



Construction Spoil Management Plan

Project:	M4 East – Design and Construct
Contract Number:	15.7105.1373
Document Number:	M4E-PM-PLN-PWD-00202
Revision Date:	13 December 2016

Document Approval

Rev	Date	Prepared by	Reviewed by	Approved by	Remarks
C	13/05/2016	John Black	Ryan Franklin Matt Lennon	Don Johnson	
D	17/06/2016	John Black	Ryan Franklin Matt Lennon	Don Johnson	
E	24/06/2016	John Black	DP&E	DP&E	Updated in response to DP&E comments
0	13/12/2016	Jacinta Fuller	Ryan Franklin	Don Johnson	Haulage routes and disposal locations removed



Glossary/Abbreviations

Abbreviation	Definition
AQMP	Construction Air Quality Management Plan
CEMP	Construction Environmental Management Plan
CLMP	Construction Contaminated Land Management Plan
CNVMP	Construction Noise and Vibration Management Plan
CoA	Condition of Approval
CSJ	CPB Samsung John Holland Joint Venture
DA	Development Application
EIS	Environmental Impact Statement
ENM	Excavated Natural Material
EPA	NSW Environment Protection Authority
EPL	Environment Protection Licence
ESD	Ecologically Sustainable Development
OTR	Other than rock
POEO Act	<i>Protection of the Environment Operations Act 1997</i>
Project	WestConnex M4 East, SSI 6307
Project Company	WCXM4 Co The Project Company, WCXM4 Co has been engaged by Roads and Maritime Services to deliver the M4 East project. WCXM4 Co has in turn, engaged the Contractor, CSJ to design and construct the M4 East project.
SCC	Specific Contaminant Concentration
SMP	Construction Spoil Management Plan (This Plan)
SPIR	Submissions and Preferred Infrastructure Report
SSI	Means the State significant infrastructure as generally described in Schedule 1 (SSI 6307)
SWMP	Construction Soil and Water Management Plan
SWTC	Scope of Works and Technical Criteria
TCLP	Toxicity Characteristics Leaching Procedure
TAMP	Traffic and Access Management Plan
VENM	Virgin Excavated Natural Material
WARR Act	<i>Waste Avoidance and Resource Recovery Act 2001</i>
WRMP	Construction Waste and Resources Management Plan
WCXM4 Co	Project Company The Project Company, WCXM4 Co has been engaged by Roads and Maritime Services to deliver the M4 East project. WCXM4 Co has in turn, engaged the Contractor, CSJ to design and construct the M4 East project.



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1 Introduction

This Spoil Management Plan (SMP, the Plan) is required in accordance with Condition D46 of the Minister's Condition of Approval (CoA) which states:

“Prior to commencement of any tunnelling works, the Proponent must prepare and implement a Spoil Management Plan for the SSI. The Spoil Management Plan is to be developed, in consultation with EPA and the relevant Council(s), for the approval of the Secretary. The Spoil Management Plan must incorporate detailed information on the handling of spoil generated during construction of the SSI, and provide information regarding each of the broad parameters specified in the documents listed in Condition A2(b) and (c).

The Spoil Management Plan is to be prepared separate to, but consistent with, the Construction Traffic and Access Management Plan required under condition D57(a)”.

The WestConnex M4 East project works is anticipated to generate approximately 2.4 million cubic metres of spoil, the majority of which will be from excavation of the tunnels.

1.1 Purpose

The purpose of the Plan is to:

- Minimise spoil removal and associated impacts on stakeholders, community and the environment;
- Maximise the beneficial reuse of spoil material from the Project; and
- Address the Project wide objective to provide certainty of delivery by managing spoil in a manner that avoids impacts on construction activities and timing.

1.2 Scope

Spoil is defined as 'rock' or 'other than rock' (OTR) resulting from construction excavation and tunnelling activities.

This Plan addresses and details the following issues:

- Excavation, handling, haulage, disposal and reuse methodology, including on-site storage and stockpiling arrangements;
- Processes and procedures that will be used for the management of spoil, including those for Virgin Excavated Natural Material (VENM), Excavated Natural Material (ENM), contaminated and unsuitable material;
- Measures that will be implemented to both reduce spoil quantities and maximise the beneficial reuse of spoil that will be generated during the performance of the works;
- Nominated quantities for reuse of spoil within the construction site, for beneficial reuse of spoil off site and for spoil disposal; and
- Processes and procedures for the management of the environmental and social impacts of spoil transfer and reuse.

1.3 Information Required

As required by CoA D46, this document is structured to follow the broad parameters outlined in Table 6-27 of Volume 1A of the Environmental Impact Statement (EIS) identified in Table 1-1.

Table 1-1 Spoil Management Strategy broad parameters (from the EIS)

Parameter	Strategy response	Relevant section
Spoil generation	2.4 million cubic metres (surplus spoil)	Section 3 Spoil Production
Spoil generation locations	<p>Spoil would be generated (from tunnelling activities and/or surface works) at the following temporary construction sites:</p> <ul style="list-style-type: none"> • Homebush Bay Drive civil site (C1) (244,000 cubic metres) • Underwood Road civil and tunnel sites (C3) (198,000 cubic metres) • Powells Creek civil site (C4) (4,000 cubic metres) • Concord Road civil and tunnel sites (C5) (455,000 cubic metres) • Cintra Park tunnel site (C6) (560,000 cubic metres) • Northcote Street tunnel site (C7) (580,000 cubic metres) • Eastern Ventilation Facility site (C8) (125,000 cubic metres) • Wattle Street and Walker Avenue civil site (C9) (116,000 cubic metres) • Parramatta Road civil site (C10) (72,000 cubic metres) 	Section 3 Spoil Production
Spoil management hierarchy	<p>Where feasible and reasonable, spoil would be managed according to the following hierarchy:</p> <ul style="list-style-type: none"> • Minimisation of spoil generation through design and management • Reuse of spoil within the project • Beneficial reuse of spoil outside the project for environmental and community works • Beneficial reuse of spoil outside the project for site levelling, development or rehabilitation • Disposal of spoil outside the project for non-beneficial uses (landfilling) 	Section 5 Spoil Reduction, Reuse and Disposal
On-site management	Spoil would be transported from the tunnel face to the surface by truck, where it would be stored at each tunnel site with capacity to store up to one day's spoil generation from the site. For surface earthworks, spoil would be stockpiled at the construction ancillary facilities. Spoil would be loaded onto trucks (within the acoustic shed at tunnel sites) for transport off site. Appropriate dust management controls would be implemented at stockpiles.	Section 6 Spoil on-Site Management
Spoil testing	Spoil would be sampled, analysed and characterised according to the <i>Waste Classification Guidelines: Part 1 Classifying Waste (EPA 2014)</i> . In the case of spoil generated from the excavation of tunnels, spoil testing would be limited to initial testing to confirm that the excavated material is VENM.	Section 4 Material Types
Spoil quality	The majority of spoil that would be generated by the project is expected to meet the classifications of VENM. There is some potential, particularly for spoil generated at the surface around current and historical development, that spoil may be classified as solid waste. More heavily	Section 4 Material Types



