MOTT MACDONALD

Sevington Inland Border Facility

Carbon Assessment and Reduction Report

06 November 2020

Confidential

[redacted]

Department for Transport

[redacted]

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[redacted]

Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
P01	22/10/20	[redacted]			For issue
P02	06/11/20	[redacted]			Final for Article 4 submission

Document reference: 419419 | 419419-MMD-XX-MO-RP-YE-0002 | P02

Information class: Secure

Contents

1 Introduction

1.1 Overview

Mott MacDonald has been appointed by the Department for Transport (DfT) to undertake an *Analysis of the Likely Environmental Effects of the Development Report* (document ref: 419419-MMD-XX-SV-RP-YE-0002) for the proposed use of a site at Sevington near Ashford in Kent (hereafter referred to as 'the site') for a temporary Inland Border Facility (hereafter referred to as 'the scheme'). The analysis is presented within this report, and it is required as per article 4(2)(h) of the *Town and Country Planning (Border Facilities and Infrastructure) (EU Exit) (England) Special Development Order 2020*. Further details on the scheme including a description of the location of the site is provided in the Sevington Inland Border Facility – An *Analysis of the Likely Environmental Effects of the Development Report* (document ref: 419419-MMD-XX-SV-RP-YE-0002). This climate assessment has been undertaken to support the *Analysis of the Likely Environmental Effects of the Development Report*.

The climate impacts of the scheme are reviewed and assessed in accordance *with Design Manual for Roads and Bridges (DMRB) Sustainability and Environment Appraisal LA 114 – Climate*[1], hereafter referred to as '*DMRB LA 114'*.

This assessment refers to the term 'movement'. One movement is defined as one HGV travelling in a single direction to or from the site. Where an HGV returns along the same route this will count as two movements.

1.2 Purpose of this Report

This assessment considers the effect of the scheme upon climate change, the greenhouse gas emissions associated with the scheme, hereafter referred to as carbon assessment and carbon emissions. A greenhouse gas is a gas that absorbs and emits radiant energy within the thermal infrared range. Greenhouse gases cause the greenhouse effect. The primary greenhouse gases in Earth's atmosphere are water vapor, carbon dioxide, methane, nitrous oxide and ozone. Greenhouse gases are measured in terms of carbon dioxide equivalents (CO_2e) where the global warming potential of the gas is measured compared to that of carbon dioxide.

[1] Highways England (2019) *Design Manual for Roads and Bridges, Sustainability and Environment Appraisal LA 114 Climate*

2 Legislative and Policy Framework

2.1 European Legislation

2.1.1 The Commission Implementing Regulation (2014/749/EU)

Article 17 states that Member States shall report approximated greenhouse gas inventories as referred to in *Article 8(1) of Regulation (EU) No 525/2013* at a level of disaggregation of source categories reflecting the activity data and methods available for the preparation of estimates for the year X-1. An explanation for the main drivers for the trends in emissions should also be reported[2].

2.2 National Legislation and Policy

2.2.1 Legislation

2.2.1.1 Climate Change Act 2008

The *Climate Change Act 2008* forms part of the UK government's plan to reduce carbon emissions, committing the government to a reduction of carbon by at least 100% of 1990 levels by 2050: a commitment to "net zero" carbon emissions by 2050[3].

The *Climate Change Act* creates an approach to managing and responding to climate change in the UK, by:

- Setting ambitious, legally binding emission reduction targets
- Taking powers to help meet those targets
- Strengthening the institutional framework
- Enhancing the UK's ability to adapt to the impact of climate change
- Establishing clear and regular accountability to the UK Parliament and to the devolved legislatures[4]

Key provisions of the 2008 Act in respect of climate change mitigation include the requirement for the government to set legally binding carbon budgets capping the amount of carbon emitted in the UK over a five-year period, as set out in Table 2.1.

