

SOIL AND WATER MANAGEMENT PLAN

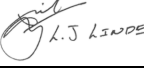
Maragle Substation and 330kV Transmission Line Connections

DECLARATION OF ACCURACY

In relation to S3.1 of the commonwealth document '*Environmental Management Plan Guidelines, Commonwealth of Australia, 2014*' please find the following signed declaration for the Soil and Water Management Plan (Stage 1 reference 3200-0645-PLN-021-CEMP-SWMP and Stage 2 reference HLW-HLJV-PRW-ENM-PLN-000020) in relation to approval EPBC 2018/8363.

Declaration of Accuracy,

In making this declaration, I am aware that section 491 of the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) makes it an offence in certain circumstances to knowingly provide false or misleading information or documents to specified persons who are known to be performing a duty or carrying out a function under the EPBC Act or the Environment Protection and Biodiversity Conservation Regulations 2000 (Cth). The offence is punishable on conviction by imprisonment or a fine, or both. I am authorised to bind the approval holder to this declaration and that I have no knowledge of that authorisation being revoked at the time of making this declaration.

Stage 1		Stage 2	
Signed:		Signed:	
Full name (please print):	Louis Linde	Full name (please print):	Tim Burns
Position:	Project Manager	Position:	Project Director
Organisation:	UGL Engineering Pty Ltd	Organisation:	UGL/CPB Joint Venture
Date:	10 December 2024	Date:	25 Nov 2024
Signed:		Signed:	
Full name (please print):	Oliver King	Full name (please print):	Jeremy Roberts
Position:	Project Director	Position:	Project Director
Organisation:	Transgrid	Organisation:	Transgrid
Date:	12 Dec 2024	Date:	04 Dec 2024

Soil and Water Management Plan

Snowy 2.0 Transmission Connection Project

Stage 1 Document Number: 3200-0645-PLN-021-CEMP-SWMP

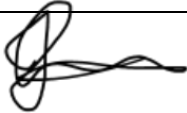
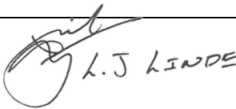
Stage 2 Document Number: HLW-HLJV-PRW-ENM-PLN-000020

TransGrid
Date 24/10/2024

Snowy 2.0 TCP
Soil and Water Management Plan

Document Control

Approvals

Title	Snowy 2.0 Transmission Connection Project – Soil and Water Management Plan
Approved on behalf of Transgrid (Snowy 2.0 TLP) by	Andrew Buttigieg
Signed	
Dated	22/11/2024
Approved on behalf of Transgrid HumeLink by	Jeremy Roberts
Signed	
Dated	05 Nov 2024
Approved on behalf of UGL by	Louis Linde
Signed	
Dated	20/11/2024
Approved on behalf of HLWJV by	Tim Burns
Signed	
Dated	04 Nov 2024

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Version Control

Revision	Date	Description	Author	Reviewer	Approver
0.01	06/10/2022	Initial issue for review	Whitney Heiniger	Jane Love	Trevor Noble
0.02	09/11/2022	Required plan review	Whitney Heiniger	Jane Love	Trevor Noble
0.03	12/05/2023	Stakeholder comments	Whitney Heiniger	Kim Lembke	Trevor Noble
0.04	17/05/2023	Transgrid comments	Whitney Heiniger	Kim Lembke	Trevor Noble
0.05	19/05/2023	Transgrid comments	Whitney Heiniger	Kim Lembke	Trevor Noble
0.06	08/09/2023	Required plan review	Whitney Heiniger	Kim Lembke	Trevor Noble
0.07	30/10/2023	Final plan review	Jane Love	Darrell Van Bruchem	Tim McCarthy
0.08	01/11/2023	Addressing NPWS comments	Jason Snape	Kim Lembke	Tim McCarthy
0.09	24/11/2023	Addressing BCD, EPS and NPWS comments	Jason Snape	Kim Lembke	Tim McCarthy
0.10	24/10/2024	Update to include Stage 2	Ian Irwin	Brendan Toohey	Louis Linde / Tim Burns

Distribution of controlled copies

This Environmental Management Plan is available to all personnel and sub-contractors via the Project document control management system. An electronic copy can be found on the Snowy 2.0 TCP website.

The document is uncontrolled when printed. One controlled hard copy of the CEMP and supporting documentation will be maintained by the Quality Manager at the Project office (and relevant documentation is available on the Snowy 2.0 TCP website [Snowy 2.0 Transmission Connection | Transgrid](#)).

Copy number	Issued to	Version

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Appendix B: Spill Response Procedure
Appendix C: Trigger Action Response Plans
Appendix D: Primary Erosion and Sediment Control Plan
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Appendix F: Water Quality Monitoring Program
Appendix G: Water Take Register
Appendix H: Contaminated Land Management Plan
Appendix I: Water Irrigation and Disposal Permit

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Definitions

Term	Definition
Aboriginal Object	Any deposit, object, or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains
Compliance audit	Verification of how implementation is proceeding with respect to a Construction Environmental Management Plan (CEMP) (which incorporates the relevant approval conditions).
Contractor or Principal Contractor	Stage 1 of the scope of works for design and construction the Contractor or Principal Contractor is UGL Pty Ltd Stage 2 of the scope of works for design and construction the Contractor or Principal Contractor is UGL/CPB Joint Venture. Any reference to the 'Contractor' relates to the activities of both appointed Contractors (UGL and UGL/CPB Joint Venture), but only as is relevant to the appointed stage of works.
Environmental aspect	Defined by AS/NZS ISO 14001:2015 as an element of an organisation's activities, products or services that can interact with the environment.
Environmental impact	Defined by AS/NZS ISO 14001:2015 as any change to the environment, whether adverse or beneficial, wholly, or partially resulting from an organisation's environmental aspects.
Environmental incident	An unexpected event that has, or has the potential to, cause harm to the environment and requires some action to minimise the impact or restore the environment.
Environmental objective	Defined by AS/NZS ISO 14001:2015 as an overall environmental goal, consistent with the environmental policy, that an organisation sets itself to achieve.
Environmental policy	Statement by an organisation of its intention and principles for environmental performance.
Environmental target	Defined by AS/NZS ISO 14001:2015 as a detailed performance requirement, applicable to the organisation or parts thereof, that arises from the environmental objectives and that needs to be set and met in order to achieve those objectives.
Environmental Representative	A suitably qualified and experienced person independent of Snowy 2.0 Transmission Line Project design and construction personnel employed for the duration of construction. The principal point of advice in relation to all questions and complaints concerning environmental performance.
Snowy 2.0 Transmission Line Approvals	Snowy 2.0 Transmission Line approvals include: Snowy 2.0 Transmission Line Infrastructure Approval NSW SSI 9717 Snowy 2.0 Transmission Line EPBC Approval Cth EPBC 2018/8363
Non-compliance	Failure to comply with the requirements of the HumeLink Approvals or

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Term	Definition
	any applicable licence, permit or legal requirements.
Non-conformance	Failure to conform to the requirements of HLW system documentation including this CEMP or supporting documentation.
Planning Approval Documentation	The NSW planning approval documents, as they relate to the Snowy 2.0 Transmission Line and as listed in CoA A2 of the NSW Infrastructure Approval for HumeLink (SSI 9717)
Principal, the	Transgrid
Synergy	UGL-CMS incident management software program to manage, report, record and take action on emergency and incidents.

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Abbreviation

Abbreviation	Explanation
AEP	Annual Exceedance Probability
BCD	Biodiversity and Conservation Division of DPE
BCS	NSW Biodiversity, Conservation and Science
BDAR	Biodiversity Development Assessment Report
BOM	Bureau of Meteorology
CEMP	Construction Environmental Management Plan
CLMP	Contaminated Land Management Plan
DCCEEW – Cth	Commonwealth Department of Climate Change, Energy, the Environment and Water
DCCEEW – NSW	NSW Department of Climate Change, Energy, the Environment and Water
DPI	NSW Department of Primary Industries
DPIRD	NSW Department of Primary Industries and Regional Development, formerly Department of Primary Industries (DPI)
DPE	Department of Planning and Environment
DPHI	Department of Planning, Housing and Infrastructure (formerly DPE)
EIS	Environmental Impact Statement
EMS	Environmental Management System
EPA	NSW Environment Protection Authority
EPL	Environment Protection Licence
EP&A Act	Environmental Planning and Assessment Act 1979
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Cth)
ESCP	Erosion and Sediment Control Plan
EWMS	Environmental Work Method Statements
FCNSW	Forestry Corporation of NSW
IECA	International Erosion Control Association
KFH	Key Fish Habitat
KNP	Kosciuszko National Park
m	Metres
ML	megalitres
mm	millimetres
NOA	Naturally Occurring Asbestos

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Abbreviation	Explanation
NPWS	National Park and Wildlife Services
NRAR	Natural Resources Access Regulator
NSW	New South Wales
PC	Principal Contractor (as defined above)
PMF	Probable Maximum Flood
POEO Act	Protection of the Environment Operations Act 1997
Proponent, the	NSW Electricity Networks Operations Pty Ltd as a trustee for NSW Electricity Operations Trust (Transgrid)
SHL	Snowy Hydro Limited
SMP	Spoil Management Plan
SVC	Snowy Valleys Council
SWMP	Soil and Water Management Plan
TARP	Trigger Action Response Plan
TG	Transgrid
TSS	Total suspended solids
VENM	Virgin Excavated Natural Material
WAL	Water Access Licence
UGLMS	UGL Management System

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1. Introduction

1.1. Context

To connect Snowy 2.0 to the National Energy Market, a new transmission connection is required. NSW Electricity Networks Operations Pty Ltd as a trustee for NSW Electricity Operations Trust (known as Transgrid and the Proponent) received state development consent on 2 September 2022 to construct a 500 kiloVolt (kV) substation and 330kV switching yard (Maragle Substation) and overhead transmission lines ('the Project') to facilitate the connection of Snowy 2.0 to the existing electrical transmission network, approximately 27 kilometres (km) east of Tumbarumba, New South Wales (NSW), refer to Figure 1-1.

The Project has also been subject to approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Approval was granted by the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW-Cth) on 21st October 2022 (EPBC 2018/8363).

An Environment Protection Licence (EPL) for the Project premises was issued to Transgrid by the NSW Environment Protection Authority (EPA) on 23rd December 2022 under the *Protection of the Environment Operations Act 1997* (POEO Act). This EPL requirement was triggered under Schedule 1 of the Protection of the Environment Operations (General) Regulation 2022 due to extractive activities required during construction.

Relevant to state development consent, a Staging Approval Request was submitted and approved by the Planning Secretary on 18 November 2022 in accordance with CoA C3 of SSI-9717 for the delivery of relevant plans and strategies for the Project in two stages:

- Stage 1 – All activities associated with the construction and operation of infrastructure related to the 330kV grid connection; and
- Stage 2 – All activities associated with the construction and operation of infrastructure related to the 500kV component of the substation.

Transgrid (the Proponent) has engaged UGL Projects Division (UGL) as the Principal Contractor (PC) to construct Stage 1 of the works and UGL / CPB Contractors Joint Venture (HLWJV) as the PC to construct Stage 2 of the Works.

This SWMP describes how soil and water will be managed by the Principal Contractors (PC) during construction, including erosion and sedimentation management, water diversion, capture and treatment methods and spoil management methods. The SWMP describes anticipated hazards during soil and water management and mitigation measures to identify and manage potential impacts that may occur during Project works.

Once this SWMP has been approved, it will be implemented onsite.

1.2. Environmental Management System

The overall Environmental Management System (EMS) for the Project is described in the Construction Environmental Management Plan (CEMP). This Soil and Water Management Plan (SWMP) forms part of the EMS for the Project and is to be read in conjunction with the overarching CEMP. It is applicable to all staff, contractors and sub-contractors associated with the construction of the Project.

A number of appendices to address specific aspects of soil and water management are included in this SWMP. These appendices include:

- Spoil Management Plan (Appendix A)

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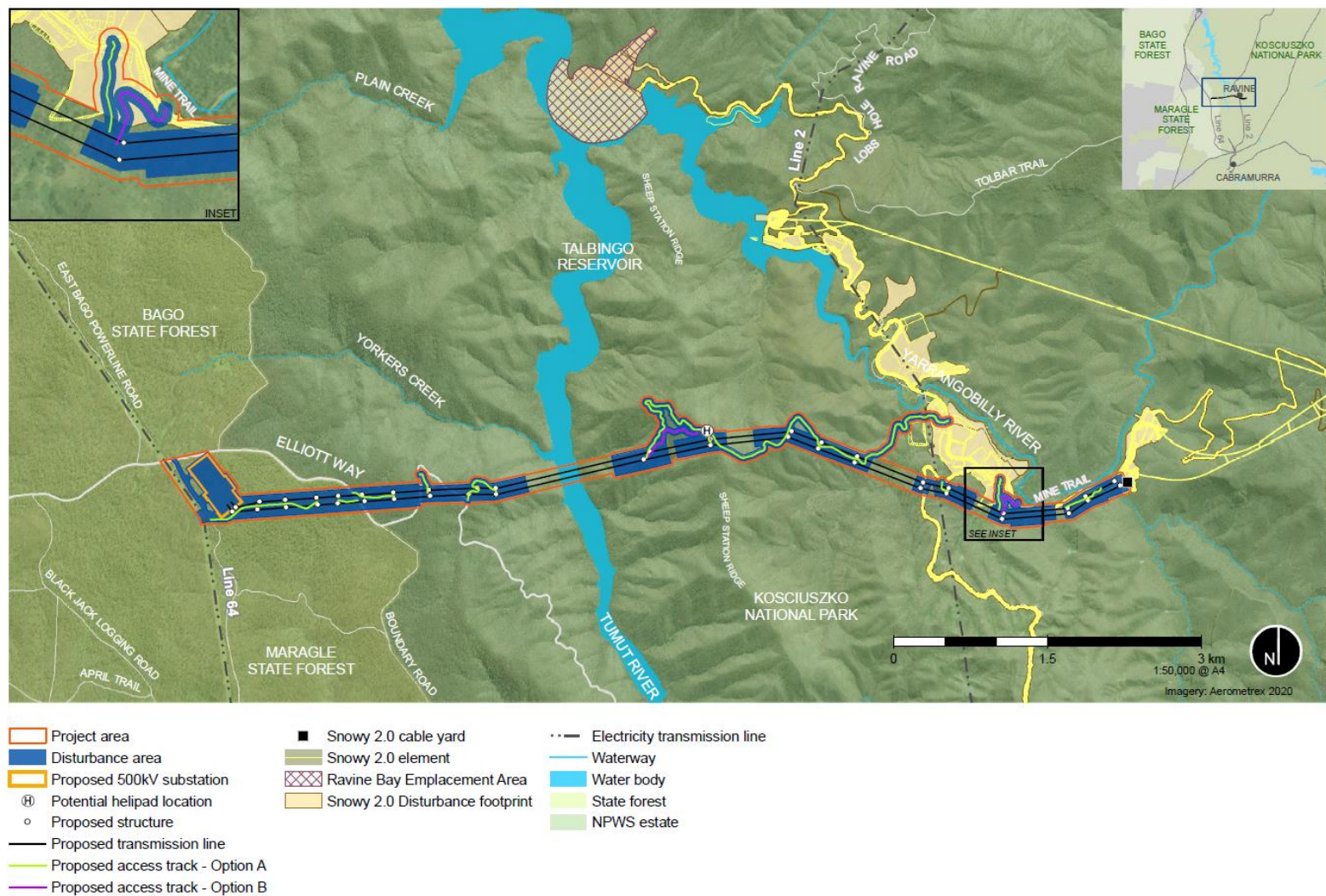
- Primary Erosion and Sediment Control Plan (Appendix D)
- Progressive Erosion and Sediment Control Plan (Appendix E)
- Water Quality Monitoring Program (Appendix F)
- Contaminated Land Management Plan (Appendix H)

The UGL Management System (UGLMS) incorporates the following for the management of soil and water impacts on the Project:

- UGLMS-131-807 Contractor HSEQ Handbook
- UGLMS-4-1730 Environmental Inspection Checklist
- UGLMS-4-1549 Environmental Inspection Weekly Checklist
- UGLMS-4-2138 Site Environmental Plan Template
- UGLMS-4-1600 Stripping Topsoil and Stockpiling Form.

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Figure 1-1 Project location and footprint (Jacobs, 2021)



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1.3. Purpose and Objectives

The purpose of this Plan is to address the construction environmental management requirements detailed within the following documents:

- Snowy 2.0 Transmission Connection Project – Environmental Impact Assessment (Jacobs, Feb 2021)
- Snowy 2.0 Transmission Connection Project – Amendment Report (Transgrid, Dec 2021)
- Snowy 2.0 Transmission Connection Project – Biodiversity Development Assessment Report (Jacobs, Aug 2022)
- Infrastructure Approval SSI 9717 (dated 2 September 2022)
- EPBC Approval 2018/8363 (21 October 2022)
- Environment Protection Licence (EPL) 21753 (23rd December 2022) and Licence Variation Notice 1628478 (14 September 2023).
- The key objectives for the management of soil and water during Project works include:
 - Prevent soil erosion and sedimentation impacts facilitated by construction
 - Prevent pollution of waters and waterways during construction
 - Prevent potential for flooding via effective surface water management
 - Excavated spoil, imported fill and contaminated soil to be disposed of or reused in accordance with legal requirements (safe handling of any potentially contaminated soil and material)
- Compliance with, and beyond, the 'Blue Book' (Landcom, 2004) and IECA Best Practice Erosion and Sediment Control Guideline.

As permitted by Condition of Approval (CoA) C3, this Soil and Water Management Plan addresses both water and soil management given that both aspects are interrelated. This soil and water convergence satisfies CoAs B8 and B16 and is reflected in condition BIO10 from the Project Biodiversity Development Assessment Report (Aug 2022), which requests a Soil and Water Management Plan be prepared and implemented during Project works. Approval was granted by the DPE Planning Secretary on 18 November 2022 to combine the Spoil Management Plan and Water Management Plan into this SWMP.

This SWMP applies specifically to proposed activities carried out within the Project area.

This plan will be considered to be a live document that is amended considering the learning experienced during its implementation. Further information about the nature of works to be completed and details on the Project can be found in the overarching CEMP.

1.4. Authorship

This SWMP has been prepared by Whitney Heiniger (NGH Senior Environmental Consultant) and Jane Love (NGH Environmental Management Technical Lead). Whitney Heiniger holds a Bachelor of Marine Biology, Honours in Environmental Science and Graduate Certificate in Environmental Management and has 5 years of professional experience in construction environmental management. Whitney is also a Certified Professional in Erosion and Sediment Control In-Training (CPESC-IT 9698). Jane Love holds a Bachelor of Environmental Science, Master of Environmental Management and has over 13 years' professional experience in environmental science and management. The SWMP will be finalised in consultation with the

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Environment Protection Authority (EPA), Forestry Corporation of NSW (FCNSW), National Parks and Wildlife Service (NPWS), DPE Water and Department of Primary Industries now known as the Department of Primary Industries and Regional Development (DPIRD).

CVs for these qualified and experienced authors will be provided to the Department of Planning and Environment (DPE) with submission of this plan. If CVs have not been provided, please contact:

- Transgrid Senior Project Manager – Andrew Buttigieg (andrew.buttigieg@transgrid.com.au)
- UGL Project Manager – Louis Linde (louis.linde@ugllimited.com).
- HLWJV Project Director – Tim Burns (tim.burns@hljv.com.au).

A summary of consultation is provided in Section 1.5.

1.5. Consultation

1.5.1. NSW Environment Protection Authority

Table 1-1 outlines consultation undertaken to date with NSW EPA in the preparation of this SWMP, including the Spoil Management Plan (SMP).

Table 1-1 Summary of consultation with NSW EPA

Date	Consultation undertaken	Outcomes
24/02/2022	Early consultation meeting – EPA reminded Transgrid of the need to consider Water Quality Objectives (WQOs) for the Project and to aim for 'best practice' outcomes. The EPA specifically mentioned Environmental Management Plans (EMPs) to show measures required to limit sedimentation, minimise potential for tannin formation and addressing cultural behaviours around erosion and sediment control (ESC).	SWMP updated and developed based on results of consultation.
18/11/2022	EPA provided comments on Rev 0.02 of the SWMP.	SWMP updated and developed based on results of consultation.
21/03/2023	Consultation meeting between Transgrid and EPA to discuss the incorporation of baseline water quality monitoring results into EPL 21753.	EPL provided guidance on WQM data and reporting requirements, incorporated into Rev 0.03 of SWMP.
04/10/2023	Transgrid consultations with EPA regarding final SWMP pickups relevant to Rev 0.04 – Rev 0.06. Comments provided to UGL (NGH)	Comments addressed by UGL (NGH) in this Rev 0.07 issue
11/10/2023	Transgrid held a meeting with EPA to discuss SHL feedback and ensure transparency for proposed document amendments.	Comments addressed by UGL (NGH) in this Rev 0.07 issue

1.5.2. Forestry Corporation of NSW

Table 1-2 outlines consultation undertaken to date with FCNSW in the preparation of this SWMP, including the SMP.

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Table 1-2 Summary of consultation with FCNSW

Date	Consultation undertaken	Outcomes
25/02/2022	Meeting between FCNSW and Transgrid to discuss general input to the SWMP	FCNSW reminded Transgrid to minimise the relocation of soil as best practicable. SWMP updated based on results of consultation.
17/10/2022	Transgrid submitted SWMP Rev 0.01 to FCNSW via the Planning Portal	No response received
13/12/2022	Transgrid submitted CLMP Rev 0.01 to FCNSW via email	No response received
22/12/2022	Transgrid submitted CLMP Rev 0.03 to FCNSW via email	No response received
20/02/2023	Transgrid submitted SWMP Rev 0.01 to FCNSW via email	No response received

1.5.3. National Parks and Wildlife Service

Table 1-3 outlines consultation undertaken to date with NPWS in the preparation of this SWMP.

Table 1-3 Summary of consultation with NPWS

Date	Consultation undertaken	Outcomes
25/01/2022	Transgrid interface meeting with NPWS. NPWS requested that water should only be sourced from T2 Tail Bay if it cannot be sourced from Tumbarumba. UGL indicated a water licence is being applied for. NPWS indicated they would like to be advised when water sourcing is confirmed or approved.	Feedback taken into consideration by UGL. Two zero share Project Water Access Licences have been acquired for the Project – D1022297 and D1022298, one each for Tumbarumba and Upper Tumut Water source.
24/02/2022	Early consultation meeting between Transgrid and NPWS, NPWS advised Transgrid to augment Blue Book erosion and sediment control measures with other recognised standards where gaps exist. NPWS also suggested consultation with Snowy Hydro Limited (SHL) regarding the classification and management of spoil.	Feedback incorporated into ESCPs and recommended consultation with SHL undertaken.
17/10/2022	Transgrid submitted SWMP Rev 0.01 to NPWS for comment via the Planning Portal.	A marked-up version of the plan was provided by NPWS on 14/11/2022 and comments addressed in SWMP Rev 0.02.
16/10/2023	Updated SWMP (Rev 0.06) to NPWS on 12/09/2023 (no feedback received as of 16/10/2023)	No further NPWS feedback incorporated into the SWMP

1.5.4. DPE Water

Table 1-4 outlines consultation undertaken to date with DPE Water in the preparation of this SWMP.

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Table 1-4 Summary of consultation with DPE Water

Date	Consultation undertaken	Outcomes
26/10/2022	SWMP provided to DPE Water by Transgrid on 17/10/2022. DPE Water advised that they had no comments on the plan.	Consultation noted and record incorporated into the SWMP.

1.5.5. NSW Department of Primary Industries

Table 1-5 outlines consultation undertaken to date with NSW DPI in the preparation of this SWMP.

Table 1-5 Summary of consultation with NSW DPI

Date	Consultation undertaken	Outcomes
4/11/2022	DPI Fisheries advised that they had reviewed the SWMP and had no further comments.	Consultation noted and record incorporated into the SWMP.

1.5.6. Natural Resources Access Regulator

Table 1-6 outlines consultation undertaken to date with the Natural Resources Access Regulator (NRAR) in the preparation of this SWMP.

Table 1-6 Summary of consultation with NRAR

Date	Consultation undertaken	Outcomes
11/10/2022	Transgrid emailed NRAR requesting confirmation of receipt of Spoil Management Plan and requesting contact person details	No response received.
17/10/2022	DPE forwarded consultation request on to DPE Water following NRAR change of roles.	Response received from DPE confirming onforward of materials to DPE Water who responded with 'no comments'.

1.5.7. Biodiversity and Conservation Division (DPE)

Table 1-7 outlines consultation undertaken to date with BCD now referred to as Biodiversity Conservation and Science (BCS) in the preparation of this SWMP.

Table 1-7 Summary of consultation with BCD

Date	Consultation undertaken	Outcomes
22/02/2023	Meeting between Transgrid, BCD, UGL, NGH and relevant species experts to discuss water quality objectives in relation to Booroolong Frog protection. Baseline monitoring points, potential impacts, ESC measures, dewatering and spoil placement discussed.	Feedback incorporated in SWMP Rev 0.03 and BMP Rev 0.06.
20/03/2023	SWMP Rev 0.01 provided to BCD for information during revision of the Project Biodiversity Management Plan.	Comments addressed in SWMP Rev 0.03.
29/05/2023	Email provided by BCD outlining a request for clearing zones to be represented in the SWMP to ensure ESC measures are located within total	Feedback incorporated into SWMP Rev 0.06 and Site Environmental Plans (SEPs).

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Date	Consultation undertaken	Outcomes
	clearing zones as required by the BDAR. Additional request for a TARP for Montane Peatlands and Swamps EEC on Yorkers Creek.	ESC measures are represented against Project clearing zones in SEPs, to be appended to the Project CEMP. TARP request discussed and minor relevant updates made to existing TARP included as SWMP Appendix C.
25/07/2023	BCD feedback provided on the SWMP Rev 0.04 review	Feedback incorporated into the SWMP Rev 0.05. Document Change Register updated.
11/08/2023	Workshop between NGH, BCD, including Booroolong Frog species experts, Transgrid and UGL to discuss the Booroolong Frog Monitoring Program and its relationship with erosion and sediment control.	Feedback incorporated into SWMP Rev 0.06 and BMP Rev 0.07 (specifically Appendix G Booroolong Frog Monitoring Program).

1.5.8. Snowy Hydro Limited

Table 1-8 outlines consultation undertaken to date with Snowy Hydro Limited (SHL) in the preparation of this SWMP.

Table 1-8 Summary of consultation with SHL

Date	Consultation undertaken	Outcomes
1/09/2022	Transgrid interface meeting with SHL – interface protocols, access and pad development, ESC management, spoil movement and stockpiling were discussed. SHL advised a desirable stockpiling location for the receipt of spoil.	Communication protocols developed and site-specific information incorporated into SWMP and SMP.
17/02/2023	Transgrid interface meeting with SHL – monitoring programs, existing baseline data, monitoring points and spoil placement were discussed.	SHL referred Transgrid and UGL to their public monitoring reports and advised spoil stockpiling and emplacement options were still under consideration.
05/09/2023	Details of the temporary spoil stockpiling area provided by SHL.	SMP reviewed for temporary stockpiling
13/10/2023	SHL have provided feedback following review of the Soil and Water Management Plan, specifically for the Spoil Management Plan (Appendix A) and supporting Spoil Characterisation Flowchart (Appendix H)	Feedback incorporated into this SWMP (Rev 0.07). Document Change Register updated.

2. Environmental Assurance

2.1. Relevant Legislation and Guidelines

2.1.1. Legislation

Legislation relevant to this SWMP includes:

- Environment Protection and Biodiversity Conservation Act 1999 (Cth)
- Contaminated Land Management Act 1997
- Environmentally Hazardous Chemicals Act 1985
- Environmental Planning and Assessment Act 1979
- Environmental Planning and Assessment Regulation 2021
- National Parks and Wildlife Act 1974
- Protection of the Environment Operations Act 1997
- Protection of the Environment Operations (General) Regulation 2021
- Protection of the Environment Operations (Waste) Regulation 2014
- Waste Avoidance and Resource Recovery Act 2001
- Water Management Act 2000
- National Environment Protection Council Act 1994

Relevant provisions of the above legislation are explained in the register of legal and other requirements included in Appendix C of the CEMP.

2.1.2. Guidelines

The main guidelines, specifications and policy documents relevant to this Plan include:

- Best Practice Erosion & Sediment Control (the White Book) – IECA, 2008
- Managing Urban Stormwater: Soils and Construction (4th Edition), Volumes 1 and 2 – Landcom, 2004 (the Blue Book)
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality – ANZECC and ARMCANZ, 2000
- Guidelines for controlled activities on waterfront land – Department of Primary Industries, Office of Water, 2012
- AS 1940:2017 “The storage and handling of flammable and combustible liquids”
- NSW Aquifer Interference Policy (DPI Water, 2012)
- Flood Hazard – Flood Risk Management Guide FB03 – DPE, 2022
- Transgrid – Amendment Report Snowy 2.0 Transmission Connection Project – Mitigation Measures
- NEPM National Environmental Protection Measures 2013
- Waste Classification Guidelines (EPA, 2014)
- Environmental Direction – Management of Tannins from Vegetation Mulch (RMS, 2012)

2.2. Permits and licences

An EPL for the Project premises was issued to Transgrid by the NSW EPA on 23rd December

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2022 under the *Protection of the Environment Operations Act 1997* (POEO Act). This EPL requirement was triggered under Schedule 1 of the Protection of the Environment Operations (General) Regulation 2022 due to extractive activities required during construction. Licence conditions provided as part of EPL 21753 are detailed in Table 2-1. In the months following calculations determined greater anticipated spoil volumes, and a request was submitted to the EPA for a licence variation. The EPA issued a Licence Variation Notice (1628478) to Transgrid on the 14 September 2023 for the approved extractive limit for spoil to increase to 561,231 Tonnes (i.e. >100000-500000 T annually).

An internal Permit for Water Irrigation and Disposal is included in Appendix I. Further details regarding permits and licences are provided in Appendix C of the CEMP.

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2.3. Project Conditions of Approval

The Conditions of Approval and mitigation measures relevant to this Plan are listed in Table 2-1 below. A cross reference is also included to indicate where the requirement is addressed in this Plan of other Project management documents.

Table 2-1 Project conditions of consent, mitigation measures and EPL conditions relevant to the SWMP

Reference number	Requirement	Document Reference
Conditions of Approval		
A1	In meeting the specific performance measures and criteria of this approval, all reasonable and feasible measures must be implemented to prevent, and if prevention is not reasonable and feasible, minimise, any material harm to the environment that may result from the construction, operation, rehabilitation, upgrading or decommissioning of the development.	Project CEMP and subplans
A2	The development must be carried out: (a) in compliance with the conditions of this approval; (b) in accordance with all written directions of the Planning Secretary; (c) generally in accordance with the EIS; and (d) generally in accordance with the Development Layout in Appendix 2	Project CEMP and subplans EMS Fig 1-1 Project location and footprint
B7	Apart from the spoil that is provided to the NPWS for use in other parts of the Kosciuszko National Park, Forestry Corporation for use in other parts of State Forest, sent off-site, used to construct temporary or permanent infrastructure for the development or Snowy 2.0 Main Works (in accordance with that infrastructure approval, or used to rehabilitate the site or the Snowy 2.0 Main Works site, the Proponent must ensure that any spoil disposed within Kosciuszko National Park are emplaced in the following emplacement areas: (a) Ravine Bay; or (b) GF01; or (c) Lobs Hole; or (d) Tantangara for spoil containing naturally occurring asbestos only.	Spoil Management Plan, Appendix A

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Reference number	Requirement	Document Reference
B8	Prior to the commencement of construction, the Proponent must prepare a Spoil Management Plan to the satisfaction of the Planning Secretary for the development. This plan must: (a) be prepared by a suitably qualified and experienced person in consultation with the NPWS, FCNSW, EPA, Water Group, NRAR and DPI. (b) include a description of the measures that would be implemented to: i. minimise the spoil generated by the development; ii. maximise the reuse of non-reactive spoil on site and in other parts of the Kosciuszko National Park, Bago State Forest and/or offsite; iii. minimise the water quality impacts of the temporary spoil stockpiles; (c) provide an overarching framework for the management of all spoil generated on site, including the testing, classification, handling, temporary storage, chain of custody and disposal of spoil – that complies with the spoil management requirements in condition B7above; (d) include a detailed plan for managing the temporary spoil stockpiles of the development, which includes suitable triggers for remedial measures (if necessary) and describes the contingency measures that would be implemented to address any water quality risks; (e) investigating, assessing and managing contaminated land and soils in the development area; (f) investigation, assessing and managing the potential for naturally occurring asbestos, potentially acid forming material and other hazardous materials in the development area; (g) include a detailed plan for managing and the disposal of all the reactive or contaminated spoil generated on site, including the contingency measures that would be implemented if the volumes of this spoil are greater than expected and unsuitable for land disposal; (h) include a program to monitor and publicly report on: i. the management of spoil on site; ii. progress against the detailed completion criteria and performance indicators. Following the Planning Secretary's approval, the Proponent must implement the approved Spoil Management Plan.	Spoil Management Plan, Appendix A
B9	The Proponent must ensure that it has sufficient water for all stages of the development, and if necessary, adjust the scale of the development to match its available water supply.	Section 5.6

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Reference number	Requirement	Document Reference
	<i>Note: Under the Water Act 1912 and/or the Water Management Act 2000, the Proponent is required to obtain the necessary water licences for the development.</i>	
B10	The Proponent must: (a) minimise erosion and control sediment generation; (b) take all reasonable and feasible measures to prevent a discharge to waters. This may include, but need not be limited to: i. adopt enhanced erosion and sediment controls, taking into consideration the best available information from the Snowy 2.0 Main Works project; ii. minimising the volume of dirty water generated onsite; and iii. exploring and implementing beneficial reuse opportunities such as irrigation and dust suppression.	Section 5.1 Section 3.5 Appendix D Appendix E
B11	Unless otherwise authorised by an EPL the Proponent must ensure the development does not cause any water pollution, as defined under Section 120 of the POEO Act.	Section 5.1 Appendix A ESCP
B12	The Proponent must: (a) ensure that appropriate components of the substation are suitably bunded; (b) ensure that all liquid waste captured by the substation's spill oil containment system is classified, transported, and disposed of at a facility that can lawfully accept the waste; and (c) minimise any spills of hazardous materials or hydrocarbons, and clean up any spills as soon as possible after they occur.	Appendix D Appendix E
B13	The Proponent must ensure that any groundwater dewatering activities do not discharge to watercourses.	Section 5.5
B14	The Proponent must ensure: (a) all activities on waterfront land are constructed in accordance with the <i>Guidelines for Controlled Activities on Waterfront Land</i> (2012), unless DPE Water agrees otherwise; and	Section 4.1 Section 5.4

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Reference number	Requirement	Document Reference
	(b) the geomorphic condition of the major rivers and distributary channels crossed by the development is not impacted.	
B15	The Proponent must ensure that the development: (a) does not materially alter the flood storage capacity, flows or characteristics in the development area or off-site; and (b) is designed, constructed and maintained to reduce impacts on surface water, localised flooding and groundwater at the site, unless otherwise agreed by either FCNSW or NPWS.	Hydrology Assessment (Jacobs, 2020) IFC Design Drawings
B16	Prior to the commencement of construction, the Proponent must prepare a Water Management Plan for the development to the satisfaction of the Planning Secretary. This sub-plan must: (a) be prepared by a suitably qualified and experienced person in consultation with the EPA, FCNSW, NPWS, the Water Group and NSW DPI; (b) include provisions for: i. detailed baseline data on surface water flows and quality in the watercourses that could be affected by the development, and a program to augment this baseline data over time; ii. detailed criteria for determining surface water impacts of the development (flows, quality and flooding), including criteria for triggering remedial action (if necessary); and iii. a description of the measures that would be implemented to minimise the surface water impacts of the development and comply with the relevant water management requirements in conditions B10 to B15 are complied with; and (c) managing flood risk during construction. Following the Planning Secretary's approval, the Proponent must implement the Water Management Plan.	This Plan Section 1.4 Appendix F Appendix D Section 5 Emergency Plan

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Reference number	Requirement	Document Reference
Mitigation measures – Amendment Report		
B2	- Erosion and sedimentation will be managed through implementation of effective sediment control measures as outlined in the SWMP which will be prepared - Revegetation of slopes will be undertaken as soon as possible in line with the Rehabilitation Plan.	Section 5.1 Appendix D Appendix E Rehabilitation Plan
B11	A Soil and Water Management Plan (SWMP) will be prepared and implemented as part of the CEMP. The plan will include stringent controls to mitigate impacts of runoff and sediment transfer from the project area during construction and operation. Control measures will remain in situ until site stabilisation completion criteria are met. The plan will ensure protection of aquatic habitat in the tributaries crossed by the project, and particularly aimed at protecting the habitat for the Booroolong Frog associated with Yarrangobilly Creek. An assessment of the current sediment basin design for the Main Works project will occur, to determine if the design specifications are suitable for the additional sediment load expected during construction of the easement. Where modification or augmentation is required, sediment basins will be increased in size to cope with any additional expected sediment load. Sedimentation will be managed through implementation of effective sediment control management plans will be implemented to ensure that sediment does not enter the waterways and result in changes to the habitat structure of riparian areas or areas downstream of the project area. Effective control measures will include: Erosion and sediment control plans for all stages of construction	This document Appendix D Appendix E

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Soil and Water Management Plan

