions associated with users' utilisation of an asset, network and/or system, and the service it provides during operation
Value chain*	Organisations and stakeholders involved in creating, operating and managing assets and/or networks

Whole life carbon*

Sum of greenhouse gas emissions and removals from all work stages of a project and/or programme of works within the specified boundaries

*Definitions as per Clause 3 of PAS 2080:2023

1. Introduction

This document provides guidance for the development of Carbon Management Plans (CMPs) for transport infrastructure projects. It is for use by project and programme sponsors, client teams, consultants, delivery bodies and local authorities responsible for developing and assuring transport infrastructure projects.

All Department for Transport (DfT)-funded transport infrastructure projects that are subject to DfT's business case assurance process are required to produce and maintain a CMP. DfT provides a CMP template to further support projects and programmes in developing and updating CMPs. It should be used alongside this guidance and is available on GOV.UK.

Projects are expected to continue to apply PAS 2080, the RICS Whole Life Carbon Assessment Professional Standard, relevant DfT guidance and other applicable industry standards and guidance.

For advice and support on DfT Carbon Management Plans, please contact infrastructurecarbon@dft.gov.uk.

1.1 Establishing a Carbon Management Plan

Carbon management is defined as the assessment, reduction and removal of GHG emissions during the planning, optioneering, design, delivery, operation, use, end of life (and beyond) of new or existing assets, networks and/or systems. DfT has set requirements to embed carbon into key decisions across infrastructure project lifecycles, supporting the sustainable development of transport infrastructure.

All DfT-funded infrastructure projects subject to DfT business case assurance must include a CMP within the management dimension of the business case. A CMP is a structured document that sets out how a project will assess, manage, reduce and monitor its whole life carbon emissions to support decision-making across the project lifecycle. The CMP informs all five business-case dimensions, particularly the strategic and economic dimensions through early objective setting and options appraisal. Projects must also complete an economic appraisal of carbon within the economic dimension. Please refer to the [Transport Appraisal Guidance \(TAG\)](#) for details on this and on carbon value-for-money metrics.

The CMP guidance and template have been designed to support projects and programmes (hereafter referred to as 'projects', unless specified) in developing CMPs. They aim to increase the consistency and quality of CMPs across the department and improve the robustness of embedding carbon into decision-making across the project lifecycle.

Projects should use the CMP guidance to develop their CMPs and are also encouraged to use the CMP template provided. To prevent duplicated effort, relevant information provided in the wider business case can be referenced in, or copied directly into, the CMP. Where information is not available or cannot be provided, this should be clearly stated along with a brief explanation.

1.1.1 Proportionate application of CMPs

The scope and level of detail within a CMP should be proportionate to the project's tier and business case stage. As projects progress from SOBC through to FBC, the CMP should reflect increasing clarity on scope, data, design development and carbon reduction opportunities. Where data is unavailable or limited at earlier business case stages, this should be clearly acknowledged and any assumptions or gaps explicitly set out within the CMP. Requirements for smaller projects are proportionately reduced.

Detailed information on what to include in CMPs by business case stage and project tier is provided in [Appendix B: Carbon Management Plan matrix](#).

1.1.2 Programme CMPs

CMPs developed at a programme-level have different expectations. Programme CMPs should set the overall direction, ambition and principles for managing whole life carbon across a portfolio of projects, functioning as a carbon management strategy rather than a fully quantified plan for individual assets.

Programme CMPs should focus on establishing the framework for effective carbon management. This should include approaches to whole life carbon assessment, shared tools and data, procurement and commercial levers, governance checkpoints and how carbon management requirements will be applied and developed through CMPs for individual projects within the programme. Programmes are not expected to set fixed project-level carbon reduction targets at this stage. Instead, these should be developed through detailed project-level CMPs as individual projects progress through the business case stages.

1.2 Standards, guidance and supporting documents

This guidance is underpinned by industry standards including:

- [**Royal Institution of Chartered Surveyors \(RICS\) Whole Life Carbon Assessment for the Built Environment Professional Standard \(2nd edition\)**](#) - The RICS guidance on conducting whole life carbon assessments in infrastructure.
- [**PAS 2080:2023 Carbon Management in Buildings and Infrastructure**](#) - The standard developed by the British Standards Institute in collaboration with

government and industry partners outlining the best practice for managing carbon in infrastructure projects.

- **Guidance Document for PAS 2080: carbon management in buildings and infrastructure** - The Institution of Civil Engineers (ICE) guide to applying PAS2080.

The RICS whole life carbon assessment (WLCA) standard aligns with the environmental performance assessment structure in **BS EN 17472:2022** and enables assessors to estimate lifecycle carbon emissions from early development through to end of life.

Throughout this guidance, signposts are provided to relevant sections of PAS 2080:2023 and other documents to help projects navigate and reference these sources. The guidance and template should also be used alongside the documents listed below:

- **Transport Business Case Guidance** - Guidance on how DfT uses the **HM Treasury Green Book** and **accompanying guidance** when developing transport business cases and preparing advice on spending decisions.
- **Transport Analysis Guidance (TAG)** - DfT guidance on the role of transport modelling and appraisal.
- **HM Treasury Guidance on developing business cases** - Guidance on how to develop business cases for projects and programmes.
- **National Infrastructure and Service Transformation Authority (NISTA) Whole Life Carbon Management Handbook for the Built Environment** - Cross-sector guidance and supporting information on whole life carbon management

The CMP guidance and template align with the expectations set out in **The Green Book** by ensuring that projects systematically consider and assess the greenhouse gas (GHG) impacts of their proposals. This includes considering the likely impact on GHG emissions, identifying potential sources of emissions arising from the proposal and ensuring that the level of detail and complexity of emissions analysis is proportionate to the scale and significance of those impacts.

Projects are expected to continue applying relevant technical guidance to ensure methodological compliance.

2. Whole life carbon management

2.1 Carbon management integration

Integrating whole life carbon (WLC) into decision-making requires the development and implementation of a carbon management process. This section outlines how projects can integrate WLC into decision-making using a structured carbon management process aligned with PAS 2080:2023 and the carbon reduction hierarchy. Within the CMP template, projects are expected to provide a description of how carbon management has been integrated into decision-making. For detailed guidance on integrating carbon management into decision-making, see **Clause 6 of PAS 2080:2023**.

2.2 PAS 2080:2023 carbon management process

PAS 2080:2023 is a publicly available specification for managing WLC in buildings and infrastructure, and its application across the transport infrastructure value chain is endorsed by DfT.

