

1EWo2 Enabling Works – Area South

Document Title: Carbon Management Plan

Document no: 1EWo2-CSJ-EV-PLN-S000-000006

Work Package Ref: N/A

Revision	Author	Reviewed by	Approved by	Date	Revision Details
C05	 Environment Manager	 Environment Manager	 Head of Environment	21-07-2021	Issued for Acceptance

STAKEHOLDER REVIEW REQUIRED (SRR)

- COUNTY/DISTRICT/LONDON BOROUGH COUNCIL
 - LOV
 - LUL
 - NRL
 - TFL
 - UTILITIES COMPANY
 - OTHER
-

PURPOSE OF SRR

- ACCEPTANCE
- APPROVAL
- NO OBJECTION
- CONSENT

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REVISION CHANGES, AUTHORISATION & ISSUE RECORD

Version	Date	Sections revised	Brief description of the revision	Prepared by	Checked by	Approved by	Reason for Issue	HS2 Acceptance Decal Code
Po1	26-06-2017		Original version	██████	██████	██████	For Acceptance	
Po2	04-08-2017		Full revision of original document in response to HS2 Comments	██████	██████	██████	For Acceptance	
Po3	26-02-2018		Amendments to WP roles and responsibilities and the Carbon Management Process	██████	██████	██████	For Acceptance	
Co1	14-05-2018		LCA Scoping Methodology and response to HS2 comments	██████	██████	██████	For Acceptance	
Co2	12-02-2019		Response to HS2 Comments and PAS 2080 Compliance Certificate	██████	██████	██████	For Acceptance	
Co3	02-05-2019		Response to HS2 Comments	██████	██████	██████	For Acceptance	
Co4	22-06-2020		Revision of PAS 2080 section to reflect status	██████	██████	██████	For Information	
Co5	21-07-2021		6 month update. Inclusion of PAS2080 certificate & additional carbon related U&As, correcting formatting, removal of carbon target as descoped.	██████	██████	██████	For Acceptance	

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1 Introduction

1.1 About the Carbon Management Plan

- 1.1.1 High Speed Two (HS2) is a new high-speed north – south railway, running from London to Birmingham. This Management Plan has been written to cover the works covered in the Enabling Works Contract (EWC) for Area South of Phase One. Phase One will connect London with Birmingham and the West Midlands.
- 1.1.2 The HS2 EWC Area South, covers 26.8km from Euston in the London Borough of Camden to Ickenham in the London Borough of Hillingdon.
- 1.1.3 It involves the preparatory works to enable the construction of tunnels, vents, shafts, bridges and other structures along the route as part of the Main Works Contract (MWC).
- 1.1.4 The Area South EWC contract covers a range of activities including utility diversions, ecology surveys, archaeology, incl. exhumations, establishing site compounds, site clearance, demolition, ground remediation, watercourse activities, highways realignments, monitoring and instrumentation, structural reinforcements, and drainage.
- 1.1.5 **Table 1** outlines the various abbreviations used throughout this document.

Table 1: List of abbreviations

Abbreviation	Definition
CSjv	Costain Skanska Joint Venture
HS2	High Speed 2 Ltd
CMO	Contract Management Organisation
EWC	Enabling Works Contract
CMP	Carbon Management Plan
DMP	Design Management Plan
EMP	Environment Management Plan
EMR	Environmental Minimum Requirements
EMS	Environmental Management System
EPD	Environmental Product Declaration
KPI	Key Performance Indicator
PAS	Publicly Available Statement
LCA	Life Cycle Assessment
WLC	Whole Life Cost
ITT	Invitation To Tender
POEM	Phase One Environment Managers (Forum)
ISO	International Standards Organisation
BREEAM	Building Research Establishment Environmental Assessment
BIM	Building Information Management

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BoQ	Bill of Quantities
COCP	Code of Construction Practice
CBA	Cost Benefit Analysis
MIDIP	Master Information Deliverables Plan
MWCC	Main Works Civils Contractor
U&A	Undertakings & Assurances
WI	Works Information
WP	Work Package

1.1.6 **Table 2** specifies what the terms Carbon and LCA refer to in the context of this document and the wider HS2 Phase One scheme.

Table 2: Definition of Terms

Term	Definition
Carbon	The term carbon is used throughout this document to refer to the combined greenhouse gas emissions reported in kilograms of carbon dioxide equivalent i.e CO _{2e}
LCA	In the context of this document, the term LCA is a combination of Global Warming Potential, BREEAM credits and the Materials Efficiency Matrix.

1.2 Why is Carbon relevant in the EWC?

- 1.2.1 HS2 plays a significant role in supporting the low carbon transport and low carbon construction objectives which are essential parts of the Government's plans for the reducing UK carbon emissions.
- 1.2.2 HS2 is committed to minimising the carbon footprint and delivering low carbon long distance journeys that are supported by low carbon energy.

1.3 Purpose of the Carbon Management Plan

- 1.3.1 The purpose of the Carbon Management Plan (CMP) is to outline how CSjv (Costain-Skanska Joint Venture) plans to identify and manage the impacts of carbon emissions over the course of the HS2 Area South Enabling Works Contract (EWC).
- 1.3.2 The CMP will outline the overarching process of identifying, calculating and managing any potential carbon hotspots that arise from the delivery of works as part of the HS2 Area South EWC.
- 1.3.3 The CMP will also outline the key roles and responsibilities of carbon management across the HS2 Area South EWC.

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- 1.3.4 The HS2 Area South CMP is a live document and will be updated as and when deemed necessary by the CSJv Area South Environment Team. The instances following which this CMP will be updated are, but not limited to:
- timelines outlined in the Area South EMP in line with ISO 14001:2015 Environment Management Systems requirements;
 - an assessment of the CSJv Area South EWC Work Package Strategy; and
 - a scoping workshop to determine the assets and activities which will have a Lifecycle Assessment (LCA).