Table 2.1: UK Carbon reduction targets

Carbon Budget	Carbon Budget Level	Reduction Below 1990 Levels
3rd carbon budget (2018- 2022)	2,544MtCO_2e	37% by 2020
4th carbon budget (2023- 2027)	1,950MtCO_2e	51% by 2025
5th carbon budget (2028- 2032)*	1,725MtCO_2e	57% by 2030

Source: *Department of Energy and Climate Change (2011)[5] and *Department for Business, Energy and Industrial Strategy (2016)[6]*

[2] Official Journal of the European Union (2014) Commission Implementing Regulation (2014/249/EU) [online] available at: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014R0749 (last accessed April 2019)

[3] Gov.uk (2019) PM Theresa May: we will end UK contribution to climate change by 2050: https://www.gov.uk/government/news/pm-theresa-may-we-will-end-uk-contribution-to-climate-change-by-2050 (last accessed August 2019)

[4] DECC (2012) Climate Change Act 2008

[5] Department of Energy and Climate Change (2011). *The Carbon Plan: Delivering our low carbon future.*

[6] Department for Business, Energy and Industrial Strategy (2016). *The Carbon Budget Order 2016*

Key provisions of the Act in respect of climate change adaptation include:

- A requirement for the government to report, at least every six years, on the risks to the UK of climate change, and to publish a programme setting out how these will be addressed. This Act also introduces powers for government to require public bodies and statutory undertakers to carry out their own risk assessment and make plans to address those risks; and
- The Adaptation Sub-Committee of the Committee on Climate Change, will provide advice to, and scrutiny of, the government's adaptation work.

2.2.1.2 The UK Town and Country Planning (Environmental Impact Assessment) Regulations 2017

The requirements of the 2014 amended EU EIA Directive were transposed into UK law by the *UK Town and Country Planning (Environment Impact Assessment) Regulations 2017*[7] and came into force on the 16 May 2017.

The amended regulations introduce climate change as a new topic, broadening the potential scope of an EIA. The regulations require the impact that the project will have on climate change to be assessed.

2.2.2 Policy

2.2.2.1 The Carbon Plan 2011

The Carbon Plan was presented to UK Parliament pursuant to Sections 12 and 14 of the *Climate Change Act 2008*. The plan sets out how the UK will achieve decarbonisation within the framework of the energy policy. UK Local Authorities and regional level authorities must report on their carbon dioxide (CO_2) emissions. However, all emissions from the motorways sector have been removed and are not factored into the annual CO_2 emissions.

2.2.2.2 Infrastructure Carbon Review

The *Infrastructure Carbon Review*[8] sets out actions that infrastructure organisations can take to reduce the carbon impact of their assets. In terms of the scheme, this means that emission reduction actions should be considered when developing scheme specific mitigation measures, where relevant.

2.2.2.3 PAS2080:2016 Carbon Management in Infrastructure

PAS2080[9] sets out a common approach and understanding of whole life carbon management in the provision of economic infrastructure as a result of the *Infrastructure Carbon Review*. It promotes reduced carbon, reduced cost infrastructure delivery, more collaborative ways of working, and a culture of challenge in the infrastructure value chain.

[7] Gov.uk (2017) The UK Town and Country Planning (Environmental Impact Assessment) Regulations 2017: http://www.legislation.gov.uk/uksi/2017/571/schedule/2/made (last accessed March 2020)

[8] HM Treasury (2013) Infrastructure Carbon Review [online] available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/260710/infrastructure_carbon_review_251113.pdf (last accessed November 2019)

[9] BSI (2016) PAS 2080: Carbon management in infrastructure [online] available at: https://shop.bsigroup.com/ProductDetail?pid=000000000030323493 (last accessed November 2019)

2.3 Local Policy

2.3.1 Adopted Local Plan

The *Ashford Local Plan 2030*[10] *(2019)* sets out a framework of policies to manage and control development within the District. Policy SP1 is the strategic objectives with one specifically relating to climate change, stating:

'To ensure new development is resilient to and mitigates against the effects of climate change by reducing vulnerability to flooding, promoting development that minimises natural resource and energy use, reduces pollution and incorporates sustainable construction practices, including water efficiency measures.