PAS 2080:2023 promotes a collaborative and consistent approach to reducing carbon. It requires organisations and project teams to integrate carbon considerations into decision-making from the earliest stages, supported by strong leadership, clear roles and responsibilities and collaboration across the value chain. The standard embeds decarbonisation principles, whole life thinking and early-stage intervention, supported by WLCA, target setting and the integration of carbon management into governance, procurement and monitoring frameworks.

For further information on the decarbonisation principles of PAS 2080:2023, see **Clause 4 of PAS 2080:2023**.

2.3 Carbon reduction hierarchy

PAS 2080:2023 emphasises the importance of the carbon reduction hierarchy (Figure 1) as a tool to identify options for reducing emissions across a project's lifecycle. The hierarchy presents the order of effectiveness, and hence priority, for implementing different carbon reduction opportunities.

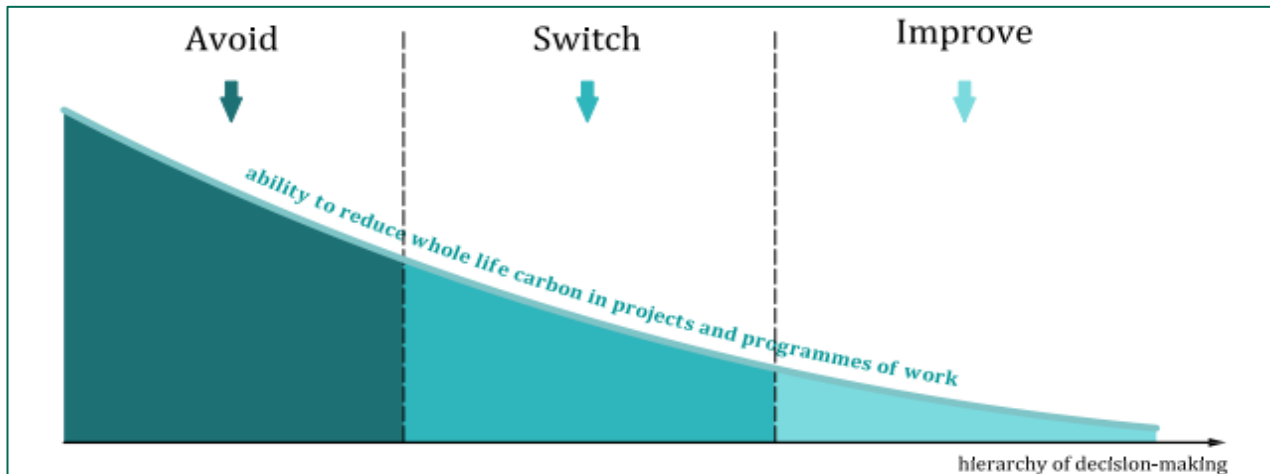


Figure 1: Carbon reduction hierarchy (PAS 2080:2023, BSI).

To align with the hierarchy, projects should demonstrate consideration of the following:

- **Avoid:** align the project outcomes with the net zero transition at the system level and test the need at the asset or network level. This may include meeting the need without constructing new assets, or by reusing, retrofitting, or repurposing existing ones.
- **Switch:** assess and adopt alternative solutions that reduce whole life emissions through changes in scope, design, materials, or technologies, while still meeting performance requirements.
- **Improve:** implement solutions and techniques that improve the use of resources and extend asset life, including applying circular economy principles to assess materials/products in terms of their potential for reuse or recycling after end of life.

The hierarchy should be applied in decision-making from the very beginning of the project, where the vision, objectives and outcomes are being developed, and throughout the project business case phases through to delivery. The greatest opportunities to reduce carbon arise at these early stages, when relatively few decisions have been fixed. As decisions are made, the ability to influence carbon outcomes diminishes. Embedding carbon considerations early therefore maximises opportunities for meaningful reduction and helps avoid locking in avoidable emissions.

2.3.1 Applying the carbon reduction hierarchy

Projects should clearly explain how the hierarchy has been applied across each relevant phase, asset, or carbon hotspot. This should include evidence of how opportunities to avoid, switch, or improve carbon performance have been identified, assessed and integrated into design and delivery. For example:

- **Design Phase:** How carbon has been avoided through efficient design, planning, or scope refinement (e.g. eliminated the need for temporary roads, avoiding emissions from materials and construction). **[avoid]**
- **Procurement:** Challenge suppliers through tender criteria and contractual terms and conditions to use low-carbon products and sustainable sourcing of materials. This

can consider appropriate opportunities for local sourcing which may reduce associated travel emissions. **[switch/avoid]**

- **Construction:** Using significantly lower carbon machinery and materials, such as electric or hydrogen machinery. **[switch]**
- **Operation and Maintenance:** Specifying long-life, durable and resilient assets that minimise repair and maintenance intervals (e.g. installing LED lighting to increase lifespan). **[improve]**
- **Offset:** Considering offsetting only as a last resort once all reasonable reduction opportunities have been explored. To comply with PAS 2080:2023, market-based offsets must not be included within carbon assessment boundaries.

For further information and guidance on how to apply the carbon reduction hierarchy, please refer to **Clause 4.3 of PAS 2080:2023**, as well as the [NISTA Whole Life Carbon Management Handbook for the Built Environment Carbon Reduction Hierarchy Challenge Checklist \(p48-49\)](#).

3. Governance and leadership

Effective governance and leadership are essential to ensure that carbon management is embedded in decision-making, supported by clear responsibilities and aligned with the project's wider objectives throughout its lifecycle.

For best practice guidance on governance and leadership, see **Clause 5 of PAS 2080:2023**.

3.1 Roles and responsibilities

All projects must define clear roles and responsibilities for carbon management, and each responsible individual should have explicit carbon objectives.

The template contains a table to complete with defined roles and responsibilities for implementing carbon management throughout the project. To demonstrate ownership for carbon reduction activities required to deliver the CMP, these should be embedded within the main project roles to ensure carbon management is treated as a core business-as-usual activity, rather than being delegated to separate carbon specialists. This table should be updated over the project lifecycle with the applicable roles and responsibilities, and a non-exhaustive list of example roles and responsibilities has been provided in the template.

Additional guidance and resources on roles and responsibilities for carbon management are available from industry bodies and organisations such as the Major Projects Association.

3.2 Leadership

Leadership provides the vision to drive carbon reductions across all levels of an organisation and enables the right capabilities to exist across the value chain to plan for and drive decarbonisation. Clear and sustained commitment from senior leadership is critical in setting direction and empowering delivery teams to act. Strong senior ownership and accountability help ensure that effective carbon management processes are embedded consistently and deliver meaningful carbon reductions.

