Welsh Government

M4 Corridor around Newport

Environmental Statement Volume 3 Appendix 3.2: Pre-Construction Environmental Management Plan

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CVJV/AAR
3rd Floor
Longross Court,
47 Newport Road,
Cardiff
CF24 0AD

Contents

1 Introduction

1.1 Purpose of the Pre-CEMP

1.1.1 The Pre-Construction Environmental Management Plan (Pre-CEMP) is the key tool for delivering environmental management during the construction. It sets out the means by which the various construction activities would be managed to comply with the relevant environmental legislation and best practice to minimise effects on local residents and environmental receptors. It provides the framework for recording environmental risks and defines the measures required to mitigate and monitor construction effects, including the mitigation measures set out in the Environmental Statement. It also outlines provisions for auditing and reporting and sets out action to be taken to resolve any corrective actions arising during the course of construction. The purpose of the Pre-CEMP is to:

- record environmental risks and identify how they would be managed during the construction period;
- provide a means of identifying environmental commitments, objectives and targets;
- provide a means of monitoring and reporting performance against the objectives and targets;
- provide a framework to ensure that all parties are aware of their responsibilities;
- establish a checklist of control procedures which must be integrated into the overall environmental management system.
- describe how construction activities would be undertaken and managed in accordance with the obligations of environmental legislation and policy, and the requirements of environmental regulatory authorities and third parties;
- provide detailed Environmental Action Plans for reducing the potential for environmental impacts during construction;
- define the activities that may require consents or licences;
- act as a link and main document reference for environmental issues between the design, construction and maintenance stages; and
- ensure the requirements of the Assessment of Implications on European Sites (AIES), Environmental Statement (ES) and the Commitments Register are met.

1.1.2 The term ‘construction’ in the Pre-CEMP includes all site preparation, demolition, earthworks, waste removal and related engineering and construction activities as authorised by the Orders.

1.2 Scope of the Pre-CEMP

1.2.1 The scope of the Pre-CEMP covers all environmental effects related to the construction of the new section of motorway between Junction 29 (Castleton) and Junction 23 (Magor) of the M4 as defined in Chapter 2 of the ES.

1.2.2 In addition to the new section of motorway, the Scheme would incorporate Complementary Measures, including the following.

- Reclassification of the existing M4 between Junction 23A (Magor) and Junction 29 (Castleton) to a rural all-purpose trunk road.
- Reclassification of the existing A48(M) between Junction 29 (Castleton) and Junction 29a (St Mellons) to a rural all-purpose trunk road.
- Remodelling of Junction 25 and 25A on the existing M4 to improve access to Caerleon from the west.
- Provision of non-motorised user friendly infrastructure,
- Connection between M48, M4 and B4245 (described within Section 2.3 above)

1.2.3 The existing M4 would be reclassified to take the form of an all-purpose trunk road. The road would generally have a National Speed Limit (70 mph), except for the section between Junction 25 and Junction 26, where a 60 mph speed limit would be in force. The existing variable speed limit system is likely to remain available for use. A separate CEMP would be prepared for these works.

1.3 Status of the Pre-CEMP

1.3.1 This document comprises the Pre-CEMP and has been prepared during the outline design and environmental assessment period in preparation for publication of the draft Orders.

1.3.2 The Pre-CEMP is a 'live' document that would be reviewed on a regular basis and updated where necessary to include the commitments agreed during the Public Local Inquiry process.

1.3.3 Prior to construction, the Pre-CEMP would become the CEMP and would include updates from pre-construction surveys, or modifications as a result of commitments made at the Public Local Inquiry.

1.3.4 The CEMP would be agreed with key stakeholders, including Natural Resource Wales (NRW) and the local planning authorities, and would be in place before construction begins. The CEMP would be incorporated in the Health and Safety Environmental Management Plan (HASEMP).

1.3.5 During construction, the CEMP would be revised to take into account any modifications to the design, changes in external factors (for example, regulations or standards), any unforeseen circumstances (for example, unknown areas of contaminated land), and any failings in environmental performance arising from routine inspections.

1.3.6 The provisions of the CEMP would be incorporated into the contracts for construction of the new section of motorway. It would be a mandatory requirement for both the Principal Contractor and all subcontractors to comply with the CEMP to ensure that best practice is implemented during construction and to safeguard the environment.

1.3.7 The requirements of the Pre-CEMP do not remove or overwrite the legal duties, responsibilities or obligations of the Principal Contractor and other parties in accordance with the contract documents and legislation.

1.4 Sustainable Construction

1.4.1 Sustainable construction is a key principle of the Scheme, which has been registered to a sustainability assessment and awards scheme for civil engineering and infrastructure projects (CEEQUAL). CEEQUAL provides projects with a framework to assess their environmental and social sustainability, and identify areas for improvement across the specification, design and construction stages. The Scheme is registered for a Whole Project Award and is aiming to achieve a 'high' rating.

1.4.2 The Pre-CEMP is the mechanism for ensuring that the Scheme adopts relevant best practice management techniques for sustainable construction, which would include the following.

- Identification of potential opportunities to further reduce the capital carbon (i.e. carbon associated with the construction activities) would be progressed through prior to construction, with identified measures set out in the CEMP. Similarly, opportunities for the efficient use of resources (including construction materials and water) would be explored.
- A sustainable procurement plan would be developed prior to construction to define the principles to be followed in the procurement of materials and services required. This would include appropriate objectives on the responsible sourcing of materials and support to local suppliers and services where feasible.
- Relevant reporting mechanisms would be defined to monitor the effectiveness of sustainability innovations implemented as well as monitoring the use of resources against relevant targets and industry benchmarks.

1.4.3 The management and monitoring measures set out in this Pre-CEMP are in line with the principles of best practice in sustainable construction. Further information on sustainability can be found in the Sustainable Development Report.

1.5 Other Construction Documents

1.5.1 Other construction documents include the following.

- Environmental Statement (2016), including Environmental Masterplans and land take plans.
- Statement to Inform an Appropriate Assessment under the Conservation of Habitats and Species Regulations 2010 (SIAA) (2016).
- Traffic Management Plans.
- Emergency Procedures.
- Communication Strategy.
- Environmental Control Plans.
- Commitments Register.

2 Proposed Works

2.1 General Description of Site

2.1.1 The existing M4 motorway runs between London and South Wales, crossing the River Severn and using the Brynglas Tunnels at Newport. The existing M4 motorway between Castleton and Magor does not meet modern motorway design standards due to problems relating to capacity, resilience, safety and issues of sustainable development.

2.1.2 The existing M4 motorway passes to the north of Newport town centre. Existing development, including residential properties, schools, recreational facilities, industrial and commercial premises lie in close proximity to the existing alignment.

2.1.3 The route for the new section of motorway would cross the South Wales to London Mainline to the south of Duffryn and to the west of Magor. In addition, the route would cross a number of existing highways, rights of way and private means of access. The new section of motorway would cross the Newport Docks between the South Dock and North Dock.

2.1.4 Approximately two thirds of the route for the new section of motorway would cross the Gwent Levels, comprising an area of flat, reclaimed coastal marshes. The Gwent Levels are dissected by an extensive network of tide locked freshwater drains, locally known as reens, and are recognised as being of environmental value. Much of the Gwent Levels are designated as Sites of Special Scientific Interest (SSSI) and are also designated as a Landscape of Outstanding Historic Interest.

2.1.5 The route would also cross the Rivers Usk and Ebbw. The River Usk is internationally and nationally designated for its conservation value. At the location of the proposed crossing, the river is designated as a SSSI and a Special Area of Conservation (SAC).

2.2 Overview

2.2.1 The new section of motorway would extend to approximately 23 km between the existing M4 Junction 29 at Castleton and the existing M4 Junction 23 at Magor and would provide three lanes in both directions. In addition to the junctions at Castleton and Magor, two new junctions would be provided along the route of the new section of motorway (at Newport Docks and Glan Lyn). New or diverted lengths of highway, public rights of way and private means of access would be provided to replace those affected.

2.2.2 Road drainage would be provided via grassed channels in the road verge, which would discharge into a series of water treatment areas and reed beds along the new section of motorway. These water treatment areas would attenuate and treat the collected surface water prior to discharging it into existing watercourses.

2.2.3 The new section of motorway would cross the River Ebbw and pass to the south of the Docks Way Landfill site. The River Ebbw Underbridge would carry the new section of motorway over the River Ebbw. The structure would consist of three separate structures, carrying the motorway, the westbound merge slip and the

eastbound diverge slip. The foundations of the bridge would be located beyond the mean high water mark.

2.2.4 The River Usk Crossing would cross the Newport Docks between the South Dock and North Dock, before straightening out over the main bridge crossing of the River Usk. A number of existing buildings in the Newport Docks area would require demolition.

2.2.5 The bridge crossing is proposed to take the form of a 2.1 km long elevated structure, including a high level cable stayed bridge crossing of the River Usk. The bridge piers would be located outside the wetted channel (mean high water mark).

2.2.6 A series of other structures would also be constructed and would include bridges to carry side roads over the motorway, bridges to carry the motorway over the South Wales to London Mainline and side roads, and culvert crossings and reen bridges to maintain connectivity of the reen system.

2.3 Construction Programme and Phasing

2.3.1 Subject to the successful completion of the statutory procedures, it is anticipated that the main construction activities would begin in early 2018 following a short mobilisation period.

2.3.2 It is anticipated that the construction of the new section of motorway would be completed within approximately four years with a completion date of autumn 2021. Following on from the construction phase, there would be a five-year landscape aftercare period through to autumn 2026.

2.3.3 Work associated with the reclassification of the existing M4 between Castleton and Magor would commence on completion of the new section of motorway under a separate construction contract. These works are expected to be completed within two years. However, programmed dates and construction periods may be subject to change depending on factors such as the actual start date, weather conditions and engineering conditions experienced on site. Table 2.1 provides an overview of the construction programme.

Table 2.1 Overall Construction Programme

Activity	Month																							
	0 - 6			7-12			13-18			19-24			25-30			31-36			37-44					
Protection of utilities																								
Enabling works																								
Major earthworks																								
Structures																								
Embankment construction																								
Settlement																								
Removal of surcharge material[1]																								
Roadworks (including pavement)																								

2.3.4 The programme has been developed around a construction start of works in spring 2018 and has been aligned with ecological and environmental seasonal

[1] The process of 'surcharging is explained in the 'Ground Treatment' section of this chapter. Surcharging is where a period of temporary preloading is undertaken using a volume of material in excess of the permanent fill, in order to create settlement within a shorter timeframe..

windows. However, programmed dates and construction periods would be subject to change depending, for example, on the actual start date, engineering conditions encountered on site and weather conditions. A summary of the key dates are set out below.

- During the twelve months enabling work would be undertaken. This would include reen protection, advanced service diversion/protection measures, pre-construction ecological and archaeological mitigation, site clearance and fencing. Other environmental mitigation measures in the form of exclusion fencing and pollution control measures would be installed before construction works commence and throughout the works as appropriate.
- The initial focus of the works would be on constructing the key structures that would facilitate the earthworks operations. These structures are the temporary bailey bridges over the South Wales to London Mainline at Duffryn and Llandevenny and the temporary bridges at Newport Road and over the existing M4. Once these temporary structures are in place and the reen protection completed, the haul road would be constructed and used to transport materials and plant/equipment.
- Earthworks would be undertaken over two periods with a 12 month settlement period in between to allow for consolidation of the main embankments across the Wentlooge and Caldicot Levels. The first period of earthworks would comprise the bulk excavation of material from the cut/borrow area at Castleton, bulk excavation of the new Junction 23 to 23A trunk road link and the embankment north of the South Wales to London Mainline at Llandevenny, and the bulk fill of embankments. The second period of earthworks would involve the excavation of surcharge material.
- The main bridge structures over the River Usk and River Ebbw would commence in month one with the construction of temporary access including an access from the Southern Distributor Road (SDR) to the Docks Link Road, before piling could begin. Following piling, the embankments would be constructed, the launching platforms installed and the structural steelwork launched to the abutments.
- Public Rights of Way would be maintained or diverted wherever practicable during the construction period.

2.4 Working Hours

2.4.1 During the construction period it is proposed that the normal working hours would be 07:00 to 19:00 Monday to Friday and 07:00 to 17:00 on Saturdays, excluding public holidays. The majority of construction activities would be undertaken within this period. In certain circumstances, specific works may have to be undertaken outside the normal working hours. Night working would also be required in some cases. This would include work to be carried out with enhanced safety requirements and, in some cases, to minimise disruption to daytime road users. These works would include the demolition of the existing overbridges at the A48(M) and Pound Hill, the installation of the decks on the underbridges and overbridges at the Castleton Interchange, the construction of the pylon upper legs on the River Usk Crossing and Network Rail possessions (i.e. blocking of rail tracks overnight to allow works adjacent to the railway).

2.4.2 On a few occasions, weekend closures of the highway would be required where 24 hour working is needed for some essential and complex operations.

2.4.3 Any working outside the normal hours would be agreed with the local Environmental Health Officer and local residents would be informed.

2.4.4 Site working hours would be closely managed to minimise the disruption to local residents and businesses and mitigation measures would be put in place where required. All operatives and staff would be informed of the site working hours during site induction.

2.5 Fencing

2.5.1 Temporary fencing would be established around new section of motorway to mark the temporary boundary during the construction phase. Areas out of bounds to construction activities (for example, soil storage areas, ecologically sensitive areas or archaeological sites) would also be fenced off or suitably demarcated to ensure that plant and machinery cannot enter. The type of fencing to be installed would vary according to its purpose and location, however typical fencing types are summarised below.

- Stock proof wire fence/three strands for crop fields – Gwent Levels.
- Permanent mammal fencing (as detailed in the Environmental Masterplans).
- Post and rail – at existing motorway tie-ins.
- ABP/UK Border approved anti-climb fence – Newport Docks.
- 2.4 metre high chain link fence – compounds.

2.5.2 The specific type of fencing would be agreed prior to construction with the relevant land owner/tenant/business user.

2.6 Security

2.6.1 The main compound and strategic satellite compounds would have 24-hour security. The compounds would be manned during the day to manage the entry/exit of site vehicles and personnel. At night, the compounds would be secured and patrolled by security guards and/or CCTV.

2.6.2 At Newport Docks, a dedicated works access would be created off Docks Way, which would be secured by fencing approved by ABP and UK Border. The western pylon of the River Usk Crossing would be accessed via the main gate at ABP and this access would be used by construction staff and for all deliveries for this section of the works.

2.7 Workforce

2.7.1 Subcontractors would be encouraged to source their workforce from the local area and provide a number of apprenticeships where possible.

3 Environmental Management System

3.1 Environmental Management System

3.1.1 An Environmental Management System (EMS) would be established which would in compliance with the requirements of the Design Manual for Roads and Bridges (DMRB) and BS EN ISO 14001.

3.1.2 This Pre-CEMP and other environmental management plans (for example, the Site Waste Management Plan) would form part of the EMS, all of which would be updated at least every six months. During construction, the CEMP would be the principal document for managing environmental compliance and best practice on site.

3.1.3 The EMS would be managed by an Environmental Clerk of Works and/or Environmental Manager.

3.2 Environmental Policy

3.2.1 The Pre-CEMP is based on an Environmental Policy Statement. The environmental policies of Costain and Vinci are set out below. The policy statements are a declaration of intent to ensure that all works are effectively managed, environmental impacts are minimised, and the operation and environmental management of activities are subject to continual improvement.

Costain

The objective is to continually improve the environmental performance of all Costain Group activities by proactively developing solutions to minimise environmental impacts during the delivery and lifecycle of contracts.

To achieve this, Costain will:

- *Maintain and continually improving its environmental management system to ensure that operations comply with all relevant environmental legislation.*
- *Ensure that staff, suppliers and subcontractors are appropriately competent to enable them to carry out their work in an environmentally responsible manner and develop the most sustainable solutions.*
- *Work openly and collaboratively with stakeholders to develop and provide sustainable and low carbon solutions that minimise environmental impacts.*
- *Promote Costain environmental standards to the supply chain through the principles of sustainable procurement to encourage the adoption of appropriate levels of environmental management and to support the Group's objectives and targets.*
- *Procure responsibly and sustainably sourced materials and seek to reduce the consumption of raw materials, energy and water in line with Costain's responsible procurement guidance.*
- *Actively reduce the amount of waste produced by operations and continue to promote reuse, recycling and recovery.*

- *Continually improve environmental performance by promoting best practice and setting progressive objectives and targets.*

Vinci

As part of our commitment to environmental leadership within the construction industry, VINCI Construction UK Ltd will aim to:

- *Comply with all relevant environmental legislation.*
- *Reduce the use of energy, raw materials and waste production whilst increasing biodiversity where opportunities exist, throughout our activities.*
- *Ensure all staff have an awareness of environmental management, and through our training programme ensure environmental leadership throughout our business.*
- *Maintain our Environmental Management Systems (which is certified to BS: EN ISO 14001:2004).*
- *Continually improve our performance, by setting progressive environmental* objectives and targets. These targets will include year on year energy and *greenhouse gas emission reductions.*
- *Report annually on progress against our environmental objectives and targets in the VINCI Construction UK Ltd Annual Report.*

3.3 Construction Strategy and Objectives

3.3.1 The approach to the construction works is based broadly on the following.

- To consider health and safety in accordance with Health and Safety at Work Act 1974 and the Construction (Design and Management) Regulations 2015 (2015). At each stage of construction, measures to protect the work force and the travelling public, as well as the ecology and environment, would be carefully managed as detailed in the referenced relevant reports.
- To meet the requirement of all relevant legislation, codes of practice and latest standards.
- To minimise the impact of the required works on road users and local communities, particularly concerning traffic management, noise, vibration and pollution control and other major works, careful management of activities to be undertaken. Major earthworks operations would be segregated from the public wherever practicable.
- To provide the most sustainable delivery of the Scheme by minimising the import and export of the materials to achieve an overall earthwork balance.
- Use on-site production of construction elements where possible.

4 Legal and Regulatory Requirements

4.1 Relevant Legislation

4.1.1 A function of the Pre-CEMP is to make construction staff aware of their legal duties and environmental responsibilities during construction of the new section of motorway. A regulatory framework, including relevant legislation and industry guidance, has been compiled and is contained within Annex A of this Pre-CEMP. The list is not exhaustive and does not absolve construction staff from complying with other relative legislation. The legislation register would be reviewed and updated during construction as required.

4.2 Consents and Other Regulatory Requirements

4.2.1 Specific construction-related activities may be subject to regulatory controls through the provisions of consents, licences or permits. These activities may include a mobile plant licence, or consent to discharge runoff to a watercourse, or a protected species licence. A preliminary list of these controls has been prepared based on the information available at the EIA stage and is set out in Annex B. The list will be reviewed and amended as necessary.

4.2.2 Construction staff would be responsible for adhering to the requirements of all relevant consents/permits etc.

4.3 Best Practice Guidance

4.3.1 Construction activities would be undertaken in accordance with best practice guidelines. The Pollution Prevention Guidelines (PPGs) published by the Environment Agency/Natural Resources Wales provided guidance and regulatory requirements on a range of construction issues. The PPGs were withdrawn from use in England on 17 December 2015, (as the Environment Agency does not provide 'good practice guidance'), however they still apply in Wales and therefore, have been included, where relevant, in this Pre-CEMP.

- Model Procedures for the Management of Land Contamination (CLR11) (Environment Agency and Defra, 2004).
- Groundwater Protection: Principles and Practice (GP13) (Environment Agency, 2013).
- CIRIA Technical Guidance C649: Control of Water Pollution from Linear Construction Projects (CIRIA, 2006).
- EA Pollution Prevention Guidelines (PPG), most notably:
    - PPG 1 General guide to the prevention of water pollution.
    - PPG 2 Above ground oil storage tanks.
    - PPG 3 Use and design of oil separators in surface water systems.
    - PPG 4 Treatment and disposal of sewage where no foul sewer is found.
    - PPG 5 Work in, near or liable to affect a Watercourse.
    - PPG 6 Working at demolition and construction sites.

- PPG 22 Dealing with spillages on highways.
- PPG 23 Maintenance of structures over water

4.3.2 Other guidance relevant to the construction of the new section of motorway and managing environmental effects from construction are identified below. A more detailed list is provided in Annex A.

- CIRIA C692 Environmental Good Practice on Site (2010).
- CIRIA Working with Wildlife (2011).
- CIRIA C648 Control of Water Pollution from Linear Construction Projects (2006).
- Institute of Air Quality Management (2014) Assessment of dust from demolition and construction.
- British Standards Institution (BSI) (2014) British Standard 5228: Code of practice for noise and vibration control on construction and open sites. Part 1: Noise + A1:2014.
- British Standards Institution (BSI) (2014) British Standard 5228: Code of practice for noise and vibration control on construction and open sites. Part 2: Vibration.

4.4 Regulatory Bodies and Other Interested Parties

4.4.1 The development of the new section of motorway has involved an ongoing process of consultation with statutory authorities, specialists and interested groups. Regular liaison and consultation would continue in order to develop appropriate mitigation.

Table 4.1: Regulatory/Interested Parties

Environmental Issue	Regulatory/Interested Party
Water Pollution	Natural Resources Wales (NRW)
Protection of Flora and Fauna	Natural Resources Wales (NRW)
Waste Management	Natural Resources Wales (NRW)
Internationally/Nationally Designated Ecological Sites	Natural Resources Wales (NRW)
Cultural Heritage and Archaeology	Cadw
Nuisance/Air Quality	Newport City Council, Monmouthshire County Council
Contaminated Land	Newport City Council, Monmouthshire County Council Natural Resources Wales (NRW)

5 Environmental Aspects Register

5.1 Purpose

5.1.1 The table below sets out an outline Environmental Aspects Register. The register identifies sensitive receptors and the potential impacts or key issues of the proposed construction works. Further information on these receptors and the potential impacts can be found within the relevant chapters of the Environmental Statement.

5.1.2 The table also outlines the key mitigation measures that would be implemented to avoid or reduce or manage these impacts. The mitigation measures are described in more detail in the Environmental Control Plans (Chapter 6 of the Pre-CEMP) and also within the Environmental Statement.

Table 5.1: Outline Environmental Aspects Register

Activity	Topic	Receptors sensitive to construction stage impacts	Potential impacts during construction	Proposed mitigation
Blasting. Demolition. Earthworks. Movement of plant.	Air Quality and Dust	Local users, workers, businesses and residents.	Dust nuisance and dust soiling surfaces (dust blown on to windows, cars, clothes being dried outdoors or damaging plants).	Dust control measures from IAQM guidance.
		Local users, workers, businesses and residents.	People being exposed to elevated concentrations of fine particles in the air (associated with adverse respiratory and cardiovascular health effects from breathing these in). These are released during demolition and construction activities.	
Site clearance. Topsoil strip. Piling. Earthworks. Haul road.	Cultural Heritage	Unknown buried archaeological	The impacts would depend on the extent of the remains within the footprint of the new section of motorway	Measures within Cultural Heritage Mitigation Plan.
		The registered Gwent Levels Landscape of Outstanding Historic Interest.	Partial loss of the Gwent Levels. Severance of the remaining areas of back-fen and their link to the remainder of the registered historic landscape would be lost.	
		Hedgerows defined as 'Important' due to their potential historical significance and protected under the Hedgerow Regulations 1997.	Boundaries that can be defined as 'Important Hedgerows' would be removed.	
		Rogiet Llanfihangel Conservation Area	All of the Conservation Area to the north of the B4245 road and west of Court Cottages would be directly affected.	
		Magor Vicarage Grade II Listed Building.	The vicarage would be demolished.	
		19 Historic Buildings (not designated)	Full demolition of the buildings, further infilling of the former graving dock.	
		Scheduled Monument - Medieval moated site 400 m north of the church at Undy	Visual impacts from works in the vicinity of the B4245 road.	
		Scheduled Monument – Devil's Quoit – standing stone 252 m south of Bencroft Lane	Damage to the setting of the monument from the proximity of the following works: construction of a new embankment	

Activity	Topic	Receptors sensitive to construction stage impacts	Potential impacts during construction	Proposed mitigation
			extending around three sides of the monument; the excavation of a highway drainage ditch along the toe of the new embankment; borrow pit and processing of the material; and the establishment of a Water Treatment Area and reed bed.	
		Grade II Listed Building -Old Windmill, Rogiet	Visual impacts from the haul road which passes to the north of the former windmill on land currently in agricultural use.	
Site clearance. Earthworks. Haul roads. Compounds Lighting.	Landscape	Residents and communities. Users of PROW, recreation facilities.	Direct and intermittent views of construction works, loss of vegetation due to large-scale earth movements, construction of cuttings and embankments, and the establishment of haul routes.	Retained vegetation to be protected.
Site clearance. Topsoil strip. Earthworks. Piling	Ecology	Internationally and nationally designated ecological sites (River Usk and Severn Estuary (SAC, SPA and SSSI)	Direct habitat loss, direct/indirect construction damage to qualifying features and sensitive habitats Damage to habitats and features adjacent to the new section of motorway from earth or other materials during construction. Spreading of invasive species during vegetation clearance Removal of hedgerows and other vegetation which may require legal consent	Environmental Masterplans Biosecurity risk assessment
		Important habitats (woodland, grazing marsh, reedbeds, mudflats, saltmarsh, rivers, surface water, hedgerows, lowland meadow and habitats in previously developed land)	Direct habitat loss, direct/indirect construction damage to sensitive habitats.	
		Vascular plants	Loss of individual plants or communities	
		Important Wildlife (Otters, Dormice,	Destruction and/or reduction in value of	

Activity	Topic	Receptors sensitive to construction stage impacts	Potential impacts during construction	Proposed mitigation
		Bats Water voles, Badgers, Hedgehogs, Reptiles, Great crested newts, Other amphibians, Breeding and Wintering birds, Fish, Land-based insects, Aquatic insects)	habitat. Severance of migration routes. Reduction in water quality. Damage or disturbance to roots/setts. Killing, injury or disturbance of protected species. Disturbance from lighting, noise and vibration	
Topsoil strip. Earthworks. Remediation of Contamination. Piling. Band drain installation.	Geology and Soils	Topsoils and subsoils	Topsoil loss from stripping and associated loss of local seed bank. Uncontrolled surface runoff during construction and erosion of topsoil.	Soil Handling Methodology. Pre-earthwork drainage.
		Construction workers, land users	Adverse health effects as a result of exposure to contamination through dermal contact, ingestion and inhalation of contaminated soil/soil derived dust. Ground gas migration and inhalation of gases / explosion. Explosion from ground gas build up in confined space and during piling and band drain installation. Explosion from buried, unidentified unexploded ordnance.	Remediation Strategy
		Groundwater	Migration of contaminants in soil and perched groundwater.	Remediation Strategy. Ground and Surface water Management Plan Pollution Control and Prevention Plan
		Surface waters (reens and rivers) within and adjacent to new section of motorway	Migration of contaminants in soil and perched groundwater and runoff into surface water. Saline intrusion	
		Surface waters (reens and rivers) in and around potential contaminant source areas	Contaminants in perched groundwater and leaching of contaminants from Made Ground migrating into surface waters. Piling and band drain installation may increase this risk.	
Blasting.	Noise	Residential properties, recreational	Noise from construction plant and activities	Noise mitigation outline in the

Activity	Topic	Receptors sensitive to construction stage impacts	Potential impacts during construction	Proposed mitigation
Demolition. Piling. Earthworks. Movement of plant and equipment.		users and other sensitive receptors (such as schools, nursing homes, hospitals etc).	Noise from construction traffic Noise and Vibration from blasting rock Vibration from construction plant and activities	Pre-CEMP
Temporary road closures	All Travellers	Users of Public Rights of way Users of Overbridge and Underbridge Crossings Drivers using the highways network	Temporary stopping up affecting route for Wales Coast Path and Newport Coast Path. Temporary loss of vehicular and NMU access across existing structures and construction of new structures, resulting in impact on local journeys. Change in traffic flow and journey experience	PRoW diversions. Road diversions. Construction Traffic Management Plan
Temporary road closures. Topsoil or U/S storage. Borrow pits	Community and Private Assets	Agricultural land and farm holdings	Severance of access routes and services	Maintenance of access and services or provision of alternatives.
Embankment construction. Construction of culverts Construction of coffer dams and dewatering –	Road Drainage and the Water Environment	Surface Water - Gwent Levels Reen System Gwent Levels Drainage System and inland watercourses	Increased and changed flood risk due to conveyance of flood waters being channelled towards the reen system, the Usk Estuary or the Ebbw.	Ground and Surface water Management Plan. Drainage Strategy Reen Mitigation Strategy

Activity	Topic	Receptors sensitive to construction stage impacts	Potential impacts during construction	Proposed mitigation
pier foundations.				
Storage and use of fuels/ chemicals		Surface Water – Gwent Levels Reen System	Pollution of watercourses as a result of spillages or leaks.	Pollution Control and Prevention Plan
Construction of haul routes. Embankment construction		Surface Water – Gwent Levels Reen System	Release of high levels of sediment into the reen system.	Ground and Surface water Management Plan. Pollution Control and Prevention Plan.