1.4 Environmental Management System

- 1.4.1 CSJv will deliver the Area South EWC in a manner that protects the environment by preventing or mitigating adverse carbon impacts whilst maximising the opportunities to enhance the environment and contribute to sustainable development in accordance with the HS2 Sustainability Policy and CSJv Environmental Policy.
- 1.4.2 CSJv and the Work Package Contractors will comply with the requirements of the Costain Group Environmental Management Systems (EMS) which is certified to ISO14001:2015 and has been adopted and adapted for the Area South EWC. This also includes the Resource Efficiency Plan which outlines the carbon management process within the Costain Group – see **Appendix 1**.
- 1.4.3 Each Work Package EMP will have a section dedicated to Carbon Management, which will outline the carbon mitigation measures. This section will also identify the key hot spots (if any) and the carbon reduction opportunities that will be undertaken for the relevant Work Package.

1.5 Work Package Environmental Management Plan (WP EMP)

- 1.5.1 Each Work Package Environmental Management Plan (EMP) will include measures to address and manage WP site specific and local environmental risks and opportunities.
- 1.5.2 The development of each Work Package EMP and Design Management Plan (DMP) will be informed by both the Area South EMP and relevant Environmental Control Plans including the Area South CMP.
- 1.5.3 The Work Package EMP will also contain all the necessary and relevant¹ evidence of implementation and carbon reduction achievements.
- 1.5.4 A diagram outlining how carbon minimisation related to the different aspects of the EMS, is provided within **Figure 1** below.

¹ Evidence that has been submitted as a separate deliverable will not be included in the WP EMP, however the document number will be provided as a reference.

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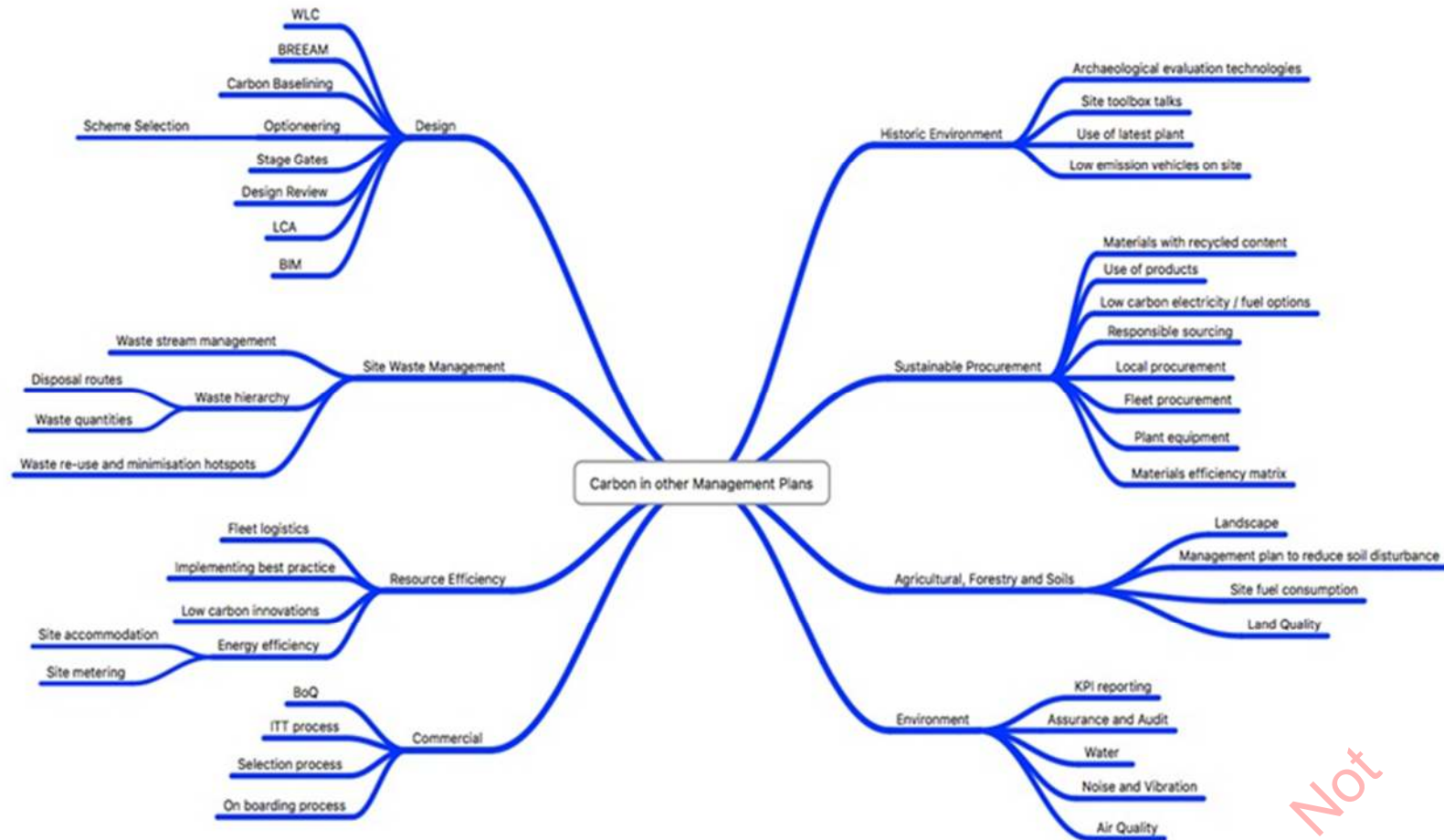


Figure 1 Carbon minimisation across the HS2 Enabling Works Contract EMS

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1.6 Work Package Design Management Plan

- 1.6.1 The Work Package DMP will include measures to address and manage the WP design specific carbon emissions.
- 1.6.2 The Design specific risks and opportunities will be identified and managed through the Work Package specific Environment and Sustainability Opportunities Matrix which will be submitted as part of the Work Package Master Information Deliverables Plan (MIDP).
- 1.6.3 The Work Package DMP will also contain all the necessary and relevant evidence of implementation and carbon reduction achievements.