Reference number	Requirement	Document Reference
	- The implementation of sediment control measures across the project area – a - sediment control ponds and sediment basins, coir logs and sediment fencing to control sediment run-off, catch drains and perimeter bunds and diversion drains - A schedule will be included for cleaning sediment basins with intervals to be informed from the outcomes of monitoring basins from Snowy 2 Main Works construction and catchment modelling. The schedule will include additional checks after rainfall events of >50 mm in 24 hours - Additional or supplementary control measures (i.e. sediment fencing, diversions, and detention ponds) will be implemented at high risk areas such as the bridge crossings at Sheep Station Creek, Cave Gully and Wallaces Creek and at tower structures site and access roads on the slopes around Yarrangobilly Creek and associated tributaries - Additional water quality monitoring points will be installed and monitored in locations to be agreed with NPWS and BCD, which are downhill of the construction footprint and upstream of Booroolong Frog habitat. An adaptive monitoring plan will be developed to trigger a rapid response if sediment loads detrimental to Booroolong frog are detected - Runoff from spoil piles will be managed through the above listed control measures to ensure that there is no contamination or sediment entering waterways or adjacent areas - Accidental spills will be reported to the contractors environmental representative as soon as the incident is observed so that the site can be remediated rapidly - Implementation of tannin leachate management controls may be required as determined by the monitoring program - Sediment traps or filters (targeting removal of coarse sediment) will be maintained at all discharge locations and will be monitored and maintained as per the scheduled requirements - Other source controls, such as mulching, matting and sediment fences may be used in consultation with BCD and NPWS and need to be approved in the CEMP and any deviation from measures by DPIE will need to be sought. Similarly, natural erosion controls incorporating organic materials, micro water capture and contour shaping will need to be approved in the CEMP where appropriate	

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Soil and Water Management Plan

Reference number	Requirement	Document Reference
	- Disturbed areas will be stabilized and rehabilitated to reduce erosion potential (i.e. exposure period of bare earth). This will be particularly important for revegetation of slopes as soon as possible, in accordance with the rehabilitation plan. Landscaping of pervious surfaces using native indigenous species only. Soil loss will be prevented by immediate stabilisation of exposed surfaces (e.g. use of Jute mesh and/or soil binder) - Any imported fill will be certified at source locations to ensure it is pathogen and weed free Excavated Natural Material or Virgin Excavated Natural Material) - An induction protocol will be mandatory for all personnel involved in construction and operation works - There needs to be acknowledgement of imported material e.g. road base being washed off tracks etc in the surrounding environment and how that will be dealt with.	
W1	The waterway crossing over flood impacted waterways such as Sheep Station Creek will be designed and constructed in a way that minimises flood risk and minimises upstream and downstream impacts. The waterway crossing will be designed to ensure flow and drainage is maintained in waterways where construction works are taking place or where the permeant waterway crossing will be located. The waterway crossing will be constructed in accordance with minimum design criteria for waterway crossings outlined in Why do fish need to cross the road? Fish passage requirements for waterway crossings (Fairfull and Witheridge, 2003). The design of waterway crossing will also consider the appropriate measures are outlined in: - Forest Soil and Water Protection – A Guide for Operators (State Forests of NSW, 2000) - Fire Trail Design, Construction and Maintenance Manual (RFS, 2017). All new waterway crossings, construction and rehabilitation of works near or within watercourses will be in accordance with the requirements of the Guidelines for Controlled Activities on Waterfront Land (NRAR 2018).	IFC Design Drawings
W2	Flood modelling will be undertaken at the detailed design stage to define flood behaviour for the existing conditions due to mainstream and overland flooding. The flood models will be utilised to	Hydrology Assessment (Jacobs, 2020)

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Reference number	Requirement	Document Reference
	identify and address potential impacts of the proposed works for construction and operation of the project on flooding - Overland flooding impacts will be considered during detailed design, to ensure that the substation's drainage and stormwater system is adequate, and the substation's platforms are above the required flood immunity - Structures within the flood extent will be designed with appropriate foundation to ensure stability against hydrostatic pressure and debris load.	IFC Design Drawings
W3	A SWMP will be prepared and implemented prior to and during construction. During the preparation of SWMP, Transgrid will working closely with the EPA in developing and designing key sediment and erosion controls as to prevent any change to the existing baseline surface water quality within and adjoining the project area. The SWMP will include: - Erosion and sediment control plans for all stages of construction that will be submitted for approval prior to its implementation. Initially the principal SWMP will be prepared, and it will be followed by the Progressive SWMP that will be regularly updated during the construction phase to take into consideration changes that may occur that require revised erosion and sediment controls - Details on the construction and management of sediment basin if determined to be required - Protection of waterways such as scour protection and revegetation - Any imported fill will be certified at source locations as pathogen and weed free Excavated Natural Material or Virgin Excavated Natural Material - Management of stockpiles and spoil - Tannin leachate management controls - Management of accidental spills, response and reporting - An induction protocol	This document Appendix D Appendix E Appendix A Section 5.2 and Appendix A Appendix B

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Reference number	Requirement	Document Reference
	Responsibilities for all management measures. All erosion and sediment control measures will be designed, implemented, progressively rehabilitated and maintained in accordance with relevant sections of Managing Urban Stormwater: Soil and Construction Volume 1 (Landcom, 2004) ('the Blue Book') (particularly Section 2.2) and Managing Urban Stormwater: Soil and Construction Volume 2A – Installation of Services (DECC, 2008b).	Table 5-2 Appendix D Appendix E
W4	A water quality monitoring program will be developed as part of the SWMP as described in Appendix E. It will be developed and implemented to gain an appreciation of background water quality, to observe any changes in surface water quality that may be attributable to the project and inform appropriate management responses. The surface water quality monitoring program will be carried out during the pre-construction, construction, and operational stages of the project.	Appendix F
W5	- All chemicals or other hazardous substances will be stored in a bunded area and away from any drainage lines/pits. The capacity of the bunded area will be at least 130% of the largest chemical volume contained within the bunded area - No refuelling or bulk herbicide preparation will occur within 40 metres of natural drainage lines - Environmental spill kits containing spill response materials suitable for the works being undertaken will be kept on site at all times and be used in the event of a spill - Any spills will be contained, cleaned up promptly and immediately reported to the relevant site representative.	Appendix B
W6	The SWMP will include arrangements for managing wet weather events, including monitoring of potential high risk events (such as storms) and specific controls and follow-up measures to be applied in the event of wet weather	Appendix D

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Reference number	Requirement	Document Reference
	Where required, adequate sediment controls (including the consideration of sediment basins) will be included in the access track design to manage erosion and sedimentation and associated impacts on receiving waters.	
W7	For the Snowy 2.0 T2 Tailbay site and Paddys River water uptake site: - A water extraction licence will be sought prior to the extraction of any water from Talbingo Reservoir and the Paddy's River - Prior to extraction of water near Paddy's River Flat Campground, rubber mats will be placed on the ground under the water trucks to prevent erosion and sediments entering the waterway - During water extraction from Talbingo Reservoir and Paddy's River, slow velocities of water pumping and screens on the hoses will be used to minimise small aquatic fauna been inadvertently picked up.	Section 5.6
W8	Temporary dewatering for construction is not anticipated. In the event that dewatering is required then the following management measures will apply: - Confirmation of whether or not a licence under the WM Act as defined under the NSW Aquifer Interference Policy (DPI Water, 2012) is required prior to any dewatering activity commencing - If dewatering is required, the management of discharge water will be documented in the SWMP - Discharge water will be limited to vegetated, grassed areas, away from waterways, and within the construction footprint. If the discharge water is highly turbid, dewatering through a filter sock (or similar), or via transportable sedimentation tanks will be considered, where appropriate, to minimise sedimentation.	Section 5.5 Appendix A Appendix I
W9	A flood management plan (FMP) will be prepared for the project and will detail the processes for flood preparedness, materials management, weather monitoring, site management and flood incident management. The FMP will also address procedures and responsibilities for flood response (preparation of site upon receipt of flood warning, evacuation of site personnel) during and recovery following a flood event.	Emergency Plan

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Reference number	Requirement	Document Reference
AQ1	Air quality mitigation measures will include, but not be limited to: - Identifying potential sources of air pollution - Dust mitigation and suppression measures to be implemented - Plant and equipment will be switched off when not in use - Vehicles, plant and construction equipment will be appropriately sized for the task and properly maintained so as to achieve optimum fuel efficiency - Materials will be delivered with full loads and will come from local suppliers, where possible - Methods to manage work during strong winds or other adverse weather conditions - A progressive rehabilitation of disturbed areas.	Section 5.8 Appendix D Appendix E
HAZ5	- All chemicals or other hazardous substances will be stored in a bunded area and away from any natural drainage lines. The capacity of the bunded area will be at least 130% of the largest chemical volume contained within the bunded area. The location of the bunded enclosure/s will be shown on Site Plans - The storage, handling and use of dangerous goods and hazardous substances will be carried out in accordance with the WHS Act and Regulations, the Storage and Handling of Dangerous Goods Code of Practice (WorkCover NSW, 2005) and relevant Australian Standards.	Appendix B
L4	A spoil management strategy will be prepared for the project. The spoil management strategy will outline appropriate management procedures for the generation, management and importation (if required) of spoil. It will include, but not be limited to: - Confirming spoil quantities - Carrying out appropriate assessments, including geotechnical investigations - Procedures for classification of spoil	Appendix A

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Reference number	Requirement	Document Reference
	- Identification of spoil reuse measures, including segregation of soils as subsoils and topsoils - Spoil stockpile management procedures including the number of stockpiles, area and time they are exposed, and locating stockpiles away from drainage lines and natural waterways and from where they will be susceptible to erosion - Spoil haulage routes - Spoil disposal and reuse locations - Imported spoil sources and volumes.	
L5	Management of topsoil stockpiles and other excavated material stockpiles to minimise dust and sediment in runoff will include: - Minimising the number of stockpiles, area and time they are exposed - Locating stockpiles away from drainage lines and natural waterways and from where they will be susceptible to erosion - Stockpiles will be bunded in accordance with the Blue Book (Landcom, 2004) <i>Managing Urban Stormwater – Soils and Construction</i>, Volume 1 4th Edition) - Stabilise stockpiles, establish sediment controls and suppress dust as required.	Section 5.2 Appendix A Appendix D Appendix E
L6	- Excavated material will be managed in accordance with the spoil management strategy. - Where applicable, excess spoil will be re-used for other elements of the project such as access track construction. Where spoil cannot be reused it will be managed as per the SWMP. Alternatively, excess material will be disposed of at other suitable locations (including at Ravine Bay, GF01, Main Yard or other Snowy 2.0 approved emplacement areas) as agreed to with NPWS and FCNSW. - Material which has been assessed as not suitable for reuse on land or for subaqueous disposal at the Ravine Bay emplacement area (as part of the Snowy 2.0 management procedure) or cannot be reused will be classified in accordance with the <i>Waste Classification Guidelines</i> (EPA, 2014). Excavated material will be transported to an appropriate excavated material disposal area. Approval will be	Appendix A

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Reference number	Requirement	Document Reference
	obtained prior to transport and will require an estimate of the likely volume of excavated material to be disposed.	
L7	Excavated material to be disposed of in the spoil emplacement locations (including Ravine Bay, GF01, Main Yard or other Snowy 2.0 approved emplacement areas will be transported to the emplacement area by Transgrid and/or contractor and then managed by Snowy Hydro in accordance with the relevant approved Snowy 2.0 Rehabilitation Plan prepared by Snowy Hydro.	Appendix A
L9	A rehabilitation plan will be prepared in consultation with NPWS and FCNSW to guide the long term rehabilitation of the project. The rehabilitation plan will be based on the rehabilitation strategy outlined in Section 5.4.10 of the EIS and will: • Include a detailed plan for rehabilitation of the site • Characterise the soil types within the disturbance area • Include details of soil management measures, including: ○ Topsoil stripping and stockpiling procedure ○ Subsoil management measures ○ Soil reinstatement methodology which includes a topsoil application procedure • Include measures to minimise: ○ Loss of soil ○ Loss of organic matter, nutrient and soil decline ○ Compaction • Consideration of how rehabilitation will be carried out where soils are unable be recovered, or soils are poor/unfit for re-use • Include detailed performance and completion criteria for evaluating the performance of the rehabilitation of the sites, and triggering any remedial action (if necessary)	Rehabilitation Plan

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Reference number	Requirement	Document Reference
	- Describe the measures that would be implemented to: - Comply with the rehabilitation objectives and associated performance and completion criteria - Progressively rehabilitate the site - Include a program to monitor and report the effectiveness of these measures.	
Mitigation measures – BDAR		
BIO10	A Soil and Water Management Plan (SWMP) will be prepared and implemented as part of the CEMP in consultation with NPWS and BCD. The plan will include stringent controls to mitigate impacts of runoff and sediment transfer from the project area during construction and operation. Control measures will remain in situ until site stabilisation completion criteria are met. The plan will ensure protection of aquatic habitat in the tributaries crossed by the project, and particularly aimed at protecting the habitat for the Booroolong Frog associated with Yarrangobilly Creek. This is particularly important for the lower reaches of Sheep Station Creek and Wallace Creek where the exclusion zone is encroached (refer Figure 11-1). An assessment of the current sediment basin design for the Main Works project will occur prior to vegetation clearing, to assess if the basin design specifications and design capacity are suitable for the additional sediment load expected during construction of the easement. Where modification or augmentation is required, sediment basins will be increased in size to cope with any additional expected sediment load. Sedimentation will be managed through implementation of effective sediment control management plans will be implemented to ensure that sediment does not enter the waterways and result in changes to the habitat structure of riparian areas or areas downstream of the project area. Effective control measures will include: - Erosion and sediment control plans for all stages of construction - The implementation of sediment control measures across the project area – a - sediment control ponds and sediment basins, coir logs and sediment fencing to control sediment run-off, catch drains and perimeter bunds and diversion drains	This document Appendix D Appendix E Appendix D Appendix E Appendix D Appendix E Appendix D – ESC 72, ESC 73 Section 6.3 Booroolong Frog

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Soil and Water Management Plan

Reference number	Requirement	Document Reference
	- A schedule will be included in the SWMP for cleaning and maintenance of sediment basins / controls with intervals to be informed from the outcomes of monitoring basins from Snowy 2 Main Works construction and catchment modelling. The schedule will include additional checks after rainfall events of >50 mm in 24 hours. A Trigger Action Response Plan will be documented in the SWMP, with management actions in place to address risk of sediment loads detrimental to Booroolong Frog entering the system. The triggers for response will be informed by evaluation of the construction monitoring results from Main Works. Immediate reporting to NPWS will occur in the event of any failure of sediment or stormwater mitigation measures, including overtopping of sediment basins. Indirect impacts are uncertain during high rainfall events during and/or after clearing. If mitigation measures and sedimentation controls fail, this could lead to a substantial loss or adverse impact to Booroolong Frog breeding and dispersal habitat. An adaptive management plan will be prepared in consultation with NPWS and BCD to address risk of increased sedimentation/run off to the identified breeding habitat and population extent downhill and downstream of the project area. - Additional or supplementary control measures (i.e. sediment fencing, diversions, and detention ponds) will be implemented at high risk areas such as the bridge crossings at Sheep Station Creek, Cave Gully and Wallaces Creek and at tower structures site and access roads on the slopes around Yarrangobilly Creek and associated tributaries - Additional water quality monitoring points will be installed and monitored in locations to be agreed with NPWS and BCD, which are downhill of the construction footprint and upstream of Booroolong Frog habitat. - An adaptive management plan as part of the monitoring program will be included in the SWMP to address risk of increased sedimentation/run off to the identified breeding habitat and population extent of the Booroolong Frog downhill and downstream of the project area. The plan will be designed to estimate any residual impact if sediment mitigation measures fail. - Runoff from spoil piles will be managed through the above listed control measures to ensure that there is no contamination or sediment entering waterways or adjacent areas	Monitoring Program (BMP Appendix G) Appendix D Appendix E Booroolong Frog Monitoring Program (BMP Appendix G) Appendix D Appendix E Appendix B Section 5.2 Appendix D Appendix E Appendix D Appendix E

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Reference number	Requirement	Document Reference
	- Accidental spills will be reported to the contractor's environmental representative as soon as the incident is observed so that the site can be remediated rapidly - Implementation of tannin leachate management controls may be required as determined by the monitoring program - Sediment traps or filters (targeting removal of coarse sediment) will be maintained at all discharge locations and will be monitored and maintained as per the scheduled requirements - Other source controls, such as mulching, matting and sediment fences may be used in consultation with BCD and NPWS and need to be approved in the CEMP and any deviation from measures by DPIE will need to be sought. Similarly, natural erosion controls incorporating organic materials, micro water capture and contour shaping will need to be approved in the CEMP where appropriate - Disturbed areas will stabilised and rehabilitated to reduce erosion potential (i.e. exposure period of bare earth). This will be particularly important for revegetation of slopes as soon as possible, in accordance with the rehabilitation plan. Landscaping of pervious surfaces using native indigenous species only. Soil loss will be prevented by immediate stabilisation of exposed surfaces (e.g. use of Jute mesh and/or soil binder) - Any imported fill will be certified at source locations to ensure it is pathogen and weed free Excavated Natural Material or Virgin Excavated Natural Material) - An induction protocol will be mandatory for all personnel involved in construction and operation works - There needs to be acknowledgement of imported material e.g. road base being washed off tracks etc in the surrounding environment and how that will be dealt with.	Appendix D Appendix E Rehabilitation Plan Appendix A Section 6.2 Table 5-2
BIO11	Weed monitoring and control programs are to be documented in the BMP and Trigger Action Response Plan as part of the SWMP and in consultation with BCD and NPWS and any deviation from measures approved by DPIE are to be raised and approved. Additional monitoring and control measures for introduced plant introduction and spread should be implemented at and around locations used for sediment control structures. Monitoring of exotic plants with waterborne propagules and a Trigger Action Response Plan for control must be undertaken along drainage lines outside the project area in locations where runoff	Weed and Pathogen Monitoring Program (BMP Appendix H)

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Reference number	Requirement	Document Reference
	drains from the construction site, and from locations where sediment control has failed. The program will include adaptive management strategies for priority weed species during construction, and early operational phase. The details of the monitoring program will be determined during the preparation of the BMP and follow the principles outlined in Section 11.2.	
BIO25	Dust management and monitoring programs using industry best practices and standards to control air quality will be implemented. - No dust generating works will be conducted during high winds - Keep stockpiles covered with material to prevent the generation of dust. Apply water dust suppression techniques during dust generating activities.	Appendix D Appendix E Section 5.8
BIO26	Provide sediment and erosion controls to manage exposed soil surfaces and stockpiles to prevent sediment discharge into waterways, vegetation, and fauna habitat. Control measures will include: - Clearly identify stockpile and storage locations and provide erosion and sediment controls around stockpiles (documented in Vegetation Clearing Plan) - Source controls, such as mulching, matting and sediment fences will only be used where approved in the CEMP - Sediment traps or filters (targeting removal of sediment) will be maintained at all discharge locations and will be regularly monitored and maintained - Disturbed areas will be stabilised and rehabilitated as soon as the event has been reported to reduce erosion potential (i.e., exposure period of bare earth) (as per Rehabilitation Plan) - Accidental spills will be immediately reported and remediated - Contaminated water will be separated from stormwater and will be managed in a process water system Provide on-site signage to identify contaminated topsoils.	Appendix D Appendix E Rehabilitation Plan Appendix C Contaminated Land Management Plan (Appendix H)
EPL Conditions (No. 21753) and EPL Variation Conditions (No. 21753)		

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Reference number	Requirement	Document Reference						
A1.1	This licence authorises the carrying out of the scheduled development work listed below at the premises listed in A2. There are four stages to the scheduled development works of which the following stages are authorised by this licence: Construction of high-voltage overhead transmission lines, new substation, grid connection between the new substation and existing Line 64, and construction facilities such as construction compounds and access tracks.	EMS CEMP						
A1.2	This licence authorises the carrying out of the scheduled activities listed below at the premises specified in A2. The activities are listed according to their scheduled activity classification, fee-based activity classification and the scale of the operation. Unless otherwise further restricted by a condition of this licence, the scale at which the activity is carried out must not exceed the maximum scale specified in this condition. <table border="1"> <thead> <tr> <th>Scheduled Activity</th><th>Fee Based Activity</th><th>Scale</th></tr> </thead> <tbody> <tr> <td>Extractive activities</td><td>Extractive activities</td><td>> 100000 - 500000 T annually extracted or processed</td></tr> </tbody> </table> Note: Under the Protection of the Environment Operations Act, the approved extractive limit for the project is 561,231 Tonnes	Scheduled Activity	Fee Based Activity	Scale	Extractive activities	Extractive activities	> 100000 - 500000 T annually extracted or processed	EMS CEMP
Scheduled Activity	Fee Based Activity	Scale						
Extractive activities	Extractive activities	> 100000 - 500000 T annually extracted or processed						
A2.1	The licence applies to the following premises:	EMS CEMP						

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Reference number	Requirement	Document Reference									
	<table><tr><td>Premises Details</td></tr><tr><td>SNOWY 2.0 TRANSMISSION CONNECTION PROJECT</td></tr><tr><td>KOSCIUSZKO NATIONAL PARK & BAGO STATE FOREST</td></tr><tr><td>KOSCIUSZKO</td></tr><tr><td>NSW 2642</td></tr><tr><td></td></tr><tr><td>PREMISES DEFINED BY: SNOWY 2.0 TRANSMISSION CONNECTION INFRASTRUCTURE APPROVAL SSI 9717 (02 SEPTEMBER 2022): APPENDIX 1 - SCHEDULE OF LANDS</td></tr></table>	Premises Details	SNOWY 2.0 TRANSMISSION CONNECTION PROJECT	KOSCIUSZKO NATIONAL PARK & BAGO STATE FOREST	KOSCIUSZKO	NSW 2642		PREMISES DEFINED BY: SNOWY 2.0 TRANSMISSION CONNECTION INFRASTRUCTURE APPROVAL SSI 9717 (02 SEPTEMBER 2022): APPENDIX 1 - SCHEDULE OF LANDS			
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A3.1	Works and activities must be carried out in accordance with the proposal contained in the licence application, except as expressly provided by a condition of this licence. In this condition the reference “o "the licence application" includes a reference to: a. the applications for any licences (including former pollution control approvals) which this licence replaces under the Protection of the Environment Operations (Savings and Transitional) Regulation 1998; and b. the licence information form provided by the licensee to the EPA to assist the EPA in connection with the issuing of this licence.	EMS CEMP									
P1.1	The following points referred to in the table are identified in this licence for the purposes of the monitoring and/or the setting of limits for discharges of pollutants to water from the point. <table><tr><th>EPA ID No.</th><th>Type of Monitoring Point</th><th>Location Description</th></tr><tr><td>1</td><td>Surface Water – YORKERS CREEK</td><td>Yorkers Creek Upstream labelled YK-RS in the document titled "Construction Water Quality Monitoring Program and Methodology Snowy 2.0 Transmission Connection Project" (DOC 22/918656-1)</td></tr><tr><td>2</td><td>Surface Water – YORKERS CREEK</td><td>Yorkers Creek at Western end of alignment labelled YK-IS in the document titled Construction Water Quality Monitoring</td></tr></table>	EPA ID No.	Type of Monitoring Point	Location Description	1	Surface Water – YORKERS CREEK	Yorkers Creek Upstream labelled YK-RS in the document titled "Construction Water Quality Monitoring Program and Methodology Snowy 2.0 Transmission Connection Project" (DOC 22/918656-1)	2	Surface Water – YORKERS CREEK	Yorkers Creek at Western end of alignment labelled YK-IS in the document titled Construction Water Quality Monitoring	Appendix F
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Reference number	Requirement			Document Reference
			Program and Methodology Snowy 2.0 Transmission Connection Project" (DOC 22/918656-1)	
	3	Surface Water – YORKERS CREEK	Yorkers Creek downstream (d/s) labelled YK-IS (d/s) in the document titled "Construction Water Quality Monitoring Program and Methodology Snowy 2.0 Transmission Connection Project" (DOC 22/918656-1)	
	4	Surface Water – NEW ZEALAND GULLY	New Zealand Gully labelled NZG-IS in the document titled "Construction Water Quality Monitoring Program and Methodology Snowy 2.0 Transmission Connection Project" (DOC 22/918656-1)	
	5	Surface Water – TUMUT RIVER	Tumut River u/' O'Hares Creek labelled TR-RS in the document titled "Construction Water Quality Monitoring Program and Methodology Snowy 2.0 Transmission Connection Project" (DOC 22/918656-1)	
	6	Surface Water – LICK HOLE GULLY	Lick Hole Gully d/s alignment labelled LHG-IS in the document titled "Construction Water Quality Monitoring Program and Methodology Snowy 2.0 Transmission Connection Project" (DOC 22/918656-1)	
	7	Surface Water – SHEEP STATION CREEK	Sheep Station Creek labelled SSC-IS in the document titled "Construction Water Quality Monitoring Program and Methodology Snowy 2.0 Transmission Connection Project" (DOC 22/918656-1)	
	8	Surface Water – CAVE GULLY	Cave Gully labelled CG-IS in the document titled "Construction Water Quality Monitoring Program and Methodology Snowy 2.0 Transmission Connection Project" (DOC 22/918656-1)	

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Reference number	Requirement			Document Reference
	9	Surface Water – YARRANGOBILLY RIVER	Yarrangobilly River at alignment labelled YR1-IS in the document titled "Construction Water Quality Monitoring Program and Methodology Snowy 2.0 Transmission Connection Project" (DOC 22/918656-1)	
	10	Surface Water – YARRANGOBILLY RIVER	Yarrangobilly River d/s alignment labelled YR2-IS in the document titled "Construction Water Quality Monitoring Program and Methodology Snowy 2.0 Transmission Connection Project" (DOC 22/918656-1)	
	11	Surface Water – WALLACES CREEK	Wallaces Creek u/s alignment labelled WC-RS in the document titled "Construction Water Quality Monitoring Program and Methodology Snowy 2.0 Transmission Connection Project" (DOC 22/918656-1)	
	12	Surface Water – WALLACES CREEK	Wallaces Creek labelled WC-IS in the document titled "Construction Water Quality Monitoring Program and Methodology Snowy 2.0 Transmission Connection Project" (DOC 22/918656-1)	
L1.1	Except as may be expressly provided in any other condition of this licence, the licensee must comply with section 120 of the Protection of the Environment Operations Act 1997.			EMS CEMP
O1.1	i. Licensed activities must be carried out in a competent manner. This includes a) the processing, handling, movement and storage of materials and substances used to carry out the activity; and ii. the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity.			Appendix A
O2.1	All plant and equipment installed at the premises or used in connection with the licensed activity: a) must be maintained in a proper and efficient condition; and			CEMP

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Reference number	Requirement	Document Reference
	b) must be operated in a proper and efficient manner.	
O3.1	All operations and activities occurring at the premises must be carried out in a manner that minimises or prevents the emission of dust from the premises.	Appendix D
O4.1	The licensee must assess, classify and manage any waste generated at the premises in accordance with the Waste Classification Guidelines 2014 and the Act. Waste need to be transported to a place that can lawfully accept that waste.	Appendix H
O5.1	Location and geochemistry The Licensee must ensure that all samples collected for spoil characterisation are: a. representative of the material currently being extracted from the specific area; b. is not skewed by veins; and c. corresponds to the material placed on the emplacement area	Appendix A
O5.2	All treatment of spoil including but not limited to the temporary storage of spoil, and treatment of Potentially Acid Forming (PAF) material and material at risk of resulting in Acid Mine Drainage or Neutral Mine Drainage, must be undertaken in a manner that: a. achieves permanent neutralisation of the material b. prevents pollution of waters; and c. prevents contamination of land	Appendix A
O5.3	The Licensee must validate that all treated spoil material meets the requirements of condition O5.2.	Appendix A
M1.1	The results of any monitoring required to be conducted by this licence or a load calculation protocol must be recorded and retained as set out in this condition.	Appendix A Appendix F Section 6.3
M1.2	All records required to be kept by this licence must be: a) in a legible form, or in a form that can readily be reduced to a legible form;	Appendix A Appendix F

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Reference number	Requirement	Document Reference																				
	b) kept for at least 4 years after the monitoring or event to which they relate took place; and c) produced in a legible form to an authorised officer of the EPA who asks to see them.	Section 6.3																				
M1.3	The following records must be kept in respect of any samples required to be collected for the purposes of this licence: a) the date(s) on which the sample was taken; b) the time(s) at which the sample was collected; c) the point at which the sample was taken; and d) the name of the person who collected the sample.	Appendix A Appendix F Section 6.3																				
M2.1	For each monitoring/discharge point location area specified below (by a point number), the licensee must monitor (by sampling and obtaining results by analysis) the concentration of each pollutant specified in Column 1. The licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns:	Appendix F																				
M2.2	Water and/ or Land Monitoring Requirements Analysis requirements for surface water monitoring is to include both total and dissolved concentrations for inorganics, metals and metalloids. Point 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 <table><tr><th>Pollutant</th><th>Units of measure</th><th>Frequency</th><th>Sampling Method</th></tr><tr><td>Aluminium</td><td>milligrams per litre</td><td>Monthly</td><td>Grab sample</td></tr><tr><td>Ammonia</td><td>milligrams per litre</td><td>Monthly</td><td>Grab sample</td></tr><tr><td>Arsenic</td><td>milligrams per litre</td><td>Monthly</td><td>Grab sample</td></tr><tr><td>Cadmium</td><td>milligrams per litre</td><td>Monthly</td><td>Grab sample</td></tr></table>	Pollutant	Units of measure	Frequency	Sampling Method	Aluminium	milligrams per litre	Monthly	Grab sample	Ammonia	milligrams per litre	Monthly	Grab sample	Arsenic	milligrams per litre	Monthly	Grab sample	Cadmium	milligrams per litre	Monthly	Grab sample	Appendix F
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Cadmium	milligrams per litre	Monthly	Grab sample																			

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Reference number	Requirement				Document Reference
	Chromium	milligrams per litre	Monthly	Grab sample	
	Copper	milligrams per litre	Monthly	Grab sample	
	Cyanide	milligrams per litre	Monthly	Grab sample	
	Dissolved Oxygen	percent	Monthly	In situ	
	Electrical conductivity	Micro-Siemens per centimetre	Monthly	In situ	
	Iron	milligrams per litre	Monthly	Grab sample	
	Lead	milligrams per litre	Monthly	Grab sample	
	Manganese	milligrams per litre	Monthly	Grab sample	
	Mercury	milligrams per litre	Monthly	Grab sample	
	Nickel	milligrams per litre	Monthly	Grab sample	
	Nitrogen (total)	milligrams per litre	Monthly	Grab sample	
	Nitrogen Oxides	milligrams per litre	Monthly	Grab sample	
	pH	pH	Monthly	In situ	
	Phosphorus (total)	milligrams per litre	Monthly	Grab sample	
	Reactive Phosphorus	milligrams per litre	Monthly	Grab sample	
	Silver	milligrams per litre	Monthly	Grab sample	
	Total dissolved solids	micrograms per litre	Monthly	Grab sample	

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Reference number	Requirement					Document Reference
	Total Hardness	micrograms per litre	Monthly	Grab sample		
	Total Nitrogen	milligrams per litre	Monthly	Grab sample		
	TSS	milligrams per litre	Monthly	Grab sample		
	Turbidity	nephelometric turbidity units	Monthly	In situ		
	Zinc	milligrams per litre	Monthly	Grab sample		
M3.1	Subject to any express provision to the contrary in this licence, monitoring for the concentration of a pollutant discharged to waters or applied to the disturbed area must be done in accordance with the Approved Methods Publication unless another method has been approved by the EPA in writing before any tests are conducted.					Appendix F
M4.1	The licensee must keep a legible record of all complaints made to the licensee or any employee or agent of the licensee in relation to pollution arising from any activity to which this licence applies.					CEMP
M4.2	The record must include details of the following: a) the date and time of the complaint; b) the method by which the complaint was made; c) any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect; d) the nature of the complaint; e) the action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and f) if no action was taken by the licensee, the reasons why no action was taken.					CEMP
M4.3	The record of a complaint must be kept for at least 4 years after the complaint was made.					CEMP

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Reference number	Requirement	Document Reference
M4.4	The record must be produced to an authorised officer of the EPA who asks to see them.	CEMP
M5.1	The licensee must operate during its operating hours a telephone complaints line for the purpose of receiving any complaints from members of the public in relation to activities conducted at the premises or by the vehicle or mobile plant, unless otherwise specified in the licence.	CEMP
M5.2	The licensee must notify the public of the complaints line telephone number and the fact that it is a complaints line so that the impacted community knows how to make a complaint.	CEMP
M5.3	The preceding two conditions do not apply until immediately from the date of the issue of this licence.	Noted
R1.1	The licensee must complete and supply to the EPA an Annual Return in the approved form comprising: 1. a Statement of Compliance, 2. a Monitoring and Complaints Summary, 3. a Statement of Compliance - Licence Conditions, 4. a Statement of Compliance - Load based Fee, 5. a Statement of Compliance - Requirement to Prepare Pollution Incident Response Management Plan, 6. a Statement of Compliance - Requirement to Publish Pollution Monitoring Data; and 7. a Statement of Compliance - Environmental Management Systems and Practices. At the end of each reporting period, the EPA will provide to the licensee notification that the Annual Return is due.	CEMP
R1.2	An Annual Return must be prepared in respect of each reporting period, except as provided below.	CEMP
R1.3	Where this licence is transferred from the licensee to a new licensee: a) the transferring licensee must prepare an Annual Return for the period commencing on the first day of the reporting period and ending on the date the application for the transfer of the licence to the new licensee is granted; and	CEMP

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Reference number	Requirement	Document Reference
	b) the new licensee must prepare an Annual Return for the period commencing on the date the application for the transfer of the licence is granted and ending on the last day of the reporting period.	
R1.4	Where this licence is surrendered by the licensee or revoked by the EPA or Minister, the licensee must prepare an Annual Return in respect of the period commencing on the first day of the reporting period and ending on: a) in relation to the surrender of a licence - the date when notice in writing of approval of the surrender is given; or b) in relation to the revocation of the licence - the date from which notice revoking the licence operates.	CEMP
R1.5	The Annual Return for the reporting period must be supplied to the EPA via eConnect EPA or by registered post not later than 60 days after the end of each reporting period or in the case of a transferring licence not later than 60 days after the date the transfer was granted (the 'due date').	CEMP
R1.6	The licensee must retain a copy of the Annual Return supplied to the EPA for a period of at least 4 years after the Annual Return was due to be supplied to the EPA.	CEMP
R1.7	Within the Annual Return, the Statements of Compliance must be certified and the Monitoring and Complaints Summary must be signed by: a) the licence holder; or b) by a person approved in writing by the EPA to sign on behalf of the licence holder.	CEMP
R2.1	Notifications must be made by telephoning the Environment Line service on 131 555. Note: The licensee or its employees must notify all relevant authorities of incidents causing or threatening material harm to the environment immediately after the person becomes aware of the incident in accordance with the requirements of Part 5.7 of the Act.	CEMP
R2.2	The licensee must provide written details of the notification to the EPA within 7 days of the date on which they became aware of the incident.	CEMP
R3.1	Where an authorised officer of the EPA suspects on reasonable grounds that: a) where this licence applies to premises, an event has occurred at the premises; or	CEMP

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Reference number	Requirement	Document Reference
	b) where this licence applies to vehicles or mobile plant, an event has occurred in connection with the carrying out of the activity authorised by this licence, and the event has caused, is causing or is likely to cause material harm to the environment (whether the harm occurs on or off premises to which the licence applies), an authorised officer may request a written report of the event.	
R3.2	The licensee must make all reasonable inquiries in relation to the event and supply the report to the EPA within such time as may be specified in the request.	CEMP
R3.3	The request may require a report which includes any or all of the following information: a) the cause, time and duration of the event; b) the type, volume and concentration of every pollutant discharged as a result of the event; c) the name, address and business hours telephone number of employees or agents of the licensee, or a specified class of them, who witnessed the event; d) the name, address and business hours telephone number of every other person (of whom the licensee is aware) who witnessed the event, unless the licensee has been unable to obtain that information after making reasonable effort; e) action taken by the licensee in relation to the event, including any follow-up contact with any complainants; f) details of any measure taken or proposed to be taken to prevent or mitigate against a recurrence of such an event; and g) any other relevant matters.	CEMP
R3.4	The EPA may make a written request for further details in relation to any of the above matters if it is not satisfied with the report provided by the licensee. The licensee must provide such further details to the EPA within the time specified in the request.	CEMP
R4.1	The licensee must notify the EPA within 24 hours by phone or in writing of any results from monitoring required by condition M2 that exceed the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG) and NSW Water Quality Objectives and caused by activities carried out by or on behalf of the Licensee.	CEMP

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Reference number	Requirement	Document Reference
R4.2	The licensee must submit an Environmental Monitoring Report every six (6) months to the EPA, unless otherwise agreed in writing by the EPA.	CEMP
R4.3	The Environmental Monitoring Report must be prepared by a suitably qualified and experienced person and include, but not be limited to: a) results of all water quality monitoring undertaken in the preceding six (6) month period; b) results of all weather monitoring undertaken in the preceding six (6) month period; c) assessment of historical trends in all water sampling data for each monitoring point inclusive of the current six (6) month period; d) identification of instances where the water quality objective triggers for each relevant pollutant were exceeded at receiving water locations and/or where the predicted discharge water quality was exceeded at sediment basin discharge points; e) include details of any actions taken by the Licensee in response to exceedances identified under point (d), including but not limited to: i. additional monitoring ii. remedial actions; and iii. activation of trigger, action, response plans (TARPs); f) recommendations for future actions in relation to monitoring and/or management	CEMP
G1.1	A copy of this licence must be kept at the premises to which the licence applies.	CEMP
G1.2	The licence must be produced to authorised officer of the EPA who asks to see it.	CEMP
G1.3	The licence must be available for inspection by any employee or agent of the licensee working at the premises.	CEMP
G2.1	Each monitoring point in condition P1.1 must be clearly marked by a sign that indicates the EPA point identification number.	CEMP

3. Existing Environment

The Project area is located within the Murrumbidgee catchment within the Snowy Mountains alpine region in NSW. It is situated within the headwaters of the catchment, which consists of 5100km² of national parks, reserves and state forest, including the Kosciuszko National Park (KNP). Snowy Hydro Limited is required to release 1,026,000 megalitres (ML) of water per year to the Murrumbidgee catchment as part of the issued water licence for the scheme. The footprint to be impacted by Project is included in Figure 3-1.

3.1. Topography and geology

Within the Project area, the topography ranges from elevated plateaus in project area west, to steep valleys and ridges around the Talbingo Reservoir and Yarrangobilly River and narrow alluvial terraces within the Yarrangobilly River valley in project area east.

The geology to be encountered during works comprises a variety of types, with dominant lithologies and associated construction activities including:

- Tonalite and granodiorite – Maragle Substation construction, Maragle Substation access road and 15 structures
- Basalt – access track and five structures
- Sandstone – two access tracks, helipad and four structures
- Shale – access track and seven structures
- Limestone – access track and 11 structures.

