17 Materials

This chapter considers the potential impacts associated with the use of material resources and the management of waste during the construction of the proposed scheme.

The use of material resources has been estimated based on the likely requirements of the DMRB Stage 3 design as assessed and reported within this ES, and the range of materials and wastes likely to be generated is described.

By applying key material and waste management principles, such as the waste management hierarchy, the effects on natural resources and need for permanent disposal of wastes will be reduced. In particular, this will be achieved by re-using existing soils and infrastructure, taking into consideration the environmental impacts of products during their purchase, and sourcing materials from local suppliers.

The potential for impacts on materials or waste disposal facilities is related to the performance of the contractor during completion of the construction works, with impacts for example likely to occur as the result of unplanned, accidental occurrences, such as spillages, or as a result of failure of management systems. The risk of such events occurring will be managed and reduced through the development and application of several plans addressing different aspects of construction site management, such as a Construction Environmental Management Plan, Site Waste Management Plan and Materials Management Plan.

After the application of these plans, the potential for impacts affecting material resources is considered to be of Slight significance. The construction of the A9 widening is expected to give rise to small-scale impacts only, mainly relating to the temporary storage and movement of materials and wastes during construction. There would be a risk of a Slight depletion of natural resources through the extraction of primary aggregates (sands and gravels).

17.1 Introduction

17.1.1 For the purposes of this assessment, 'Materials' are defined as comprising the:

- use of material resources; and
- generation and management of waste.

17.1.2 The assessment focuses on the construction phase of the proposed scheme. Operational impacts in terms of resource use and waste generation are likely to be insignificant in the context of construction of the proposed scheme. In addition, as the proposed scheme involves replacement of an existing road, there would be no significant change to the maintenance regime that would otherwise have been undertaken on the same section of existing A9.

Material Resources

17.1.3 Material resources include both primary raw materials, such as aggregates and minerals, and secondary manufactured products. Many material resources would originate off-site and some would arise on-site, such as excavated soils or recycled road planings (old road surface materials removed from redundant carriageways or areas to be re-surfaced).

17.1.4 Road schemes require significant quantities of both primary raw materials and secondary manufactured products. The production, sourcing, transport, handling, storage and use of these materials, as well as the disposal of any surplus, have the potential to affect the environment adversely.

Generation and Management of Waste

17.1.5 In considering material resources use and waste management, it is important to define when, under current legislation and understanding, a material is considered to be a waste. The Waste Framework Directive (European Directive 2006/12/EC, as amended by Directive 2008/98/EC) defines waste as any substance or object that the holder discards or is required to discharge.

17.1.6 Some types of waste are harmful to human health, or to the environment, either immediately or over an extended period of time. These are called special (or hazardous) wastes.

17.1.7 Once a material has become waste, it remains waste until it has been fully recovered and no longer poses a potential threat to the environment or to human health, at which point it is no longer subject to the controls and other measures required by the Directive. These principles are applied by SEPA to waste used as aggregate/construction material in civil engineering applications, which ceases to be waste once it is incorporated in the construction.

17.1.8 Construction wastes account for approximately three times as much waste as all UK households combined. Scotland's 'Zero Waste Plan 2010' sets out the Scottish Government's vision for a zero waste society. This describes a Scotland where: all waste is seen as a resource; waste is minimised; valuable resources are not disposed of in landfills; and most waste is sorted, leaving only limited amounts to be treated. To achieve this, the Plan sets out new measures, including:

- development of a Waste Prevention Programme for all wastes, ensuring the prevention and re-use of waste is central to all the Scottish Government's actions and policies; and
- two new targets applying to all waste by 2025: 70% recycled and maximum 5% sent to landfill.