1.7 Links to Other Documents

- 1.7.1 The CMP is not a standalone document and must be read in conjunction with the Area South EMP (1EW02-CSJ-EV-PLN-S000-000001) to put into context the relationship between the Area South CMP and other relevant Environmental Control Plans.
- 1.7.2 The CMP and Area South EMP is to be applied across the Area South EWC and should be used to inform and produce the Work Package EMP's or Work Package DMP's which are tailored to address site specific environmental requirements.
- 1.7.3 The CMP also links to other Management Plans within the scope of Area South EWC, including the:
 - Environmental Management Plan (1EW02-CSJ-EV-PLN-S000-000001)
 - Sustainable Procurement Plan (1EW02-CSJ-EV-PLN-S000-000037)
 - Historic Environment Management Plan (1EW02-CSJ-EV-PLN-S000-000018)
 - Agricultural, Forestry and Soils Management Plan (1EW02-CSJ-EV-PLN-S000-000004)
 - Land Quality Management Plan (1EW02-CSJ-EV-PLN-S000-000007)
 - Site Waste Management Plan (1EW02-CSJ-EV-PLN-S000-000014)

2 Roles and Responsibilities

- 2.1.1 The roles and responsibilities relating to the development and implementation of the CMP within each Work Package, are provided within **Table 3**.
- 2.1.2 To ensure applicability across the different types of WP's, responsibilities have been divided into 3 groups: CMO, Designers and WP Contractor

Table 3: Carbon Management Plan Roles and Responsibilities with respect to individual work packages

Role	Summary of responsibilities with respect to individual Work Packages
<p>CMO</p> <p>(Carbon Specialist, Environment Managers and Environment and Sustainability Manager)</p>	<ul style="list-style-type: none"> • Early identification of carbon risks, opportunities and requirements associated with the WP (this includes general requirements). • Facilitation of carbon workshops and training – including carbon foot printing, PAS 2080. • Communication of the carbon management related requirements of the Work Package EMP to the WP Contractor(s). • Production of final draft of the Work Package EMP or DMP collaboration with the WP Contractor. • Approval of Design EMP's carbon baselines and LCA. • Undertake analysis of carbon data captured. • Production of carbon best practices, for dissemination to the project and upload onto HS2 Xactium system.
<p>Designers</p> <p>(design consultants, design houses, CSjv design teams for permanent and temporary assets). (The * denotes the <u>only</u> deliverables required of temporary assets)</p>	<ul style="list-style-type: none"> • Produce the Environment & Sustainability Opportunities Matrix in collaboration with CSjv (undertaken at design stage as well) *. • Produce carbon baseline for the contracted Work Package's based on industry standard. • Produce Design specific LCA's and WLC. • Produce Design Management Plans showing PAS 2080 compliance. • Provide internal assurance of EMP baseline and LCA.
<p>Work Package Contractors</p> <p>(demolition contractors, civils and construction contractors, utilities contractors, landscape contractors)</p>	<ul style="list-style-type: none"> • Identification of significant activity related carbon risks associated with the WP. • Review of the Draft Work Package EMP and contribute to the final draft Work Package EMP. • Implementation of the Work Package EMP relating to reduction of carbon. • Recording and reporting of carbon emissions in the prescribed tool. • Produce relevant sections of the 'As Built Report' at end of design. • LCA Report to be developed and updated at relevant stage gates.

2.1.3 The following CMO key carbon related roles listed in **Table 4** are responsible for the development and implementation of the Area South EWC Carbon Management Plan.

Table 4 Specific CMO roles and responsibilities with respect to the Carbon Management Plan

Role	Summary of responsibilities with respect to the Carbon Management Plan
Head of Environment	<ul style="list-style-type: none"> • Provides strategic advice to the Area South EWC to deliver environment and sustainability requirements in line with the Works Information and Environmental Minimum Requirements.
Environmental Manager / Environment Advisor	<ul style="list-style-type: none"> • Drive and encourage the use of low carbon technologies and solutions across the Work Packages. • Prepare writeups of carbon best practices, for communication to the supply chain and HS2 (via Xactium and legacy papers).

Carbon Specialist	<ul style="list-style-type: none"> Develop, maintain and implement the Area South EWC Carbon Management Plan. Provide the team with the knowledge and tools to minimise whole life carbon emissions. Provide specialist training and advice and work with the estimators to update the carbon footprint.
Design Manager	<ul style="list-style-type: none"> Responsible for ensuring that the CSJv and HS2 contractual requirements are fully embedded within the design process and within all stages of the design. Ensure all carbon opportunities are identified and optimised during the design process.
Work Package Manager	<ul style="list-style-type: none"> Overall responsibility to ensure that the carbon management requirements are implemented and managed within each work package.

3 Requirements and Obligations

3.1 UK and EU Legislation legal requirements

3.1.1 The Costain EMS (adopted for the HS2 Area South EWC) includes a legal register which is a live document, maintained by the Costain head office. The Area South EWC Aspects and Impacts Register (1EW02-CSJ-EV-REG-S000-000002) identifies which sections of the legal register are applicable to the HS2 Area South EWC. These are reflected in the HS2 Area South Legal Register (1EW02-CSJ-LE-REG-S000-000001).

Climate Change Act 2008

3.1.2 The Area South EWC EMP and CMP have been written in line with the *Climate Change Act 2008*.

3.1.3 Action plans will be aligned with EU carbon emission reduction targets of 20% reduction on 1990 levels by 2020 and 80% reduction by 2050.

High Speed Rail (London – West Midlands) Act 2017

3.1.4 On 23 February 2017, Royal Assent was granted for Phase One of HS2. The High Speed Two Bill is now an Act of Parliament (law) i.e. High Speed Rail (London – West Midlands) Act 2017 including its Register of Undertakings and Assurances and accompanying Environmental Minimum Requirements (EMR's).

3.1.5 The EMR's set out the high level environmental and sustainability commitments and are contained in the EMR General Principles document supported by a series of papers:

- Annex 1: Code of Construction Practice;
- Annex 2: Planning Memorandum;
- Annex 3: Heritage Memorandum; and
- Annex 4: Environmental Memorandum.

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Code of Construction Practice (CoCP)

- 3.1.6 The CoCp details a range of control measures and the standards to be implemented during construction works across Area South (and all of Phase 1 Areas) to protect communities and the environment.

