

# M5 Junction 10 Improvements Scheme

Preliminary Environmental Information  
Report (PEIR)  
Materials and Waste chapter

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# Notice

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## Document accessibility

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## Glossary

Abbreviation	Definition
AADT	Annual Average Daily Traffic
AAWT	Annual Average Weekday Traffic
AEP	Annual Exceedance Probability
ALC	Agricultural Land Classification
AMP	Archaeological Management Plan
AONB	Area of Outstanding Natural Building
ARN	Affected Road Network
ASPT	Average Score Per Taxon
AQAL	Air Quality Assessment Level
AQMA	Air Quality Management Area
AQS	Air Quality Strategy
BAP	Biodiversity Action Plan
BCT	Bat Conservation Trust
BEIS	Department of Business, Energy and Industrial Strategy
BGS	British Geological Survey
BMV	Best and Most Versatile
BoQ	Bill of Quantities
BS	British Standards
BTO	British Trust for Ornithology
CAMS	Catchment Abstraction Management Strategy
CBC	Cheltenham Borough Council
CBC	Common Birds Census
CCC	Committee on Climate Change
CD&E	Construction, Demolition and Excavation
CDW	Construction and Demolition Waste
CEMP	Construction Environmental Management Plan
CEA	Cumulative Effects Assessment
CIEEM	Chartered Institute of Ecology and Environmental Management
CIRIA	Construction Industry Research and Information Association
CL:AIRE	Contaminated Land: Applications in Real Environments
CLP	Classification, Labelling and Packaging
CMS	Continuous Monitoring Station
CO <sub>2</sub>	Carbon Dioxide
CO <sub>2</sub> e	Carbon Dioxide Equivalent
COP	Conference of the Parties
COSHH	Control of Substances Hazardous to Health
CPS	Connecting Places Strategies
CRoW	Countryside and Rights of Way
CRTN	Calculation of Road Traffic Noise
CSZs	Core Sustenance Zones
DCO	Development Consent Order
DfT	Department for Transport
DM	Do Minimum
DMOY	Do Minimum Scenario in the Opening Year
DMFY	Do Minimum Scenario in the Future Assessment Year
DMRB	Design Manual for Roads and Bridges
DoE	Department of the Environment
DoWCoP	Definition of Waste: Development Industry Code of Practice
DS	Do Something
DSFY	Do Something in the Future Assessment Year
DSOY	Do Something Scenario in the Opening Year
EC	European Commission
ECoW	Ecological Clerk of Works

Abbreviation	Definition
eDNA	environmental DNA
EEA	European Economic Area
EFT	Emissions Factors Toolkit
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
END	Environmental Noise Directive
EPA	Environmental Protection Act
EPS	European Protected Species
EPUK	Environmental Protection UK
EQS	Environmental Quality Standards
EU	European Union
ES	Environmental Statement
FRA	Flood Risk Assessment
ES	Environmental Statement
GCC	Gloucester City Council
GCER	Gloucestershire Centre for Environmental Records
GCN	Great Crested Newt
GFirst LEP	Gloucestershire Local Enterprise Partnership
GHER	Gloucestershire Historic Environment Record
GHGs	Greenhouse Gases
GLNP	Gloucestershire Local Nature Partnership
GLVIA3	Guidelines for Landscape and Visual Impact Assessment
GLTA	Ground Level Tree Assessment
GPLC	Guiding Principles for Land Contamination
GWDTE	Groundwater Dependant Terrestrial Ecosystems
GWT	Gloucestershire Wildlife Trust
HDV	Heavy Duty Vehicles
HER	Historic Environment Record
HEWRAT	Highways England Water Risk Assessment Tool
HGVs	High Good Vehicles
HIF	Housing Infrastructure Fund
HLC	Historic Landscape Characterisation
HMC	Habitat Modification Class
HMS	Habitat Modification Score
HRA	Habitat Regulations Assessments
HSI	Habitat Suitability Index
IAQM	Institute of Air Quality Management
IDB	International Drainage Board
IPCC	International Panel on Climate Change
JCS	Joint Core Strategy
JNCC	Joint Nature Conservation Committee
LAQM	Local Air Quality Management
LCAAs	Landscape Character Assessments
LCRM	Land Contamination: Risk Management
LCT	Landscape Character Type
LDV	Light Duty Vehicles
LLFA	Lead Local Flood Authority
LNR	Local Nature Reserves
LOAEL	Lowest observed adverse effect level
LTP	Local Transport Plans
LVIA	Landscape and Visual Impact Assessment
MAFF	Ministry of Agriculture, Fisheries and Food
MCHW	Manual of Contract Documents for Highway Works
MHCLG	Ministry of Housing, Communities and Local Government
MMP	Materials Management Plan
MSA	Mineral Safeguarding Areas

Abbreviation	Definition
MW	Minor Watercourse
NCA	National Character Area
NERC	Natural Environment and Rural Communities
NHLE	National Heritage List for England
NIA	Noise Important Areas
NMP	National Mapping Programme
NMU	Non- Motorised User
NNR	National Nature Reserves
NPS NN	National Policy Statement for National Networks
NOEL	No Observed Effect Level
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance
NPSE	Noise Policy Statement for England
NSIP	Nationally Significant Infrastructure Projects
NSR	Noise Sensitive Receptors
NVC	National Vegetation Classification
OS	Ordnance Survey
PAH	Polyaromatic Hydrocarbons
PAS	Portable Antiquities Scheme
PCBs	Polychlorinated Biphenyls
PCF	Project Control Framework
PCL	Potential Contaminant Linkage
PCM	Pollution Climate Mapping
PCSM	Preliminary Conceptual Site Model
PEAOR	Preliminary Environmental Assessment of Options Report
PEIR	Preliminary Environmental Information Report
PINS	Planning Inspectorate
PPE	Personal Protective Equipment
PPGs	Pollution Prevention Guidelines
PPG	Planning Practice Guidance
PPS10	Planning Policy Statement 10
PPGN	Planning Practice Guidance: Noise
PRA	Preliminary Roost Assessment
PRoW	Public Right of Way
Q <sub>95</sub>	The 5 percentile flow
RAMS	Risk Assessments, Method Statements
RBD	River Basin Districts
RBMP	River Basin Management Plans
RCP	Relative Concentration Pathway
RCS	River Corridor Survey
RFFPs	Reasonably Foreseeable Future Projects
RHS	River Habitat Survey
RNAG	Reason for not Achieving Good
RoWIP	Rights of Way Improvement Plan
SAC	Special Area of Conservation
SHMP	Soil Handling Management Plan
SM	Scheduled Monument
SOAEL	Significant Observed Adverse Effect Level
SoCC	Statement of Community Consultation
SPD	Supplementary Planning Document
SPA	Special Protection Area
SPZ	Source Protection Zones
SSSI	Site of Special Scientific Interest
SuDS	Sustainable Drainage Systems
SWMP	Site Waste Management Plan
TAMP	Transport Asset Management Plan



Abbreviation	Definition
TBC	Tewkesbury Borough Council
TAR	Technical Appraisal Report
TSCS	Thin Surface Course System
UKCP18	United Kingdom Climate Projections 2018
UNFCCC	United Nations Framework Convention on Climate Change
UXO	Unexploded Ordnance
VfM	Value for Money
WCH	Walkers, Cyclists and Horse Riders
WEEE	Waste Electrical and Electronic Equipment
WER	Water Environment Regulations
WFD	Water Framework Directive
WHTP	Whalley, Hawkes, Paisley & Trigg
WSI	Written Scheme of Investigation
ZTV	Zone of Theoretical Visibility

Chapters 1-4 of this PEIR have been produced as a separate document.