[10] Ashford Borough Council. *Ashford Adopted Local Plan to 2030.* Available at: https://www.ashford.gov.uk/planning-and-development/planning-policy/adopted-development-plan-documents/adopted-local-plan-to-2030/

3 Carbon reduction principles

3.1 Introduction

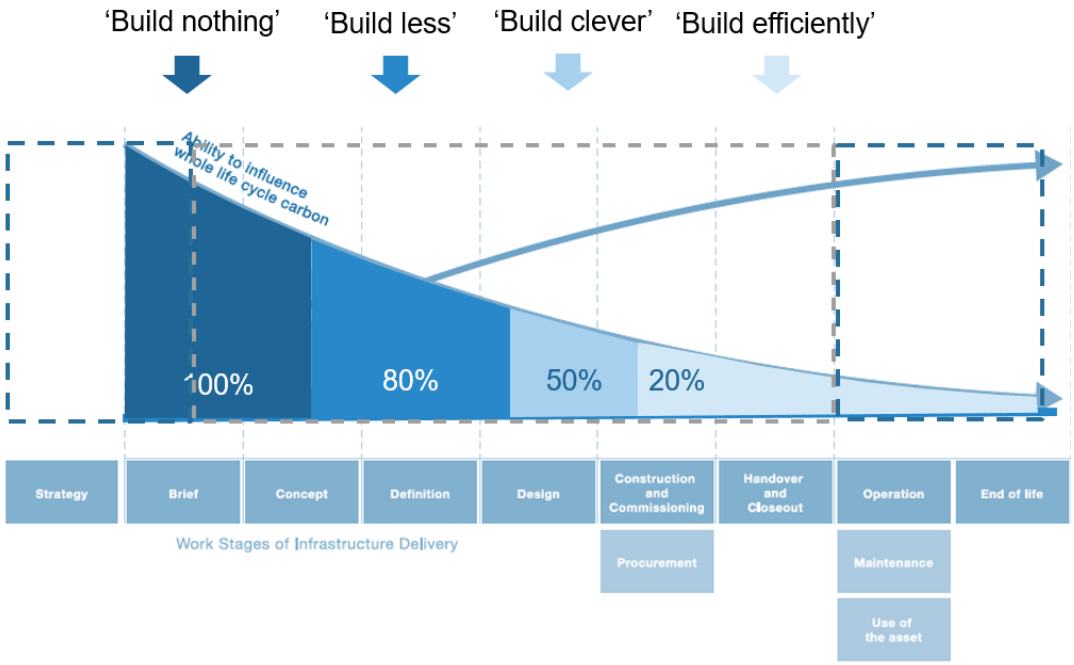
Carbon reduction has been considered as part of the design approach across the scheme. This section outlines the methods employed to minimise carbon emissions through design and operation which has been considered by the design consultants and would be considered by the construction contractor.

The measures have been produced considering and building upon the prevent, reduce and remediate measures included within Section 3.22.1 *DMRB LA114*.

The measures listed are not presented in a particular priority order. All opportunities to reduce the carbon impact of construction and operation of the assets would be taken, where possible. Any reduction opportunities would be assessed in terms of their whole life benefit considering both capital carbon and operational carbon reductions.

The principles of the carbon emission reduction hierarchy (as set out in *PAS 2080*[9]) would be followed. The principles of identifying assets which can be designed out (build nothing), opportunities to build less, build clever and build smart are shown in Figure 3.1.

Figure 3.1: Carbon emission reduction hierarchy



3.2 Design and Construction

The following elements have been the main focus for carbon reduction through design and construction.

Any earthworks would be designed to deliver the optimum balance between cut and fill to minimise the quantity of material needed to be imported to or exported from site.

Any transportation associated with delivering the asset would prioritise low-carbon modes, where possible, even if this is only for a part of the journey. An effective reverse logistics strategy would be put in place.

Resource efficiency would be maximised with opportunities to minimise material use, waste generation, energy use and water use explored throughout the design and construction process. This would extend to the consideration of decommission and reinstatement, rather than demolition, of existing assets on the site and making best use of materials, products and assets consequently made available.

Assets and sites would be designed with consideration of the end of life. Circular principles, such as design for flexibility and design for de-construction and disassembly, would be considered to maximise carbon efficiency and economic value at the end of life.