This should be reflected in the CMP through clear articulation of strategic alignment, collaboration across the value chain and the approach to building capability through carbon training, as set out in the corresponding sub-sections.

3.2.1 Strategic alignment

Projects should ensure that carbon ambitions are proportionate, deliverable and responsive to both the project context and wider strategic drivers. Carbon objectives should be set with a clear understanding of the project's scope, delivery constraints and opportunities for carbon reduction across the lifecycle. They should take account of how the project interacts with other assets, services and the wider built environment. Projects should also draw on existing evidence, expertise and lessons learnt from comparable projects and the wider built environment to inform ambition setting and delivery approaches.

The CMP should explain how the project's carbon objectives align with wider organisational, regional and national objectives and strategies, including relevant sectoral pathways and national decarbonisation priorities. Where strategic, economic or market conditions affect the feasibility of delivering planned reductions, projects should also review and adjust their carbon ambitions transparently and with clear justification for doing so.

3.2.2 Collaboration

Collaboration is essential for WLC reduction, as no single organisation or discipline has all the information needed to reduce carbon effectively. Organisations should work closely and early with their supply chains to set clear expectations in line with government requirements and support the wider dissemination of good carbon management practice. Early engagement with the supply chain can encourage the exploration of new ideas, challenge thinking and support the development of practical solutions to reduce emissions. The CMP should explain how the project will engage with value chain members and describe the arrangements that will enable effective collaboration.

Prior to SOBC, at the Project/Programme Initiation Document (PID) stage, projects should set out the overarching intentions and principles for collaboration. At SOBC, projects should move beyond intent and start planning how collaboration on carbon will be delivered. This includes identifying key stakeholders, the intended mechanisms for collaborative working and how early engagement will support the development of the CMP.

By FBC, projects should demonstrate fully established ways of working, including clear governance structures, escalation routes, defined roles and responsibilities and practical arrangements that enable effective collaboration across the value chain. Tier 1 projects may require a greater level of detail to address the number and complexity of relationships. Projects should also consider and explain how potential blockers to collaboration such as confidentiality/non-disclosure agreements are dealt with.

3.3 Carbon training

Effective WLC reduction depends on building the capability of everyone in the value chain to apply consistent carbon management practices. Therefore, carbon training should be provided to people across a range of roles and responsibilities within an organisation and across the value chain to fill in knowledge and skills gaps. This could be achieved through outcome-based training initiatives and certifications relevant to the sector, discipline or skill set they are addressing.

The CMP should outline any carbon training that will be provided and to whom. For some projects it may be appropriate to refer to organisation-level arrangements already in place, rather than project-specific items.

4. Whole life carbon assessment

A whole life carbon assessment (WLCA) is the process of assessing or estimating greenhouse gas emissions and removals across the full lifecycle of a project and/or programme of works. WLCAs can be undertaken during any project phase, using generic information in the early design phases and more specific data as the design becomes more developed.

Conducting a WLCA for a project provides a WLC baseline that can be compared to the results of later assessment iterations. The WLC baseline is the estimated carbon impact of the project in the absence of specific carbon reduction measures. This is based on the initial scope, design assumptions and expected performance, and provides a reference point against which reductions can be measured. WLCAs should be reviewed and updated at each business case stage, with an increasing level of detail as the project moves from SOBC through to FBC.

Undertaking WLCAs at appropriate points throughout the project lifecycle supports informed decision-making during options selection and design development. WLCAs should be conducted ahead of major decision points to ensure that reduction measures are current and reflected in the overall assessment. When applied iteratively and using a modular life-cycle structure, WLCAs help to establish consistent baselines, identify carbon hotspots and reduction opportunities, inform realistic project-level carbon reduction targets and enable progress against those targets to be monitored over time. This strengthens options appraisal by providing comparable evidence as projects develop, enabling projects to test the carbon implications of proposed measures as options are refined and prioritise interventions with the greatest WLC benefit.

Assessing carbon from a whole life perspective supports wider benefits such as asset reuse, resource efficiency, waste reduction and other circular-economy principles. It can also improve value for money by avoiding overspecification and reducing the risk of assets becoming misaligned with future policy, regulatory, or technological changes.

See **Clause 7 of PAS 2080:2023** for further guidance on using WLCA to support decision-making.

4.1 Applying whole life carbon assessment

The [RICS Whole Life Carbon Assessment for the built environment professional standard \(2nd edition\)](#) sets out a technical methodology for assessing WLC. Projects should apply the RICS methodology, ensuring the level of application remains proportionate to the project stage and tier. This section of the guidance provides advice for projects on conducting and reporting WLCAs within the context of DfT CMPs.

Where applying the RICS WLCA Professional Standard is not feasible or proportionate, alternative methodologies may be used if they are transparent and align with the modular life-cycle approach in [BS EN 17472:2022](#). Local transport infrastructure projects should align with DfT's [Local transport quantifiable carbon guidance \(QCG\)](#). Any alternative method should clearly explain its assumptions, boundaries and calculation approach.

4.1.1 Boundaries and module breakdown

To accurately calculate the WLC baseline for a project, it is important to understand the project boundaries. Projects should clearly define project boundaries within the CMP. The WLCA should include capital, operational and user carbon and removals associated with the project. Further detail and support on project and study boundaries are available in **BS EN 17472:2022** and **Section 4.2 of the RICS WLCA Professional Standard**.

WLCAs use a modular structure for carbon assessment and reporting, which breaks down the built asset's life cycle into stages and modules. Some modules are broken down further into sub-modules. The modular breakdown in Figure 2 is based on the methodology explained in BS EN 17472:2022.