	contaminated materials are not expected to be encountered.	
Spoil disposal locations	Excess spoil would be disposed of at a location that has appropriate approval or licences to accept the material. Alternative sites from those listed in this chapter may also be considered for spoil reuse / disposal subject to necessary environmental planning approvals being in place for those sites and the specific needs of the project. Solid waste and more highly contaminated materials would only be reused on-sites permitted to accept the materials, or otherwise directed to an appropriately licensed waste management facility.	Section 7 Spoil Disposal Locations
Spoil transport	Spoil would be transported by truck. Haulage routes are outlined in section 6.9.4 (of the EIS).	Section 8 Spoil Transport



2 Consistency with Traffic and Access Management Plan

The Spoil Management Plan has been developed in accordance with CoA D46. This document is considered consistent with the Traffic and Access Management Plan (TAMP) (CoA D57(a)), a sub-plan of the Construction Environment Management Plan (CoA D56), with the following points illustrating this consistency:

- Spoil haulage trucks will utilise the routes presented in Section 6.3.2 Spoil Haulage Routes and Annexure E of the TAMP;
- Heavy vehicle haulage routes generally follow arterial roads, as foreshadowed in the plan;
- Disposal and reuse locations mirror those locations broadly identified in the Environmental Impact Statement (EIS), Table 6.25; and
- The identification of alternative disposal and reuse locations in accordance with the spoil disposal hierarchy as outlined in the EIS (section 6.9.2 and 6.9.3 of EIS).



3 Spoil Production

It is envisaged that the project will generate approximately 2.4 million cubic metres of surplus spoil. The majority of spoil will be generated from excavation of the tunnels, shafts and surface works. Key spoil production locations for the M4 East project are shown in Table 3-1.

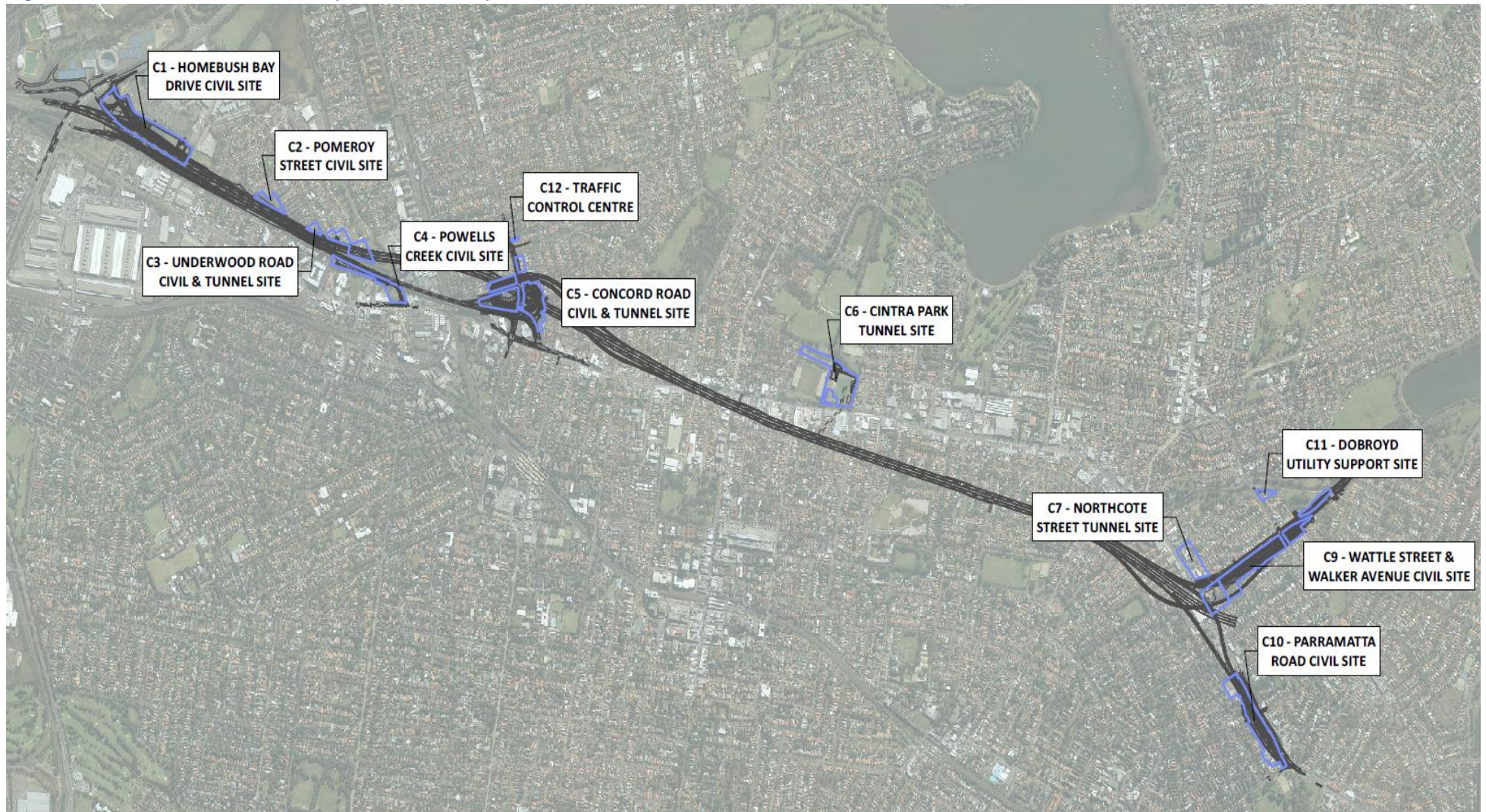
The majority of excavated material will be uncontaminated crushed sandstone and shale material, classified as virgin excavated natural material (VENM). Some excavated natural material (ENM) is also expected.