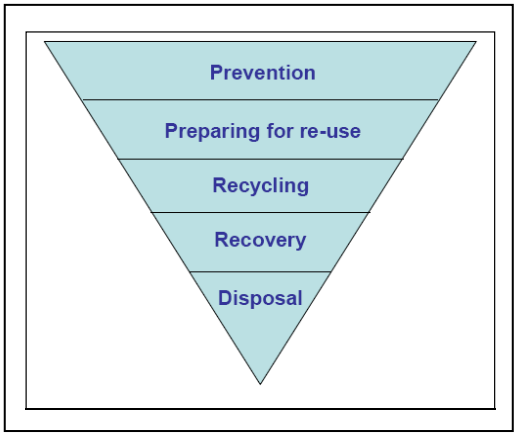
Legislative and Policy Background

17.1.9 The following legislation, regulations or guidelines are applicable to the assessment of the proposed scheme:

- Waste Framework Directive 2008, as amended;
- Waste (Scotland) Regulations 2012;
- Waste Management Licensing (Scotland) Regulations 2011;
- Special Waste Regulations 1996;
- Special Waste Amendment (Scotland) Regulations 2004;
- Pollution Prevention and Control (Scotland) Regulations 2000;
- Environmental Protection (Disposal of Polychlorinated Biphenyls and other Dangerous Substances) (Scotland) Regulations 2000;
- Environment Act 1995;
- Environmental Protection Act 1990;
- Environmental Protection (Duty of Care) Regulations 1991;
- Wildlife and Countryside Act 1981;
- Weeds Act 1959;
- Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (DEFRA, 2009);
- The Definition of Waste: Development Industry Code of Practice Version 2 (CL:AIRE, 2011);
- SEPA Technical Guidance Note Paragraph 19 Exemption Waste for construction and other "relevant work";
- Strategy for Sustainable Construction DEFRA 2008;
- Strategy for Sustainable Construction, Progress Report 2009; and
- Scotland's Zero Waste Plan 2010.

17.1.10 Waste management is structured around a 'waste hierarchy', which defines the order of preference of the various options for the management of waste. Plate 17.1 illustrates the waste hierarchy in diagrammatic form.

Plate 17.1: The Waste Hierarchy



17.2 Approach and Methods

Study Area

17.2.1 The study area for this topic is limited to the boundaries of the construction site, within which materials would be used and wastes generated and managed. Chapter 4 (The Proposed Scheme) provides detailed descriptions of the proposed works.

17.2.2 The construction site is deemed to include the full footprint of the A9 widening, together with any land that would be used temporarily during construction. Such temporary land includes site compounds, temporary storage areas for soils and other materials, haul-roads, and potentially land for temporary construction site drainage.

Scope

17.2.1 This chapter focuses on the assessment of construction impacts arising from the transport, storage and use of material resources within the construction site, and the production, movement, transport, processing, and disposal of wastes, to the extent that they are not covered within Chapters 8 (Geology, Soils, Contaminated Land and Groundwater), 9 (Road Drainage and the Water Environment) or 14 (Air Quality). The consumption of energy has also been considered in relation to the above processes.

17.2.2 Operational impacts in terms of resource use and waste generation are not assessed in this chapter as they are likely to be insignificant in the context of construction of the proposed scheme. In addition, as the proposed scheme involves replacement of an existing road, there would be no significant change to the maintenance regime that would otherwise have been undertaken on the same section of the existing A9 (i.e. no significant change to the baseline).

17.2.3 The assessment of materials has not yet been incorporated into the current DMRB guidance, but this chapter follows the interim guidance on the scope of the 'Materials' topic and the approaches / methodologies to be applied as set out in DMRB Interim Advice Note (IAN) 153/11 Guidance on the Environmental Assessment of Material Resources (Highways Agency, 2011).

17.2.4 The assessment considers materials and waste aspects of the scheme, falling under the following general categories:

- Material Resource - the primary and secondary materials required for construction.
- Material Resource Efficiency - optimisation of material resource use through minimisation of the use of resources, promotion of materials re-use and minimisation of waste production.

- Material Resource Flow - consideration of demand for, and proposed use of, materials and the management/use of surplus materials in the context of the Waste Hierarchy (defined above).

Impact Assessment

17.2.5 Details and quantity estimates of materials and wastes have been prepared by the project engineering team, based on the Stage 3 design. The assessment of potential impacts has been undertaken with consideration of:

Materials

- assessment against regulatory and policy drivers;
- assessment against the carrying capacity of the environment; and
- materials re-use/recycling/recovery.

Waste

- assessment against regulatory and policy drivers;
- waste prevention, materials re-use, recycling and recovery; and
- waste classification, volumes and disposal routes.

Limitations to Assessment

17.2.6 Baseline information, potential impacts and mitigation are described based on known information; however, some of the relevant aspects may not be finalised until later stages (during pre-construction preparation or during the construction period). Estimated quantities are approximate, based on the Stage 3 design and available information.

17.2.7 Some environmental impacts associated with the extraction and transport of primary raw materials and manufactured products would occur off-site. The source and processing/manufacture cannot be determined at this stage and the production of these materials is likely to have been the subject of separate consent procedures (such as applications for planning permission), which may have included environmental assessment. Therefore, it is outside the scope of this assessment to consider the environmental impacts associated with the extraction of raw materials and the manufacture of products.

17.3 Baseline Conditions

A9 Dualling: Strategic Environmental Assessment (SEA)

17.3.1 As noted in Chapter 2 (Need for the Scheme), an SEA of the wider programme of proposed dualling of the A9 from Perth to Inverness has also been undertaken. This includes consideration of material resources. The outcomes of the SEA, including responses from consultees and strategic considerations for material assets, have been taken into account in this assessment.