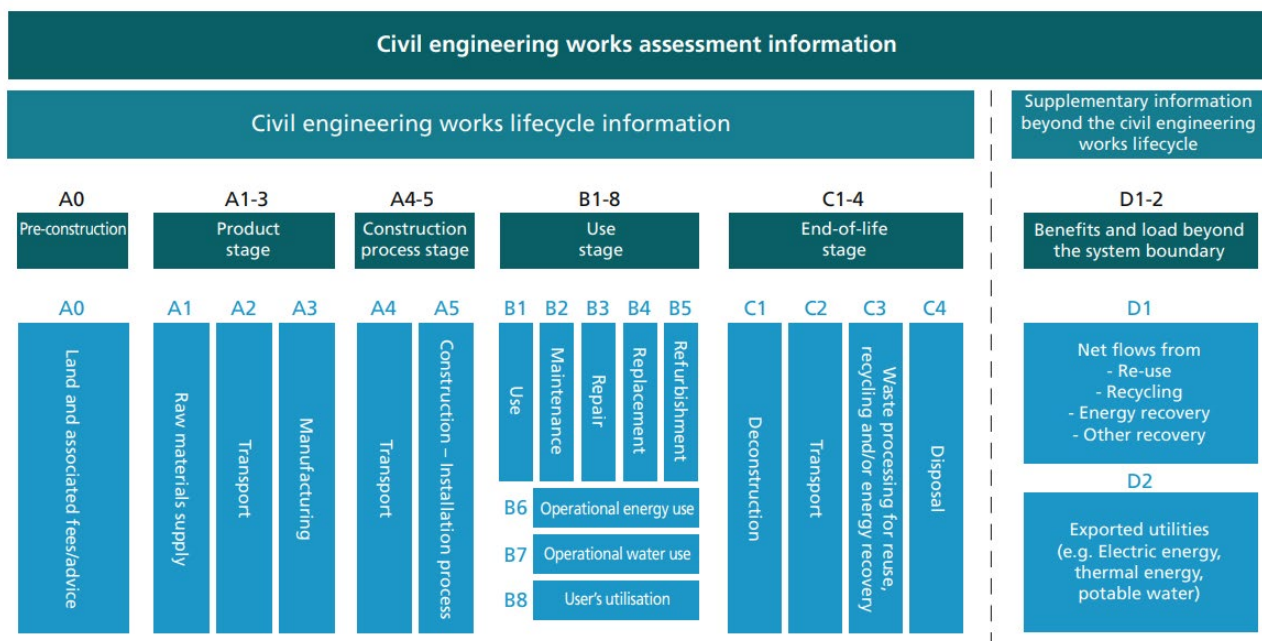


Figure 2: Modular approach developed for Life Cycle Assessment reporting based on the methodology used in BS EN 17472:2022 (Guidance Document for PAS 2080, ICE).

When defining boundaries, projects should consider whether carbon stored or sequestered in habitats affected by the project is material to decision-making. Where relevant, projects may estimate carbon storage and sequestration impacts using published factors, such as those set out in the Natural England Research Report: [Carbon Storage and Sequestration by Habitat 2021 \(NERR094\)](#).

Where appropriate, end-of-life carbon (Module C) should include necessary demolition and waste handling for assets or unsafe structures.

Module D is part of the WLCA but must be reported separately. It includes benefits and loads beyond the system boundary. For example, the potential carbon loads and benefits from reuse, recycling, energy recovery or landfilling of any material arising from the construction, use or end-of-life stages, or potential carbon benefits from changes in road traffic emissions outside the system boundary. Estimates for Module D should be updated at each business case stage.

User carbon should be reported in Module B8 where it relates to use of the asset within the defined WLCA system boundary, consistent with the approaches set out in the RICS WLCA Professional Standard and BS EN 17472:2022. Wider system-level effects, including changes in emissions arising from mode shift identified through the economic appraisal, should be reported in Module D.

The level of separation between direct user carbon and wider system effects will depend on the availability of data and model outputs. Where a clear separation is possible, within-boundary user carbon should be reported in Module B8 and wider system-level effects in Module D. Where this separation is not possible, all user-related emissions should be reported in Module D.

Projects may use a range of methodologies and tools to estimate user carbon. The approach used, along with any assumptions and limitations, should be clearly explained within the CMP.

4.1.2 Conducting and reporting WLCA

A WLC baseline (the estimated emissions impact in the absence of specific carbon reduction measures) should be produced and updated at each business case stage and revised where there are material changes to project scope, design, or delivery assumptions. Carbon should be reported in tonnes of carbon dioxide equivalent (tCO₂e). While detailed, quantifiable estimates of resources may not be available at SOBC stage, projects should consider options and undertake early-stage analysis. Establishing a WLC baseline for the project as early as possible will maximise opportunities to reduce WLC, support the identification of carbon hotspots and embed carbon considerations into early design decisions.

At the SOBC stage, WLC can be estimated using benchmarks from similar projects or industry standards, including client data, published trajectories, or DfT sources such as the [TAG Data Book](#) and from project carbon management processes.

At the OBC stage, carbon estimates should be informed by emerging design information and quantities used for cost planning. WLC should be estimated by applying appropriate

carbon factors to quantities derived from design drawings, specifications, or cost plans, using generic or industry-average data where product-specific information is not yet available. Carbon estimates at OBC stage should be calculated in line with RICS guidance and be sufficiently robust to support option comparison, identify carbon hotspots and inform selection of the preferred option, while remaining proportionate to the level of design definition available.

By the FBC stage, WLC estimates should be based on project-specific quantities and material schedules consistent with the Economic Case. Carbon factors for typical construction materials (cradle to grave) should be taken from credible data sources, and emissions from material transport and construction activities calculated in line with RICS guidance. Carbon estimates should assume best practice in minimising carbon emissions.

Business Case Stage	Capital	Operational	User
SOBC	◆ Published industry benchmarks e.g. ICE / RICS benchmarks ◆ Benchmark data from previous projects or comparable assets ◆ DfT Local transport infrastructure carbon benchmarking tool ◆ High-level scope assumptions (asset types, route length, station count)	◆ Published industry benchmarks ◆ Benchmark data from previous projects or comparable assets ◆ Indicative operational assumptions consistent with option definition (e.g. service type, operating hours)	◆ Published industry benchmarks ◆ Benchmark data from previous comparable projects ◆ BS EN ISO 14083:2023 - TC ◆ TAG Data book
OBC	◆ Quantities used for cost planning with carbon factors applied ◆ Preliminary quantities from outline design drawings and layouts ◆ Refinement using project-specific benchmarks where available	◆ Operational energy, fuel and water consumption estimated using system-level models informed by outline design and operating assumptions ◆ Refinement of benchmarks using project-specific parameters	In addition to above: ◆ Project-specific demand forecasts and mode shift modelling
FBC	◆ Quantities based on design drawings or 3D/BIM models with carbon factors applied based on specified materials and construction techniques ◆ Supplier- and contractor-specific carbon data and EPDs where available	◆ Operational energy, fuel and water consumption derived from detailed operational modelling informed by detailed design, confirmed asset strategies and operating plans	In addition to above: ◆ User carbon based on final demand forecasts and opening-year assumptions

Table 1: Potential data types for a whole life carbon assessment by carbon category and business case stage.