Undertakings and Assurances

- 3.1.7 The register of undertakings and assurances details all commitments offered throughout the parliamentary process for the High Speed Rail (London – West Midlands) Bill up until Royal Assent. The purpose of the register is to record all the individual undertakings and assurances given to petitioners and to Parliament in a single document. This will help to ensure that the CSJv and Secretary of State for Transport, or any other organisation exercising the powers provided by the Act coming into force following Royal Assent of the High Speed Rail (London – West Midlands) Bill, complies with them throughout the projects lifecycle.
- 3.1.8 The Area South EWC Carbon related U&A's are detailed in **Appendix 2**.

3.2 PAS 2080: 2016 Carbon Management in Infrastructure

- 3.2.1 PAS 2080: 2016 Carbon Management in Infrastructure compliance provides a common framework for all infrastructure sectors and value chain members, on how to manage whole life carbon when delivering infrastructure assets and programmes of work. Implementation of PAS 2080 promotes the delivery of reduced carbon, reduced cost infrastructure, more collaborative ways of working and a culture of challenge in the infrastructure value chain through which innovation can be fostered.
- 3.2.2 CSJv, has a contractual obligation² to demonstrate PAS 2080: 2016 Carbon Management in Infrastructure compliance. Evidence of the compliance will be included in the CMP.
- 3.2.3 In October 2020, CSJv underwent the PAS 2080: 2016 re-certification process. A copy of the PAS 2080 certificate is provided within **Appendix 3**.

3.3 Infrastructure Carbon Review (ICR)

- 3.3.1 Both CSJv partners; Costain Ltd and Skanska UK plc have signed the Infrastructure Carbon Review.
- 3.3.2 As part of this, the commitments made by the joint venture partners are as follows:
- Leadership – to create the environment and the imperative for change.
 - Innovation – to be the engine of change.

² As set out in the Area South – EWC Contract Requirements Technical (1EW02-HS2-EN-SPE-S000-000001)

- Procurement – to provide the mechanisms that enable the supply chain to respond.

3.3.3 A copy of the 'Statement of Endorsement' for both Costain Ltd. and Skanska UK plc is attached in **Appendix 4**.

3.4 HS2 Technical Standards

Technical Standard – Carbon Management

3.4.2 The Carbon Management Technical Standard (HS2-HS2-SU-STD-000-000004) details the requirements and associated guidance for developing, maintaining and implementing a carbon management plan to deliver carbon reductions consistent with the expectations of the stated contract carbon reduction targets.

Technical Standard – Carbon Footprinting and Lifecycle Assessment

3.4.3 The Carbon footprinting and Life Cycle Assessment Technical Standard (HS2-HS2-SU-STD-000-000010) sets out the specification for conducting an LCA for minimising whole life cycle carbon emissions and reducing embedded environmental impacts.

4 Carbon Management

4.1 Carbon Management HS2 EWC Area South

4.1.1 CSJv aims to reduce the carbon impacts resulting from the various Life Cycle Stages (Technical Standard – Carbon footprinting and life cycle assessment; Document no.: HS2-HS2-SU-STD-000-000010) of activities and assets on the HS2 Area South EWC. The Life Cycle Stages relevant to the activities and assets on Area South EWC are outlined Section 4.5.6.

4.2 Carbon Management Scoping Process

4.2.1 CSJv has developed a mechanism, in agreement with HS2 by which to determine how it will determine which WP's will have a full LCA versus those that will have an industry standard baseline and its emissions monitored through the HS2 Environmental Sustainability Reporting Standard Template (HS2-HS2-SU-TEM-000-000007).

4.2.2 Actuals from each sector within Area South will be reported in the HS2 Environmental Sustainability Reporting Standard Template (HS2-HS2-SU-TEM-000-000007) on a monthly basis.

4.2.3 The mechanism has 4 main criteria to determine if a design WP qualifies for a full LCA:

- A permanent asset (belonging to HS2 or a 3rd party).
- A lifespan of 25 years or more.

- CSjv having a degree of influence on the materials and construction methodology.
- The potential to achieve significant reductions.

4.2.4 An illustration of this methodology against CSjv's WP's can be found in **Appendix 5**. Following a workshop with HS2, it was confirmed that the following WP's would trigger the need for a full LCA:

- WP 134 and 63 – Granby Terrace Bridge (Design & Construction)³.
- WP 137 and 138 – LU Vent shaft and substation (Design & Construction).

4.2.5 Alongside the above WP's any utilities WP's that are associated with the 2 permanent civils assets will also have an LCA – this will be documented in the relevant LCA report.

4.2.6 Deliverables for the above WP's will be:

- an LCA report that is produced and updated at key project gateway's – this will be compliant to Section(s) 7.1.1 to 7.3.5 of Technical Standard – Carbon footprinting and lifecycle assessment (HS2-HS2-SU-STD-000-000010).
- An Environment and Sustainability Opportunities Matrix updated at all key project gateway stages.

4.2.7 The delivery schedule for the LCA reports is outlined in **Appendix 6**. These reports will be produced in compliance with Section 7 of Technical Standard – Carbon footprinting and life cycle assessment (Document no.: HS2-HS2-SU-STD-000-000010). All reports will be submitted to HS2 at the relevant stages.

4.3 Carbon Management Pre-appointment

Competencies and resourcing

4.3.2 During the project procurement stage, it is essential to ensure that the WP Contractor and Designers have the required competency to successfully deliver the carbon management requirements of the Area South EWC.

4.3.3 To ensure that the WP Contractor and Designer is fully aware of the carbon management requirements, CSjv will ensure that the Invitation to Tender (ITT) Information Pack contains the relevant Environment and Sustainability specifications. This will comprise of the carbon management requirements contained with the EMR's, CoCP and the carbon Technical Standards.

³ WP 134 and WP 63 have been taken out of CSjv's scope. Carbon deliverables were completed to detailed design stage at the time of hand over.