1. Introduction
2. The Scheme
3. Assessment of Alternatives
4. Environmental Assessment Methodology

Table 4-1 - Significance Matrix

Sensitivity of receptor	Magnitude of impact				
	Major	Moderate	Minor	Negligible	No change
Very high	Very large	Large or very large	Moderate or large	Slight	Neutral
High	Large or very large	Moderate or large	Slight or moderate	Slight	Neutral
Medium	Moderate or large	Moderate	Slight	Neutral or slight	Neutral
Low	Slight or moderate	Slight	Neutral or slight	Neutral or slight	Neutral
Negligible	Slight	Neutral or slight	Neutral or slight	Neutral	Neutral

Table Source: DMRB LA 104 Environmental assessment and monitoring Table 3.8.1

Table 4-2 - Significance Categories and Typical Descriptions

Value	Typical descriptors
Very Large	Effects at this level are material in the decision-making process.
Large	Effects at this level are likely to be material in the decision-making process.
Moderate	Effects at this level can be considered to be material decision-making factors.
Slight	Effects at this level are not material in the decision-making process.
Negligible	No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

Table Source: DMRB LA 104 Environmental assessment and monitoring Table 3.7

The discipline specific chapters of this PEIR have been produced as separate documents.

5. Air Quality
6. Noise and Vibration
7. Biodiversity
8. Road Drainage and the Water Environment
9. Landscape and Visual
10. Geology and Soils
11. Cultural Heritage

## 12. Materials and Waste

### 12.1. Introduction

- 12.1.1. This chapter presents the preliminary environmental assessment of the M5 Junction 10 Improvements Scheme (the Scheme) for Materials and Waste based on the Scheme as it is described in Chapter 2 (and detailed in the Design Fix 2 drawings in Appendix 2.1). This chapter identifies and assesses the likely impacts of material use and waste generation associated with the Scheme, during construction, demolition and excavation (CD&E). The chapter has been written in accordance with the DMRB standard LA 110 Material Assets and Waste.
- 12.1.2. It is anticipated that, during operation (stated as the opening year in DMRB LA 110) of the Scheme, negligible quantities of material assets would be required for maintenance and negligible quantities of waste would be produced. Material assets and waste during operation were therefore scoped out of further assessment, as stated in the Environmental Scoping Report. This decision is based on discussions with design engineers (for materials) and road maintainers (for waste) on previous schemes. Scoping out material assets and waste during operation is in line with requirements stated in Section 3.2 of DMRB LA 110, which sets out the need to do further assessment only where a scheme would generate large quantities of waste.
- 12.1.3. Materials are defined in DMRB LA 110 as “primary, recycled/secondary and renewable sources of materials required for constructing a project”.
- 12.1.4. Waste is defined as per the Waste Framework Directive (2008/98/EC) as “any substance or object which the holder discards or intends or is required to discard.”

### 12.2. Planning policy and topic legislative context

- 12.2.1. A summary of legislative requirements in relation to material assets and waste and how they apply to the Scheme is presented below.
- 12.2.2. Many of the relevant UK acts and regulations relating to waste incorporate EU directives into UK Law. These include:
- EU Revised Waste Framework Directive (2008/98/EC);
  - EU Landfill Directive (1993/31/EC), as amended by the EU Directive (2003/33/EC);
  - EU Hazardous Waste Directive (1991/689/EEC); and
  - EU Regulation 1272/2008 on classification, labelling and packaging of substances and mixtures (including revisions).

#### National Policy

##### National Policy Statement for National Networks (NPS NN)

- 12.2.3. The NPS NN outlines the importance of managing resources and wastes to prevent and minimise environmental impacts. The resource and waste management measures outlined in the ‘Waste Management’ chapter should be adhered to and considered throughout all stages of the Scheme. Management measures are inclusive of but not limited to, the implementation of the waste hierarchy, the correct management of waste both on-site and off-site and ensuring the appropriate waste infrastructure for waste treatment and disposal.

##### National Planning Policy Framework (NPPF)

- 12.2.4. The NPPF’s goal of supporting sustainable development identifies the importance of using natural resources prudently and minimising waste. It identifies that strategic policies should make provision for minerals and waste management. Section 17 focuses on

“Facilitating the sustainable use of minerals”, and states planning policies should include consideration of the following points:

- Provide for the extraction of mineral resources of local and national importance, except for peat;
- Take account of the contribution that recycled materials and minerals waste can make to supply of materials; and
- Safeguard mineral resources by defining Mineral Safeguarding Areas (MSA).

#### Resources and Waste Strategy for England 2018

- 12.2.5. The Strategy sets out national policy for minimising waste, promoting resource efficiency and moving towards a circular economy. The Strategy focuses on the importance of driving waste management up the Waste Hierarchy and states the importance of considering the Government’s ambition of achieving zero avoidable waste.
- 12.2.6. The Strategy is based around two overarching objectives which aim to maximise the value of resource use and to minimise waste and its impact on the environment.
- 12.2.7. The Strategy puts a strong emphasis on waste prevention through making products using fewer natural resources. The Strategy references the UK statistics on waste which show that over 90% of non-hazardous construction and demolition waste was recovered in 2016.

#### Waste Management Plan 2021

- 12.2.8. The Plan for England focuses on waste arisings and their management. Its core aim is to bring current waste management policies under the umbrella of one national plan.
- 12.2.9. It is a high-level, non-site specific document that provides an analysis of the current waste management situation in England and evaluates how implementation of the objectives and provisions of the Waste (England and Wales) Regulations 2011 will be undertaken.
- 12.2.10. It references the critical issues of proximity principle and the circular economy which should enable the repair, remanufacture and reuse items to reduce waste generation.

#### The Environmental Protection Act 1990

- 12.2.11. The Act implements integrated pollution control for the disposal of waste to air, land and water, including solid waste disposal.
- 12.2.12. As part of this, under Section 34, the Act imposes a Duty of Care on anyone who produces, imports, keeps, stores, transports, treats or disposes of waste.
- 12.2.13. This will mean that the applicant and all contractors must take all reasonably practical steps to ensure that:
- Waste is consigned only to a registered waste carrier, licensed waste contractor, local authority waste collector or person dealing with waste in ways that are exempt from licensing;
  - Waste that is disposed of is accompanied by a detailed written description of the waste to ensure its safe handling, treatment and disposal (waste transfer notes are to be kept for a minimum of two years and hazardous waste consignment notes are to be kept for a minimum of three years);
  - Waste is securely contained to prevent it escaping to the environment;
  - Appropriate measures are taken to ensure that others involved in the handling and disposal of waste do so in accordance with all applicable Regulations;
  - Copies of registration certificates should be obtained for all waste contractors and waste carriers used as part of the Scheme and it should be ensured that they are on the Environment Agency’s ‘Public Register of Waste Carriers, Brokers and Dealers’; and
  - Checks should be made on the destination of each waste, ensuring that each waste management facility is licensed to accept the waste. Duty of Care audits of carriers

and waste management facilities are advisable.