17.3.2 Recommendations made within the SEA and considered within mitigation (Section 17.5) include:

- strategic programme level discussions with SEPA to investigate potential mechanisms to support material resource efficiency along the route, for example, temporary depots for excavated material, etc;
- Site Waste Management Plans (SWMPs) are adopted as best practice across all A9 dualling schemes; and
- wherever possible, A9 dualling uses locally sourced materials and suppliers, to reduce material transport emissions and to support local businesses.

Potential Receptors

17.3.3 Receptor types likely to be at risk of impacts under this topic heading include:

- Quarries and other sources of minerals and other finite raw material resources; specific sources of raw materials to be used for this scheme have not yet been identified.
- Registered landfill sites; there are three in the area, along with a Sewage Treatment Works located in close proximity to the existing A9.
- Soils and agricultural land in the surrounding area. The majority of the surrounding land contains soil types of a 3.2 quality, which is capable of producing high yields of oats, barley and grass. More information on soil resources and land is given in Chapters 7 (Community and Private Assets) and 8 (Geology, Contaminated Land and Groundwater).
- Water environment features, with those in vicinity of the A9 including the designated sites Cairnleith Moss SSSI and the River Tay SAC; the SAC watercourses of Shochie and Ordie Burns are crossed by the A9. There are a number of other watercourses, surface water ditches and burns (for more baseline information see Chapters 9: Road Drainage and the Water Environment and 10: Ecology and Nature Conservation).
- Groundwater resources; the groundwater within the study has been classified by SEPA as susceptible to pollution (see Chapters 8: Geology, Soils, Contaminated Land and Groundwater and Chapter 9: Road Drainage and the Water Environment).
- Human beings, particularly local residents, and commercial businesses, including forestry operations (see Chapter 7: Community and Private Assets).
- Wildlife and its habitats; information on habitats and protected species is given in Chapter 10 (Ecology and Nature Conservation) and associated Figures.
- The global climate, through the use of energy and resultant greenhouse gas emissions (see Chapter 14: Air Quality).

17.3.4 Existing waste landfill capacity information has been sourced from the SEPA 'Landfill sites and capacity report for Scotland 2011' (SEPA, 2011), which is based upon data from SEPA's public register of licensed/permitted sites and supplied by landfill site operators.

- Scotland:
  - The total amount of controlled waste sent to landfills in Scotland in 2011 was 4,657,206 tonnes.
  - In 2011 there were 58 active landfills in Scotland (15 inert, 42 non-hazardous and 1 hazardous).
  - The 15 active inert waste landfills had a remaining capacity of 4,319,298 tonnes at the end of 2011, which combined with the six non-active inert landfills (total capacity of 6,544,000 tonnes) give a total of 10,863,398 tonnes remaining capacity for inert landfill.
  - The remaining capacity of the 42 active non-hazardous landfills in 2011 was 63,469,060 tonnes, with an additional 2,826,805 tonnes of capacity at four non-active non-hazardous landfills; giving a total remaining capacity of 66,305,865 tonnes of non-hazardous landfill.
  - The only active hazardous landfill in Scotland in 2011 was Avondale in Falkirk. 45,866 tonnes were landfilled at this site in 2011, leaving a remaining capacity of 342,971 tonnes.
- Perth & Kinross:
  - 128,231 tonnes was landfilled in Perth & Kinross local authority area in 2011 (comprising 128,106 of non-hazardous waste and 125 tonnes of inert waste).
  - The remaining capacity after 2011 was 103,687 tonnes for inert waste and 1,200,000 tonnes for non-hazardous waste.

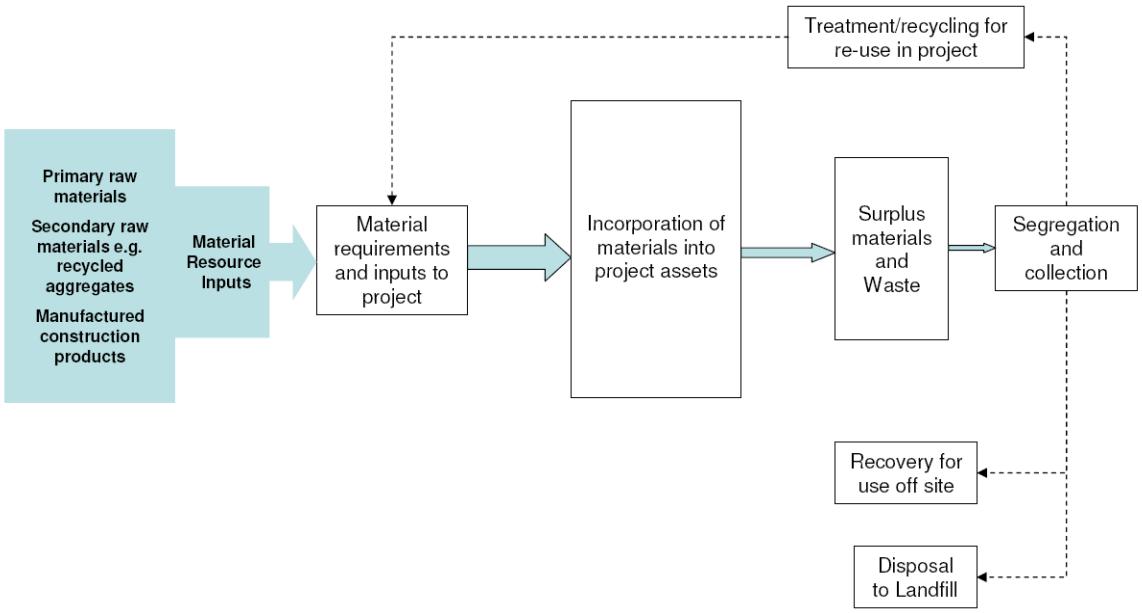
17.3.5 Identification of the baseline conditions to inform the assessment of the proposed scheme have been considered, where possible, according to conditions likely to be present at the commencement of construction (assumed for the purposes of this assessment to be in 2017).