4.4 Carbon Management Pre-commencement

Carbon Hotspots

- 4.4.2 The term carbon hotspots refers to areas in a WP that have a high carbon impact.
- 4.4.3 Carbon hot spots in WP's will be identified through an Environment & Sustainability Opportunities workshop, organised by the CMO and led by the Area South EWC Carbon Specialist/Environmental Manager. Participants will include the CSjv WP Manager, the WP Contractor and / or Designers or key suppliers (where possible) and any relevant specialists in relation to the WP.
- 4.4.4 Minutes and outcomes of these workshops will be recorded in the WP EMP or DMP (where appropriate), key outcomes will also be mentioned in the carbon section of the relevant WP EMP or DMP.

Explore Low Carbon Opportunities

- 4.4.5 The outcomes of the Environment & Sustainability Opportunities workshops will also determine the feasibility of low carbon opportunities that can be implemented while carrying out the WP to reduce the carbon impacts of the works.
- 4.4.6 All innovations will be recorded as an opportunity in the relevant WP Environment and Sustainability Opportunities Matrix.
- 4.4.7 Key reduction opportunities will then be uploaded onto the HS2 Xactium system at the closeout of each WP.
- 4.4.8 CSjv will endeavour to share the innovations submitted and implemented with all relevant stakeholders. Innovations, lessons learnt, and best practices will also be shared with other CMO's and relevant stakeholders during the regular POEM and other appropriate forums.

Continuous Improvement

- 4.4.9 To ensure continuous improvement in the implementation of the CMP across the Area South EWC, Environment and Sustainability Opportunities Matrices will be updated at the key stage gates of all work packages.
- 4.4.10 This will ensure that identified opportunities are regularly evaluated to increase their likelihood of successful onsite implementation.

4.5 Commencement

Carbon Baseline and LCA Methodology

- 4.5.2 CSjv has procured OneClick LCA (www.oneclicklca.com) to calculate the carbon baseline and LCA for the relevant permanent asset WP's. The tool will be based on the guidelines set out in

the HS2 Technical Standard – Carbon footprint and lifecycle assessment (HS2-HS2-SU-STD-000-000010) Po6.

- 4.5.3 Following the baseline calculation, the output will be recorded and communicated through the WP LCA report which will be updated and submitted at the agreed key project gateways outlined in Appendix 5.
- 4.5.4 Any carbon reduction interventions taken on a WP will be recorded in the specific WP Environment and Sustainability Opportunities Matrix.
- 4.5.5 The review of the WP specific carbon management elements will be undertaken by the Area South EWC Carbon Specialist and Environmental Manager assigned to the WP.
- 4.5.6 The LCA tool will align with the relevant life cycle stage modules (Ao-D) outlined in Table 5, as per BS EN15804, BS EN15978 and PAS 2080.

Table 5: Description of Life Cycle Stage Modules (Ao – D)

Life cycle stage	Activities incorporated
Product stage (module A1-A3)	The transportation of all materials required for the permanent assets and construction equipment to site from the point of production (or point of storage in the case of plant and machinery) The transportation of workers to and from the construction site.
Construction process stage – transport to site (module A4)	The transportation of all materials required for the permanent assets and construction equipment to site from the point of production (or point of storage in the case of plant and machinery). The transportation of workers to and from the construction site
Construction process stage – construction and installation (module A5)	Construction site works activities including; <ul style="list-style-type: none"> • temporary work, ground works and landscaping • materials storage and any energy or otherwise need to maintain necessary environmental conditions; • transport of materials and equipment on site; • installation of materials and products into the infrastructure asset; • emissions associated with site water demand; • waste management activities (transport, processing, final disposal) associated with waste arising from the construction site; • production, transportation, and waste management of materials / products lost during works; and, • land use change.
Use Stage – Maintenance (module B2)	The production, transportation (to and from the site) and end of life processing of all materials required for preventative maintenance. The electricity, fuel and water used for responsive or reactive treatment to an acceptable condition.
Use stage – Replacement (module B4)	The production, transportation (to and from the site) and end of life processing of all materials required to replace any assets or any components within assets that have a design life of less than 120 years.
Benefits / loads beyond the project	Includes:

boundary Module D	<ul style="list-style-type: none"> • avoided carbon emission impacts; including potential for re-use, recovery and recycling of materials and/or energy beyond the system boundary; and, • exported energy.
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Design and LCA Reporting

- 4.5.7 Design LCA's will be calculated by the relevant Designers using the agreed methodology. This LCA will be reviewed by the Area South EWC Carbon Specialist in conjunction with the Designers, Design WP Managers, and Environment Managers.
- 4.5.8 In line with the Technical Standard – Carbon footprinting and life cycle assessment (HS2-HS2-SU-STD-000-000010) a Key Project Gateway LCA report and an As Built LCA report will also be produced.

Carbon Reporting

- 4.5.9 Carbon impacts will be reported monthly in line with the HS2 Environmental and Sustainability Reporting schedule. All reporting will be done in accordance with the HS2 Environmental Sustainability Reporting Standard Template (HS2-HS2-SU-TEM-000-000007).
- 4.5.10 Should there be a deviation from this template, CSjv will notify HS2 of this change.

4.6 Carbon Management in Environment & Sustainability Opportunities Matrices

- 4.6.1 CSjv uses the Environment & Sustainability Opportunities Matrix in compliance with the requirements of the Environmental Opportunities Realisation Process (HS2-HS2-SU-PRO-000-000003).
- 4.6.2 Opportunities once implemented are monitored throughout the duration they are active with data collection and monitoring done monthly.
- 4.6.3 At the end of its lifecycle or that of the work package and site, the data collected is interrogated. Where possible and relevant, the outcome of the opportunity is quantified into carbon savings.
- 4.6.4 Quantification of carbon savings is done using carbon data sets either issued by the product manufacturer or supplier in the form of an EPD or equally verified process. Failing this industry standard carbon data sets like the ice database or those issued by BEIS on the www.gov.uk website will be used to calculate the carbon savings.
- 4.6.5 For transparency, these calculations are recorded in the individual matrix.
- 4.6.6 Once the quantifiable and non-quantifiable savings have been calculated a best practice would be written up. This will then be uploaded onto Xactium (at opportunity completion) to ensure compliance with the requirements set out in of the Environmental Opportunities Realisation Process (HS2-HS2-SU-PRO-000-000003).