#### Clean Neighbourhoods and Environment Act 2005

- 12.2.14. Chapter 16 of the Act prescribes the correct transportation, collection, disposal and management of waste and prohibits fly tipping.

#### The Environmental Permitting (England and Wales) Regulations 2016

- 12.2.15. The Regulations put in place requirements to ensure that sites that produce certain materials and undertake certain activities (such as the storage, use or treatment of waste) have a permit or exemption from the regulator (i.e. the Environment Agency).
- 12.2.16. Permit or exemption details of all sites that manage waste from the Scheme will be checked to ensure waste is being managed in accordance with all applicable legislation and policies and in accordance with good practice.

#### Waste (England and Wales) Regulations 2011

- 12.2.17. The Regulations transpose the Revised EU Waste Framework Directive (2008/98/EC) into law and require organisations to manage waste in accordance with the waste hierarchy, to prevent waste going to landfill.
- 12.2.18. Waste management contractors working on the Scheme will be required to provide evidence that the waste hierarchy has been applied. This evidence can be in the form of waste transfer notes and hazardous waste consignment notes, which themselves must be kept for two and three years, respectively.

#### The Hazardous Waste (England and Wales) Regulations 2005 (as amended in 2016)

- 12.2.19. The Regulations transpose the Revised EU Waste Framework Directive (2008/98/EC) into law, providing a definition of hazardous waste and require a hazardous waste consignment note to be produced for movement of hazardous waste.

#### Waste Electrical and Electronic Equipment (WEEE) Regulations 2013

- 12.2.20. The Regulations have a key objective to reduce the amount of WEEE that goes to landfill. This is to be achieved by making producers responsible for the collection, treatment and recovery of WEEE, including the associated costs.
- 12.2.21. For the Scheme, all WEEE produced in the CD&E and operational phases must be segregated and managed separately from other wastes, with relevant paperwork provided as described above.

#### The Waste Batteries and Accumulators Regulations 2015

- 12.2.22. The Regulations main requirements are that producers of batteries and accumulators must either take back waste batteries and accumulators or fund the collection and recycling of them.
- 12.2.23. All batteries produced in the CD&E and operational phases of the Scheme must be segregated and managed separately from other wastes.

#### The CLP (Classification, Labelling and Packaging) Regulation

- 12.2.24. The CLP Regulation was introduced in a staggered manner between 1999 and 2015. It should be noted that the CLP Regulation has replaced the Dangerous Substances Directive (67/548/EEC) and the Dangerous Preparations Directive (1999/45/EC). To summarise, the Regulation provides guidance on the application of the CLP criteria for hazards (physical, health and environmental). With specific reference to the Scheme, the Regulation should be used to support the classification of both waste and materials. All waste should be classified by a six-digit code, which must be recorded on all waste transfer notes and hazardous waste consignment notes for the movement of waste from the CD&E and operational phases of the Scheme.

### Environmental Protection (Disposal of Polychlorinated Biphenyls and other Dangerous Substances) (England and Wales) Regulations 2000

- 12.2.25. The Regulations require the safe disposal or decontamination of all equipment that contains polychlorinated biphenyls (PCBs). Equipment containing 5 litres or more of PCB substance or mixture is also covered by the Regulations. PCBs can be present in old electrical equipment which may be removed as part of the Scheme.

### Environmental Damage (Prevention and Remediation) (England) Regulations 2017

- 12.2.26. The Regulations introduce obligations to ensure the polluter pays for any environmental damage caused. The Regulations require caution to be taken when managing sites to prevent damage to water, land and biodiversity. Such damage could be caused by poor waste management practices and as such the generation of waste from the Scheme must be managed in accordance with all applicable legislation and policies and in accordance with good practice.

### The Control of Asbestos Regulations 2012

- 12.2.27. The Regulations require notification to the appropriate authority of all notifiable asbestos works (as specified in the Regulations), the medical surveillance (from April 2015) and health records for employers dealing with asbestos, the provision of the correct equipment and training for working with asbestos; and the documentation of the method, storage and disposal of asbestos waste. Any waste containing asbestos (such as insulation or lagging) must be stored and disposed of, in suitable packaging to prevent fibre release, in line with the Regulations. All asbestos must be removed by a licensed contractor who has undergone the appropriate training for the removal of asbestos and must wear the appropriate PPE. Written records must be kept of the workers and the likely level of exposure. The asbestos must only be disposed of at an appropriately permitted disposal site.

## Local Policy

### Minerals Local Plan for Gloucestershire (2018-2032) (adopted March 2020)

- 12.2.28. The plan highlights the importance of minerals to build our homes, infrastructure and even day to day products.
- 12.2.29. It summarises the drivers for change in the county and the vision and objectives for the plan period around mineral management, including the significance of mineral safeguarding and the future supply of materials.
- 12.2.30. The plan also establishes the value of sourcing minerals from secondary and recycled supplies.

### Gloucestershire Waste Core Strategy (2012 – 2027)

- 12.2.31. The Strategy stresses the importance of reducing waste in the future as well as reusing and increasing recycling.
- 12.2.32. For the waste that can not be managed in those ways, the Strategy also sets out the requirements for facilities that can recover energy from the remaining waste, to ensure this can be effectively managed in the future.
- 12.2.33. The Strategy sets out what facilities will be needed over the plan period, where they will be built and when, as well as taking into consideration issues such as flood risk in the county.
- 12.2.34. In relation to construction and demolition (C&D) waste the Strategy notes there is sufficient capacity to manage this stream over the plan period although efforts will need to be made to continue to divert 50% of C&D waste from landfill, in line with the national target set down for 2012.

## 12.3. Methodology

12.3.1. An environmental assessment, as defined in DMRB LA 110, has been carried out to assess the impacts of material assets and waste from the Scheme during its CD&E phases. The assessment process comprised of the following tasks:

- Review of relevant legislation and guidance to identify material and waste management objectives and targets;
- Establish the baseline demand for material assets and the baseline capacity of waste management infrastructure;
- Review of the Bill of Quantities (BoQ) to establish the quantities and types of materials to be used and wastes to be generated during construction;
- Identify and assess the impacts of the Scheme by comparing the information in the BoQ against the baseline data; and
- Identify mitigation measures to reduce, re-use, recycle and/or recover materials and wastes from the Scheme.

### Assessment Criteria

12.3.2. An assessment of the level of environmental effect from the use of material assets and generation of waste will be made using the criteria in Table 12-1 below, which are set out in DMRB LA 110.