The soils of the Project area are varied and depend on landform. The soils are generally red and brown earths/structured red earths, with sandy loam and clay loam textures. Erosion has been observed on poorly constructed or maintained forest tracks. Areas of mapped potential acid sulfate soils are not within the Project area.

Vegetation clearing to establish the transmission corridor and access tracks can also disturb soil and in the long-term, can also increase soil erosion. Soil disturbance generates the potential for erosion and sediment transfer offsite, which may result in sedimentation of surrounding land and drainage lines. The risk of sediment transfer is higher where excavation or vegetation clearing is proposed in steep areas in close proximity to waterways, for instance at the Sheep Station Creek waterway crossing. (Jacobs, 2022).

3.2. Surface water

A total of 29 waterways intersect the Project area, including the Tumut River, which is the largest tributary of the Murrumbidgee River. Talbingo Reservoir, immediately north of the Project area, is a major rock fill dam forming part of the Snowy Hydro scheme and is crossed by the Project near the confluence of the Tumut and Yarrangobilly Rivers.

The main Project alignment design traverses a total of 11 waterways and drainage channels, including minor tributaries of Yorkers Creek, Tumut River (and Talbingo Reservoir), Sheep Station Creek, Lick Hole Gully, Cave Gully, Wallaces Creek and minor tributaries of the Yarrangobilly River. These intersections arise primarily from access track construction as well as during construction of the Maragle Substation. Proposed access tracks will cross five waterways and drainage lines – two minor tributaries of Tumut River (and Talbingo Reservoir), Sheep Station Creek an unnamed drainage line and a minor tributary to Yarrangobilly River. A new permanent waterway crossing is to be constructed at Sheep Station Creek consisting of a bridge structure. The Maragle Substation will cross two waterways – New Zealand Gully and a minor tributary of Yorkers Creek.

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Six waterways within the Project area are stream order three or greater in accordance with the Strahler method and have also been mapped as Key Fish Habitat (KFH). These waterways include Wallaces Creek, Tumut River and Yarrangobilly River, classified as greater than sixth order, and Sheep Station Creek, Lick Hole Gully and Cave Gully, classified as third order. A tributary of Lick Hole Gully is also mapped as second order and KFH. The locations of these waterways and their associated stream orders are indicated in [Figure 3-2](#).

The PC are implementing a water quality monitoring program for the Project. The reports are available on the Project's website. The baseline criteria for these waterways and water quality monitoring is being captured over time as part of the water quality monitoring program. The water quality monitoring program is provided in Appendix F.

3.3. Rainfall and climate

The average rainfall in the Murrumbidgee catchment is approximately 1000 millimetres (mm) per annum, within the headwaters of the Project. The highest rainfall levels occur in winter and spring however rain falls year-round at a relatively consistent rate, with an average of 9.4 (lowest) rainy days recorded for the township of Talbingo in January and 14 in August (highest). The Project EIS specifies an average mean rainfall for the Snowy region as 976 millimetres (mm) per year.

The Project area is also subject to winter snow and frost events which have the potential to influence erosion of soils. Soil freezing and thawing can create stress fractures and alter soil physical properties including pore continuity and aggregate stability. These alterations can influence soil hydraulic properties and erodibility long after the soil is thawed. Water migration associated with soil freezing can also influence solute movement (G.N. Flerchinger... D.K. McCool, in Reference Module in Earth Systems and Environmental Sciences, 2013). The thawing of snow can intensify the rate of surface water runoff causing soil erosion. This aspect will need to be considered in the design of Erosion and Sediment Controls and stabilisation of cleared land within the Project area.

3.4. Flooding

Flood modelling for the Project area was undertaken as part of exploratory studies for the greater Snowy 2.0 Project. The waterways in project area west were found to be too minor to warrant flood modelling. However, a portion of project area east was found to be within the Probable Maximum Flood (PMF) limit (Figure 3-3). Within the Project area, Sheep Station Creek is known to be affected by flooding, with the Yarrangobilly River, Lick Hole Gully, Cave Gully and Wallaces Creek mapped as subject to flooding in the 1% AEP.

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Figure 3-1 Amended disturbance footprint in the greater Project area (Transgrid, 2021)

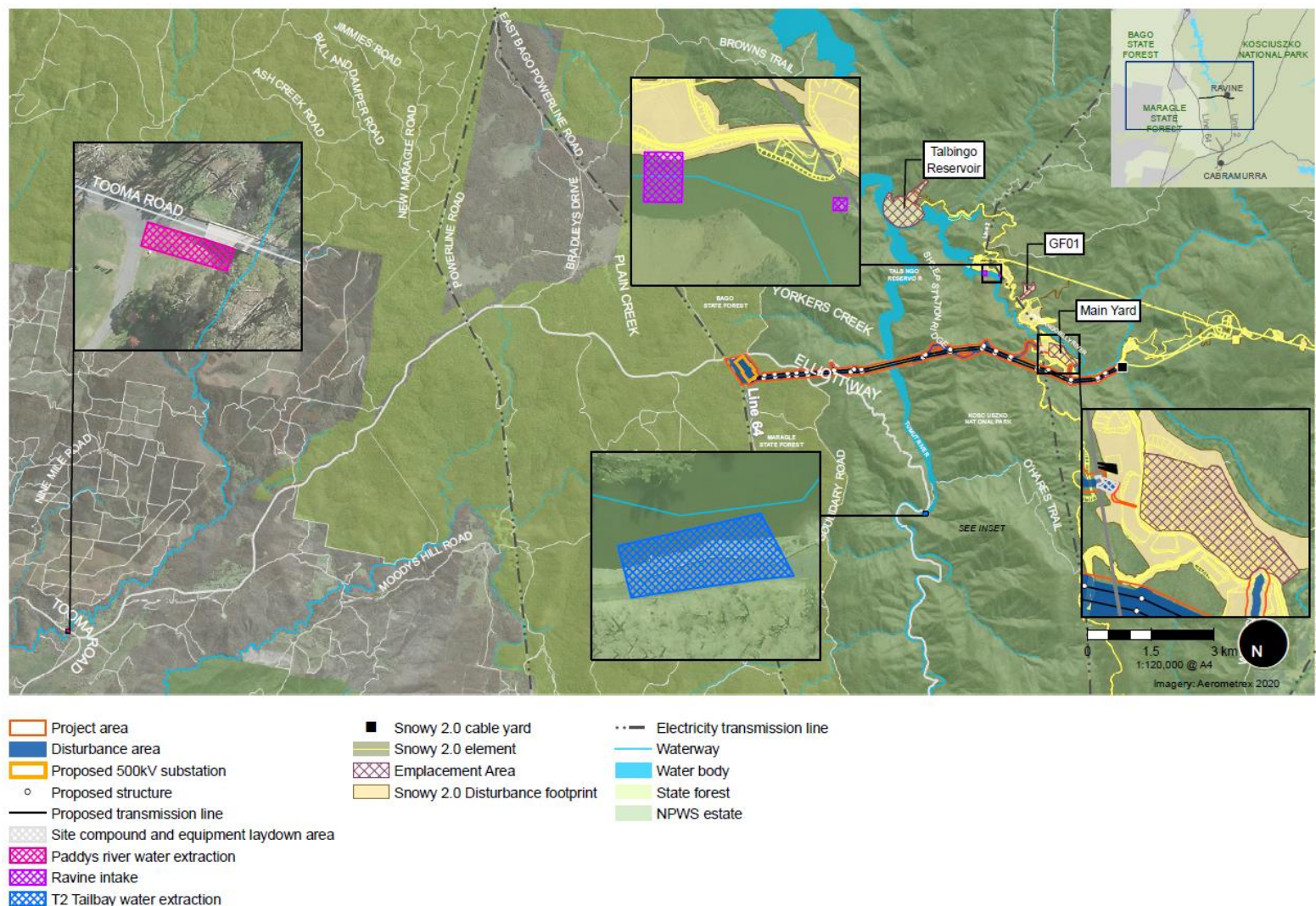
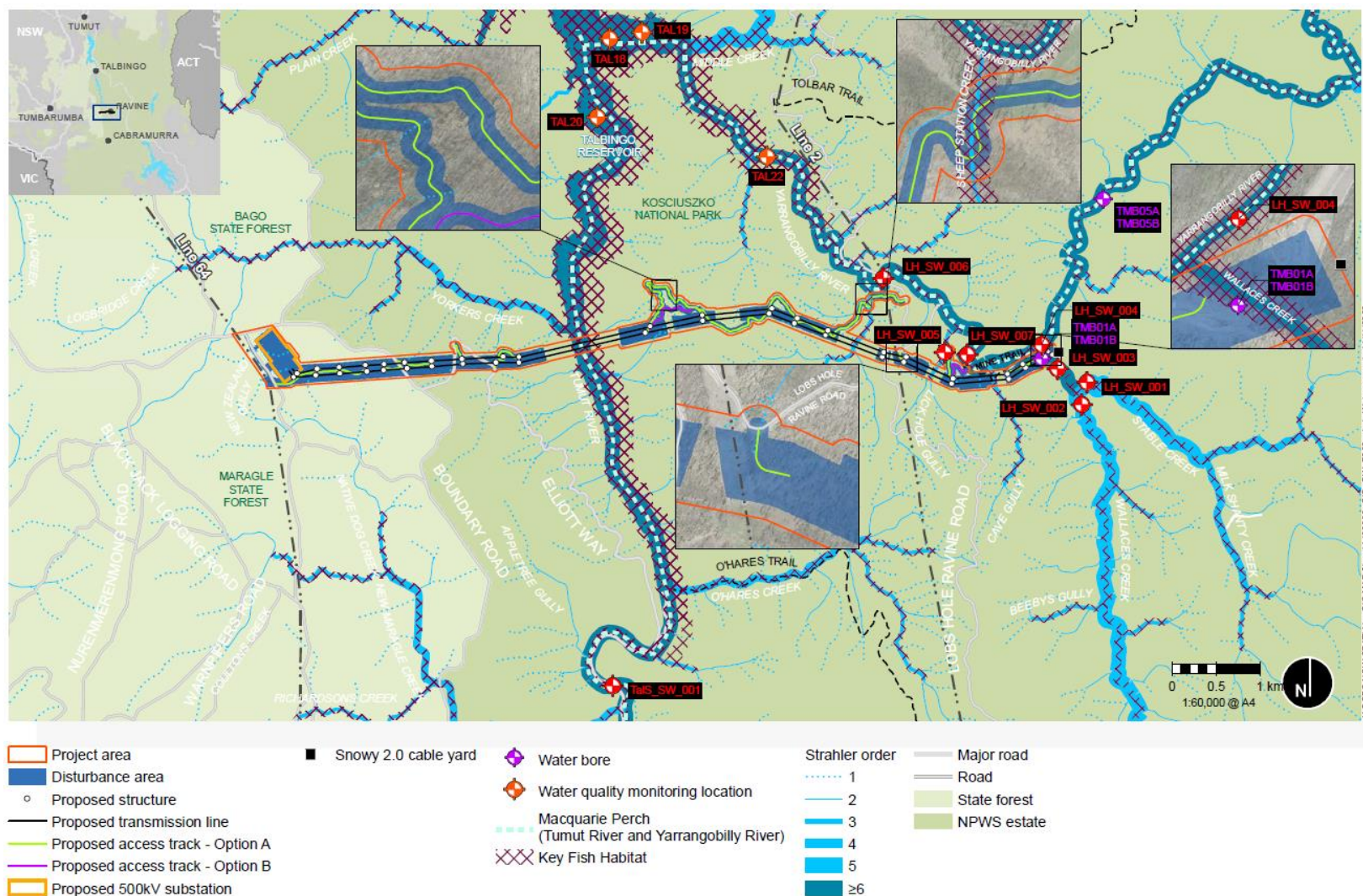
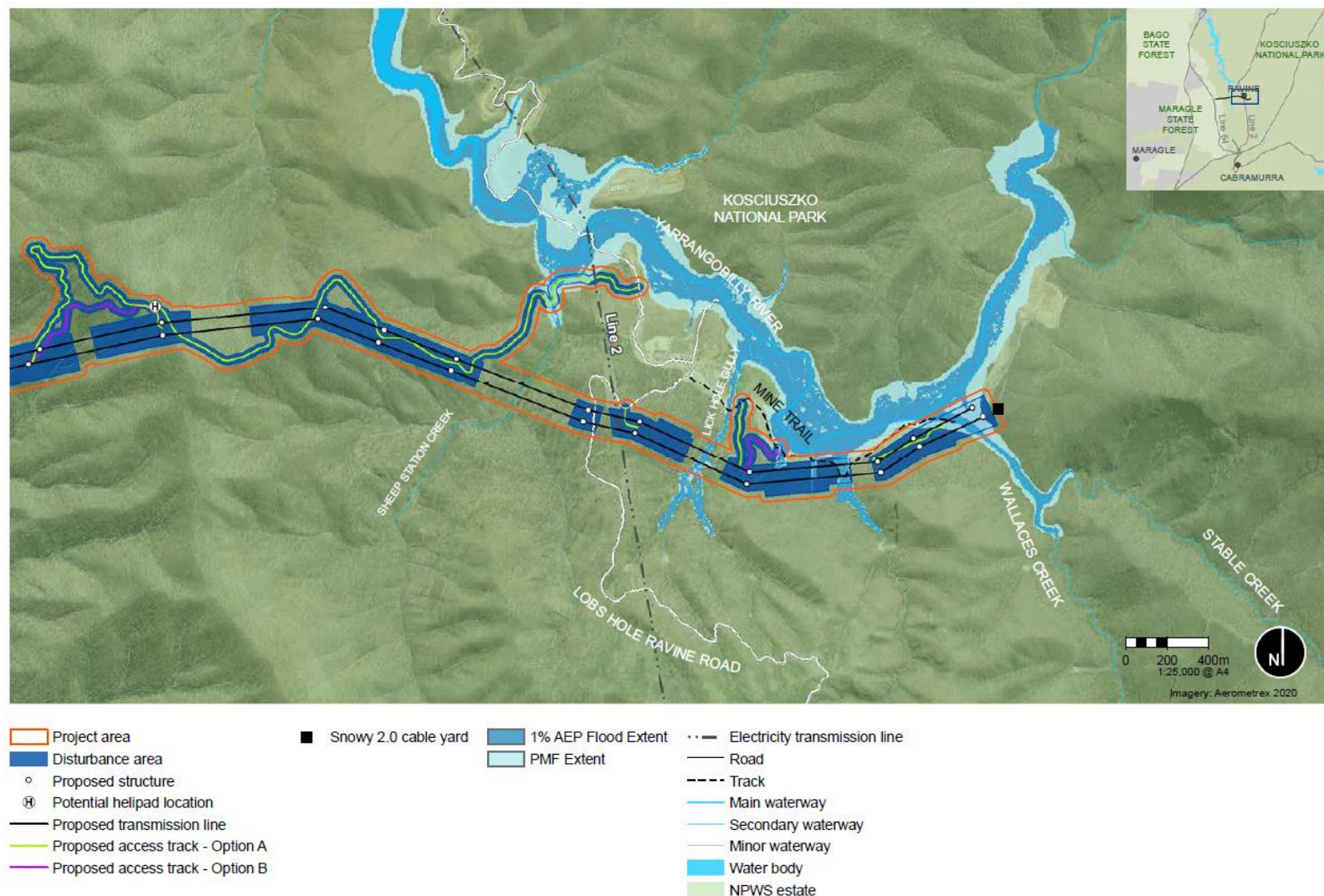


Figure 3-2 Waterways, Snowy 2.0 Main Works monitoring points and waterway Strahler orders within the Project area (Jacobs, 2020)



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Figure 3-3 Probable Maximum Flood (PMF) levels and intersection with the Project area (Jacobs, 2020)



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3.5. Learnings from the Snowy 2.0 Main Works Project

In the preparation of this SWMP, the publicly available audit, incident and non-compliance reports, as well as EPL monitoring reports, for the Snowy 2.0 Project have been reviewed and any learnings from those reports have been considered in this plan.

The Independent Environment Audit conducted for the Snowy 2.0 Main Works (Dickson Consulting Pty Ltd, 2021a), outlined three environmental incidents had been reported since the commencement of Main Works including:

- Discharge of sediment laden water to Yarrangobilly River on side of Mine Trail Road 11 December 2020 (notification to EPA and SHL)
- Stonewall application leak – Quarry Trail at Tantangara, Kelly Plain Creek culvert crossing 1 January 2021
- Diesel spill incident at the “Sat Cow” generator off Lobs Hole Ravine Road – 13 January 2021.

The audit identified two non-compliances primarily related to inadequate minimisation of potential spills and leaks and notification of incidents to DPIE and NPWS. The proposed actions based on these non-compliances that can be applied to this Project includes:

- Implementing appropriate task-specific training to crews on chemical storage and spill response
- Prohibiting offsite dewatering, regulating water irrigation via a permit system and detailing protocols for site water irrigation (Appendix I)
- Transgrid and the PC implement a system to ensure all incidents are reported to the appropriate agencies within the required timeframes (CEMP Section 8.4)
- Development of Site Environmental Plans which detail chemical storage, refuelling and servicing locations away from environmentally sensitive areas.

The 6 monthly audit report undertaken September 2021 further identified non-compliances regarding chemical management, and the following actions specific to soil and water management (Dickson Consulting Pty Ltd, 2021b):

- Install signage and undertake training to ensure the adequate segregation of soils and mulch is utilised to protect topsoil.

The Snowy 2.0 Main Works EPL 21266 Bi-Annual Monitoring Reports June 2021 to November 2021 and December 2021 to May 2022 outlines the EPA notifiable events for the Project. For the two reports, the main notifiable events included:

- Sediment laden water leaving site or entering water ways due to inappropriate or overwhelmed controls
- Sediment laden water entering clean water drains
- Failure of clean water drains
- Sediment basins overtopping.

The outcomes for the above incidents outlined in the reports mostly relate to improving erosion and sediment controls, prioritising permanent drainage controls, stabilising of batters and desilting of basins.

The PC have considered the above non-compliances and incidents for Snowy 2.0 Main Works and within this Plan have:

- Used ‘better than Blue Book’ erosion and sediment controls within the primary and

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progressive erosion and sediment control plans for the Project

- Outlined inspections and procedures that are to be in place during construction to ensure erosion and sediment controls are working and the one sediment basin is being maintained for functionality and capacity, including for rainfall events >50mm in 24 hours, as per BIO11 from the Project BMP.

4. Environmental Aspects and Impacts

4.1. Construction activities

A variety of construction activities that have the potential to impact upon soil and water management will be undertaken as part of the Project. These activities include, but are not limited to:

Table 4-1 Anticipated Project activities

Project Activity	Where addressed
Bulk earthwork	Section 5 of this SWMP
Vegetation clearing	Biodiversity Management Plan
Topsoil stripping	Section 5 of this SWMP
Access track construction	Section 5 of this SWMP
Spoil emplacement	Spoil Management Plan (refer Appendix A of this SWMP)
Material stockpiling	Spoil Management Plan (refer Appendix A of this SWMP)

4.2. Impacts

The potential for impacts on soil and water will depend on a number of factors, including the nature, extent and magnitude of construction activities and their interaction with the natural environment. Potential impacts attributable to construction activities could include:

- Exposure of soils during vegetation clearing and earthworks, creating the potential for offsite transport of eroded sediments and pollutants
- Increased turbidity of waterways and waterbodies due to exposure, erosion, runoff, dust propagation and vegetation removal
- Production of tannins from mulch during clearing
- Alteration of surface and subsurface flows that could cause disturbances to hydrology
- Alterations to habitat that could impact threatened species such as the Booroolong Frog
- A reduction in groundwater levels and flows, and off-site discharge of water containing sediment from dewatering activities
- Contamination of soils, and surface and groundwater from accidental spills or oil leaks
- Disturbance of contaminated land or water and subsequent generation of contaminated runoff or materials.

Refer also to the Aspects and Impacts Register included in Appendix F of the CEMP.

All activities on waterfront land will be conducted in accordance with the suite of *Guidelines for controlled activities on Waterfront Land* (DPI, 2012), unless otherwise approved by the Department of Planning and Environment.

5. Environmental Mitigation and Management Measures

5.1. Erosion and sediment control

Erosion and Sediment Control Plans (Primary and Progressive) (ESCPs) will be prepared for the Project in accordance with both the 'Blue Book' (Landcom, 2004) and the White Book (IECA, 2012), as well as relevant best practice guidelines and Transport for NSW (TfNSW) guidelines, where applicable. These plans will include site-specific erosion and sedimentation controls, staging advice and stabilisation measures as well as technical notes to guide the installation, function and maintenance of ESC devices. These ESCPs will take into consideration any learnings from the Snowy 2.0 Main Works Project, in accordance with CoA B10, as outlined in Section 3.5.

5.1.1. Drainage control

Drainage control refers to the management of both 'clean' stormwater runoff around and through the site; and 'dirty' site stormwater runoff to enable treatment of sediment prior to release offsite, as defined below:

Clean water	Water that either enters site from an external source and has not been further contaminated by sediment within site; or water that has originated from the site and is of such quality that it does not need to be treated in order to achieve the required water quality standard (IECA, 2008).
Dirty water	Site derived water not defined as clean, thereby requiring treatment with appropriate controls prior to release from site (IECA, 2008).

Drainage control measures (temporary and permanent) will enable management of stormwater within work areas, including to:

- Enable diversion of 'clean' up-slope, run-on water either around or through the site at non-scouring velocities
- Enable collection of 'dirty' runoff generated within construction areas and the delivery of this water to an appropriate sediment control measure
- Minimise the risk of soil erosion caused by site-generated flows within the project, through the use of 'intermediate' flow treatment and release points
- Control of the flow velocity, volume and location of water passing through the project at drainage line and waterway crossings.

5.1.2. Erosion control

Erosion control is the primary approach for the prevention of adverse impacts associated with sedimentation. Construction activities are to be undertaken to reduce the duration of soil exposure to erosive forces (wind and water), either by holding the soil in place or by shielding it.

Erosion control measures to be adopted include construction practices, structural controls and vegetative measures aimed at managing runoff at a non-erosive velocity, and the protection of disturbed soil surfaces.

The specific measures implemented will be based on seasonal erosion risk and construction activities. Measures will be documented in the Project ESCP.

Proposed controls include:

- Progressive management of the works to reduce overall exposed area as far as practical (see Section 5.1.3)
- Promptly stabilising exposed areas once construction stage has been completed (permanent

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works)

- Protection of soil surface (temporary and permanent) including placement of hardstand surfaces, use of soil binder, vegetation establishment (including landscaping), and protection with mats & blankets (e.g., jute, geotextile)
- For high-risk areas during construction, prior to forecast rainfall of > 50 % chance of 10 mm or more in 24 hours, all exposed batters (excluding rock faces) are to be temporarily ground-covered using fabric, polymer or similar
- Dust suppression by wetting of exposed surfaces, application of soil binder, and/or application of soil cover.

It is noted that any use of soil binder on site will be in a manner that does not cause any water pollution, as defined under s120 of the POEO Act.

5.1.3. Progressive Management of works

Progressive management of works will be undertaken to minimise the amount of ground disturbance occurring at any one time during construction. This progressive works management will be detailed within the Progressive ESCP. Two work fronts, one each for Project areas east and west, will be established for works and continual rehabilitation and mulching will be implemented.

5.1.4. Sediment control

Sediment control measures will be installed in combination with drainage and erosion control measures to provide effective pollution management. The Project will adopt a 'treatment train' approach, where various control measures are utilised in sequence.

Sediment control measures include systems, procedures and materials to filter, trap and/or settle sediment from sediment-laden waters. In addition to adopting measures as per the *Blue Book* and IECA (2008) standard drawings, variations to these will be implemented where it can be demonstrated that they are equally as effective and meet or exceed the intent of best practice guidelines. The use of site-won materials will be prioritised in the establishment of sediment controls, including the use of topsoil and mulch windrows, mulch as groundcover and rock checks in drainage lines. Types of sediment controls used on site and their placements are detailed within the Project ESCPs.

5.1.5. Plan preparation

The ESCPs prepared for the Project have been prepared by an appropriately qualified person (AQP), in this instance a Certified Professional in Erosion and Sediment Control (CPESC), in accordance with, and beyond, both the 'Blue Book' (Landcom, 2004) and the White Book (IECA, 2012).

The ESCPs will be revised when work methods change, when greater impacts than anticipated are realised or when control structures or work methods are found to be ineffective or are no longer required. The ESCPs identify all erosion and sediment control risks and describe how these will be addressed during construction. The ESCPs comprise two parts; a Primary ESCP with overarching requirement and a Progressive ESCP with detailed plans for application of measures. Regular consultation of the ESCPs will be undertaken during construction, particularly during site inspections, to provide advice on erosion and sediment control design, installation and maintenance.

5.2. Stockpile and tannin management

Stockpile management indicators to be monitored during weekly environmental inspections include:

- Installation of erosion and sediment control measures prior to stockpiling material

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- Location of temporary stockpiles
- Height of temporary stockpiles
- Temporary stabilisation of stockpiles
- Stockpile separation
- Weed management on stockpiles
- Visual observation for leachate formation (discoloration to trigger pH testing).

Spoil management, including stockpile management, is addressed in Appendix A of this plan.

Mulch arising as a result of on-site vegetation clearing and mulching will be utilised for erosion and sediment controls, applied as mulch bunds and blankets, wherever possible. Stockpiling of mulch will be minimised to prevent the production of tannin-impacted water on site. Tannin-impacted water captured within bunding or sumps will be utilised for on-site dust suppression or landscape watering, however will not be discharged from site or to water.

5.3. Spoil management

A spoil management strategy to be implemented for the Project is included in Appendix A of this plan. Spoil management will also be managed through the design and implementation of a site-specific ESCP.

5.4. Temporary waterway crossings

Although no temporary waterway crossings are anticipated during works, any temporary waterway crossings required across mapped waterways and drainage lines (Figure 3-2) will maintain flow in the waterway and will be designed, constructed and maintained in accordance with the requirements of the 'Blue Book'. To minimise impacts on waterways, the temporary waterway crossing must comply with COA B14 and B31, consider the Project ESCP and mitigation measures outlined in Table 5-2, as well as the following measures:

- Fish passage will be maintained in accordance with the DPI Fisheries guideline: "Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings"
- Temporary waterway crossings will be constructed with material that will not result in fine sediment material entering the waterway. Rock used must be hard, sound, durable rock, free of fine particles and not contaminated with foreign materials
- Erosion and sediment controls at entry/exit points of the crossing will be installed to minimise mud tracking on the crossing
- Temporary structures over aquatic vegetation will allow for light penetration by considering structure loads and temporary works designs, with an aim to leave gaps between solid planks or where loads allow utilise mesh, grid or grates.

The design for any temporary crossings will be modelled for its impact on overland and riverine flooding. Strategies for removal or maximising flood flows will be implemented based on the outcomes of the modelling. A Work Method Statement considering these requirements will be prepared prior to undertaking such activities. The WMS will be provided to Transgrid for endorsement.

5.5. Dewatering

No offsite dewatering as part of construction is anticipated or permitted. Site waters will be irrigated to disturbed construction footprints but will not be discharged to watercourses, receiving waters or offsite. No groundwater dewatering is anticipated to occur during works, and it is noted that no

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groundwater is permitted to be discharged to watercourses.

Irrigated water will be limited to vegetated or grassed areas, away from waterways, and within the construction footprint. If the discharge water is highly turbid, dewatering through a filter sock (or similar), or via transportable sedimentation tanks will be considered, where appropriate, to minimise sedimentation redistribution. In-situ testing will be performed during irrigation activities, following testing and approval via the Permit provided in Appendix I, and visual monitoring will also be regularly undertaken.

Any water discharged that has the potential to leave the Project boundary via land or water will comply with the Water Irrigation and Disposal Permit (Appendix I), and have sufficient measures applied to ensure off-site dewatering does not occur.

A Water Quality Monitoring Program (WQMP) (Appendix F) has been developed for the Project, including baseline monitoring data, to inform specific discharge criteria prior to construction. Water quality objectives for receiving waters adjacent to the Project are included in Section 3.2 of the WQMP.

5.6. Water extraction and reuse

Two Water Access Licences (WALs) have been sought by UGL for use on the Project. One WAL applies to water extraction for Tumbarumba and the other applies to Upper Tumut. The WAL numbers acquired by UGL include:

- WAL44782 (Tumbarumba Water Source)
- WAL44788. (Upper Tumut Water Source)

Additional preventative measures will be implemented during extraction activities to prevent adverse environmental effects, including:

- Rubber mats will be installed underneath water trucks at the Paddy's River to prevent erosion and sediment entering the waterway
- Utilising screens, intake protection and floats on pumps to minimise harm to aquatic fauna
- Utilising slow pumping velocities to minimise harm to aquatic fauna and to ensure no substrate is pumped as water levels lower.

The estimated water use for the life of construction is approximately 40 ML from Paddys River and 20ML of process water from FGJV Main Works at Lobs Hole.

All water extraction will be recorded in the Project Water Take Register (Appendix G). It will additionally be measured using a flow meter and records kept in a logbook as per the conditions of the WAL. Water resources required for Project works will be appropriately managed in context of available water, with works adjusted to match available water supply if required.

Process water from FGJV Main Works will be utilised where available. Water intended for reuse from these works will be tested to ensure suitability prior to use on site and will be managed by FGJV in accordance with the Main Works STP and Process Water Re-use Procedure (FGJV, 2023).

5.7. Flooding

As discovered during flood modelling undertaken for the EIS, the Project area east contains some areas with potential to be impacted during a PMF event. Local overland flows have the potential to enter construction areas and excavations within Project area west. However, the area is not expected to be subject to flooding during a PMF event. The proposed access track and associated waterway crossing at Sheep Station Creek will be prone to flooding impacts. However, the design for this structure has been adapted to account for this and will minimise flood risk.

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The Project will not materially alter the flood storage capacity, flows or characteristics in the development area or off-site.

Flood hazard classification ratings have been applied to waterways within the Project area as per Table 5-1.

Table 5-1 NSW flood classifications (DPE, 2022)

Classification	Description	Limiting still water depth (m)	Limiting velocity (m/s)
H1	Generally safe for people, vehicles and buildings	0.3	2.0
H2	Unsafe for small vehicles	0.5	2.0
H3	Unsafe for vehicles, children and the elderly	1.2	2.0
H4	Unsafe for vehicles and people	2.0	2.0
H5	Unsafe for vehicles and people. All buildings vulnerable to structural damage. Some less robust building types vulnerable to failure.	4.0	2.0
H6	Unsafe for vehicles and people. All building types vulnerable to failure.	>4.0	>4.0

Generally, flood hazard is classified as H6 in Yarrangobilly River for all flood events between a 20% Annual Exceedance Probability (AEP) and the PMF. Wallace Creek's flood hazard is classified as H5 for the 20% AEP, increasing to H6 for all other flood events up to the PMF.

A Flood Response Procedure for the Project is included in Appendix I of the Project Emergency Plan.

A system for daily monitoring of flood alerts will be implemented by the Project team so that in the event of a flood warning being issued, all unsecured material on the floodplain can be efficiently removed and other appropriate precautionary measures can be taken.

5.8. Air quality

In addition to erosion measures for implementation during periods of rainfall, erosion measures to prevent wind erosion will be employed during the Project. Site-specific measures and controls for the prevention of wind erosion will be outlined in the Project ESCP and will include, but not be limited to:

- Identifying potential sources of air pollution
- Dust mitigation and suppression measures to be implemented
- Plant and equipment will be switched off when not in use
- Vehicles, plant and construction equipment will be appropriately sized for the task and properly maintained so as to achieve optimum fuel efficiency
- Materials will be delivered with full loads and will come from local suppliers where possible
- Methods to manage work during strong winds or other adverse weather conditions
- Progressive rehabilitation of disturbed areas and midspan areas left with a mulch covering.

The prevention of erosion remains the primary approach for prevention of adverse impacts relating to

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dust-related air quality. Reducing the time of exposure and prioritising rehabilitation, in combination with dust-suppression measures during bulk earthworks, will minimise the impact of construction activities on Project air quality.

5.9. Biodiversity Management

During works associated with soil and water management, including clearing, general earthworks and the installation of erosion and sediment control devices, biodiversity impacts will be managed in accordance with the Project Biodiversity Management Plan (BMP) and all relevant appendices. All clearing activities will be managed in accordance with the Clearing Procedure (BMP Appendix A), including the demarcation of exclusion zones and footprint boundaries.

Project works have the potential to impact upon the KNP's Booroolong Frog (*Litoria booroolongensis*) population through sedimentation and erosion impacts. The Project has the potential to show increased risks above that assessed for the Main Works of indirect impacts from sedimentation due to the location of steep ridges and the proximity to mapped Booroolong Frog breeding habitat. A 50-metre buffer has been identified as the appropriate distance to protect the Booroolong Frog habitat from the impacts of the Project. However, the potential for an encroachment of the 50-metre buffer (Figure 5-1), as a result of the Project, has been identified to be of a higher risk than the Main Works Project. The impacts are likely to increase due to the risk of steep slopes surrounding catchment causing movement of sediment from erosion and runoff from the Project into waterways, particularly after large rain events from Wallaces Creek and Sheep Station Creek. These effects exceed those of the Main Works Project.

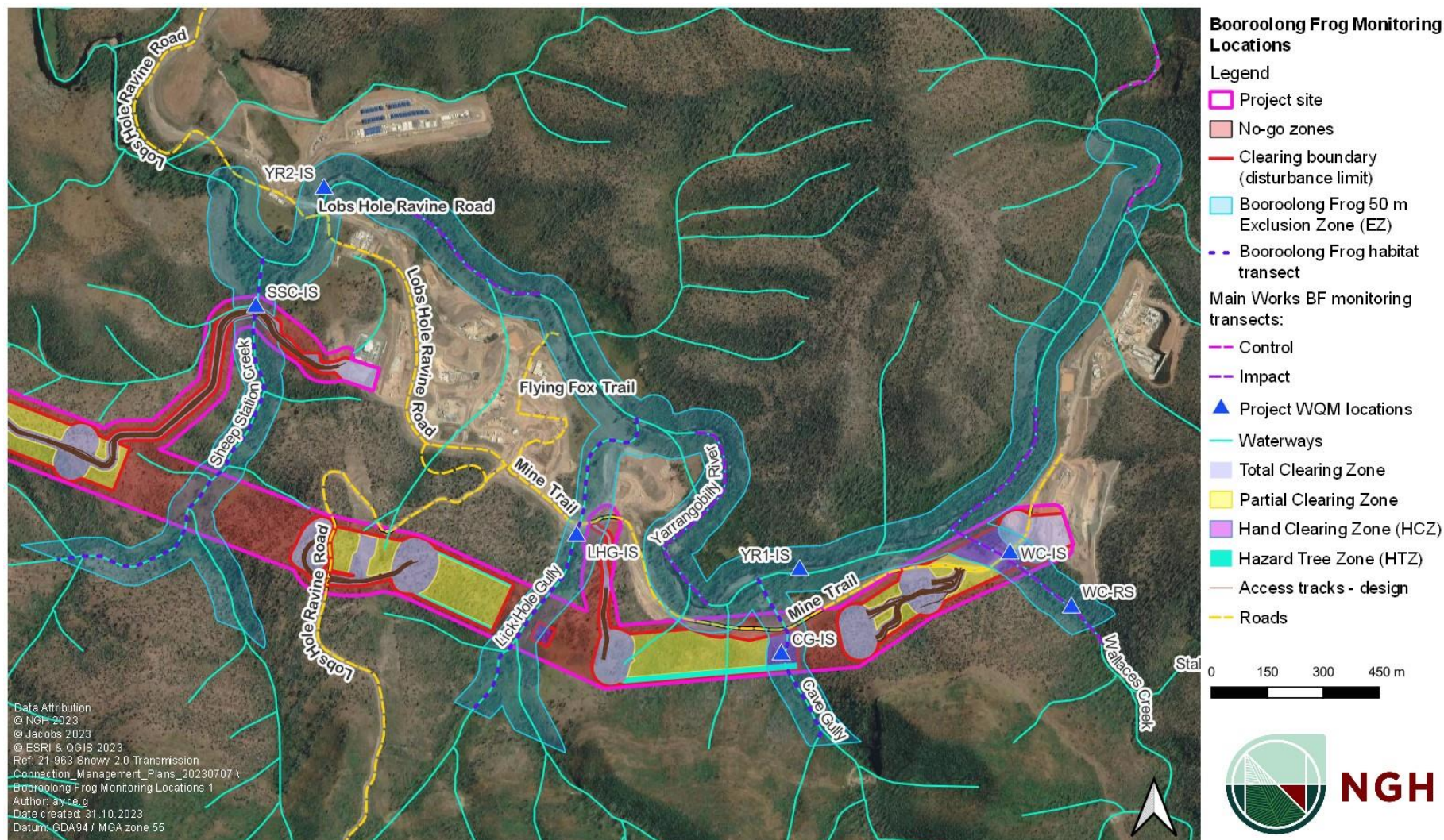
The Project will have potential impacts on water quality, water bodies and hydrological processes that sustain the Booroolong Frog in the following ways:

- There is potential for release of poor-quality sediment laden water into watercourses within and adjacent to the disturbance area when there are rainfall events during construction
- There is potential for a reduction in stream bank stability following vegetation removal for construction of bridges or clearances for power lines, resulting in bank erosion and sedimentation of watercourses
- There is potential for increased water flow into the waterways resulting from vegetation removal and access track construction (channelling of water) and increased erosion.

Through the implementation of this SWMP and the BMP, including the Booroolong Frog Management Plan (BMP Appendix G), biodiversity impacts will be appropriately mitigated during soil and water management activities on site. Additionally, in order to ensure compliance with clearing zones as described in Appendix B of the Project BMP, all erosion and sediment controls will be installed within total clear zones. The representation of these ESC measures within total clear zones is included in the Project Site Environmental Plans (SEPs), included as Appendix G of the Project CEMP.

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Figure 5-1 Project Booroolong Frog monitoring locations, Project clearing zones and water quality monitoring locations



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Specific mitigation measures to address impacts on soil and water management are outlined in Table 5-2.