6 Environmental Control Plans

6.1 Site Traffic and Access

Control Measures

Temporary Site Access Points

6.1.1 During the early part of the construction programme, the local road network would be used for delivery of materials and plant. All access and egress points from the local highway to the construction works area would be kept clear and where required, wheel wash facilities would be provided to ensure that the highway is kept free of mud.

6.1.2 The access points from the local highway would avoid residential areas. A plan of permitted haul routes and access points would be provided to the supply chain to ensure that all deliveries are managed correctly.

6.1.3 The use of public transport would be promoted to construction workers and site visitors. Adequate parking for construction workers would be provided at the main and section office compounds to avoid the need for parking in residential areas.

Construction Traffic Haul Routes

6.1.4 With the exception of certain circumstances (for example, early in the construction programme before construction accesses have been established, in areas where the stabilised cement/lime haul route may be used, or during tie-in works with existing highways), construction traffic would use one of three types of haul road. These would be the earthworks haul road, structures haul road and the combined haul road, all of which would be within the construction boundary (i.e. within the limits of the permanent and temporary land take).

Measures to Control Polluting Discharge from Haul Roads/Disturbed Areas

6.1.5 The haul roads would be maintained in an adequate condition to ensure they remain fit for use by the appropriate construction vehicles.

6.1.6 Temporary pipes would be installed within the existing reens and ditches early in the construction programme to maintain connectivity of the watercourses and to provide temporary plant crossings. The number of pipes installed would vary according to the reen channel dimensions and the discharge rate.

6.1.7 During construction, surface water runoff from the embankments would be managed by capture and settlement before being released to the existing reen system. The runoff would be captured in a bunded area located along the corridor of construction between the main line embankment and the permanent parallel field ditch/replacement reen.

6.1.8 Silt fencing would be also installed where appropriate.

Vehicle Movements within the Site

6.1.9 Measures would be adopted to reduce the spread of mud and dust by site vehicles and by delivery vehicles. A site speed limit would be imposed and movements of construction traffic around the site would be minimised where possible.

6.2 Air Quality and Dust

Control Measures

6.2.1 The EIA process has classified the site as high risk due to the presence of sensitive receptors in close proximity to the construction works. The following site specific mitigation measures for high risk sites would be applied (where applicable) to reduce dust emitting activities (taken from the Institute of Air Quality Management (IAQM) (2014) Guidance on the Assessment of Dust from Demolition and Construction).

6.2.2 The measures described in this control plan would be developed into a Dust Management Plan, which would be implemented throughout the duration of the construction works to minimise the impacts from dust and air quality nuisance.

Communication

6.2.3 The name and contact details of the person(s) accountable for air quality and dust issues and the head or regional office contact information would be displayed on notice boards in prominent locations on the boundary of the works area.

6.2.4 A stakeholder communications plan would be developed before work commenced on the site. The plan would include measures to engage local communities and businesses.

6.2.5 A Dust Management Plan would be developed and implemented during the construction works. The plan would be agreed by the local planning authority.

Site Management

6.2.6 All complaints relating to dust and air quality would be recorded. The cause(s) of the complaints would be identified and the appropriate measures to reduce the emissions would be taken in a timely manner. The measures taken would be documented. The complaints log would be made available to the local authority when requested.

6.2.7 Any exceptional incidents that cause dust/air emissions, either on or off site would be recorded in the log book, together with details of the action taken to resolve the situation.

6.2.8 Liaison meetings would be held with other high risk construction sites located with 500 metres of the site boundary to ensure plans are co-ordinated and dust and particulate matter emissions are minimised.

Monitoring

6.2.9 Regular inspections of the works area would be undertaken to monitor compliance with the Dust Management Plan. The inspection results would be logged and made available to the local planning authority when requested.

6.2.10 The frequency of site inspections (by the person accountable for air quality and dust issues) would be increased when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

6.2.11 Where the works areas are close to receptors (including roads), daily on-site and off-site inspections would be undertaken to monitor dust. The results of the inspections would be recorded and the log would be made available to the local planning authority on request. Details such as dust deposition, dust flux, or real-time PM_{10} continuous monitoring locations would be agreed with the local planning authority.

Site Maintenance

6.2.12 The site layout would be planned so that machinery and dust causing activities are located away from receptors, as far as possible.

6.2.13 Solid screens or barriers would be erected around key construction compounds or around dusty activities within the construction compounds. Operations where there is a high potential for dust production and the site is active for an extensive period would be enclosed.

6.2.14 Construction practices would avoid generating site runoff of water or mud where possible. Fencing, barriers and scaffolding would be kept clean using wet methods.

6.2.15 Materials that have the potential to produce dust would be removed from the site as soon as possible, unless the materials are being re-used on site, stockpiles would be covered or seeded.

Operating Vehicle/Machinery and Sustainable Travel

6.2.16 A procedure would be implemented to ensure that the engines of stationary vehicles are switched off (i.e. no idling vehicles). Where practicable, the use of diesel or petrol powered generators would be avoided and mains electricity or battery powered equipment would be used.

6.2.17 A maximum speed limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas would be imposed and signposted. Any increase in these speed limits would be agreed with the local authority.

6.2.18 A Construction Logistics Plan would be prepared and implemented to manage the sustainable delivery of materials. Construction staff would be encouraged to use sustainable modes of transport when travelling to the site compounds (for example, public transport, cycling and car sharing).

Operations

6.2.19 All cutting, grinding or sawing equipment used during construction of the new section of motorway would be fitted with suitable dust suppression techniques, such as water sprays. An adequate water supply would be provided for

dust/particulate matter suppression and non-potable water would be used where possible and appropriate.

6.2.20 Enclosed chutes, conveyors and covered skips would be used. Drop heights from conveyors, loading shovels and other loading or handling equipment would be minimised and fine water sprays would be used where appropriate.

6.2.21 Waste would be managed in accordance with the Site Waste Management Plan and burning of waste would be avoided.

Measures for Specific Construction Activities

6.2.22 Due to the categorisation of the site as a high risk, further mitigation measures are proposed to reduce fugitive dust emissions and adverse air quality impact for specific construction works. These are outlined below.

Measures Specific to Demolition

- Soft strip inside buildings before demolition (retain walls and windows in the rest of the building where possible to provide a screen against dust).
- Ensure effective water suppression is used during demolition operations (i.e. hand held sprays are often more effective than hoses attached to equipment as the water can be directed to where it is needed.
- Bag and remove any biological debris or damp down such material before demolition.

Measures Specific to Earthworks

- Re-vegetate earthworks and exposed areas/soil stockpiles as soon as practicable to stabilise the surfaces and reduce the risk of runoff/wind erosion.
- Where it is not possible to re-vegetate or cover exposed areas/soil stockpiles with topsoil, use hessian or mulches as soon as practicable.
- Only remove the cover from areas where earthworks are programmed to occur within a reasonable timescale to minimise the potential for dust emissions.
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Measures Specific to Construction

- Avoid roughening of concrete surfaces (scabbling) if possible.
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out.
- Ensure that bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.
- Ensure that bags of fine powder materials are sealed after use and stored appropriately.

Measures Specific to Trackout

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary any material tracked out of the site. This may require the sweeper being continuously in use.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving the site with dust generating materials are covered to prevent escape of materials during transport.
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
- Record all inspections of haul routes and any subsequent action in a site log book.
- Install hard surfaced haul routes, which are regularly dampened down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever the site size layout and layout permits.
- Access gates to be located at least 10 m from receptors where possible.

6.2.23 In addition to the above measures, the stabilised haul route would be laid in a wet form, dressed with a layer of stones and dampened down as required to reduce dust emissions.

Monitoring

6.2.24 Monitoring of dust or dust deposits generated by the construction works would be undertaken to ensure that levels do not exceed levels which could constitute a nuisance to residents or occupants of local buildings. Monitoring would primarily be undertaken via regular inspections (as described above). The results of inspections and any subsequent actions would be recorded.

6.2.25 Another way of monitoring the effectiveness of the dust control measures would be recording any complaints which relate to dust and air quality nuisance. These complaints and the action taken would be recorded on the ICE database.

6.2.26 The requirement for physical dust monitoring during construction would be agreed with the local planning authority.

6.3 Cultural Heritage

Control Measures

6.3.1 Where appropriate, archaeological and historical features would be protected prior to and during construction, and procedures would be implemented to manage any unexpected archaeological features which may be encountered during construction.

6.3.2 Prior to the commencement of construction works, the Archaeological Contractor would prepare a Project Design for the activities identified in the Cultural Heritage Mitigation Plan (CHMP) (as set out in Appendix 8.10 of the Environmental Statement) including detailed method statements for the activities proposed (from survey, machine-excavation, hand-excavation, environmental sampling etc. to office-based activities such as finds processing, database use, reporting etc). The Project Design would meet the scope of works described in the CHMP and would set out aims and objectives in accordance with national and regional research frameworks. The Project Design would be submitted and agreed by the Contractor's Archaeologist and the Curator appointed by Welsh Government.

Specific Control Measures

Identified Cultural Heritage Remains

6.3.3 Cultural heritage mitigation work would be undertaken at a number of locations in the vicinity of the new section of motorway where the presence of archaeological remains is known but for which further information would be useful to determine the nature and extent of further archaeological investigation.

6.3.4 The programme of cultural heritage mitigation would involve the use of several separate but complementary methodologies listed below:

- detailed archaeological excavation;
- detailed historic building recording;
- basic historic building recording;
- historic landscape study;
- protection of cultural heritage remains; and
- archaeological watching brief.

6.3.5 The mitigation would be undertaken by one or more experienced specialist contractors monitored by the Contractor's Archaeologist and the Curator appointed by Welsh Government.

6.3.6 A description of these locations and the proposed mitigation are provided in the CHMP (Appendix 8.10 of the Environmental Statement).

Discovered Cultural Heritage Remains

6.3.7 Much of the land traversed by the new section of motorway is considered to have a high potential for the presence of significant archaeological remains. Cultural heritage assets that are currently unknown could be identified through the programme of mitigation set out below:

- archaeological evaluation;
- archaeological watching brief undertaken by the Archaeological Contractor during construction; or
- Contractor observation and reporting.

6.3.8 Where previously unknown heritage assets are discovered during construction as a result of the mitigation programme (see above), the Archaeological Contractor would delineate the remains and ensure that the remains are clearly visible to

any persons working in the area. A preliminary survey and investigation of the remains would be undertaken to establish their nature and significance.

6.3.9 As soon as is reasonably practicable (and within five working days of the identification of the remains) the Archaeological Contractor would submit a Further Archaeological Design. This would describe the nature and extent of the remains and include a costed proposal for any further investigation and recording of the remains. The Further Archaeological Design would be submitted to and agreed by the Contractor, the Contractor's Archaeologist and the Curator prior to the commencement of any part of the mitigation described within the design.

6.3.10 There are some locations outside the Gwent Levels where no archaeological fieldwork survey has been undertaken and where considerable physical impact is predicted as a result of construction. A stage of archaeological evaluation in the form of trial trenching would be undertaken in these areas prior to construction commencing. The work would be undertaken in line with a Written Scheme of Investigation prepared by the Contractor's Archaeologist and agreed by the Curator appointed by Welsh Government. The detailed methodology for trial trenching is set out in the CHMP. Upon completion of the trial trenching, a report would be prepared that described the results of the work. Any archaeological remains identified during the trial trenching would be classed as 'Discovered Cultural Heritage Remains' and a Further Archaeological Design would be prepared in accordance with the procedures described above.

Protection of Cultural Heritage Remains

6.3.11 The Scheduled Monument known as the Devil's Quoit (a standing stone of possible Bronze Age date) located to the north of Undy would require protection during the construction of the new section of motorway. The standing stone is very close to the embankment of the existing M4 motorway. It would remain in situ during construction and would be surrounded by a secure perimeter fence (2 metre high Heras anti-climb or similar). Signage would be placed on the fence to indicate that it is a Scheduled Monument. The Contractor's Archaeologist would be informed before any works in the vicinity of the monument were undertaken and the works would be authorised by a permit.

6.4 Landscape

Control Measures

6.4.1 The control measures for landscape are closely linked to other disciplines (for example, ecology and nature conservation) and the environmental design of the new section of motorway.

- Existing vegetation would be retained where possible.
- The early re-establishment of vegetation within the highway boundary.
- Re-use the coppiced vegetation wherever possible within the planting areas, especially where a screening function is required.
- Loss of or damage to landscape features (for example, hedges/hedgerows/ hedgebanks, drystone walls, individual veteran trees, woodland, water features or field systems) would be avoided where possible.
- Native species of local provenance would be used wherever possible.

- Careful consideration would be given to the location and design of lighting.

6.5 Ecology and Nature Conservation

Control Measures

Biosecurity Method Statement for Site Works, including Ecology Surveys

6.5.1 Works (including surveys and monitoring visits) would be undertaken in accordance with a biosecurity risk assessment and safe system of work, a copy of which is included in Annexes C and D. The risk assessment and safe system of work would take into account species-specific guidelines for management and control of non-native invasive species produced by the Non-Native Species Secretariat and NRW.

6.5.2 Any infected (disease or pest) plants, prunings or timber arisings would be dealt with in accordance with arboricultural best practice and up-to-date best practice guidelines published by NRW.

Use of Woodland Soils and Rootstocks in New Planting Areas

6.5.3 At Berryhill Farm, during clearance of the existing wood, where practicable, coppice stools of hazel and other shrub species would be lifted and replanted in areas of woodland planting to the east of New Park Farm north of the new Castleton Interchange in an area which would not otherwise be disturbed. Woodland topsoil from this wood would also be stripped and placed in new planting areas to encourage the establishment of the woodland ground flora.

Capture and Translocation of Dormouse

6.5.4 Hazel dormice would be captured and translocated to an appropriate off-sire receptor site prior to the commencement of construction.

6.5.5 The methodology for trapping, handling and translocation and post-translocation monitoring and reporting would be undertaken in accordance with best practice guidelines (including Bright *et al.* 2006) and a European Protected Species Licence which would be obtained in advance of the works. The receptor site would be agreed with NRW and secured by agreement prior to the granting of an European Protected Species licence and commencement of licenced works.

6.5.6 Surveys of potential woodland receptor sites in the surrounding area in order to identify a suitable receptor site are ongoing. Results of hazel nut searches undertaken during the winter of 2015 have reported no signs that could confirm the presence of hazel dormice in Coed Mawr Wood, which is located less than 5 km to the north of the western end of the new section of motorway and is owned by NRW. No historic records of dormice in Coed Mawr woodland were reported during the desk study. The woodland is a suitable size to be used as a receptor site, includes broadleaved habitat of potential value to dormice and is well connected to surrounding areas of habitat of potential value to dormice, including hedgerows and woodland. The next stage would be to carry out a dormouse nest tube survey of this wood in 2016 in order to help confirm the likely absence or presence of dormice. Should results of these surveys confirm dormice are likely to be absent, the Method Statement for the translocation would be agreed with NRW, which would include any enhancement measures

necessary to ensure the woodland is in favourable condition for use as a receptor site, prior to the commencement of any translocation.

6.5.7 If a suitable receptor site has not been agreed, or should the receptor site not be in favourable condition prior to the commencement of translocation, captured dormice would be maintained as a captive population at a suitable facility for re-release once the receptor site has been restored/enhanced to favourable condition.

6.5.8 The translocation would be undertaken by appropriately experienced and qualified ecologists named on the NRW licence for dormice. The ecologists would work under the guidance of the ECoW. Reports of all captures and translocations would be maintained by the ECoW and would be provided on a regular basis to the Project Manager and NRW.

6.5.9 Reports of all captures and translocations would be maintained by the ECoW and provided on a regular basis to the Project Manager and NRW.

6.5.10 Outside the areas to be cleared, the mitigation strategy for the Scheme would include the establishment of a buffer zone around retained trees and scrub of known value to dormice. Buffer zones would be at least the width of the root protection zone of the exterior trees/scrub. Buffer zones would exclude the tracking of heavy machinery and vehicles; storage of equipment, machinery or soils; and below-ground destructive works.

6.5.11 Where considered necessary by the ECoW and/or Site Manager, high visibility or construction fencing would be used to demarcate boundaries of buffer zones.

6.5.12 Reports of all captures and translocations would be maintained by the ECoW and provided on a regular basis to the Project Manager and NRW.

6.5.13 Outside the areas to be cleared, the mitigation strategy for the Scheme would include the establishment of a buffer zone around retained trees and scrub of known value to dormice. Buffer zones would be at least the width of the root protection zone of the exterior trees/scrub. Buffer zones would exclude the tracking of heavy machinery and vehicles; storage of equipment, machinery or soils; and below-ground destructive works.

6.5.14 Where considered necessary by the ECoW and/or Site Manager, high visibility or construction fencing would be used to demarcate boundaries of buffer zones.

Capture and Translocation of Reptiles

6.5.15 Prior to commencement of construction in areas where common lizard and slow worm populations have been identified, reptile fencing would be installed and reptiles would be captured and transferred to suitable habitat on the margin of the new section of motorway, or to suitable habitat within the SSSI mitigation areas (Appendix 10.35) or elsewhere by agreement. The detailed method statement for the capture and translocation would be agreed with NRW in advance.

6.5.16 The translocation would be undertaken by appropriately experienced and qualified ecologists, working under the guidance of the ECoW. Reports of all captures and translocations would be maintained by the ECoW and would be provided on a regular basis to the Project Manager and NRW.

6.5.17 Mitigation measures for grass snakes would be detailed in an NRW approved grass snake Method Statement. Measures may include habitat management (e.g. clearance of scrub and mowing of grass cover) in order to remove ground cover along the banks of watercourses/waterbodies within the working area that are of potential value to grass snakes and identification of features of potential importance to grass snakes, such as leaf piles, and where these would be affected by the Scheme, removal to suitable locations at the scheme boundary or elsewhere by agreement.

Capture and Translocation of Water Vole

6.5.18 Mitigation measures designed to displace or translocate water voles from working areas (excluding temporary access routes) to favourable receptor sites prior to the commencement of construction would be set in place in accordance with a water vole Method Statement. The exact area of clearance at any location would be determined with regard to habitats and the type of land use and would be agreed with NRW.

6.5.19 Measures included in the water vole Method Statement may include:

- habitat management (e.g. clearance of scrub and mowing of grass cover) in order to remove bankside ground cover and thereby help to displace and/or deter water voles throughout the construction phase in an area;
- the excavation and infilling of burrows under an ecological watching brief;
- the drainage of watercourse prior to infilling in order to deter water voles;
- the installation of steel mesh across excavated banks and/or the banks and channels of newly constructed watercourses in order to prevent water voles from (re-)excavating burrows; and
- if necessary the capture and translocation of individuals to pre-prepared receptor sites in the SSSI mitigation areas (Appendix 10.35) or elsewhere by agreement.

6.5.20 If required, the receptor sites would be agreed with NRW, and they would not form part of any other water vole's home range and would contain habitat favourable to water voles. Where necessary, habitat creation and/or enhancement measures would be undertaken prior to any displacement or translocation in order to ensure receptor sites are in favourable condition prior to translocation. Measures could include clearance of bankside scrub and mowing to encourage the development of good ground cover. Should a receptor site be located outside the existing area covered by the Gwent Wildlife Trust mink control programme, a mink control management plan would be instated prior to translocation in order to help ensure any displacement or translocation is successful.

6.5.21 The translocation would be undertaken by appropriately experienced and qualified ecologists, working under the guidance of the ECoW. Reports of all captures and translocations would be maintained by the ECoW and would be provided on a regular basis to the Project Manager and NRW.

Capture and Translocation of Great Crested Newt

6.5.22 Mitigation measures that would form part of any great crested newt licence application, and would be undertaken at an appropriate time of year and during appropriate local weather conditions, would include the following.

- Installation of great crested newt exclusion fencing around working areas within 250 m of habitat known to or likely to be inhabited by great crested newts, in order to prevent great crested newts from entering, but to enable them to leave, the construction site.
- If required pre-construction trapping in order to capture and translocate any great crested newts from within exclusion fenced areas to appropriate receptor sites outside working areas, for example in the SSSI mitigation areas (Appendix 10.35) or elsewhere by agreement.
- Clearance of habitat of potential value to newts from within exclusion fencing in order to capture any remaining newts and translocate them to the approved receptor sites.
- Installation of culverts.

6.5.23 Where necessary, habitat creation and/or enhancement measures would be undertaken in order to ensure receptor sites are in favourable condition prior to displacement or translocation. Measures could include clearance of overhanging and over-shading scrub along the banks of watercourses/waterbodies in order to encourage the establishment and spread of aquatic vegetation, and provision of hibernacula, potentially using suitable materials derived from site clearance.

6.5.24 If required, the translocation would be undertaken by appropriately experienced and qualified ecologists, working under the guidance of the ECoW. Reports of all captures and translocations would be maintained by the ECoW and would be provided on a regular basis to the Project Manager and NRW.

Removal of Bat Roosts at the Appropriate Season

6.5.25 The following buildings have been identified as bat roosts:

- Old Stores in Newport Docks;
- Pye Corner Farm;
- Tatton Farm; and
- The Vicarage, Magor.

6.5.26 Several trees have also been identified as supporting bat roosts.

6.5.27 Mitigation measures would include further pre-construction surveys of mature trees and buildings that would be felled or demolished, or would be at potential risk of significant noise disturbance from the works, in order to confirm the presence/absence of bat roosts. Should any roosts be confirmed and should works require the loss of the roost or be likely to result in the displacement of bats, a European Protected Species licence would be obtained prior to the commencement of works. The pre-construction surveys would inform the licence application and associated method statement.

Replacement Roosts

6.5.28 Replacement bat roosts would be provided, for example a bat building would be provided at the proposed water treatment area north of Magor to replace the roost at the Vicarage, which would be removed to construct the new section of motorway. This would be a purpose built building, parts of which would receive full sunlight for the majority of the day, providing warm conditions for breeding bats. Cool areas would also be included for spring, autumn and winter roosting.

6.5.29 Artificial bat roost boxes to replace roosts which would be removed for the new section of motorway would be installed in suitable trees in field boundaries such as on the margins of construction sites and borrow pits, and elsewhere by agreement. The number and locations of the bat boxes would be agreed with NRW. Bat boxes would also be provided within the SSSI mitigation areas, or elsewhere by agreement.

Crossing Points

6.5.30 The construction of crossing points and planting of landscaping would be carried out as soon as practicable during construction once it can be confirmed that ongoing construction would not result in damage to the new planting.

6.5.31 Whilst the planting is becoming established, to help guide bats to crossing points prior to the commencement of operation, artificial 'bat corridors' (e.g. lines of hazel hurdle fencing) would be installed between crossing points and retained habitats in or connected to high and very high bat activity areas. These would be installed during night time hours between at least March and September inclusive (the main period of bat activity) and until landscape planting has become sufficiently developed to provide a permanent alternative.