Table 12-1 - Criteria for Classifying the Environmental Effects

Significance Category	Description
Very Large	<p>Material Assets</p> <p>1) no criteria: use criteria for large categories.</p> <p>Waste</p> <p>1) &gt;1% reduction or alteration in national capacity of landfill, as a result of accommodating waste from a project; or</p> <p>2) construction of new (permanent) waste infrastructure is required to accommodate waste from a project.</p>
Large	<p>Material Assets</p> <p>1) project achieves &lt;70% overall material recovery / recycling (by weight) of non-hazardous Construction and Demolition Waste (CDW) to substitute use of primary materials; and</p> <p>2) aggregates required to be imported to site comprise &lt;1% re-used / recycled content; and</p> <p>3) project sterilises ≥1 mineral safeguarding site and/or peat resource.</p> <p>Waste</p> <p>1) &gt;1% reduction in the regional capacity of landfill as a result of accommodating waste from a project; and</p> <p>2) &gt;50% of project waste for disposal outside of the region.</p>
Moderate	<p>Material Assets</p> <p>1) project achieves less than 70% overall material recovery / recycling (by weight) of non-hazardous CDW to substitute use of primary materials; and</p> <p>2) aggregates required to be imported to site comprise re-used/recycled content below the relevant regional percentage target.</p> <p>Waste</p>



Significance Category	Description
	<p>1) &gt;1% reduction or alteration in the regional capacity of landfill as a result of accommodating waste from a project; and</p> <p>2) 1-50% of project waste for disposal outside of the region.</p>
Slight	<p><b>Material Assets</b></p> <p>1) project achieves 70-99% overall material recovery / recycling (by weight) of non-hazardous CDW to substitute use of primary materials; and</p> <p>2) aggregates required to be imported to site comprise re-used/recycled content in line with the relevant regional percentage target.</p> <p><b>Waste</b></p> <p>1) ≤1% reduction or alteration in the regional capacity of landfill; and</p> <p>2) waste infrastructure has sufficient capacity to accommodate waste from a project, without compromising integrity of the receiving infrastructure (design life or capacity) within the region.</p>
Neutral	<p><b>Material Assets</b></p> <p>1) project achieves &gt;99% overall material recovery / recycling (by weight) of non-hazardous CDW to substitute use of primary materials; and</p> <p>2) aggregates required to be imported to site comprise &gt;99% re-used / recycled content.</p> <p><b>Waste</b></p> <p>1) no reduction or alteration in the capacity of waste infrastructure within the region.</p>

Table Source: LA 110, Table 3.13.

12.3.3. An assessment of the level of environmental effect from the use of material assets and generation of waste will be made using the criteria in Table 12-1 below, which are set out in DMRB LA 110.

12.3.4. Table 12-1 defines ‘neutral’ to ‘very large’ environmental effects for both material assets and waste. The Scheme can then be defined as significant or not significant, as shown in Table 12-2 below.

**Table 12-2 - Significance Criteria for Material Assets and Waste**

Significance	Description
Significant (one or more criteria met)	<p><b>Material Assets:</b></p> <p>1) category description met for moderate or large effect.</p> <p><b>Waste:</b></p> <p>1) category description met for moderate, large or very large effect.</p>
Not significant	<p><b>Material Assets:</b></p> <p>1) category description met for neutral or slight effect.</p> <p><b>Waste:</b></p> <p>1) category description met for neutral or slight effect.</p>

Table Source: LA 110, Table 3.14

## Data sources

12.3.5. The baseline has been established through a desk-based review of data from the following sources:

- The Mineral Products Association's Profile of the UK Mineral Products Industry<sup>1</sup>;
- South West Aggregates Working Party Annual Report: 2018<sup>2</sup>
- National Association of Steel Service Centres Annual Report 2018-2019 – Appendix V, Domestic Supply<sup>3</sup>;
- Environment Agency, Remaining Landfill Capacity, 2020<sup>4</sup>;
- Environment Agency, Waste Data Interrogator, 2019<sup>5</sup>;
- Gloucestershire Policies Map<sup>6</sup>; and
- Department of Food and Environment Multi-Agency Geographical Information for the Countryside (MAGIC) online mapping<sup>7</sup>.

12.3.6. The assessment itself will use information from the Scheme's BoQ.

## 12.4. Study area

12.4.1. Two study areas have been defined for the assessment, as per DMRB LA 110. These are:

- First Study Area - the Scheme boundary including temporary construction areas (such as construction compounds) where construction materials will be consumed, and waste generated; and
- Second Study Area - this will cover the feasible sources and availability of materials required to construct the main elements of the Scheme and suitable recovery and waste management infrastructure that could accept arisings and/or waste generated by the Scheme.

12.4.2. Based on the DMRB LA 110 the Second Study Area will be the South West region of England. The Second Study Area takes into account the proximity principle which should ensure that the most appropriate material sources and waste management facilities are utilised while balancing other issues such as logistics, cost and environmental impacts of sourcing materials and managing waste at greater distance.

## 12.5. Consultation

12.5.1. No consultation has occurred and is unlikely to take place in future for this chapter.

## 12.6. Baseline conditions

12.6.1. The baseline information presented in the following sections will be used to assess the Scheme's impact and determine the significance of the effect.

### First Study Area – Material Assets and Waste Current State

12.6.2. The current material asset use and waste generation and disposal are both expected to be low.

<sup>1</sup> Mineral Products Association, 2020, Profile of the UK Mineral Products Industry:

[https://www.mineralproducts.org/MPA/media/root/Publications/2021/Profile\\_of\\_the\\_UK\\_Mineral\\_Products\\_Industry\\_2020\\_Spread.pdf](https://www.mineralproducts.org/MPA/media/root/Publications/2021/Profile_of_the_UK_Mineral_Products_Industry_2020_Spread.pdf)

<sup>2</sup> <https://www.cornwall.gov.uk/media/0mhnvqg/south-west-aggregates-working-party-annual-report-2018.pdf>

<sup>3</sup> National Association of Steel Service Centres, 2019. Annual Report 2018-2019.

<https://nass.org.uk/Publications/Publication4536/Annual%20Report%202018-2019.pdf>

<sup>4</sup> <https://environment.data.gov.uk/portalstg/home/item.html?id=23e73243c2da494f9370897173221885>

<sup>5</sup> <https://data.gov.uk/dataset/d409b2ba-796c-4436-82c7-eb1831a9ef25/2019-waste-data-interrogator>

<sup>6</sup> <https://www.gloucestershire.gov.uk/planning-and-environment/planning-policy/policies-proposals-map/>

<sup>7</sup> <https://magic.defra.gov.uk/>

12.6.3. The types of material assets used are likely to be aggregate, asphalt, concrete and steel with the wastes being the same in addition to soil (from excavations) and municipal waste, based on experience from other similar projects.

12.6.4. The current availability of material assets would be large quantities of soil and small quantities of asphalt, aggregate, concrete and steel from demolition or the taking up of redundant road constructions, and masonry and timber etc from building demolition.

#### First Study Area – Mineral Safeguarding Areas and Peat Resource Current State

12.6.5. The Gloucestershire Policies Map shows a sand and gravel Mineral Safeguarding Area (MSA) immediately beneath and adjacent to the Scheme, as shown in **Error! Reference source not found..**

12.6.6. There are no Blanket Bogs, Lowland Fens or Lowland Raised Bogs areas along the Scheme. Therefore, there are no areas that are / could give rise to peat reserves.