Table 5-2 Mitigation measures for soil and water management for the Project

Id	Measure/requirement	Resources needed	When to implement	Responsibility	Reference
General					
SWM1	A SWMP will be prepared and implemented prior to and during construction. The SWMP will include: • Erosion and sediment control plans for all stages of construction and will be submitted for approval prior to plan implementation. • Progressive SWMP that will be regularly updated during the construction phase to take into consideration changes that may occur that require revised erosion and sediment controls • Details on the construction and management of sediment basin if determined to be required • Protection of waterways such as scour protection, stabilisation and revegetation • Any imported fill will be certified at source locations as pathogen and weed free Excavated Natural Material or Virgin Excavated Natural Material • Management of stockpiles and spoil • Tannin leachate management controls • Management of accidental spills, response and reporting • An induction protocol • Responsibilities for all management measures.	SWMP – this document	Prior to construction During construction	Senior Environmental Advisor Project Environmental Consultant	W3 BDAR BIO10

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Id	Measure/requirement	Resources needed	When to implement	Responsibility	Reference
SWM2	Training will be provided to all Project personnel, including relevant sub-contractors on contaminated land management practices, and naturally occurring asbestos including the unexpected finds procedure and the requirements from this plan through inductions, toolboxes, and targeted training.	Induction package Toolbox training material Targeted training material	Pre-construction and construction	Construction Manager Site Environmental Advisor	Best practice L3
SWM3	Air quality mitigation measures will be included in the SWMP and ESCP for management of dust and emissions.	SWMP ESCP Appendix D Appendix E	During construction	Senior Environmental Advisor Site Supervisor	AQ1
SWM4	Existing ground conditions and weather forecasts will be taken into consideration prior to conducting civil works. Excavation works will not be conducted if ground conditions are unsuitable or pose environmental risk.	Environmental inspection records	During construction	Construction Manager	Best practice
SWM5	An induction protocol will be mandatory for all personnel involved in construction and operation works.	Induction records	During construction	Environmental Advisor	BDAR BIO10
Erosion and Sediment Control					
SWM6	Erosion and sedimentation will be managed through implementation of effective sediment control measures as outlined	SWMP	During construction	Senior Environmental	B2 COA B10

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Id	Measure/requirement	Resources needed	When to implement	Responsibility	Reference
	in the SWMP and ESCP.	ESCP Appendix D Appendix E		Advisor	COA B16 BDAR BIO10
SWM7	Erosion and sediment control plans (ESCP) will be designed and implemented for the Project in accordance with, and beyond, 'the Blue Book' (Landcom, 2004), the White Book (IECA, 2012) and site-specific weather and hydrology data	Environmental inspection records	During construction	Senior Environmental Advisor	W3 COA B10 COA B16
SWM8	Where required, adequate sediment controls (including the consideration of sediment basins) will be included in the access track design to manage erosion and sedimentation and associated impacts on receiving waters.	ESCP Appendix D Appendix E	As required	Senior Environmental Advisor	W6 COA B10 BDAR BIO10
SWM9	An assessment of the current sediment basin design for the Main Works project will occur prior to vegetation clearing, to assess if the basin design specifications and design capacity are suitable for the additional sediment load expected during construction of the easement. Where modification or augmentation is required, sediment basins will be increased in size to cope with any additional expected sediment load.	ESCP Appendix D Appendix E	During construction	Senior Environmental Advisor	BDAR BIO10
SWM10	A schedule will be included in the SWMP for cleaning and maintenance of sediment basins / controls with intervals to be informed from the outcomes of monitoring basins from Snowy 2 Main Works construction and catchment modelling. The schedule will include additional checks after rainfall events of >50 mm in 24 hours.	ESCP Appendix D Appendix E	During construction	Senior Environmental Advisor	BDAR BIO10
SWM11	Immediate reporting to NPWS (via Transgrid) will occur in the event of any failure of sediment or stormwater mitigation	Environmental inspection	As required	Senior Environmental	BDAR BIO10

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Id	Measure/requirement	Resources needed	When to implement	Responsibility	Reference
	measures, including overtopping of sediment basins.	records		Advisor	
SWM12	Controls such as mulching, matting and sediment fences shall be used in consultation with BCS and NPWS and need to be approved in the CEMP and any deviation from measures by DPIE will need to be sought. Similarly, natural erosion controls incorporating organic materials, micro water capture and contour shaping will need to be approved in the CEMP where appropriate.	ESCP Appendix D Appendix E	During construction	Senior Environmental Advisor	BDAR BIO10
SWM13	Access tracks will be appropriately compacted to prevent erosion of road base and gravel material.	ESCP Appendix D Appendix E	During construction	Senior Environmental Advisor	BDAR BIO10
SWM14	No dust generating works will be conducted during high winds.	ESCP Appendix D Appendix E	During construction	Construction Manager	BDAR BIO25
SWM15	Stockpiles will be covered with material to prevent the generation of dust.	ESCP Appendix D Appendix E	During construction	Site Supervisor	BDAR BIO25
SWM16	Dust suppression techniques will be implemented during dust generating activities.	ESCP Appendix D Appendix E	During construction	Site Supervisor	BDAR BIO25
SWM17	Install erosion and sediment controls as per Erosion and Sediment Control Plan (ESCP). Install devices, where safe to do	ESCP	During	Senior Environmental	Best practice

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Id	Measure/requirement	Resources needed	When to implement	Responsibility	Reference
	so, prior to soil disturbance from construction activities. Maintain the devices throughout the duration of the Project. Review ESCP weekly and update as required.	Appendix D Appendix E	construction	Advisor	
SWM18	The area of disturbed land will be kept to a minimum. Existing vegetated areas will be kept intact prior to clearing.	Environment al inspection records	During construction	Construction Manager	Best practice
SWM19	<u>Drainage:</u> • Diversion drains shall be installed where required to prevent mixing of on-site run-off with run-off from outside the site • Off-site run-off shall be diverted to undisturbed areas so that it is filtered through vegetation prior to entering watercourses in the first instance • Check dams will be installed as necessary to slow concentrated flows and trap sediment through the Project • Sandbag check dams located in flow paths as velocity controls.	ESCP Appendix D Appendix E	During construction	Senior Environmental Advisor	Best practice
SWM20	<u>Sheet flow (e.g., batters):</u> • Existing vegetation maintained prior to clearing • Minimise disturbance areas at any one time • Water shall be directed around disturbed areas where possible, including consideration of disturbance location and terrain limitations, to minimise the need for erosion and sediment control devices	ESCP Appendix D Appendix E	During construction	Senior Environmental Advisor	Best practice

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Id	Measure/requirement	Resources needed	When to implement	Responsibility	Reference
	- Shredded on-site native vegetation shall be utilised in sheet flow areas as natural filtration and velocity reduction - Install sediment fences at the top of batters or other suitable control to direct flows away from batter face - Install geotextile batter chutes at appropriate distances to enable road runoff to flow through the work area without interaction with disturbed areas and soil material - Install sediment barriers along the contour with appropriate spacing and returns as required.				
SWM21	<u>Stockpiles:</u> - Install sediment fences on the downhill side of stockpiles - Stockpiles shall be located to prevent erosion and sediment entering waterways or drainage lines (e.g., out of flow paths) - Topsoil will not be stockpiled at a height greater than two (2) metres to prevent structural decline of the soil.	ESCP Appendix D Appendix E	During construction	Senior Environmental Advisor	Best practice
SWM22	<u>Wet weather:</u> - Drainage paths to be free of obstructions - Site inspections conducted prior to forecast rainfall - All reasonable actions shall be taken that are necessary to minimise the impact of afflux or flow velocities associated with floods	Environmental inspection records	During construction	Senior Environmental Advisor	Best practice

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Id	Measure/requirement	Resources needed	When to implement	Responsibility	Reference
SWM23	<u>Revegetation and general:</u> - Disturbed areas revegetated or mulched to minimise time that areas are exposed. Work front to be progressively re-vegetated as work progresses and where further disturbance from construction activities will be minimal. - Construction vehicles kept to well defined haul roads - Maintain in effective working order erosion and sediment control devices until: - Re-vegetation of disturbed areas with cover of no less than 75% - Declared weed species are eradicated and other (herbaceous) environmental weeds are controlled - Check dams and sediment fences must be removed from the site once stable grass cover is achieved following completion of earthworks or at the end of the defects liability period (whichever is first). Check dams in particular must not be left to concentrate flows at spillways on the locally erosive soils - Soil is suitably stabilised with no evidence of erosion gullies.	ESCP Appendix D Appendix E Environment al inspection records	During construction	Senior Environmental Advisor	Best practice
Waterways and Water Quality					
SWM24	Unless otherwise authorised by an EPL the Proponent must ensure the development does not cause any water pollution, as defined under Section 120 of the POEO Act.	ESCP Appendix D Appendix E	During construction	Construction Manager	COA B11

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Id	Measure/requirement	Resources needed	When to implement	Responsibility	Reference
SWM25	Any waterway crossings will be constructed in accordance with guidelines outlined in Project mitigation measures, including: - Minimum design criteria for waterway crossings outlined in Why do fish need to cross the road? Fish passage requirements for waterway crossings (Fairfull and Witheridge, 2003). - Forest Soil and Water Protection – A Guide for Operators (State Forests of NSW, 2000) Fire Trail Design, Construction and Maintenance Manual (RFS, 2017).	Environmental inspection records	During construction	Senior Environmental Advisor Project Engineer	W1 COA B7
SWM26	All activities on waterfront land will be accordance with the requirements of the Guidelines for Controlled Activities on Waterfront Land (NRAR 2018) and ensure the geomorphic condition of the major rivers and distributary channels crossed by the development is not impacted.		During construction	Senior Environmental Advisor	W1 COA B7 COA B14
SWM27	A water quality monitoring program will be developed as part of the SWMP and will be carried out prior to, during and following construction.	WQM Program (Appendix F)	Prior to construction During construction	Senior Environmental Advisor	W4 COA B16
SWM28	For water quality samples collected for laboratory analysis, QA/QC will include the collection of one field blank and one field duplicate per sampling event.	Water quality records	During construction	Senior Environmental Advisor	Best practice
SWM29	Where there is risk of impact to waterways, corrective actions shall be implemented immediately upon identifying a non-	Environmental inspection	During construction	Senior Environmental	Best practice

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Id	Measure/requirement	Resources needed	When to implement	Responsibility	Reference
	conformance.	records		Advisor	
SWM30	Monitoring shall be undertaken in accordance with the Monitoring and Sampling Manual, DES (2018). All laboratory analyses are to be undertaken at a National Association of Testing Authorities (NATA) accredited laboratory. Samples are to be submitted appropriately i.e., under Chain of Custody, documentation, within the holding times and with appropriate preservation.	Water quality records COC documents	During construction	Environmental Advisor	Best practice
SWM31	Field data sheets or equivalent will be used to record visual observations of potential pollutants and contaminants along with site details, sampling details, sampling conditions and details of samples collected.	Environmental inspection records	During construction	Environmental Advisor	Best practice
Chemical Management					
SWM32	All chemicals or other hazardous substances will be stored in a bunded area and away from any drainage lines/pits. The capacity of the bunded area will be at least 130% of the largest chemical volume contained within the bunded area	Environmental inspection records	During construction	Environmental Advisor Site Supervisor	W5 COA B12
SWM33	The substation and its components will be suitably bunded. All liquid waste captured by the substation's spill oil containment system will be classified, transported, and disposed of at a facility that can lawfully accept the waste	Environmental inspection records	Design During construction	Environmental Advisor Site Supervisor	COA B12
SWM34	No refuelling or bulk herbicide preparation will occur within 40 metres of natural drainage lines (as a minimum)	Environmental inspection	During construction	Environmental Advisor	W5

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Id	Measure/requirement	Resources needed	When to implement	Responsibility	Reference
		records		Site Supervisor	
SWM35	Environmental spill kits containing spill response materials suitable for the works being undertaken will be kept on site at all times and be used in the event of a spill. Any spills will be contained, cleaned up promptly and immediately reported to the relevant site representative.	Spill kit register	During construction	Environmental Advisor Site Supervisor	W5 COA B12 BDAR BIO10
SWM36	The storage, handling and use of dangerous goods and hazardous substances will be carried out in accordance with the WHS Act and Regulations, the Storage and Handling of Dangerous Goods Code of Practice (WorkCover NSW, 2005) and relevant Australian Standards.	Environmental inspection records	During construction	Environmental Advisor Site Supervisor	HAZ5
SWM37	Contaminated water will be separated from stormwater and will be managed in a process water system.	Environmental inspection records	As required	Environmental Advisor	BDAR BIO26
SWM38	On-site signage to identify contaminated topsoils will be installed.	Environmental inspection records	As required	Environmental Advisor	BDAR BIO26
SWM39	No parking of plant and equipment near waterways. Where appropriate, equipment to be fitted with drip trays under engines.	Environmental inspection records	During construction	Environmental Advisor	Best practice
SWM40	Machinery and vehicles with internal combustion engines will be maintained in good condition to minimise the chance of leaks or drips of lubricants, fuels, or other fluids.	Maintenance records	During construction	Environmental Advisor	Best practice

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Id	Measure/requirement	Resources needed	When to implement	Responsibility	Reference
Dewatering					
SWM41	The PC must ensure that it has sufficient water for all stages of the development, and if necessary, adjust the scale of the development to match its available water supply. For the Snowy 2.0 T2 Tailbay site and Paddys River water uptake site: - A water extraction licence will be sought prior to the extraction of any water from Talbingo Reservoir and the Paddy's River - Prior to extraction of water near Paddy's River, rubber mats will be placed on the ground under the water trucks to prevent erosion and sediments entering the waterway.	Water extraction licence	As required	Senior Environmental Advisor Site Supervisor Project Engineer	COA B9 W7
SWM42	During water extraction from Talbingo Reservoir and Paddy's River, slow water pumping velocities and screens on the hoses will be used to minimise small aquatic fauna been inadvertently collected.	Environmental monitoring records	As required	Environmental Advisor	W7
SWM43	Temporary dewatering for construction is not anticipated. In the event that dewatering is required then the following management measures will apply: - Confirmation of whether or not a licence under the WM Act as defined under the NSW Aquifer Interference Policy (DPI Water, 2012) is required prior to any dewatering activity commencing - If dewatering is required, the management of discharge water will be documented in the Project SWMP	Dewatering register	As required	Environmental Advisor Site Supervisor	W8

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Id	Measure/requirement	Resources needed	When to implement	Responsibility	Reference
SWM44	Discharge water will be limited to vegetated and grassed areas, away from waterways, and within the construction footprint. If the discharge water is highly turbid, dewatering through a filter sock (or similar), or via transportable sedimentation tanks will be considered, where appropriate, to minimise sedimentation.	Dewatering register	As required	Environmental Advisor Site Supervisor	W8 COA B10 COA B13
SWM45	All dewatering will be done in a controlled manner via onsite irrigation. All onsite irrigation will be regulated through the use of an internal permit.	Dewatering permit	As required	Environmental Advisor	Best practice
SWM46	If contractors wish to extract water from Talbingo Reservoir or Paddy's River a Water Extraction Licence will be required prior to extracting water. Note prior to extraction of water near Paddy's River, rubber mats will be placed on the ground under the water truck to prevent erosion and sediment entering waterway. Also, during extraction of water from Talbingo Reservoir and Paddy's River, slow water pumping velocities and screens on the hoses will be used to minimise small aquatic fauna been inadvertently collected.	Water extraction licence	As required	Senior Environmental Advisor	Best practice
Flooding and Adverse Weather					
SWM47	Flood modelling will be undertaken during the detailed design stage to determine potential flood impacts and to inform design.	Flood modelling	Prior to construction	Transgrid the PC Designers	W2 COA B15 COA B16
SWM48	Design, construct and maintain the development to reduce impacts on surface water, localised flooding and groundwater at the site.	IFC drawings	Prior to construction	Construction Manager	W1

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Id	Measure/requirement	Resources needed	When to implement	Responsibility	Reference
				the PC Designers	COA B15
SWM49	The waterway crossing over flood impacted waterways such as Sheep Station Creek will be designed and constructed in a way that minimises flood risk and minimises upstream and downstream impacts.	IFC drawings	Prior to construction	Construction Manager the PC Designers	W1 Best practice
SWM50	A flood management procedure will be prepared for the Project and will detail the processes for flood preparedness, materials management, weather monitoring, site management and flood incident management.	Flood Response Procedure	Prior to construction During construction	Senior Environmental Advisor	W9 COA B15
SWM51	The Project SWMP will include arrangements for managing wet weather events, including monitoring of potential high-risk events (such as storms) and specific controls and follow-up measures to be applied in the event of wet weather.	SWMP	During construction	Senior Environmental Advisor Site Supervisor	W6
SWM52	Detailed drawings of Stormwater Management are contained in the drawings. Ensure proposed earthworks do not result in increase in ponding or runoff of stormwater onto existing infrastructure.	IFC drawings	During construction	Senior Environmental Advisor	COA B15 COA B16 Best practice

Spoil Management

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Id	Measure/requirement	Resources needed	When to implement	Responsibility	Reference
SWM53	A spoil management strategy will be prepared for the Project. The spoil management strategy will outline appropriate management procedures for the generation, management and importation (if required) of spoil.	Spoil Management Strategy (Appendix A)	Prior to construction During construction	Senior Environmental Advisor Project Environmental Consultant	COA B7 COA B8 L4
SWM54	Management of topsoil stockpiles and other excavated material stockpiles to minimise dust and sediment in runoff will include: - Minimising the number of stockpiles, area and time they are exposed - Locating stockpiles at least 50 m away from drainage lines and natural waterways and from where they will be susceptible to erosion - Stockpiles will be bunded in accordance with the Blue Book (Landcom, 2004) <i>Managing Urban Stormwater – Soils and Construction</i>, Volume 1, 4th Edition) - Stabilise stockpiles, establish sediment controls and suppress dust as required - Ensure contingency measures for stockpiles are on hand for imminent rain events.	ESCP Appendix D Appendix E	During construction	Senior Environmental Advisor Site Supervisor Project Engineer	L5
SWM55	Excavated material will be managed in accordance with the spoil management strategy.	Spoil Management Strategy (Appendix A)	During construction	Environmental Advisor	L6 COA B7 COA B8

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Id	Measure/requirement	Resources needed	When to implement	Responsibility	Reference
		ESCP Appendix D Appendix E			
SWM56	Where applicable, excess spoil will be re-used for other elements of the Project such as access track construction. Where spoil cannot be reused it will be managed as per the SWMP. Alternatively, excess material will be disposed of at other suitable locations (including at Ravine Bay, GF01, Main Yard or other Snowy 2.0 approved emplacement areas) as agreed to with NPWS and FCNSW.	Spoil Management Strategy (Appendix A)	During construction	Senior Environmental Advisor	L6 COA B7 Best practice
SWM57	Material which has been assessed as not suitable for reuse on land or for subaqueous disposal at the Ravine Bay emplacement area (as part of the Snowy 2.0 management procedure) or cannot be reused will be classified in accordance with the <i>Waste Classification Guidelines</i> (EPA, 2014).	Spoil Management Strategy (Appendix A)	During construction	Senior Environmental Advisor	L6
SWM58	Excavated material to be disposed of in the spoil emplacement locations (including Ravine Bay, GF01, Main Yard or other Snowy 2.0 approved emplacement areas) will be transported to the emplacement area by Transgrid and/or contractor and then managed by Snowy Hydro in accordance with the relevant approved Snowy 2.0 Rehabilitation Plan prepared by Snowy Hydro.	Snowy 2.0 Rehabilitation Plan	During construction	Senior Environmental Advisor	L7 COA B7
SWM59	Note any imported fill materials will be certified at source locations as pathogen and weed free Excavated Natural Material or Virgin Excavated Natural Material prior to delivery to site. These	Import inspection records	During construction	Environmental Advisor	Best practice

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Id	Measure/requirement	Resources needed	When to implement	Responsibility	Reference
	certificates shall form part of the PC quality documentation				
SWM60	Stockpiles are to be managed following Landcom, 2004 – Managing Urban Stormwater – Soils and Construction, Volume 1, 4 th Edition. All stockpiles shall be located away from drainage lines and natural waterways to prevent erosion and soil loss. Any soil, mulched vegetation and spoil materials will not be stockpiled within 50 metres of any gullies or waterways or steep slopes.	Environmental inspection records	During construction	Senior Environmental Advisor	COA B7 Best practice BDAR BIO10
SWM61	Concrete washout to be conducted in designated areas only, with concrete drivers advised of its location. Alternately, mobile washout kibbles shall be used.	Environmental inspection records Site induction	During construction	Environmental Advisor	Best practice
SWM62	Additional stockpiles are to be in areas that are already cleared and are to have appropriate erosion controls in place. No permanent stockpiles will remain on site unless agreed to by Transgrid. Note stockpiles are to be limited around the Project areas and are to have adequate sediment controls and dust suppression throughout the Project duration.	ESCP Appendix D Appendix E	During construction	Environmental Advisor	Best practice
Monitoring and Maintenance					
SWM63	Daily visual and weekly overall assessments of erosion and sediment control structures will be undertaken to verify their condition and effectiveness and ensure known issues are rectified.	Environmental inspection records	During construction	Environmental Advisor Site Supervisor	Best practice

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Id	Measure/requirement	Resources needed	When to implement	Responsibility	Reference
SWM64	Site inspections will be conducted prior to forecast rainfall.	Environmental inspection records	During construction	Environmental Advisor	Best practice
SWM65	All temporary erosion and sediment control measures, including drainage control measures, will be fully operational and maintained in proper working order at all times as reasonably practical.	Environmental inspection records	During construction	Environmental Advisor	Best practice
SWM66	Erosion control measures are to be maintained until all earthworks and construction activities are completed and/or site rehabilitation is complete (if applicable). Erosion and Sediment control plans will be staged for various stages of the Project. Note during the construction of access tracks sediment basins need to be included in design and construction to manage erosion and sedimentation and associated impacts on receiving waters.	ESCP Appendix D Appendix E	During construction	Environmental Advisor	Best practice
Revegetation					
SWM67	A rehabilitation plan will be prepared in consultation with NPWS and FCNSW to guide the long-term rehabilitation of the Project. The rehabilitation plan will be based on the rehabilitation strategy outlined in Section 5.4.10 of the EIS.	Rehabilitation Plan	Prior to construction During construction	Senior Environmental Advisor	L9
SWM68	Revegetation of slopes will be undertaken as soon as possible in line with the Rehabilitation Plan.	Rehabilitation Plan	During construction	Environmental Advisor	B2
SWM69	Landscaping of pervious surfaces using native indigenous species only.	Rehabilitation Plan	During construction	Environmental Advisor	BDAR BIO10

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Id	Measure/requirement	Resources needed	When to implement	Responsibility	Reference
Biodiversity Protection					
SWM70	Control measures will remain in situ until site stabilisation completion criteria are met. The plan will ensure protection of aquatic habitat in the tributaries crossed by the project, and particularly aimed at protecting the habitat for the Booroolong Frog associated with Yarrangobilly Creek. this is particularly important for the lower reaches of Sheep Station Creek and Wallace Creek where the exclusion zone is encroached	ESCP Appendix D Appendix E Environmental inspection records	During construction	Environmental Advisor	BDAR BIO10
SWM71	A Trigger Action Response Plan will be documented in the SWMP, with management actions in place to address risk of sediment loads detrimental to Booroolong Frog entering the system.	Booroolong Frog Monitoring Strategy - TARPs (Appendix G of the BMP)	During construction	Senior Environmental Advisor	BDAR BIO10
SWM72	An adaptive management plan for the Booroolong Frog will be prepared in consultation with NPWS and BCS to address risk of increased sedimentation/run off to the identified breeding habitat and population extent downhill and downstream of the project area.	Booroolong Frog Monitoring Strategy – TARPs (Appendix G of the BMP)	During construction	Senior Environmental Advisor	BDAR BIO10
SWM73	Additional or supplementary control measures (i.e. sediment fencing, diversions, and detention ponds) will be implemented at high risk areas such as the bridge crossings at Sheep Station Creek, Cave Gully and Wallaces Creek and at tower structures site	ESCP Appendix D Appendix E	During construction	Environmental Advisor	BDAR BIO10

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Id	Measure/requirement	Resources needed	When to implement	Responsibility	Reference
	and access roads on the slopes around Yarrangobilly Creek and associated tributaries.				
SWM74	Additional water quality monitoring points will be installed and monitored in locations to be agreed with NPWS and BCS, which are downhill of the construction footprint and upstream of Booroolong Frog habitat.	Booroolong Frog Monitoring Strategy (Appendix G of the BMP)	During construction	Senior Environmental Advisor	BDAR BIO10
SWM75	Any imported fill will be certified at source locations to ensure it is pathogen and weed free Excavated Natural Material or Virgin Excavated Natural Material).	Spoil Management Plan (Appendix A)	During construction	Environmental Advisor	BDAR BIO10
SWM76	Weed monitoring and control programs are to be documented in the BMP and Trigger Action Response Plan as part of the SWMP and in consultation with BCS and NPWS and any deviation from measures approved by DPIE are to be raised and approved.	Weed and Pathogen Monitoring Program (Appendix H of the BMP)	During construction	Senior Environmental Advisor	BDAR BIO11

6. Compliance Management

6.1. Responsibilities

The PC's organisational structure and overall roles and responsibilities are outlined in Section 4.11 of the CEMP. Specific responsibilities for the implementation of environmental controls are detailed in Section 5 of this Plan.

6.2. Training

All site personnel will undergo the PC site induction training relating to soil and water management issues. The induction training will address elements related to soil and water management including:

- Roles and responsibilities relating to soil and water management
- Familiarisation with the Project ESCP
- Site-specific areas of risk for soil and water management
- Penalties and non-compliance with this management plan.

Targeted training in the form of toolbox talks or specific training will also be delivered to personnel with a key role in soil and water management. Examples of training topics include:

- ESC measure installation methodology
- Working near or in waterways and drainage lines
- Emergency response measures in high rainfall events
- Preparedness for high rainfall and flood events
- Spill response
- Stockpile location criteria
- Identification of potentially contaminated spoil and fill material
- Sensitive environments within and near the Project area.

Further details regarding staff induction and training are outlined in Section 6 of the CEMP.

6.3. Monitoring and inspection

Inspections of sensitive areas and activities with the potential to impact upon soil and water management will occur for the duration of the Project.

Requirements and responsibilities in relation to monitoring and inspections are documented in Section 4.11 of the CEMP. The environmental monitoring program for the Project is included in Appendix G of the CEMP, with soil and water management monitoring requirements outlined in Table 6-1, below.

Table 6-1 Monitoring requirements for soil and water management

Monitoring Parameter	Frequency	Performance Criteria
Any visible signs of erosion	Weekly	No erosion No visible pollution

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Monitoring Parameter	Frequency	Performance Criteria
Drainage and erosion & sediment controls are in place and in good working order	Weekly	All structures sound and working correctly No land or soil contamination because of Project activities.
Soil stockpiles and excavations are being protected	Weekly	Sediment fences/berms erected No land or soil contamination because of Project activities.
Sediment has been removed following large storm events and controls maintained	Weekly and after storm events	No silt in sediment controls
Effectiveness of landscaping and rehabilitation	Weekly	75% coverage where applicable (refer to either Bluebook or ICEA Guidelines) Rehabilitation of site to existing conditions or better.
Visual inspection for indications of sediment-laden waters, waste waters or pollution (e.g., grease/oil, effluent) because of construction.	Weekly and after each rainfall event	No visible pollution No spills or runoff of contaminants or sediments into waterways.
Visual inspection of settled water for contaminants or sedimentation will be made before water is discharged to drains.	Weekly and after each rainfall event	No visible pollution All dewatering off site meets water quality targets and is accompanied by a permit.
Visual inspection of waterway crossings and access tracks	Weekly and after each rainfall event	No additional erosion No sediment-laden runoff No structural damage to crossings or tracks.
Additional clearing and maintenance of sediment controls	Following a rain event of >50mm in 24 hours (BIO10)	All structures sound and working correctly No sediment-laden runoff No silt in sediment controls No land or soil contamination because of Project activities.

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6.4. Non-conformance reporting and incidents

Environmental incidents are defined within Section 8.3 of the CEMP, whilst required notifications are detailed in Section 3.12 of the EMS and Section 8.4 of the CEMP. Reporting requirements and responsibilities are documented in Section 9.4 the CEMP. Non-compliance management and notification is detailed in Section 3.9 of the EMS and Section 9.5 of the CEMP.

The PC are dedicated to ensuring full compliance with Statutory Approvals and Infrastructure Approval. However, where there is an incident which results in a non-compliance the reporting of the incident is outlined in Section 8 of the CEMP. Environmental incidents relating to soil and water management will include but not be limited to:

- Discharge of turbid water to a waterbody within the Project area
- Discharge of turbid water outside of the Project boundary
- Transport of contaminants through surface runoff
- Impact upon groundwater quality, levels and flows
- Structural erosion within work areas.

In the event of any failure of sediment or stormwater mitigation measures, including overtopping of sediment basins (, immediate notification to DPE, EPA and NPWS will be undertaken.

Incident Notification

The protocol for managing and reporting incidents will be in accordance with the Infrastructure Approval, the UGL and Transgrid Management Systems, and the Contract specification. Transgrid will notify the Department and NPWS via the Major Projects website immediately after becoming aware that an incident has occurred in accordance with COA C7. A written notification will then be provided to the Department via the Major Projects website within seven days after becoming aware of the incident. The PC will provide the appropriate details to assist Transgrid.

The written notification will include the following details:

- Identify the development and application number;
- Provide details of the incident (date, time, location, a brief description of what occurred and why it is classified as an incident);
- Identify how the incident was detected;
- Identify when the Proponent became aware of the incident;
- Identify any actual or potential non-compliance with conditions of consent;
- Describe what immediate steps were taken in relation to the incident;
 - Identify further action(s) that will be taken in relation to the incident; and
 - Identify a development contact for further communication regarding the incident. Within 30 days of the date on which the incident occurred, or as otherwise agreed by the Planning Secretary, Transgrid will provide the Department and any relevant public authorities with a detailed report on the incident addressing the following requirements, and any further reports that shall be requested: a summary of the incident;
 - Outcomes of an incident investigation, including identification of the cause of the incident;
 - Details of the corrective and preventative actions that have been, or will be, implemented to address the incident and prevent recurrence; and
 - Details of any communication with other stakeholders regarding the incident.

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Non-compliance Notification

The protocol for managing and reporting non-compliances will be in accordance with the Infrastructure Approval, the UGL and Transgrid Management Systems, and the Contract specification. Transgrid will notify the Department and NPWS via the Major Projects website within seven days after becoming aware that a non-compliance has occurred in accordance with COA C8.

The notification will include;

- Identification of the development and the application number for it,
- set out the condition of approval that the development is non-compliant with,
- the way in which it does not comply and the reasons for the non-compliance (if known), and what actions have been, or will be, undertaken to address the non-compliance.

Public Reporting

As per the conditions of approval (Schedule 2 condition B8 (h)), the management of spoil on site and the progress against the completion criteria and performance indicators will be monitored throughout the development and publicly reported on.

6.5. Auditing

Audits (both internal and external) will be undertaken to assess the effectiveness of environmental controls, compliance with this sub plan, infrastructure approval and other relevant approvals, licences, and guidelines. Internal audit requirements are detailed in Section 9.3.1 of the CEMP. External audit requirements are detailed in Section 9.3.2 of the CEMP.

Relevant to Independent (External) Audits the described frequency is in accordance with the *Independent Audit Post Approval Requirements* (2020), will include as a minimum independent compliance audits to the CSSI (C10) and EPBC (Part B 28-31). The frequency is indicated as;

- CSSI Audit within 3 months of commencing construction, then at 6 monthly intervals from the initial audit or otherwise agreed by the Secretary.
- CSSI Audit within 3 months of commencement of operations, then at 3-year intervals or otherwise agreed by the Secretary.
- EPBC Audit every five-year period following the commencement of the Action until the approval expires.

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Soil and Water Management Plan

7. References

Jacobs. (2020). Snowy 2.0 Transmission Connection Project EIS v.1. Jacobs Pty Ltd.

Landcom. (2004). Managing Urban Stormwater: Soils and Construction (4th Edition), Volumes 1 and 2 (the Blue Book)

IECA. (2008). Best Practice Erosion & Sediment Control Guidelines (the White Book)

Transgrid. (2021, February). Environmental Impact Statement: Snowy 2.0 Transmission Connection Project - Volume 2.

FGJV. (2023). STP and Process Water Re-use Procedure (S2-FGJV-ENV-PRO-0042)

APPENDIX A: Spoil Management Plan

Spoil Management Plan

Snowy 2.0 Transmission Connection Project

Stage 1 Document Number: 3200-0645-PLN-020-CEMP-SMP

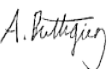
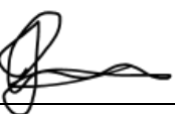
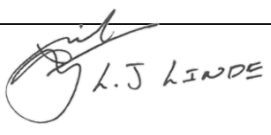
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TransGrid
Date 1/11/2024

Snowy 2.0 TCP
Spoil Management Plan

Document Control

Approvals

Title	Snowy 2.0 Transmission Connection Project – Spoil Management Plan
Approved on behalf of Transgrid (Snowy 2.0 TLP) by	Andrew Buttigieg
Signed	
Dated	22/11/2024
Approved on behalf of Transgrid HumeLink by	Jeremy Roberts
Signed	
Dated	05 Nov 2024
Approved on behalf of UGL by	Louis Linde
Signed	
Dated	20/11/2024
Approved on behalf of HLWJV by	Tim Burns
Signed	
Dated	04 Nov 2024

Snowy 2.0 TCP Spoil Management Plan

Version Control

Revision	Date	Description	Author	Reviewer	Approver
0.01	05/10/2022	Initial issue for review	Whitney Heiniger	Kim Lembke	Trevor Noble
0.02	12/05/2023	Required plan review	Whitney Heiniger	Kim Lembke	Trevor Noble
0.03	17/05/2023	Addressing Transgrid comments	Whitney Heiniger	Kim Lembke	Trevor Noble
0.04	08/09/2023	Required plan review	Whitney Heiniger	Kim Lembke	Tim McCarthy
0.05	30/10/2023	Final review	Jane Love	Kim Lembke	Tim McCarthy
0.06	01/11/2023	Addressing NPWS comments	Jason Snape	Kim Lembke	Tim McCarthy
0.07	24/11/2023	Addressing BCD, EPA and NPWS comments	Jason Snape	Kim Lembke	Tim McCarthy
0.08	1/11/2024	Updates to include Stage 2	Nicholas Mok	Ian Irwin	Louis Linde / Tim Burns

Distribution of controlled copies

This Environmental Management Plan is available to all personnel and sub-contractors via the Project document control management system.

The document is uncontrolled when printed. One controlled hard copy of the CEMP and supporting documentation will be maintained by the Quality Manager at the Project office (and relevant documentation is available on the Snowy 2.0 TCP website [Snowy 2.0 Transmission Connection | Transgrid](#)).

Copy number	Issued to	Version

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Acronyms and Abbreviations

Abbreviation	Explanation
ASS	Acid Sulfate Soils
AMD	Acid and Metalliferous Drainage (also known as Acid Mine Drainage)
bgl	below ground level
BOM	Bureau of Meteorology
CEMP	Construction Environmental Management Plan
CLMP	Contaminated Land Management Plan
DCCEEW - NSW	NSW Department of Climate Change, Energy, the Environment and Water
DPE	NSW Department of Planning and Environment
DPHI	NSW Department of Planning Housing and Infrastructure
EIS	Environmental Impact Statement
ENM	Excavated Natural Material
EPA	NSW Environment Protection Authority
EPL	Environment Protection Licence
EP&A Act	Environmental Planning and Assessment Act 1979
ESCP	Erosion and Sediment Control Plan
EWMS	Environmental Work Method Statements
FCNSW	Forestry Corporation of NSW
FGJV	Future Generation Joint Venture
IECA	International Erosion Control Association
KNP	Kosciuszko National Park
m	metres
mm	millimetres
NAF	Non-Acid Forming
NAG	Net Acid Generation
NAPP	Net Acid Producing Potential
NOA	Naturally Occurring Asbestos
NPWS	National Parks and Wildlife Service
NSW	New South Wales
PAF	Potential Acid Forming
PAF-LC	Potential Acid Forming – Low Capacity
PASS	Potential Acid Sulfate Soils

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Abbreviation	Explanation
PC	Principal Contractor (as defined in the Soil and Water Management Plan)
POEO Act	Protection of the Environment Operations Act 1997
Proponent, the	NSW Electricity Networks Operations Pty Ltd as a trustee for NSW Electricity Operations Trust (Transgrid)
SHL	Snowy Hydro Limited
SVC	Snowy Valleys Council
SWMP	Soil and Water Management Plan
SMP	Spoil Management Plan (this document)
TfNSW	Transport for NSW
TSS	Total suspended solids
UGLMS	UGL Management System
VENM	Virgin Excavated Natural Material

Snowy 2.0 TCP Spoil Management Plan

1 Introduction

1.1 Context

To connect Snowy 2.0 Main Works to the National Energy Market (NEM), a new transmission connection is required. NSW Electricity Networks Operations Pty Ltd as a trustee for NSW Electricity Operations Trust (known as Transgrid and the Proponent) received development approval on 2 September 2022 to construct a 500 kiloVolt (kV) substation and 330kV switching yard (Maragle Substation) and overhead transmission lines ('the Project') to facilitate the connection of Snowy 2.0 to the existing electrical transmission network, approximately 27 kilometres (km) east of Tumbarumba, New South Wales (NSW).

This Spoil Management Plan (SMP) describes how spoil will be managed by the PC during transmission line construction, including segregation, testing and use and emplacement requirements. The SMP describes anticipated hazards during spoil management and mitigation measures to identify and manage potential impacts that could occur during Project works.

For the purposes of classification, 'spoil' is defined in this Plan as all subsoil material excavated during Project works, and therefore any material not classified and segregated as topsoil will be treated as spoil. Topsoil for the project will be defined by character rather than by depth limitation and can include underlying (secondary) soil profiles as long as characteristics are largely consistent with the overlying material type. Transgrid & the PC believe such weed-free material would be beneficial for site rehabilitation as 'horizon-A' topsoil volumes may be limited.