Closure of Badger Setts at the Appropriate Season

6.5.32 Results of the 2014 and 2015 badger surveys confirm several active and inactive badger setts located within or adjacent to the working areas.

6.5.33 Therefore, in order to protect any badgers that might be utilising the setts and prevent a breach of the Protection of Badgers Act 1992, badgers would need to be displaced from the setts prior to closing them.

6.5.34 Three artificial setts would be constructed in order to provide alternative habitat for use by any badgers displaced from the three active main setts. Artificial setts would be constructed prior to closing main setts and all closures of active setts would be carried out in accordance with the requirements of an NRW licence for badgers which would be obtained prior to the commencement of licenced works. The artificial setts would be constructed in areas that would enable badgers to continue to gain access to parts of their existing home range that contain significant areas of habitat of potential value.

6.5.35 Should pre-construction surveys report the presence of new main setts that would need to be closed, one artificial sett would be constructed in place of each new main sett to be closed.

Pre-construction Surveys

6.5.36 To confirm the measures required during construction, pre-construction surveys would be undertaken for:

- bats;
- badgers;
- water vole;
- otter;
- great crested newt; and
- features of importance to grass snakes.

6.5.37 In order to support the Method Statements that would support European Protected Species licence applications for disturbance of bats, otter and great crested newt; a licence under the Protection of Badgers Act 1992 for closure of badger setts; and a translocation licence for water vole if required, further surveys for these species would be carried out in advance of commencement of construction. Features of potential importance to grass snakes, such as leaf piles, would be identified and where these would be affected by the new section of motorway would be moved to a suitable allocation at the boundary of the new section of motorway or elsewhere by agreement.

6.5.38 Where licences are required, 'ghost' licence applications would be prepared and discussed with NRW in advance of the decision on the Orders in order to avoid delays when and if the formal applications are made.

Bats

6.5.39 Taking into account the mobile nature of bats, mitigation measures would include pre-construction surveys of mature trees and buildings that would be felled or demolished, or would be at potential risk of significant noise disturbance from the works, in order to confirm the presence/absence of bat roosts. Should any roosts be located and should works require the loss of the roost or be likely to result in the displacement of bats, a European Protected Species licence would be obtained prior to the commencement of works. The pre-construction surveys would inform the licence application and associated method statement.

6.5.40 With regard to commuting routes to potential bat roosts, Berryhill Farm and Fair Orchard Farm buildings would be surveyed prior to construction in order to confirm the presence or likely absence of bats roosts. Should these buildings contain roosts and should it be possible to retain the buildings and, therefore, the roosts, the existing A48 and Lighthouse Road would continue to provide potential access routes to the roosts as well as crossing points across the new road, thereby helping to minimise the potential impact on roosting bats (bats were recorded commuting along the A48 and the Lighthouse Road during bat activity surveys completed in 2014 (Appendix 10.7)). As referred to above, if a bat roost is found to be present in buildings to be demolished at Berryhill Farm, consideration would be given to provision of a further bat barn within the scheme in this area.

Water Voles

6.5.41 Prior to the commencement of any works that could directly or indirectly affect a watercourse (i.e. any works located within 8 m of a watercourse), a survey would be undertaken by an appropriately experienced ecologist in order to confirm whether or not water voles and their burrows are present. For all watercourses known to support water voles, a detailed method statement would be agreed with NRW and, as necessary, an NRW licence would be obtained prior to the commencement of works, so as to minimise the potential impact on water voles.

Dormouse

6.5.42 The trapping and translocation of dormice would be undertaken in accordance with a European Protected Species licence and associated method statement. The receptor site would be approved by the NRW and would contain adequate favourable habitat prior to the commencement of trapping and translocation.

6.5.43 Should no favourable off-site receptor site be located prior to the commencement of construction, with NRW approval and licencing, dormice would be trapped and translocated prior to construction to a temporary NRW approved holding site in order to be cared for in captivity until an off-site receptor site has been enhanced to favourable condition or replacement planting has established and developed sufficiently to support the dormouse population in the long term.

Badgers

6.5.44 Badgers typically use main setts for many years. However annex setts and outliers are less fixed. Taking this into account pre-construction surveys would be undertaken of habitat of potential value to badgers located within 30 m of the works area (or up to 100 m for high disturbance works such as pile driving) in order to locate any badger setts and areas of high badger activity. Results of the update survey would inform the final Badger Method Statement and badger licence application under the Protection of Badgers Act 1992.

Otter

6.5.45 Pre-construction surveys for otters would be undertaken. An emergency procedure protocol to use in the event of encountering an otter or potential otter rest/holt during construction, would be given to contractors. This would require:

- immediate halting of works within 50 m of the resting place/holt or 100 m for more significant disturbance works such as piling; and
- notification of findings to the ECoW as soon as practicable, either directly or through the Site Manager.

6.5.46 An appropriately qualified and experienced ecologist (who could be the ECoW) would attend the site as soon as practicable in order to confirm reports of otter activity, and to assess the need for further surveys to confirm the presence of otter holts/resting places and/or the need for a development licence for otters to enable works to recommence.

6.5.47 If an NRW licence for otters is required for works to continue, works within 50 m – 100 m of the holt/resting place would be halted, as described above, until a

licence has been granted. Once a licence has been obtained, works in the area would then be completed in accordance with the requirements of the licence.

6.5.48 If a dead or injured otter is located, the ECoW or appropriately experienced ecologist instructed by the ECoW should determine the cause of death where possible (e.g. through speaking to site workers, inspecting the body and/or investigating site conditions). If the death is considered likely to be a result of construction works, the ecologist would assess the need for further mitigation.

6.5.49 A report of the findings of the site visit and implications for construction would be produced by the ECoW and provided to the Developer and Site Manager as soon as practicable and to NRW as required/requested.

Great Crested Newts

6.5.50 Great crested newts typically disperse up to 250 m from their breeding sites (English Nature 2001), although they can travel further, and have been known to travel further than 1 km. Therefore, although results of the 2015 great crested newts eDNA survey (Appendix 10.22) indicate that the new section of motorway would not result in the loss of any watercourses, where great crested newt DNA was recorded, newts could move into working areas during the construction phase. Newts could also begin to utilise watercourses where they have previously been recorded as absent, prior to or during the construction phase.

6.5.51 Pre-construction surveys would be undertaken to inform the mitigation Method Statement and great crested newt licence applications.

Gwent Levels Site of Special Scientific Interest

6.5.52 The new section of motorway crosses the Gwent Levels, which comprises one of the most extensive areas of reclaimed wet pasture in Great Britain. The Gwent Levels are notified as a series of Sites of Special Scientific Interest, four of which would be directly affected. These are:

- Gwent Levels – St Brides SSSI;
- Gwent Levels – Nash and Goldcliff SSSI;
- Gwent Levels – Whitson SSSI; and;
- Gwent Levels – Redwick and Llandevenny SSSI.

6.5.53 The special features of each of these SSSIs include:

- reen and ditch habitat;
- insects are other invertebrates (aquatic); and
- shrill carder bee.

6.5.54 Under Section 28G of the Wildlife and Countryside Act 1981, the Welsh Government has a duty to take reasonable steps to further the conservation and enhancement of these features. A strategy has been prepared to mitigate the loss of coastal grazing marsh habitat as a result of the new section of motorway and, where possible enhance the Gwent Levels SSSI. The SSSI Mitigation Strategy (Appendix 10.35 of the Environmental Statement) sets out mitigation and management measures

Clearance of Vegetation Suitable for Nesting Birds

6.5.55 As explained in Appendix 3.1 of the ES, tree clearance and protection fencing would be planned with the ecological supervisor in accordance with industry standards and guidelines. Tree clearance works would be undertaken outside the normal breeding bird season (March to August) where practicable.

6.5.56 Where unforeseen delays or unexpected circumstances prevent this, additional measures would be put into place to prevent disturbance or harm to breeding birds. Such measures would include detailed hand searching and distance-observation of any potential bird-nesting habitats requiring clearance during the bird-nesting season by suitably experienced ecologists.

Provision of Barn Owl Boxes

6.5.57 Barn owl nest boxes would be provided in trees around the boundaries of the mitigation land at Green Moor (chainage 17900 to 19100) in the same area as the potential barn owl nest but further from the construction area and also within the SSSI mitigation areas (Appendix 10.35).

Management of Surface Water and Groundwater

6.5.58 As explained in Chapter 16 Road Drainage and the Water Environment, the Outline Ground and Surface Water Management Plan (Annex G) would consider all drainage required during the construction phase and would reference all industry and regulatory pollution prevention guidelines. The plan would describe the design of each element of the surface water management system required to manage surface water runoff during construction and potential risks to surface waters. This would include consideration of temporary storage and settlement requirements to manage the sediment load of waters. The plan would define the water quality criteria to ensure any discharge to receiving watercourses meets regulatory requirements. The plan would also define an appropriate monitoring regime to ensure water quality would be protected to the satisfaction of the regulatory authorities. The plan would consider discharges to the Gwent Levels, inland water courses and tidal water bodies as required.

6.5.59 The methodology for the excavation and installation for new culverts along reens and selected field ditches is described in Appendix 3.1 of the ES. Generally the method would be to:

- construct replacement reen(s) parallel to the new road;
- install temporary pipe crossing in existing channels to permit plant and materials to cross for these works and transit along the trace;
- connect the new reens/field ditches into north and / south to the existing system;
- prevent flow through existing reen/field ditch; and
- introduce plant material from reens and ditches to be infilled to new channels to encourage colonisation.

6.5.60 Where practicable, the layout of areas of land identified for temporary construction areas would avoid existing reens and ditches to minimise the infilling of these features.

6.5.61 To facilitate the process of recolonisation of replacement reens and ditches by aquatic vegetation and invertebrates, subject to approval from NRW, material removed from existing reens and ditches proposed to be infilled (subject to timing) and material from annual maintenance of the reen network would be introduced into the new watercourses to speed up recolonisation. In particular this would be considered where there is the known presence of notable species such as the great silver water beetle (recorded in Middle Road Reen and Elver Pill Reen) and the water beetle *Hydaticus transversalis (*recorded in the Old Dairy Reen and Pont-y-Cwcw Reen).

6.5.62 For any watercourses which would be severed from the network for the duration of construction, consideration would be given to the translocation of fish from these watercourses to those still connected to the main reen network.

6.5.63 At some locations it may be necessary to temporarily de-water sections of reens prior to or following connection to culverts. In such instance care would be taken to avoid trapping fish in these sections.

Construction Lighting

6.5.64 Lighting would be provided as required during periods of normal working hours in autumn and winter and for night time working. As far as possible, task lighting would be used for specific works to direct light towards the working areas during the night time. Such task lighting would be positioned at low level on posts and directed at the most frequently used areas of work.

6.5.65 Inward facing security lighting would be provided at construction compounds on a 24 hour basis.

6.5.66 A more detailed lighting strategy for the construction period would be developed to identify the type of lighting to be used and measures to be implemented to reduce light spill. The strategy would be agreed with the local planning authority.

Installation of Piles for the East Pier of the River Usk Crossing

6.5.67 Piling to install the cofferdam and pylon piles for the east pylon of the River Usk Crossing would be scheduled to avoid the period of highest sensitivity for underwater noise related impacts on migratory fish in the River Usk which has been identified as March to June (inclusive). Confirmation as to the requirement to include other piles (e.g., those for the west pylon and some of the viaduct piles) within this seasonal restriction would be determined following the test pile and associated noise monitoring in consultation with NRW.

6.5.68 High vibration activity would be limited to 30 minutes per eight hour shift and would not be undertaken one hour either side of high tide.

Provision of Mammal Fencing

6.5.69 Temporary boundary fencing would be installed around the perimeter of the works site to prevent unauthorised access. Areas out of bounds to construction activities (e.g. soil storage areas, ecologically sensitive areas or archaeological sites) would also be fenced off or suitably demarcated to ensure plant and machinery cannot enter. Where necessary to ensure that badgers and otters could not access the working areas, mammal exclusion fencing would be attached to the boundary of the works site, including temporary working areas. .

6.5.70 Fencing would be installed under the supervision of an appropriately experienced person so as to ensure there were no gaps along the fence line that badgers could push through, e.g. where the fencing abuts features such as hedges, stiles or fences.

6.5.71 Mammal exclusion fencing would be surveyed throughout construction so as to ensure any necessary repairs are undertaken as soon as practicable.

Provision of Barn Owl Boxes

6.5.72 Barn owl nest boxes would be provided in trees around the boundaries of the mitigation land at Green Moor (chainage 17900 to 19100) in the same area as the potential barn owl nest but further from the construction area and also within the SSSI mitigation areas (Appendix 10.35).

Provision of Means of Escape from Excavations

6.5.73 Any excavations that are located outside the mammal exclusion fencing that are more than 0.5 m deep would be fenced individually; covered overnight where practicable; walls would be re-profiled so as to enable mammals and other wildlife to walk out of the excavation; or a means of escape would be provided, such as a wooden plank rested against the wall of an excavation that could act as a ladder.

Construction Sites at Great Pencarn, Newport Docks and Tata Steel

6.5.74 Following completion of the works all temporary construction work sites would be removed and the land affected would be restored. In restoring the construction sites at Great Pencarn, within Newport Docks and Tata Steel, element of the Open mosaic habitat on previously developed land habitat would be incorporated and the habitat requirements of Shrill carder bee (and terrestrial invertebrates generally) and reptiles would be taken into account. In particular the seed mixes used in restoring these areas would include food plant species of value to shrill carder bee.

Monitoring

6.5.75 Monitoring would be undertaken both during the construction and the operation of the new section of motorway to confirm the effectiveness of mitigation measures, and if necessary, to inform the need for any changes in management of impacts.

6.5.76 The mammal exclusion fencing would be monitored throughout the construction phase to ensure that it remained intact. The ECoW would be responsible for ensuring regular monitoring is undertaken and that repairs are made as soon as practicable.

6.5.77 The establishment of the landscape elements included in the Environmental Masterplans would be monitored by the Contractor during the construction and maintenance periods. The South Wales Trunk Road Agency (SWTRA) would then be responsible for ongoing monitoring and maintenance.

6.5.78 Requirements for monitoring of protected species would be set out in the European Protected Species Licence Method Statements and other species Method Statements. This would include monitoring of populations of dormouse, bats, water vole, badger, and shrill carder bee.

6.6 Geology and Soils

Control Measures

Pollution Control

6.6.1 Fuel, oil and chemicals would be stored in designated and secure locations within the compounds. The storage area would have an impervious base and a secondary containment such as a bund, to contain any spillages or leaks. The base and bund walls would be impermeable to the material stored and have a capacity to contain at least 110% of the volume stored. The bund would also enclose the ancillary equipment (for example, local fill and draw-off facilities, vent pipes, taps and valves) and have no drain outlets.

6.6.2 Secondary containment for drum storage would be provided by a drip tray, bunded pallet or kerb-bunded area. The capacity would be at least 25% of the total volume of the drums being stored.

6.6.3 Where possible, fuel, oil and chemical storage areas would not be located within 10 metres of a watercourse or 50 metres of a borehole, well or spring, and would be above any flood water level to minimise the risk of a spill entering the water environment. Leaking, damaged or empty drums would be removed from the compounds/working areas as soon as possible, and disposed via a registered waste disposal contractor.

6.6.4 Spill kits (containing sand or absorbent materials) would be kept close to the storage area. Staff would be trained on how to use the spill kits. Once used, the sand/absorbent material would be disposed via a registered waste disposal contractor.

6.6.5 Refuelling of plant would be undertaken in designated areas on an impermeable surface away from drains or watercourses. All refuelling and bulk deliveries would be supervised, and staff and contractors would receive incident response training. Hoses, valves and pipework would be regularly checked for signs of wear and tear and corrosion.

6.6.6 Security measures would be provided for the storage areas to prevent vandalism and theft. Storage system valves, taps and delivery hoses would be fitted with locks and locked shut when not in use.

6.6.7 Used oils would be stored, transported and disposed of via a registered waste contractor.

6.6.8 An Outline Pollution Control and Prevention Plan is provided in Annex E, which sets out the procedures for managing a pollution incident.

Soils

6.6.9 A Soil Handling Methodology would be prepared for the new section of motorway, which would identify the methods for stripping, handling, storage and replacement of soils in areas of temporary land take. The methodology would follow the guidance in Defra's Good Practice Guide for Handling Soils (Defra, 2000) and Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (Defra, 2009).

6.6.10 The methodology would set out the different types of soils, in particular the different types of soil, the depths of topsoil and subsoil and their characteristics.

6.6.11 Topsoil and subsoils would be stripped separately according to specified depths. The timing of soil striping and handling operations would avoid periods of the wet weather (i.e. soils would not be stripped during or after heavy rainfall or when water has ponded on the surface). Multiple handling of soil materials would be minimised to avoid the risk damaging the soil structure. Appropriate soil handling equipment would be used (for example, tracked equipment) to avoid compaction and damage to soil structure.

6.6.12 Topsoil and subsoil would be stored in separate stockpiles. The stockpiles would be a maximum height of 3 metres (topsoil) and 5 metres (subsoil) and an appropriate slope. The location of the stockpiles would be designed to keep the topsoil and subsoil separate to minimise the potential for mixing. The stockpiles would not be positioned within the root or crown spread of trees, or adjacent to ditches, watercourses or existing or future excavations.

6.6.13 The stockpiles would be cordoned off from the rest of the works area and protected from construction activities and traffic. The sides of the stockpiles would be graded to avoid ponding. Once prepared, the stockpiles would be seeded using a standard Rye Grass seed mix to minimise soil erosion and to help reduce infestation by nuisance weeds.

Contaminated Land

6.6.14 There are several areas of potentially contaminated land along the route of the new section of motorway which require to be built over or to be partially or wholly excavated. The risk posed by each area to human health and the environment has been assessed and the need for remedial action has been identified in Appendix 11.1 of the Environmental Statement.

6.6.15 An Outline Remediation Strategy (set out in Appendix 11.2 of the ES) has been prepared for the new section of motorway, which establishes the most appropriate approach for managing the risks posed by potential land contamination.

6.6.16 The Outline Remediation Strategy is based on initial assessments of land contamination. The Strategy would be refined following the outcome of additional ground investigations and detailed design. The Outline Remediation Strategy comprises the following elements:

- setting of remediation objectives;
- remedial options appraisal;
- remediation implementation plan; and
- remediation verification plan.

6.6.17 Where practicable (i.e. where the materials are geotechnically suitable and do not pose an unacceptable risk to human health or the environment) contaminated materials would be retained and reused within the construction of the new section of motorway. The Remediation Strategy would set out the approach for assessing if the material would be suitable for reuse with or without treatment. The strategy would be implemented using a Materials Management Plan (MMP)

prepared in accordance with the Definition of Waste: Development Industry Code of Practice (CL:AIRE, 2011). An Outline MMP has been prepared and would be developed during detailed design.

6.6.18 It is possible that during construction, previously unidentified areas of contamination may be discovered. Site workers would be given training on how to identify potential contamination and the procedures that should be followed. If previously unidentified contaminated land is encountered, the procedure would require works to be stopped immediately and the area would be secured to prevent access to site workers, plant and equipment and to prevent the spread of contaminants. The local planning authority and NRW would be notified and consulted on the proposed measures to deal with the contamination.

6.6.19 Where it has been agreed by the local planning authority and NRW for works to continue materials would be managed to minimise the risk of cross contamination. Control measures may include the following.

- Avoid stockpiling contaminated soils. If the material must be stockpiled (for example for testing to be completed) the material would be stored on hardstanding or an impermeable layer.
- Stockpiles would be covered to prevent rainwater leaching out contaminants and generating contaminated runoff.
- Additional wheel wash facilities would be provided where necessary and traffic movements minimised to ensure contamination is not spread.

6.6.20 An Unexploded Ordnance Mitigation Strategy would be developed using guidance from 'Unexploded Ordnance: A Guide for the Construction Industry' (CIRIA, 2009).

6.7 Waste and Materials Management

Control Measures

Materials Management

6.7.1 Opportunities to re-use site won materials would be maximised in accordance with the waste hierarchy defined within the Waste Framework Directive (Directive 2008/98/EC). The re-use of site won materials would be subject to compliance with relevant specification and assessment criteria to ensure engineering suitability and protection of environmental receptors. The assessment criteria would be agreed with the regulators.

6.7.2 Where necessary, materials would be treated and processed on site to render them suitable for use. Treatment would include stabilisation/solidification of contaminated materials (for example, material excavated from the Tata lagoons) whilst processing would include the screening and crushing of materials to achieve the required grading requirements.

6.7.3 The re-use of materials would be undertaken in accordance with the Materials Management Plan, which details the assessment criteria for material re-use and details of the proposed locations where materials would be re-used.

6.7.4 Materials which have to be imported from off site would be sourced from local suppliers where possible, to reduce the impact upon the local transport network. Imported materials are likely to include materials for road pavement construction, aggregates, reinforcing and structural steelwork and concrete.

Waste

6.7.5 Materials that are classified as waste would be managed in accordance with the requirements of the relevant waste management legislation and the 'Duty of Care' obligations.

6.7.6 An Outline Site Waste Management Plan has been prepared (Annex F) which identifies the types of waste likely to be generated during construction of the new section of motorway. It also provides a strategy for managing these wastes in accordance with waste hierarchy principle, together with objectives to divert waste from landfill. In accordance with Duty of Care obligations, waste would only be transported by registered waste carriers and transferred to appropriately licensed waste management facilities.

6.7.7 The Site Waste Management Plan is a living document and would be updated during the detailed design stage when information on the quantities and types of waste becomes available. It would be implemented during construction: all wastes would be managed in accordance with the Site Waste Management Plan and all movements of waste from the site would be recorded and the appropriate documentation would be retained.

Monitoring

6.7.8 Monitoring of the materials used and waste generated from the construction of the new section of motorway would be monitored throughout the construction period. The MMP and Site Waste Management Plan would be the main tools for undertaking this monitoring. The parameters to be monitored may include:

- the overall quantities of materials used;
- the quantity of material of site won material re used;
- the quantity of imported materials;
- quantity of waste (inert and non-hazardous) generated;
- quantity of hazardous waste generated;
- quantity of waste diverted from landfill.

6.8 Noise and Vibration

Control Measures

6.8.1 Noise monitoring (and vibration monitoring where appropriate) would be carried as appropriate out at or around residential properties during the construction phase to check compliance with noise (and vibration) limits agreed with Newport City Council or other regulators, as appropriate to the specific area.

6.8.2 The proposed hours of work during the construction phase are set out in Section 2.4 of this Pre-CEMP. Approval would be sought from Newport City Council's Environmental Health Officer, or other regulators, as appropriate to the specific

area, in advance of the works commencing. This approval may be formalised, as deemed appropriate by the regulator(s) through the Section 61 of the Control of Pollution Act procedure for "Prior consent for work on construction sites". Where the works are agreed, affected residents would be notified of the programme for the intended works, and particularly of the requirement for any out of hours works, and kept up to date as construction progresses.

6.8.3 Standard best practice construction working methods (for example, the use of silenced plant, turning off plant when not in use, and selecting quieter plant where available), would be adopted during the construction phase.

6.8.4 For those properties located in close proximity to the works, noise levels may exceed those acceptable even with standard good practice measures in place. In these locations, additional mitigation would be provided as appropriate and to fully implement Best Practicable Means, in the form of:

- temporary hoardings or noise barriers around worksites or noisy activities; and where still necessary
- the offer of a scheme of sound insulation or temporary re-housing of affected residents as appropriate.

6.9 Community and Private Assets

Control Measures

6.9.1 Control measures relating to agricultural soils area set out in the Geology and Soils Control Plan. The following measures relate to farming enterprises.

6.9.2 Agricultural land temporarily used for the construction of the new section of motorway would be reinstated to its former use on completion of the construction period to minimise the effect on farm holdings due to permanent land take.

6.9.3 Farm access points would be maintained wherever possible to limit the short-term severance of accesses to farm buildings and land. Where this is not possible, alternative accesses would be provided early in the construction process.

6.9.4 Essential services would be maintained throughout the construction period.

6.9.5 To minimise the risk of disease transmission between farm holdings, best practice construction procedures would be implemented to maintain bio-security.

6.9.6 Grazing livestock or crops may be affected by dust and noise generated during the construction period. The farming enterprises most likely to be affected are free-range outdoor poultry enterprises, where production levels can be reduced by sudden noises (for example, blasting). Best practice construction procedures would be implemented to reduce the impacts of dust and noise on crops and livestock.

6.9.7 Many of the farm holdings receive payments through agri-environment schemes in return for adjusting their farming practices to benefit wildlife. These payments are calculated on the amount of land within the agri-environment scheme. To minimise the financial loss to the farmer (and the effectiveness of the agri-environment scheme), restored agricultural land (temporarily used for

construction) would be reintegrated into the agri-environment scheme following consultation with NRW.

6.10 Road Drainage and Water

Control Measures

6.10.1 Control measures would include the following.

- Undertaking the works within an agreed Materials Management Plan underpinned by regulator approved Remediation Strategy and associated re-use criteria for the protection of the water environment, validated during the works. An Outline Materials Management Plan is set out in Annex H.
- Undertaking regular surface water and groundwater monitoring to establish water environment conditions before and during construction works to demonstrate impacts to surface water and groundwater are within accepted limits agreed with NRW.
- Construction of a flood resilient surface water run-off containment bund along both sides of the alignment to capture, convey and treat construction drainage water prior to release to the water environment. Treatment methods would include settlement, filtering and flocculation. Such discharges will be limited to avoid pollution and water quality monitoring will be undertaken to demonstrate compliance. Waters unfit for discharge would be disposed off-site if required.
- Construction of replacement reens and ditches during construction to maintain connectivity of SSSI and replacement of sections lost under the alignment. Greater lengths of replacement reens and ditches are proposed than that lost due to construction (see the Reen Mitigation Strategy Appendix 2.3).
- Avoiding placing Usk crossing bridge pier foundations within the 'wetted channel' to avoid direct impacts to the Usk SAC.
- Undertaking works within a framework of environmental protection practices defined and co-ordinated via the Construction Environmental Management Plan (CEMP). This includes the provision of an Outline Pollution Control and Prevention Plan (Annex E) and an Outline Groundwater and Surface Water Management Plan (Annex G).
- Implementing measures to protect surface and groundwater.