17.3.6 The proposed scheme description is discussed in detail in Chapter 4 (The Proposed Scheme).

17.4 Potential Impacts

17.4.1 Environmental impacts associated with material resources and wastes occur at each stage of the project's material flow cycle. A simplified diagrammatic representation of materials resource flows is shown on Plate 17.2, identifying material resource use and the management of waste.

Plate 17.2: A Project's Material Flow Cycle



Materials

Construction

17.4.2 The types of materials likely to be required for construction are common to all road schemes. The approximate quantities of the major materials required are provided in Table 17.1.

Table 17.1: Summary of Material Volumes

Material	Units	Approximate Amount *
Bulk Earthworks (soils and/or rock)	m^3	1,054,700
Pavement - Bituminous Materials	m^3	67,000
Pavement - Sub-base	m^3	57,000
Concrete	m^3	8,100
Steel	tonnes	1,900
Type B continuous fill material	m^2	23,600
Pavement surface (TS2010 specification)	m^2	176,100
Pavement surface (hot-rolled asphalt)	m^2	24,600
Thin surface for pavement	m^2	16,600

* To nearest 100 for each unit, based on DMRB Stage 3 design. Amounts are approximate and indicative only.

17.4.3 The depletion of finite natural resources could occur through extraction of primary aggregates (e.g. sands and gravels) from local or other quarries. Structures, drainage and signage products are to be procured with consideration of the environmental impacts associated with their manufacture, as well as other considerations such as structural design, carbon footprint, energy consumption, long-life performance, visual impacts, durability and cost. Both reinforced concrete and steel structures include a measurable recycled content in their manufacture.

17.4.4 Existing soils and infrastructure are considered to be potential material resources, including the following which would be generated during construction of the proposed scheme:

- Excavated natural soils and/or rocks (and made ground) produced during topsoil stripping and the construction of cuttings and embankments (collectively referred to as 'earthworks'). These could be re-used on-site for landscaping or for other earthworks off-site.
- Road planings, which could be incorporated into new pavements on or off-site.

17.4.5 It is a key aim to design the scheme so as to achieve a 'cut and fill balance' such that the amount of material produced by widening the existing highway is matched by the amount of material required to build embankments and landscaping. However, for the proposed scheme some earthworks materials would require to be imported, as illustrated by the estimated earthworks quantities for construction provided in Table 17.2. The import quantity is additional to any material re-used on-site, whilst the disposal quantities of material are for those unsuitable to be re-used on site as engineering fill.

Table 17.2: Earthworks Volume Estimates

	Approximate Volume (m^3)
Estimated Import	382,500
Estimated Disposal	180,500

17.4.6 Imported aggregates are likely to be required for earthworks, structures, drainage and road pavement construction. These can be either primary aggregates, such as sand, natural gravels and rocks, or secondary aggregates, such as recycled concrete, recycled road planings, Incinerator Bottom Ash Aggregate (IBAA) and reclaimed railway ballast.

17.4.7 The choice of whether to use primary or secondary aggregates (or a combination of both) would be made considering a combination of factors such as materials source, specification, production and transport. Secondary (recycled) aggregates may not always have the lowest impact on the environment and materials would be selected based on a consideration of all relevant impacts.

17.4.8 Some of the additional earthworks or other construction materials would be imported to site for specialist purposes. For example, the incorporation of geo-textiles (i.e. textiles that are permeable to water that can be used to reinforce structural earthworks) in earthworks can considerably reduce the quantity of fill material required by improving the strength of the material. Similarly this can also reduce the quantity of steel or concrete required to build structures.

17.4.9 Poor planning of materials re-use could lead to excessive use of plant and vehicles to move and handle bulk materials, resulting in inefficient use of energy (contributing to climate change) and increased risk of spillages of fuel, lubricants etc, potentially causing localised contamination of soils or watercourses.