All carbon factors, data sources, assumptions and system boundaries should be clearly documented within the WLCA and CMP and must be consistent with the Economic dimension of the business case. Transparent reporting supports comparability across options, enables assurance and ensures alignment across business case dimensions.

4.1.3 Managing uncertainty

Carbon assessments should include an estimate of uncertainty that reflects the level of design development and data availability at each project stage. Uncertainty should be reported both as an asymmetrical percentage and in tCO₂e. For guidance on appropriate methodology for calculating uncertainty values, refer to the [TAG Uncertainty Toolkit](#) or **RICS WLCA Professional Standard Section 4.10 - Addressing uncertainty in WLCAs**.

At SOBC stage, uncertainty is likely to be high. By FBC, uncertainty should be lower for capital and operational carbon due to greater specification detail, however, uncertainty on user carbon and land use change carbon may remain higher than uncertainty on capital and operational carbon. The carbon management and design development processes may still result in the addition or deletion of significant scope items and affect uncertainty levels throughout the project lifecycle.

5. Carbon hotspots and reduction opportunities

Through the WLCA process, projects should identify carbon hotspots. These are the assets, materials, activities or operations that represent the most significant sources of WLC emissions.

Hotspot analysis should focus on capital and operational emissions within the project's influence, where there is greatest opportunity to reduce carbon. Recognising these high-impact areas, especially at early project stages, enables more effective planning and provides the greatest opportunity to achieve meaningful reduction in WLC.

5.1 Conducting carbon hotspot analysis

The CMP should include a description of each identified hotspot, an estimate of its carbon in tCO₂e and, where possible, its percentage contribution to the project baseline. Visual summaries, such as graphs and tables comparing the relative carbon impacts of different hotspots, should be provided to support clear interpretation.

For smaller projects and for those at earlier business case stages, the hotspot analysis may be limited to the most significant carbon hotspots, provided this approach is proportionate to the project's scale and available evidence. However, Tier 1 projects and projects at more advanced design stages are expected to report all identified carbon hotspots.

5.2 Carbon hotspot mitigation options

Developing and embedding options to mitigate the carbon-intensive activities will present opportunities to reduce the project's carbon impact and integrate additional benefits across the project lifecycle. These should be recorded to ensure they remain part of the requirements as the project develops. If they are removed, an alternative solution should be adopted.

As with carbon hotspot analysis, a proportionate approach may be applied for smaller projects and for those at earlier business case stages, with mitigation options developed for the most significant hotspots. Tier 1 projects and those at more advanced design stages should develop mitigation options for all identified carbon hotspots.

Mitigation options should be developed and assessed in accordance with the PAS 2080:2023 carbon reduction hierarchy, prioritising the avoidance of carbon through need, scope and design decisions. This should be followed by switching to lower-carbon alternatives and improving the efficiency of remaining activities. Offsetting should be considered only where residual emissions remain after all reasonable avoid, switch and improve measures have been exhausted. Where offsets are considered, they should be reported separately from assessed WLC emissions and must not be counted within WLCA boundaries.

6. Carbon reduction targets

All projects are expected to set a carbon reduction target to demonstrate their ambition to reduce their carbon impact. In line with PAS 2080:2023, WLC reduction targets should be set by asset owners and managers and then adopted and communicated across the value chain. Ambitious target setting is critical to driving early and sustained carbon reduction, embedding carbon considerations into design and delivery decisions and avoiding the risk of locking in higher-carbon solutions.

The carbon reduction target should be set against the WLC baseline and be as ambitious as feasibly possible, while taking account of the available budget, delivery constraints and the project's strategic objectives. The scope of the carbon reduction target should be clearly defined within the CMP, with targets covering capital and operational carbon emissions where the project has direct influence. Any targets relating to user carbon or wider project benefits should be clearly delineated from those for carbon emissions under direct control.

Where appropriate, projects may set a target range, comprising a minimum target and a stretch target. This approach may be suitable for smaller projects or at earlier business case stages. As the project progresses, targets should become more specific, with a defined project-level target expected by FBC stage.

See **Clause 8 of PAS 2080:2023** for further guidance on carbon reduction targets.

6.1 Setting carbon reduction targets

Carbon reduction targets should be set against the WLC baseline estimates produced at SOBC or from the earliest stage possible. Any other carbon reduction targets should also be set out in the CMP, including any carbon reduction targets or commitments agreed through the planning process. When setting a carbon reduction target, projects should be able to demonstrate how they have assessed a range of feasible reduction opportunities and justified their final level of ambition. Projects should also ensure that their carbon ambitions reflect their strategic purpose, delivery constraints and relevant national or regional priorities.

CMPs should detail how wider organisational or national targets have been considered when setting the project's carbon reduction target and carbon management approach. This should include consideration of the UK's statutory carbon budgets and the legal

requirement to achieve net zero greenhouse gas emissions by 2050, as set out in the [Climate Change Act 2008](#). Other relevant targets may include Network Rail's commitment to achieve net zero by 2050, National Highways' net zero maintenance and construction by 2040 target, Rail Safety and Standards Board (RSSB) [Net Zero Carbon Rail](#), or the Construction Leadership Council (CLC) [Five Client Carbon Commitments](#).

6.2 Risks to achieving carbon reduction targets

Projects should identify and actively manage the key risks to achieving their carbon reduction targets as part of a robust carbon management approach. These risks should be included in the overarching project risk register for the business case.

Within the CMP, projects are required to reference the location of the carbon risks within the business case risk register. The register should be maintained throughout the project lifecycle.

7. Procurement

Procurement plays a critical role in enabling WLC reduction, and projects must consider a wide range of commercial approaches that integrate carbon considerations into delivery. Effective procurement policies can incentivise carbon reduction, encourage innovation in low-carbon solutions and establish contractual expectations to deliver. An effective sustainable procurement framework that embeds carbon and other sustainability outcomes, such as social value and biodiversity net gain, as weighted assessment criteria can support sustainable project decision-making.

Overall procurement principles and intentions should be set by SOBC, with specific detail of the agreed commercial arrangements and mechanisms to monitor carbon reduction targets provided by FBC. At early business case stages, the CMP should outline how procurement is intended to support low-carbon delivery and how the supply chain will be engaged. As the project progresses, the CMP should explain how procurement has been used to secure low-carbon outcomes, how reduction opportunities have been identified and assessed and who is responsible for advancing each opportunity.