Outline Pollution Control and Prevention Plan

6.10.2 The pollution prevention plan shall identify all measures to minimise risks of contamination during the construction phase over and above the protocols and measures outlined in the other strategies and management plans.

Outline Groundwater and Surface Water Management Plan

6.10.3 With regard to surface water, the Outline Groundwater and Surface Water Management Plan (OGSWMP) shall consider all drainage required during the construction phase and will reference all industry and regulatory pollution prevention guidelines. The OGSWMP shall describe the design of each element of surface water management system required to manage surface water runoff

during construction and potential risks to surface waters. This shall include consideration of temporary storage and settlement requirements to manage sediment load of waters. The OGSWMP shall define the water quality criteria to ensure any discharge to receiving watercourses meets regulatory requirements. The OGSWMP shall also define an appropriate monitoring regime to ensure that water quality will be protected to the satisfaction of the regulatory authorities. The OGSWMP will have to consider discharges to the Gwent Levels, inland watercourses and tidal water bodies as required. Additionally, a site-specific piling risk assessment shall be provided, to ensure the most appropriate piling approach and methodology is utilised for the construction of pile foundations for embankments (above 5 m height) and bridge tower and viaduct pier foundations. The piling risk assessment shall minimise the potential for the creation of new pathways and hence the cross contamination of controlled water receptors (i.e. groundwater and surface water).

6.10.4 With regard to groundwater, the OGSWMP shall consider all activities to be undertaken during the construction phase that may require groundwater control through pumping. The OGSWMP will reference all relevant industry and regulatory pollution prevention guidelines. The OGSWMP shall consider excavations within borrow pits, structures required for managing groundwater in areas of cut, the excavations required for bridge tower and viaduct pier foundations (particularly those requiring cofferdam construction) and excavations required for subsurface structures/utilities that may encounter shallow groundwater. The OGSWMP shall define the nature and approach for groundwater management following its abstraction, including monitoring to determine the acceptability of chemical and physical quality with respect to discharge to the surface water system. The OGSWMP shall also outline the scope of monitoring required with respect to private groundwater abstractions considered at theoretical risk from the Scheme. This shall include a summary of source specific contingency measures should the flow, reliability and or quality be affected during the period of monitoring.

Outline Remediation Strategy

6.10.5 The Outline Remediation Strategy (ORS) shall identify the nature and extent of remediation works required in advance of the construction phase. A contamination discovery strategy shall define the approach to managing any land contamination that may be identified during the construction phases. This includes the discovery of contamination within the land take area. The discovery strategy shall outline the methodology to be adopted to determine the acceptability of land quality and the contingency measures required should land quality be shown to be unsuitable for remaining in-situ. The discovery strategy shall include appropriate characterisation and verification monitoring required to demonstrate that these works are complete.

6.10.6 The ORS report shall also outline all chemical reuse criteria, also known as Re-use Target Concentrations (RTCs), required for the construction phase, including monitoring/verification testing requirements. Precautionary RTCs shall also be developed for the materials to be replaced on borrow pits to ensure groundwater quality and groundwater dependent receptors are not adversely affected by the backfilling of these structures. The RTCs will be designed to ensure that the EQS agreed with NRW are achieved, based on leachability results and mixing with the received in groundwater body.

7 The Project Team

7.1.1 The Project Manager would have overall responsibility for the construction of the new section of motorway. A full-time Environmental Co-ordinator would be responsible for developing the Pre-CEMP into the CEMP and implementing the CEMP during construction.

7.1.2 Other members of the project team would be assigned specific roles to assist the Project Manager in the implementation of the CEMP and individual specialists would be appointed to provide expert advice. The key environmental roles and responsibilities are identified below.

7.2 Key Roles

Environmental Co-ordinator

7.2.1 The Environmental Co-ordinator (ECO) would be responsible for the interface between the environmental specialists and engineers. The ECO would have primary responsibility for managing environmental issues through the construction and post-construction monitoring phases and for obtaining relevant licences and consents.

7.2.2 Their specific tasks would include the following.

- Co-ordinating and attending the necessary meeting and consultations relating to the environment and sustainable construction aspects of the works such as:
  - design meetings;
  - monthly progress meetings;
  - Environmental Liaison Group meetings; and
  - Technical Working Groups as appropriate.
- Ensuring that the commitments resulting from the statutory procedures (including the Public Inquiry) are included in the CEMP and detailed environmental design.
- Ensuring commitments made in the Project Commitments Register are included in the environmental management system, CEMP and detailed environmental design.
- Ensuring environmental quality standards are adhered to and monitor compliance during detailed design and construction phases of the new section of motorway.
- Undertaking contractor staff induction courses on environmental matters.
- Periodically, provide review reports, including monitoring data where appropriate, to consultees. These reports would demonstrate compliance with the CEMP and would provide assurance that a high standard of environmental protection is being maintained as well as identifying the implications of failure to meet standards of mitigation, the reasons for this and remedial actions to be taken.
- Providing monthly reports on site environmental monitoring.

- Developing the CEMP document and maintaining it as a working document, undertaking reviews and updates where required.

Environmental Clerk of Works

7.2.3 A full time Environmental Clerk of Works (ECOW) would support the ECO during construction and aftercare. The ECOW would be the site representative for the ECO and would be responsible for overseeing construction activities to ensure all environmental commitments are met and compliance with the conditions of all licences and permits. The ECOW would be based on site full time and would have the authority to direct members of the contractor's site staff on environmental issues.

7.2.4 The ECOW would also be responsible for the following.

- Ensuring all relevant licences, consents and method statements are in place prior to construction activities.
- Overseeing and auditing the implementation of the CEMP and environmental mitigation measures on site during Key Stage 6.
- Maintaining, updating, auditing and monitoring the EMS, the CEMP and the environmental commitments register.
- Ensuring that ecological inspections are carried out and signed off prior to any works where habitat may be affected.
- Identifying training needs and providing environmental training including inductions, tool box talks etc.
- Ensuring correct procedures are followed in the event of environmental incidents.
- Assisting the Site Foreman in maintaining environmental records.
- Providing advice and assistance to site personnel on environmental matters.
- Completing a daily environmental log.
- Managing the environmental monitoring programme and review the routine reports.

Site Environmental Manager

7.2.5 The Site Environmental Manager would report on environmental activities to the ECO and ECOW and would be responsible for the following.

- Implementing and maintaining environmental controls on site, including water protection measures and environmental fencing.
- Attending to any spills or environmental incidents that may occur on site.
- Reporting any activity that has resulted in, or has the potential to result in, an environmental impact immediately to the site environmental representative, ECOW or ECO.
- Monitoring and completing the waste register and ensuring the correct waste management procedures are implemented.
- Carrying out regular monitoring and inspection of the works.

Environmental Specialists

7.2.6 A team of environmental specialists would provide support as required. During construction their role would be to undertake the required Watching Briefs and to assist the team with specific issues as they arise.

8 Communications and Complaints Procedure

8.1.1 A Communications Strategy has been developed for the Scheme. The strategy would be implemented using a phased approach to reflect the various stages of the construction programme and provide detailed information to the appropriate target groups. A Public Liaison Officer (PLO) would be appointed who would be responsible for implementing the strategy. The PLO would attend public meetings including liaison meetings with community groups. The PLO would also attend and provide updates at internal meetings including programme coordination, site progress and traffic management meetings.

8.1.2 The PLO would be responsible for managing all contacts with local residents groups, schools, emergency services and local businesses with regard to general construction works issues.

8.1.3 The strategy would be reviewed at regular intervals using public feedback linked to the Scheme website and a text messaging service.

8.1.4 A summary of the Communication Strategy is set out below.

- Public meetings would be held to update local people and other interested parties on progress of the works and future activities.
- A visitor and resource centre would be established within the main project office.
- An Environmental Liaison Group would be established that would consist of key stakeholders including the NRW. The Group would meet at regular intervals throughout the construction period to review progress of the new section of the motorway and its construction, and to focus on specific environmental issues as required.
- Exhibitions at local events would offer a range of information relating to the Scheme.
- A Scheme website would be established.
- SMS Texts would be sent to local residents and businesses who sign up to the service, providing regular updates on the Scheme, in particular traffic management information.
- Quarterly newsletters would be published and distributed to promote the overall progress of the Scheme and upcoming works. The newsletters would be distributed to residential and business premises in the vicinity of the construction works. Copies would also be placed in local libraries, the visitor centre and on the Scheme website.
- Leaflet drops would supplement newsletters. They would be targeted at residents and businesses that may be affected by specific construction activities to provide advanced notice of works.
- Notice and display boards would be erected in public areas and regularly updated with Scheme information.
- A 24-hour public help line would be set up, the details of which would be promoted on site notice boards, newsletters, flyers and press releases. The help line would provide information on the Scheme and would also be used to record complaints from the public.

- The complaints procedure would be managed with the use of the Incidents, Complaints and Enquiries Database (ICE). All complaints would be recorded and resolved within seven days of being reported. The action taken to resolve the complaints would also be recorded.
- An Emergency and Extraordinary Incident Communication Response Plan would be developed and emergency contacts would be displayed on the notice boards, newsletters and website.

9 Emergency Response Plan

9.1.1 A Pollution Incident Emergency Response Plan would be developed in accordance with the guidance set out in the Environment Agency's PPG21: Pollution Incident Response Planning (Environment Agency *et al.,* 2009).

9.1.2 The Response Plan would set out the procedures to be followed and measures to implemented in the event of a pollution incident. These incidents may be the result of:

- delivery and use of materials;
- spillages of oils or chemicals
- discharge of silty water or other pollutants to watercourses;
- flooding event; and
- fire (emissions to air) and failure to contain firewater runoff.

9.1.3 The Response Plan would contain the following key information.

- External and internal list containing contacts 24 hour contact details for organisations that may need to be involved during or after an incident, for example, the emergency services, NRW, Newport City Council and/or Monmouthshire County Council, and Dwr Cymru Welsh Water.
- Chemical and waste inventory: an up-to-date record of all substances stored on site would be maintained together with an estimate of the likely quantities stored and product data sheets. The location of drums, containers or bulk storage vessels used for storing potentially polluting chemicals would be identified on the site plan. The inventory would be made accessible to emergency responders.
- Pollution prevention equipment inventory. This would include equipment and materials on site to deal with pollution incidents (for example spill kits, drain mats/covers, pipe blockers, absorbents) and contact details of staff trained in the use of specialist equipment (where relevant).
- Site plan showing access routes and meeting points for emergency services; areas or facilities used to store raw materials, products and wastes; watercourses located within or near the site; and site drainage.

9.1.4 Emergency procedures would be developed to support the Response Plan. The procedures would define the circumstances when the plan should be activated and include, the names and contact details of staff trained in incident response, clearly defined roles and responsibilities, the types and location of emergency response equipment available, and procedures for recovering spilled product.

9.1.5 All relevant staff would be trained in how and when to contact the emergency services, NRW and other organisations identified in the Response Plan. A copy of the Pollution Incident Emergency Response Plan would be incorporated into the Scheme Health, Safety and Environmental Management Plan (HASEMP), which would be kept in the main site offices.

9.1.6 In the event of an emergency, members of the public would be able to contact the site via the 24-hour helpline.

10 Training

10.1.1 All construction staff, including sub-contractors, would receive structured training on the requirements of the Pre-CEMP and the associated environmental control plans.

10.1.2 They would also be required to attend a site induction which would include the key environmental issues identified on the Scheme including the sensitivity of the reen system, protected species and habitats, cultural heritage resources and local residents and businesses.

10.1.3 The briefing would emphasise the methods and working practices which must be employed to protect the environment, including emergency procedures for reporting and dealing with environmental incidents.

10.1.4 Records of training and those attended would be retained.

11 Monitoring, Reporting, Review

11.1 Monitoring

11.1.1 The performance of the Scheme would be monitored against the commitments, objectives and targets identified in the Environmental Management System (in accordance with ISO 14001), the Pre-CEMP and the Register of Commitments which would include all mitigation requirements as set out in the ES, AIES, licences/consents and other documentation.

11.1.2 Monitoring would be undertaken to:

- determine if the environmental measures have been achieved or are achieving their intended purpose;
- identify any successes, failures or weaknesses in the application of those measures;
- identify remedial measures required to achieve the environmental requirements;
- provide information for the production of performance reports required under the contract; and
- to ensure that the agreed environmental commitments as set out within the CEMP are being implemented.

11.1.3 Monitoring is a key element of the Scheme Environmental Management System and the Pre-CEMP to ensure that the environmental measures set out in this document are adhered and to demonstrate the effectiveness of the measures.

11.1.4 Adequate surveys and monitoring would be undertaken to establish whether ecological, landscape and other mitigation and enhancement identified in the ES, AIES has been successful following completion of the works.

11.1.5 Monitoring proposals would be developed in consultation with the appropriate regulatory authority. As a minimum, the scope of the monitoring would include the following.

- Monitoring of the effectiveness of the water quality, drainage, hydrology and ground water management measures.
- Monitoring of the establishment of the landscape planting areas and the extent to which they are meeting their required environmental function.
- Monitoring of the effectiveness of the ecological mitigation measures (for example, mammal fencing, essential mitigation areas).
- Botanical monitoring of areas of habitat creation.
- Monitoring of hard and soft landscape features and elements to assess integration and establishment.

12 References

British Standards Institution (BSI) (2014a) British Standard 5228: Code of practice for noise and vibration control on construction and open sites. Part 1: Noise + A1:2014.

British Standards Institution (BSI) (2014b) British Standard 5228: Code of practice for noise and vibration control on construction and open sites. Part 2: Vibration.

CIRIA (2006) C648 Control of Water Pollution from Linear Construction Projects.

CIRIA (2009) Unexploded Ordnance: A Guide for the Construction Industry.

CIRIA (2010) C692 Environmental Good Practice on Site.

CIRIA (2011) Working with Wildlife.

CL:AIRE (2011) Definition of Waste: Development Industry Code of Practice, Contaminated Land: Applications in Real Environments, London 2011

Defra (2000) Defra's Good Practice Guide for Handling Soils.

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

Environment Agency, Scottish Environment Protection Agency and Northern Ireland Environment Agency (2009) Pollution Prevention Guidelines: PPG 21. Incident Response Planning.

Institute of Air Quality Management (2014) Assessment of dust from demolition and construction.

Annexes

Annex A: Regulatory Framework

General

Highways Act 1980

Noise and Vibration

British Standards Institution (BSI) (1991), British Standard 7445: Description and measurement of environmental noise. Part 2: Guide to the acquisition of data pertinent to land use.

British Standards Institution (BSI) (1991). British Standard 7445: Description and measurement of environmental noise. Part 3: Guide to the application of noise limits.

British Standards Institution (BSI) (2014) British Standard 8233: Guidance on sound insulation and noise reduction for buildings.

British Standards Institution (BSI) (2003). British Standard 7445: Description and measurement of environmental noise. Part 1: Guide to environmental quantities and procedures.

British Standards Institution (BSI) (2014). British Standard 5228:Code of Practice for Noise and Vibration Control on Construction and Open Sites. Part 1: Noise +A1: 2014.

British Standards Institution (BSI) (2014). British Standard 5228: Code of Practice for Noise and Vibration Control on Construction and Open Sites. Part 2: Vibration.

Part III of the Control of Pollution Act (1974).

Air Quality

Defra (2007) The Air Quality Strategy for England, Scotland, Wales and Northern Ireland. Volume 2.

Institute of Air Quality Management (IAQM) (2012). Guidance on the Assessment of the Impacts of Construction on Air Quality and the Determination of their Significance.

Institute of Air Quality Management (IAQM) (2014) Guidance on the assessment of dust from demolition and construction,.

Geology and Soils

Environmental Damage (Prevention and Remediation) Regulations 2009
Environment Act 1995
Environmental Protection Act 1990

Materials and Waste

Hazardous Waste (England and Wales) Regulations 2005 (as amended)

Protection of Surface and Groundwater Resources

Environmental Permitting (England and Wales) Regulations 2010.
Water Resources Act 1991

Annex B: List of Permits/Consents

- Marine Licence
- Flood Defence Consents
- Land Drainage Consents
- Abstraction Licence(s)
- Mobile Plant Licence
- New bespoke water discharge permit(s)
- Environmental Protection Licences
- Protected Species Licences

Annex C: Biosecurity Safe System of Works

Contact Details

Project Managing Ecologist/Ecological Clerk of Works (ECoW)

- NAME:
- Tel:
- Email:

Site Manager

- NAME:
- Tel:
- Email:

General good practice to be followed during all site visits:

- Arrive at the site with clean footwear, equipment and vehicle(s).
- Before leaving the site and before moving from one farm to another, **remove mud, plants and other materials** from boots, vehicles and equipment using a stiff brush where necessary.
- Keep access routes to a minimum and whenever practicable, follow existing tracks.
- Whenever practicable, park on areas of hard-standing.
- Restrict the amount of equipment you take onto site to the minimum required.
- Whenever practicable, **AVOID**:
    - driving through wooded areas;
    - areas with known plant disease;
    - livestock areas;
    - **contact with potentially infectious material** e.g. *Rhododendron*, a primary host plant of *Phytophthora* diseases, especially when wilted/dying (i.e. showing signs of infection); and
    - areas of known *Chytridiomycosis* infection, known crayfish plague and other diseases or pathogens.
- Schedule multiple site visits so that sites of greatest risk with regard to invasive species, diseases or pathogens are visited at the end of the day.
- If you do come into contact with potentially infectious material (e.g. dead amphibians, crayfish, dying *Rhododendron*) you must:
    - **make a note of findings and the location** of material (take photographic records of plant material);
    - **notify the ECoW** of findings as soon as practicable;
    - **dispose of or thoroughly disinfect with an appropriate disinfectant* all external clothing and footwear** (e.g. Virkon ® broad spectrum

disinfectant (1% solution or 10g/l)*, or Propeller™ disinfectant if addressing a *Phytophthora* infection); and

- dispose of powder-free disposable gloves appropriately.

* Virkon ® broad spectrum disinfectant (1% solution or 10g/l)* or, for Phytophthora infections, Propeller™ disinfectant. All disinfectants should be used and disposed of in accordance with manufacturer and product label instructions and should not be disposed of in waterbodies. Take care to ensure all soil is removed prior to treatment and disinfectant has dried/evaporated before leaving or entering site. Take care so as to ensure no disinfectant enters a waterbody.

When working in a waterbody:

- **clean boots** (using a hard bristle brush if necessary) **and disinfect** (away from waterbodies to prevent potential pollutant incidents) **all equipment that might come into contact with water using Virkon ®** suitable for wetland habitat (1% solution or 10g/l) **prior to and at the end of each site visit**; and
- appropriately dispose of powder-free disposable gloves between site visits; and
- ensure vehicle tyres and wheel arches are cleared of mud, plants and other organic material before leaving site and before moving from one farm to another. Leave removed material on site.

Annex D: Invasive Species

The following invasive species have been recorded during pre-construction surveys.

Aquatic plants:

- New Zealand pygmyweed (Crassula helmsii).
- Nuttall's waterweed (Elodea nuttallii).
- Floating pennywort (Hydrocotyle ranunculoides).
- Least duckweed (Lemna minuta).
- Canadian pondweed (Elodea Canadensis).
- Water fern (Azolla filiculoides).

Terrestrial plants:

- Japanese knotweed (Fallopia japonica).
- Himalayan balsam (Impatiens glandulifera).
- Giant hogweed (Heracleum mantegazzianum).
- Montbretia (Crocosmia x crocosmifolia).
- Cotoneaster species (Cotoneaster spp.).

Animals:

- American mink (Neovison vison)

The additional species listed below are also risk species in Wales. The presence of the following species on site is unknown, but they should be considered when undertaking any site visits.

Aquatic plants:

- Parrot's-feather (Myriophyllum aquaticum)
- Water primrose (Ludwigia peploides)
- Waterweeds (other Elodea species)

Terrestrial plants:

- American skunk cabbage *(Lysichiton americanus)*
- Giant hogweed (Heracleum mantegazzianum)
- Rhododendron (Rhondendom ponticum)
- Russian vine (Fallopia baldschuanica)
- Turkey oak (Quercus cerris)

All site personnel should be made aware of the identification of the above species. Identification sheets for invasive plants are available at:

https://secure.fera.defra.gov.uk/nonnativespecies/index.cfm?sectionid=47.

Should any invasive species be located, where necessary, a **photographic record** should be taken to confirm identification and details of the **location** (preferably as a global positioning system (GPS) location reference) should be taken. Findings should be **reported to the ECoW** as soon as practicable.

Where work within a waterbody containing invasive plant species is unavoidable, take care to **remove plant material from machinery, equipment, and clothing and disinfect as required with Virkon ®** suitable for aquatic habitats and allow to dry at the end of each site visit.

Disease

Amphibian - Chytridiomycosis disease

Amphibian *Chytridiomycosis* disease is caused by a fungus called *Batrachochytrium dendrobatidis.* It is generally considered that the fungus can be transported to new locations via the movement of materials that have come into contact with waterbodies or the movement of amphibians themselves. The disease can also be transferred between amphibians.

Advice should be sought from the ECoW prior to working in waterbodies on site. Should the disease be present on site, it is likely that works will need to be supervised by an ecologist, who would adhere to the following requirements when handling infected animals:

- **Avoid contact** with dead or dying amphibians or other fauna.
- Wear **appropriate protective clothing** which can be easily disinfected or disposed of at the end of each survey visit.
- If **disinfecting**, equipment and boots that might come in contact with water should be thoroughly treated with **Virkon** ® suitable for aquatic habitats before leaving each site and allowed to dry completely before being re-used. Prior to disinfectant, equipment and boots should be cleaned of mud, plants and other materials using a hard bristled brush.
- When working in waterbodies, **consider using different equipment for each waterbody or between each waterbody**, take care to remove all organic material and disinfect with Virkon ® for aquatic habitats and allow to dry.
- Avoid using bottle traps in waterbodies with *Chytridiomycosis*.
- Equipment to be re-used should be wrapped in plastic bags and stored in plastic boxes in vehicles.
- **Wear disposable, powder-free gloves** that should be disposed at the end of each survey visit.
- **Hands should be wiped thoroughly with disinfectant** alcohol wipes or 70% alcohol solution between each site visit.
- Field clothes can be disinfected by washing at 50^{o}C.

Should any **dead or dying animals** be located, their symptoms and location should be **reported to the ECoW** as soon as practicable.
Where practicable captured animals should be temporarily kept in individual containers so as to minimise the potential spread of disease and individuals from

different water bodies should never be kept together, to prevent the potential spread of disease between different groups or populations.

Plant disease

All site personnel should be made aware of signs that could indicate plants are infected by the following diseases:

- Ash dieback disease (*Chalara fraxinea*). Symptoms guide:
- http://www.forestry.gov.uk/pdf/Symptoms_guide_Chalara_dieback_of_ash_2012.pdf/$FILE/Symptoms_guide_Chalara_dieback_of_ash_2012.pdf
- *Phythopthora ramorum*. Symptoms guide: http://www.fera.defra.gov.uk/plants/publications/documents/factsheets/phytophthoraRamorumFactsheet.pdf.
- Alder disease (*Phytophthora alni).* Symptoms guide: http://www.forestry.gov.uk/website/forestresearch.nsf/ByUnique/INFD-737HZD.

Photographic evidence of any potential signs of plant disease should be taken along with a record of the plant species and **location** (preferably as a global positioning system (GPS) location reference). Findings should be forwarded to the Project Ecologist/ECoW as soon as practicable and an updated safe system of works will be produced by the Project Ecologist/ECoW. The Project Ecologist/ECoW should notify the Forestry Commission and/or AshTag project of the location of any new signs of disease.

Should signs of disease be recorded, **advice should be sought from the ECoW,** which is likely to include the following requirements:

- Where practicable, **alternative access routes** should be used so as to avoid disturbance of infected ground.
- Vehicle access and parking should be off-site or away from infected areas.
- Avoid driving through wooded areas.
- If plant samples are collected to aid identification, equipment should be **disinfected** using an appropriate disinfectant** **immediately after cuttings are taken** and each sample should be **stored in a separate well-sealed plastic container/bag**. **Disposable powder-free gloves should be disposed of between sites**.
- Prior to leaving the site, extra vigilance should be practiced when cleaning vehicles (tyres and wheel arches), equipment, boots and clothing.

*** Virkon ® broad spectrum disinfectant (1% solution or 10g/l)* or, for Phytophthora infections, Propeller™ disinfectant. All disinfectants should be used and disposed of in accordance with manufacturer and product label instructions and should not be disposed of in waterbodies. Take care to ensure all soil is removed prior to treatment and disinfectant has dried/evaporated before leaving or entering site. Take care so as to ensure no disinfectant enters a waterbody*

Annex E: Outline Pollution Control and Prevention Plan

Welsh Government

M4 Corridor around Newport

Environmental Statement Volume 3 Annex E to Appendix 3.2 Outline Pollution Control and Prevention Plan

M4CaN-CJV-GEN-ZG_GEN-PL-ZM-0020

At Issue | March 2016

CVJV/AAR
3rd Floor
Longross Court,
47 Newport Road,
Cardiff
CF24 0AD

Contents

1 Introduction

1.1 Purpose of the Plan

1.1.1 The majority of the proposed new section of motorway crosses the Gwent Levels, which are a nationally important area of flat reclaimed coastal marshes. The Gwent Levels are dissected by an extensive network of tide locked freshwater drains, locally known as reens. The water levels in the reens are controlled by a series of sluice structures and are divided into winter penning levels and summer penning levels.