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4.7 Package Closeout

4.7.1 When packages have been completed or are being removed from CSJv's contracted scope of works, carbon management deliverables will be included in the handover files. A system will be in place to manage and ensure that carbon management documentation is included in handover files (**Table 6**).

Table 6: List of documents at handover or close out of WP's

Nature of Work Package	Closure	Handover
Permanent works	<ul style="list-style-type: none"> LCA reports of relevant key stage gate. OneClick LCA inputs in an MS Excel file. Environment & Sustainability Opportunities Matrix. Best Practices for actualised opportunities. 	<ul style="list-style-type: none"> LCA reports of relevant key stage gates. OneClick LCA inputs in an MS Excel file. Environment & Sustainability Opportunities Matrix. Best Practices for actualised opportunities. Handover notes.
Non – permanent works	<ul style="list-style-type: none"> Environment & Sustainability Opportunities Matrix. Best Practices for actualised opportunities. 	<ul style="list-style-type: none"> Environment & Sustainability Opportunities Matrix. Best Practices for actualised opportunities.

5 Communication

5.1 Communication between the CMO, WP Contractors and Designers

- 5.1.1 The contents and requirements of this CMP will be communicated to the CMO WP team and WP Contractors.
- 5.1.2 Site inductions, WP Plans and task briefing documents will be used to communicate key resource efficiency / carbon requirements to the WP Contractor, as appropriate.
- 5.1.3 The CMO Carbon Specialist, along with other members of the CMO team will work closely with the WP Contractor Project Manager, Environmental Advisor and Designer team to ensure the contract requirements are suitably addressed.
- 5.1.4 Formal communication roles and responsibilities for the CMO, WP Contractor and Designers are outlined within **Table 7**.

Table 7: Formal communication roles and responsibilities

CMO	WP Contractor	Designers
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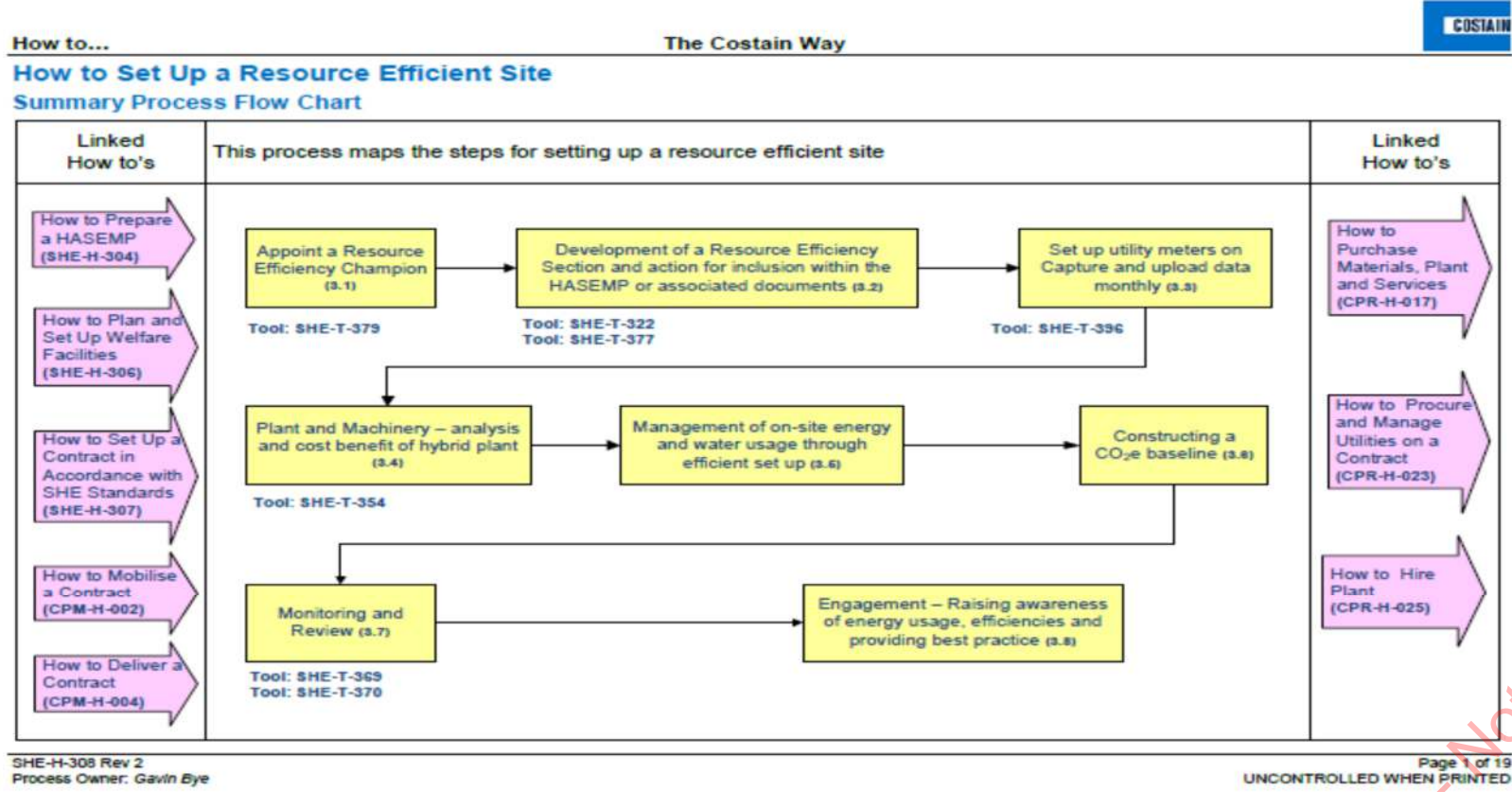
<ul style="list-style-type: none"> Quarterly meeting with Environment & Sustainability team to discuss: <ul style="list-style-type: none"> - reported carbon actuals - technical issues - reporting issues Sharing of good practice with other work packages. 	<ul style="list-style-type: none"> WP Plans for approval by CMO. Weekly site inspection checklist to CMO. Weekly meeting with the CMO WP Manager. 	<ul style="list-style-type: none"> Weekly meetings during baseline calculations on design WP's. Quarterly meetings for baseline vs. actuals review. Review meetings at the beginning and end of each key design stage.
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5.2 Communication with HS2