1.2 Environmental Management System

UGL's Environmental Management System (EMS) for the Project is described in the Construction Environmental Management Plan (CEMP). This SMP forms part of the EMS for the Project and is to be read in conjunction with the overarching CEMP as well as the Soil and Water Management Plan (SWMP). It is applicable to all staff, contractors and sub-contractors associated with the construction of the Project.

UGL's Environmental Management System should not be confused with the project Environmental Management Strategy (required by the Conditions of Approval) which is a strategic framework document detailing both Proponent and Principal Contractor responsibilities to the project. It also specifies environmental obligations beyond the construction phase of the project. The EM Strategy is provided by the document 3200-0645-PLN-011-EMS.

The UGL Management System (UGLMS) is certified to ISO 14001:2015 and incorporates the following procedures for the management of spoil on the Project:

- UGLMS-131-547 Spill Response and Remediation Procedure
- UGLMS-131-387 Waste Management Procedure
- UGLMS-131-374 Excavation and Trenching Procedure
- UGLMS-131-807 Contractor HSEQ Handbook
- UGLMS-4-1730 Environmental Inspection Checklist
- UGLMS-4-1549 Environmental Inspection Weekly Checklist

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- UGLMS-4-2138 Site Environmental Plan Template
- UGLMS-4-1607 Earthworks Inspection Checklist
- UGLMS-4-1005 Excavation Inspection Report
- UGLMS-4-1007 Excavation Inspection Checklist
- UGLMS-4-1006 Excavation Permit

These documents will support the implementation of this SMP. Also refer to Spoil Movement & Placement Permit and VENM Certificate for permits assigned to this plan.

1.3 Purpose and Objectives

The purpose of this Plan is to address the construction environmental management requirements detailed within the following documents:

- Snowy 2.0 Transmission Connection Project – Environmental Impact Assessment (Jacobs, Feb 2021)
- Snowy 2.0 Transmission Connection Project – Amendment Report (Transgrid, Dec 2021)
- Project Conditions of Approval (CoAs) – Snowy 2.0 Transmission Connection (SSI 9717) Schedule 1 Issued 02/09/2022
- Environment Protection Licence (EPL) 21753 (23rd December 2022) and Licence Variation Notice 1628478 (14 September 2023).

The key objectives for the management of spoil and topsoil during Project works include:

- Maximise the beneficial re-use for construction activities and rehabilitation
- Ensure excavated spoil, imported fill and contaminated soil is disposed of or reused in accordance with legal requirements (waste classification, transportation and safe handling of any potentially contaminated soil and material)
- Compliance with and exceedance of the requirements of the 'Blue Book' (Landcom, 2004) and IECA Best Practice Erosion and Sediment Control Guideline where achievable
- Prevent impact(s) of potentially contaminated spoil on the surrounding environment
- Conduct appropriate spoil testing, classification of material and record-keeping, where required; and
- Appropriate emplacement and handover of spoil within the Snowy 2.0 approved emplacement areas.

1.4 Authorship

This SMP has been prepared by Whitney Heiniger (NGH Senior Environmental Consultant) and Jane Love (NGH Environmental Management Technical Lead). Whitney Heiniger holds a Bachelor of Marine Biology, Honours in Environmental Science and Graduate Certificate in Environmental Management and over 5 years' professional experience in construction environmental management. Whitney is also a Certified Professional in Erosion and Sediment Control In-Training (CPESC-IT 9698). Jane Love holds a Bachelor of Environmental Science,

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Master of Environmental Management and has over 13 years' professional experience in environmental science and management.

CVs for these qualified and experienced authors will be provided to DPE (now referred to as NSW Department of Planning Housing and Infrastructure DPHI) with submission of this plan. If CVs have not been provided, please contact:

- Transgrid Senior Project Manager – Andrew Buttigieg (andrew.buttigieg@transgrid.com.au); or
- UGL Project Manager – Louis Linde (louis.linde@ugllimited.com).
- UGL/CPB Project Director – Tim Burns (tim.burns@hljv.com.au)

1.5 Consultation

This plan has been compiled by NGH, a professional consultancy with 30 years' experience providing environmental services. Development of this plan has been in consultation with UGL, Transgrid and stakeholders, including NPWS, FCNSW, EPA, DPE Water and DPI, as indicated in Section 1.5 of the overarching SWMP.

2 Environmental Assurance

2.1 Relevant Legislation and Guidelines

2.1.1 LEGISLATION

Legislation relevant to this SMP includes:

- Contaminated Land Management Act 1997
- Environmental Planning and Assessment Act 1979
- Environmental Planning and Assessment Regulation 2000
- National Parks and Wildlife Act 1974
- Protection of the Environment Operations Act 1997 (POEO Act)
- Protection of the Environment Operations (General) Regulation 2009
- Protection of the Environment Operations (Waste) Regulation 2014
- Waste Avoidance and Resource Recovery Act 2001
- National Environment Protection Council Act 1994

Relevant provisions of the above legislation are explained in the register of legal and other requirements included in Appendix C of the CEMP.

2.1.2 GUIDELINES

Guidelines, specifications and policy documents relevant to this Plan include:

- Waste Classification Guidelines (NSW EPA, 2014)
- Waste Avoidance and Resource Recovery Strategy 2007 (DECC, 2007)
- Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014 – The excavated natural material order 2014 (NSW EPA)
- Resource Recovery Exemption under Part 9, Clauses 91 and 92 of the Protection of the Environment Operations (Waste) Regulation 2014 – The excavated natural material exemption 2014 (NSW EPA)
- Certification: Virgin excavated natural material (NSW EPA, 2013)
- Virgin Excavated Natural Material Fact Sheet (TfNSW, 2022)
- Australian Standard 1141.3.1-2012 Methods for sampling and testing aggregates – Sampling – Aggregates
- Best Practice Erosion & Sediment Control (BPESC) – IECA, 2008
- Best Practice Waste Reduction Guidelines for the Construction and Demolition Industry (tools for Practice), Natural Heritage Trust, 2000
- Managing Urban Stormwater: Soils and Construction (4th Edition), Volumes 1 and 2 – Landcom, 2004 (The Blue Book)

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- Transgrid – Amendment Report Snowy 2.0 Transmission Connection Project – Mitigation Measures
- Guidelines for controlled activities on waterfront land – Department of Primary Industries, Office of Water, 2012
- NEPM National Environmental Protection Measures 2013
- National Environment Protection (Assessment of Site Contamination) Measure (ASC NEPM), NEPC 2013
- Preventing Acid and Metalliferous Drainage Leading Practice Sustainable Development Program for the Mining Industry, Department of Industry 2016 (AMD Guideline)
- AMIRA ARD test handbook (AMIRA, 2002)
- Global Acid and Metalliferous Drainage (GARD) Guide, developed by the International Network for Acid Prevention (INAP, 2008); and
- Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials (MEND, 2009)

2.2 Permits and Licences

Movement and placement of spoil materials will be tracked and permitted with the following forms;

- Spoil Movement & Placement Permit (Spoil Movement & Placement Permit)
- VENM certificate (VENM Certificate)
- Section 143 Notice – for waste tracking (Section 143 Notice)
- ENM Compliance Statement (ENM Compliance Statement).

An EPL for the Project premises was issued to Transgrid by the NSW EPA on 23rd December 2022 under the *Protection of the Environment Operations Act 1997* (POEO Act). This EPL requirement was triggered under Schedule 1 of the *Protection of the Environment Operations (General) Regulation 2022* due to extractive activities required during construction. Licence conditions provided as part of EPL 21753 are detailed in Table 2-1. In the months following calculations determined greater anticipated spoil volumes, and a request was submitted to the EPA for a licence variation. The EPA issued a Licence Variation Notice (1628478) to Transgrid on the 14 September 2023 for the approved extractive limit for spoil to increase to 561,231 Tonnes (i.e. >100000-500000 T annually).

2.3 ENM Requirements

As outlined in Section 3, any spoil not able to be reused as part of the Project works will be disposed of in the Snowy 2.0 Main Works emplacement areas. In order for this transport and placement to occur, spoil will be assessed for classification as Excavated Natural Material (ENM) under the POEO Act.

Excavated Natural Material (ENM) is naturally occurring rock and soil (including materials such as sandstone, shale, clay and soil) that has:

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- been excavated from the ground
- contains at least 98 per cent (by weight) natural material; and
- does not meet the definition of Virgin Excavated Natural Material (VENM).

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

ENM may be sent offsite to a place that can legally accept this material for reuse or reprocessing. Off-site reuse must be undertaken in compliance with all conditions of the EPA's Excavated natural material order 2014 (ENM order) and Excavated natural material exemption 2014 (ENM exemption).

ENM can be beneficially re-used off-site as engineering fill or for use in earthworks.

Prior to supplying ENM off-site, the generator must certify that the ENM complies with the relevant conditions of the ENM order and provides the off-site consumer with:

- A written statement of compliance, certifying that the ENM complies with the conditions of the ENM order.
- Copies of all test results (see below).
- A copy of the ENM exemption, or a link to the EPA website where the ENM exemption can be found.

The generator must keep a written record of the quantity of ENM supplied, and the name and address of each person to whom the processor supplied the ENM. Records must be kept for six years.

Receiving ENM from an off-site source requires that you ensure the ENM:

- Complies with the relevant conditions of the ENM exemption.
- Meets all chemical and other material requirements as per the excavated natural material order.
- Is only applied to land as engineering fill or for use in earthworks.
- Is applied to land within a reasonable period of time after its receipt.

A consumer must keep records of the quantity of ENM received and the supplier's name and address. These records must be kept for six years.

ENM must not be mixed with any other types of waste to maximise future re-use opportunities.

Testing requirements

ENM must be sampled, tested and contain contaminant levels less than the criteria listed in the ENM order before the material is transported to the receiving site. Sample collection and testing methodology is detailed in the ENM order.

Additional testing (beyond the ENM criteria) is only required if there is evidence that potentially-contaminating activities previously took place on the excavation site (for example, former service station site, cattle tick dip site, banana plantation, asbestos or lead-painted infrastructure). If this is the case, specialist advice shall be obtained from the PC's project Environmental Manager on additional test requirements.

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Written records of all test reports must be kept for six years.

Transporting requirements

It is a Transport requirement that records must be kept for six years and include as a minimum:

- Notice under section 143
- amount of ENM generated, stored, treated or disposed of
- amount of ENM transported
- name of transporter and transporter's vehicle registration number
- date of transportation
- name and location of the facility that is receiving the ENM.

Disposal requirements

Snowy Hydro Ltd has a target of 100% beneficial re-use of ENM (mostly derived from the top 10m soil layer)

Every effort will be made to re-use ENM on or off-site before considering disposal. If disposal is the only option, justification of disposal must be documented, and the material taken to a licenced waste facility, licenced to accept General Solid Waste (non-putrescible).

2.4 VENM Requirements

The *Protection of the Environment Operations Act 1997* (POEO Act) defines virgin excavated natural material (VENM) as material:

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

Waste classification

VENM is a waste that has been pre-classified as general solid waste (non-putrescible). For more information see the EPA's VENM website.

Beneficial re-use

VENM by its nature can be re-used more easily once certain tests confirm absence of NOA or PAF materials. Weed and disease-free topsoil can be stockpiled and re-used on batters or in landscaping and revegetation works.

VENM may be sent off-site to a location that can legally accept this material for re-use or reprocessing. A VENM Certificate must be supplied prior to transporting VENM to the receiving site. VENM must be transported in accordance with a Notice under section 143.

If VENM is being accepted onto your Project site, a VENM Certificate must be provided by the producer and VENM transported in accordance with a Notice under section 143.

VENM must be segregated from other types of waste to maximise re-use opportunities.

The PC has a target of 100% beneficial re-use of VENM.

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Testing requirements

Classification of excavated material as VENM requires certainty that all aspects of the above definition are met. To determine if your material meets the definition of VENM the following questions must be asked:

1. Are manufactured chemicals or process residues present?
2. Is the material pathogen and weed free?
3. Are sulfidic ores or spoils present?
4. Are naturally occurring asbestos soils present?
5. Is there any other waste present?

Additional information to assist in answering these questions can be found at EPA's VENM website.

If your material meets the definition of VENM, it can be re-used off-site without prior testing.

If there is any doubt as to whether the material is VENM, you must sample and test the material as per the excavated natural material resource recovery order to confirm that the material is free of contaminants

Transporting requirements

It is a Transport requirement that records must be kept for six years and include as a minimum:

- Notice under section 143
- VENM Certificate
- amount of VENM generated, stored, or disposed of
- amount of VENM transported
- name of transporter and transporter's vehicle registration number
- date of transportation
- name and location of the facility that is receiving the VENM.

Disposal requirements

Snowy Hydro Limited has a target of 100% beneficial re-use of VENM.

Every effort must be made to re-use VENM on or off-site before considering disposal. If disposal is the only option, justification of disposal must be documented, and the material taken to a licenced waste facility, licenced to accept General Solid Waste (non-putrescible). The PC does not plan to dispose of VENM off-site as part of these works.

2.5 Limits of Liability

The PC has a requirement to test, treat and place spoil in accordance with relevant legislation and Transgrid contractual obligations. However, once spoil from Project works has been placed within designated emplacement areas (or approved off easement temporary stockpiling areas), this liability transfers to SHL for the ongoing management of such material. Likewise, approvals / endorsements for such locations rests with SHL if outside the scope of Transgrid's

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approvals. Transgrid will consult with SHL and advise when emplacement or stockpiling areas are endorsed and approved, and ready to receive spoil.

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2.6 Project Conditions of Approval

The Conditions of Approval and mitigation measures relevant to this Plan are listed in Table 2-1. A cross reference is also included to indicate where the requirement is addressed in this Plan or in other Project management documents.

Table 2-1 Project conditions of consent, mitigation measures and EPL conditions relevant to the SMP

Reference Number	Requirement	Document Reference
Conditions of Approval		
B7	Apart from the spoil that is provided to the NPWS for use in other parts of the Kosciuszko National Park, Forestry Corporation for use in other parts of State Forest, sent off-site, used to construct temporary or permanent infrastructure for the development or Snowy 2.0 Main Works (in accordance with that infrastructure approval, or used to rehabilitate the site or the Snowy 2.0 Main Works site, the Proponent must ensure that any spoil disposed within Kosciuszko National Park are emplaced in the following emplacement areas: a) Ravine Bay; b) GF01; c) Lobs Hole; or d) Tantangara for spoil containing naturally occurring asbestos only. Note: The location of these emplacement areas is shown in the figures in Appendix 2	Section 3.4

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Reference Number	Requirement	Document Reference
B8	Prior to the commencement of construction, the Proponent must prepare a Spoil Management Plan to the satisfaction of the Planning Secretary for the development. This plan must: - be prepared by a suitably qualified and experienced person in consultation with the NPWS, FCNSW, EPA, Water Group, NRAR and DPI; - include a description of the measures that would be implemented to: - minimise the spoil generated by the development; - maximise the reuse of non-reactive spoil on site and in other parts of the Kosciuszko National Park, Bago State Forest and/or offsite; - minimise the water quality impacts of the temporary spoil stockpiles; - provide an overarching framework for the management of all spoil generated on site, including the testing, classification, handling, temporary storage, chain of custody and disposal of spoil – that complies with the spoil management requirements in condition B7 above; - include a detailed plan for managing the temporary spoil stockpiles of the development, which includes suitable triggers for remedial measures (if necessary) and describes the contingency measures that would be implemented to address any water quality risks; - investigating, assessing and managing contaminated land, soils and groundwater in the development area; - investigation, assessing and managing the potential for naturally occurring asbestos, potentially acid forming material and other hazardous materials in the development area; - include a detailed plan for managing and the disposal of all the reactive or contaminated spoil generated on site, including the contingency measures that would be implemented if the volumes of this spoil are greater than expected and unsuitable for land disposal; - include a program to monitor and publicly report on: - the management of spoil on site; - progress against the detailed completion criteria and performance indicators. Following the Planning Secretary's approval, the Proponent must implement the approved Spoil Management Plan.	Sect 1.4 Sect 6.1 PESCP S2.3, S2.4 & S5.1 Sect 6.4 & ESCP Sect 3.1 & CLMP Sect 5.2 S5.1, S6.3 & Liming Procedure EM Strategy Noted (Audits)
Mitigation measures		
L4	A spoil management strategy will be prepared for the project. The spoil management strategy will outline appropriate management procedures for the generation, management and importation (if required) of spoil. It will include, but not be limited to: - Confirming spoil quantities - Carrying out appropriate assessments, including geotechnical investigations - Procedures for classification of spoil	This Plan

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Reference Number	Requirement	Document Reference
	- Identification of spoil reuse measures, including segregation of soils as subsoils and topsoils - Spoil stockpile management procedures including the number of stockpiles, area and time they are exposed, and locating stockpiles away from drainage lines and natural waterways and from where they will be susceptible to erosion - Spoil haulage routes - Spoil disposal and reuse locations - Imported spoil sources and volumes.	
L5	Management of topsoil stockpiles and other excavated material stockpiles to minimise dust and sediment in runoff will include: - Minimising the number of stockpiles, area and time they are exposed - Locating stockpiles away from drainage lines and natural waterways and from where they will be susceptible to erosion - Stockpiles will be bunded in accordance with the Blue Book (Landcom, 2004) <i>Managing Urban Stormwater – Soils and Construction</i>, Volume 1, 4th Edition) - Stabilise stockpiles, establish sediment controls and suppress dust as required.	S6.4 ESCP
L6	- Excavated material will be managed in accordance with the spoil management strategy. - Where applicable, excess spoil will be re-used for other elements of the project such as access track construction. Where spoil cannot be reused it will be managed as per the SWMP. Alternatively, excess material will be disposed of at other suitable locations (including at Ravine Bay, GF01, Main Yard or other Snowy 2.0 approved emplacement areas) as agreed to with NPWS and FCNSW. - Material which has been assessed as not suitable for reuse on land or for subaqueous disposal at the Ravine Bay emplacement area (as part of the Snowy 2.0 management procedure) or cannot be reused will be classified in accordance with the <i>Waste Classification Guidelines</i> (EPA, 2014). Excavated material will be transported to an appropriate excavated material disposal area. Approval will be obtained prior to transport and will require an estimate of the likely volume of excavated material to be disposed.	This Plan S3.4

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Reference Number	Requirement	Document Reference
L7	Excavated material to be disposed of in the spoil emplacement locations (including Ravine Bay, GF01, Main Yard or other Snowy 2.0 approved emplacement areas will be transported to the emplacement area by Transgrid and/or contractor and then managed by Snowy Hydro in accordance with the relevant approved Snowy 2.0 Rehabilitation Plan prepared by Snowy Hydro.	S6.5
EPL Conditions		
O5.1	Location and geochemistry The Licensee must ensure that all samples collected for spoil characterisation are: a. representative of the material currently being extracted from the specific area; b. is not skewed by veins; and c. corresponds to the material placed on the emplacement area	Section 5
O5.2	All treatment of spoil including but not limited to the temporary storage of spoil, and treatment of Potentially Acid Forming (PAF) material and material at risk of resulting in Acid Mine Drainage or Neutral Mine Drainage, must be undertaken in a manner that: a. achieves permanent neutralisation of the material b. prevents pollution of waters; and c. prevents contamination of land	Section 6
O5.3	The Licensee must validate that all treated spoil material meets the requirements of condition O5.2.	Section 6 Spoil Movement & Placement Permit

Note: Mitigation Measures taken from the Amendment Report, Snowy 2.0 Transmission Connection Project (December 2021)

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3 Existing Environment

3.1 Past Use

The existing environment is defined within section 7.2.2 and 7.3.2 of the project EIS and provides historical context for land use for the project area and eastern alignment. Much of the transmission line exists along the escarpment and outside the footprint of Lobs Hole (Ravine). The following excerpts are provided:

7.2.2.1 Environmental and cultural context – *The project area is within the country of the Walgal people (also spelled Walgalu, Wolgal), whose lands occupied the northern part of the Australian Alps, near Kiandra, now referred to as KNP.*

Aboriginal occupation of the Australian Alps is represented in the region's archaeological record, and in the cultural knowledge of the Aboriginal population. These provide information on a network of pathways, ceremonial practices and sites, and the practice of moth hunting, which together make up a unique cultural complex. The landscape, and places within it, are connected with this cultural complex and consequently with its heritage value.

An examination of environmental factors, and of cultural and spiritual practices associated with the project area reinforces the importance of the Snowy Mountains to local Aboriginal groups and demonstrates the presence of varying amounts of Aboriginal archaeological material. The archaeological record within the region includes a variety of site types such as occupation sites in the open and in rock shelters, as well as culturally modified trees, quarries, ceremonial places, and burials.

7.3.2.1 Historical Context – *Much of the landscape contains limited human disturbance, however some development within and in proximity to the project includes an existing transmission line, minor access tracks, and infrastructure associated with the Talbingo Reservoir. European settlers have been living and working within the project area since the early 19th century. The historical record shows that there have been phases of land use, commencing with pastoralism and subsumed by mining, of both copper and gold.*

Mining in the Australian Alps was primarily for alluvial gold mining, which brought large numbers of people to settle in the Australian Alps in towns like Kiandra, approximately 13 kilometres from the project. With the commencement of mining for copper in 1874 at Lobs Hole (also known as Ravine), a settlement began to support both the miners and the facilities required by them. By 1908, the village of Ravine contained a number of temporary buildings, a school, butcher's shop, blacksmiths' shop and a boarding house. At its height, 500 people lived at Lobs Hole.

From 1915, the village of Ravine began its decline due to falling copper prices and World War One leading to the abandonment of the Lobs Hole Central Mine.

Mining also occurred at the New Maragle goldfields which opened in 1874, however unlike Lobs Hole, no town was established.

The construction of the Snowy Scheme brought another wave of habitation into the area, although it is likely that it also destroyed much of the earlier heritage. The Snowy

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Scheme was completed in 1974, with a total of seven power stations, 16 dams and 225 kilometres of tunnels, pipelines and aqueducts.

The chronology of settlement in the locality is provided as follows;

Date	Event(s)
1820s	European exploration and sporadic settlement begins. Settlement at this time is outside the limits of the recognized "Colony" of NSW
1830s	Intensification of European settlement and grazing
1851	Gold is discovered in Kiandra
1874	Discovery of copper in Lobs Hole
1880s	Decline of Kiandra
1891	Construction of copper smelt at Ravine
1910	Proclamation of the village of Ravine (Lobs Hole)
1921	Abandonment of village of Ravine
1949-1974	Snowy Scheme constructed
1986	Ravine included in KNP

For the western side of Talbingo Reservoir usage goes back to the 1860s when gold mining began in the 1860s. Soon after timber reserves were identified in the area and Bago State forest was gazetted as a timber reserve in 1878. Maragle State Forest was dedicated in 1917. Various sawmills were established throughout the area. Logging in various forms continues through to present day with no recent logging activities having been carried out in the direct vicinity of the project site.

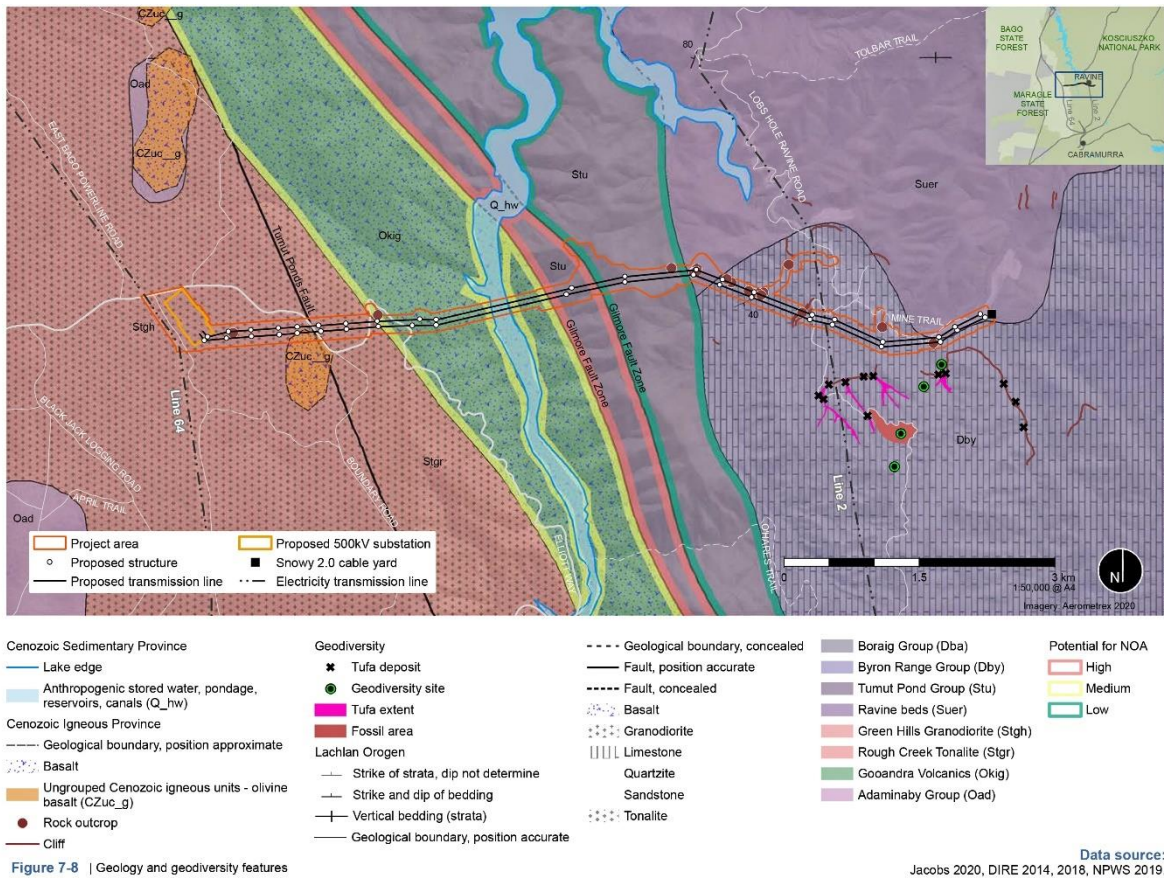
3.2 Geology

Geological detail and potential for NOA is provided in sections 7.2.5.3 of the EIS report. The following excerpt is provided;

7.2.5.3 Naturally Occurring Asbestos – NOA mapping for the region (NSW Trade & Investment, Division of Resources and Energy, 2015) indicates that there is a risk of encountering NOA around Sheep Station Ridge in geology associated with the Gilmore Fault Zone, Gooandra Volcanics and the Tumut Ponds Group, refer to Figure 7-8.

Marc Hendrickx and Associates Pty Ltd (2020) were engaged by TransGrid to assess the potential for NOA within the project area. On the basis of the assessment and observed geology of the project area these areas mapped on Figure 7-8 as having a low to high risk of NOA have been re-classed with a very low potential to contain NOA.

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Furthermore, a report commissioned by Transgrid titled **Assessment of potential NOA, TransGrid Talbingo Reservoir, 2019** provided the following excerpt

Conclusions

A geological investigation along proposed access roads and tower sites has provided a basis to update maps and re-classify NOA potential in the area of proposed earthworks. On the basis of the observed geology the line of the proposed tracks and tower locations have been re-classed as having VERY LOW potential to host NOA. In general for areas classed as having VERY LOW NOA potential HACA³ advise that if asbestiform and/or indicator minerals and/or textures are encountered, specialist geological advice should be sought.

Recommendations

Proposed track and tower construction will be undertaken in areas of VERY LOW NOA potential and in relation to NOA, work can proceed on an unexpected finds basis. Site foreman should undertake NOA awareness training that would entail recognition of key NOA bearing rock types in the region that might be encountered; mainly serpentinite.

If asbestiform and/or indicator minerals and/or textures are encountered or suspected during excavation works, work is to stop in the area and management be alerted. The area is to be isolated with a 10m exclusion zone and sign posted, access is to be restricted and specialist geological and occupational hygiene advice is to be sought prior to further progressing work in that area

Refer to S4.3 for the subsequent risk rating for NOA.

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Regarding AMD, the following EIS excerpt is provided;

7.5.2.5 Acid sulfate soils – *No local scale acid sulfate soils mapping is available for the project area. A review of the national Atlas of Australian Acid Sulfate Soils (Fitzpatrick et al., 2011) on 26 October 2020 identified that Talbingo Reservoir is mapped as having a high probability of acid sulfate soils present. The areas of mapped acid sulfate soils are not within the disturbance area.*

Refer to S4.3 for the subsequent risk rating for AMD

3.3 Spoil Volumes

As part of bulk earthworks required for the Project, a large volume of excavated material will be generated, containing a mixture of rock and various grades of soil. Excavated material that cannot be reused as fill material will be classified as spoil and managed as per this Spoil Management Plan. The reuse of excavated material will be prioritised throughout design and construction, including the reuse of road base, construction bench materials at transmission structure sites and for landscaping purposes as part of the Maragle Substation build.

The Project Hydrology Assessment, prepared by Jacobs (2020), outlines the desktop geotechnical study completed for the Project area. Additional site-based geotechnical investigations will be completed as part of the detailed design phase.

During works, approximately 184,388m³ of surplus spoil will be generated as per quantities outlined in Table 3-1.

Table 3-1 Surplus spoil volumes predicted for the Project

Activity	Project area west (m ³)	Project area east (m ³)
Maragle 330kV switching yard	5410	N/A
Maragle 500kV	5240	N/A
Construction of access tracks	23,340	136,390
Construction of structure foundations and benches	4,847	14,401
Total	38,837	150,791

Inappropriate management of spoil during construction can result in adverse environmental impacts, including:

- Exposure of soils during vegetation clearing and earthworks, creating the potential for offsite transport of eroded sediments and pollutants
- Increased turbidity of waterways due to exposure, erosion, runoff, dust propagation and vegetation removal
- Impacts to protected flora & fauna particularly in sensitive receiving environments
- Incidental spread of weed and seed material or pathogens
- Alteration of surface and subsurface flows that could cause disturbances to hydrology
- A reduction in groundwater levels and flows, and off-site discharge of water containing sediment from dewatering activities

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- Contamination of soils, and surface and groundwater from accidental spills or oil leaks; and
- Disturbance of contaminated land or water and subsequent generation of contaminated runoff or materials.

3.4 Spoil Emplacement Options

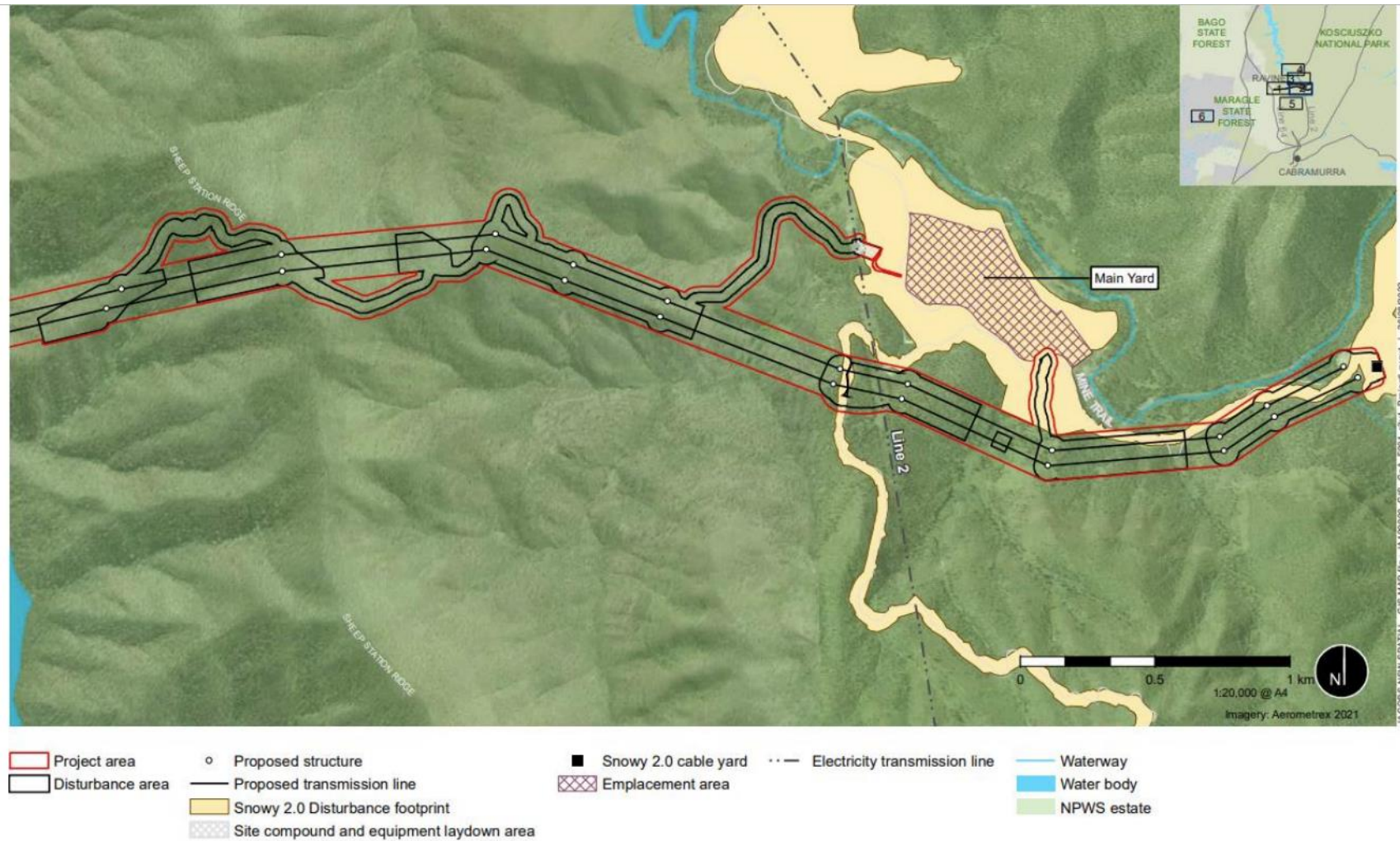
Excess spoil generated by Project works is expected to be disposed via the following methods:

- Project area west:
 - Excess spoil generated in the western Project area (within Bago State Forest) will be utilised at the Maragle Substation site, at select tower pads, on access tracks, and/or in approved mid-span areas not adjacent to sensitive receiving environments. The material will be contoured to blend in with the natural landscape with consultation to Forestry Corporation NSW (FCNSW). Exposed areas will be stabilised and rehabilitated with low growing native grass species, and/or surplus mulch. No excess spoil shall need be removed from the Bago State Forest unless contaminated.
- Project area east:
 - Excess spoil generated in the eastern Project area (within the National Park) will be transported from excavated areas on the escarpment to approved spoil emplacement locations at Ravine Bay, GF01, or Lobs Hole. With Transgrid approval (and in consultation with SHL and their approvals) such material can also be temporarily placed at interim stockpiling locations in the vicinity of Lobs Hole or used as capping material on access tracks at Lobs Hole once tested in accordance with Section 2.3 and Section 2.4. The haulage of this material will be confined to the existing and newly formed access tracks as part of ongoing construction activities. These tracks are closed to the public access for the duration of Project works.
 - Confirmed NOA (both reactive or non-reactive) spoil is to be placed within approved and designated encapsulation cells in accordance with COA B7(d) or disposed of off-site to facilities lawfully permitted to receive it, at the Clients direction, and with appropriate safety controls applied. Material is deemed hazardous waste and must be managed as such as detailed in Section 5.

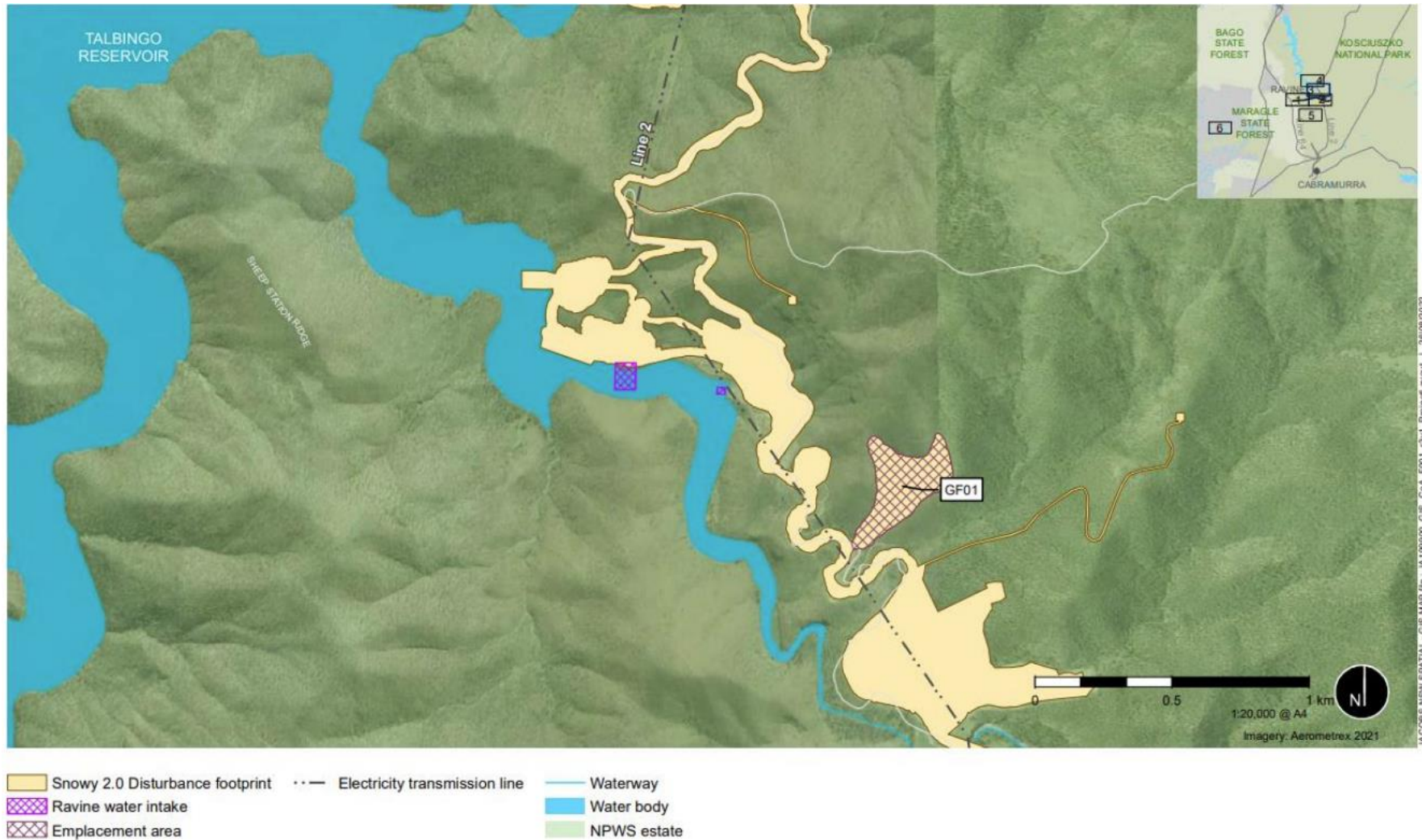
Where there is sufficient capacity for the total generated spoil volume to be placed within a single emplacement area, no spoil is to be transported between east and west Project areas unless approved by DPE and NPWS. Final emplacement at approved locations is subject to timings, capacity, transport distances and readiness and can change at short notice. Final placement is subject to limits of liability detailed in Section 2.5 above, or as otherwise defined in a Project Rehabilitation Plan.