It is important that the procurement requirements genuinely incentivise WLC reduction, while avoiding processes that create unnecessary burden or increase the risk of contractual disputes during delivery. These requirements should be appropriately reflected in the commercial dimension and programme requirements, avoiding conflict with them.

7.1 Procurement mechanisms

Contractual arrangements on carbon may include a combination of incentives, rewards or penalties. Examples of sustainable procurement approaches include:

- Using financial and contractual incentives such as performance tables, bonuses, or penalties linked to sustainability targets.
- Engaging the supply chain early to co-design sustainable solutions and set achievable targets.
- Evaluating bids on WLC, cost, social value and other sustainability criteria.
- Setting supplier criteria to select organisations based on sustainability credentials.
- Requiring regular, validated and transparent reporting and disclosure on carbon performance.
- Requiring verification against PAS 2080:2023 or other relevant industry standards.

- Providing mechanisms that encourage and enable suppliers to propose innovative low-carbon solutions.

Additional examples and considerations for projects are available in Appendix A of this document. Projects are encouraged to use, adapt, or draw on the following clauses and guidance to integrate carbon reduction requirements into procurement:

- **Clause 10 of PAS 2080:2023** - Guidance on embedding carbon reduction requirements in procurement and commercial processes.
- **Promoting Net Zero Carbon and Sustainability in Construction Guidance Note** within The Construction Playbook - Government guidance on delivering carbon reduction and sustainability through construction procurement.
- **Procurement Policy Note 06/21: Taking account of Carbon Reduction Plans in the procurement of major government contracts** - Guidance on assessing supplier Carbon Reduction Plans in government procurement.
- **Procurement Policy Note 016: Carbon reduction contract schedule and guidance** - Carbon reduction schedule and guidance to reduce contract-level GHG emissions.
- **NEC X29 Climate Change** - An NEC contract clause for incorporating climate change and carbon reduction requirements.
- **The Chancery Lane Project** - climate-aligned contract clauses to support decarbonisation objectives.

8. Carbon monitoring and reporting

Tracking carbon performance is essential to ensure that the carbon outcomes and benefits that the project has committed to, and for which public funding is being invested, are delivered. Monitoring and reporting allow project teams to assess whether the project is on track to achieve its carbon reduction target, evaluate the effectiveness of planned interventions and take timely corrective action when performance deviates from expectations.

The CMP template includes a table for recording the reporting frequency, methods and audience aligned with the project's carbon management objectives. This should be completed to reflect how carbon performance will be tracked, reviewed and communicated throughout each stage of the project lifecycle, including how reporting outputs will be used and how they will inform project decisions.

Where appropriate, projects are encouraged to share carbon monitoring outputs and summary reports with DfT.

For best practice guidance on monitoring and reporting, see **Clause 9 of PAS 2080:2023**.

8.1 Monitoring approach and governance

Projects must establish a structured and proportionate approach to monitoring and reporting carbon performance, supported by clear governance arrangements. Projects should produce carbon reports that track progress against the WLC baseline, identify hotspots and associated mitigation measures, monitor WLC risks and interventions and record delivery of agreed reduction opportunities. The frequency and depth of reporting should be proportionate to project scale and complexity.

For larger or more complex projects, consideration should also be given to the use of appropriate carbon data management systems to support the consistent capture, storage and analysis of carbon data. Where such systems are proposed, the CMP should set out how carbon data will be managed, maintained and assured over the project lifecycle to support robust reporting and decision-making.

Carbon assessment tools, such as [One Click LCA](#) or [e-Tool](#), may be used from early design and optioneering stages to support the assessment of capital and operational carbon. From FBC onwards, use of these tools or similar tools is expected for the

purposes of formal monitoring, reporting and assurance of carbon performance for elements within the project's control.

Where performance deviates from the expected carbon trajectory, projects should have defined and proportionate processes for escalation and corrective action, which may include re-forecasting, developing additional carbon reduction measures or reviewing commercial arrangements to ensure CMP outcomes are delivered. These actions should be embedded within existing project controls and assurance processes.

Where deviations from the expected carbon trajectory arise due to factors beyond the reasonable control of the project (for example, supply chain disruption or changes in external conditions), projects should consider whether carbon reduction targets and forecasts remain appropriate and clearly document any revisions with robust justification. Conversely, where performance exceeds expectations, projects should capture and share good practice with wider sector and consider whether further reasonable carbon reduction opportunities can be identified.

8.2 Monitoring through procurement

Monitoring arrangements should also extend across the supply chain, and projects should ensure that procurement documentation clearly sets out reporting requirements, including data provision, performance metrics, frequency of reporting and any contractual mechanisms linked to carbon performance. This ensures suppliers understand expectations from the outset and supports consistent measurement and accountability throughout delivery.

Appendix A: Procurement considerations for infrastructure decarbonisation

This appendix sets out key procurement considerations for projects to support WLC reduction throughout the value chain.

Engagement and communications

How will the project / client communicate to current and prospective suppliers more broadly to understand market decarbonisation capability? Projects should consider how and when to share project goals with the supply chain to maximise results, noting that early engagement often yields better carbon results.

Procurement strategy

How will procurement be used to enable WLC reduction? For example:

- Contract type encouraging proposal of alternative lower carbon design solutions or materials. Or request use of specific lower-carbon materials directly in project specification (appropriate for Tier 2 and 3 projects).
- Appropriate risk sharing mechanisms to promote the inclusion of low WLC solutions, which might be novel and not proven in previous projects and/or programmes of work.
- What incentives are in place to support projects to embed low-carbon innovations or procure low-carbon materials etc.?

Procurement policies and processes

How is carbon weighted in the tender evaluation criteria? This could include:

- Awarding tenders on the basis of lowest carbon or as a key metric, similar to quality and cost.
- Screening of tenders/subconsultants for adherence with minimum carbon management requirements.
- Where a project is in scope of the requirement to dedicate a minimum 10% weighting to social value criteria, have decarbonisation-related criteria been considered as potentially appropriate for this project? For more guidance, see [Procurement Policy](#)

Note 06/20 – taking account of social value in the award of central government contracts.

Contract award

What is expected to be in contracts, related to carbon? For example:

- Appropriate risk sharing mechanisms to promote the inclusion of low WLC solutions, which might be novel and not proven in previous projects and/or programmes of work.
- Any contractual carbon reduction targets, which should also link back to the project carbon reduction targets and have a mechanism for amending the contractual target if doing so enables better carbon performance of the project overall.
- Any requirements for value chain members to achieve accreditations or to submit carbon reduction opportunities/ plans.
- Any incentive mechanisms that reward WLC performance. Consider value chain maturity and uncertainty in the derivation of carbon reduction targets when determining what incentive mechanisms may be appropriate.
- Prescriptive requirements (for example minimum materials specifications) for smaller projects where appropriate, to reflect scale and level of resource available on project.
- Data management/information exchange requirements in contracts to support monitoring and reporting.
- Permitted and/or required mechanisms for knowledge share outside of the project, to promote continual improvement.