The design for the building types of prefabricated modular unit construction have been established to promote a fast, efficient solution with ease of delivery, as detailed in the Department for the Environment, Food and Rural Affairs (Defra) EUX Inland Sites DfT Performance Specification[11]. Low carbon design and the reuse of the building structures are also part of the main principles adopted in the design. It is therefore proposed to minimise or eliminate embodied and operational carbon in the building design whilst meeting the prime objectives. The design and construction would follow the principles of reduce, reuse, recycle, as follows:

- Reduce: The building design and construction would minimise the amount of material used and associated embodied carbon, except where additional material gives a significant benefit to the long-term value and carbon footprint of the building
- Reuse: The design would aim to maximise the long-term use of the buildings following their prime use. An effort to provide flexibility and increased residual value would be made. For each site on which the buildings are constructed, a sustainability strategy would be developed in accordance with the site-specific requirements, which may include:
  - Retaining the buildings on site for long term use
  - Dismantling the buildings and rebuilding it elsewhere
  - Dismantling the buildings and returning components to the market for reuse.
- Recycle: The buildings would be built from materials with low embodied carbon. The use of the materials in their current form would be maximised, either as part of an extended design life of the building or use in a disassembled form. Where materials need to be demolished and recycled after the prime use, they would be reduced in quantity to the minimum

Where possible, low-carbon construction materials and products will be preferred. Maintenance, replacement frequency and design life would be considered to reduce the carbon impact through employing strategies such as designing in layers. Material and product selection would match the durability and lifespan of the assets' service life.

Where possible low-carbon construction plant and equipment would be used. Renewable energy (electricity) would be used on-site wherever possible. On-site welfare facilities would be energy efficient.

[11] Mott MacDonald (2020) *DEFRA EUX Sites DfT Buildings Performance Specification 420236-MM-SP-002 B.*

The use of non-potable water sources for non-potable construction purposes would be prioritised. The water hierarchy would be followed, where the hierarchy includes, from the highest to the lowest in terms of the priority for water conservation: elimination, reduction, outsourcing or reuse and regeneration. Water efficiency measures would be put in place wherever possible, regardless of source.

Provision should be made to enable waste to be effectively segregated during construction, enabling materials to be effectively managed using the waste hierarchy, prioritising re-use and recycling over disposal. Circular economy principles, such as Modern Methods of Construction, should be implemented, where possible.

A landscape design has been completed as part of the scheme to mitigate against the effects caused by the scheme and bring benefits through and beyond operation of the scheme. Details of this are found within the Landscape Environmental Management Plan. The design includes the provision of 3.6 hectares (ha) of planting. Through the lifetime of the planting the plants would sequester carbon and reduce regional emissions. An estimate of the sequestering potential of the planting is included within Section 5.

3.3 Operation

All assets would be designed in such a way that energy use is minimised, and that the energy hierarchy is followed. The hierarchy includes, from highest priority to lowest priority, energy conservation, energy efficiency, use of renewable or sustainable resources, use of non-renewable sources by low-carbon technologies and use of conventional (non-renewable not low carbon) resources. Where possible, measures would be put in place to limit profligate energy use by unintended user behaviours e.g. using motion sensors to control lights. Renewable energy (electricity) would be used, including on-site renewable energy generation, wherever possible.

Provision would be made to enable waste to be effectively segregated during operation, enabling materials to be effectively managed using the waste hierarchy, prioritising re-use and recycling over disposal.

All assets would be designed in such a way that water use is minimised. Where possible, measures would be put in place to enable the use of non-potable sources. The water hierarchy would be followed. Measures should also be put in place to limit profligate water use by unintended user behaviours e.g. using aerated taps.

4 Assessment approach

4.1 Scope of assessment

The scope of assessment is presented below within Table 4.1 which provides additional detail on the Publicly Available Specification (PAS) 2080[9] lifecycle stages scoped into the assessment of impacts on climate and their study areas are explored below.