17.4.10 The site is located close to roads infrastructure capable of accommodating vehicle movements for materials and waste transportation. A rough estimate of potential on-site traffic deliveries over the duration of the works is estimated to be up to 40,000 and the number of traffic deliveries to site is therefore in the region of 80,000 (one delivery = 2 movements). Where possible, materials would be sourced locally in order to reduce potential environmental effects, such as from transport emissions, and to support local businesses. Table 17.3 presents the current anticipated approximate distances for material transport; though all information regarding distance to and from source is subject to change.

Table 17.3: Current Estimated Distances for Material Transport

Material	Distance
Bitmac	30km from batch plant
Steel reinforcement	250km by road
Steel (other)	250km by road
Concrete	25km from batching plant
Aggregates	80km by roads

17.4.11 Other potential impacts associated with the use of materials in the construction phase are:

- Creation of nuisance in the local communities and damage to farmland, wildlife, habitats and surface waters as a result of wind-blown dust arising from the excavation, movement, temporary storage and permanent placement of large quantities of topsoil and subsoil.
- Pollution of controlled waters by the creation of water-borne sediments, which can damage farmland, wildlife, habitats and particularly surface waters. Such impacts could occur by, for example, locating unmanaged stockpiles of materials close to watercourses or drainage. Silting of watercourses and drainage can occur if water containing silts, for example from dewatering of excavations, is not managed appropriately.
- Flooding or disruption of the existing drainage network could be caused by poor stockpile management and the creation of additional impermeable areas etc.

Waste

17.4.12 For wastes and surplus or defective materials, the potential environmental impacts would be primarily associated with the production, movement, transport and processing (including recycling/recovery) wastes on and off-site, and, if required, their disposal at licenced off-site facilities. A waste management concern of high importance would be the risk of sterilising waste management or waste disposal facilities, either through permanent or temporary severance of access to existing landfill sites, or by filling a local landfill site up to capacity with surplus excavated materials or other wastes. This would force locally-produced wastes to be transported greater distances for disposal elsewhere.

17.4.13 The following wastes are likely to require removal from site, though the potential quantities are currently unknown. It is assumed the majority would be returned to the manufacturer, re-used or recycled, though a proportion of the general and office wastes may require disposal to landfill.

- soils and earthworks materials;
- road planings, especially those containing coal tars;
- metals and plastics;
- wood and vegetation wastes;
- general waste and office waste;
- recycled concrete, and
- bituminous macadam (‘tarmac’).

17.4.14 Based on the DMRB Stage 3 design, estimated quantities have been calculated for pavement sub-base, topsoils and earthworks materials that are likely to require disposal off-site, as outlined in Table 17.4. The other items listed above cannot be quantified at this time due to unknown factors within the proposed scheme boundary.

Table 17.4: Indicative Quantities of Known Wastes for Off-site Disposal

Material	Quantity (tonnes) *	Notes
Acceptable topsoil	114,500	Based on a conversion factor of 1.2 tonnes per m^3
Unacceptable topsoil	9,400	Based on a conversion factor of 1.2 tonnes per m^3
Unacceptable earthwork material	115,900	Based on a conversion factor of 1.5 tonnes per m^3
Pavement sub-base material	n/a	n/a
Total	**239,800**	

* To nearest 100 for each unit, based on DMRB Stage 3 design. Amounts are approximate and indicative only.

17.4.15 Though the proposed scheme seeks to achieve an earthworks balance in order to reduce the need for earthworks materials to be disposed off-site, there would be some surplus fill material which will require to be exported from site (see Table 17.4). Existing soils and infrastructure removed during the construction works are considered to be a waste if there is no possibility of recovering the material through recycling (on-site or off-site), or other processing that would enable re-use of the materials in the new construction or elsewhere. Where re-use of any material is not possible, the material would need to be discarded and would thus become classified as waste. As illustrated in paragraph 17.3.4, there is currently landfill capacity in Perth & Kinross for all the forecast waste arisings, whilst retaining capacity for other wastes.

17.4.16 However, in accordance with the Zero Waste Plan, wastes would be re-used or recycled off-site where possible; for example, Table 17.4 indicates that acceptable topsoil is approximately half the known waste arisings, enabling re-use off-site. In addition, Table 17.2 indicates that twice as much earthworks material needs to be imported than exported for disposal. Maximising use of imported materials with recycled content may divert other third party wastes away from landfills, thereby potentially resulting in a net reduction in materials disposed to landfill in Scotland; or at worse only a net slight adverse increase.

17.4.17 Though the proposed scheme would be predominantly across agricultural land, there is a requirement for demolition of an existing building known as Ladner Cottage, to the east of the A9 and south of the existing Stanley junction. The demolition of this building would contribute to the quantity of the overall demolition waste generated by construction of the scheme and associated recycling activities. The demolition waste generated by the proposed scheme would also include items such as redundant safety barriers and lighting columns, but the overall quantity would be small and re-used or recycled where feasible.