For resources and examples of contract terms which can be used in contracts to meet these aims, see [Procurement Policy Note 01/24 Carbon Reduction Contract Schedule](#).

Contract management

How will suppliers be supported to increase their capabilities and how will their carbon performance be reviewed? For example:

- The project could outline the KPIs / carbon related contract clauses that have been selected to hold contractors/suppliers to account.
- If decarbonisation-related social value criteria have been selected, are appropriate social value metrics and reporting mechanisms in place?

Further guidance and practical resources on decarbonisation for procuring construction and infrastructure projects and programmes is available in [Promoting Net Zero Carbon and Sustainability in Construction Guidance Note](#) within [The Construction Playbook](#).

Appendix B: Carbon Management Plan matrix

Projects should complete as much of the template as is feasible given their size, complexity and maturity. To support proportionate and consistent CMPs, the following matrix sets out what should be included in a CMP at each business case stage and project tier. By clarifying expectations across SOBC, OBC and FBC, this matrix aims to reduce ambiguity, avoid disproportionate effort and promote a more consistent approach to producing CMPs.

All projects are expected to apply a proportionate approach to carbon management that is transparent and integrated into project governance and assurance processes. CMPs should define boundaries, assumptions and limitations, align with relevant organisational and statutory targets and be kept under review as the project develops. Projects should also demonstrate alignment with PAS 2080:2023, focusing on the application of its principles through governance, decision-making and delivery, rather than formal compliance or certification.

Carbon Management Plan matrix

The matrix below sets out the expected content of a CMP by project tier and business case stage. The requirements are also reproduced below in an accessible list format.

Tier	SOBC	OBC	FBC
Tier 1 / GMPP	♦ WLC baseline, which may be project-specific or derived from comparable projects or published benchmarks, with capital, operational and user carbon breakdown ♦ WLC reduction target, which may be project-specific or derived from comparable projects or published benchmarks and may be expressed as a range	♦ Project-specific WLC baseline, consistent with the Economic Case, with capital, operational and user carbon breakdown ♦ Project-specific WLC reduction target, which may be expressed as a range but should be justified ♦ Assessment of project-specific hotspots, identifying <i>at least the five</i>	♦ Project-specific WLC baseline, consistent with the Economic Case and final scope, with capital, operational and user carbon breakdown ♦ Project-specific WLC reduction target ♦ Comprehensive assessment of project-specific hotspots ♦ Comprehensive assessment of project-specific reduction

	◆ Early estimates of carbon hotspots, based on project-specific or benchmarked data, identifying <i>at least the three largest sources of emissions</i> ◆ Early estimates of carbon reduction opportunities, based on project-specific or benchmarked data, identifying <i>at least three key opportunities</i> □ High-level approach describing how carbon will be considered in decision-making	<i>largest sources of emissions</i> ◆ Assessment of project-specific reduction opportunities with early estimates on their reduction potential, identifying <i>at least five key opportunities</i> ◆ Evidence of carbon considerations in optioneering, demonstrating how WLC has informed option development and selection ◆ Assessment of the potential impacts (benefits and risks) of planned reduction measures on cost, quality and schedule ◆ Defined governance, roles and responsibilities for carbon management ◆ Emerging procurement approach outlining proposed mechanisms for embedding WLC requirements ◆ High-level monitoring and reporting arrangements	opportunities and their reduction potential ◆ Reduction measures implemented to date, and progress against the original reduction target ◆ Assessment of the impacts (benefits and risks) of implemented reduction measures on cost, quality and schedule ◆ Reduction potential of remaining planned measures, including their anticipated impacts on cost, quality and schedule ◆ Fully established governance, roles and responsibilities for carbon management ◆ Residual risks to achieving carbon reduction target and mitigation plans reflected in the overall business case ◆ Procurement mechanisms to be used, detailing how WLC requirements are embedded in tendering and contract award, with evidence of supplier engagement and collaboration where applicable ◆ Monitoring, evaluation and reporting plan for WLC throughout the project's lifecycle
Tier 2	◆ WLC baseline, which may be project-specific or derived from comparable projects or published benchmarks, with capital, operational and user carbon breakdown ◆ WLC reduction target, which may be project-specific or derived from comparable projects or published benchmarks and may be expressed as a range	◆ Project-specific WLC baseline, consistent with the Economic Case, with capital, operational and user carbon breakdown ◆ Project-specific WLC reduction target, which may be expressed as a range ◆ Assessment of project-specific carbon hotspots, <i>at least three sources of emissions</i>	◆ Project-specific WLC baseline, consistent with the Economic Case and final scope, with capital, operational and user carbon breakdown ◆ Project-specific WLC reduction target ◆ Assessment of project-specific carbon hotspots ◆ Assessment of project-specific carbon reduction opportunities, with final

	◆ Early estimates of carbon hotspots, based on project-specific or benchmarked data, identifying <i>at least the three largest sources of emissions</i> ◆ Early estimates of carbon reduction opportunities, based on project-specific or benchmarked data, identifying <i>at least three key opportunities</i> ◆ High-level approach describing how carbon will be considered in decision-making	◆ Assessment of project-specific carbon reduction opportunities, with early estimates of reduction potential, identifying <i>at least three key opportunities</i> ◆ Assessment of the potential impacts (benefits and risks) of planned reduction measures on cost, quality and schedule ◆ Indication of governance, roles and responsibilities for carbon management ◆ Explanation of how carbon will be considered as part of commercial and procurement decisions	estimates of reduction potential ◆ Summary of carbon reduction measures already implemented and any progress against the carbon reduction target ◆ Assessment of the impacts (benefits and risks) of implemented reduction measures on cost, quality and schedule ◆ Established governance, roles and responsibilities for carbon management ◆ Procurement arrangements setting out how WLC requirements have been embedded ◆ Monitoring, evaluation and reporting plan, proportionate to the project's scale
Tier 3	◆ WLC baseline, derived from comparable projects or published benchmarks, with capital, operational and user carbon breakdown ◆ WLC reduction target, derived from comparable projects or published benchmarks. This may be expressed as a range ◆ High-level approach describing how carbon will be considered in decision-making	◆ WLC baseline, which may be project-specific or derived from comparable projects or published benchmarks, with capital, operational and user carbon breakdown ◆ WLC reduction target, which may be project-specific or derived from comparable projects or published benchmarks, and may be expressed as a range ◆ Estimates of carbon hotspots and reduction opportunities, based on project-specific or benchmarked data, aiming to identify <i>the three largest sources of emissions and reduction opportunities</i> ◆ Explanation of how carbon considerations are used to inform decision-making	◆ Project-specific WLC baseline, consistent with the Economic Case and final scope, with capital, operational and user carbon breakdown ◆ Project-specific WLC reduction target ◆ Summary of project-specific carbon hotspots and reduction opportunities, with estimates on their reduction potential ◆ Summary of the potential impacts (benefits and risks) of planned reduction measures on cost, quality and schedule, at a proportionate level of detail ◆ Established governance, roles and responsibilities for carbon management ◆ Explanation of how carbon has been considered as part of commercial and procurement decisions