Table 4.1: Lifecycle stages within scope of assessment and the affected study area

Lifecycle scope	Study area	Emissions scope
A1-3 (products and materials)	Construction materials within the construction site boundary and the supply chains associated with these will be included. This includes the modular buildings	Primary raw material extraction, manufacturing, and transportation within the supply chain of all materials required for the permanent assets.
A4 (transport to works site)	Transport of permanent construction materials to site using Royal Institute of Chartered Surveyors (RICS) assumptions if Scheme specific data is not available.	Emissions from vehicles transporting materials to site.
A5 (construction plant)	Construction plant would consider the plant quantities, sizes and operating hours.	Plant emissions, where plant specification data is available and included within the Moata Carbon Portal.
B6 (operational energy use)	Lighting for the operational period	Energy consumption for lighting for the operational period
B9 (user utilisation of infrastructure)	Emissions from traffic use of the infrastructure within the defined study area, see Section 4.2.2	Emissions from vehicles effected by the implementation of the Scheme. This includes the forecasted impacts to personal vehicles, heavy good vehicles and public transport vehicles which would be used for the Inland Border Facility.
D (benefits and loads beyond the system boundary)	Emission reduction by sequestration of the trees incorporated into the design.	Broadleaved and Conifer trees included within the planting design.

4.2 Assessment Methodology

4.2.1 Construction

The assessment of the estimated carbon emissions associated with the construction was completed based upon the available design information and the use of the Mott MacDonald Moata Carbon Portal.

Due to the modular nature of much of the design, the timescales associated with the scheme and in the absence of a completed detailed design the materials and quantities were estimated from the General Arrangement Drawing (drawing references: Day 1 (419419-MMD-01-MO-SK-C-0028) and Day 200 (419419-MMD-01-MO-SK-C-0029), design drawings, the Defra EUX Sites HMRC Buildings Performance Specification11[11] and the DEFRA EUX Inland Sites DfT Performance Specification[12] with assumptions from relevant discipline professionals.

[12] Mott MacDonald (2020) Defra EUX Sites HMRC Buildings Performance Specification 420236-MM-SP-002 B. September 2020

The key assumptions include:

- Transport of materials to site used the RICS assumptions[13]
- Foundations for the modular buildings were estimated to be 1m^2 500mm thick concrete pads located at the corner of each bay and one centrally on either side
- An allowance of 50kg per m^2 of secondary beams for the roof and walls of the inspection shed was used
- Floor tiles for the modular buildings were assumed to be 42mm thick aluminium
- Booth constituents were estimated from the other modular buildings
- Internal fixings have been omitted including sinks, toilets and air circulation systems
- Construction plant emissions have not been entirely accounted for due to the limited level of information on construction of the modular buildings therefore the estimated emissions for A5 (construction plant) are considered lower than the true value

4.2.2 Operation

The study area for the operational assessment has been determined through annual average traffic flows provided from the scheme traffic modelling. Two potential Do-Something scenarios which include the scheme have been assessed against a Do-Minimum scenario which is representative of traffic flows without the scheme. These two scenarios have been included within the assessment sequentially rather than as two separate scenarios. The two Do-Something scenarios are:

- Scenario 1: With disruption
  - Do-Minimum traffic flows with disruption caused by the Quick Moveable Barrier (QMB) and an extended (by distance) Operation TAP.
  - Do-Something
    - Traffic flows with disruption caused by the Quick Moveable Barrier (QMB) and an extended (by distance) Operation TAP.
    - Traffic flows associated with rerouting of HGVs heading into and out of the UK
  - 549 staff movements per day (i.e. 1098 two-way movements)
- Scenario 2: No disruption
  - Do-Minimum traffic flows
  - Traffic flows associated with rerouting of HGVs heading into and out of the UK
  - 549 staff movements per day (i.e. 1098 two-way movements)

The site is assumed to operate from January 2021 for five years. The first six months of operation is expected to be at the highest capacity the remaining time at lower capacity. This assessment has modelled the maximum operating capacity for 12 months based on 2021 traffic flows and emission factors. Whilst the site will be operational from January 2021 for five years, the use of 2021 emission factors rather than 2022 – 2025 is considered a conservative approach as emission rates from traffic are anticipated to reduce in future years due to improvements in vehicle emissions as new cleaner cars enter the road fleet and replace older more polluting vehicles.

The assessment considers the two scenarios successively, with disruption being relevant for the first six months and no disruption relevant for the operation beyond six months. The total carbon

[13] Royal Institute of Chartered Surveyors (2017). Whole life carbon assessment for the built environment.

emissions are of interest for the assessment and as such the results are reported as the total emissions for the operational period and not disaggregated per scenario.