**Second Study Area – Material Assets Current State**

12.6.7. The baseline for the current availability of materials required to construct the main elements of the Scheme is presented below. Table 12-3 provides a breakdown of annual sales of material assets in South West England and the UK, for 2018 (the most recent year data is available for).

**Table 12-3 - Availability of Material Assets in South West England**

Material Assets	Annual Sales in South West England (Million Tonnes)	Annual Sales in UK (Million Tonnes)
Aggregate	30	179.9
Recycled & secondary aggregate	2.7	71.0
Asphalt	2.2	25.4
Concrete*	3.1	54.2
Steel	Not Available	4.2

Table Source: Mineral Products Association: Profile of the UK Mineral Products Industry 2020, South West Aggregates Working Party Annual Report: 2018 and National Association of Steel Service Centres, 2019. Annual Report 2018-2019. \* cubic metres have been converted to tonnes using densities from Atkins Carbon Knowledgebase.

12.6.8. Table 12-4 presents the targets for use of recycled or secondary aggregates in construction of the Scheme. The target for South West England is 22% and will be used to assess the Scheme’s aggregate use.

**Table 12-4 - Recycled Aggregate Targets**

Region	Recycled content target (alternative materials)	Total aggregate provision (million tonnes)
South West	22%	656
England	25%	3,908

Table Source: Design Manual for Roads and Bridges LA 110 material assets and waste (2019).

**Second Study Area – Waste Current State**

12.6.9. The baselines to assess against for the Scheme’s generation of wastes during construction are presented below.

12.6.10. The remaining landfill capacity data for the Second Study Area, is calculated by the Environment Agency and is presented below in Table 12-5.

**Table 12-5 - Remaining Landfill Capacity**

Waste Stream	South West England (m3)
Inert and non-hazardous	23,686,121
Hazardous	1,351,993

12.6.11. The capacity of waste management infrastructure for the Second Study Area, is calculated by the Environment Agency and is presented below in Table 12-6.

**Table 12-6 - Waste Infrastructure Capacity Baseline**

Waste Stream	South West England (Tonnes)
Inert and non-hazardous	6,079,798
Hazardous	50,974

### Second Study Area - Mineral Safeguarding Areas and Peat Reserves Current State

- 12.6.12. The Gloucestershire Policies Map shows MSAs in proximity to the Scheme. These are shown in Figure 12-2 below.
- 12.6.13. There are also Blanket Bogs, Lowland Fens and/or Lowland Raised Bogs in the Second Study Area, however they are not in close proximity to the Scheme.

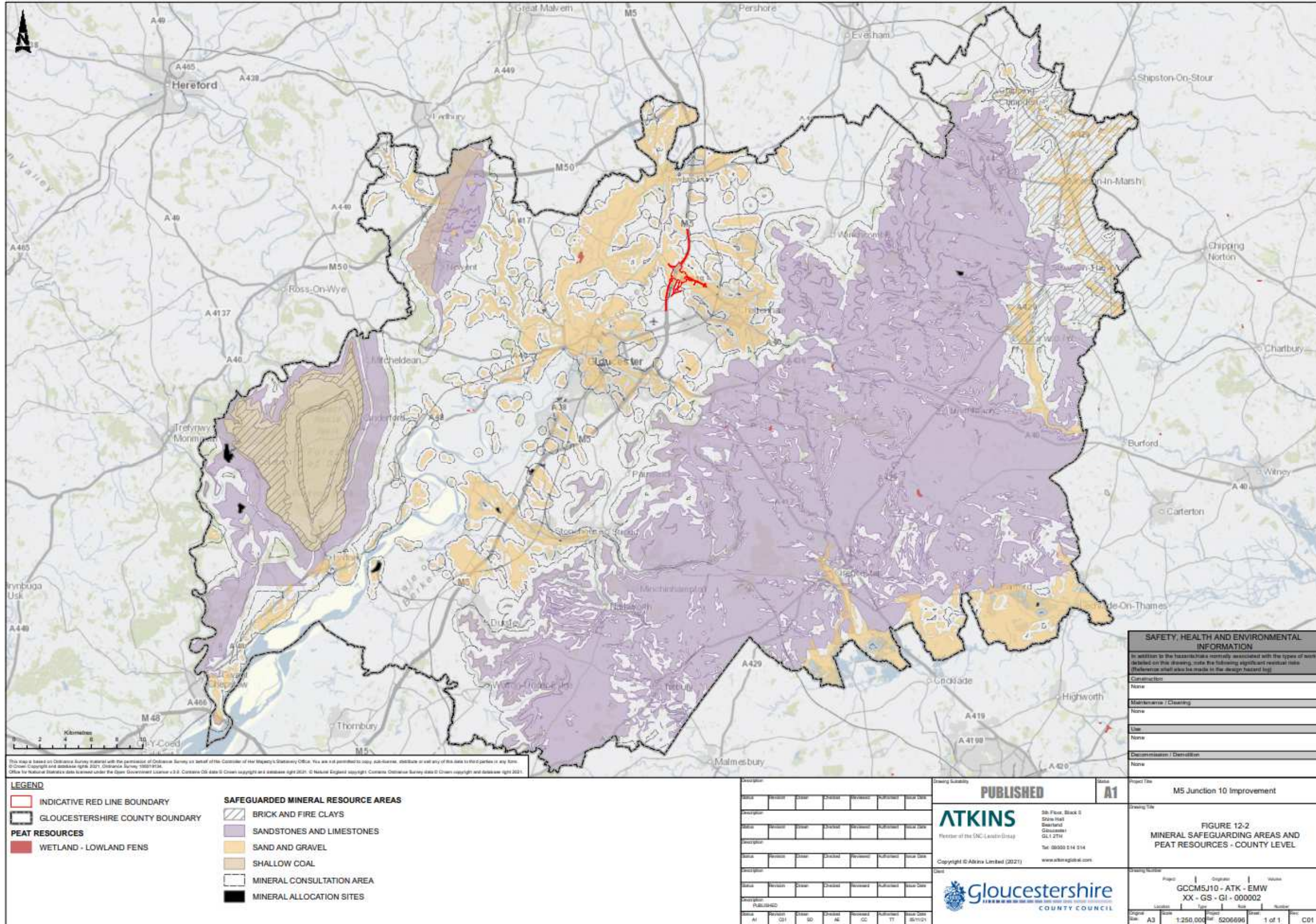


Figure 12-2 - Mineral Consultation/Safeguarded Areas In Proximity To The Scheme

### First Study Area – Mineral Safeguarding Areas and Peat Resource Future State

- 12.6.14. The likely future state (in the absence of the Scheme) of MSAs and peat resources within the First Study Area are expected to remain the same due to the protection provided to them largely preventing development on or within them.

### Second Study Area – Material Assets Likely Future State

- 12.6.15. The likely future state of material asset use is expected to be very similar to the current state, potentially reducing as fewer primary materials are used as aspects of the circular economy are embraced and more recycled materials are used.

### Second Study Area – Waste Likely Future State

- 12.6.16. The likely future remaining landfill and management infrastructure capacity is shown in the figures below, for the South West. The estimates use historic and current Environment Agency data and extrapolates it forward to 2024, the opening year of the Scheme. This was done using the Microsoft Excel forecasting function.