			◆ Monitoring, evaluation and reporting plan, proportionate to the project's scale
--	--	--	---

Table 2: Carbon Management Plan requirements by business case stage and project tier.

Carbon Management Plan matrix (list)

The requirements set out in the matrix are reproduced below in an accessible list format.

Tier 1 / Government Major Projects Portfolio

SOBC

- WLC baseline, which may be project-specific or derived from comparable projects or published benchmarks, with capital, operational and user carbon breakdown
- WLC reduction target, which may be project-specific or derived from comparable projects or published benchmarks and may be expressed as a range
- Early estimates of carbon hotspots, based on project-specific or benchmarked data, identifying at least the three largest sources of emissions
- Early estimates of carbon reduction opportunities, based on project-specific or benchmarked data, identifying at least three key opportunities
- High-level approach describing how carbon will be considered in decision-making

OBC

- Project-specific WLC baseline, consistent with the Economic Case, with capital, operational and user carbon breakdown
- Project-specific WLC reduction target, which may be expressed as a range but should be justified
- Assessment of project-specific hotspots, identifying at least the five largest sources of emissions
- Assessment of project-specific reduction opportunities with early estimates on their reduction potential, identifying at least five key opportunities
- Evidence of carbon considerations in optioneering, demonstrating how WLC has informed option development and selection
- Assessment of the potential impacts (benefits and risks) of planned reduction measures on cost, quality and schedule
- Defined governance, roles and responsibilities for carbon management
- Emerging procurement approach outlining proposed mechanisms for embedding WLC requirements
- High-level monitoring and reporting arrangements

FBC

- Project-specific WLC baseline, consistent with the Economic Case and final scope, with capital, operational and user carbon breakdown
- Project-specific WLC reduction target
- Comprehensive assessment of project-specific hotspots
- Comprehensive assessment of project-specific reduction opportunities and their reduction potential
- Reduction measures implemented to date, and progress against the original reduction target
- Assessment of the impacts (benefits and risks) of implemented reduction measures on cost, quality and schedule

- Reduction potential of remaining planned measures, including their anticipated impacts on cost, quality and schedule
- Fully established governance, roles and responsibilities for carbon management
- Residual risks to achieving carbon reduction target and mitigation plans reflected in the overall business case
- Procurement mechanisms to be used, detailing how WLC requirements are embedded in tendering and contract award, with evidence of supplier engagement and collaboration where applicable
- Monitoring, evaluation and reporting plan for WLC throughout the project's lifecycle

Tier 2

SOBC

- WLC baseline, which may be project-specific or derived from comparable projects or published benchmarks, with capital, operational and user carbon breakdown
- WLC reduction target, which may be project-specific or derived from comparable projects or published benchmarks and may be expressed as a range
- Early estimates of carbon hotspots, based on project-specific or benchmarked data, identifying at least the three largest sources of emissions
- Early estimates of carbon reduction opportunities, based on project-specific or benchmarked data, identifying at least three key opportunities
- High-level approach describing how carbon will be considered in decision-making

OBC

- Project-specific WLC baseline, consistent with the Economic Case, with capital, operational and user carbon breakdown
- Project-specific WLC reduction target, which may be expressed as a range
- Assessment of project-specific carbon hotspots, at least three sources of emissions
- Assessment of project-specific carbon reduction opportunities, with early estimates of reduction potential, identifying at least three key opportunities
- Assessment of the potential impacts (benefits and risks) of planned reduction measures on cost, quality and schedule
- Indication of governance, roles and responsibilities for carbon management
- Explanation of how carbon will be considered as part of commercial and procurement decisions

FBC

- Project-specific WLC baseline, consistent with the Economic Case and final scope, with capital, operational and user carbon breakdown
- Project-specific WLC reduction target
- Assessment of project-specific carbon hotspots
- Assessment of project-specific carbon reduction opportunities, with final estimates of reduction potential
- Summary of carbon reduction measures already implemented, and any progress against the carbon reduction target

- Assessment of the impacts (benefits and risks) of implemented reduction measures on cost, quality and schedule
- Established governance, roles and responsibilities for carbon management
- Procurement arrangements setting out how WLC requirements have been embedded
- Monitoring, evaluation and reporting plan, proportionate to the project's scale

Tier 3

SOBC

- WLC baseline, derived from comparable projects or published benchmarks, with capital, operational and user carbon breakdown
- WLC reduction target, derived from comparable projects or published benchmarks. This may be expressed as a range
- High-level approach describing how carbon will be considered in decision-making

OBC

- WLC baseline, which may be project-specific or derived from comparable projects or published benchmarks, with capital, operational and user carbon breakdown
- WLC reduction target, which may be project-specific or derived from comparable projects or published benchmarks, and may be expressed as a range
- Estimates of carbon hotspots and reduction opportunities, based on project-specific or benchmarked data, aiming to identify the three largest sources of emissions and reduction opportunities
- Explanation of how carbon considerations are used to inform decision-making

FBC

- Project-specific WLC baseline, consistent with the Economic Case and final scope, with capital, operational and user carbon breakdown
- Project-specific WLC reduction target
- Summary of project-specific carbon hotspots and reduction opportunities, with estimates on their reduction potential
- Summary of the potential impacts (benefits and risks) of planned reduction measures on cost, quality and schedule, at a proportionate level of detail
- Established governance, roles and responsibilities for carbon management
- Explanation of how carbon has been considered as part of commercial and procurement decisions
- Monitoring, evaluation and reporting plan, proportionate to the project's scale