The estimated quantities of spoil to be generated at the main locations (subject to detailed design) are detailed in Table 3-1.

Table 3-1 Anticipated Spoil Production

Location	Approximate Spoil Production (m3)	
	Surface Works	Tunnelling
Homebush Bay civil site (C1)	244,000	-
Underwood Road civil and tunnel sites (C3)	36,000	162,000
Powells Creek civil site (C4)	4,000	-
Concord Road tunnel site (C5)	110,000	345,000
Cintra Park tunnel site (C6)	-	560,000
Northcote Street tunnel site (C7)	-	625,000
Wattle Street and Walker Avenue civil site (C9) (identified in EIS as C8 and C9)	196,000	-
Parramatta Road civil site (C10)	72,000	-
Sub Totals	662,000	1,692,000
Total		2,354,000

Figure 3-1 WestConnex M4 East Project, with ancillary facilities



4 Material Types

Topsoil occurs between approximately 50-300mm of natural ground surface. Topsoil reuse shall be maximised on site to minimise the import of external topsoil for revegetation and landscaping purposes where ever practicable.

The material below the topsoil is considered to be spoil and is defined as any earthen material that is surplus to requirements or unsuitable for reuse within the Project works.

4.1 Classification

Topsoil and spoil, other than virgin excavated natural material (VENM), will be sampled, analysed and characterised in accordance with the *Waste Classification Guidelines: Part 1 Classifying Waste* (EPA 2014) (the Guidelines) as required by the Construction Waste and Resource Management Plan (WRMP). Further information regarding the classification of VENM and ENM and other resource recovery exemptions are provided below.

4.1.1 VENM

The majority of tunnel spoil excavated is expected to be classified as VENM and will be classified in accordance with the *Waste Classification Guidelines: Part 1 Classifying Waste* (EPA 2014):

Virgin excavated natural material means natural material (such as clay, gravel, sand, soil or rock fines):

- *That has been excavated or quarried from areas that are not contaminated with manufactured chemicals, or with process residues, as a result of industrial, commercial, mining or agricultural activities*
- *That does not contain sulfidic ores or soils, or any other waste,*

and includes excavated natural material that meets such criteria for virgin excavated natural material as may be approved from time to time by a public notice published in the NSW Government Gazette.

CSJ, the generator of the VENM, or its Environmental Consultant will consider the following four questions when classifying material as VENM:

- 1 Are manufactured chemicals or process residues present?
- 2 Are sulfidic ores or soil present?
- 3 Are naturally occurring asbestos soils present?
- 4 Is there any other waste present?

If material meets the definition of VENM it can be reused on or offsite without prior testing. However, if there is any doubt as to whether the material is VENM, CSJ will sample and test the material as per the excavated natural material resource recovery exemption to confirm that the material is free of contaminants.

4.1.2 ENM

If spoil is unable to be classified as VENM it will be sampled, and tested to determine whether it meets the excavated natural material (ENM) classification criteria in accordance with the *Protection of the Environment Operations (Waste) Regulation 2014* (the Regulation) current general resource recovery exemption, *the excavated natural material exemption 2014*:

Excavated natural material (ENM) means naturally occurring rock or soil (including but not limited to materials such as sandstone, shale, clay and soil) that has:

- a) *Been excavated from the ground, and*
- b) *Contains at least 98% by weight natural material, and*



c) *Does not meet the definition of Virgin Excavated Natural Material in the Act*

ENM does not include material that has been processed or contains acid sulphate soils or potentially acid sulphate soils.

4.1.3 General solid waste or other classifications

Spoil not classified as either VENM or ENM due to contamination from either construction material or other sources shall be characterised in accordance with the *Waste Classification Guidelines: Part 1 Classifying Waste* (EPA 2014) as required by the WRMP. This may include classification as General Solid Waste (Non putrescible), Hazardous Waste or Special Waste.

4.1.3.1 Special Waste

Special Waste is a class of waste that has unique regulatory requirements. The potential environmental impacts of special waste need to be managed to minimise the risk or harm to the environment or human health.

Special waste means any of the following:

- Clinical and related waste
- Asbestos waste
- Waste tyres
- Anything classified as special waste under an EPA gazettal notice.

4.1.3.2 Hazardous Waste

The following waste types (other than special waste or liquid waste) have been pre-classified by the EPA as 'hazardous waste':

- Containers, having previously contained a substance of Class 1, 3, 4, 5 or 8 within the meaning of the Transport of Dangerous Goods Code, or a substance to which Division 6.1 of the Transport of Dangerous Goods Code applies, from which residues have not been removed by washing or vacuuming,
- Coal tar or coal tar pitch waste (being the tarry residue from the heating, processing or burning of coal or coke) comprising of more than 1% (by weight) of coal tar or coal tar pitch waste,
- Lead-acid or nickel-cadmium batteries (being waste generated or separately collected by activities carried out for business, commercial or community services purposes),
- Lead paint waste arising otherwise than from residential premises or educational or child care institutions, and
- Any mixture of the wastes referred to above.