- 5.2.1 The CMO Carbon Specialist will maintain regular communication with counterparts in the HS2 Environment Team, at both strategic and operational levels. More formal arrangements in the shape of monthly meetings will be implemented to ensure effective management of ongoing carbon matters and continual improvement.
- 5.2.2 In addition, joint meetings will be held between HS2, the CMO, and other HS2 contractors. The frequency of these meetings will be determined by the nature and extent of the works.
- 5.2.3 Other formal communications will relate to deliverables, carbon reduction workshops and reports.

Code 5 - Not Reviewed

Appendix 1 Costain Resource Efficiency Plan



Reviewed

Code 5 - Not

Appendix 2 Carbon Related Undertakings and Assurances

U&A ref id	To Whom	Type	Date issued	Subject	Geographical location	Reference	Text
60	General	Assurance	23/07/2017	HS2 Carbon Minimisation Policy	Routewide	Information Paper E10 - Carbon, (v1.7), paragraph 7.1	<p>In accordance with the climate change objective of the HS2 Sustainability Policy, a carbon management strategy will be developed and applied and will:</p> <ul style="list-style-type: none"> calculate the carbon footprint of the Proposed Scheme and use this as a tool to assess the potential to reduce carbon across the design, construction and operation phase; consider low carbon options in developing the detailed design of the Proposed Scheme; reduce embedded carbon in construction materials and carbon emissions from construction works, where practicable; reduce energy requirements of the scheme and maximise the energy efficiency of operations, if practicable; use and/or generate low carbon energy, if practicable; and sequester carbon, if practicable.
62	Royal Society for the Protection of Birds	Assurance	20/05/2014	Carbon footprint	Routewide	Letter from [redacted] (HS2 Ltd) to [redacted] (RSPB)	The Promoter will require the nominated undertaker to continue to seek to minimise the carbon footprint for Phase 1 of the proposed scheme as far as reasonably practicable.
2590	Campaign to Protect Rural England	Assurance	25/11/2016	Carbon reduction targets	Routewide	Letter from [redacted] (HS2) to [redacted]	The Secretary of State will require the nominated undertaker in respect of the construction and operation of the Proposed Scheme, to set carbon reduction targets, consistent with HS2 Ltd's Sustainability Policy ambition

Reviewed

1EW02-CSJ-EV-PLN-S000-000006 - Not for publication

U&A ref id	To Whom	Type	Date issued	Subject	Geographical location	Reference	Text
						<p>██████████ ██████████ (The Campaign to Protect Rural England), paragraph 2, assurance 1</p>	<p>to be an exemplar project — and continue to seek to minimise the carbon footprint for Phase One of the Proposed Scheme as far as is reasonably practicable.</p>
2593	Campaign to Protect Rural England	Assurance	25/11/2016	Energy Storage	Routewide	<p>Letter from ██████████ ██████████ (HS2) to ██████████ ██████████ (The Campaign to Protect Rural England), paragraph 2, assurance 4</p>	<p>The Promoter will require the nominated undertaker to consider the potential for utilising methods of energy storage, consistent with HS2's Carbon Minimisation Policy, consistent with powers within the Bill and provided that no new significant environmental effects are created.</p>

Reviewed

Code 5 - Not

Appendix 3 CSjv PAS2080 Certificate

bsi.

Verification Certificate

This is to certify that:

Costain Skanska HS2 Enabling Works
South Joint Venture
7th Floor, The Tower
1 Eversholt Street
Euston
London
NW1 2DN
United Kingdom

Holds Certificate Number: CAMS 725317

In respect of:

Costain Skanska HS2 JV has demonstrated the capability for delivery of infrastructure projects to PAS 2080:2016, in the capacity of Designer and Constructor for the HS2 enabling works project

For and on behalf of BSI: [Redacted Signature] Product Certification Technical and Compliance Director

First Issued: 2021-02-16
Latest Issue: 2021-02-16

Effective Date: 2021-02-16
Expiry Date: 2024-02-15

Page: 1 of 2

...making excellence a habit.™

This certificate has been issued by and remains the property of BSI Assurance UK Ltd, Kitemark Court, Davy Avenue, King's Hill, Milton Keynes MK3 0PP, United Kingdom and should be returned immediately upon request.
To check its validity telephone +44 (0) 345 080 9000. An electronic certificate can be authenticated [online](#).

BSI Assurance UK Limited, registered in England under number 7905321 at 389 Chiswick High Road, London W6 4AL, UK.
A member of BSI Group of Companies.

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Appendix 4 Infrastructure Carbon Review Statement of Endorsement

Statement of Endorsement

We endorse the Infrastructure Carbon Review and agree that the infrastructure sector should pursue lower carbon solutions that also cost less.

We will play our part within the value chain, and therefore commit our organisations to releasing the value of lower carbon through:

Leadership

To create the environment and the imperative for change

Innovation

To be the engine of change

Procurement

To provide the mechanisms that enable the supply chain to respond

We agree that where it can reduce costs to the taxpayer and consumer, Government and industry clients should work together to incorporate carbon reduction objectives within their infrastructure projects and programmes by 2016.