In the unlikely instance that spoil cannot be utilised in construction works or emplaced within the Snowy 2.0 areas, spoil may be disposed of offsite at a licenced waste facility. This method of disposal must be approved by Transgrid prior to proceeding.

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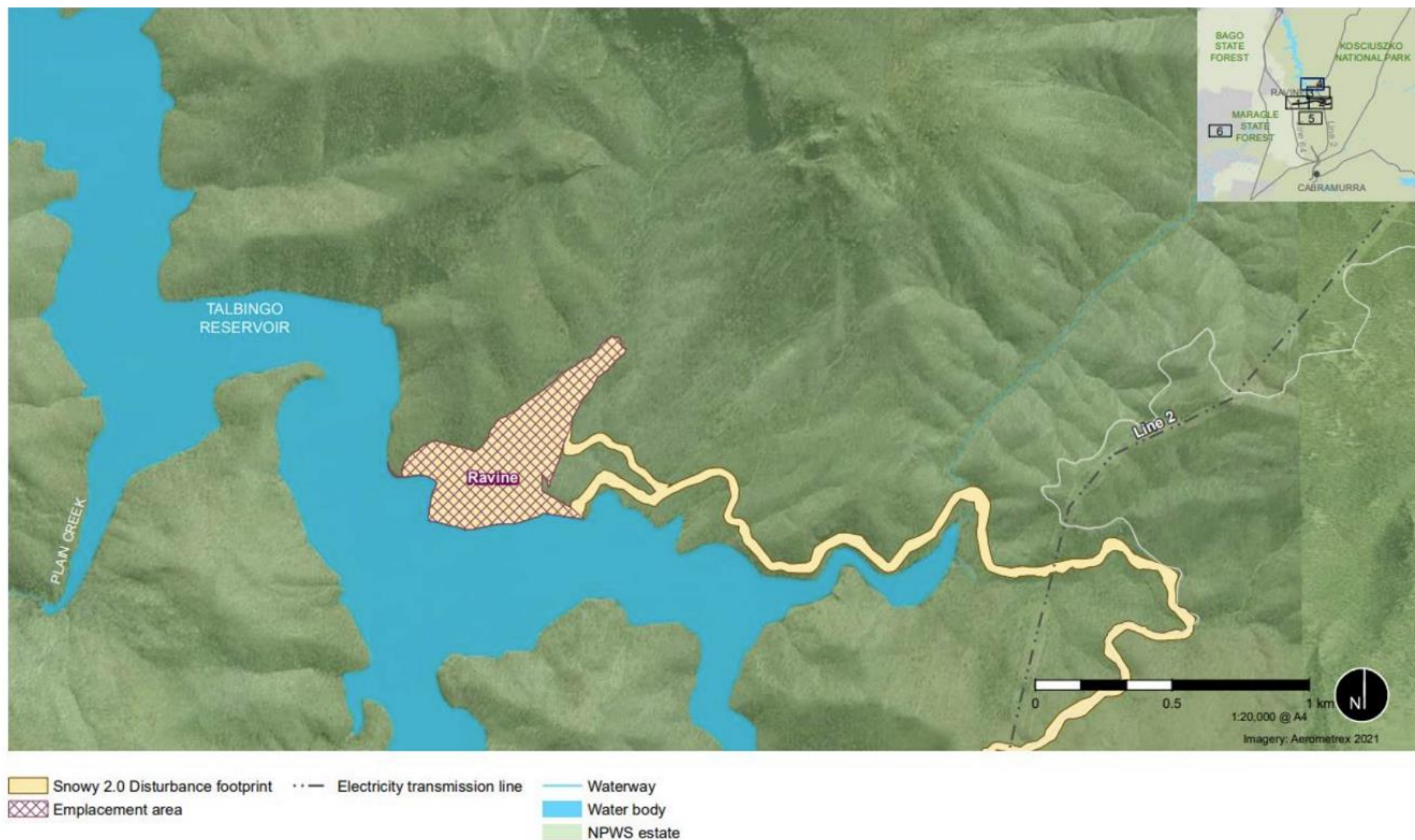


Figure 3-1 Overview of the CoA approved spoil emplacement locations

4 Environmental aspects and impacts

4.1 Construction Activities

A variety of construction activities that have the potential to impact upon spoil management will be undertaken as part of the Project. These activities include, but are not limited to:

- Bulk earthworks
- Access development
- Spoil emplacement
- Spoil haulage
- Material stockpiling

4.2 Potential Impacts

The potential for impacts arising from spoil management will depend on a number of factors, including the nature, extent and magnitude of construction activities and their interaction with the natural environment. Potential impacts attributable to construction activities could include:

- Exposure of spoil during minor and major earthworks and vegetation clearing, creating the potential for offsite transport of eroded sediments and pollutants
- Disturbance of contaminated land or water and subsequent generation of contaminated runoff or materials
- Movement of unclassified spoil between Project areas
- Batter failures or slippages resulting in mass movement of rocks, soils and/or sediment
- Incidental spread of weed and seed material and pathogens through cross-contamination of plant and equipment
- Leachate risk from spoil emplacement if AMD risk is not managed
- Increased turbidity of waterways and waterbodies due to exposure, erosion, runoff, dust propagation and vegetation removal
- Alteration of surface and subsurface flows that could cause inadvertent disturbances to hydrology and dependant ecosystems
- Immediate alterations to habitat that could impact sensitive receiving environments and threatened species such as the Booroolong Frog
- Health risks associated with unexpected NOA finds (if not managed)

Refer to the Aspects and Impacts Register included in Appendix F of the CEMP.

All activities on waterfront land will be conducted in accordance with the suite of *Guidelines for controlled activities on Waterfront Land* (DPI, 2012), unless otherwise approved by the Department of Planning and Environment (DPE).

4.3 Risk Assessment

Following information reviewed in S3.1 and S3.2, the following PC risk ratings have been allocated and will subsequently be applied for VENM / ENM soil classification below S5.0

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- Hotspot Soil Contamination from past use (all locations) – Negligible
- Naturally occurring metals / sulfides / AMD risk (eastern side) – Undetermined
- Naturally occurring metals / sulfides / AMD risk (western side) – Undetermined
- NOA risk (within fault zone) – Low
- NOA risk (outside fault zone) – Negligible

4.4 Spoil Importation

In the unlikely instance where spoil deficit exists, the importation of spoil can be carried out. Such material will be sourced from suitably licensed quarries and certified as weed, pathogen and pest free, Excavated Natural Material (ENM) or Virgin Excavated Natural Material (VENM), and in compliance with relevant legislation. Required quantities will be determined upon the excavation and classification of site-won materials. All spoil importation will first be approved by Transgrid. This does not include manufactured construction materials like stabilised road base or quarry rock.

4.5 Weed AND pathogen Management

Although a significant seed bank is not expected to be present within spoil material, weed management practices, particularly in preventing cross-contamination between Project areas east and west will be implemented in accordance with the Project Biodiversity Management Plan (BMP) and Section 5 of this Plan.

Pathogen monitoring and management will be implemented in accordance with the Weed and Pathogen Monitoring Program (Appendix H of the BMP) and Section 5 of this plan.

4.6 Traffic Movements

Approved haulage routes for traffic movements related to spoil haulage are defined within the Project Traffic and Transport Management Plan (TTMP). Mitigation measures relevant to spoil haulage are addressed within the TTMP.

4.7 Unexpected Finds

All unexpected finds relevant to contaminated spoil or similar, will be managed in accordance with the Unexpected Finds Procedure included as Appendix A of the Project Contaminated Land Management Plan.

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5 Spoil characterisation

5.1 Overview

Spoil characterisation for the project has been developed in accordance with the guidelines and standards detailed in Sect 2.1.2 above. The general approach is detailed as follows;

Table 5-1 Overview of spoil characterisation

Aspect	Approach
Existing Contamination	An EIS search of the NSW EPA contaminated sites register revealed no contaminated sites within the project area and subsequent risk assessment has determined the potential for unexpected contamination as negligible. Should preliminary soil investigations (Geotech testing), or other construction activities encounter unexpected soil staining, debris, odour or waste Unexpected Finds protocols (S4.7) will apply and targeted contamination testing as per <i>Waste Classification Guidelines – Part 1: Classification of Waste, NSW EPA 2014</i> will be initiated. Refer to the Contaminated Land Management Plan Appendix H of the SWMP.
In-situ Spoil	Preliminary characterisation of soils will be initiated as part of Geotech investigations S5.2 to be carried out at the start of works. Sampling and analysis will be aligned with relevant parts of the AMD guidelines, and NOA testing assigned to towers 10, 11, 12, 13 and 14. Samples will be sent to a NATA accredited lab for analysis. AMD analysis will focus on Possible, Likely and Confirmed AMD at each tower site. Sampling and analysis will align with relevant parts of ASC NEPM and AS 4964–2004. Should NOA results be confirmed, Unexpected Finds (S4.7) applies and Client notification must occur. Health risk exposure must also be managed in accordance with the WHSMP.
Ex-situ Spoil (Stockpiles)	Excavated spoil needing to be transported outside the easement (to temporary stockpiling or emplacement areas) will be subject to VENM / ENM classification. VENM classification requires AMD and NOA testing and assessment as per S5.3, and geotechnical context S5.4 are expected to assist with any VENM determination. VENM classification will apply to all spoil to be provided to SHL in the first instance, and where preliminary sampling has determined elevated risk ENM classification will apply. SHL will receive spoil classified as ENM only with prior consultation and written acceptance. All ex-situ material will be classified to the Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014 – The excavated natural material order 2014 (NSW EPA). The Order details sampling density, testing requirements compliance to codes and standards, details of which are indicated below (S5.3). Ex-situ spoil not subject to transportation may be applied at the point of excavation for reuse on tower pads or Maragle Substation construction..
Topsoils	Unless triggered by unexpected finds, contamination testing of topsoils will not be initiated. Likewise for AMD and NOA, as the risk in topsoils is negligible. Topsoils will be stockpiled and remain where generated due to weed seed risks and therefore are not generally subject to classification. Topsoil relocation will

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Aspect	Approach
	only occur with Client consultation and VENM determination and/or ENM classification and testing.
Waste	Waste classification, transport and off-site licensed disposal is subject to the Waste Classification Guidelines (NSW EPA, 2014), and must only be carried out in accordance with protocols defined within the Contaminated Land Management Plan for lawful disposal and Client consultation. It must be noted that any spoil approved for offsite disposal must be regarded as 'waste' and therefor subject to this requirement.

In summary spoil can be assessed and classified as follows:

- **NC / NT** – Non-Classified. Non-tested. Cannot be transported from the vicinity of excavation. Only suitable for application at the site of excavation. Includes topsoils. Spoil tracking permits not required
- **VENM** – Spoil meeting VENM determination as per the RRE, i.e. no AMD, NOA & contaminant risk based on geology and preliminary sampling. Precludes full testing to ENM criteria. Spoil is suitable for application to temporary stockpiling areas, at designated spoil emplacement areas, or emplacement within the project. Eastern and western segregation however still remains. Spoil tracking permits and VENM certificates apply
- **ENM / NR** – ENM tested and classified as non-reactive (& non-NOA). Spoil is suitable for application to designated spoil emplacement areas, or re-emplacement within the project. Only when SHL written permission has been provided prior can such materials be placed in temporary stockpiling areas. Eastern and western segregation however still remains. Spoil tracking permits and ENM compliance statements apply
- **ENM / RS** – ENM tested and classified as reactive spoil (but non-NOA). Spoil is suitable for application to designated spoil emplacement areas, or re-emplacement within the project, but only with appropriate liming treatment S6.3, follow-up testing, and engineering and environmental controls applied (if required). Eastern and western segregation still remains. Spoil tracking permits and ENM compliance statements apply
- **NOA** – Confirmed NOA (both reactive or non-reactive) spoil to be placed within approved and designated encapsulation cells at the Clients direction (see CoA B7(d) as an option), with appropriate engineering, environmental and safety controls. May also be disposed of off-site to facilities lawfully permitted to receive it, at the Clients direction, and with appropriate safety controls applied. Material is deemed hazardous waste and must be managed as such. Spoil and waste tracking permits apply; or
- **US** – Unsuitable and/or Contaminated spoil, non-NOA. Tested and classified to waste guidelines. Spoil to be disposed of off-site to facilities lawfully permitted to receive it (as waste) with Client consultation. Spoil and waste tracking permits apply

A flowcharted process for this determination is indicated in Spoil Characterisation Flowchart.

5.2 Preliminary Investigation (Geotech)

Geotech investigations for each tower site will be initiated as the start of construction activities, or as otherwise enabled by preliminary work approval. Multiple boreholes will be taken at each location noting soil characteristics and geology. Midspan locations with significant access

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works will also be sampled. As part of these investigations, indicative sampling for AMD and NOA will be initiated.

Minimum preliminary sampling requirements include;

- Two samples (mid & max borehole depth) from one bore hole at each tower site;
- Two samples (mid & max borehole depth) from one borehole at each midspan access track location subject to significant bulk earthworks; and
- Four samples (mid & max borehole depth) from eight boreholes across the Maragle Substation site.

Samples will be sent to a NATA accredited lab under Chain of Custody (CoC) protocols for testing. All samples will be tested for AMD potential with Towers 10, 11, 12, 13 & 14 (either side of Talbingo reservoir) also being tested for NOA. Geological evaluation precluded NOA potential at the other tower sites. Preliminary testing is anticipated to help with due diligence and VENM determination. It does not substitute for ENM testing and characterisation.

5.3 AMD Assessment & Classification Criteria

Preliminary AMD testing in the first instance will be carried out via kinetic geochemical testing of each location identified in S5.2 above. The three main types of kinetic geochemical test procedures are column or test pile leach, humidity cell and oxygen consumption (standardised simulated weathering tests). The primary aim of these tests is to quantify acidity, generation rates, estimate the likely lag time prior to the onset of acid drainage and to provide an indication of the likely quality of leachate from spoil materials. Testing will determine materials as PAF (Potential Acid Forming – low capacity) or potential (uncertain) AMD risk.

Subsequent testing (as part of bulk earthworks) for ENM determination can include infield testing using Field XRD / XRF scanning, and pH and EC screening for more immediate results (applied by a UGL trained person), or further lab testing if the XRF is unavailable. When utilising XRF to characterise spoil, an appropriately qualified person will collect and prepare samples in accordance with relevant standards and guidelines to ensure representative and accurate results. Where Total Sulfide content is >1% Sequential Net Acid-Generation (NAG) testing will be applied. NAG testing provides a better estimate of total acid generating capacity.

Laboratory analysis will be compared to / correlated with field scanning to mitigate identified risks associated with potentially PAF material.

A combination of Net Acid Producing Potential (NAPP) and NAG testing is recommended to reduce the risk of spoil misclassification, with an 'uncertain' result indicating that more extensive testing, including kinetic testing, is required. Preliminary screening criteria for NAF and PAF material is provided in Table 5-2 and shall be utilised in the interpretation of lab results when classifying onsite spoil as NAF or PAF material.

Table 5-2 Preliminary screening criteria based on NAPP and NAG test data

Preliminary Geochemical Material Type	NAPP (Kg H ₂ SO ₄ /tonne)	NAG pH
Potentially acid-forming (PAF)	> 10	< 4.5
Potentially acid-forming – low capacity (PAF-LC)	0 – 10	< 4.5
Non-acid forming (NAF)	Negative	≥ 4.5
Acid-consuming (ACM)	< -100	≥ 4.5

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Preliminary Geochemical Material Type	NAPP (Kg H ₂ SO ₄ /tonne)	NAG pH
Uncertain	Positive	≥ 4.5
	Negative	< 4.5

Note: Criteria sourced from the AMD Guideline, Department of Industry, 2016

The AMD classification criteria provided below shows the materials varying acid-generating capacities, acid-neutralising capacities and Neutral Mine / Metalliferous Drainage (NMD) potential or Saline Drainage (SD) potential based on test results, so that the risk profiles of those materials can be identified and managed appropriately.

Table 5-3 AMD Classification Criteria

General AMD Risk Classification	Detailed AMD Risk Classification		
	Description	AMD & NMD ¹ Risk Classification	AMD & NMD & Salinity Risk Classification
Potentially Acid Forming (PAF)	High Potential for Acid Generation (AG1)	AG1	AG1 Saline
	Moderate / High Potential for Acid Generation (AG2)	AG2	AG2 Saline
	Moderate Potential for Acid Generation (AG3)	AG3	AG3 Saline
			AG3 Non Saline
Non Acid Forming (NAF)	Unlikely to be Acid Generating (UAG)	AG4	AG4 Saline
			AG4 Non Saline
		UAG	UAG Saline
			UAG Non saline
	Likely to be Acid Consuming (LAC)	UAG NMD	UAG NMD Saline
			UAG NMD Non saline
		LAC	LAC Saline
			LAC Non Saline
		LAC NMD	LAC NMD Saline
			LAC NMD Non Saline

¹ NMD – pH neutral mine drainage (pH 6-8)

* Sourced from the AMD Guideline, Department of Industry 2016

5.4 NOA Assessment

Preliminary NOA testing will be performed during Geotech at Towers 10, 11, 12, 13 & 14. Testing will be conducted in accordance with Australian Standard Method for the Qualitative Identification of Asbestos in Bulk Samples (AS4964–2004).

Any asbestos detected will be reported as such to Transgrid, and the corresponding material classified and managed as NOA. Further testing will likely apply if preliminary testing confirms NOA. NOA will be managed in accordance with the CMLP and Asbestos Management Plan (AMP) if required to be developed. The AMP will be prepared and implemented to guide the handling, transport, and disposal of the material.

5.5 Contamination Testing

In the unlikely event of encountering unexpected soil staining, debris, odour or waste, a more generalised suite of soil contaminants will be tested for, and consultancy engagement may be required. Testing could include metals, hydrocarbons, volatile organics, PAFs, leachates, etc (see ENM Testing Requirements) and representative of any expected contaminant and

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applicable sampling and assessment guidelines (e.g. Sampling Design Guidelines, NSW EPA 1995).

Results will be compared to the National Environment Protection Measures (NEPM) Health investigation and screening levels as relevant to the land use for the location (e.g. HIL/HSL C). Subsequent waste classification will be compliant with *Waste Classification Guidelines – Part 1: Classification of Waste, NSW EPA 2014*.

Refer to the Contaminated Land Management Plan for more detailed guidance.

Confirmed contaminated material will not be regarded as VENM / ENM and will require off-site disposal at licensed waste facility.

6 Spoil Management Strategy

6.1 Minimisation & Beneficial Reuse

The PC design team has consulted with Transgrid to minimise spoil generated by application to tower sites, for tower site or pad site adjustments; and by strategic access track placement. Spoil volume estimates have decreased as projects design has been refined.

To achieve one of the key objectives of this plan, VENM / ENM material will prioritise beneficial reuse onsite. The PC intends to apply most VENM / ENM materials as engineered fill to support the structure of the build, to not prevent harm to the existing environment, to the benefit of servicing the asset, and in a manner that ensures earthworks are blended in with the natural landscape for visual amenity.

Any beneficial reuse requirements incumbent on spoil emplacement areas are the domain of Snowy Hydro Limited as the receiver of the spoil, and holder of the emplacement and temporary stockpiling areas.

6.2 Spoil Segregation

Spoil segregation will be managed as per the classification criteria detailed in S5.1 above. During excavation, adjacent classifications of different types will be delineated and/or signed such to prevent cross contamination or combining of materials. Any delineation or signage will be referenced to Spoil Movement Permit numbers (where applicable). Segregation and delineation requirements will be communicated to all subcontractors concerned, with Supervisors and Leading Hands managing the delineation and signage.

Topsoil will be stripped and stockpiled. Where stockpiled topsoil is not clearly identifiable as such, topsoil stockpiles will be delineated and/or signposted to prevent inadvertent mixing and subsequent loss. Topsoils will be reapplied to finalised batters as quickly as practicable, unless construction impacts to reapplied topsoils are anticipated.

6.3 Treatment

In the event that Potential Acid Forming (PAF) material is uncovered during the works, a Liming Procedure will be implemented in consultation with Transgrid. In order to provide interim protection for uncovered spoil material, the Project ESCP will be implemented to prevent erosion, contaminant transport and sedimentation within adjacent waterbodies.

Long-term rehabilitation will be undertaken in accordance with the Project Rehabilitation Plan, to be developed and implemented within 12 months of construction commencement.

6.4 Stockpile Management

All stockpiles will be designed and managed in accordance with the principles of erosion and sediment control. Stockpile locations, associated controls and standard drawings will be specified on the Project ESCP. Topsoil stockpiles will be treated differently to spoil stockpiles, and both will include the application of one or more of following controls;

- Placing stockpiles outside of concentrated flow paths, and away from sensitive receiving environments, site boundaries and tree protection zones
- Ensuring ESC measures for clean water diversion and sediment controls are applied to all temporary stockpiling locations
- Limiting stockpile volumes, heights and slopes

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- Applying signage to designated stockpiles and/or stockpiling areas, and tracking spoil stockpile movement and placement with a Spoil Movement Permit
- Minimising stockpile erosion by limiting the duration of exposed stockpile surfaces (e.g. applying covers, polymer application, or hydromulching)
- Locating stockpiles at least 50m from drainage lines, waterways and waterbodies
- Implementing progressive revegetation measures
- Appropriately covering, bunding, and/or treating stockpiles containing PAF or NOA
- Treating stockpiles for weeds, shall weed issues become apparent

Stockpile aspects to be monitored during weekly environmental inspections include:

- Installation of erosion and sediment control measures
- Location and height of stockpiles
- Temporary stabilisation of stockpiles
- Stockpile segregation / delineation
- Potential leachate runoff
- Weed management; and
- Tanin formation

The PC temporary stockpiling areas will be established as required for spoil excavation and handling at suitable locations. Preference will be given to areas nearby, to minimise transport requirements. As per Appendix B of this plan the PC may opt to sample ENM in-situ and load direct, negating the need for stockpiling. The PC anticipate this option will be most preferred when spatial constraints are apparent.

An SHL temporary stockpiling area is intended to be established at the Sheep Station Creek / North Ravine works area and will have a detailed ESCP (and measures) applied by SHL. Establishment and use of such temporary stockpiling area(s) must only occur with Transgrid endorsement if on-easement, and with SHL endorsement & approvals if within their site. No off-easement placement of temporary stockpiling areas will occur outside of the SHL footprint at Lobs Hole, or outside the project alignment at Maragle.

Note that temporary stockpiling areas differ to permanent emplacement areas detailed in Figure 3-1, and that the beneficial re-use policy for spoil relates to the establishment of the SHL temporary stockpiling area.

6.5 Spoil Emplacement Requirements

The PC carries limited liability for the emplacement of spoil into approved SHL spoil emplacement areas (S3.4), and temporary stockpiling areas. Such movements will be tracked with spoil movement and placement permits (Spoil Movement & Placement Permit), and under the direction of Transgrid interfacing with Snowy Hydro Limited. Transgrid (and the PC) carry liability for the placement of spoil within their project easement.

PC operators will be inducted and trained in the requirements of transporting and placing spoil, and be under instruction from PC Supervisors, Leading Hands or delegates at all times.

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PC operators will carry tracking permits, and work packs with Site Environmental Plans which detail delivery locations. They will also readily communicate with construction management for the generation and delivery of such materials. Initial advanced notification for delivery will be provided to Transgrid, with reciprocating acknowledgement for delivery readiness to be received prior to delivery to Snowy Hydro spoil emplacement areas or temporary stockpiling sites. Likewise, the PC will confirm the application of erosion & sediment control measures prior to or at the time of spoil placement, or excavation.

PC operators will be encouraged to seek environmental advice in the event that spoil placement has a perceived environmental risk, and any incidents will be notified immediately to the PC project management.

The PC however takes no liability for the environmental readiness and mitigation of the SHL spoil emplacement areas, or temporary stockpiling sites outside their project boundary. This includes establishment, environmental controls & mitigations, maintenance and final emplacement of spoil.

All the PC operators are required not to place spoil closer than 3 meters to an applied sediment retention device such as mulch berms, or silt fencing.

6.6 Leachate Monitoring

In the unlikely event that suspect leachate is encountered after the emplacement of spoil on site, the PC environmental advisor will be notified and pH testing will be performed. Any detection of pH outside 6-8 will be notified to Transgrid for further discussion and investigation.

In the event of suspect leachate being encountered on the Snowy emplacement sites, SHL will initiate testing and advise Transgrid accordingly if further action is warranted. Transgrid will discuss with the PC and determine further action to be taken.

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7 Environmental Mitigation and management measures

Specific mitigation measures to address impacts on spoil management are outlined below.

Table 7-1 Mitigation measures for spoil management for the Project

ID	Measure / Requirement	Resources Needed	When to implement	Responsibility	Reference
General					
SM01	Training will be provided to all Project personnel, including relevant sub-contractors on contaminated land management practices, spoil emplacement and naturally occurring asbestos including the unexpected finds procedure and the requirements from this Plan through inductions, toolboxes, and targeted training.	Induction package Toolbox training material Targeted training material	Pre-construction and construction	Construction Managers Environmental Advisor (EA)	Best practice
SM02	Existing ground conditions and weather forecasts will be taken into consideration prior to conducting civil works. Excavation works will not be conducted if ground conditions are unsuitable or pose environmental risk.	Environmental inspection records	During construction	Environmental Advisor	Best practice
SM03	Geotechnical investigations will be undertaken prior to the commencement of construction to determine the location of reactive soils, NOA and contaminated materials within anticipated work areas.	Geotechnical Report	Prior to construction	Environmental Advisor	Best practice
SM04	Prior to the commencement of construction, the Proponent must prepare a Spoil Management Plan for the development	Spoil Management Plan	Prior to construction During construction	Environmental Advisor Project Environmental Consultant	CoA B8 Amendment Report L4, L6
Spoil Classification and Use					
SM05	Where applicable, excess spoil will be re-used for other elements of the Project such as access track construction and tower site fill. Where spoil cannot be reused it will be managed as per the SWMP. Alternatively,	Spoil Management Plan	During construction	Site Environmental Manager	Amendment Report L6

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ID	Measure / Requirement	Resources Needed	When to implement	Responsibility	Reference
	excess material will be disposed of at other suitable locations (including at Ravine Bay, GF01, Main Yard or other Snowy 2.0 approved emplacement areas) as agreed to with NPWS and FCNSW.				
SM06	Material which has been assessed as not suitable for reuse on land or for subaqueous disposal at the Ravine Bay emplacement area (as part of the Snowy 2.0 management procedure) or cannot be reused will be classified in accordance with the <i>Waste Classification Guidelines</i> (EPA, 2014).	Spoil Management Plan	During construction	Environmental Advisor	Amendment Report L6
SM07	Excavated material to be disposed of in the spoil emplacement locations (including Ravine Bay, GF01, Main Yard or other Snowy 2.0 approved emplacement areas) will be transported to the emplacement area by Transgrid and/or contractor and then managed by Snowy Hydro in accordance with the relevant approved Snowy 2.0 Rehabilitation Plan prepared by Snowy Hydro.	Spoil Management Plan & Snowy 2.0 Rehabilitation Plan	During construction	Environmental Advisor	Amendment Report L7
SM08	Apart from the spoil that is provided to the NPWS for use in other parts of the Kosciuszko National Park, Forestry Corporation for use in other parts of State Forest, sent off-site, used to construct temporary or permanent infrastructure for the development or Snowy 2.0 Main Works (in accordance with that infrastructure approval, or used to rehabilitate the site or the Snowy 2.0 Main Works site, the Proponent must ensure that any spoil disposed within Kosciuszko National Park are emplaced in the following emplacement areas: a) Ravine Bay; b) GF01; c) Lobs Hole; or d) Tantangara for spoil containing naturally occurring asbestos only, if identified onsite and in accordance with the CLMP and AMP. Note: The location of these emplacement areas is shown in the figures in Appendix 2	Spoil Movement & Placement Permit; ENM Compliance Statement & test results	During construction	Environmental Advisor	CoA B7
SM09	In the event that naturally occurring asbestos (NOA) is discovered in spoil material, direction will be sought from Transgrid prior to proceeding. NOA	Test results & CLMP	As required	Environmental Advisor	Best practice

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ID	Measure / Requirement	Resources Needed	When to implement	Responsibility	Reference
	will be managed in accordance with the CLMP and AMP.				
SM10	In the event that PAF material requires treatment prior to testing and reuse, the liming procedure included in Liming Procedure will be implemented.	Test results & SMP	As required	Environmental Advisor	Best practice
Spoil Stockpiles					
SM11	Management of topsoil stockpiles and other excavated material stockpiles to minimise dust and sediment in runoff will include: - Minimising the number of stockpiles, area and time they are exposed - Locating stockpiles away from drainage lines and natural waterways and from where they will be susceptible to erosion - Stockpiles will be bunded in accordance with the Blue Book (Landcom, 2004) <i>Managing Urban Stormwater – Soils and Construction</i>, Volume 1, 4th Edition) - Stabilise stockpiles, establish sediment controls and suppress dust as required Ensure contingency measures for stockpiles are on hand for imminent rain events. These contingency measures are outlined in the ESCP and include applying temporary groundcovers prior to rainfall and cleaning out sediment controls.	ESCP	During construction	Environmental Advisor Site Supervisor Project Engineer	Amendment Report L5
SM12	Spoil will be clearly delineated from topsoil material when stockpiling onsite.	Environmental inspection records	During construction	Environmental Advisor Site Supervisor	Amendment Report L4
SM13	Spoil classified as VENM will be clearly delineated from that unable to be classified as VENM and that requiring amelioration.	Environmental inspection records	During construction	Environmental Advisor Site Supervisor	Amendment Report L4
SM14	Spoil containing PAF, NOA or other suspected contaminants will be bunded and covered with a non-permeable cover prior to treatment and emplacement or disposal.	Environmental inspection records	During construction	Environmental Advisor Site Supervisor	Best practice

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ID	Measure / Requirement	Resources Needed	When to implement	Responsibility	Reference
SM15	Segregation will include signage, clear physical delineation, ESC measures as required and communication of segregation implementation with the wider Project team.	Environmental inspection records Signage Toolbox records	During construction	Environmental Advisor Site Supervisor	Best practice
SM16	Stockpiles are to be managed following Landcom, 2004 – Managing Urban Stormwater – Soils and Construction, Volume 1, 4 th Edition. All stockpiles shall be located away from drainage lines and natural waterways to prevent erosion and soil loss. Any soil, mulched vegetation and spoil materials will not be stockpiled within 50 metres of any gullies or waterways or steep slopes.	ESCP & Environmental inspection records	During construction	Environmental Advisor	Best practice
Weed and Pathogen Management					
SM17	Weed and pathogen management will be undertaken in accordance with the Biodiversity Management Plan (3200-0645-PLN-017-CEMP-BMP) at all times during spoil management activities.	BMP	During construction	Environmental Advisor	Best practice
SM18	Spoil will not be transported between Project area east and Project area west (unless Transgrid approved) to minimise the potential of weed and pathogen spread between the two locations.		During construction	Environmental Advisor	Best practice
SM19	Any plant or equipment used for topsoil management activities in Project area east will be thoroughly washed down prior to transport to Project area west, and vice versa.	Washdown facilities / hygiene declaration	During construction	Environmental Advisor	Best practice
SM20	Note any imported fill materials will be certified at source locations as pathogen and weed free Excavated Natural Material or Virgin Excavated Natural Material prior to delivery to site. These certificates shall form part of the PC quality documentation.	Material declarations (VENM / weeds)	During construction	Environmental Advisor	Best practice
Erosion and Sediment Control					
SM21	Excavated spoil will be managed in accordance with Primary and Progressive Erosion and Sediment Control Plans, included as Appendix E of the SWMP.	ESCP	During construction	Environmental Advisor	Best practice

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ID	Measure / Requirement	Resources Needed	When to implement	Responsibility	Reference
SM22	Erosion and sediment control Plans (ESCP) will be designed and implemented for the Project in accordance with 'the Blue Book' (Landcom, 2004), the White Book (IECA, 2012) and site-specific weather and hydrology data.	ESCP & Environmental inspection records	During construction	Environmental Advisor	Amendment Report W3
SM23	Where required, adequate sediment controls (including the consideration of sediment basins) will be included in the access track design to manage erosion and sedimentation and associated impacts on receiving waters.	ESCP	As required	Environmental Advisor	Amendment Report W6
SM24	Install erosion and sediment controls as per Erosion and Sediment Control Plan (ESCP). Install devices, where possible, prior to soil disturbance from construction activities. Maintain the devices throughout the duration of the Project. Review ESCP weekly and update as required.	ESCP	During construction	Environmental Advisor	PC CEMP Section 15.1
SM25	The area of disturbed land will be kept to a minimum. Existing vegetated areas will be kept intact for as long as possible prior to clearing.	Environmental inspection records	During construction	Environmental Advisor	PC CEMP Section 15.1
SM26	<u>Drainage:</u> ▪ Diversion drains shall be installed where required to prevent mixing of on-site run-off with run-off from outside the site ▪ Where possible, off-site run-off shall be diverted to undisturbed areas so that it is filtered through vegetation prior to entering watercourses ▪ Check dams will be installed as necessary to slow concentrated flows and trap sediment through the Project ▪ Sandbag check dams located in flow paths as velocity controls.	ESCP	During construction	Environmental Advisor	Best practice
SM27	<u>Sheet flow (e.g., batters):</u> ▪ Existing vegetation maintained as long as possible ▪ Minimise disturbance areas at any one time	ESCP	During construction	Environmental Advisor	Best practice

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ID	Measure / Requirement	Resources Needed	When to implement	Responsibility	Reference
	- Water shall be directed around disturbed areas where possible to minimise the need for erosion and sediment control devices - Shredded on-site native vegetation can be utilised in sheet flow areas as natural filtration and velocity reduction - Install sediment fences at the top of batters or other suitable control to direct flows away from batter face - Install geotextile batter chutes at appropriate distances to enable road runoff to flow through the work area without interaction with disturbed areas and soil material - Install sediment barriers along the contour with appropriate spacing and returns as required.				
SM28	<u>Stockpiles:</u> - Install sediment fences and/or mulch berms on the downhill side of stockpiles - Stockpiles shall be located to prevent erosion and sediment entering waterways or drainage lines (e.g., out of flow paths)	ESCP	During construction	Environmental Advisor	Best practice
SM29	<u>Wet weather:</u> - Drainage paths to be free of obstructions - Site inspections conducted prior to forecast rainfall - All reasonable actions shall be taken that are necessary to minimise the impact of afflux or flow velocities associated with floods	Environmental inspection records	During construction	Environmental Advisor	Best practice

Snowy 2.0 TCP Spoil Management Plan

ID	Measure / Requirement	Resources Needed	When to implement	Responsibility	Reference
SM30	<u>Revegetation and general:</u>				
	- Disturbed areas revegetated or mulched as early as practicable to minimise time that areas are exposed. Work front to be progressively re-vegetated as work progresses where possible. - Construction vehicles kept to well defined haul roads - Maintain in effective working order erosion and sediment control devices until: - Re-vegetation of disturbed areas with cover of no less than 75% - Declared weed species are eradicated and other (herbaceous) environmental weeds are controlled - Check dams and sediment fences must be removed from the site once stable grass cover is achieved following completion of earthworks or at the end of the defects liability period (whichever is first). Check dams in particular must not be left to concentrate flows at spillways on the locally erosive soils - Soil is suitably stabilised with no evidence of erosion gullies.	ESCP			
		Environmental inspection records	During construction	Senior Environmental Advisor	Best practice
Monitoring and Maintenance					
SM31	Daily visual and weekly overall assessments of erosion and sediment control structures will be undertaken to verify their condition and effectiveness. Any issues will be rectified as soon as practicably possible.	Environmental inspection records	During construction	Environmental Advisor Site Supervisor	Best practice
SM32	Site inspections will be conducted prior to forecast rainfall.	Environmental inspection records	During construction	Environmental Advisor	Best practice
SM33	All temporary erosion and sediment control measures, including drainage control measures, will be fully operational and maintained in proper working order at all times as reasonably practical.	Environmental inspection records	During construction	Environmental Advisor	Best practice

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8 Compliance Management

8.1 Responsibilities

The PC's organisational structure and overall roles and responsibilities are outlined in Section 4 of the CEMP. Specific responsibilities for the implementation of environmental controls are detailed in Section 5 of this Plan.

8.2 Training

All site personnel will undergo the PC site induction training relating to spoil management issues. The induction training will address elements related to spoil management including:

- Roles and responsibilities relating to spoil management
- Familiarisation with the Project ESCP
- Site-specific areas of risk for spoil management
- Penalties and non-compliance with this management plan.

Targeted training in the form of toolbox talks or specific training will also be delivered to personnel with a key role in spoil management. Examples of training topics include:

- Areas of potential contaminant risk during spoil management
- Stockpile location criteria
- Segregation requirements for topsoil and spoil material
- Identification of potentially contaminated spoil and fill material
- ESC measure installation methodology
- Working near or in waterways and drainage lines
- Sensitive environments within and near the Project area.

Further details regarding staff induction and training are outlined in Section 10 of the CEMP.

8.3 Monitoring and Inspection

Inspections of sensitive areas and activities with the potential to impact upon spoil management will occur for the duration of the Project.