In accordance with *DMRB LA 114*, the following criteria have been applied to the change between the Do-Minimum and Do-Something scenario traffic flows. These criteria have been used in order to identify which roads are likely to be affected by the scheme (referred to as affected roads) to a degree that they require consideration within the operational climate assessment.

The criteria are:

- A change of more than 10% in Annual Average Daily Traffic
- A change of more than 10% to the number of heavy duty vehicles
- A change in daily average speed of more than 20km/hr

The difference in traffic flows between the Do-Minimum and Do-Something traffic flows for both scenarios has been assessed in accordance with *WebTAG Unit A3*.

4.2.3 Carbon sequestration from planting

The required planting for the landscape design would result in the secondary benefit of carbon sequestration. To determine the carbon reduction associated with this planting the Woodland Carbon Code (WCC) Carbon Calculation Spreadsheet (V2.3)[14] and associated guidance has been utilised. The 'Small Project Carbon Calculator' was applicable due to the tree planting being less than 5ha which considers the total area of planting for trees. The draft Outline Planting Species List[15] was used to determine the hectares of planting for both broadleaved and conifer trees. Anything other than broadleaved or conifer trees were omitted from the calculations due to these plants and shrubs not being significant for sequestration or included within the WCC calculator.

[14] https://www.woodlandcarboncode.org.uk/standard-and-guidance/3-carbon-sequestration/3-3-project-carbon-sequestration

[15] Mott MacDonald (2020) Outline Planting Species List. (Document reference: 419419-MMD-XX-MO-SC-L-0001)

5 Carbon Assessment

5.1 Construction

The assessment of the emissions lifecycle stages A1-3 (products and materials) and A4 (transport of materials to works site) estimated a total of 33,094tCO_2e through the construction of the scheme. The breakdown of these emissions is shown in Table 5.1.

Table 5.1: Construction emissions

Lifecycle stage	Emissions (tCO_2e)	Proportion of total emissions (%)
A1-3 (products and materials)	20,835	63
A4 (transport of materials to works site)	5,624	17
A5 (construction plant)	6,634	20
Total	33,094	100

5.2 Operation

The emissions associated with the operation of the scheme for the five year period would result in an estimated 3,307tCO_2e this includes both operational lighting and operational user utilisation of the scheme. A breakdown between the different lifecycle stages and the two scenarios is shown in Table 5.2 below.

Table 5.2: Operation emissions

Lifecycle stage	Operational emissions (tCO_2e)
B2 (operational energy)	239
B9 (user utilisation of the scheme)	3.069
Total	3,307

5.3 Carbon sequestration from planting

The planting of 3.6ha of broadleaved and conifer trees would result in an estimated reduction of carbon emissions of 8tCO_2e.

6 Conclusion

The assessment of the carbon emissions through construction and operation is summarised below in Table 6.1.

Table 6.1: Total emissions for the scheme

Project stage	Estimated total carbon over carbon budget (tCO_2e) ('Do something' Scenario)	Net CO2 project GHG emissions (tCO_2e) (Do something - Do minimum)	Relevant carbon budget
Construction	33,094	33,094	3rd Carbon Budget
Operation	584,466	-56	3rd Carbon Budget
	885,384	3,363	4th Carbon Budget
Total	617,560	33,038	3rd Carbon Budget
	885,384	3,363	4th Carbon Budget

The total emissions associated with the scheme are estimated to be 36,393tCO_2e. The quantity of emissions is relatively small equating to 0.0013% of the 3rd Carbon Budget and 0.00017% of the 4th Carbon Budget (detailed in Table 2.1). In addition, through the implementation of the carbon reduction principles, detailed in Section 3, and the implemented planting the emissions have been minimised as far as possible. *DMRB LA114*, states that *"The assessment of projects on climate shall only report significant effects where increases in GHG emissions will have a material impact on the ability of Government to meet its carbon reduction targets*." It is not considered that the carbon emissions would have a material impact on the ability of the government meeting the carbon reduction targets, therefore, no significant effects are anticipated.

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