4.1.3.3 General Solid Waste (Non putrescible)

General Solid Waste (Non putrescible) is any waste that is not classified as special waste, liquid waste, hazardous waste, restricted solid waste or general solid waste (putrescible).

4.1.4 Waste Classification Process Steps

The WRMP identifies six classes of waste: Special, Liquid, Hazardous, Restricted Solid, General Solid (putrescible) and General Solid (non-putrescible), and describes a six step process to classifying waste. That process is summarised below:



Step 1: Is it 'Special Waste'?

Establish if the waste should be classified as special waste. Special wastes are: clinical and related waste, asbestos waste, waste tyres. Definitions are provided in the Guidelines.

Note: The transportation and management of asbestos waste must be managed in accordance with Part 7 of the *Protection of the Environment Operations (Waste) Regulation 2014* (Regulation) and special requirements pertaining to clinical and related waste are stipulated in section 113 of the Regulation.

Step 2: If not special, is it 'Liquid Waste'?

If it is established that the waste is not special waste it must be decided whether it is 'liquid waste'. Liquid waste means any waste that: has an angle of repose of less than 5° above horizontal becomes free-flowing at or below 60° Celsius or when it is transported is generally not capable of being picked up by a spade or shovel.

Liquid wastes are sub-classified into:

- Sewer and stormwater effluent.
- Trackable liquid waste according to the *Protection of the Environment Operations (Waste Regulation) 2014*, Schedule 1, Waste to which waste tracking requirements apply.
- Non-trackable liquid waste.

Step 3: If not liquid, has the waste already been pre-classified by the NSW EPA?

The EPA has pre-classified several commonly generated wastes in the categories of hazardous, general solid waste (putrescibles) and general solid waste (non-putrescibles). If a waste is listed as 'pre-classified', no further assessment is required.

Step 4: If not pre-classified, is the waste hazardous?

If the waste is not special waste (other than asbestos waste), liquid waste or pre-classified, establish if it has certain hazardous characteristics and can therefore be classified as hazardous waste.

Hazardous waste includes items such as explosives, flammable solids, substances liable to spontaneous combustion, oxidizing agents, toxic substances and corrosive substances.

Step 5: If the waste does not have hazardous characteristics, undertake chemical assessment to determine classification.

If the waste does not possess hazardous characteristics, it needs to be chemically assessed to determine whether it is hazardous, restricted solid or general solid waste (putrescible and non-putrescible). If the waste is not chemically assessed, it must be treated as hazardous.

Waste is assessed by comparing Specific Contaminant Concentrations (SCC) of each chemical contaminant, and where required the leachable concentration using the Toxicity Characteristics Leaching Procedure (TCLP), against Contaminant Thresholds (CT).

Step 6: Is the general solid waste putrescible or non-putrescible?

If the waste is assessed as general solid waste, a further assessment is required to determine whether the waste is putrescible or non-putrescible. The assessment determines whether the waste is capable of significant biological transformation.



Contamination due diligence assessment has been undertaken as part of the EIS and possible contaminated material may be present in the upper soil layers at the Homebush Bay Road civil site, Powells Creek civil site, Underwood Road civil and tunnel sites, Northcote Street tunnel site, Wattle Street and Walker Avenue civil site and Parramatta Road civil site. Spoil generated from these sites will be sampled, analysed and characterised in accordance with Section 4.1 of the WRMP. Disposal locations for these materials will be determined by the classification and the materials will be disposed of at an approved waste management facility.

Material characterised as contaminated that has not been previously identified, shall be managed in accordance with the Unexpected Discovery of Contaminated Land Procedure or Acid Sulfate Soils Management Plan within the Construction Soil and Water Management Plan (SWMP), including the preparation of a remediation action plan (RAP), where appropriate. Waste materials will be managed and disposed in accordance with the WRMP.

4.1.5 Resource recovery exemptions

The *Protection of the Environment Operations (Waste) Regulation 2014* enables the EPA to issue 'resource recovery exemptions' which allow for the beneficial reuse of wastes via land application or for use as a fuel. These exemptions enable a project to comply with the principle of 'wastes to resources for beneficial reuse' (where the wastes are fit for beneficial reuse). During the project, materials may be encountered that do not meet the VENM or ENM classification but are also not contaminated material. In these circumstances the Project will check for existing resource recovery exemptions such as:

- The excavated public road material exemption 2014 (EPA);
- The reclaimed asphalt pavement exemption 2014 (EPA);
- The recovered aggregate exemption 2014 (EPA); and
- Raw mulch material exemption 2014 (EPA).

Should the existing resource recovery exemptions not be appropriate, the Project will consider application for a site specific exemption established through consultation with the EPA.

5 Spoil Reduction, Reuse and Disposal

The Spoil Management Hierarchy has been developed to meet the objectives and principles of the NSW *Waste Avoidance and Resource Recovery Act 2001* and the *NSW Waste Avoidance and Resource Recovery Strategy 2007*.

5.1 NSW Waste Avoidance and Resource Recovery Act 2001

The NSW *Waste Avoidance and Resource Recovery Act 2001* (the Act) includes the majority of NSW's overarching objectives and guiding principles to encourage beneficial reuse and resource recovery. Implementation of a waste hierarchy in accordance with the principle of Environmentally Sustainable Development (ESD) is identified as a main objective of the Act, along with objectives to minimise the consumption of natural resources and waste generation. The NSW Environment Protection Authority (EPA) defines ESD as including the following:

- The precautionary principle;
- Inter-generational equity;
- Conservation of biological diversity and ecological integrity; and
- Improved valuation, pricing and incentive mechanisms.

The NSW *Waste Avoidance and Resource Recovery Strategy 2007* include an extensive list of principles broadly focused on ESD, economic analysis, and community and industry involvement.

5.2 Spoil Reduction

To reduce spoil quantities, the design has optimised the tunnel cross section area by using road headers rather than tunnel boring machines (TBM). A 16 metre diameter TBM has a cross sectional area of 201 square metres, compared with a 107 square metre profile for a road header. This measure reduces the volume of material requiring disposal by 94 cubic metres per lineal metre of tunnel. Over two 5.5 kilometre tunnels the total reduction is estimated to be 1,034,000 cubic metres.