17.4.18 As much of the land is under commercial land management, some areas alongside this section of the A9 have been recently felled or are scheduled to be felled in accordance with existing forestry development plans prior to the proposed scheme being constructed. The majority of the woodland that may be affected is within the Murthly Estate and is defined as commercial forestry with commercially viable timber. Felled forestry and related organic residues require consideration for reuse or recycling, as covered in Section 17.5 (Mitigation).

17.4.19 Other surplus organic materials, including stripped vegetation and scrub residues, or deposits removed from within redundant drainage channels, could generate waste material for disposal. Where possible the material would be re-used or recycled, such as through on-site ecological improvement works; for example, as log cuttings or used for habitat creation, with appropriate consideration and control of any watercourse pollution risk. Off-site disposal through a green waste disposal contractor could also offer recycling through composting. Details of any specific proposed ecological improvement works are outlined in Chapter 10 (Ecology and Nature Conservation).

17.4.20 Special wastes may comprise any contaminated soils that cannot be treated to make them suitable for use, such as any material contaminated with asbestos or Volatile Organic Compounds. Disturbance or storage of contaminated soils during construction can also lead to the release of chemical pollutants into the air, ground or water (remobilisation of contaminants). The potential for waste materials or land uses to generate contaminated soils or groundwater is discussed in Chapter 8 (Geology, Contaminated land and Groundwater).

17.5 Mitigation

17.5.1 Measures will be implemented to mitigate the potential impacts of both the use of materials and the generation of waste in relation to the proposed scheme. There is significant synergy between materials re-use and the avoidance of the generation of waste. Therefore, there is a substantial overlap between the mitigation measures for materials and waste.

17.5.2 The importance of careful management of materials to promote re-use and reduce waste has been widely recognised by the construction industry. Both legislation and voluntary best practice mechanisms have been developed and implemented. These provide measurable and accountable processes that form the basis for mitigating environmental impacts associated with materials and waste.

17.5.3 Where possible materials would be sourced locally in order to reduce potential environmental impacts, such as from transport emissions, and to support local businesses. As noted previously, the A9 Dualling SEA Environmental Report (Halcrow, 2013) also recommended strategic programme level discussions with SEPA to investigate potential mechanisms to support material resource efficiency along the route.

17.5.4 Throughout the detailed design and construction stages the principles of the waste hierarchy (see Plate 17.1) will be applied to minimise waste generation and maximise re-use of waste arisings on-site, where possible. Where re-use is not possible within the proposed scheme design, alternative options will be sought off-site such as reprocessing into aggregate or the use of inert materials on local farms. For all potential waste arisings, the Contractor will consult SEPA for advice where appropriate and will comply with The Waste Management Licensing (Scotland) Regulations 2011 (WML) and the UK Forestry Standard and associated Environmental Guidelines. Exemptions from licensing are set out in Schedule 1 of the WML. Consideration will also be given to SEPA guidance on sustainable waste management, such as the 'Promoting the Sustainable Re-use of Greenfield Soils in Construction' (SEPA, 2010) and 'Guidance on the Production of Fully Recovered Asphalt Road Planings' (SEPA, 2008). If wastes cannot be legitimately re-used on site, these will be removed to a licensed recycling or disposal facility in line with regulation requirements (**Mitigation Item M1**).

17.5.5 In terms of potential waste arisings from forestry and tree felling, mitigation is stated separately in Chapter 7 (Community and Private Assets), whereby commercially viable timber associated with woodland areas present within the CPO at commencement of construction that could not be retained would be felled and provided to the landowner. Any remaining forest residues in these commercial woodland areas would be dealt with in accordance with existing forest development plans. Other surplus organic materials (such as stripped vegetation, scrub residues, or deposits removed from redundant drainage channels), would also be re-used or recycled. Information regarding this mitigation is provided in Chapter 7 (Community and Private Assets) and is therefore not assigned a mitigation item reference in this chapter.

17.5.6 A principal mitigation measure relating to this topic will be the development and implementation of a Construction Environmental Management Plan (CEMP) (**Mitigation Item M2**). The CEMP will be developed by the appointed contractor during the detailed design phase (i.e. before the start of construction) and implemented during the construction phase. The CEMP will include the following:

- details of the approach to environmental management throughout the construction phase, with the primary aim of mitigating any adverse impacts from construction activity on the identified sensitive receptors;
- methods for the prevention and control of any potential short-term construction-phase impacts (e.g. construction dust and the risk of accidental spillages of contaminating materials) and also permanent impacts (e.g. disturbance to vegetation, archaeology and heritage);
- good materials management methods, such as co-location of temporary haul routes on permanent capping and recovery and re-use of temporary works materials from haul routes, plant and piling mattresses, etc; and

- risk/impact-specific method statements and strategic details of how relevant environmental impacts will be addressed throughout the proposed scheme, embodying the requirements of the relevant SEPA Pollution Prevention Guidelines.