As per the conditions of approval (Schedule 2 condition B8 (h)), the management of spoil on site and the progress against the completion criteria and performance indicators will be monitored throughout the development and publicly reported on. Requirements and responsibilities in relation to monitoring and inspections are documented in Sections 6 and 9 of the CEMP. The environmental monitoring program for the Project is included in Appendix G of the CEMP with spoil management monitoring requirements outlined in Table 8-1.

Table 8-1 Monitoring requirements for spoil management

Monitoring Parameter	Frequency	Performance Criteria
Visible erosion on spoil stockpiles	Weekly	No erosion No visible pollution

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Monitoring Parameter	Frequency	Performance Criteria
Spoil and topsoil are being appropriately segregated during excavation and storage activities	Weekly	Spoil and topsoil stockpiles are clearly segregated.
Spoil stockpiles and excavations are being protected	Weekly	Sediment fences/berms erected. No land or soil contamination because of Project activities.
No spoil is being transported between the east and west sections of the Project	Weekly	No spoil transport occurring between Project areas.
Inspection of VENM / ENM transportation documentation	Weekly	All VENM being transported to Snowy Main Works emplacement or temporary stockpiling areas is accompanied by appropriate documentation
Inspection of Plant and equipment being used during spoil management	Weekly	No equipment being used in spoil management is moved between Project areas without a full and documented washdown

8.4 Reporting and Incidents

Reporting requirements and responsibilities are documented in Sections 6 and 9 of the CEMP.

Details on incident reporting is included in Section 8 of the CEMP. Environmental incidents relating to spoil management may include but not be limited to:

- Transport or placement of unclassified spoil
- Exposure of PAF material to water and/or air
- Exposure of NOA to the environment and Project staff
- Uncovering of unexpected contamination during excavation
- Transport of contaminants through surface runoff.

8.5 Trigger Action Response Plan

Trigger Action Response Plans (TARPs) provide an effective process for dealing with non-conformances. The following TARPs apply for spoil non-conformance.

Table 8-2 TARP for Spoil Non-conformances

Trigger	Action	Response (Prevention)
Spoil permit and/or compliance statement missing, incomplete or	1. Stop work on problem stockpile	Environmental Manager and Advisor to investigate failure, communicate and/or re-train
	2. Notify Site Supervisor & Environmental Manager	

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Trigger	Action	Response (Prevention)
incorrect	3. Investigate stockpile for origin, content, and contamination 4. Re-test stockpile (where necessary) for spoil tracking 5. Isolate (barricade and/or sign) stockpile if testing isn't immediate 6. Environmental Manager or Construction Manager to review results and 'release' stockpile for transport	personnel involved, check permits for ongoing compliance
Spoil test results non-conforming to VENM / ENM	1. Stop work on non-conforming stockpile 2. Isolate (barricade and/or sign) non-conforming material 3. Notify Site Supervisor & Environmental Manager 4. Environmental Manager to review results and advise actions	Environmental Manager and Advisor to investigate non-conforming material & advise treatment or disposal options
Spoil showing visual contaminant and/or leachate	1. Isolate (barricade and/or sign) suspect material 2. Notify Site Supervisor & Environmental Manager 3. Environmental Manager or Construction Manager to advise Transgrid	Environmental Manager and Advisor to investigate occurrence and initiate testing of suspect material. Results to be reviewed and treatment / disposal options to be agreed with Transgrid
Stockpiling in incorrect location	1. Advise Site Supervisor & Environmental Manager 2. Remove / relocate stockpile to correct location under permit & compliance statement	Site Supervisor or Environmental Manager to investigate and communicate and/or re-train personnel involved
Spoil erosion visible or highly likely	1. Advise Site Supervisor & Environmental Manager of issue 2. The PC to apply immediate ESC measures if on easement. Site Supervisor or Environmental Manager to initiate	Environmental Manager to advise Transgrid if spoil is their concern

8.6 Auditing

Audits (both internal and external) will be undertaken to assess the effectiveness of environmental controls, compliance with this Plan, infrastructure approval and other relevant approvals, licences, and guidelines. Audit requirements are detailed in Appendix D of the CEMP.

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9 References

For Guidelines and Standards refer to Sect 2.1

- Snowy 2.0 Transmission Connection Project EIS – Jacobs Pty Ltd., 2020
- Snowy 2.0 Transmission Connection Project Amendment Report – Transgrid, 2021
- Managing Urban Stormwater: Soils and Construction (4th Edition), Volumes 1 and 2 – Landcom, 2004
- Best Practice Erosion & Sediment Control – IECA, 2008
- Snowy 2.0 Transmission Connection Project – Amendment Report (TransGrid, Dec 2021)
- Project Conditions of Approval (CoAs) – Snowy 2.0 Transmission Connection (SSI 9717) Schedule 1

Snowy 2.0 TCP
Spoil Management Plan**Appendix A Spoil Movement & Placement Permit**

Part A – Permit Information				
Permit Number:	Spoil Source:			
	(Long/Lat):			
Volume (m ³):	Spoil Destination:			
	(Long/Lat):			
Permit Start Date:	Permit End Date:			
Part B – Classification Requirements				
Testing Criteria	Yes	No	N/A	Comments
Has preliminary soil testing been completed? If YES, attach results and continue with permit and spoil classification	☐	-	☐	If N/A, no permit is required but spoil cannot be transported from excavation location. Contact PC Environmental Advisor if transport is required.
Does spoil contain Naturally Occurring Asbestos (NOA)? If YES, proceed to Part E and report to PC Environmental Advisor	☐	☐	☐	If NO or N/A continue with permit and spoil classification
Does spoil meet all requirements to be classified as Virgin Excavated Natural Material (VENM)? If NO, initiate ENM testing (ENM Testing Requirements) and consider for ENM classification	☐	☐	☐	If YES, complete a VENM certificate (VENM Certificate) and attach to this permit. Proceed to Part C
Do ENM test results classify material as Excavated Natural Material (i.e. ENM RRO / RRE compliant)? If NO, proceed to Part D of this Permit.	☐	☐	☐	If YES, complete ENM Compliance Statement (ENM Compliance Statement) and attach to this permit, along with all test results. Proceed to Part C

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Comments / Recommendations:

Part C – Spoil Placement

Requirement	Yes	No	N/A	Comments
All involved personnel have undergone training / awareness for spoil placement requirements	☐	☐	-	If NO, consult with PC Environmental Advisor
Spoil emplacement map has been provided and understood by all drivers covered by this permit	☐	☐	-	If NO, consult with PC Environmental Advisor
Acceptance of VENM or ENM material received from Snowy. If NO, report to PC Environmental Advisor	☐	☐	☐	If YES, place spoil and complete this permit. Return copy to PC Environmental Advisor

Part D – Spoil Treatment

Requirement	Yes	No	N/A	Comments
Is PAF treatment an option for reclassification? If NO, proceed to Part E	☐	☐	-	If YES, segregate material, establish ESC measures, and proceed with Liming Procedure (Liming Procedure)
Has the Liming Procedure (Liming Procedure) been implemented? If NO, proceed to Part E	☐	☐	-	If YES, initiate re-testing for re-classification. PC Environmental Advisor to review results
Do the re-test results comply with ENM classification (i.e. ENM RRO / RRE compliant)? If NO, proceed to Part E	☐	☐	-	If YES, attach re-test results and go to Part C for spoil placement

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Part E – Spoil Verification Failure

Is spoil NOA, acid forming and/or otherwise contaminated (i.e. not VENM / ENM)? If YES, consult with PC Environmental Advisor for encapsulation or regulated waste disposal and completion of Section 143 Notice. **Ensure material is kept segregated, bunded and covered to limit exposure**

☐
☐

-

If NO, consult with PC Environmental Advisor. Material may be classified incorrectly

Does a Section 143 Notice (Section 143 Notice) need to be completed before regulated waste transport & disposal. If YES, complete and attach to this permit

☐

-

☐

If N/A, specify reason

Part F – PC Signoff

I, _____ (full name) _____

(role) _____
—

verify that this permit contains necessary testing results and that the indicated spoil volume from specified source location IS / IS NOT (*circle one*) permitted to be transported to the SHL Snowy Main Works emplacement location specified in Section A.

Signed: _____
Date: _____

Company : _____

Mobile No.: _____

Vehicle Type & Registration: _____

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Appendix B ENM Testing Requirements

Sampling of material for ENM classification will be undertaken in accordance with the Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014 – The excavated natural material order 2014 (NSW EPA). The following tables indicate required sampling frequencies and parameters, however the excavated natural material order 2014 will be utilised to inform specific requirements for material testing throughout the lifetime of the Project.

Stockpiled Material

In accordance with Clause 4.3 of The excavated natural material order 2014, sampling frequency will be undertaken as per Table 1 for stockpiled material.

Table 1

Sampling of Stockpiled Material		
Column 1	Column 2	Column 3
Quantity (tonnes)	Number of samples	Validation
< 500	3	Required
500 – 1000	4	
1000 – 2000	5	
2000 – 3000	7	
3000 – 4000	10	

In-Situ Sampling – Surface (not for Geotech testing)

In accordance with Clause 4.4 of The excavated natural material order 2014, sampling frequency will be undertaken as per Table 2 for in-situ sampling of surface material.

Table 2

In-Situ Sampling at Surface				
Column 1	Column 2	Column 3	Column 4	Column 5
Size of in-situ area (m ²)	Number of systematic sampling points recommended	Distance between two sampling points (m)	Diameter of the hot spot that can be detected with 95% confidence (m)	Validation
500	5	10.0	11.8	Required
1000	6	12.9	15.2	
2000	7	16.9	19.9	
3000	9	18.2	21.5	
4000	11	19.1	22.5	
5000	13	19.6	23.1	

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In-Situ Sampling at Surface				
6000	15	20.0	23.6	
7000	17	20.3	23.9	
8000	19	20.5	24.2	
9000	20	21.2	25.0	
10,000	21	21.8	25.7	
15,000	25	25.0	28.9	
20,000	30	25.8	30.5	
25,000	35	26.7	31.5	
30,000	40	27.5	32.4	
35,000	45	27.9	32.9	
40,000	50	28.3	33.4	
45,000	52	29.3	34.6	
50,000	55	30.2	35.6	

In-Situ Sampling – At Depth (Not for Geotech testing)

In accordance with Clause 4.4 of The excavated natural material order 2014, sampling frequency will be undertaken as per Table 3 for in-situ sampling of material at depth.

Table 3

In-Situ Sampling at Depth	
Column 1	Column 2
Sampling Requirements	Validation
1 soil sample at 1.0m below ground level (bgl) from each surface sampling point followed by 1 soil sample for every metre thereafter. From 1.0m bgl, sample at the next metre interval until the proposed depth of excavation of the material is reached. If the proposed depth of excavation is between 0.5 to 0.9m after the last metre interval, sample at the base of the proposed depth of excavation.	Required if the depth of excavation is equal to or greater than 1.0m bgl

Chemical and other material requirements

Excavated natural material will not be transported to the Snowy 2.0 Main Works emplacement

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areas if sampling results exceed limits included in Table 4, as per Clause 4.5 of The excavated natural material order 2014 below.

Column 1	Column 2	Column 3
Chemicals and other attributes	Maximum average concentration for characterisation (mg/kg dry weight unless otherwise specified)	Absolute maximum concentration (mg/kg dry weight unless otherwise specified)
1. Mercury	0.5	1
2. Cadmium	0.5	1
3. Lead	50	100
4. Arsenic	20	40
5. Chromium (total)	75	150
6. Copper	100	200
7. Nickel	30	60
8. Zinc	150	300
9. Electrical Conductivity	1.5 dS/m	3 dS/m
10. pH	5 to 9	4.5 to 10
11. Total Polycyclic Aromatic Hydrocarbons (PAHs)	20	40
12. Benzo(a)pyrene	0.5	1
13. Benzene	N/A	0.5
14. Toluene	N/A	65
15. Ethyl-benzene	N/A	25
16. Xylene	N/A	15
17. Total Petroleum Hydrocarbons C ₁₀ – C ₃₆	250	500
18. Rubber, plastic, bitumen, paper, cloth, paint and wood	0.05%	0.10%

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Appendix C VENM Certificate

Certification:

Virgin Excavated Natural Material (VENM)



1. I [full name]

of

[organisation]

and address]

certify that the waste as set out in section 2 of this notice is Virgin Excavated Natural Material (VENM) as defined in Schedule 1 of the *Protection of the Environment Operations Act 1997*.

This certification is made on behalf of the waste generator [fill out if applicable]

being [full name]

of

[organisation]

and address]

2. The waste was generated at:

Street address:

Title reference (Lot/DP, etc.):

The amount of waste
(by volume or weight) is:

3. I have made the determination that the waste is VENM because:

☐ I have assessed the historical and current land use of the site at which the waste was generated.

☐ The waste is not contaminated with manufactured chemicals, or with process residues, as a result of industrial, commercial, mining or agricultural activities.

☐ The waste does not contain any sulfidic ores or soils.

☐ The waste does not contain any other waste.

☐ The waste does not contain asbestos in any form.

Note: that all sections of this form must be completed including all boxes checked in Section 3 above and signed below for any material to be certified as VENM.

Signature(s)

.....

Name(s) (printed)

Date

Warning: There are significant penalties under s.144AA of the *Protection of the Environment Operations Act 1997* for a person who supplies (whether knowingly or not) information that is false or misleading in a material respect about waste.

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Version: Rev 08

UNCONTROLLED WHEN PRINTED

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This certificate is intended to assist waste generators, contractors and/or receivers of VENM to have confidence that a range of relevant factors have been considered in the classification of a waste material as VENM.

Published by:
Environment Protection Authority, 59–61 Goulburn Street, Sydney South 1232
Ph: 131 555. TTY users: phone 133 677, then ask for 131 555
Speak and listen users: phone 1300 555 727, then ask for 131 555
Email: info@environment.nsw.gov.au; Web: www.epa.nsw.gov.au
Report pollution and environmental incidents: Environment Line: 131 555 (NSW only)
EPA 2013/0693; September 2013

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Appendix D Section 143 Notice

ORIGINAL: TO BE COMPLETED BY LANDOWNER AND GIVEN TO WASTE
TRANSPORTER OR DISPLAYED AT WASTE FACILITY

APPROVED NOTICE UNDER SECTION 143

PROTECTION OF THE ENVIRONMENT OPERATIONS ACT 1997

WARNING: If you sign this notice it could be used as a defence by a transporter if they deposit waste on your land. It does not give you a defence. It is an offence to provide false or misleading information about waste (section 144AA)

I (full name)

am the owner and/or occupier (delete if not applicable) of (insert street address and/or folio identification number of place):

.....
.....

certify that this place can lawfully be used as a waste facility for the **waste(s) specified** in the following table.

(Note: you must clearly state the exact type. Do not use terms like 'fill' or 'clean fill'.)

Table of specified wastes

Type of waste e.g. virgin excavated natural material	Classification of waste e.g. general solid waste	Amount of waste e.g. 50 tonnes
.....		
.....		
.....		
.....		

Before signing this notice you should read the back of this form for important information about offences.

Signature	Signature
Name	Name
Position title (e.g. director, owner, occupier)	Position title (e.g. director, owner, occupier)
ACN	ACN
Date	Date

Note that only one signature is required if the person signing this notice is **not** signing on behalf of a company.

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EPA 2016/0095

EPA 2016/0095

* Approved January 2016

* Approved January 2016

Appendix E ENM Compliance StatementCompliance
Excavated

Natural

Material

Statement:
(ENM)

1. I [full name]
of
and address]

[organisation]

certify that the waste as set out in section 2 of this notice is Excavated Natural Material (ENM) that meets such criteria for Virgin Excavated Natural Material detailed by the EPA's Excavated Natural Material Order 2014 (ENM Order) and Excavated Natural Material Exemption 2014 (ENM Exemption).

This certification is made on behalf of the waste generator *[fill out if applicable]*

being [full name]

of
and address]

[organisation]

2. The waste was generated at:
Street address:

Title reference (Lot/DP, etc.):

The amount of waste
(by volume or weight) is:

3. I have made the determination that the waste is ENM because:

☐ I have assessed the historical and current land use of the site at which the waste was generated.

☐ The waste is not contaminated with manufactured chemicals, or with process residues, as a result of industrial, commercial, mining or agricultural activities. Test results are attached to this statement

☐ The waste does not contain any sulfidic ores or soils.

☐ The waste does not contain any other waste.

☐ The waste does not contain asbestos in any form.

Note: that all sections of this form must be completed including all boxes checked in Section 3 above and signed below for any material to be certified as ENM (VENM compliant).

Signature(s)

.....

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Name(s) (printed)

Date

Warning: There are significant penalties under s.144AA of the *Protection of the Environment Operations Act 1997* for a person who supplies (whether knowingly or not) information that is false or misleading in a material respect about waste.

This statement is intended to assist waste generators, contractors and/or receivers of ENM to have confidence that a range of relevant factors have been considered in the classification of a waste material as ENM (VENM).

The Excavated Natural Material Order 2014 (ENM Order) and Excavated Natural Material Exemption 2014 (ENM Exemption) are available here;

- <https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/waste/rro14-excavated-natural-material.pdf?la=en&hash=726FDE7971279C4C583806464CF503B5CB06E73B>
- <https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/waste/rre14-excavated-natural-material.pdf?la=en&hash=701B28368EAEF1D3CB8E539738BA0B4DECAD42A6>

RELEVANT TEST RESULTS MUST BE ATTACHED TO THIS REPORT

Appendix F Liming Procedure

Purpose

This procedure details the actions to be taken when potential-acid forming (PAF) materials are encountered during excavation/construction activities.

Scope

This procedure applies to all construction activities undertaken as part of the Project that have the potential to uncover or disturb PAF material. This procedure must be supplemented with advice from an appropriately qualified professional in the event of PAF discovery during Project works. In the unanticipated event that PAF spoil volumes are greater than expected and/or all discovered PAF is not able to be appropriately treated for reuse on site, specialist advice will be sought to initiate the process of material disposal offsite at a licensed waste facility.

Induction and training

All site personnel and subcontractors working in areas of high probability PAF risk will be trained this procedure.

Procedure

1. PAF encountered during excavation/ construction activities

If PAF is encountered during excavation/construction activities the Site Supervisor must:

- STOP ALL WORK in the immediate/ affected area and contact the Site Environmental Manager
- Recommence works in alternate area where practicable.

The Site Environmental Manager (or delegate) is responsible for initiating testing of PAF. Testing will determine the acidity (field pH test) and potential for acidity (field 30% peroxide test) of the material encountered.

2. Action criteria for management intervention

Table F-1 details the texture based action criteria for management of PAF disturbance. Where soils containing concentrations at or above the action criteria are disturbed, management of spoil is required.

As this Project will disturb spoil greater than 1000 tonnes, the two right hand columns should be used.

Table F-1 Action criteria based on the ASS analysis for three broad texture categories

Type of Material			Action Criteria 1- 1000 tonnes disturbed			Action Criteria > 1000 tonnes disturbed		
Texture (McDonald (1990)	range et al.	Approx clay content (%<0.002 mm)	Sulphur trail % S oxidisable e.g. S _{TOS} or S _{POS}	Acid trail mol H+/tonne e.g. TPA or TSA		Sulphur trail % S oxidisable e.g. S _{TOS} or S _{POS}	Acid trail mol H+/tonne e.g. TPA or TSA	
Coarse Texture Sands to loamy sands		≤5	0.03	18		0.03	18	

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Type of Material		Action Criteria 1- 1000 tonnes disturbed	Action Criteria > 1000 tonnes disturbed
Medium Texture Sandy loams to light clays	5 – 40	0.06 36	0.03 18
Fine Texture Medium to heavy clays and silty clays	≤40	0.1 62	0.03 18

Source: Ahern et al. 1998

3. Neutralisation of excavated PAF material from earthworks

If field tests are positive or inconclusive, laboratory analysis using the Chromium Suite will be required to determine if the material is in fact acid-forming and/or the required treatment rates based on the net acidity.

Neutralising agents must be incorporated within all PAF. All cut batters shall be coated with fine Ag-Lime at the rate of 5kg/m and the lime coating will be checked and re-limed as necessary on a daily basis during periods of dewatering during construction excavation. The base of all fill areas where treated material is to be placed shall be treated with a neutralising agent forming a guard layer prior to the placement of any fill soils to neutralise downward seepage of acidic drainage water. This application may need to be increased depending on stockpile height and actual and potential acidity of the PAF material developed through detailed assessment.

Ag-Lime rates will be as determined through analytical assessment to establish S% to determine an indicative level of treatment as specified in Table F-2. Interpretation of analytical data must be conducted by an appropriately qualified and experienced in dealing with PAF management.

PAF must be sufficiently dry before neutralising is commenced so that the lime can be thoroughly mixed through the soil. Where moisture levels in soil are high, the soil must be dried by spreading and leaving open to the atmosphere. Drying can be accelerated by regular aeration by turning with an excavator or backhoe. Drying will be carried out on a guard layer and protected from stormwater ingress.

Following the successful treatment of the lot (as determined through the validation testing), the material shall be compacted and the next layer of excavated material to be treated shall be placed over the already treated material. This process shall be continued until the required site elevation is achieved.

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Table F-2 Treatment levels and Ag-Lime required to treat total weight of disturbed PAF material

Table 4-2: Estimating treatment levels and pure CaCO₃ required to treat the total weight of disturbed ASS, based on laboratory analysis of soil

Disturbed ASS (tonnes) ²	Sum of existing and potential sulfidic acidity (as defined in the Laboratory Methods Guidelines), expressed in % S and mol H ⁺ /t units ³ .													
	0.03 18	0.06 36	0.1 62	0.2 125	0.4 250	0.6 375	0.8 500	1 625	1.5 940	2 1250	2.5 1560	3 1870	4 2500	5 3120
1	0	0	0	0	0	0	0	0	0.1	0.1	0.1	0.1	0.2	0.2
10	0	0	0	0.1	0.2	0.3	0.4	0.5	0.7	0.9	1.2	1.4	1.9	2.3
50	0.1	0.1	0.2	0.5	0.9	1.4	1.9	2.3	3.5	4.7	5.9	7.0	9.4	12
100	0.1	0.3	0.5	0.9	1.9	2.8	3.7	4.7	7.0	9.4	12	14	19	23
250	0.4	0.7	1.2	2.3	4.7	7.0	9.4	12	18	23	29	35	47	59
500	0.7	1.4	2.3	4.7	9.4	14	19	23	35	47	59	70	94	117
1000	1.4	2.8	4.7	9.4	19	28	37	47	70	94	117	140	187	234
2000	2.8	5.6	9.4	19	37	56	75	94	140	187	234	281	374	468
5000	7.0	14	23	47	94	140	187	234	351	468	585	702	936	1170
10 000	14	28	47	94	187	281	374	468	702	936	1170	1404	1872	2340
50 000	70	140	234	468	936	1404	1872	2340	3510	4680	5850	7020	9361	11701
100 000	140	281	468	936	1872	2808	3744	4680	7020	9361	11701	14041	18721	23401
L	Low treatment (<0.1 t CaCO ₃) ¹				TABLE NOTES 1. Application amounts are for pure fine CaCO ₃ , assuming an NV of 100% and using a safety factor of 1.5. A factor that accounts for effective neutralising value must be used for commercial grade aglime. 2. An approximate soil weight (tonnes) can be obtained from the calculated volume by multiplying volume (in cubic metres, m ³) by bulk density (BD, t/m ³). Use 1.7 if soil BD is unknown. Dense fine sandy soils may have a BD up to 1.7, and hence 100 m ³ of such soil may weigh up to 170 t. In these calculations, figures should be converted to dry soil mass, since laboratory results are reported on a dry-weight basis. 3. Potential acidity can be measured using chromium reducible sulfur (S _{CR}) or peroxide oxidisable sulfur (S _{POS}). For samples with pH <6.5, the actual acidity must also be measured by laboratory analysis, e.g. titratable actual acidity (TAA). Soils with retained acidity, e.g. jarosite or other similar insoluble compounds, have a less available acidity and will need more detailed analysis. The amount of treatment needed may be reduced if the measured neutralising capacity of the soil is demonstrated to be effective. In this case, the net acidity equations described in section A3 of the latest Laboratory Methods Guidelines or in AS4969 may be used in place of existing plus potential acidity.									
M	Medium treatment (0.1 to 1 t CaCO ₃)													
H	High treatment (1 to 5 t CaCO ₃)													
VH	Very high treatment (5 to 25 t CaCO ₃)													
XH	Extra high treatment (>25 t CaCO ₃)													

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4. Neutralising materials

For management or neutralisation of PAF soils, medium-fine Ag-Lime will be used. Dolomitic Ag-Lime, or magnesium-blend Ag-Lime, will not be used. In general, a finer grind is better. The Ag-Lime purity should preferably be 90% or better (that is, Neutralising Value [NV] > 90) unless there is a significant savings to be made by use of less pure Ag-Lime. In the latter case, the individual lime dosing rates will need to be increased accordingly. The requirement for greater amounts of Ag-Lime of lower purity shall be borne in mind when assessing the supplies of this material, as the cost savings from less pure material may be offset by the need for more, and correspondingly higher total transport costs.

PAF treatment will occur within an PAF treatment area. Material which is transported to treatment cells must be completely treated and removed from the treatment area before new material is introduced. This will ensure that treated material remains segregated and is not mixed with contaminated material. Ag-Lime or other suitable treatment material will be stored at the treatment area in sufficient quantities to enable the treatment of all PAF material expected to be treated in the upcoming few weeks/months and will be determined by the expected delivery schedule of treatment material. The management of onsite treatment is the responsibility of the Site Supervisor, with assistance from the Environmental Advisor (EA).

Ag-Lime is non-corrosive and requires no special handling – it may be necessary to cover the stockpile with a tarpaulin or cover the stockpile with plastic, to minimise dust generation and prevent wetting, since it is then more difficult to spread. Intermittently, until such time as field testing suggests otherwise, a small quantity of Ag-Lime will be stored on site, in the order of 200kg or so. This will enable the regular treatment of soil and cater for any unexpected occurrences of 'hotter' PAF.

Dolomitic Ag-Lime, or magnesium-blend Ag-Lime, will not be used as these materials impose environmental risks from overdosing with the potential to damage estuarine ecosystems. A reasonable quantity of calcium hydroxide solution (hydrated lime) shall be kept on site at all times for treatment of acidic waters. The supply shall be stored in a covered and bunded area to prevent accidental release to waters. Neutralising agents must be replenished and or replaced regularly to remain effective against loss by wind or water erosion.

5. Validation of ameliorated PAF

Samples of the treated soil will be taken, and laboratory analysed to demonstrate compliance with the performance criteria (i.e. verification testing). These performance criteria equate to there being no net acidity in the soil following neutralisation. Soil that has been treated by neutralisation techniques and has not met these criteria must be retreated until the above performance criteria are met.

The objective of ameliorating PAF materials is to ensure that there is no chance that net acidity will be produced. Validation testing only occurs when soils have been treated (with a neutralising agent) to prevent any future acidification. If results of the validation testing indicate a failure to comply with the performance criteria, soil may need to be re – treated additional application of neutralising agent.

Soils that have been mixed with Ag-Lime will be analysed by either the SPOCAS or SCR Suite test methods at a rate of one sample per 250m³. All validation samples are to be recorded by GPS or survey, clearly marked on a map/sketch or otherwise recorded. Where large quantities (>1,000m³) of ameliorated soils are involved and 'net acidity' rates are generally low (18 – <125 mol H⁺/t or 0.03 – 0.20 %S), a reduced rate of sampling may be

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Spoil Management Plan

appropriate subject to approval. A rate of one sample per 1,000m³ may be suitable for example.

The following performance criteria must be attained for soil that has been treated using neutralisation:

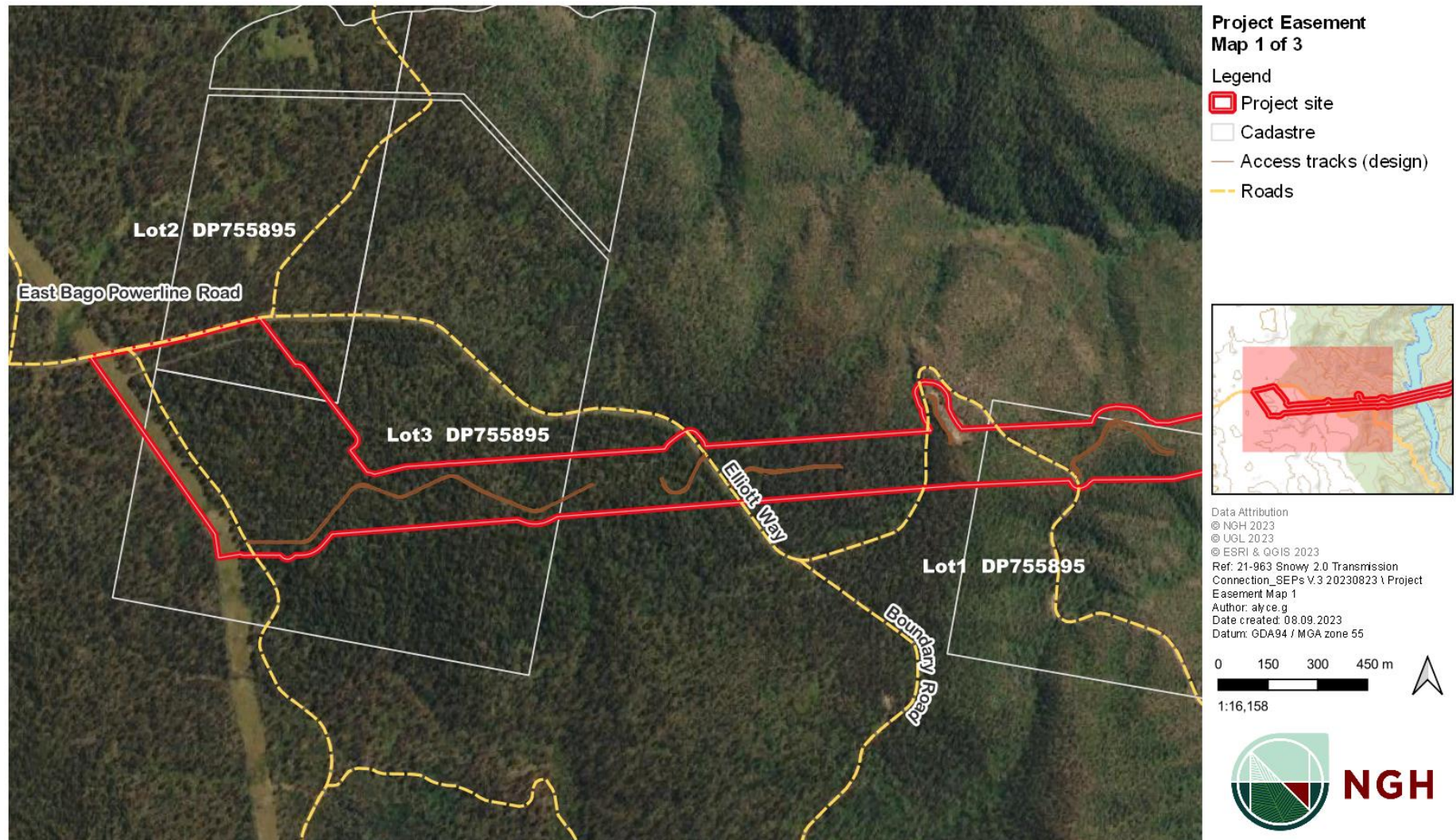
- The neutralising capacity of the treated soil must exceed the existing plus potential acidity of the soil.
- Post-neutralisation, the soil pH is to be greater than 5.5.
- Excess neutralising agent shall remain within the soil until all acid generation reactions are complete and the soil has no further capacity to generate acidity.

If ameliorated PAF is going to be reused on site, due environmental regard for areas of placement shall be assessed, documented and approved by the PC EA. Assessment measures may include:

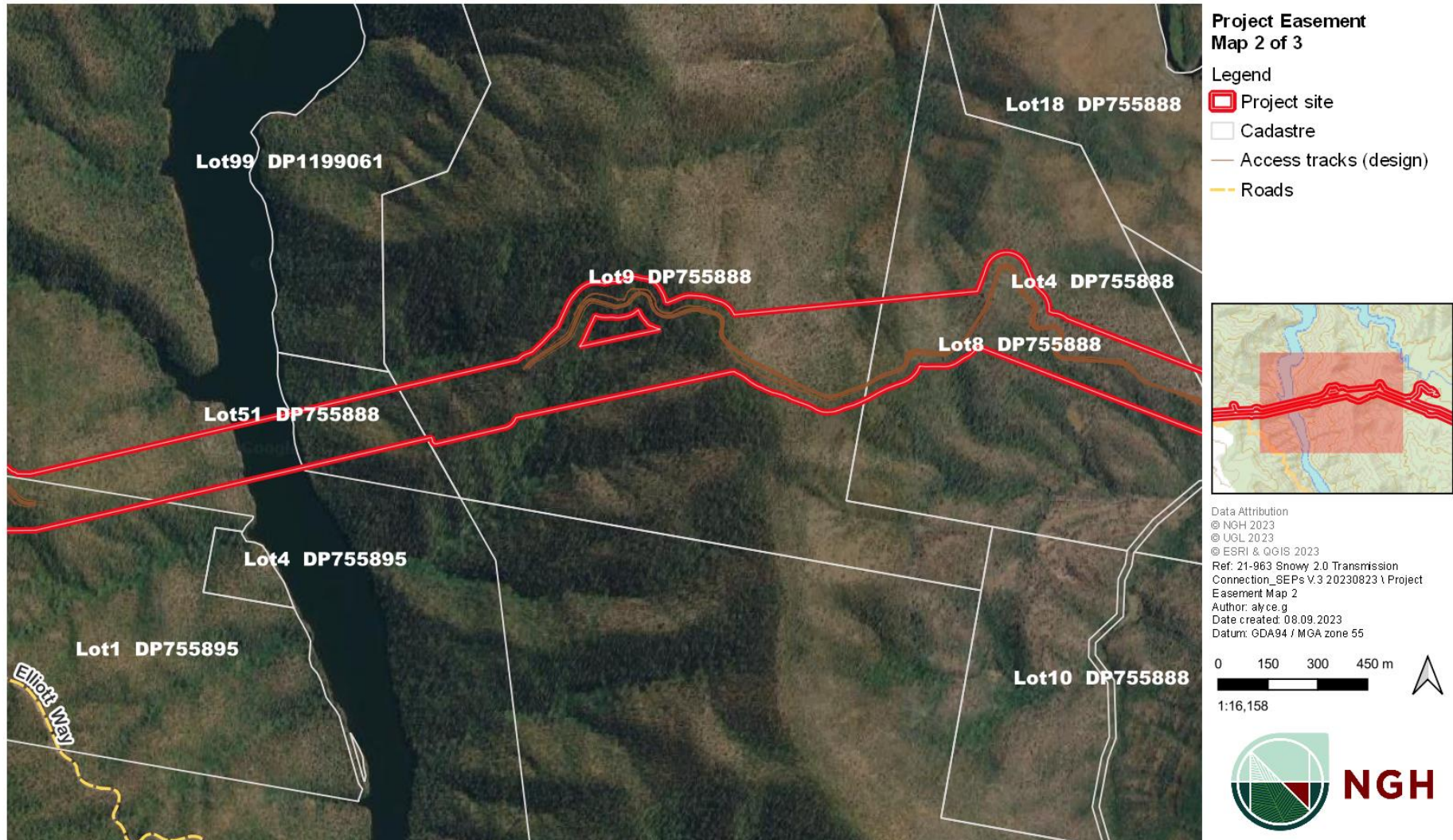
- Location of proposed placement areas and potential receptors (waterways, sensitive flora and fauna, structures)
- Stability and suitability of materials as select fill (especially clays)
- Suitability of soil type for plant growth.