Innovative design will place all the tunnel conduits behind the tunnel reflective linings or within the concrete barriers eliminating trenching below the pavement. This will reduce spoil by a further estimated 33,000 cubic metres.

Use of an electronic guidance system on the road headers will reduce over break by around 100mm. This equates to a further reduction in spoil of 27,000 cubic metres.

The total estimated reduction in spoil is estimated to be 1,094,000 cubic metres, which equates to a reduction of 170,000 truck movements.

It is unlikely that the spoil volume will be further reduced during the delivery phase of the project; however, if future design or construction methodology development provide any opportunities to reduce spoil generation such opportunities will be implemented.

5.3 Spoil Management Hierarchy

The plan for management of spoil material from the M4 East Project shall be guided by the hierarchy in section 6.9.2 of the EIS and Table 5-1.

It should be noted that beneficial reuse of spoil described in this document is considered to be any approved or appropriate offsite and onsite reuse.



Table 5-1 Spoil management hierarchy

Rank	Options	Example of Options	Potential for option to be used on WestConnex M4 East
1	Avoid and reduce spoil generation	<ul style="list-style-type: none"> Reduce the amount of spoil being generated through design and construction methodology. 	Limited
2	Reuse within the Project	<ul style="list-style-type: none"> Reuse in the Project to fill embankments and mounds within short haulage distance of source. Restoration of any pre-existing contaminated sites within the Project boundaries. Reuse as a feed product in construction materials (e.g. concrete). 	Preferred
3	Reuse for environmental works	<ul style="list-style-type: none"> Reuse in native vegetation rehabilitation projects. Coastal systems conservation projects. Rising water table/salinity remediation projects. Reuse in flood mitigation works. 	Limited
4	Reuse on other development projects	<ul style="list-style-type: none"> Reuse for fill embankments and mounds on projects within an economic transport distance from site. Reuse sand for manufacturing concrete and reuse shale for manufacturing bricks/tiles. 	Preferred
5	Reuse for land restoration	<ul style="list-style-type: none"> Reuse for land reclamation or remediation works Reuse to fill disused facilities, e.g. mines and quarries, to enable ecological rehabilitation or other ecologically beneficial end use. 	Preferred
6	Reuse for landfill management	<ul style="list-style-type: none"> Reuse to cap completed landfill cells. Reuse in daily covering of landfill waste. 	Limited
7	Dispose offsite as waste	<ul style="list-style-type: none"> Disposal of excess spoil as waste at an approved facility licenced to receive the material. 	Potential but not preferred

5.4 Reuse of Spoil

The recycling or reuse of waste and spoil is an aspect of the Infrastructure Sustainability reporting that the Project is required to comply with. The target is to re-use greater than 95% of the VENM and ENM waste generated on the project with the remaining spoil to be disposed of as waste at an approved facility, licensed to receive the material. Further information on targets, reporting and compliance is detailed further in the WRMP and Sustainability Plan.

During construction where space constraints permit, topsoil will be stripped and if required for later reuse at that site or during landscaping work, stockpiled in a suitable area.

All VENM will be beneficially reused within the project or at the nominated reuse sites detailed in Section 7 of this Plan.



5.4.1 Monitoring and Reporting

Quantities of material reused will be monitored. To track the performance against the sustainability target, the quarterly sustainability report provided to WCXM4 Co will include the monthly quantities of spoil reused and spoil disposed. The report will separate the reused spoil into the quantities of material reused on-site and the quantities of material reused offsite.

5.4.2 Reuse within the Project

Given the nature of the construction activities, opportunities to reuse this material on-site as fill for works associated with the tunnel are limited to back filling for services, surface works at the Western, Northern and Eastern portals, and remediation works at the temporary shaft and decline locations throughout the project footprint.

The Project has estimated the quantities of beneficially reusable material from each extraction point as shown in Table 5-2 below.

Table 5-2 Spoil reuse/disposal quantities

Extraction point	Spoil produced (m3)	Reuse on site (m3)	Offsite reuse (m3)	Offsite Disposal (m3)
Civil Sites				
Homebush Bay civil site (C1)	244,000	24,000	204,000	16,000
Underwood Road civil site (C3a)	36,000	2,000	30,000	4,000
Powells Creek civil site (C4)	4,000	1,000	2,000	1,000
Concord Road civil site (C5a)	110,000	8,000	97,000	5,000
Wattle St and Walker Avenue civil sites (C9) (identified in EIS as C8 and C9)	196,000	17,000	172,000	7,000
Parramatta Road civil site (C10)	72,000	8,000	59,000	5,000
Subtotal Civil Sites	662,000	60,000	564,000	38,000
Tunnel Sites				
Underwood Road Tunnel Site (C3b)	162,000	-	160,000	2,000
Concord Rd Tunnel Site (C5b)	345,000	-	343,000	2,000
Cintra Park Tunnel Site (C6)	560,000	-	558,000	2,000
Northcote St Tunnel Site (C7)	625,000	-	622,000	3,000
Subtotal Tunnel Sites	1,692,000	-	1,683,000	9,000
Total	2,354,000	60,000	2,247,000	47,000

5.4.3 Reuse in environmental works/community works

Tidal inundation prevention works along Canada Bay foreshore and the Ashfield Council Wangal Park development have been identified, in the EIS, as potential beneficial reuse locations.

CSJ have contacted Canada Bay Council, Ashfield Council, Burwood Council and Strathfield Council and advised each Council that should they require bulk quantities of sandstone and shale materials for any of their projects, the WestConnex M4 East Project may be able to provide such materials free of charge.

Burwood Council have indicated they may require some material for parkland upgrade works.



5.4.4 Reuse in development works/land restoration

The project Spoil Offsite Reuse Locations Register (M4E-ES-REG-PWD-01950) details possible reuse locations for development works and land restoration.