17.5.7 Though not mandatory in Scotland, a SWMP will be developed, and regularly updated during construction of the proposed scheme (**Mitigation Item M3**). The SWMP will identify, prior to the start of construction, the types and likely quantities of wastes that may be generated. It will set out, in an auditable document, how these wastes will be reduced, re-used, managed and disposed of. The SWMP will be developed by the contractor before commencement of the construction phase and, where possible, incorporated within the CEMP as the documents are naturally interlinked.

17.5.8 The SWMP will contain a Materials Management Plan (MMP) to set out how all construction phase materials will be managed and quantities recorded. Where possible, materials would be sourced locally to reduce potential environmental effects (such as from transport emissions), and to support local business. As recommended in the SEA, strategic programme level discussions with SEPA will be held with regard to material resource efficiency, and the MMP will further include specific soils management plans developed under the following Codes of Practice:

- Construction Code of Practice for Sustainable Use of Soils on Construction Sites (DEFRA, 2009) provides best practice guidance for soil excavation, handling, storage and final use.
- The Definition of Waste: Development Industry Code of Practice Version 2 (CL:AIRE, 2011) provides a process whereby contaminated soils can be re-used on the site of origin (i.e. they do not become a waste) if they are proven through appropriate risk assessment to be suitable for use. It also provides for soils with naturally elevated contamination to be used directly on another site provided that they are suitable for use at that site.

17.5.9 Implementation of the SWMP and the accompanying MMPs will minimise waste at source, during detailed design and construction, by facilitating measures to maximise re-use of materials on-site and reduce the need for new construction materials. Regular reviews of, and updates to, the SWMP (including MMP) would enable the monitoring of mitigation measures effectiveness at maximising the use of locally sourced and low environmental impact materials and minimising of waste generation, especially disposal to landfill.

17.5.10 Where materials cannot be used on the proposed scheme, opportunities will be sought to re-use materials on other A9 projects as part of the strategic commitment to waste management (**Mitigation Item M4**). It is acknowledged that any soils or peat stored for greater than 3 years will require a permit under The Landfill (Scotland) Regulations 2003. For example, it may be possible to recycle all or most of the road surface (planings) for incorporation in other schemes or sale to other local construction projects, but it will not be possible to confirm this until closer to the time of implementing the works.

17.5.11 If contaminated soils are encountered during the construction works, further investigation, testing and risk assessment will be undertaken to determine whether the soils could stay on-site, require treatment to make them suitable to remain on-site or will need to be disposed of off-site (**Mitigation Item M5**). Details for dealing with unexpected contaminated soils will be included in the CEMP.

17.5.12 Table 17.5 summarises mitigation measures that would be adopted in accordance with Annex 3 of IAN 153/11.

Table 17.5: Mitigation Measures

Project Activity	Potential Impacts Associated with Material Resources/Waste Arisings	Mitigation Item Ref.	Description of Mitigation Measures
Site remediation/ preparation	The depletion of finite natural resources could occur through extraction of primary aggregates (e.g. sands and gravels) from local or other quarries.	M1, M2, M3 & M4	The sources and quantities highlighted previously would be kept to a minimum with the intention to re-use material where possible. (Implemented through CEMP)

Project Activity	Potential Impacts Associated with Material Resources/Waste Arisings	Mitigation Item Ref.	Description of Mitigation Measures
Site remediation/ preparation (continued)	The sterilisation of waste-management or waste-disposal facilities.	M1, M2, M3 & M4	The design proposed requires a greater import of materials than export for disposal, thereby offering potential for a net reduction in waste to landfill when maximising recycled content of imported materials. (Implemented through CEMP)
Demolition	Wastes anticipated during the widening of the A9 include the following: • Surplus organic materials including topsoil, earthworks materials, vegetation, deposits removed from redundant drainage channels, etc. • Concrete, steel, plastic and wood wastes resulting from off cuts and defective products that could not be returned to the manufacturer or otherwise re-used.	M1, M2, M3 & M4	Wherever possible material would be recycled or re-used. (Implemented through CEMP, SWMP, MMP)
Site Construction	Poor management of materials re-use could lead to excessive use of plant and vehicles to move and handle bulk materials, resulting in inefficient use of energy and increased risk of spillages of fuel, lubricants etc., and potentially causing localised contamination of soils or watercourses.	M2, M3 & M5	Vehicle movements would be kept to a minimum and further detail will be provided by the contractor as part of the CEMP. (Implemented through CEMP, SWMP, MMP)
	For surplus materials and wastes, including those generated from vegetation clearance, the potential environmental impacts would be primarily associated with the production, movement, transport, processing (including recycling/recovery) of the materials on and off-site and, if required, the disposal of wastes at licenced off-site facilities.	Refer to Chapter 7 (Mitigation Item CP14)	Commercially viable timber to be felled and provided to the landowner. Any remaining forest residues in these commercial woodland areas dealt with in accordance with existing forest development plans.
		M2, M3 & M5	Vehicle movements will be kept to a practicable minimum and further detail will be provided by the contractor as part of the CEMP. (Implemented through CEMP, SWMP, MMP)
			Comply with relevant legislation including The Waste Management Licensing (Scotland) Regulations 2011 (WML) and UK Forestry Standard and its associated Environmental Guidelines. Review SEPA's guidance on Waste and consult with SEPA as appropriate. (Implemented through CEMP, SWMP, MMP)