1.1.2 Given the nature of the reen system and its ecological importance, it is sensitive to pollution from surrounding land uses. To minimise the risk of a pollution incident occurring as a result of the proposed construction activities, a Pollution Control and Prevention Plan has been developed.

1.1.3 The purpose of the Plan is to identify the main risks of pollution occurring on the site, to identify and implement appropriate pollution prevention measures, and to reduce the effects of any pollution incidents that may occur. The Plan should be read in conjunction with the Outline Ground and Surface Water Management Plan and the Pre-CEMP.

1.2 Status and Scope of the Plan

1.2.1 This report comprises an Outline Pollution Control and Prevention Plan and is based on the information available at the outline design stage. As the detailed design progresses, the Plan would be reviewed and updated accordingly. The final Pollution Control and Prevention Plan would be agreed with Natural Resources Wales (NRW) prior to the start of construction.

1.2.2 The Plan would be implemented throughout the construction process for the new section of motorway and all construction staff would be required to follow its provisions.

2 Responsibilities

2.1.1 The Project Manager would have overall responsibility for the construction of the new section of motorway. A full-time Environmental Co-ordinator would be appointed before construction commenced. Their main responsibility would be managing the environmental issues through construction. The specific tasks of the Environmental Co-ordinator are set out in the Pre-CEMP (Appendix 3.2).

2.1.2 For the purpose of the Outline Pollution Control and Prevention Plan, the key roles are set out in Table 2.1 below. Additional roles and responsibilities will be developed as the detailed design progresses.

2.1.3 Table 2.1 Key Responsibilities

Details	Responsibilities
Environmental Co-ordinator	Liaising with NRW to update the Plan during detailed design. Agreeing the pollution controls in accordance with NRW requirements. Ensuring pollution controls are implemented and communicated effectively. Investigating any incidents. Communicate learning from incidents Liaise with regulatory bodies.
Construction Staff and workforce	Responding to a pollution incident in line with this plan and the procedure included within. Front line responsibility to enact requirements of the plan.
Project Manager	Responsible for ensuring procedures are followed.

3 Pollution Risk Assessment

3.1.1 A preliminary pollution risk assessment has been undertaken to identify the main risks from the construction process. During the detailed design stage, the risk assessment would be updated as required.

3.1.2 The risk assessment will consider:

- The materials stored or transported and the condition of storage containers.
- Effects of accidents, flooding, vandalism and failure of containment.
- Location and proximity to local water courses, sensitive groundwater locations and Sites of Special Scientific Interest.
- Surface water drains that flow off the site.
- Areas of unsurfaced ground.
- Operations and layout of the site.

3.1.3 The table below sets out the materials that would be handled on site and activities that may be a hazard.

Materials	Activities
Fuels/chemicals	Spillage during refilling (overfilling or poor handling)
	Damaged or leaking storage containers
	Equipment and containment failure
Sediment	Failure of pre-earthworks drainage
	Failure of lateral bunds
	Working too close to watercourse
Cementitious dust	Inappropriate storage containers

4 Site Design

4.1 Location and Layout of Construction Compounds

4.1.1 Site compounds and car-parks will be located away from all surface water features and watercourses.

4.1.2 Water pollution, storage of fuels, oils, wheel wash facilities, drainage, and surface water run-off are detailed in the Outline Ground and Water Management Plan. Mitigations measures are described and will be developed and agreed before start of construction.

4.1.3 Wheel wash facilities will be established at designated site locations, away from water courses and drains. Cleaning will be carried out in a bunded area and waste water will either be recycled or discharged to foul sewer (with consent from the sewerage undertaker). Contaminated waste will be removed from site by a licensed waste carrier for disposal to an appropriately licensed facility.

5 Pollution Incident Response Plan

5.1 Response Plan

5.1.1 A pollution incident response plan will be designed for every construction compound. The plan will set out the actions to be taken in the event of a pollution incident and identify the pollution control equipment and the control devices and where they should be located.

5.1.2 The Response Plan would contain the following key information:

- external and internal list containing contacts 24 hour contact details for organisations that may need to be involved during or after an incident, for example, the emergency services, NRW, Newport City Council and/or Monmouthshire County Council, and Dwr Cymru Welsh Water.
- Chemical and waste inventory: an up-to-date record of all substances stored on site would be maintained together with an estimate of the likely quantities stored and product data sheets. The location of drums, containers or bulk storage vessels used for storing potentially polluting chemicals would be identified on the site plan. The inventory would be made accessible to emergency responders.
- Pollution prevention equipment inventory. This would include equipment and materials on site to deal with pollution incidents (for example spill kits, drain mats/covers, pipe blockers, absorbents) and contact details of staff trained in the use of specialist equipment (where relevant).
- Site plan showing access routes and meeting points for emergency services; areas or facilities used to store raw materials, products and wastes; watercourses located within or near the site; and site drainage.

5.1.3 Key actions for the response plan would include:

- stop the works immediately;
- contain the spillage to avoid escalation of the problem (refer to Pollution Control Hierarch);
- notify the Environmental Co-ordinator immediately and any other key staff;
- evacuate staff if necessary;
- call for emergency services if necessary;
- implement pollution control equipment;
- document the cause of the incident and the action take;
- replace pollution control equipment where required.

5.2 Practice

5.2.1 Staff will be trained in the procedures which to follow if there is a pollution incident, in particular:

- where the personnel protective equipment and pollution control equipment is stored;

- how to use the equipment; and
- the location of pollution incident response plan.

5.2.2 In the development of the pollution incident response plan, drafts will be sent to NRW, Newport City Council and/or Dwr Cymru, as relevant, for comment, including advice on when to notify the regulators of a spill. .

6 Fire Plan

6.1.1 Action to be taken in the event of fire :

- Raise the alarm
- Call the fire Brigade
- On hearing the alarm, the area must be evacuated immediately and staff to assemble at the Muster point.
- Visitors, clients and contractors to be escorted to the same assembly point.
- Turn off generators, compressors and other powered equipment.
- Turn off heat producing equipment and shut cylinder valve.
- Attack fire with the equipment if it is safe to do so.
- Obey instructions from the Office Fire Marshall or supervisory staff.
- Do not re-enter the working area until told it is safe to do so.

6.1.2 If necessary inform others who may be affected by effects of the fire (smoke near hospitals, schools etc)

6.1.3 The capacity of the construction surface water management system will be sufficient to contain within the site boundaries the water rejected by a fire truck, avoiding direct spillage of potentially contaminated material into the natural watercourses within the SSSI.

7 Pollution Control Options

7.1 Pollution Hierarchy

7.1.1 This section identifies the options that may be used to manage a pollution incident. The options are presented in the order of the preferred response.

Preferred response

Least Preferred response

1. Contain at Source
2. Contain close to the Source
3. Contain on the Surface
4. Contain in the Drainage System
5. Contain on or in the Watercourse

7.2 Spill response plans

7.2.1 The preliminary pollution risk assessment has identified that the most likely causes of a pollution incident would involve:

- spillage of oils or chemicals;
- a discharge of sediment-laden water or other pollutant into a watercourse; or
- firewater runoff.

7.2.2 Pollution control equipment would be appropriate for the location of the site (for example the Gwent Levels SSSI) and the chemical/substance it is being used to contain. For example, absorbent materials such as sand, spill granules, absorbent pads and booms will be kept at each site compound, on plant working near water courses and particularly at refuelling areas and where fuel or oil is stored.

7.2.3 Following a pollution incident, used pollution control equipment (for example, spill kits) would be disposed of appropriately and new/replacement equipment would be provided.

7.2.4 Some of the key actions that would be included in the action plans are as follows:

- Priority action plan to be implemented when possible : Contain at source
  - Stop at source or as close as possible from the source (especially prior to the drainage system).
  - Stop pollutant spreading by using oil booms, terram wrapped barriers, hay bales as applicable.
  - Trace impacts further downstream to establish extent of pollution.
  - Review the activity that caused the pollution prior to restarting work.
- Least action plan to be implemented when it is impossible to contain the spill at source : Contain on or in a watercourse:
  - Stop the flow at point of discharge
  - Stop the flow spreading
  - Dam the flow with earth/sand/polythene/absorbent material;

- Divert the flow from drains/watercourses where possible;
- Black off drains with drain covers or sandbags
- Check the site drainage plan- where will spill end up?

7.3 Discovery of Contaminated land

7.3.1 The following will need to be adhered to in relation to encountering previously unidentified chemical contamination and asbestos during construction works.

- Ensure personnel involved in the earthworks are briefed on the likely nature and type of soils that could indicate the presence of contamination (e.g. asbestos, discolouration, oils, odours, ash and clinker materials).
- If such material is encountered, the Environmental Co-ordinator would be immediately contacted to inspect the material.

7.3.2 Testing of the material will be undertaken and the material will not be reused or removed until the results of the tests have been reviewed.

7.3.3 Contaminated materials will be handled and managed in line with the Remediation Strategy Report.

8 Training

8.1.1 This procedure will be discussed in the Site Induction. It will be displayed on noticeboards along with contact details of relevant individuals.

8.1.2 All personnel must attend a site induction before commencing work on the site. The induction will discuss the Pollution Control and Prevention Plan and also include key environmental issues on the project including the sensitivity of the watercourses, contamination, and air quality management. The briefing will emphasise the methods and working practices employed for protection, including emergency procedures for reporting and dealing with environmental incidents.

8.1.3 All staff will receive relevant training on environmental issues throughout the construction of the project.

8.1.4 All method statements will include an environmental section and any specific pollution control and prevention information.

8.1.5 Drills of this emergency response plans will be carried out regularly to ensure understanding.

9 Monitoring, Review and Reporting.

9.1.1 In accordance with the Environment Agency's Pollution Prevention Guidelines (PPGs) and relevant construction industry guidance, best practice measures to prevent pollution will be implemented during the construction of the Scheme.

9.1.2 Should a situation arise where our proposed mitigation is not adequate, this plan will be reviewed. It will also be reviewed quarterly by the Environmental Co-ordinator to ensure it is up to date and accurate.

9.1.3 Specific monitoring requirements will be detailed. Nominated staff will carry out regular site inspections to control measures are in place and adhered to during the works.

9.1.4 Any instances of pollution or spill will be reported immediately to the Environmental Co-ordinator who will investigate and communicate investigation's conclusions to the project team to aid continuous improvement and to prevent reoccurrence of the event.

9.1.5 Records will be produced to show compliance with our Pollution Control and Prevention Plan, including inspections records, site plans and progress reports

9.1.6 Surface water monitoring will be undertaken to demonstrate no adverse effects on water quality during construction works. An appropriate monitoring schedule and programme will be agreed with NRW.

Annex F: Outline Site Waste Management Plan

Welsh Government

M4 Corridor around Newport

Environmental Statement Volume 3
Annex F to Appendix 3.2
Outline Site Waste Management Plan

M4CaN-DJV-EGN-ZG_GEN-AX-EN-0016

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CVJV/AAR
3rd Floor
Longross Court,
47 Newport Road,
Cardiff
CF24 0AD

Contents

1 Introduction

1.1 Background

1.1.1 This Site Waste Management Plan (SWMP) has been prepared to accompany the Environmental Statement for M4CaN. M4CaN would consist of a new three-lane motorway to the south of Newport between the existing M4 Junction 29 at Castleton and the existing M4 Junction 23 at Magor, and a number of 'Complementary Measures', some of which would be on the existing M4 between the same junctions.

1.1.2 This SWMP would apply to the new section of motorway only, as the Complementary Measures would be constructed under a separate contract.

Design Concepts

1.1.3 Opportunities to reduce waste and increase resource efficiency have been investigated during the outline design stage. These include opportunities to minimise the use of materials, designing out waste through reductions in the footprint of the new section of motorway, reductions in height and use of composite construction. For example, one of the main changes to the conceptual design is at the Castleton Interchange, which has reduced the number of major structures from six to four, which facilitates a better cut and fill balance overall with the other parts of the new section of motorway.

1.1.4 Further opportunities would be considered during the detailed design stage where appropriate.

1.2 Stucture and Scope of the SWMP

1.2.1 The SWMP considers the type and volume of waste that is likely to be generated from the construction of the new section of motorway. In particular, this Plan sets out:

- The waste regulation framework.
- The types of waste that would be generated.
- How the waste would be managed - i.e. would it be reduced, re-used or recycled?
- The waste management facilities available.
- The methods used to measure and record the quantity of waste generated from the construction of the new section of motorway.

1.2.2 The SWMP has been prepared during the outline design and environmental assessment period - Key Stage 3 in preparation of draft Order publication. Information needed to calculate the quantity of all the predicted types of waste is not yet available. This information would become available during the detailed design stage (Key Stage 6). The SWMP would be a 'live' document that would be reviewed and updated to incorporate the detailed waste information.

2 Regulatory Framework

2.1 Definition of Waste

2.1.1 For the purpose of this document, the definition of "waste" is taken from Article 3(1) of the revised European Waste Framework Directive (WFD) (2008/98/EC), which states that waste us "*any substance or object which the holder discards or intends or is required to discard*". Once they are discarded, the substance or object remains a waste until fully recovered.

2.1.2 "Discard" includes the recovery and recycling of a subject or object as well as its disposal. The decision on whether something is discarded must take account of all the circumstances (for example, the nature of the material, how it was produced and how it would be used) and have regard to the aims of the WFD, which is "*the protection of human health and the environment against harmful effects caused by the collection, transport, treatment, storage and tipping of waste*".

2.1.3 Guidance on the interpretation of the WFD definition of waste is taken from Defra's recently published *'Guidance on the legal definition of waste and its application*', which provides a practical guide to help organisations make decisions about whether a material is a waste or not.

2.1.4 The document also takes into account CL:AIRE's Definition of Waste: Development Industry Code of Practice (CoP) (CL:AIRE, 2011). The CoP is voluntary and applies to England and Wales only. The CoP sets out good practice for the development industry to use on a site specific basis when assessing if excavated materials are classified as waste or not and when treated excavated waste can cease to be a waste for a particular use. If materials are dealt with in accordance with the CoP, the EA considers that those materials are unlikely to be waste if they are used for the purposes of "*land development*".

2.1.5 The scope of the CoP relates to "excavated materials", which include:

- soil, both top soil and sub soil, parent material and underlying geology;
- soil and mineral based dredgings (following appropriate dewatering);
- ground based infrastructure that is capable of reuse within earthworks projects, for example road base, concrete floors any processing would have to be in-line with permitted controls before considered suitable for reuse);
- made ground;
- source segregated aggregate material arising from demolition activities, such as crushed brick and concrete, to be reused on the site of production within earthworks projects or as sub-base or drainage materials; and
- stockpiled excavated materials that include the above.

2.2 Legislation and Guidance

2.2.1 The legislative framework for the management of construction wastes comprises the following:

- Environmental Protection Act1990;

- Environment Act 1995;
- Hazardous Waste (England and Wales) Regulations 2005 (as amended);
- Revised Waste Framework Directive (2008/98/EC);
- Landfill Directive (1999/31/EC);
- Environmental Permitting (England and Wales) regulations 2010;
- Waste Management (England and Wales) Regulations 2006;
- Waste (England and Wales) Regulations 2011 (as amended);
- Waste Duty of Care Code of Practice Consultation Draft July 2015;
- Technical Advice Note 21: Waste, 2014;
- Newport Local Development Plan 2011-26 (adopted January 2015)

2.2.2 The key driver for waste management legislation in the UK is the WFD. The Directive is transposed into UK legislation by the Waste (England and Wales) Regulations 2011 (as amended). These regulations require all businesses and organisations to take reasonable measures to prevent waste, to apply the waste hierarchy when transferring waste using the definitions in Article 3 of Directive 2008/98/EC, and include a declaration on their waste transfer notes or consignment notes to that effect. Standard Industry Classification (SIC) Codes 2007 (Office for National Statistics 2009) of the waste producer must also be provided on the waste transfer note.

2.2.3 Hazardous Waste (England and Wales) Regulations 2005 (as amended) set out the requirements for controlling and tracking the movement of hazardous waste and bans the mixing of different types of waste. Under the Regulations "mixing" includes mixing of different categories of hazardous waste, non-hazardous wastes or any other substance or material. Businesses or organisations generating more than 500kg of hazardous waste a year must register with NRW as a hazardous waste producer.

Key Obligations

Duty of Care

2.2.4 Waste materials arising from the construction of the new section of motorway would only be transported by waste carriers and hazardous waste carriers registered with the NRW/EA. Each consignment of waste removed from the construction site (and compounds) would be accompanied by a waste transfer note (or hazardous waste consignment note as appropriate), which correctly describes the waste using the European Waste Catalogue code, identifies the waste carrier and where the waste would be transported to. The waste would only be transported to facilities which hold an appropriate environmental permit or waste exemption.

Pre-treatment of Wastes

2.2.5 Inert, non-hazardous and hazardous waste destined to be landfilled would be pre-treated prior to disposal in accordance with the EU Landfill Directive (1999/31/EC). Treatment can comprise physical, thermal, chemical or biological processes providing that they change the characteristics of the waste in order to reduce its volume of hazardous nature or to facilitate its handling or recovery.

3 Waste Arisings

3.1 Waste Forecasting

Construction Stages

3.1.1 In order to identify the types of waste generated by the proposed development, the construction programme is divided into its key stages as each stage of development has the potential to generate waste.

3.1.2 The key programme stages that are likely to generate waste include

- enabling works, including pre-construction ecological mitigation, pre-construction archaeological mitigation, provision of access points, temporary fencing and fencing to protect sensitive sites;
- remediation of contaminated land or groundwater where required;
- site clearance and water management works;
- demolition works;
- earthworks;
- structures;
- drainage and reen management;
- pavement, road works and surfacing; and
- landscaping.

3.2 Waste Types

3.2.1 At a strategic level the key waste streams produced on site can be classified as:

- INERT – wastes that would not cause adverse effects to the environment when disposed of, or do not decompose and they have no potentially hazardous content when placed in a landfill. Examples of inert wastes are rocks, concrete, mortar, glass, uncontaminated soils and aggregates.
- NON HAZARDOUS – wastes that would decompose when buried resulting in the production of methane and carbon dioxide. Examples of non-hazardous wastes include timber, paper and cardboard.
- HAZARDOUS – wastes that are harmful to human health or the environment (for example, pollution of watercourses) if they are inappropriately contained, treated or disposed of. Hazardous wastes may have one or more of the following properties: explosive, corrosive, flammable, highly flammable, infectious, oxidising or sensitising.

3.2.2 The following materials would be removed as part of the site clearance/demolition phase:

- trees, shrubs other vegetation;
- bricks;
- windows;
- roofing material (bitumen, steel cladding);

- wooden boarding;
- corrugated steel;
- internal fittings;
- concrete and tarmacadam surfacing; and
- service cables and mains

3.2.3 Based on the current uses of the site, the following materials may also have to be removed:

- fuel storage tanks;
- solvents, oils, fuels etc associated with the industrial buildings;
- metal containers;
- office furniture.

3.2.4 The waste generated during construction would be assigned a European Waste Catalogue code. A list of relevant codes is provided in Table 3.1. These codes would be provided on each waste transfer note that would accompany every movement of waste from the site.

Table 3.1 List of Waste Categories for Construction Wastes

17 Construction and demolition wastes (including excavated soil from contaminated sites - it should be noted that waste types generated would not be restricted to this list)
17 01 Concrete, bricks, tiles and ceramics
17 01 01 Concrete
17 01 02 Bricks
17 01 03 Tiles and ceramics
17 01 06* Mixtures of, or separate fractions of concrete, bricks, tiles and ceramics containing dangerous substances
17 01 07 Mixtures of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06
17 02 Wood, glass and plastic
17 02 01 Wood
17 02 02 Glass
17 02 03 Plastic
17 02 04* Glass, plastic and wood containing or contaminated with dangerous substances
17 03 Bituminous mixtures, coal tar and tarred products
17 03 01* Bituminous mixtures containing coal tar
17 03 02 Bituminous mixtures other than those mentioned in 17 03 01
17 03 03* Coal tar and tarred products
17 04 Metals (including their alloys)
17 04 01 Copper, bronze, brass
17 04 02 Aluminium
17 04 03 Lead
17 04 04 Zinc
17 04 05 Iron and steel
17 04 06 Tin
17 04 07 Mixed metals
17 04 09* Metal waste contaminated with dangerous substances

17 Construction and demolition wastes (including excavated soil from contaminated sites - it should be noted that waste types generated would not be restricted to this list)
17 04 10* Cables containing oil, coal tar and other dangerous substances
17 04 11 Cables other than those mentioned in 17 04 10
17 05 Soil (including excavated soil from contaminated sites), stones and dredging spoil
17 05 03* Soil and stones containing dangerous substances
17 05 04 Soil and stones other than those mentioned in 17 05 03
17 05 05* Dredging spoil containing dangerous substances
17 05 06 Dredging spoil other than those mentioned in 17 05 05
17 05 07* Track ballast containing dangerous substances
17 05 08 Track ballast other than those mentioned in 17 05 07
17 06 Insulation materials and asbestos–containing construction materials
17 06 01* Insulation materials containing asbestos
17 06 03* Other insulation materials consisting of or containing dangerous substances
17 06 04 Insulation materials other than those mentioned in 17 06 01 and 17 06 03
17 06 05* Construction materials containing asbestos
17 08 Gypsum – based construction material
17 08 01* Gypsum–based construction materials contaminated with dangerous substances
17 08 02 Gypsum–based construction materials other than those mentioned in 17 08 01
17 09 Other construction and demolition wastes
17 09 01* Construction and demolition wastes containing mercury
17 09 02* Construction and demolition wastes containing PCB (for example PCB–containing sealants, PCB–containing resin–based floorings, PCB–containing sealed glazing units, PCB–containing capacitors)
17 09 03* Other construction and demolition wastes (including mixed wastes) containing dangerous substances
17 09 04 Mixed construction and demolition wastes other than those mentioned in 17 09 01, 17 09 02 and 17 09 03

3.3 Estimated Waste Arisings

Completing the SWMP Data Sheets

3.3.1 The indicative types of waste to be generated from the construction of the new section of motorway are identified in Appendix A based on the available design information. The list is a useful planning tool and provides an early indication of the types of waste that may be generated during the main construction stages. The list is not exhaustive and may be extended as the detailed design develops.

3.3.2 The figures from the Plan would be entered into a Waste Estimates Data Sheet, an example of which is shown in Appendix B. This identifies how the waste types would be managed during the project (i.e. re-used on site, recycled off site etc).

3.3.3 Once construction is underway, the Principal Contractor would complete the Waste Management Data Sheet (see Appendix C). These Sheets would be updated every time waste is removed from the site and would record:

- the types and quantities of waste produced;

- the types and quantities of waste that have been re-used/recycled/recovered/landfilled or otherwise disposed of on or off site;
- the identity of the person removing the waste,
- the registration number of the waste carrier,
- a copy or reference to the written description of the waste, and
- details of the site where the waste is taken to and whether it holds a permit or is exempt.

3.3.4 These details would form part of a review of this SWMP to be undertaken every six months (as a minimum) by the Principal Contractor and the client. Where necessary a further plan would be produced to accommodate any changes in order to reflect the progress of the project and of meeting the SWMP targets.

Setting Targets to Divert Waste from Landfill

3.3.5 Targets would be set to reuse or recycle construction and demolition waste to allow the performance of the SMWP to be monitored and evaluated at the end of the construction period.

3.3.6 The overall target set by this SWMP is to reuse, recycle or recover 70% of construction and demolition wastes (excluding soils and stones) (by weight) generated by the construction of the new section of motorway. This target is in line with the target set by the Waste (England and Wales) Regulations 2011 (as amended) and Article 11 of the Waste Framework Directive.

3.3.7 The 'Construction and Demolition Sector Plan Towards Zero Waste One Wales, One Planet '(Welsh Government, 2012) forms part of a suite of documents that overall comprise the waste management plan/strategy for Wales. The purpose of the document is to deliver the sustainable development outcomes identified in the Sustainable Development Scheme 'One Wales, One Planet' and in 'Towards Zero Waste'. The Sector Plan sets a longer term target to reuse, recycle or recover 90% by weight of construction and demolition waste by 2019/2020. Opportunities to meet the Towards Zero Waste proposed waste prevention target of 1.4% year on year reduction of construction and demolition waste would also be investigated.

3.3.8 To achieve these targets, specific recycling rates would be set for priority or 'Quick Win' materials which may include:

- wood;
- plastic;
- glass;
- paper and card; and
- aggregates.

4 Management of Waste from the Scheme

4.1 Waste Hierarchy

4.1.1 Construction waste generated from the Scheme would be managed according to the principles of the waste hierarchy. The waste hierarchy ranks waste management options according to environmental impact, with 'prevention' as the option with the best outcome for the environment. When waste has been generated, the hierarchy gives priority to preparing the waste for re-use, then recycling, then other recovery, and disposal as the least favoured option. The waste hierarchy is a key element of sustainable waste management. It was transposed into UK law through The Waste (England and Wales) Regulations 2011 and the provisions relating to the hierarchy came into force in September 2011. These provisions require waste producers (and any business which collects, transports, recovers or disposes of waste) to "*take all such measures available to it as are reasonable in the circumstances to apply the following waste hierarchy….*" .