6 Spoil On-site Management

Spoil from tunnel construction will predominantly be temporarily stockpiled at four locations, being the Underwood Road tunnel site, Concord Road tunnel site, Cintra Park tunnel site, and Northcote Street tunnel site. Smaller temporary stockpiles shall be established for related surface works. These sites represent a combination of shaft and/or decline tunnels:

- Underwood Road tunnel site (one shaft);
- Concord Road (one decline tunnel);
- Cintra Park (one decline tunnel);
- Northcote Street (one decline tunnel).

6.1 Tunnel Spoil Stockpiles

Stockpiling of spoil at the tunnel shaft and decline locations will occur within acoustic sheds. Stockpiling from the cut and cover dive structures will occur within close proximity of the dive structure. The sheds will have the capacity to store at least one day's spoil production.

Stockpile sites shall have ready access to the road network or direct access to the construction corridor. Ongoing spoil stockpile management shall take into account the following principles:

- Manage stockpiles to minimise wind and/or water erosion; and
- Manage spoil unloading and loading to minimise noise, vibration, and dust.

6.1.1 Spoil stockpiles at temporary decline excavations

Suitable measures will be implemented to manage dust and runoff in accordance with the requirements of the Construction Environmental Management Plan (CEMP).

The location of the stockpile at each decline has been chosen with the following objectives:

- Provide separation between the haul, dump and return cycle of the off highway dumpers and the highway tippers;
- Minimise the haul distance from the excavation to the stockpile; and
- Remain clear of areas required for the establishment of site infrastructure associated with the tunnelling operation.

6.2 Other Spoil Stockpile Locations

Temporary stockpile sites for spoil other than tunnel construction will be established and managed in accordance with the following criteria:

- Located 5 metres away from areas of concentrated water flow;
- Located at least 10m away from 1st Order Watercourse;
- Have ready access to project or road network;
- Located on relatively level land;
- Located to minimise the need for heavy vehicles to travel on local streets and / or through residential areas;
- Not unreasonably affect the land use of adjacent properties;



- Located so that the appropriate erosion and sediment control measures can be installed and will operate effectively;
- Located on land above the 20 ARI flood level unless a contingency plan to manage flooding is prepared and implemented;
- On land that does not require the removal of threatened species (beyond those already impacted by the project);
- On land that does not require the removal of EECs (beyond those already impacted by the project) or within the tree protection zone (in accordance with AS 4970) of EEC;
- On land that does not require the removal of roosting habitat for listed threatened fauna species (beyond those already impacted by the project);
- Provides sufficient area for the storage of raw materials to minimise, to the greatest extent practical, the number of deliveries required outside of construction hours;
- Positioned in areas where minimal visual and light spill impacts anticipated at the nearest residence.
- Positioned in areas where minimal noise and vibration impacts anticipated at the nearest residence.
- Located in areas that will not impact on heritage sites (beyond those already impacted by the project); and
- Located within the approved Project boundary.

6.3 Stockpile Management

Ongoing stockpile management practices for temporary stockpile sites related to construction works other than tunnel construction will be in accordance with the SWMP and the CLMP and shall take into account the following general principles:

- Materials will not be stockpiled within the tree protection zone (in accordance with AS 4970) of trees or native vegetation to be retained, and never pushed up around the base of trees. Trees are not to be flooded or soils caused to be waterlogged as a result of stockpile development.
- Contaminated materials will be stockpiled separately to other materials and identified with signage.
- Erosion and Sediment Control Plans (ESCP) will be prepared and implemented in advance of stockpiling.
- The ESCP will detail soil and water management measures consistent with Managing Urban Stormwater - Soils and Construction Vols 1 and 2, 4th Edition (Landcom, 2004) to minimise soil erosion and the discharge of sediment and other pollutants to land and/or waters.
- Erosion and sedimentation controls will be erected between the site and any drainage lines or down-slope areas.
- A diversion bund will be installed on the uphill side of the stockpile to divert water around the site, unless run on water is 'dirty' construction water. Where this occurs 'dirty' run on water shall be diverted to erosion and sediment controls.
- Erosion and sediment control structures shall remain installed and maintained until sufficient stabilisation is achieved as per the Blue Book.
- Separating 'clean' run-on water from 'dirty' (e.g. turbid) construction area run-off.
- Construction of temporary sediment basins. It is noted that some small and/or flat sites might not warrant construction of a sediment basin. This includes sites with <2,500 square metres of disturbed area, or those with an average annual soil loss from the total area of land disturbance that is less than 150 cubic metres per year.
- Maximising the diversion of turbid construction runoff into detention/sediment basins.



- Controlling run-off during the construction of stockpiles (e.g. fill shaping and the construction of temporary dykes and batter drains).
- Diverting stockpile run-off through sediment traps and into pits and the stormwater drainage system as soon as practical to reduce surface flow lengths and velocities.
- Controls will be installed around all stockpiles that are in place for more than 10 days in order to prevent wind and water erosion. These controls will be in accordance with the Erosion and Sediment control plan and may include stabilisation with cover crop or similar appropriate controls as per the site ESCP.
- Dust management measures (including for vehicle movements associated with stockpiling activities) will be implemented in accordance with the requirements of the Construction Air Quality Management Plan (AQMP).

7 Spoil Disposal and Reuse Locations

Given the considerable quantity of spoil material that will be generated in a relatively short period of time, it is necessary to identify a number of potential spoil reuse and disposal locations. Some of these locations have been described in the EIS, Table 6.25, however section 6.9.3 of the EIS notes that the alternative spoil reuse locations may emerge during construction that could represent an improved outcome. These additional sites would be evaluated based on the spoil disposal hierarchy in section 6.9.2 of the EIS,

Due to the number of concurrent major infrastructure projects under construction at the present time, not all sites have not been secured and will change over time. CSJ are engaging with industry continually to secure appropriate sites identified within and in addition to those in the EIS. The project Spoil Offsite Reuse Locations Register (M4E-ES-REG-PWD-01950) includes a summary of spoil offsite reuse locations which the Project has identified. This table will be updated following approval of the reuse location by the Project Environmental Representative. This approval process is outlined in section 7.1 and Figure 1.