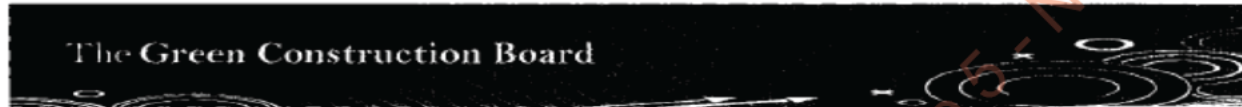
Minister of State for
Business and Energy

Commercial Secretary to
the Treasury

Construction Adviser

Green Construction Board
Infrastructure Working Group

Costain Ltd



Reviewed

Code Not

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Minister of State for
Business and Energy

Commercial Secretary
to the Treasury

Government's Chief
Construction Adviser

Green Construction Board
Infrastructure Working Group

Skanska



Reviewed

Costain Not

Appendix 5 LCA Scoping Output

WP Reference	WP Name	Sector	Criteria 1: A permanent asset (belonging to HS2 or 3rd party)	Criteria 2: A lifespan of 25years or more	Criteria 3: CSJv having a degree of influence on the materials and construction methodology	Criteria 4: Potential to achieve significant reductions
P003a	Priority Design Works	S1	✓	✓	x	✓
P003b	Priority Design Works	S1	✓	✓	x	✓
P004	Demolition Surveys	S3	x	x	x	x
P005	DB Carbo Pre-demolition Survey	S1	x	x	x	x
P009	Design Tranche One	S3	x	x	x	x
P034	Hampstead Road Demolitions	S1	x	x	x	x
P026	Regents Park Vehicle Area	S1	✓	✓	✓	x
P027a	Walkden / Wolfson House & Euston St Demolition	S3	x	x	x	x
P027b	Ibis Hotel and 1 Coburg St Demolition & Thistle Hotel Demolition	S3	x	x	x	x
P027c	One Euston Square / GT Demolition & Euston Station Forecourt Café Demolitions	S3	x	x	x	x

Code 5 - Not Reviewed

WP Reference	WP Name	Sector	Criteria 1: A permanent asset (belonging to HS2 or 3rd party)	Criteria 2: A lifespan of 25years or more	Criteria 3: CSJv having a degree of influence on the materials and construction methodology	Criteria 4: Potential to achieve significant reductions
Po27d	Melton St Demolitions	S3	x	x	x	x
Po27e	Euston Power Signal Box Demolition	S3	x	x	x	x
P37	Atlas Road Demolitions	S1	x	x	x	x
P38	Stanhope / Harrington Street Demolitions	S1	x	x	x	x
P39	DB Cargo Shed Demolitions Package	S1	x	x	x	x
Po42	OOO Demolitions GWR Depot, Clearance and Compound Package	S4	x	x	x	x
Po49a	Security and Site Set Up for Victoria Road Compounds	S2	x	x	x	x
Po49b	Demolitions (All) and Site Set Up (West Ruislip Golf Course and Badminton Close Pumping Station)	S2	x	x	x	x
Po53	MSD Works Package inc Utilities Works	S2	✓	✓	✓	x
Po54c	St James Gardens Exhumation and Historic Environment Package	S3	x	x	x	x

Code 5 - Not Reviewed

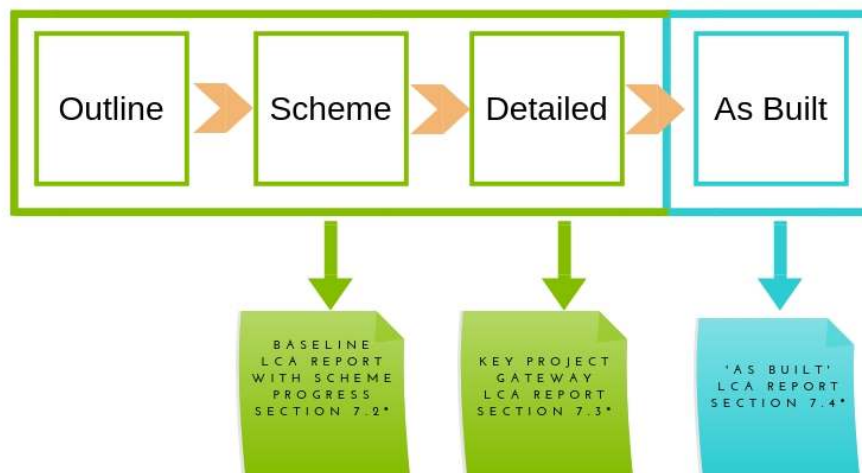
WP Reference	WP Name	Sector	Criteria 1: A permanent asset (belonging to HS2 or 3rd party)	Criteria 2: A lifespan of 25years or more	Criteria 3: CSJv having a degree of influence on the materials and construction methodology	Criteria 4: Potential to achieve significant reductions
Po63	Granby Terrace Bridge Construction	S1	✓	✓	✓	✓
Po66b	Euston Noise Insulation Tranche 2a, 3b & 4	S1	✗	✗	✗	✗
Po69	Willesden Euroterminal Package	S1	✗	✗	✗	✗
Po81	Granby Terrace Bridge Utilities Remove and Divert	S1	✓	✓	✓	✓
Po92a / b	Euston Utilities Work – West and South Rationalisation (Zones 3 & 4)	S3	✗	✗	✗	✗
Po131	Euston Utilities Work – East Rationalisation (Zones 5)	S1	✓	✓	✓	✓
P134	Granby Terrace Bridge Design	S1	✓	✓	✓	✓
P137	LU Traction Substation & Vent Shaft - Design	S3	✓	✓	✓	✓
P138a	LU Traction Substation & Vent Shaft - Construction Shaft & Tunnels	S3	✓	✓	✓	✓
P138b	LU Traction Substation & Vent Shaft - Construction MEP & Tunnel Ventilation	S3	✓	✓	✓	✓

Code 5 - Not Reviewed

WP Reference	WP Name	Sector	Criteria 1: A permanent asset (belonging to HS2 or 3rd party)	Criteria 2: A lifespan of 25years or more	Criteria 3: CSJv having a degree of influence on the materials and construction methodology	Criteria 4: Potential to achieve significant reductions
P138c	LU Traction Substation & Vent Shaft - Construction Envelope & Fit out	S3	✓	✓	✓	✓

Code 5 - Not Reviewed

Appendix 6 LCA Report Delivery Schedule



*LCA Report Requirements Technical Standard: Carbon footprinting and life cycle assessment. Document no.: HS2-HS2-SU-STD-000-000010 (P06)

- Design Stage
- Construction Stage

Reviewed

Code 5 - Not