17.6 Residual Impacts

17.6.1 A high proportion of the potential impacts associated with materials cannot be absolutely predicted, as they would only occur if something went wrong (i.e. they would be the result of unplanned, accidental occurrences, such as spillages, or as a result of failure by a contractor or sub-contractor to follow procedures established in the various management plans described in this chapter).

17.6.2 These risks may be reduced or eliminated through well-planned and well-controlled construction site management, planned and expressed through the CEMP, MMP, SWMP and (for the operational period) the HEMP. The proper application of these management procedures should reduce the significance of all of the impacts described in this chapter to below the level of significance.

17.6.3 The nature and magnitude of each residual impact has been described in Table 17.6 in relation to whether it is considered adverse/beneficial, permanent/temporary, and direct/indirect.

Table 17.6: Summary of Residual Impacts

Project Activity	Impacts Associated with Material Resources/Waste Arisings	Description of Impacts
Site remediation/ preparation	The depletion of finite natural resources could occur through extraction of primary aggregates (e.g. sands and gravels) from local or other quarries.	Slight Adverse, Permanent, Direct
	The sterilisation of waste-management or waste-disposal facilities, though offset by maximising recycled content of imported earthworks materials.	Neutral
Demolition	Wastes anticipated during the widening of the A9 include the following that would be predominantly recycled, where possible: Surplus organic materials including topsoil, earthworks materials, vegetation, deposits removed from within redundant drainage channels, etc. Concrete, steel, plastic and wood wastes resulting from off-cuts and defective products that could not be returned to the manufacturer or otherwise re-used.	Neutral
Site Construction	Creation of nuisance in the local communities and damage to farmland, wildlife, habitats and surface waters as a result of wind-blown dust arising from the excavation, movement, temporary storage and permanent placement of large quantities of topsoil and subsoil.	Refer to Chapter 14 (Air Quality)
	Flooding, disruption of drainage networks or pollution of controlled waters by the creation of water-borne sediments, which can damage farmland, wildlife, habitats and particularly surface waters. Such impacts could occur by, for example, locating unmanaged stockpiles of materials close to watercourses or drainage. Silting of watercourses and drainage can occur if water containing silts, for example, from dewatering of excavations is not managed appropriately.	Refer to Chapter 9 (Road Drainage and the Water Environment)
	Disturbance or storage of contaminated soils during construction can lead to the release of chemical pollutants into the air, ground or water (remobilisation of contaminants). However, no significant contamination has been identified at the site as part of previous investigations.	Refer to Chapter 8 (Geology, Contaminated Land and Groundwater)
	Poor management of materials re-use could lead to excessive use of plant and vehicles to move and handle bulk materials, resulting in inefficient use of energy (contributing to climate change) and increased risk of spillages of fuel, lubricants etc., and potentially causing localised contamination of soils or watercourses.	Slight Adverse, Temporary, Direct
	For surplus materials and wastes, the potential environmental impacts would be primarily associated with the production, movement, transport, processing (including recycling/recovery) of the materials on and off-site and, if required, the disposal of wastes at licenced off-site facilities.	Slight Adverse, Permanent, Direct

17.7 References

CL:AIRE (2011). The Definition of Waste: Development Industry Code of Practice Version 2.

DEFRA (2009). Construction Code of Practice for the Sustainable Use of Soils on Construction Sites.

DEFRA (2008). Strategy for Sustainable Construction.

Halcrow (2013). A9 Dualling: Strategic Environmental Assessment. Environmental Report. June 2013.

HM Government (2009). Strategy for Sustainable Construction, Progress Report 2009.

SEPA (undated). Technical Guidance Note, Paragraph 19 Exemption Waste for construction and other “relevant work”.

SEPA (SEPA, 2008). Guidance on the Production of Fully Recovered Asphalt Road Planings.

SEPA (2010). Promoting the Sustainable Re-use of Greenfield Soils in Construction.

SEPA (2011). Landfill Sites and Capacity Report for Scotland 2011.

The Scottish Government (2010). Scotland’s Zero Waste Plan.