The Spoil Offsite Reuse Locations Register identifies locations where ENM or VENM will be reused. This list excludes waste disposal locations where spoil will be disposed as General Solid Waste, Restricted Waste or Hazardous Waste in accordance with the WRMP.

7.1 Approval of Spoil Offsite Reuse Locations

Potential spoil offsite reuse locations will be identified by the project Spoil Manager and construction teams. If the location is not identified in the Spoil Offsite Reuse Locations Register, CSJ will:

- Check that appropriate approvals are in place for the receiving site,
- Check that a s143 Notice has been completed by the reuse location owner and / or site operator,
- Agree to commercial terms with the site operator and / or owner, and
- Ensure that relevant CoA, environmental, community and traffic impacts are managed under the approved CEMP, sub plans and Traffic and Access Management Plan (TAMP), including approved haulage routes.

Where spoil offsite reuse locations have the potential to receive a significant volume of material from the M4 East project, the Spoil Manager will generally complete a site inspection of the reuse location to confirm:

- The site has suitable access, e.g. wet weather access with exit controls if the site is proposed to be used during or following periods of rain,
- The site has capacity to receive the volume of spoil indicated by the site owner or manager,
- The type and number of spoil trucks which can access the site hourly / daily, and
- Appropriate management measures are in place.

As detailed in CoA A9, spoil disposal and reuse sites are required to have an appropriate planning approval in place to lawfully receive the material from the project. Such planning approvals (issued under the relevant part of the *Environmental Planning and Assessment Act 1979*) will be obtained by the operators of the sites, and be in place prior to spoil being deposited at a specific location. The known status of approval for the proposed locations is provided in the project Spoil Offsite Reuse Locations Register (M4E-ES-REG-PWD-01950). Where the development application for a spoil disposal and reuse site is pending, CSJ will not place spoil at the location until evidence of an approved development application has been provided to the Project Environment and Sustainability Manager. CSJ will ensure that relevant requirements of the receiving site approval are communicated to construction teams and spoil haulage drivers, including hours of operation and roads to be used to access the site.

Once these checks have been completed and it has been confirmed that approved haulage routes (refer to TAMP, Annexure G) can be used to access the reuse location, approval will be sought from the Project Environmental Representative for the project to use this reuse location. Following approval of the location, the revised Spoil Offsite Reuse Locations Register will be provided to DP&E for information.



If the proposed reuse location cannot be accessed using the approved haulage routes (refer to TAMP, Annexure G), the project will update the TAMP and haulage routes and seek approval, either from Secretary or the project Environmental Representative in accordance with Section 9.2 of the Construction Environmental Management Plan. The Project environmental Representative will not provide approval for the project to the reuse location until the revised haulage routes have been approved.

If the checks have been completed and the reuse does not have appropriate approvals or an s143 Notice, this reuse location would not be used by the project.

Disposal of material to licensed facilities is costly due to the waste disposal levy. CSJ will seek to reuse as much material as possible, both onsite and offsite, to limit the amount of material that is disposed of at licensed facilities.

Spoil reuse as opposed to spoil disposal is not only positive from an environmental perspective it is also positive commercially and saves the public money.