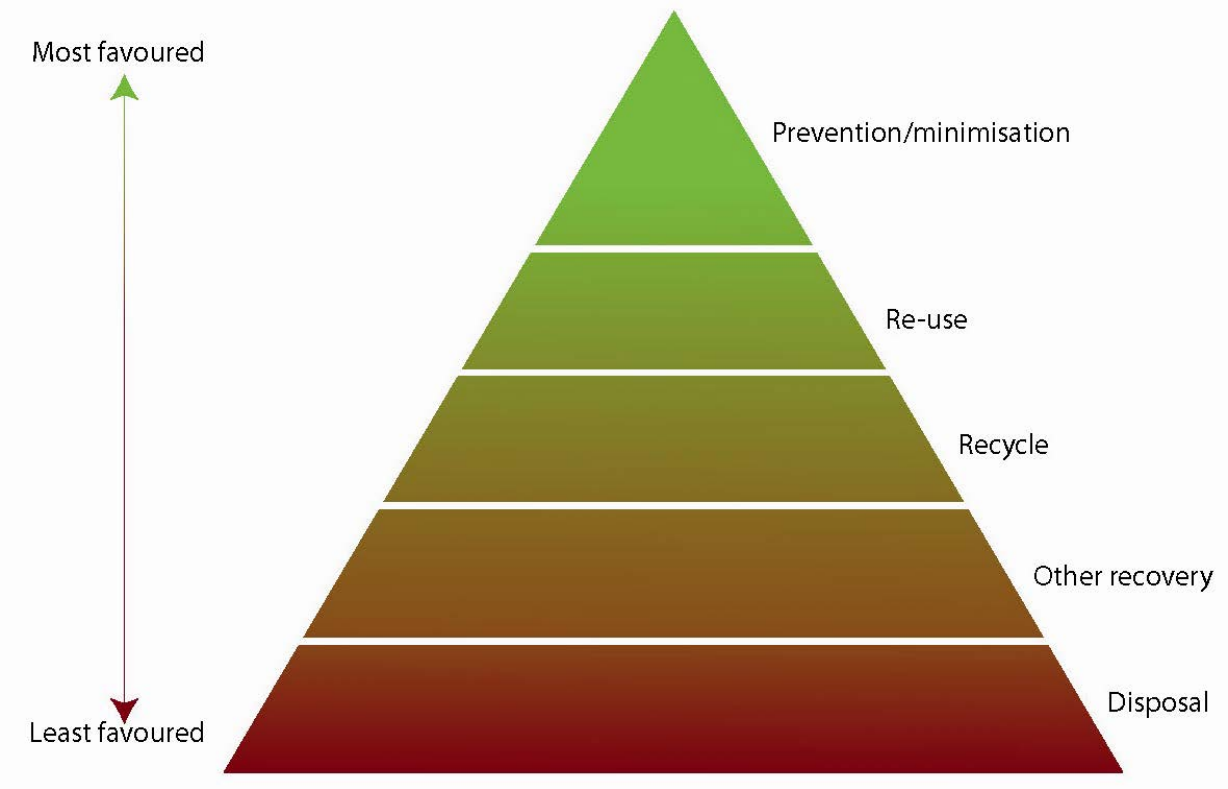

Diagram 4.1 Waste Hierarchy

4.1.2 Defra has published guidance on how the waste hierarchy should be applied to a range of common wastes (Defra 2011). It summarises the findings of current scientific research on the environmental impacts of various waste management options for a range of materials and products. The guidance states that for most materials the waste hierarchy should be applied. However, evidence suggests that for some materials the preferred waste management option (i.e. with the lowest environmental impact) does not follow the waste hierarchy order. This is

true for lower grades of wood where energy recovery options are more suitable than recycling.

Prevention

4.1.3 Waste can be prevented by using less material in design and manufacture, keeping products for longer or using less hazardous materials. The following design measures would be implemented for the new section of the motorway:

- Using pre-fabricated materials where possible.
- Achieving a materials balance between cut and fill (i.e. the material excavated and the material placed) and minimising the generation of material that has to be disposed off site.
- Avoiding the removal of topsoil across the Gwent Levels, reducing the volume of unsuitable material generated.

4.1.4 Opportunities would be investigated to provide extra durability of structures and extend the maintenance intervals, for example tests are ongoing to investigate the use of weathered steel rather than painted steel for the River Usk bridge.

4.1.5 Waste would also be minimised by improving wastage rates when ordering materials. Waste allowances are generally included within material orders to take into account design waste and construction process waste. These waste allowances are often generic and not project specific, and therefore, run the risk of being inaccurate. This can lead to a surplus of materials, which typically end up being discarded (i.e. waste). A system would be put in place to enable the accurate estimates of material requirements at the start of the construction programme. Clear estimates and targets of waste that would be generated would be agreed at the detailed design stage.

4.1.6 On appointment of the construction team, the Buyer would discuss the purchasing requirements with the Principal Contractor to identify priorities and review the quotations received. Materials would be checked against the material specifications as part of the quality control system. Opportunities to reduce packaging or implement take-back schemes for packaging and unused materials to be discussed with the suppliers. Where possible, hazardous materials would be substituted for less hazardous alternatives.

4.1.7 Waste minimisation measures would be implemented by the Principal Contractor and Site Manager during construction in order to achieve the waste allowance targets. These measures include:

- a logistic system which allows 'just-in-time' deliveries to minimise the length of time materials are stored on site and co-ordination with other trades;
- providing suitable and secure storage for materials where 'just-in-time' deliveries cannot be set up;
- mechanical systems and machinery would be considered for moving materials to reduce the risk of damage; and
- programming and monitoring construction activities to avoid overlap of incompatible trades working in the same area and to reduce the potential for waste to be generated from replacing damaged work.

Preparing for Re-use

4.1.8 This involves checking, cleaning or repairing operations by which products or components of products that have become waste are prepared so that they can be re-used without any other pre-processing.

4.1.9 Demolition audits would be undertaken of structures and bridges to identify any materials which can be re-used or prepared for re-use either within the construction of the new section of motorway or off-site.

4.1.10 Site won materials would be reused in accordance with the approach set out in the Definition of Waste Development industry Code of Practice (CL:AIRE, 2011). An Outline Materials Management Plan has been prepared which would be updated during the detailed design process. The plan would be used to control and document the reuse of site won materials subject to their compliance with relevant assessment criteria. The assessment criteria would be agreed with NRW, Newport City Council and Monmouthshire County Council prior to construction.

4.1.11 Other opportunities to re-use materials would be investigated as the detailed design and construction philosophy progresses.

Recycling

4.1.12 The term "recycling" includes any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes.

4.1.13 Where possible, waste generated during the construction process would be segregated into waste types to facilitate off-site recycling (for example, metals, wood, plastic and glass). The layout of the main compound, section offices and compounds would be designed to allow sufficient space for separate containers of key waste materials to be stored prior to collection. The containers would be clearly labelled and construction staff would be given training on waste segregation.

4.1.14 Excavated material would be processed on site and used in the construction of the new section of motorway. This would include the treatment of material from the Tata sludge lagoons and the lagoon walls. Materials generated from the demolition of structures which cannot be salvaged for reuse would be sent for recycling off site, or would be crushed and used within the construction process.

4.1.15 Green waste generated during clearance of vegetation would be recycled using a number of options according to the size of the material. For example, green waste and small diameter woody waste would be mulched/composted, larger diameter waste would be chipped, and the largest items would be cut into logs.

4.1.16 Where packaging cannot be reused, it should be recycled.

4.1.17 The procurement process would consider responsible sourcing of materials. In particular, the Principal Contractor would investigate opportunities to use recyclable materials or recycled content materials, for example recycled aggregates or

4.1.18 Appropriate targets would be set for the use of recycled content materials following the Welsh Government's sustainability requirements and objectives that

at least 10% of the total value of materials and products used in all new buildings promoted by the Welsh Government should be of recycled or reused content.

Other Recovery

4.1.19 This option is where waste is used to replace other materials which would have otherwise been used to fulfill a particular function. The waste management technologies under this option include anaerobic digestion, incineration with energy recovery, gasification and pyrolysis which produce energy and materials from waste.

4.1.20 There are unlikely to be any opportunities to use this option for waste generated by the new section of motorway.

Disposal

4.1.21 All waste that cannot be re-used, recycled or recovered would be collected by the licensed waste management contractor and disposed of at a permitted site suitable for the type of waste. Burning of surplus material or material arising from the site would not be permitted.

4.2 Storage of Waste

4.2.1 Waste would be stored in dedicated areas of the construction compounds. Each skip/container would be clearly marked to indicate the intended contents (e.g. metal waste) and would be suitable for the storage of the specified contents. All skips would be covered to prevent the escape of waste by windblow or vandalism. If liquid waste is being stored, an appropriate bund and drip pans would be in place.

4.2.2 Storage areas would be located away from potential contaminant pathways, such as soakaways and drains, trial pits, excavations and trenches.

4.2.3 Any hazardous waste would be stored in suitable containers in a secure designated area away from non-hazardous and inert wastes and labelled accordingly. Written instructions would be displayed for the storage and disposal of the hazardous wastes and the containers would be regularly checked for leaks or deterioration. Subject to the type and quantity of hazardous material generated, NRW would be notified and the appropriate requirements would be met.

4.3 Waste Management Facilities

4.3.1 One of the principles of the SWMP is to recover/recycle as much waste generated from construction as possible. However, in reality the availability and location of waste management facilities would dictate if materials can be recycled. Ideally, one waste management contractor would be used to collect and recycle all of the different waste types generated in order to reduce costly waste management documentation. However, this is not always possible but the aim would be to limit the number of contractors involved.

4.3.2 Prior to the commencement of site development, the Principal Contractor would identify a suitable waste management contractor(s) and also investigate opportunities to recycle other materials.

4.3.3 Recycling facilities in the vicinity of the new section of motorway would be identified by the Principal Contractor prior to the commencement of site development. An initial review of waste management facilities is provided in the Materials Chapter of the ES (Chapter 12).

4.3.4 Only appropriately qualified and licensed waste management facilities would be used as a requirement of this SWMP.

4.3.5 During the construction programme the availability of recycling/reprocessing and disposal sites may change. It is the responsibility of the Principal Contractor to evaluate the waste management marketplace and identify suitable options.

5 Implementation of the SWMP

5.1 Roles and responsibilities

5.1.1 Although the construction team had not been appointed at the time of writing this SWMP, the key roles and associated responsibilities with regard to this plan are outlined below. The Construction (Design and Management) Regulations 2015 also identify the legal duties, responsibilities and obligations of all the major roles within the construction team.

Client

5.1.2 The client would be responsible for the following:

- appointing the Principal Contractors for the purpose of the SWMP;
- ensuring that the SWMP is implemented effectively; and
- reviewing, revising and refining the SWMP (where necessary) in conjunction with the Principal Contractor.

Principal Contractor

5.1.3 The Principal Contractor is generally appointed by the client and has the overall responsibility for:

- updating and delivering this SWMP on behalf of the client;
- ensuring all procedures in this SWMP and followed;
- ensuring all contractors are suitably qualified and experienced in implementing the measures within this SWMP. These measures would be contained within the terms of contracts to ensure understanding and accountability;
- making and maintaining arrangements that enable those engaged in construction and demolition to co-operate effectively in promoting measures to manage waste in accordance with the terms of the SWMP;
- ensuring, so far as is reasonably practicable, that waste produced during construction is re-used, recycled or recovered;
- regularly reviewing (every three months as a minimum) the SWMP and update where necessary;
- reporting on the performance of the SWMP within three months of the work being completed (see Section 6.3);
- establishing procedures for the regular review and recording of the quality of the works as part of it Quality Management System; and
- maintaining records relevant to this SWMP.

5.2 Training

5.2.1 A training regime focused on the provisions of the SWMP would be implemented for all relevant members of the construction team, including those carrying out demolition works to ensure their competence in carrying out their duties on the Scheme.

5.2.2 Any SWMP training would be additional to the mandatory training requirements on site Health and Safety.

Environmental Induction

5.2.3 A general site induction would be developed to introduce all site personnel to the main provisions of the SWMP, important environmental controls associated with the construction of the Scheme and effective delivery of the SWMP (for example, waste storage arrangements, waste segregation at source). A full register of induction attendance would be maintained on site.

Toolbox Talks and Method Statement Briefings

5.2.4 Toolbox talks and method statement briefings would be given to the construction (and demolition) teams as work proceeds and would cover the types of wastes produced at each key build stage, and the SWMP controls related to specific activities undertaken during the works. A full register of toolbox talks and method statement briefing attendance would be maintained on site.

Training Records

5.2.5 All training records would be maintained and filed on site. The records would include the content of the training courses (induction and toolbox training), record of attendance and schedule of review.

6 Monitor, Review and Report

6.1 Monitoring of the SWMP

6.1.1 Monitoring of the SWMP would principally be achieved through the completion of the Waste Management Data sheets and regular inspections of the works areas by the Principal Contractors to ensure that the provisions of this SWMP and control measures outlined in relevant method statements are being implemented.

6.1.2 Duty of Care paper work documenting the movements of waste from the site (i.e. Waste Transfer Notes) and the registered carriers' details would be retained.

6.2 Review of the SWMP

6.2.1 During the construction process, the SWMP would be reviewed as often as necessary or at least once every three months to ensure that the plan accurately reflects the progress of the Scheme in terms of waste estimates and targets. As part of the review, the Principal Contractor must record the following:

- the types and volumes of waste produced;
- identify on the plan the work area where the waste was removed from;
- the types and volumes of waste that have been -
  - re-used (and whether this was on or off site);
  - recycled (and whether this was on or off site);
  - sent for another form of recovery (and whether this was on or off site);
  - sent to landfill; or
  - otherwise disposed of.

6.3 Report

6.3.1 Within three months of the end of construction the Principal Contractor would report on the performance of the SWMP. It would include confirmation that the plan was monitored on a regular basis to ensure compliance with the provisions of the SWMP; that the plan was updated accordingly; and that any deviations from the plan would be explained.

6.3.2 In addition to the above, the report would include a comparison of the estimated quantities of each waste type against the actual quantities of each waste type; performance against the Scheme targets; and an estimate of the cost savings achieved by and costs incurred in completing and implementing the plan.

Appendix A: Initial Waste Forecast

Construction stage	Material	Quantity (m3)	Stage Start Date	Target for reuse/recycle (%)	Market Outlets
Enabling works					
Remediation of contaminated land					
Site clearance	Green waste			100%	Mulching/ composting/ chipping
Demolition	Bricks			100%	Recycling, reuse on site
	Metal			100%	Recycling
	Timber (windows)			TBC	Recycling
	Tarmacadam, concrete & sub-base			TBC	Aggregate recycling or reuse onsite
Earthworks	Subsoil and underlying natural materials			100%	Materials Management Plan
Structures					
Drainage and reen management					
Pavement, road works and surfacing	Black top	TBC	Unknown	TBC	

Construction stage	Material	Quantity (m3)	Stage Start Date	Target for reuse/recycle (%)	Market Outlets
Landscape Works and Paving	Vegetation, paving materials, aggregates	TBC	Unknown	TBC	Recycling, Reuse, Green Composting

Appendix B Waste Estimates Data Sheet

WASTE ESTIMATES DATA SHEET (To be completed pre construction)

Waste Category & Type	EWC Code	Source of waste	Re-used on site	Re-used off site	Recycled on site	Recycled off-site	Recovered on site - use off site	Sent to a Permit exempt site	Sent to landfill site for disposal
			(m3)	(m3)	(m3)	(m3)	(m3)	(m3)	(m3)
INERT									
Sub TOTAL			0.00	0.00	0.00	0.00	0.00	0.00	0.00
NON-HAZARDOUS									
Sub TOTAL			0.00	0.00	0.00	0.00	0.00	0.00	0.00
HAZARDOUS									
Sub TOTAL			0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL VOLUMES			0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix C: Waste Management Data Sheet

WATE MANAGEMENT DATA SHEETS (to be completed each time waste is removed off site/re-used on site)

CONSTRUCTION

Waste Category & Type	EWC Code	Date	WTN Y/N	Name of person collecting waste	Waste carrier registration number	Name & location of waste site	Permitted or exempt site	Permit number	Re-used on site (tonnes)	Re-used off site (tonnes)	Re-cycled on site (tonnes)	Re-cycled off-site (tonnes)	Recovered on site - use off site (tonnes)	Landfilled (tonnes)
INERT														
Sub TOTAL									0.00	0.00	0.00	0.00	0.00	
NON-HAZARDOUS														
Sub TOTAL									0.00	0.00	0.00	0.00	0.00	
HAZARDOUS														
Sub TOTAL									0.00	0.00	0.00	0.00	0.00	
TOTAL VOLUMES									0.00	0.00	0.00	0.00	0.00	

Total Waste Landfilled	Weight (tonnes)			Cost (£)
Inert				
Non-Hazardous				
Hazardous				
Total	0.00			0.00

Total Waste Reused/ Recycled	Weight (tonnes)			Cost (£)
Inert				
Non-Hazardous				
Hazardous				
Total	0.00			0.00

Annex G: Outline Ground and Surface Water Management Plan

Welsh Government

M4 Corridor around Newport

Environmental Statement Volume 3 Annex G to Appendix 3.2 Outline Ground and Surface Water Management Plan

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CVJV/AAR
3rd Floor
Longross Court,
47 Newport Road,
Cardiff
CF24 0AD

Contents

1 Introduction

1.1.1 This report is an Outline Ground and Surface Water Management Plan and is based on the information available at the outline design stage. As the detailed design progresses, the plan would be reviewed and updated accordingly. The Outline Ground and Surface Water Management Plan would be developed in consultation with Natural Resources Wales (NRW) and would be agreed prior to the start of construction.

1.1.2 The final Ground and Surface Water Management Plan (GSWMP) will consider all drainage required during the construction phase and will reference all industry and regulatory pollution prevention guidelines. It shall describe the design of each element of surface water management system required to manage surface water runoff during construction and potential risks to surface waters. This shall include consideration of temporary storage and settlement requirements to manage sediment load of waters. The GSWMP shall define the water quality criteria to ensure any discharge to receiving watercourses meets regulatory requirement

1.1.3 With regard to groundwater, the GSWMP shall consider all activities to be undertaken during the construction phase that may require groundwater control through pumping. The GSWMP will reference all relevant industry and regulatory pollution prevention guidelines. The GSWMP shall consider excavations within borrow pits, structures required for managing groundwater in areas of cut, the excavations required for bridge tower and viaduct pier foundations (particularly those requiring cofferdam construction) and excavations required for subsurface structures/utilities that may encounter shallow groundwater. The GSWMP shall define the nature and approach for groundwater management following its abstraction, including monitoring to determine the acceptability of chemical and physical quality with respect to discharge to the surface water system.

2 Responsibilities

2.1.1 Competent managers and key team members will be appointed to work on this plan and support it along the project duration. Additional roles and responsibilities will be developed as the detailed design progresses.

Staff	Responsibilities
Environmental Manager-	• Ensuring adequate planning is undertaken to protect surface and groundwater from pollution, and for monitoring the effectiveness of these plans.-
Construction Staff	• For the day-to-day implementation of the mitigation measures required minimising the impact arising from the works and for ensuring appropriate consents are in place and adhered to.
Project Manager	• Responsible for ensuring procedures are followed.

3 Consents

3.1.1 The treatment of waters arising from construction activities, including point source discharges resulting from the treatment of materials regulated by mobile plant licence will require regulation by NRW. An application for an environmental permit (Discharge Consent) will be submitted prior to works commencing. The permit will regulate the discharge of treated contaminated waters to ground, via re-injection (or possibly soakaway). A separate environmental permit will be required for each location.

3.1.2 An abstraction licences will be in place for de-watering operations for dust suppression or pressure testing on site. A separate licence will be required for each location. An impoundment of water in any watercourse or abstraction exceeding 20 cubic metres a day will be controlled by means of NRW consent (Abstraction Licence).

3.1.3 Construction works carried out over, under or near a main river, or in a flood plain or flood defence (including a sea defence) will require a Flood Defence Consent. A Flood Defence Consent will be required for each location.

3.1.4 A Land Drainage Consent is required for all works carried out over, under or near an ordinary watercourse. Ordinary watercourses include non-main rivers and all ditches, drains, cuts, culverts, dikes, sewers (other than public sewers) and passages through which water flows. Consents will be in place for works falling within the Caldicot and Wentlooge Levels Internal Drainage District. The responsibility for Land Drainage Consenting within the district lies with NRW.

4 Mitigation Measures

4.1 General Measures

4.1.1 Temporary drainage systems will be installed and carefully managed to prevent localized flooding or pollution of surface and groundwater from silt and other contaminants.

4.1.2 In areas where old potentially contaminated land has been identified, specific mitigation measures will be designed to manage and contain potential contamination in line with the Remediation Strategy Report. Detailed method statements will be prepared for works in these areas.

4.1.3 Where concrete works are required for superstructures (e.g. bridges), if watercourses are present beneath the structures, deck sections will be sealed and inspected.

Induction of site personnel

4.1.4 All personnel will attend a site induction before commencing work on site. The briefing will emphasise the sensitivity of the watercourses, surrounding habitat and methods and working practices employed to protect the water environment.

Emergency Response Planning

4.1.5 An emergency response plan will be developed in accordance with EA Guidance PPG21- Pollution Incidence Response Planning. The plan will be communicated to all personnel.- Emergency spill control equipment such as spill kits, ail booms and absorbent materials, will be held at appropriate locations on site and within site compounds.

General mitigation measures

4.1.6 An outline of the main work activities to be carried out throughout the scheme as well as relevant water management proposals currently being considered are described in the table below.

Risks Or Construction Activities	Mitigation
Concrete washwater reaching groundwater	• Work involving concrete and cement will be carried out in accordance with EA Guidance PPG 5 'Works in, near or liable to affect a watercourse'. Controls will be implemented to ensure that wet cement does not come into contact with river or groundwater. • Adequately sized and lined washout area to be developed and maintained. • Investigate concrete supplier's use of concrete sock.
Excessive cutting	• Establish diversion drains around the top and bottom of slopes where earthworks cuttings are to be carried out. This will be carried out before the slope is cut to ensure that runoff is captured and treated.

Risks Or Construction Activities	Mitigation
Extensive filling operation	• Pre-earthwork drainage such as diversion channels leading to settlement ponds/ tanks. • Use of bunds adjacent to the watercourse to act as barrier for large material overspill during filling work. • Silt netting used to manage runoff.
Site Compound Facilities (including Car Parks)	• Site compounds will, where possible, be located away from all surface water features and watercourses. • A site drainage plan will be prepared in advance of construction works to identify the location of all watercourses and drains/drainage paths. • All drainage on site will be identified and color coding will be used to distinguish between surface water, foul sewer and combined drainage. This will ensure that all those working on site are aware of the type of drain in the event of a pollution incident. Pollution control measures such as the use of oil interceptors or the placement of bunds or silt traps will be used to prevent silt run-off entering drains.
Vehicle/Plant Movements	• Haul routes will be regularly inspected and maintained to minimise silty run-off. • Areas of hard standing will be provided at site access and egress points, where practicable. The areas will be regular inspected and cleaned and road sweepers/cleaners will be employed on existing highways near the construction area. • All vehicles, plant and equipment will be regularly inspected and maintained in accordance with manufacturers' recommendations. Records of inspections will be maintained on site.
Wheelwash facilities	• Site wheel washing facilities will be established at designated locations, away from watercourses. Cleaning will be carried out in a bunded area and wastewater will either be recycled or discharged to foul sewer (with consent from the sewerage undertaker). • Any contaminated waste will be removed from site by a licensed waste carrier for disposal to an appropriately licensed facility. • Guidance from PPG13 will be used to put in place good practice for vehicle washing and cleaning.
Aquatic Protection	• Advice will be sought from all specialists involved in the project and will be entered into control documents and issued through to the workforce and management ahead of works affecting watercourses. • The use of construction materials on site will be free from contaminated material so as to avoid potential contamination of the watercourse.

Risks Or Construction Activities	Mitigation

Storage of fuels, oils and other chemicals	• Spill kits to be available near all points of work and personnel trained in their use.
	• COSHH store to be bunded and locked when not in use.
	• In areas of limited footprint, settlement tanks and oil separators will be used to treat contaminated water from the work areas.
	• Physical barriers to stop material overspill.
	• No fuels, oils or other chemicals will be stored in high-risk locations such as:
	  • within 50 metres of a spring, well or borehole
	  • within 10 metres of a watercourse
	  • places where spills could enter open drains or soak into groundwater
	• Storage tanks will be sited on an impermeable base, surrounded by an impermeable bund, and inspected regularly for leaks. Any valve, filter, sight gauge, vent pipe or ether ancillary equipment must be kept within the bund when not in use.
	• Associated pipework should be situated above ground and protected from accidental damage
	• All bulk fuels storage must be contained within a double skinned bowser/container or have a bund. Double skinned tanks or bowsers must also be bunded unless the outer skin would provide secondary containment. The bund must have sufficient volume to contain 110% of the contents of the largest fuel/pipe container or 25% of the total storage capacity of all the containers, whichever is the greater.
	• All fuel containers, including those containing waste fuels, must be stored on a drip tray/bunded area away from vehicle traffic within a designated storage area, where possible, to avoid damage.
	• Guidance from the PPG3 will be followed for the use and design of oil separators for the surface water drainage systems and guidance from PPG2 will be used regarding to ground storage oil.

Drainage	• Site plans and trial holes will determine the position of known services including disused storage tanks and sewer networks. • Where possible, permanent drainage will be incorporated into the works at the earliest opportunity in preference to temporary drainage systems. • Oil interceptors or the placement of bunds or silt traps will be used to prevent polluted run-off entering drains, additional guidance from PPGs will also be followed.

Risks Or Construction Activities	Mitigation
Surface water run-off/Silt	• Use of cut-off drains or ditches to channel water around the site and/or prevent silty water entering excavations and watercourses. • Silty water will be treated to allow suspended solids to settle out before disposal • Settlement and filtration ponds will have the base sealed to prevent water entering adjacent ground and to contain potentially contaminated water. • Wherever practicable, grey water systems will be used at site compounds to reduce run-off from site, improve water efficiency and reduce the potential for polluting discharges to surface watercourses

4.1.7 This section will be further developed following detailed discussions with the site team, to ensure it is site specific.