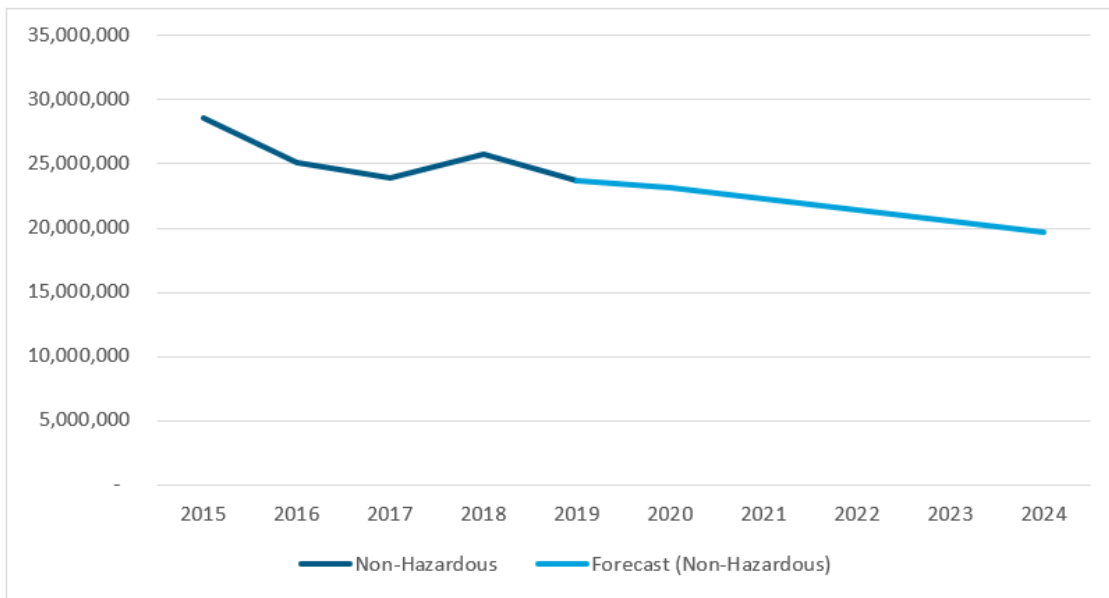


Figure 12-3 - Estimated Future Remaining Landfill Capacity (Non-Hazardous and Inert)



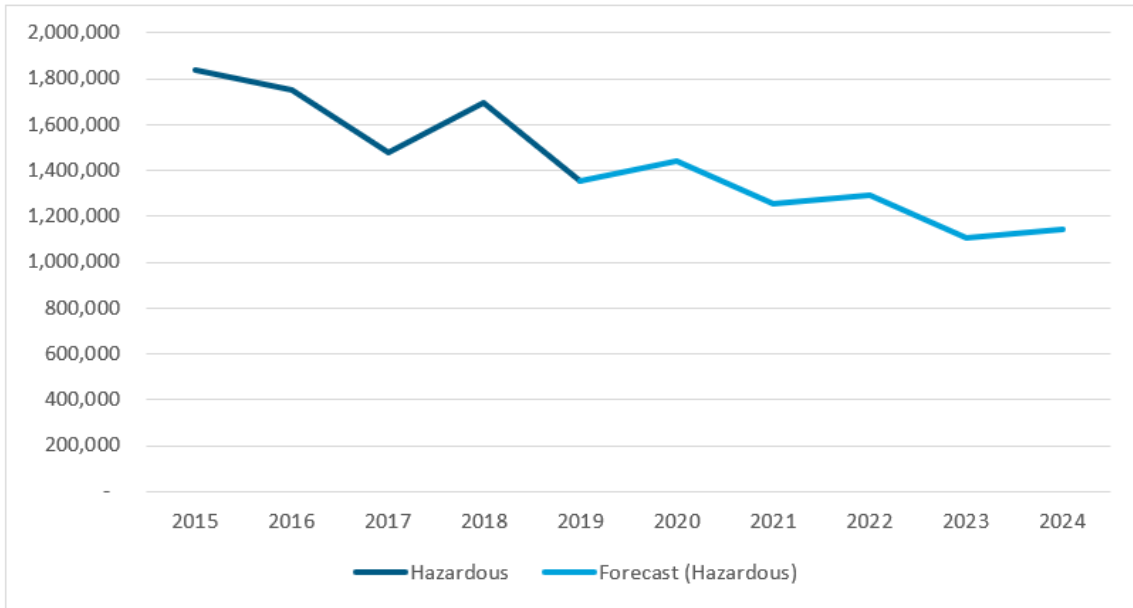


Figure 12-4 - Estimated Future Remaining Landfill Capacity (Hazardous)

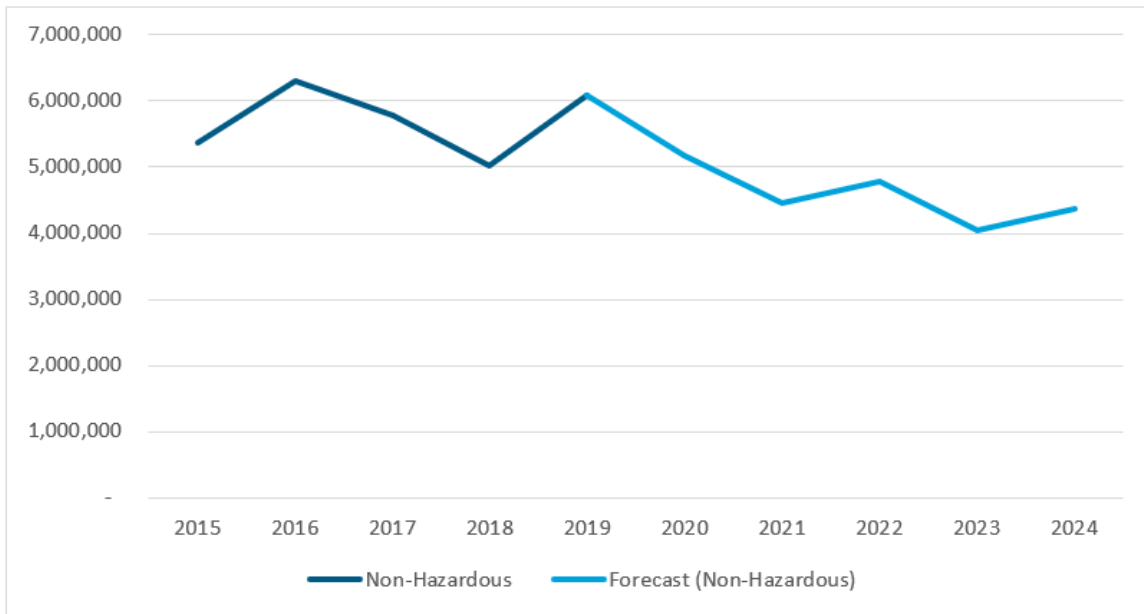


Figure 12-5 - Estimated Future Waste Management Infrastructure Capacity (Non-Hazardous and Inert)