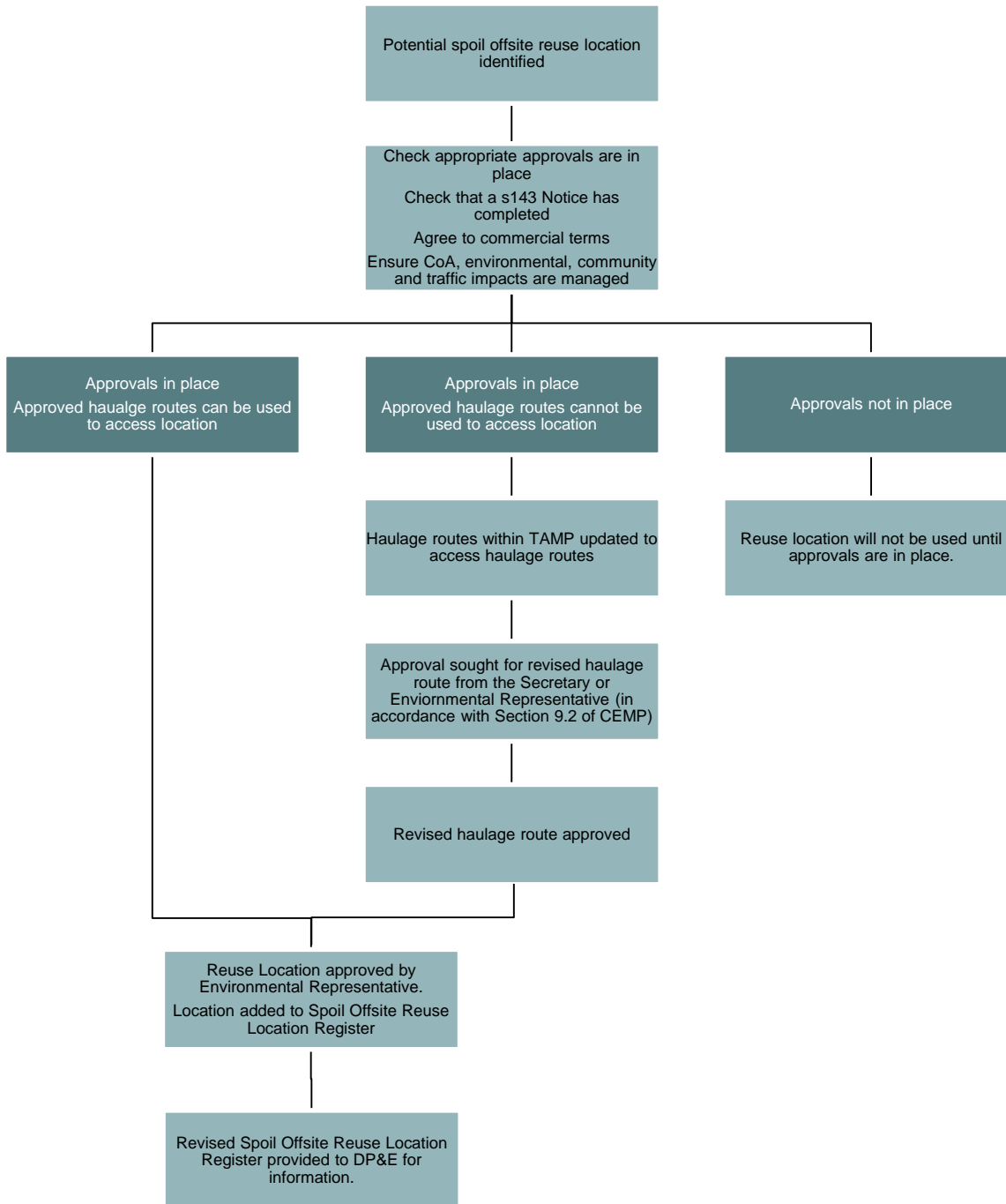


Figure 1: Approval process for spoil offsite reuse locations.

8 Spoil Transport

8.1 Spoil haulage routes

Spoil will be transported by registered road trucks. Spoil haulage routes are identified in the TAMP, Annexure E, and have been selected to minimise impacts to sensitive receivers, the travelling public, and the local community whilst meeting compliance with road traffic rules in relation to vehicle length and weight limits. The transport routes predominantly utilise regional and state roads, including Concord Road, Parramatta Road, Wattle Street, Homebush Bay Drive and the M4 Motorway, where practicable and in accordance with road and traffic safety requirements. The routes identified provide access for sites where spoil disposal and reuse is known and utilise the arterial road network to the greatest extent practicable.

The Project has minimised the impact of haulage movement noise on local roads by restricting spoil haulage on local roads, however there are some instances where the project has identified a need for heavy vehicles, including spoil haulage trucks, to utilise local roads in the vicinity of the project, as described in section 6.3.2 and Table 7 of the TAMP. The use of these local roads has been approved by DP&E in accordance with Condition of Approval D42.

In accordance with the spoil management hierarchy (section 5.3), the project will work with local councils to identify spoil reuse opportunities. Where these spoil reuse locations are within the vicinity of the project (i.e. are within suburbs of Sydney Olympic Park, Homebush West, Homebush, North Strathfield, Strathfield, Concord, Burwood, Croydon, Ashfield and Haberfield) and are accessed via the local road network, project spoil haulage trucks will use spoil haulage routes which have been approved for the offsite spoil reuse location, e.g. through a development approval or planning approval. Notwithstanding any request for spoil by local councils or others, the transport of spoil on local roads will not proceed unless approved by the Secretary.

The Project aims to maximise haulage movements during standard construction hours, thereby minimising potential noise impacts from night time spoil activities. It should be noted however that night time spoil movements, as described in the EIS, will be required throughout construction. The Project will program its night time spoil haulage on public roads with the aim to minimise any increase in road traffic noise levels by maximising haulage during day and evening periods. Mitigation measures described in Section 7 of NVMP will also be implemented.

Where night haulage is proposed, the Project will use a noise and vibration impact assessment to identify the noise impacts of varying frequency of truck movements against different periods of the night to assist in the implementation of the above commitments. Approvals to haul spoil outside of standard hours will be put in place in accordance with the Out of Hours Works Protocol.

In accordance with CoA D26, the Project will place within its spoil haulage contracts provisions to deal with unsatisfactory noise performance for the vehicle and/or the operator, and specifying non-tonal movement alarms in place of reversing beepers or alternatives such as reversing cameras and proximity alarms, or a combination of these, where tonal alarms are not mandated by legislation.

Initial and ongoing training will be carried out with construction vehicle contractors in order to make them aware of the requirements of the CEMP, contract requirements and in accordance with CoA D26 the non-use of compression brakes for construction vehicles associated with the SSI during construction.

8.2 Spoil tracking

Tunnel spoil will be weighed by either calibrated loader scales, weighbridge or axle weigh in motion devices depending on available space and site logistics. For those sites having an axle weigh in motion device trucks will be fitted with automatic sensors which will log the weight of the material and the truck details. This information will be fed into spoil tracking system.

The Environment and Sustainability Manager will ensure that a spoil tracking system will be developed as a component of the waste register required as part of the WRMP. This will document all spoil leaving site in



terms of when, truck registration, characterisation and location of disposal. Fields that will be included in the system are as follows:

- 1 Date:
- 2 Docket Number
- 3 Haulage Company
- 4 Material Classification
- 5 Quantity in Tonnes
- 6 Truck Identification Number
- 7 Location of Spoil Generation Site
- 8 Location of Spoil Reveal Site

The tracking system will be implemented when spoil disposal commences.



9 Review and Improvement

9.1 Continuous Improvement

Continuous improvement of this Spoil Management Plan will be achieved by the ongoing evaluation of environmental management performance against environmental policies, objectives and targets for the purpose of identifying opportunities for improvement.

The continuous improvement process will be designed to:

- Identify areas of opportunity for improvement of environmental management and performance.
- Determine the cause or causes of non-conformances and deficiencies.
- Develop and implement a plan of corrective and preventative action to address any non-conformances and deficiencies.
- Verify the effectiveness of the corrective and preventative actions.
- Document any changes in procedures resulting from process improvement.
- Make comparisons with objectives and targets.

9.2 Update and Amendment

The processes described in Section 9.1 of the CEMP may result in the need to update or revise this Plan. This will occur as needed.

It is proposed that revisions to the Spoil Management Plan will be in accordance with the process outlined in Section 9.2 of the CEMP, including consultation with relevant stakeholders and the Secretary's approval as appropriate.

A copy of the updated plan and changes will be distributed to all relevant stakeholders in accordance with the approved document control procedure – refer to Section 10.3.2 of the CEMP.