4.2 Special measures within the Gwent Levels

Overview

4.2.1 Construction Phase site water management beyond the Gwent Levels in the Junction 23 and Junction 29 areas are dictated by the phasing of the works, gradient of the terrain and the earthworks strategy for the Project. General measures in these areas are covered in the Earthworks Buildability Report section.

4.2.2 Water management across the Gwent Levels has been developed in line with CIRIA documents *Control of water pollution from linear construction projects* C648 “Technical guidance” and C649 “Site guide”.

4.2.3 The works on the Gwent Levels are across an existing water management area forming a SSSI. Connectivity of the existing network is maintained through installation of culverts and construction of replacement reens and field ditches that intercept channels being severed by proposed carriageway embankments. Some of the new replacement reens / field ditches provide betterment to the existing network.

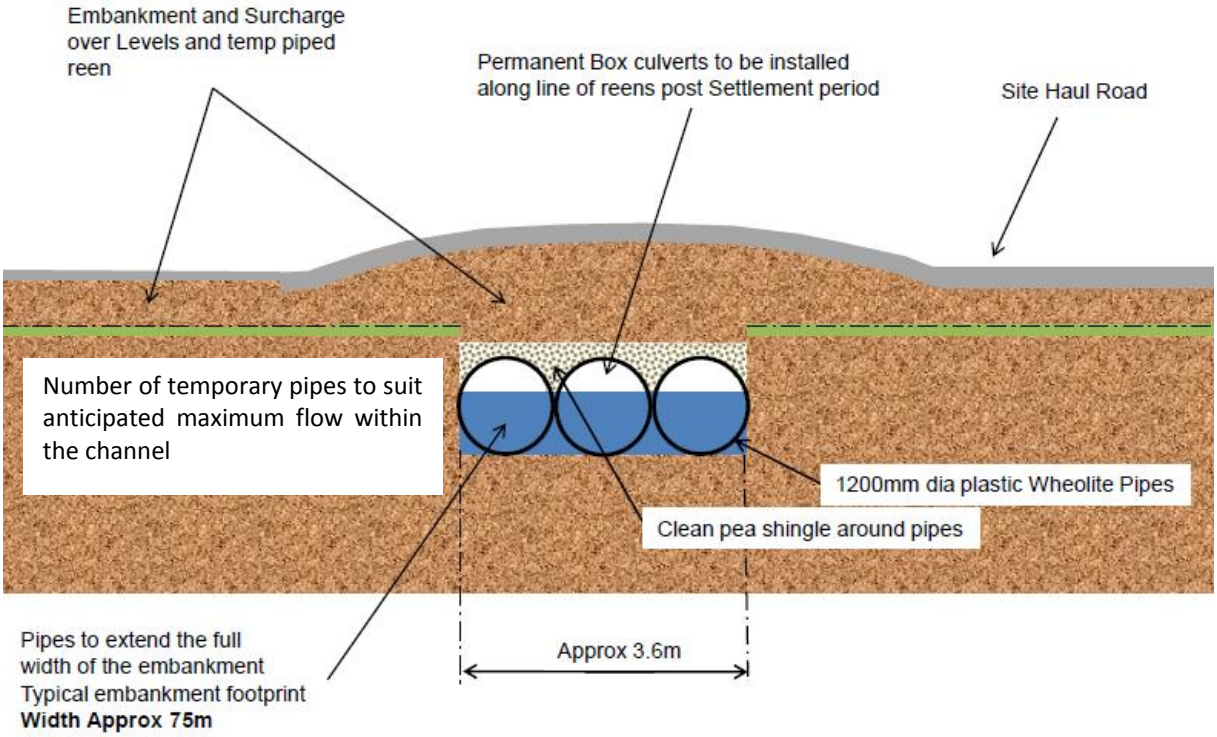

Figure 1 Elevation through propsed temporary reen crossing

4.2.4 Most culverts are proposed offline, with the reens permanently diverted after installation. Temporary crossings of the existing water courses would need to be constructed to provide continuity of site haul road and access to works along the proposed M4 footprint. These temporary crossings would be formed with pipes and backfill surround as detailed in Figure 1 above. The number of pipes installed would vary according the reen channel dimensions and discharge rate.

4.2.5 The permanent culvert would then be installed two sections, to maintain the haul route access through the site. In areas of driven piles, a permanent box culvert would be installed after the piling is installed. For low height embankment areas, two options are available:

- Install driven piles to support the box culvert with a transition zone either side back to the adjacent low height embankment construction. This enables earliest installation of the permanent culvert and addresses the potential for differential settlement between the two construction methodologies. This is the solution that will be implemented typically.
- Install the box culvert after the low height embankment consolidation period settlement has concluded. This would require enhanced temporary works as embankment fill has increased the relative depth of the box culvert and also elongates the construction programme. This solution would only be considered where driven piled foundations are not available until after the ground consolidation period has been concluded.

4.2.6 The concept to manage water across the Gwent Levels during the construction phase is to:

- Isolate upstream catchment flows from the proposed works footprint
- Capture water collected within the proposed works footprint

- Treat the captured site water to attain agreed minimum water quality parameters prior to consented discharge into the existing reen network

4.2.7 The site haul road is located within the footprint of the proposed M4 embankment, except at underbridges where it would need to deviate locally around the abutments during their construction. The site haul road will be within the measures to capture site collected water.

Construction Phase Water Treatment Areas (WTAs)

4.2.8 Permanent WTA footprint locations would be utilised in the earthworks embankment construction phase to process the captured site runoff. The construction phase WTAs would be formed by perimeter impermeable bunds on top of the existing ground surface. This would avoid interface and therefore possibility of contamination with groundwater, plus enable removal of settled solids without risk of damage to the permanent WTA pond liner where utilised.

4.2.9 Weirs would be installed within the construction phase WTAs to form a series of settlement lagoons, increasing the water quality as it progresses towards the discharge point. A water quality sampling regime would be implemented so that treated water achieving the required consent parameters can be discharged into the reen network.

Figure 2 CIRIA 648 Settlement pond with straw bale filters and an oil boom

Figure 3 CIRIA 648 Silt trap comprising bags of sand

4.2.10 The permanent reed beds would be installed during the earthworks construction phase to allow them to become established prior to receiving permanent highway drainage flows.

Capture of Water Collected Within the Proposed Works Footprint

4.2.11 Measures and relative positioning of runoff control to capture water collected within the proposed works footprint are detailed below:

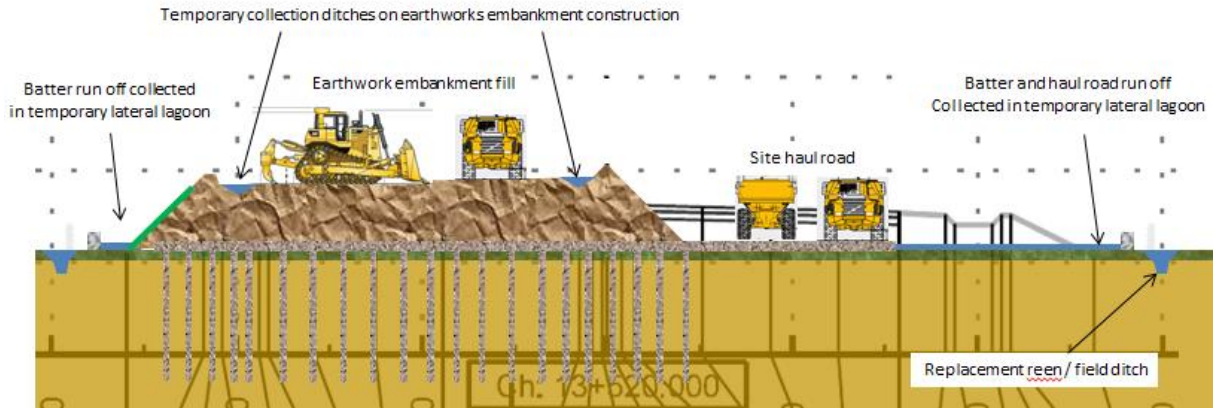

Figure 4 Temporary collection ditches / lateral lagoons during construction

- Construct replacement reen / field ditch where required to maintain connectivity of existing Gwent Levels water management network
- Construct bunds at construction boundary to form temporary lateral lagoons
- Form temporary collection ditches on top of the earthwork embankment
- Seed permanent embankment batter to form erosion control to surface during consolidation period

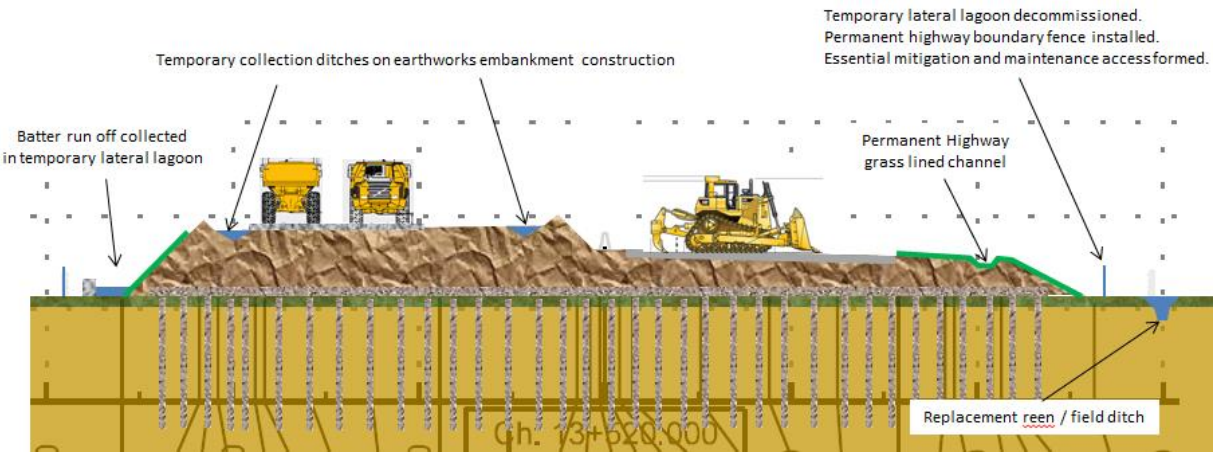

Figure 5 Transition to permanent design water management

- Upon completion of consolidation period, remove surcharge
- Construct carriageway foundation and place initial layer of carriageway surfacing
- Construct permanent grass lined channel
- Empty the temporary lateral lagoon and remove the bund
- Install permanent highway boundary fence line 1m offset from toe of batter
- Form maintenance access between highway boundary fence and the replacement reen / field ditch
- Construct permanent WTAs once carriageway initial surfacing is installed on both carriageways

4.2.12 Risk of site water runoff polluting reens / drainage ditches is greatly reduced following earthworks vegetation establishment and asphalt surfacing installation.

Water collected from earthworks batters

4.2.13 The corridor of land between the proposed embankment and the permanent parallel field ditch / replacement reen would be utilised to collect embankment batter run-off in a impermeable bunded area forming a lateral lagoon. This would perform in a similar way to the permanent highway grass lined channel drainage permitting:

- The flow of water would be retarded by lack of existing ground longfall
- Slow moving water encourages sedimentation and filtration by the grass
- Sediment would be deposited and organic matter retained and broken down in the top layer of soil and vegetation (this area becomes highway cut off ditches or essential mitigation and maintenance access in the permanent scheme)
- After a rainfall event, a proportion of the collected run-off may be lost due to evaporation

4.2.14 Site run-off collected within the bunded lateral lagoons adjacent to the earthworks embankment, would migrate to natural low areas of these lateral lagoons, to be pumped or transported by tanker to the nearest WTA.

Water collecting on the earthworks embankments

4.2.15 Bunds and collection ditches would be formed on the edges of the earthworks embankment during construction. These would channel water falling on the embankment footprint along the proposed M4 alignment to the WTAs. Discharge from the top of the embankment to the WTA would be via a slope drain

Permanent Water Treatment Areas (WTAs)

4.2.16 Permanent WTAs would be constructed after establishment of vegetation on the earthworks embankments and installation of paved surfaces on the carriageways when siltation of site runoff would be minimised.

4.2.17 Works would be undertaken with a long reach excavator, during a weather window where minimal incoming flows would be anticipated. The construction phase WTA water would be pumped out via Siltbuster (or similar) tanks.

4.2.18 Sediment collected on the base of the construction phase WTA and material excavated to form the profile of the permanent WTA would be transported along the proposed M4 carriageway and deposited as unsuitable fill in previously excavated borrow pit areas.

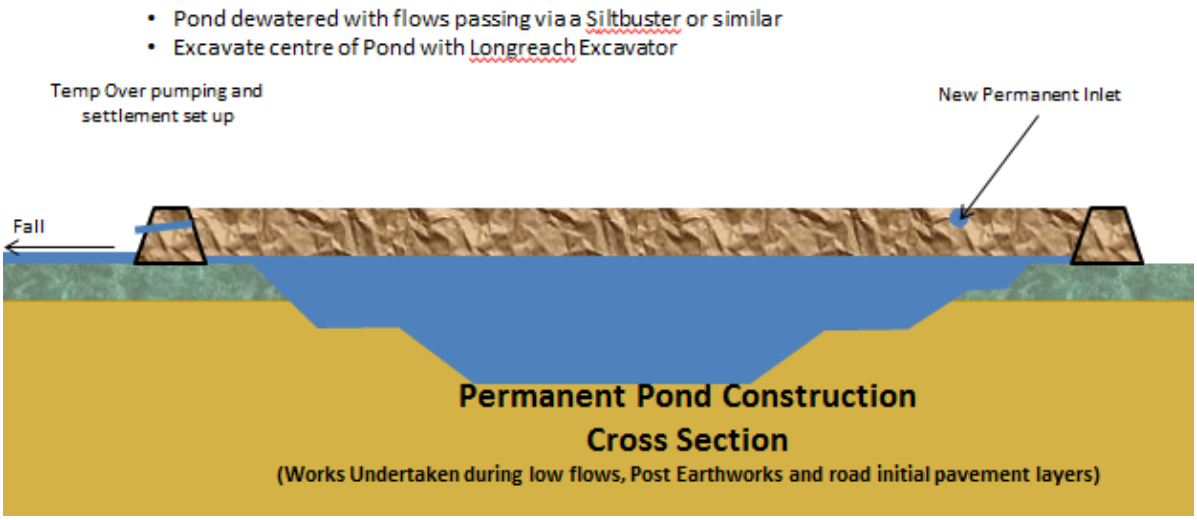

Figure 6 Permanent WTA construction

Sample Area

4.2.19 The area between Ch 6+500 Duffryn Railway Underbridge and Ch 8+400 River Ebbw Underbridge west abutment has been selected to be studied as the sample area for construction phase water management because it:

- Is typical of an area on the Levels to be drained during construction
- Is located within the Wentlooge Levels SSSI boundary
- Covers the area served by WTA5 in the permanent works. WTA5 location to be used for temporary control, storage and treatment of runoff during construction
- Includes additional land beyond the footprint of the proposed M4 embankment utilised during the construction phase (temporary compounds etc.)
- Crosses existing field ditches and reens, culverted, realigned or filled as part of the Scheme
- Contains site access and plant crossings of public highways.

4.2.20 CIRIA C648 Technical guidance "Control of water pollution from linear construction projects" has been utilised in the development of the proposed water management concept and this worked example. Main points considered are:

- Wet weather peak flows will determine the sizing of temporary structures and acceptable discharge volumes
- Consultation with the Environmental Regulator (NRW) has being ongoing through Key Stage 3 for permanent works design and construction phase mitigation measures
- Temporary works should be designed for the worst-case scenario at the outset (a 1 in 10 year storm is recommended as for appropriate for the 3½ year anticipated construction duration and the risk of failure)
- Licences and consents to be obtained for discharging water to surface water during the construction phase in addition to the final scheme

- More than one sediment treatment method may have to be used:
  - Pump to grassland, soakaway or infiltration basin (within the construction site boundary)
  - Pump to an adequately sized settlement facility (WTA5 footprint in this worked example)
  - Pass through a silt trap or filtration system
  - Install specialist treatment equipment
  - Pump into a tanker and dispose of offsite.

4.2.21 The total area within the footprint of the Scheme within this sample area, i.e. including all Essential Licence and Title Mitigation land as well as permanent works, is 245,503m². The catchment size does not include the surrounding area from which runoff is likely to flow on to the site as the lateral bunds will prevent this and the retained connectivity of the existing reen network will permit upstream runoff to pass under, and remain segregated from the Scheme.

4.2.22 The positioning of the lateral bunds will vary as the construction works progress to ensure that:

- Effective continuity is retained
- Newly constructed paths for water to discharge to the existing reen network are also protected
- Drained area is minimised to reduce potential water volumes captured and thus reduce the risk of an incident during an extreme storm event.

4.2.23 The table below provides average summer intensities and rainfall depths for various return periods and various storm durations, produced for this location by the Scheme designers.

	Storm Durations							
	6hrs		10 hrs		24 hrs		48 hrs	
Storm Return Periods (years)	Average intensity mm/hr	Storm depth mm	Average intensity mm/hr	Storm depth mm	Average intensity mm/hr	Storm depth mm	Average intensity mm/hr	Storm depth mm
5	6.0	36.3	4.2	42.4	2.3	55.1	1.4	67.7
10	7.0	42.0	4.9	48.8	2.6	62.7	1.6	76.2
20	8.1	48.6	5.6	56.1	3.0	71.3	1.8	85.8

4.2.24 An intense, short storm will provide a surge volume of water that needs to be retained and treated prior to discharge under consent. A long duration storm will provide greater volumes of water, however as this is spread over a longer time period initial volumes would have been treated and discharged prior to receipt of later quantities.

4.2.25 Using the recommended 10 year storm return period

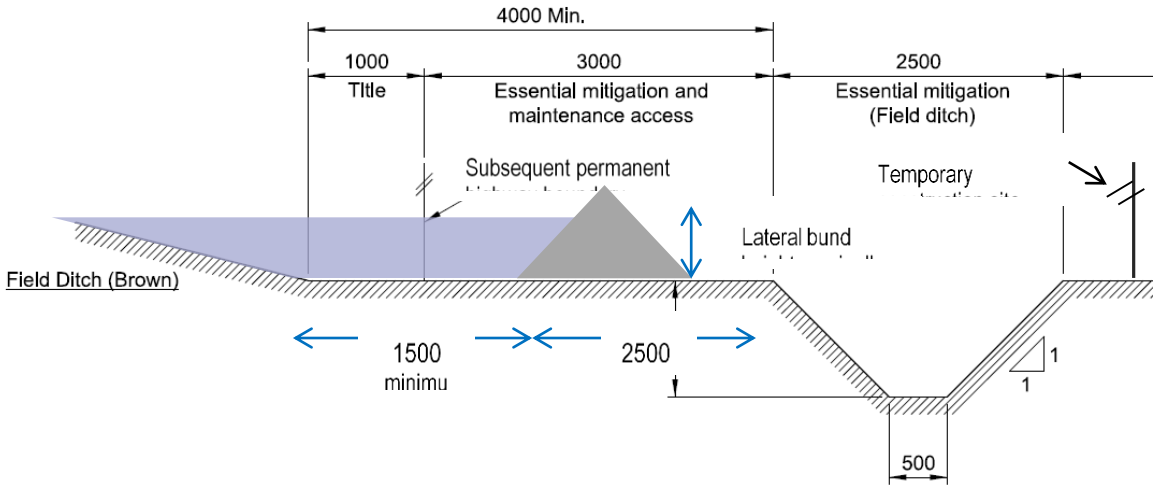

Figure 7 - lagoon dimensions between proposed embankment and construction lateral bund

- 6 hour storm depth x catchment area 0.042m x 245,503m^2 = 10,311m^3 rainfall
- Ch 8+400 – 6+500 = 1900 linear metres either side of the embankment
- 1900 x 2 x 1.5 wide x 1 deep = 5,700m^3 storage capacity in lateral lagoons
- 10,311 - 5,700 = 4,611m^3 minimum capacity required within the construction phase WTA
- WTA5 base area is 6,974m^2 so can retain 4,611m^3 at 660mm deep.

4.2.26 A maximum intensity 10 year return period storm volume could therefore be retained without requirement to discharge to the existing reen network. This assumes that no runoff is absorbed into the ground through infiltration, however groundwater released through the band drains during embankment consolidation has been discounted for this short duration.

4.2.27 A 10 year return period 48 hour storm depth x catchment area produces 0.0762m x 245,503m2 = 18,707m3 volume of rainfall.

4.2.28 In addition to the rainfall volume, groundwater released into the works footprint via band drains from low height embankment consolidation needs to be considered:

- Assume consolidation period 12 months with 70% of consolidation occurring during within 2 month period
- 1m assumed consolidation depth of soil supporting the proposed embankment taken to be from displacement of water within soil voids
- Conservative assumption taken that all surcharge embankments are constructed at the same time to produce a maximum peak flow of groundwater, rather that staged loading linearly along the footprint
- Low height embankment areas – Ch 7+000 – 8+000 and 45m wide
- 1000 (L) x 45 (w) x 1 (d) x = 45,000m^3 groundwater during consolidation period
- 70% consolidation occurs over 60 day period 45.0*.700 x 70% x 2/60 = 1050m^3 maximum groundwater during 48 hour storm

- Total maximum volume of water produced within the site footprint for a 10 year return period event 18,707 + 1050 = 19757m^3

4.2.29 Where the intensity of a rainfall event is greater that the infiltration rate, the excess water becomes runoff. In winter, the ground becomes waterlogged such that there is no infiltration, and all rainfall becomes runoff. This worst case has been assumed for this calculation.

4.2.30 Retention time depends on the particle size, disturbance of the water, depth of the water, temperature and particle density. Finer particulate matter may require several days or more and therefore larger settlement facilities.

4.2.31 In ideal conditions retention time is a function of settlement velocity and depth. CIRIA C648 Table 19.2 shows theoretical values of retention time for continuous flow conditions (i.e. flow in equals flow out). Settlement efficiency can only be increased by increasing the surface area or decreasing the outflow.

Water depth	**Retention time** (settling velocity)				
	Fine clay (0.001 mm/s)	Fine silt (0.02 mm/s)	Medium silt (0.05 mm/s)	Coarse sand (30 mm/s)	Flocculated silt (10 mm/s)
0.5 m	6 days	7 h	3 h	16 s	50 s
1 m	11 days	14 h	5.5 h	33 s	2 min
2 m	23 days	1 day	11 h	1 min	3 min

Figure 8 - CIRIA C648 table 19.2 Theoretical range of retention times for a variety of particles sizes

4.2.32 Assuming the particulate matter transported by site runoff is Fine Silt, and a minimum WTA depth of 660mm is required from the 6 hour intensive storm retention volume, interpolation from Table 19.2 provides a retention time for settlement to occur.

- (7 hours / 500mm) x 660mm = 9.24 hours (9 hours 15 minutes) minimum fine silt settlement time
- WTA5 base area is 6,974m^2 so can retain 4,611m^3 at 660mm deep
- 4,611m^3 / 9.24 hours' minimum settlement period = 499m^3/hour maximum WTA5 discharge rate (138.6l/s)
- 48-hour storm depth x catchment area produces 18,707m^3 volume of rainfall plus 1050m3 groundwater from band drains = 19,757m^3
- At end of 48-hour storm 48 * 499 = 23,952m^3 settled which exceeds the volume of water produced.

4.2.33 The construction phase water management proposal for this area is therefore able to:

- Retain the volume of water from a 1 in10 year intense (6 hour) storm within the lateral lagoons and WTA5 footprint without discharge to the existing reen network.

- Settle fine silt transported by runoff from a 1 in 10 year long duration (48 hour) storm using WTA5 footprint without incoming flow rate exceeding the minimum settlement duration.

4.2.34 To add additional robustness to the water management system, specialist treatment equipment could also be utilised, suitable for very fine suspended solids, very large volumes of water or where there is insufficient space for conventional treatment methods. Flocculation is a viable treatment method to include on linear construction sites.

- This is very often the optimum solution for treating large volumes of silty water where space is restricted and suspended particle size is too small to settle out, and is therefore highly suitable for use on linear schemes.
- Fine particles carry a negative surface charge. A flocculent, in this case, is a positively charged solid, powder or liquid. Flocculating agents increase the rate of settlement of suspended solids by “pulling together” small particles into larger, and therefore heavier particles.
- The design of the system, size and dosing rates etc. need careful consideration and supervision to avoid failures of the system. It will also be necessary to gain approval from the relevant environmental regulator before flocculants are employed.
- Solid flocculants, usually in the form of “floc blocks”, are placed in a channel of flowing water and dissolve in the flow, providing a dose of the chemical. The performance of the block is dependent on the flow and the suspended sediment concentration.

4.2.35 The above ground perimeter bunds to the temporary WTA5 would be nominally 1200mm high. This gives additional mitigation capacity for extreme storm events. Within the temporary pond, lower intermediate bunds would be installed with adjustable weirs to provide sequential areas forming:

- Delivery zone for water to be discharged from the lateral lagoons. The delivery zone would prevent turbulent flow disturbing settling water in subsequent zones of the pond. This delivery zone would also act as a petrochemical pollution control element, utilising floating berms supporting a silt curtain
- Primary settlement zone
- Secondary settlement zone

4.2.36 Weir levels would control the rate of flow from each zone and provide a location of controlled flow should additional specialist treatment (e.g. floc blocks) be required. Adjustable Weir levels also allow the temporary pond water levels to be reduced during periods of low flow, thus restoring the retention capacity required for extreme storm events.

4.2.37 Water collected in the lateral lagoons would need to be pumped or tankered to the WTA5 location as there is negligible longfall across the Levels to enable a gravity feed. Additional obstructions affecting the passage of collected water to the treatment area include; culvert headwalls, side road public highways, proposed embankments.

4.2.38 Submersible pumps controlled by float switches would be used to move collected water between each discrete section of lateral lagoon where connectivity is

prevented by an obstruction. Submersible pumps would be suspended off the base of the lateral lagoon so as not to disturb and transport any settled material, rated to suit the discharge required during an intense storm for the applicable collection area.