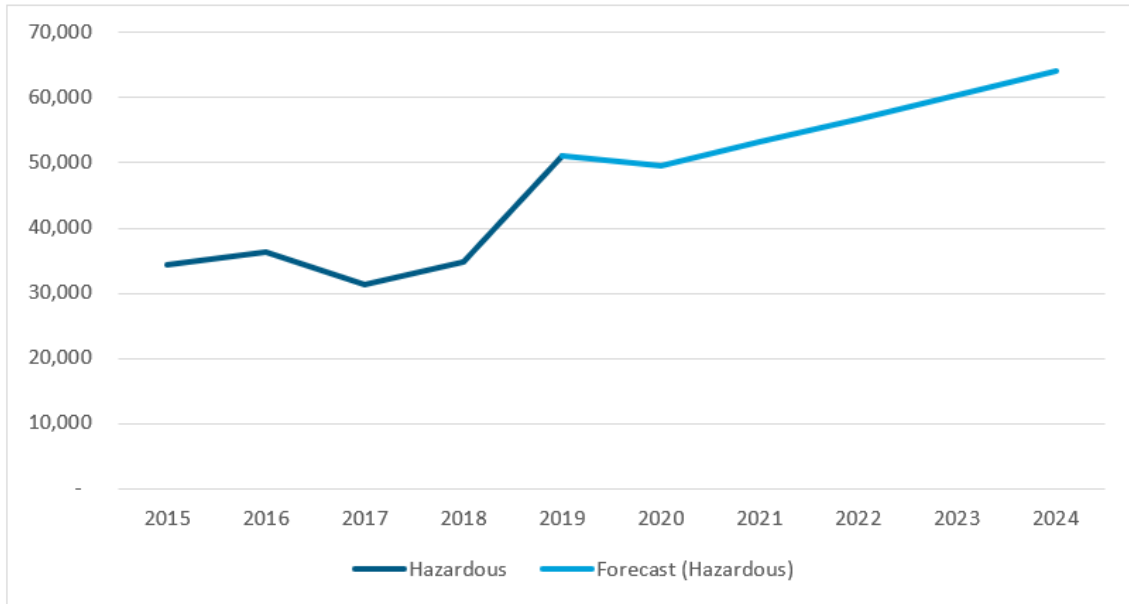


Figure 12-6 - Estimated Future Waste Management Infrastructure Capacity (Hazardous)

### Second Study Area – Mineral Safeguarding Areas and Peat Resource Likely Future State

12.6.17. The likely future state (in the absence of the Scheme) of MSAs and peat resources within the Second Study Area are expected to remain the same due to the protection provided to them largely preventing development on or within them.

## 12.7. Potential impacts

12.7.1. The potential impacts of the Scheme during construction are outlined below. These are based on the Bill of Quantities for the Scheme.

### Construction

#### Material assets

12.7.2. Throughout construction material assets would be consumed to build the Scheme. The estimated potential material asset quantities to be consumed by the Scheme are shown in Table 12-7. These would be from primary sources e.g. no recycled content and would all be imported to site from regional supplies.

12.7.3. The material quantities below have been summarised from the following components that will be needed to construct the Scheme:

- Site clearance;
- Earthworks;
- Structures;
- Pavements;
- Drainage; and
- Kerbs, Footways and Paved Areas.

12.7.4. The material quantities represent a worst case before mitigation measures are implemented.

Table 12-7 - Potential Material Quantities

Material Assets	Primary Material Quantity (m3)	Primary Material Quantity (Tonnes)
Aggregate	509,526	697,170
Asphalt	83,183	191,321
Concrete	30,166	71,794
Steel	326	2,546

#### Mineral safeguarding areas

12.7.5. The Scheme is within a MSA for sand and gravel, which could sterilise that part of the MSA. It should be noted that parts of the MSA are already sterilised by the existing infrastructure.

#### Landfill sites and waste management infrastructure

12.7.6. Throughout construction waste would be generated and require disposal. The estimated potential quantities of waste to be generated by the Scheme are shown in Table 12-8. Cubic metres and tonnes are used to aid comparison to the baseline data.

12.7.7. The waste quantities represent a worst case before mitigation measures are implemented.

Table 12-8 - Potential Waste Quantities

Waste Type	Waste Quantity (m3)	Waste Quantity (Tonnes)
Aggregate	25,551	27,779
Asphalt	5,613	4,603
Concrete	20,756	25,797
Soil	415,724	519,655
Total	467,644	577,834

### Operation

12.7.8. DMRB LA 110 states that operational activities are those which occur in the opening year. It is considered that negligible material asset use will take place in this time, as the Scheme will just have opened. Consequently, operational material assets assessment has been scoped out. Similarly, it is considered that the opening year will not generate large quantities of waste relative to regional landfill capacity or have an effect on the ability of waste infrastructure within the local area to continue to accommodate waste from other sources. As such operational waste assessment has also been scoped out.

## 12.8. Potential mitigation measures

12.8.1. Mitigation measures will follow the waste hierarchy to reduce, reuse, recycle and recover.

12.8.2. Reduction of material asset use and waste generation at design stage (embedded mitigation) will include actions that:

- Shorten underpasses;
- Reduce footprint of junctions;
- Reduce road connection lengths; and
- Rationalise/reduce site compounds.

12.8.3. These actions will also minimise impact on the MSA that the Scheme is within, by ensuring the permanent footprint of the Scheme is as small as possible.

- 12.8.4. Reduction and reuse will be achieved on the Scheme through the implementation of a Materials Management Plan (MMP) which would be produced under the CL:AIRE Definition of Waste: Code of Practice (DoWCoP). The MMP would be produced in conjunction with the Principal Contractor and a declaration submitted by a Qualified Person registered with CL:AIRE. A tracking system would be established and used to track the movement, storage and placement of excavated materials within the Scheme. Upon completion of the works, a verification report would be submitted to CL:AIRE. The reuse of soil onsite would reduce the need for the import of materials and the need for waste to be managed or disposed of offsite. This would also utilise some of the material within the MSA, further reducing sterilisation of the MSA.
- 12.8.5. The Principal Contractor will reduce primary material use through a commitment to use recycled materials. Actions that will be taken by the Principal Contractor also include consideration of off-site manufacture of components and use of modular construction and other modern methods of construction. Discussions will also take place with the supply chain to use reusable packaging and take back unused materials, instead of them being disposed of.
- 12.8.6. To support the recycling and recovery aspect of the waste hierarchy, the Principal Contractor will set a target to recycle or recover wastes that leave site, therefore diverting them from landfill.
- 12.8.7. Waste that cannot be recycled or recovered, such as hazardous wastes, including any contaminated soil would be identified, removed, and kept separate from other construction wastes, in order to avoid contaminating ‘clean’ materials.
- 12.8.8. Impacts from material asset use and waste generation will be managed during construction through the implementation of an Environmental Management Plan (EMP) in accordance with DMRB LA 120. The EMP would include the MMP (if it is required) and a Site Waste Management Plan (SWMP). As part of the SWMP, the Principal Contractor would have to monitor waste arisings and management practices.
- 12.8.9. Further to the above, mitigation measures associated with transport of materials and waste and greenhouse gas emissions are identified in their respective chapters of this PEIR, including air quality (chapter 5), noise and vibration (chapter 6), population and human health (chapter 13) and climate (chapter 14).