4.2.39 CIRIA C648 calculation for a smaller catchment (<0.5km2).

- This method uses annual rainfall and soil type data to calculate the mean annual flood for catchments smaller than 0.5km^2. Flood flows can be calculated

Parameter	Derivation	Value
Rainfall zone	• Annual rainfall can be estimated from Figure 18.1 or known site-specific values can be used. • Figure 18.1 estimate used for Gwent Levels area	871 – 1060mm annual average rainfall
Soil type	• Soils are divided into the five classes shown in Table 18.3 • Soil classified as Class 3 Very fine sands, silts and clays – “Moderate” runoff potential • Or • Class 4 Clayey or loamy soils – “High” runoff potential	Soil class 3 Soil class 4
Peak flow per hectare	• Flood flows should be estimated from Table 18.2 • Read from Table 18.2 with previous parameters	5.2 l/s/ha 6.7 l/s/ha
Mean annual flood	• Multiply this flood flow in litres/second/hectare by the catchment area (in hectares) • Worked example catchment area 245,503m2=0.246km2=24.5503ha. Mean annual flood for the catchment = 5.2 l/s/ha x 24.55ha	127.66 l/s 164.49 l/s
10 year return period flood	• The mean annual flood can be multiplied by a factor for range of return periods (Table 18.4) • 10 year multiplier is 1.48.	188.94 l/s 243.44 l/s

- This calculation technique produces a flow rate for the catchment higher that the settlement rate required to treat water from a 48 hour storm duration (138.6 l/s), however it would not be anticipated to receive the CIRIA C648 calculated 1 in 10 year storm peak flow rate for this duration of storm.
- 6 hour storm duration 7mm/hr = 477.4 l/s for this catchment exceeds the CIRIA C648 calculated 1 in 10 year storm peak flow rate.
    - 0.007 x 245503 = 1718.521m3 = 1,718,521 litres (1m3 = 1,000 litres)
    - 1,718,521 litres/hour = 477.4 l/s

4.3 Special measures for Earthworks

4.3.1 Worst case emergency procedures would be planned for within the Water Management Plan. Rainfall and associated surface water run-off during construction works can mobilise and transport pollutants into the water environment causing potential harm to plants and animals.

4.3.2 Pollution from sediment and other pollutants can derive from a number of sources including:

- Run off from exposed ground and material stockpiles
- Run off from roads, haul routes and river crossings
- Wash down of plant/vehicles
- Fuel and chemical storage/refuelling areas
- Leaking / vandalised equipment
- Dewatering excavations
- Incidents such as heavy rainfall or flooding

4.3.3 Key construction activities, which have the potential to impact upon water quality include:

- Site clearance, uprooting of trees and transportation of clearance arising's
- Excavation works, earthworks and unfinished embankments
- Materials, fuel and chemicals storage and handling
- Concrete activities and handling of concrete wash waters
- Physical disturbance of watercourses and their banks
- Piling and surcharge with band drains within the Gwent Levels

4.3.4 There are numerous watercourses that cut across the length of the proposed new section of motorway between Castleton and Magor, the Gwent Levels SSSI would act as a sensitive receptor. Any works over, within and adjacent to watercourses will require a Flood Defence Consent from Natural Resources Wales (NRW). Early consultation with NRW and the adoption of best environmental practice would be undertaken to agree appropriate pollution control measures and consent requirements.

4.3.5 Particular attention is drawn to known PCB contaminated areas in the east, along with the entire TATA site and where the proposed route will sever its existing operational water management system.

4.3.6 At Castleton and Magor, the topography and land uses are those of typical green field sites. Water management issues here are common to many similar sites as described below however, the Gwent Levels are unique and a very detailed high level bespoke Water Management Plan would be developed as part of the CEMP.

Fuel Storage and Refuelling

4.3.7 All fuel storage on the site would be in double bunded, locked tanks, located in secure areas at the compounds. A controlled procedure for refuelling of plant

would be adopted across the works. All practicable means of securing fuel will be utilised on mobile plant. Refuelling will be carried out by appointed competent persons only. Measures to prevent pollution would be developed in alignment with PPGs and would include:

- Drip trays would be utilised underneath static plant; including generators.
- Spill kits would be available within each item of mechanical plant. Trained persons would be present on site to deal with fuel spillage.
- No plant would be utilised within a watercourse (including all dry ditches and field drains that exist currently) without full consideration of all available alternatives.

Topsoil Stripping and Storage

4.3.8 Wherever possible, topsoil will be left in place to minimise the amount of unprotected ground exposed to runoff. Where topsoil removal is required it would take place as late as possible prior to other works in the area.

4.3.9 In advance of vegetation clearance and soil stripping operations commencing within 10m of a watercourse, appropriate control measures would be implemented to prevent contamination.

4.3.10 Topsoil stockpiles would be created and managed in accordance with best practice guidance in line with a Soil Management Strategy. The sides of stockpiles would be graded to prevent ponding and to help shed rainwater. Exposed stockpiles that are to remain for long periods would be seeded with a standard Rye Grass seed mix immediately upon completion and in suitable weather conditions. This would minimise soil erosion during the soil storage period and to help reduce colonisation of nuisance weeds.

4.3.11 Silt fencing would be installed around the margins of topsoil mounds to minimise the risk of sediment-laden runoff reaching watercourses.

Cut off ditches

4.3.12 Cut-off ditches would be constructed where required on the uphill side of the works area. These ditches will serve to intercept overland flow from adjacent land areas in order to ensure that they do not flow over the site.

4.3.13 Within the cut-off ditches temporary baffles will be formed to break up the flow distances and promote the settlement of fines.

4.3.14 Run off from earthworks areas will be intercepted prior to it entering reens and watercourses in order to prevent a pollution incident. Similarly baffles and other method would be employed to prevent dirty water reaching local reens.

Pond Maintenance

4.3.15 Pond maintenance during the construction phase would be carried out during periods of dry weather. The ponds would be drained, and sediment will be removed utilising a small excavator. The excavator would be careful so not to disturb the ponds formation whilst removing silt. This operation would not be carried out whilst water is flowing or prior to a forecasted rainfall event due to the potential remobilisation of silt. Ponds would be regularly inspected for integrity and any defects remedied immediately.

Management of Dust

4.3.16 During the earthworks mass haul operation, damping down of the haul roads to minimise dust being generated by plant movements would be required. This would minimise dust pollution causing nuisance to neighbouring properties and businesses along the route of the new section of motorway.

Controlling Mud on local roads

4.3.17 Wheel washing and other road / vehicle cleaning facilities would be provided as suited to each location where vehicles need to exit the site onto the public highway i.e. from Imperial Park. As appropriate, these facilities would be manned so continuous vigilance is maintained. Similar facilities would be provided where plant crossings are required over local roads.

Permanent Ponds during Construction

4.3.18 At Castleton and Magor, the permanent ponds would be excavated early as part of the bulk earthworks operations. These ponds could then be utilised to assist in the water management system.

4.3.19 Across the Gwent Levels, where necessary, only the bunds of the permanent ponds will be constructed. These ponds will remain in their temporary state and excavated to their proposed profile only in the latter stages of the project.

Areas in 1 in 100 year flood

4.3.20 The area north of Mill Reen culvert is susceptible to a 1 in 100 year flood. Temporary material storage areas would be located outside this area of influence when forecast suggest high rainfall is likely.

5 Monitoring, Review and Reporting.

5.1.1 In accordance with the Environment Agency's Pollution Prevention Guidelines (PPGs) and relevant construction industry guidance, best practice measures to protect the water environment will be implemented during the construction of the Scheme.

5.1.2 Should a situation arise where our proposed mitigation is not adequate, this plan will be reviewed. It will also be reviewed quarterly by the Environmental Manager to ensure it is up to date and accurate.

5.1.3 Any instances of surface or groundwater pollution will be reported immediately to the Environmental Manager who will investigate.

5.1.4 Specific monitoring requirements will be detailed. Nominated staff will carry out regular site inspections to control measures are in place and adhered to during the works.

5.1.5 Records will be produced to show compliance with our Groundwater and surface water management system, including inspections records, site plans and progress reports

5.1.6 Surface water monitoring will be undertaken to demonstrate no adverse effects on water quality during concrete works. An appropriate monitoring schedule and programme will be agreed with NRW.

Annex H Outline Materials Management Plan

Welsh Government

M4 Corridor around Newport

Environmental Statement Volume 3:
Annex H to Appendix 3.2 Outline Material Management Plan

M4CaN-DJV-EGN-ZG_GEN-AX-EN-0013

At Issue | March 2016

CVJV/AAR
3rd Floor
Longross Court,
47 Newport Road,
Cardiff
CF24 0AD

Contents

Appendices

1 Introduction

1.1 Background

1.1.1 It is intended that, in relation to the construction and operation of the Scheme, the reuse of site won soils is maximised thereby avoiding the need for significant waste disposal.

1.1.2 In this context, this Material Management Plan (MMP) has been prepared in order to establish the requirements in relation to the reuse of site won soils particularly with regards to material specification, control, regulator acceptance and associated verification.

1.1.3 This report presents the approach for managing the reuse of site won soils and provides an outline Material Management Plan in accordance with CL:AIRE guidelines ready for Qualified Person Declaration. This Material Management Plan has been prepared in order to support the requirements of the CL:AIRE Definition of Waste: Industry Code of Practice (Dow CoP), Version 2 (CL:AIRE, 2011)

1.2 Scope

1.2.1 The scope of this MMP is to cover the Scheme. It will identify the information from the Scheme design and construction documentation to demonstrate the requirements of the CL:AIRE DoW CoP can be met.

1.2.2 The earthworks strategy for the Scheme, and hence this MMP, is at an outline stage and will be developed further as the Scheme design progresses.

1.3 Technical Status

1.3.1 The general principles for management of site won soils have been discussed with land contamination technical representatives from Natural Resources Wales (NRW), Newport City Council and Monmouthshire County Council. A Land Contamination Management Strategy (Appendix 11.3) has been developed and agreed that describes both the general approach to the characterisation of land contamination risks as well as the design, implementation and verification of remedial works. This identifies the approach utilising the CL:AIRE DoW CoP.

1.4 Structure of Report

1.4.1 The remainder of this report will include the following sections:

Section 2: Overview of Material Management Plan.

Section 3: Supporting Documentation.

Section 4: Summary.

2 Overview of Material Management Plan

2.1 Site Location

2.1.1 The existing M4 motorway connects London and South Wales, crossing the River Severn and using the Brynglas Tunnels to the north of Newport. The proposed Scheme will provide a new, approximately 24 km, three-lane motorway to the south of Newport between Junctions 29 (Castleton) and 23A (Magor) of the M4.

2.1.2 From Junction 29 at Castleton, the new motorway will pass to the south and east of Newport and Duffryn, crossing the north-eastern part of the Wentlooge Levels and the South Wales to London Mainline railway. The alignment will cross the River Usk to the south of Newport, crossing Newport Docks as an elevated section before continuing in an easterly direction towards Magor. To the east of the River Usk, the route passes to the south of the main Tata Llanwern Steelworks, passing through the northern parts of the Caldicot Levels. The route will cross the South Wales to London Mainline railway on the approach to Magor, re-joining the existing M4 at Junction 23A.

2.1.3 The location of the existing M4 and the proposed route of the Scheme are shown on Figure 11.1of the Environmental Statement.

2.2 Summary of Intentions

2.2.1 It is understood that there is a net deficit of materials for the Scheme and hence, subject to suitability, any site won soils can be beneficially used within the Scheme construction. It is intended to support this by producing a Material Management Plan.

2.2.2 The MMP is normally underpinned by documentation that demonstrates that there is a design intention to unitise site won soils, hence avoiding designation as waste. These documents are individually agreed with the relevant regulators and then used to support the MMP.

2.2.3 In support of this the new section of motorway has been subject to a series of investigations that have characterised the ground conditions and identified sites with potential land contamination. As a result,27 potentially contaminated sites have been identified as potentially impacted by the new section of motorway.

2.2.4 The assessments of the route as a whole and in relation to the presence of potential land contamination are presented in the Land Contamination Assessment Report in Appendix 11.1 of the M4CaN Environmental Statement (ES). The sites are shown on Figure 2.1 and further details are provided for each area affected by the new section of motorway in the relevant Annex in the Land Contamination Assessment Report.

2.2.5 The Land Contamination Assessment Report and Annexes have been used to inform the development of an Outline Remediation Strategy (Appendix 11.2 of the ES) for the Scheme including a remediation options appraisal and remediation verification plan.

2.2.6 It is intended that an earthworks strategy and specification for the works is developed taking account of these assessments and remediation strategy that

will maximise the beneficial reuse of site won soils and meet the requirements of the CL:AIRE DoW CoP.

2.2.7 The key supporting documents will need to be agreed with the appropriate regulators, enabling the MMP to be completed, and a Qualified Person Declaration to be made.

2.2.8 The making of the declaration falls outside the scope of this report.

3 Supporting Documentation

3.1 Introduction

3.1.1 The MMP does not have a fully prescribed list of supporting documents that enables sign off but rather a list of questions that need to be answered and supported with relevant design documentation. These documents are normally produced as part of standard design requirements so do not add to the burden of documentation except for encouraging early discussion and agreement with the Regulators.

3.2 Document Register

3.2.1 The following provides a list of the expected documentation requirements to support the completion of a MMP for the Scheme:

- Earthworks Strategy.
- Land Contamination Management Strategy.
- Remediation Strategy including a verification plan.
- Earthworks Specification.
- Cut/Fill requirements and earthworks movements plan.
- Proforma MMP.

3.2.2 A draft MMP is provided within Annex 1. The other supporting documentation referenced is prepared separately and references incorporated into the MMP as regulator agreement is obtained. The draft MMP would be reviewed and updated during detailed design of the Scheme.

4 Summary

4.1 Summary

4.1.1 There is an intent to maximise the reuse of site won soils for the construction of the Scheme.

4.1.2 There is understood to be a net deficit of materials that demonstrates, subject to suitability, the site won soils can be beneficially used within the Scheme.

4.1.3 Ground investigation along the new section of motorway has identified areas of potential land contamination that can be managed with remediation.

4.1.4 Management of this reuse using the CL:AIRE DoW CoP has been agreed in principal with the Regulators.

4.1.5 A number of Scheme specific design documents require agreement with the Regulators to underpin the MMP and enable a Qualified Person Declaration to be made.

4.1.6 A draft MMP is provided in order to enable the information requirements to be assessed and subsequently agreed.

5 References

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

Appendices

A1 Appendix 1

DRAFT CL:AIRE Material Management Plan

Materials Management Plan (MMP) Form - October 2014

This form should be completed once the lines of evidence have been marshalled in relation to suitability for use, certainty of use and quantity required.

The answers to the questions posed within this form, together with the supporting information will constitute the MMP and must be provided to the Qualified Person.

A Qualified Person may comment on draft versions of this MMP, but will not complete the Declaration until all the relevant documents, demonstrating lines of evidence have been provided for each site.

The person / organisation who will pay the Declaration fee should confirm that they have read and understand the Terms and Conditions relating to the payment of the Declaration fee to CL:AIRE. These can be found on the CL:AIRE website.

The person / organisation agreeing to pay the Declaration Fee - Name, organisation and contact details inc. email address -	

☐ **I confirm I have read and understood the Terms & Conditions.**

Each question must be answered. If the question is not applicable please state this and provide a brief explanation.

1. Specify the scenario to which this MMP relates, as described in the Definition of Waste: Development Industry Code of Practice (DoW CoP) (1, 2, 3 or 4):

✓ 1. Reuse on the Site of Origin

☐ 2. Direct Transfer of clean naturally occurring soil / mineral materials

☐ 3. Cluster Project

☐ 4. Combination of any of the above

In the case of a combination of reuse scenarios, please describe it below (e.g. (i) Reuse on Site of Origin and Direct Transfer of clean naturally occurring unpolluted soils, (ii) Reuse on the Site of Origin with Direct Transfer of clean naturally occurring soil to x number of development sites etc:

(NB: A Declaration is required for reuse on the Site of Origin and for any 2 site arrangement i.e. there is no facility for a combination Declaration)

2. Organisation and name of person preparing this MMP	(Full address and contact details)

Document Control

Date issued	
Revision date	
Summary of revision 1	
Summary of revision 2	

Insert additional lines to the table above for any subsequent revisions.

Note - revisions to the MMP do not trigger an additional Declaration by a Qualified Person, unless an additional site is added to the project.

Revisions to the MMP must be recorded and summarised in the Document Control box above.

Site Details

3. Site / Project name(s)	
Reuse / receiving site name :	
Donor site name (if Direct Transfer)	

Landowners

4a. Name of Landowner(s) (full address and contact details) – where excavated materials are to be reused	
4b. Name of Landowner(s) (full address and contact details) – where excavated materials are arising from	

Summary and objectives

5a. Provide a brief description of the planned project and how excavated materials are to be reused.	The strategy for the Scheme is to re-use as much site won material as possible. The re-use of site won material will be subject to compliance with relevant specifications and assessment criteria to ensure engineering suitability and protection of environmental receptors. The assessment criteria will be agreed with the regulators and details will be provided within this Materials Management Plan. Where materials are unable to meet the assessment criteria they will be treated to make then suitable for use, thereby minimising the quantity of materials requiring off-site disposal as

	waste.

General Plans and Schematics

6. **Attach** a location plan for the site(s) and a plan of the site(s) which identifies where different materials are to be excavated from, stockpile locations (if applicable), where materials are to be treated (if applicable) and where materials are to be reused.	Plan Document Reference(s):

7. **Attach** a schematic of proposed materials movement. Where there is only one source area and one placement area briefly describe it. For all other projects a schematic is required.	Description & Schematic Document Reference:

Parties Involved and Consultation – if more than one party please provide additional details for them and identify the location that they will be working e.g. where a site is zoned

8a. Main earthworks contractor(s) (full address and contact details) – Where	Not identified at outline design stage.

excavated materials are to be reused	
8b. Main earthworks contractor(s) (full address and contact details) - Where excavated materials are arising from	Not identified at outline design stage.

9. Treatment contractor(s) (full address and contact details) – for treatment on site of origin, or at a Hub site within a fixed STF / Cluster Project	To be identified during the detailed design stage

10. Where wastes and materials are to be transported between sites, provide details of the transport contractor(s) (full address, contact details and waste carriers registration details (if applicable))	To be identified during the detailed design stage

11. Provide Local Authority contact details (full address and named contacts) where excavated materials are to be reused	Newport City Council, Civic Centre, Newport, South Wales, NP20 4UR

12a. For the site where materials are to be reused and for Hub Site locations provide	To be identified during the detailed design stage

Environment Agency contact details (full address and named contacts):	
For all Cluster Projects: 12b. Attach any relevant documentation from the EA relating to the excavation and reuse of the materials to demonstrate no objection to the proposals (see 3.37 of DoW CoP) If the EA has not been consulted please explain why (see paragraph 3.39 of the DoW CoP).	EA references:

Lines of Evidence

There is no one single factor that can be used to decide that a substance or object is waste, or when it is, at what point it ceases to be waste; as complete a picture as possible has to be created.

The following sections require completion to ensure the correct decision is made.

If a requested item is not relevant it is important to clearly state why this is so (e.g. no planning permission required because permitted development status exists).

Suitable for use criteria

13. Please describe or provide copies of the required specification(s) for the materials to be reused on each site.	Document Reference(s): This will be combination of the earthworks specification and landscape specifications To be identified during the detailed design stage

Where contamination is suspected or known to be present 14a. Please provide copies of or relevant extracts from the risk assessment(s) that has been used to determine the specification for use on the site. **This must relate to the place where materials are to be used.** This must be in terms of (i) human health (ii) controlled waters and (iii) any other relevant receptors. If a risk assessment is not relevant for a particular receptor given the site setting please explain why below:	Details can be found in Land Contamination Assessment Report (Appendix 11.1) and the Remediation Strategy (Appendix 11.2).

14b. Please attach any relevant documentation from the LA relating to the excavation and reuse of the materials to demonstrate no objection (see 3.37 of the CoP)	LA Document references: This will include ref for MOU (approach taken) and correspondence following full issue and review of the CL reports etc. I 14a)
14c. Please attach any relevant documentation from the EA relating to the excavation and reuse of the materials to demonstrate no objection (see 3.37 and Table 2 of the CoP)	EA Document references: This will be provided during detailed design.
14d. Please attach any relevant documentation from any other regulators (if relevant) relating to the excavation and reuse of the materials to demonstrate no objection (see 3.37 of the CoP)	Document Reference(s):

Where contamination is not suspected 15a. Please attach copies or relevant extracts from the Desk Top Study that demonstrates that there is no suspicion of contamination.	Document Reference(s) Information on land where contamination is not suspected is set out in Appendix 11.1 of the Environmental Statement.
15b. Please attach copies of or relevant extracts from the site investigation/testing	Document Reference(s) Information on land where contamination is not suspected is set out in Appendix 11.1

reports that adequately characterise the clean materials to be used (if appropriate).	of the Environmental Statement. This will be supplemented by further investigatin during detailed design.
15c. Please attach copies of any other relevant information (if available) confirming that land contamination is not an issue.	Document Reference(s)

NB: It is your responsibility to assess the nature of the material to be used and that it fits within the limitations of the scenario under which it is to be used

Certainty of use

Various lines of evidence are required to demonstrate that the materials are certain to be used. This includes:

- The production of this MMP
- An appropriate planning permission (or conditions that link with the reuse of the said materials)
- An agreed Remediation Strategy(ies)
- An agreed Design Statement(s)
- Details of the contractual arrangements

Please identify in the following sections what lines of evidence relate to the site(s) **where the materials are to be used**.

16a. Planning Permission(s) relating to the site where materials are to be reused Please provide a copy of the relevant planning permission	Document Reference:
16b. Explain how the reuse of the excavated materials fits within the planning permission(s) for each site.	
16c. If planning permission is not required for any one site please explain why below e.g. permitted development, clean up of a chemical spill, surrender of an Environmental Permit, re-contouring within the existing permission.	

Where contamination is suspected or is known to be present 17. Please provide a copy of any Remediation Strategy(ies) that have been agreed with relevant regulators.	Document Reference(s):

Where contamination is not suspected	Document Reference(s):

18. Please provide a copy of any Design Statement(s) that have been agreed (e.g. with the planning authority or in the case of permitted developments the client).	

Quantity of Use

19. Please provide a breakdown of the excavated materials for each site and how much will be placed at each site or sub area of each site. Where this is not specific to a single readily identifiable source refer to an annotated plan, schematic or attach a tabulated summary.	Document Reference(s): To be identified during the detailed design stage

20a. How has consolidation/compaction being considered in the above mass balance calculations?	To be identified during the detailed design stage
20b. How has loss due to treatment being	To be identified during the detailed design stage

considered in the above mass balance calculations (if applicable)?	
20c. How has the addition of treatment materials being considered in the above mass balance calculations (if applicable)? Note - An exact figure is not required but one that is reasonable in the circumstances and can be justified if challenged.	To be identified during the detailed design stage

Contingency arrangements

Explain what is to happen in the following situations and **identify the appropriate clauses** in the contract(s) (Such clauses must be provided to the Qualified Person, preferably as a summary document): or

21a. What is to happen to, and who is to pay for out of specification materials?	Reference:
21b. What is to happen to, and who is to pay for any excess materials?	Reference:
21c. What happens if the project programme slips in relation to excavated materials or materials under -going treatment?	Reference:

21d. Other identified risk scenarios for the project (relating to excavated materials)?	Reference:

The Tracking System

Where contamination is suspected or known to be present, state the procedures put in place to:

22a. For all sites please describe the tracking system to be employed to monitor materials movements.	The approach to tracking materials is set out in the Outline Remediation Strategy (Appendix 11.2).
Where contamination is suspected or known to be present, state the procedures put in place to: 22b. Prevent contaminants not suitable for the treatment process being accepted	The approach is set out in the Land Contamination Management Strategy (Appendix 11.3) and the Outline Remediation Strategy (Appendix 11.2).
Where contamination is suspected or known to be present, state the procedures put in place to: 22c. Prevent cross contamination of materials not in need of treatment, wastes awaiting treatment and treated materials	To be added during detailed design
Where contamination is suspected or known to be present, state the procedures put in place to:	The approach to tracking materials is set out in the Outline Remediation Strategy (Appendix 11.2).

22d. Demonstrate that materials that do not require treatment and successfully treated materials reach their specific destination	
Where contamination is suspected or known to be present, state the procedures put in place to: 22e. Ensure that waste for off-site disposal or treatment is properly characterised and goes to the correct facility	The approach to tracking materials is set out in the Outline Remediation Strategy (Appendix 11.2).

23. Please attach a copy of the tracking forms / control sheets that are to be used to monitor materials movements. To include transfer of loads on site into stockpiles prior to treatment (if applicable), stockpiled after treatment (if applicable), stockpiled awaiting use (as appropriate) and final placement.	Document reference(s)

For Hub Sites within Cluster Projects & where materials need treatment before	Permit reference / EA letter reference:

reuse 24. Please attach a copy of the Environmental Permit covering the treatment process. Alternatively if the treatment is covered by a Mobile Plant Permit and associated Deployment Form, attach a copy of the EA agreement to the Deployment Form.	

Records

25. Where, and in what form, are records to be kept? Note – records e.g. transfer notes, delivery tickets, Desk Top Study, Site Investigation, Risk Assessment(s), Verification Report(s) need to be kept for at least 2 years after the completion of the works and production of the Verification Report	

Verification Plan

26. Provide or explain the Verification Plan which sets out how you will record the placement of materials and prove that excavated materials have been reused in the correct location and in the correct quantities within the development works (see 3.4 of the DoW CoP).	Document Reference The approach to tracking materials is set out in the Outline Remediation Strategy (Appendix 11.2).