## 12.9. Residual impacts

### Construction

#### Materials

- 12.9.1. At present the design includes the reuse of approximately 308,555 tonnes/246,994 m<sup>3</sup> of potential waste on site (53% of total potential waste) with the majority of the remaining potential waste requiring management offsite also expected to be recovered/recycled (70-99%), which would substitute use of primary materials.
- 12.9.2. Further to this is the expectation that the Principal Contractor will commit to the use of materials with at least 22% recycled content, in line with the regional percentage target.
- 12.9.3. The Scheme is within a MSA for sand and gravel however impacts on that will be minimised through design which minimises the permanent footprint of the Scheme.
- 12.9.4. Following application of the mitigation measures above, the table below summarises the quantities of materials that will be imported to the Scheme from primary sources.

**Table 12-9 - Material Quantities Required after Mitigation**

Material Assets	Primary Material Quantity (m3)	Primary Material Quantity (Tonnes)
Aggregate	156,758	351,137
Asphalt	64,883	149,230
Concrete	23,529	55,999

Material Assets	Primary Material Quantity (m3)	Primary Material Quantity (Tonnes)
Steel	254	1,986

12.9.5. Based on all the information above and the criteria in Table 12-1, it is likely the Scheme would have a slight adverse effect (based on all mitigation measures being implemented). As shown in Table 12-2, a slight adverse effect is considered not significant.

### Waste

12.9.6. The waste quantities to be generated by the Scheme and the percentage change this will cause to waste infrastructure is shown in Table 12-10.

12.9.7. The estimated waste takes into consideration the potential waste reused on site (as above) and the expectation that the Principal Contractor will commitment to achieve, at minimum, a 95% recovery rate for wastes managed offsite.

Table 12-10 - Waste Assessment

Receptor	Waste Baseline	Estimated Waste	% Change
Waste infrastructure (tonnes)	6,079,798	269,279	4.43
Landfill (m3)	23,686,121	11,033	0.047

12.9.8. Based on all the information in paragraph 12.9.7 and Table 12-10 and criteria in Table 12-1, the Scheme would have ≤1% reduction in the regional capacity of landfill and the waste infrastructure is likely to have sufficient capacity to accommodate waste from the Scheme, without compromising its integrity (based on all mitigation measures being implemented).

12.9.9. These effects fall within the slight adverse significance category which as shown in Table 12-2. This is considered not significant.

### Operation

12.9.10. DMRB LA 110 states that operational activities are those which occur in the opening year. It is considered that negligible material asset use will take place in this time, as the Scheme will just have opened. Consequently, operational material assets assessment has been scoped out. Similarly, it is considered that the opening year will not generate large quantities of waste relative to regional landfill capacity or have an effect on the ability of waste infrastructure within the region to continue to accommodate waste from other sources. As such operational waste assessment has also been scoped out.

## 12.10. Cumulative effects

12.10.1. Cumulative effects on material assets and waste may occur from interaction with other committed and planned developments in the vicinity of the Scheme. The Reasonably Foreseeable Future Projects (RFFP) in Chapter 15 provides a list of these developments (at the time of the submission of the PEIR). The cumulative effects of the Scheme and these other developments on material assets and waste will be addressed as part of the ES process.

## 12.11. NPS compliance

12.11.1. The NPS NN outlines the importance of managing resources and wastes to prevent and minimise environmental impacts (paragraphs 5.39 to 5.66).

12.11.2. Mitigation measures will be adopted and considered throughout all stages of the Scheme. Mitigation measures are inclusive of, but not limited to, the implementation of the waste hierarchy, the correct management of waste both on-site and off-site and identifying the appropriate waste infrastructure for waste treatment and disposal.

12.11.3. Compliance with NPS NN has been demonstrated through the description of such mitigation measures, as described in Section 12.8.

## 12.12. Assumptions and limitations

- 12.12.1. The assumptions applicable to the assessment methodology are outlined, as follows:
- All material and waste quantities have been converted into tonnes or cubic metres, from the design information provided, using conversion rates from Atkins Carbon Knowledgebase (materials) or the Waste and Resources Action Programme's (WRAP) Site Waste Management Plan template (waste);
  - All materials and wastes have been grouped according to main types; and
  - No hazardous waste has been identified at this stage, but this will be confirmed via a Ground Investigation as the Scheme progresses.
- 12.12.2. The following limitations have been identified for the assessment:
- The material assets used, and waste generated through construction of the Scheme have been estimated from the available design information (contained in the BoQ). These quantities will be updated as the design develops, and the construction programme becomes more advanced;
  - The material assets and waste baselines presented in this chapter use publicly available data;
  - The material assets and waste baselines use the most recently published data; however, this is sometimes two to three years old so does not reflect the exact current quantities;
  - Indirect impacts, such as those from the offsite manufacture of products or extraction of minerals, are outside the scope of the assessment, as it is not possible at this stage to determine where products will be manufactured, or minerals extracted; and
  - Impacts associated with the transport of materials and waste are considered in their respective chapters, including air quality (chapter 5), noise and vibration (chapter 6), population and human health (chapter 13) and climate (chapter 14).
- 12.12.3. It is not considered that these limitations and/or assumptions have affected the ability to undertake the assessment, nor the conclusions reported in this chapter.

## 12.13. Chapter summary

- 12.13.1. A material and waste assessment has been undertaken for the Scheme in accordance with the DMRB standard LA 110.
- 12.13.2. The chapter has summarised the quantities of material assets that would be required without mitigation and waste that could require management and disposal without mitigation.
- 12.13.3. Mitigation that follows the waste hierarchy is expected to be applied during detailed design and construction which will lead to material asset use and waste generation reduction, reuse, recycling, and recovery. In particular during construction this includes reuse of waste, use of materials with minimum 22% recycled content and recovery of 95% of wastes that are managed offsite.
- 12.13.4. Assessment following application of the mitigation measures demonstrates that during construction, the effect of material asset use and waste generation is estimated to be slight adverse, this is based on the Scheme meeting the following criteria (from Table 12-1):
- Material Assets
    1. project achieves 70-99% overall material recovery / recycling (by weight) of non-hazardous CDW to substitute use of primary materials; and
    2. aggregates required to be imported to site comprise re-used/recycled content in line with the relevant regional percentage target.
  - Waste
    1. ≤1% reduction or alteration in the regional capacity of landfill; and

2. waste infrastructure has sufficient capacity to accommodate waste from a project, without compromising integrity of the receiving infrastructure (design life or capacity) within the region.
- 12.13.5. As shown in Table 12-2 a slight significance category is classified as not significant.
- 12.13.6. Assessment for the operation phase has been scoped out as it is considered that during operation (defined in DMRB LA 110 as the opening year) there will be negligible material asset use or waste generation. This decision is based on discussions with design engineers (for materials) and road maintainers (for waste) on previous schemes.

The discipline specific chapters of this PEIR have been produced as separate documents.

## 13. Population and Human Health

## 14. Climate

## 15. Cumulative Effects Assessment



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