Appendix G Project Easement

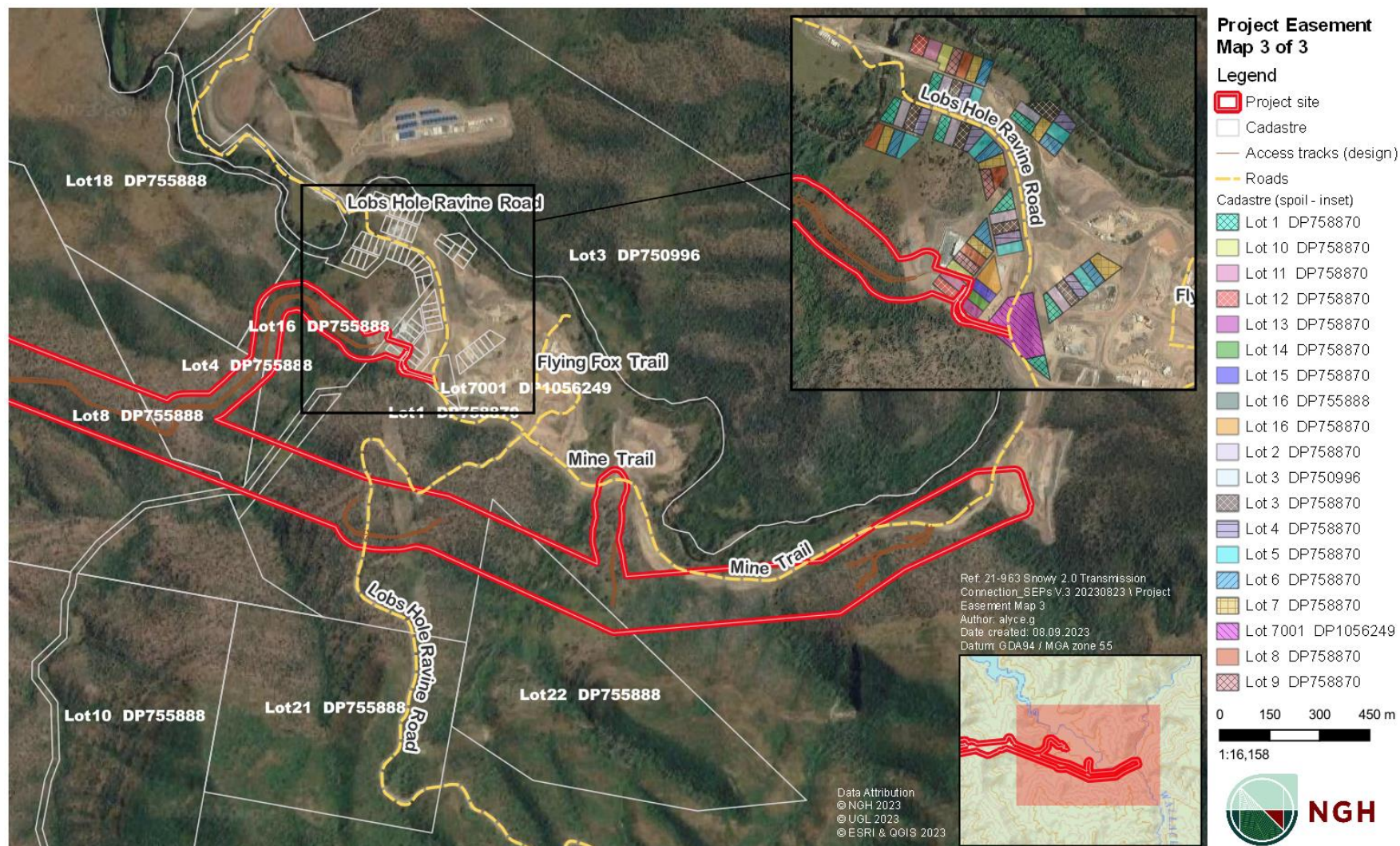
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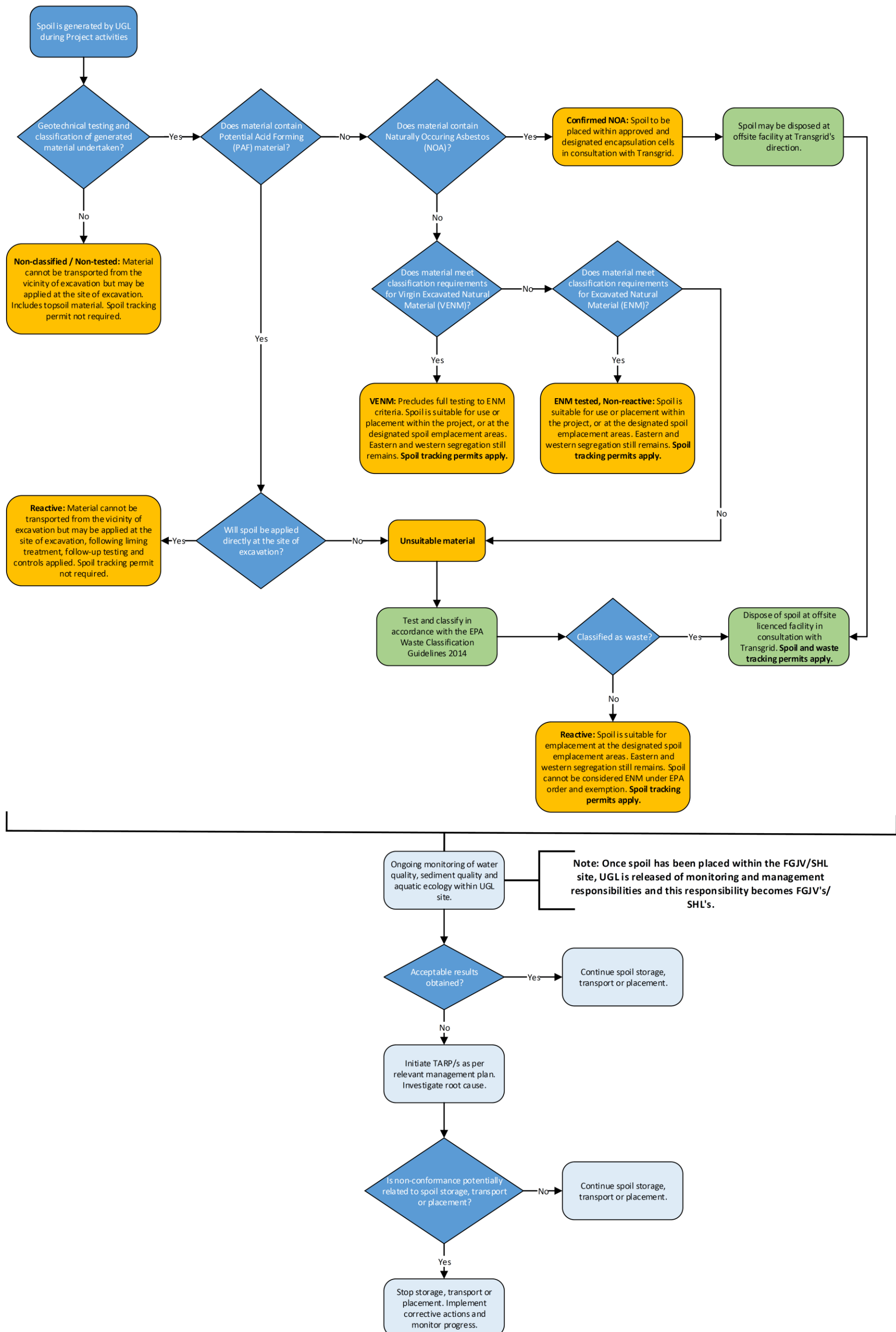


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Spoil Management Plan

Appendix H Spoil Characterisation Flowchart



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Appendix I Stripping topsoil and stockpiling form

Stripping Topsoil and Stockpiling

FORM - UGLMS-4-1600

Project No.		Lot No.		Date:	
Location:		Chainage:		To:	
Engineer:		Foreman:			
Activity	Status			Comments	
	Y	N	N/A		
Are clearing limits marked out by survey and is boundary marking or fencing clearly apparent and does the site have a valid Permit to Clear?	☐	☐	☐		
Have the cultural heritage areas been relocated or an exclusion zone erected?	☐	☐	☐		
Have adequate Erosion & Sediment Control measures been applied?	☐	☐	☐		
Are all stockpiles or lay down area located and clearly marked on site?	☐	☐	☐		
Is there an excavation permit in place?	☐	☐	☐		
		Expiry No.			
		Detail:			
Will the topsoil be removed to a minimum of 100mm and stockpiled?	☐	☐	☐		
Is any unsuitable material evident? Has the Construction Manager or SEA been contacted for placement or disposal options?	☐	☐	☐		
Are stockpiles placed outside of drainage paths and have erosion or sediment measures been applied?	☐	☐	☐		
Are Spoil Tracking Permits required and being completed?	☐	☐	☐		
Lot Accepted and Closed:					
UGL:		Signed:		Date:	
Contractor:		Signed:		Date:	
Client:		Signed:		Date:	

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Soil and Water Management Plan

APPENDIX B: Spill Response Procedure

Pollution Incidents that are to be notified

A pollution incident is required to be notified to the EPA if there is a risk of 'material harm to the environment', which is defined in section 147 of the POEO Act as:

- a. harm to the environment is material if:
 - i. it involves actual or potential harm to the health or safety of human beings or to ecosystems that is not trivial, or
 - ii. it results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding \$10,000 (or such other amount as is prescribed by the regulations), and
- b. loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment.

Where spills or pollution incidents have far reach or consequences incident notification shall be required to:

- DPE – Major Projects website
- NSW EPA – 131 555
- Fire and Rescue NSW – 000
- SafeWork NSW – 131 050
- Tumut Health Service – 6947 0800
- Snowy Valleys Council (SVC) – 1300 275 782

Types of pollution incidents that are to be notified

Spills and pollution incidents that could potentially occur at a construction site, and that are covered by this plan include:

- Material, such as waste materials, fuel etc.
- Discharge to waters from site.

Small spills that do not leave the site boundary and are cleaned up without material environmental harm or residual environmental impact are most likely not required to be notified to the EPA or other authorities. However, all such incidents are to be recorded and reported in accordance with client and/or organisational requirements.

An environmental incident may include a major spillage or leak, failure of a pollution control device such as a bund or basin, major settlement, collapse of a bank or embankment, or catastrophic events.

The Environmental Site Representative and the Project are responsible for classifying the level of incident. The incident will be classified and reported to Transgrid as per Section 8 of the CEMP.

Spill Response Procedure

Pollution incidents caused by spills of chemicals and oils will be managed in accordance with the following:

1. Identify incident has occurred
2. Stop work immediately and notify management

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Soil and Water Management Plan

3. Delegation: The senior member of the team present when a pollution incident occurs is to take charge and become the Emergency Controller; this person will delegate the main assisting roles of the emergency response i.e., Safety controller, information controller, combat assistant, communications clean up and waste management.
4. Control the source of the incident, e.g., stop the fuel leaking
5. Contain the incident using appropriate spill kits and adequate measures
6. Site staff to report to environment team and all other relevant personnel including Transgrid
7. **NOTIFY** the agencies **immediately** if material environmental harm has occurred. Where the public has been, or could potentially be, impacted the public will be notified
8. Plan clean up and implement strategy, this shall involve specialist external spill subcontractors
9. Undertake incident investigation to determine cause and include measures to minimise potential for incident reoccurring
10. Ensure contaminated waste disposal is managed appropriately and any spill kits utilised are restocked.
11. Findings of the incident investigation to be briefed to all relevant staff.

The emergency response procedure will be tested one month and then six monthly after construction commences.

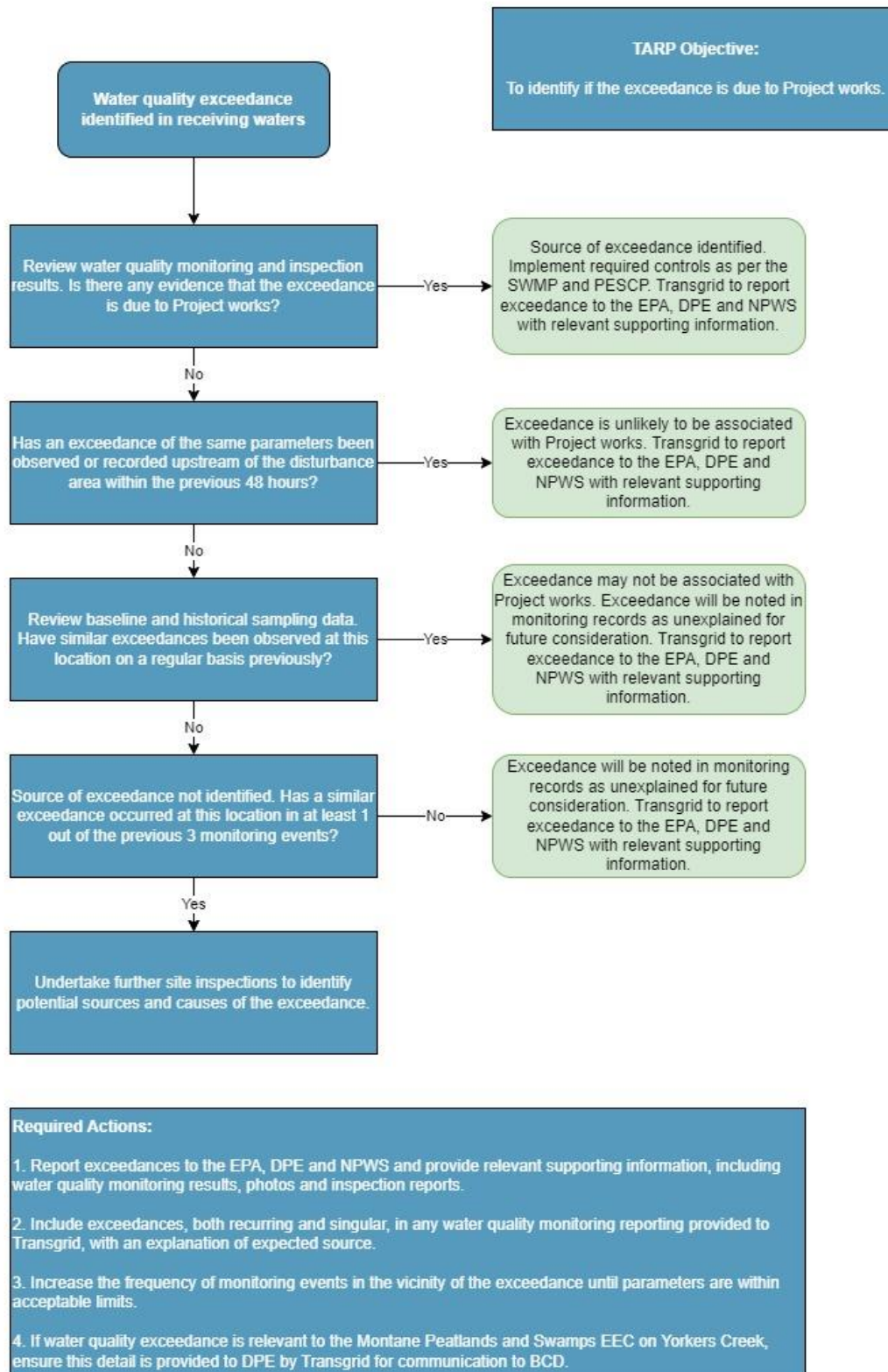
The Contractor will provide all records of the environmental incidents and regulatory action to Transgrid Project team.

The Contractor will induct all staff and subcontractors working on the Site about the potential environmental emergencies and provide training in implementing the relevant environmental safeguards and risk mitigation measures.

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Soil and Water Management Plan

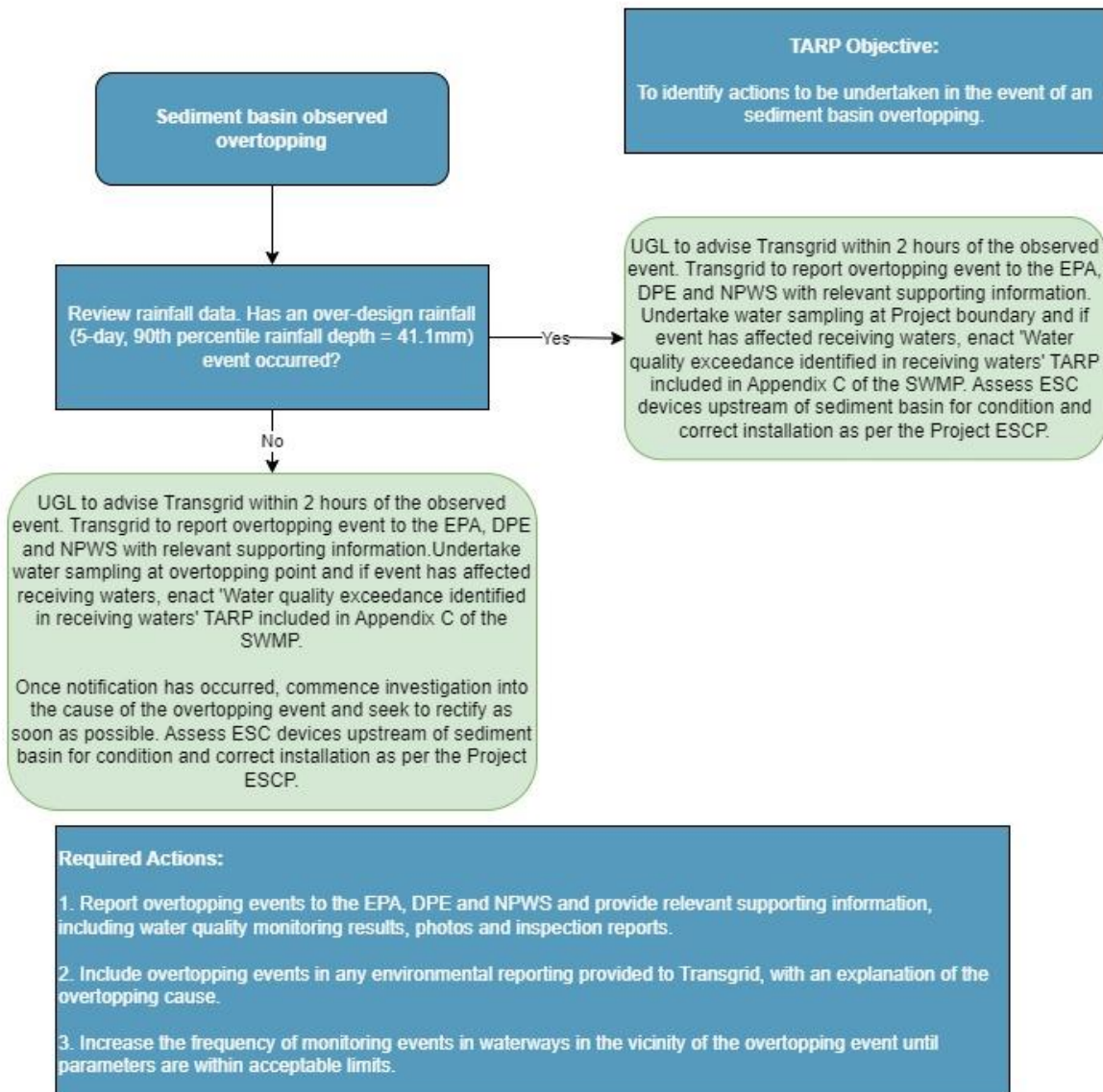
APPENDIX C: Trigger Action Response Plans

Receiving Waters Exceedance TARP



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Soil and Water Management Plan

Basin Overtopping Event TARP



APPENDIX D: Primary Erosion and Sediment Control Plan

Primary Erosion and Sediment Control Plan

Snowy 2.0 Transmission Connection Project

Stage 1 Document Number: 3200-0645-PLN-020-CEMP-ESCP

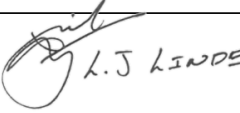
Stage 2 Document Number: HLW-HLJV-PRW-ENM-PLN-000020 – Appendix D

TransGrid
Date 01/11/2024

Snowy 2.0 TCP
Primary Erosion and Sediment Control Plan

Document Control

Approvals

Title	Snowy 2.0 Transmission Connection Project – Primary Erosion and Sediment Control Plan
Approved on behalf of Transgrid (Snowy 2.0 TLP) by	Andrew Buttigieg
Signed	
Dated	22/11/2024
Approved on behalf of Transgrid HumeLink by	Jeremy Roberts
Signed	
Dated	05 Nov 2024
Approved on behalf of UGL by	Louis Linde
Signed	
Dated	20/11/2024
Approved on behalf of HLWJV by	Tim Burns
Signed	
Dated	04 Nov 2024

Snowy 2.0 TCP Primary Erosion and Sediment Control Plan

Version Control

Revision	Date	Description	Author	Reviewer	Approver
0.01	14/11/2022	Initial issue for review	Andrew Macleod, SEEC	Kim Lembke	Trevor Noble
0.02	12/05/2023	Required plan review	Andrew Macleod, SEEC	Kim Lembke	Trevor Noble
0.03	17/05/2023	Addressing Transgrid comments	Whitney Heiniger, NGH	Kim Lembke	Trevor Noble
0.04	08/09/2023	Required plan review	Whitney Heiniger, NGH	Kim Lembke	Tim McCarthy
0.05	30/10/2023	Final review	Jane Love, NGH	Kim Lembke	Tim McCarthy
0.06	01/11/2023	Addressing NPWS comments	Jason Snape	Kim Lembke	Tim McCarthy
0.07	01/11/2024	Updates to include Stage 2	Nicholas Mok	Ian Irwin	Louis Linde / Tim Burns

Distribution of controlled copies

This Environmental Plan is available to all personnel and sub-contractors via the Project document control management system.

The document is uncontrolled when printed. One controlled hard copy of the CEMP and supporting documentation will be maintained by the Quality Manager at the Project office (and relevant documentation is available on the Snowy 2.0 TCP website [Snowy 2.0 Transmission Connection | Transgrid](#)).

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Primary Erosion and Sediment Control Plan

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Primary Erosion and Sediment Control Plan

Acronyms and Abbreviations

Abbreviation	Explanation
AHD	Australian Height Datum
BMP	Biodiversity Management Plan
BOM	Bureau of Meteorology
CEMP	Construction Environmental Management Plan
CoA	Condition of Approval
CPESC	Certified Professional in Erosion and Sediment Control
CM	Construction Manager
CSSI	Critical State Significant Infrastructure
DPE	NSW Department of Planning and Environment
DPHI	NSW Department of Planning Housing and Infrastructure (formerly DPE)
EIS	Environmental Impact Statement
EMS	Environmental Management System
ERSED	Erosion and Sediment
ESC	Erosion & Sediment Control
ESCM	Erosion & Sediment Control Measure
ESCP	Erosion & Sediment Control Plan
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPA	NSW Environment Protection Authority
EWMS	Environmental Work Method Statement
HSE	Health safety and Environment
IECA	International Erosion Control Association
KNP	Kosciuszko National Park
kV	Kilovolts
m	Metres
mbgl	metres below ground level
MW	Megawatts
MWh	Megawatt hours
NOA	Naturally Occurring Asbestos
NTU	Nephelometric Turbidity unit
PC	Primary Contractor
PE	Project Engineer

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Abbreviation	Explanation
POEO Act	<i>Protection of the Environment Operations Act 1997</i>
RUSLE	Revised Universal Soil Loss Equation
SEA	Senior Environmental Advisor
SEP	Site Environmental Plan
SMP	Spoil Management Plan
SWMP	Soil and Water Management Plan
TARP	Trigger Action Response Plan
TG	Transgrid
TSS	Total Suspended Solids
UGL	UGL Engineering Pty Ltd
WQMP	Water Quality Monitoring Program
WQO	Water Quality Objectives

Snowy 2.0 TCP
Primary Erosion and Sediment Control Plan

1 Introduction

1.1 Context and Purpose

This document is the Primary Erosion and Sediment Control Plan (ESCP) for the Maragle Substation and 330kV Transmission Line Connections project (“the project”). Refer to the Project Construction Environmental Management Plan (CEMP) for a project summary and location description. This Primary ESCP is supplementary as Appendix D to the Soil & Water Management Plan (SWMP) for the project, within which project water quality objectives are defined. The Primary ESCP should be read in conjunction with the SWMP and the Water Quality Monitoring Program (WQMP).

This Primary ESCP addresses key requirements of the Conditions of Approval (CoAs), the project Environmental Impact Statement, subsequent Amendment reports, and stakeholder input.

Construction activities expose lands to erosion by wind, water and human activity. Soil particles eroded from a construction site can be transported downslope to offsite lands and waterways, where they can cause environmental harm. By implementing a series of recognised best-practice erosion and sediment controls, UGL and UGL/CPB, the Primary Contractors (PC), respectively for Stage 1 and Stage 2 of the Project, can minimise the potential impact to downslope lands and waterways. This Primary ESCP provides the proposed strategies and commitments to be employed.

This Primary ESCP is accompanied by a series of Progressive ESCPs where site-specific erosion and sediment control measures (ESCMs) are detailed on design drawings for each location and type of works. The Progressive ESCPs are live documents and will be periodically updated as required to reflect current works, environmental factors and conditions. The Progressive ESCPs will be appended to the Primary ESCP

1.2 Objectives

This Primary ESCP has the following key objectives:

- To comply with project approvals and regulatory requirements (see below)
- To comply with state relevant erosion and sediment control standards and guidelines
- To comply with contractual obligations relating to erosion and sediment control
- To help maintain the environmental values and water quality objectives within the Kosciuszko National Park (KNP)
- To prevent or minimise pollution of waters as best practicable by implementing effective ESCMs;
- Provide an organised, integrated and systematic approach to effectively implement erosion and sediment control throughout construction; and
- To make project personnel aware of erosion and sediment control matters and the risk of erosion and sediment impacts during construction

Specifically, and relevant to the SWMP and WQMP, the following criteria have been assigned;

Snowy 2.0 TCP Primary Erosion and Sediment Control Plan

Table 1-1 Project Objectives

Coarse sediment (> 0.02mm)	Retain all coarse sediment on site (as best practicable)
Fine Sediment (< 0.02mm)	In catchments where sediment basins are not triggered by Sect 6.3.2 (d) of Landcom (2004) ("the Blue Book") (i.e. disturbance <2,500 square metres and soil loss less than 150 cubic metres per year) alternative measures to a sediment retention basin will be employed to protect the receiving waters (see Erosion and Sediment Control Measures defined in Appendix E of the SWMP) In catchments where sediment basins are triggered, fine sediment will be retained for each rainfall event up to and including the nominated 5-day, 90th-percentile 'design' rainfall event. Calculated from LFD data (1yr, 120hr) rainfall intensity the adopted rainfall event is 41.1mm. Minimum basin sizing will conform to this 'design' rainfall event. Erosion and Sediment Control Measures as defined in Appendix E of the SWMP will support sediment retention
Environmental Values and Water Quality Objectives (KNP and Bago State Forest)	Baseline water quality monitoring was initiated at the start of 2022 prior to construction and has helped to define the Water Quality Objectives (WQOs) for receiving waters in Appendix F of the SWMP. A summary is provided below. Ongoing water quality monitoring will occur throughout construction with exceedance criteria for a 'design' rainfall event defined by WQOs for the receiving environment. Where exceedances are detected the Trigger Action Response Plan will apply (SWMP Appendix C) and EPA notification is required. No active discharge to receiving waters will be undertaken during Project works, in accordance with EPL 21753 and EPL Variation Notice (1628478). Detained waters can be used for onsite irrigation in accordance with Appendix I of the SWMP. Dewatering to a 5-day design capacity is required. WQOs are defined in the Water Quality Monitoring Program (Appendix F of the SWMP)
Beyond Blue Book Aspects	Aspects of the ESCPs that are 'Beyond Blue Book' are as follows: - The requirement to maintain mulch cover over all inactive areas where ground disturbance has occurred, using mulch won onsite as a result of vegetation clearing. Typical Blue Book requirements are for disturbed lands to be stabilised within 20 days of inactivity. However, the ESCP requires the use of mulch cover to stabilise all inactive areas following disturbance. - The requirement to 'Rapidly Rehabilitate' disturbed areas within 14 days of completion. Typical Blue Book requirements are for disturbed lands to be stabilised within 20 days of inactivity.

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	• The requirement to stage disturbance to minimise the amount of exposed area at any one time is designed to minimise the potential soil loss in each catchment by minimising the amount of disturbed area. Typical Blue Book standards do not include a specific requirement to stage disturbance within a single catchment. • The sediment basin design rainfall event has been increased to the 5 day, 90th %ile event (41.1mm). Typical Blue Book standard require the 5 day, 85th %ile to be adopted. • The inclusion of large mulch or earth bunds (min. 700-1,000mm high) with regular 'returns' and lined spillway weirs in all low points. These are proposed in catchments where sediment basins are not required under Blue Book standards (based on the erosion hazard assessment detailed in Section 6.3.2 (d)). The sediment retention performance of large mulch or earth bunds exceeds that of typical Blue Book controls such as silt fence, and provides a significant sustainability benefit through beneficial reuse of cleared vegetation. • CPESC engagement for the project works; and • The inclusion of multiple sediment traps/sumps (or large fabric-wrapped rock check dams) in 'higher risk' sections of the access tracks to provide additional capacity and to reduce runoff velocities in those areas. Typical Blue Book standards do not include a specific requirement for the number of sediment traps/sumps in a single catchment.
--	--

1.3 Environmental Management System

The UGL Management System (UGLMS) incorporates the following for the management of erosion and sediment control on the project;

- UGLMS-131-390 Erosion & Sediment Control Procedure
- UGLMS-131-807 Contractor HSEQ Handbook
- UGLMS-4-1730 Environmental Inspection Checklist
- UGLMS-4-1549 Environmental Inspection Weekly Checklist
- UGLMS-4-1324 Irrigation and Disposal Permit
- UGLMS-4-1600 Stripping Topsoil and Stockpiling Inspection Checklist
- UGLMS-4-2138 Site Environmental Plan Template

These documents will support the implementation of this Primary ESCP and all accompanying Progressive ESCPs.

2 Environmental Assurance

2.1 Relevant Legislation and Guidelines

2.1.1 Key Legislative Requirements

Local, State and Commonwealth legislation that may apply to the management of erosion and sediment control on the project include:

- Environmental Planning and Assessment Act 1979 (EP&A Act)
- Protection of the Environment Operations Act 1997 (POEO Act)
- Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) (Commonwealth)
- Water Act 1912; and
- Water Management Act 2000

Relevant provisions of the above legislation are explained in the register of legal and other requirements included in Appendix C of the CEMP.

2.1.2 Standards and Guidelines

Local, state and commonwealth guidelines and standards relating to the management of erosion and sediment control include:

- Managing Urban Stormwater: Soils and Construction Volume 1 (4th Edition) (Landcom, 2004) (the “Blue Book”).
- Managing Urban Stormwater: Soils and Construction Volumes 2A and 2C (DECC, 2008).
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC and ARMCANZ 2000)
- Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings. NSW Fisheries, Cronulla, 16 pp; Fairfull, S. and Witheridge, G. (2003)
- Department of Primary Industries Guidelines for Controlled Activities on Waterfront Land (2012)
- NSW Office of Water Guidelines for working within riparian corridors
- Environmental Best Management Practice Guideline for Concreting Contractors, DEC, 2004; • NSW Floodplain Development Manual (2005)

Where the above guidelines are lacking, the following will be applied – IECA (2008), *Best Practice Erosion and Sediment Control*. International Erosion and Sediment Control Association (Australasia), Picton NSW.

2.2 Permits and Licences

under the Protection of the Environment Operations Act 1997 (POEO Act). This EPL requirement was triggered under Schedule 1 of the Protection of the Environment Operations (General) Regulation 2022 due to extractive activities required during construction. In the

Snowy 2.0 TCP Primary Erosion and Sediment Control Plan

months following calculations determined greater anticipated spoil volumes, and a request was submitted to the EPA for a licence variation. The EPA issued a Licence Variation Notice (1628478) to Transgrid on the 14 September 2023 for the approved extractive limit for spoil to increase to 561,231 Tonnes (i.e. >100000-500000 T annually).

2.3 Project Conditions of Consent

Under Part 5.1 of the EP&A Act (1979) a declared Critical State Significant Infrastructure (CSSI) project is assessed and must be approved by the Minister for Planning. Table 2-1 outlines the COAs for the project from the NSW Department of Planning and Environment (DPE) related to erosion and sediment control. A cross reference is also included to indicate where the requirement is addressed.

Table 2-1 Project Objectives

Reference Number	Requirement	Document Reference
Conditions of Approval		
B10	The Proponent must: (a) minimise erosion and control sediment generation; (b) take all reasonable and feasible measures to prevent a discharge to waters. This may include, but need not be limited to: (i) adopt enhanced erosion and sediment controls, taking into consideration the best available information from the Snowy 2.0 Main Works project; (ii) minimising the volume of dirty water generated onsite; and (iii) exploring and implementing beneficial reuse opportunities such as irrigation and dust suppression.	Section 5 Appendix E of SWMP
B11	Unless otherwise authorised by an EPL the Proponent must ensure the development does not cause any water pollution, as defined under Section 120 of the POEO Act.	Section 1.2, Section 4.2 and Section 5
B13	The Proponent must ensure that any groundwater dewatering activities do not discharge to watercourses	Section 3.5. Unlikely to be necessary due to depth of GW
B14	The Proponent must ensure: (a) all activities on waterfront land are constructed in accordance with the Guidelines for Controlled Activities on Waterfront Land (2012), unless DPE Water agrees otherwise; and (b) the geomorphic condition of the major rivers and distributary channels crossed by the development is not impacted	Section 5
Other Requirements		

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Reference Number	Requirement	Document Reference
B11*	A Soil and Water Management Plan (SWMP) will be prepared and implemented as part of the CEMP. The plan will include stringent controls to mitigate impacts of runoff and sediment transfer from the project area during construction and operation. Control measures will remain in situ until site stabilisation completion criteria are met. The plan will ensure protection of aquatic habitat in the tributaries crossed by the project, and particularly aimed at protecting the habitat for the Booroolong Frog associated with Yarrangobilly Creek. An assessment of the current sediment basin design for the Main Works project will occur, to determine if the design specifications are suitable for the additional sediment load expected during construction of the easement. Where modification or augmentation is required, sediment basins will be increased in size to cope with any additional expected sediment load. Sedimentation will be managed through implementation of effective sediment control management plans will be implemented to ensure that sediment does not enter the waterways and result in changes to the habitat structure of riparian areas or areas downstream of the project area. Effective control measures will include: • Erosion and sediment control plans for all stages of construction • The implementation of sediment control measures across the project area - sediment control ponds and sediment basins, coir logs and sediment fencing to control sediment run-off, catch drains and perimeter bunds and diversion drains • A schedule will be included for cleaning sediment basins with intervals to be informed from the outcomes of monitoring basins from Snowy 2 Main Works construction and catchment modelling. The schedule will include additional checks after rainfall events of >50 mm in 24 hours • Additional or supplementary control measures (i.e. sediment fencing, diversions, and detention ponds) will be implemented at high-risk areas such as the bridge crossings at Sheep Station Creek, Cave Gully and Wallaces Creek and at tower structures site and access roads on the slopes around Yarrangobilly Creek and associated tributaries • Additional water quality monitoring points will be installed and monitored in locations to be agreed with NPWS and BCS, which are downhill of the construction footprint and upstream of Booroolong Frog Mitigation Measures habitat. An adaptive monitoring plan will be developed to trigger a rapid response if sediment loads detrimental to Booroolong frog are detected • Runoff from spoil piles will be managed through the above listed control measures to ensure that there is no contamination or sediment entering waterways or adjacent areas • Accidental spills will be reported to the contractors environmental representative as soon as the incident is observed so that the site can be remediated rapidly • Implementation of tannin leachate management controls may be required as determined by the monitoring program	SWMP Appendix E of SWMP Appendix E of SWMP Appendix E of SWMP Sect 5 & Appendix E of SWMP Appendix E of SWMP SWMP (WQMP Appendix F) & TARP (Appendix C) Spoil Management Plan (SMP Appendix A of SWMP) CLMP (Appendix H of SWMP) SWMP

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Reference Number	Requirement	Document Reference
	- Sediment traps or filters (targeting removal of coarse sediment) will be maintained at all discharge locations and will be monitored and maintained as per the scheduled requirements - Other source controls, such as mulching, matting and sediment fences may be used in consultation with BCS and NPWS and need to be approved in the CEMP and any deviation from measures by DPIE will need to be sought. Similarly, natural erosion controls incorporating organic materials, micro water capture and contour shaping will need to be approved in the CEMP where appropriate - Disturbed areas will be stabilised and rehabilitated to reduce erosion potential (i.e. exposure period of bare earth). This will be particularly important for revegetation of slopes as soon as possible, in accordance with the rehabilitation plan. Landscaping of pervious surfaces using native indigenous species only. Soil loss will be prevented by immediate stabilisation of exposed surfaces (e.g. use of Jute mesh and/or soil binder) - Any imported fill will be certified at source locations to ensure it is pathogen and weed free Excavated Natural Material or Virgin Excavated Natural Material) - An induction protocol will be mandatory for all personnel involved in construction and operation works - There needs to be acknowledgement of imported material e.g. road base being washed off tracks etc in the surrounding environment and how that will be dealt with.	Section 5 CEMP & Appendix E of SWMP Appendix E of SWMP and Rehabilitation Plan SMP (Appendix A of SWMP) & Biodiversity Management Plan (BMP) CEMP Appendix E of SWMP
W3*	A SWMP will be prepared and implemented prior to and during construction. During the preparation of SWMP, Transgrid will working closely with the EPA in developing and designing key sediment and erosion controls as to prevent any change to the existing baseline surface water quality within and adjoining the project area. The SWMP will include: - Erosion and sediment control plans for all stages of construction that will be submitted for approval prior to its implementation. Initially the principal SWMP will be prepared, and it will be followed by the Progressive SWMP that will be regularly updated during the construction phase to take into consideration changes that may occur that require revised erosion and sediment controls - A water quality monitoring program - Details on the construction and management of sediment basin if determined to be required - Protection of waterways such as scour protection, stabilisation and revegetation - Any imported fill will be certified at source locations as pathogen and weed free Excavated Natural Material or Virgin Excavated Natural Material) - Management of stockpiles and spoil - Tannin leachate management controls - Management of accidental spills, response and reporting	SWMP Appendix E of SWMP SWMP (WQMP, Appendix F) Appendix E of SWMP SWMP SMP (Appendix A of SWMP) & BMP Section 5 SWMP (Section 5.2)

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Reference Number	Requirement	Document Reference
	- An induction protocol - Responsibilities for all management measures. All erosion and sediment control measures will be designed, implemented, progressively rehabilitated and maintained in accordance with relevant sections of Managing Urban Stormwater: Soil and Construction Volume 1 (Landcom, 2004) ('the Blue Book') (particularly Section 2.2) and Managing Urban Stormwater: Soil and Construction Volume 2A – Installation of Services (DECC, 2008).	SWMP (Appendix C) CEMP CEMP
W6*	- The SWMP will include arrangements for managing wet weather events, including monitoring of potential high-risk events (such as storms) and specific controls and follow-up measures to be applied in the event of wet weather - Where required, adequate sediment controls (including the consideration of sediment basins) will be included in the access track design to manage erosion and sedimentation and associated impacts on receiving waters	SWMP Appendix E of SWMP
W7*	For the Snowy 2.0 T2 Tailbay site and Paddys River water uptake site: - A water extraction licence will be sought prior to the extraction of any water from Talbingo Reservoir and the Paddy's River - Prior to extraction of water near Paddy's River Flat Campground, rubber mats will be placed on the ground under the water trucks to prevent erosion and sediments entering the waterway - During water extraction from Talbingo Reservoir and Paddy's River, slow velocities of water pumping and screens on the hoses will be used to minimise small aquatic fauna been inadvertently picked up.	SWMP
L4*	A spoil management strategy will be prepared for the project. The spoil management strategy plan will outline appropriate management procedures for the generation, management and importation (if required) of spoil. It will include, but not be limited to: - Confirming spoil quantities - Carrying out appropriate assessments, including geotechnical investigations - Procedures for classification of spoil - Identification of spoil reuse measures, including segregation of soils as subsoils and topsoils - Spoil stockpile management procedures including minimising the number of stockpiles, area and time they are exposed, and locating stockpiles away from drainage lines and natural waterways and from where they will be susceptible to erosion - Spoil haulage routes - Spoil disposal and reuse locations - Imported spoil sources and volumes.	SMP (Appendix A of SWMP) SMP (Appendix A of SWMP) SMP (Appendix A of SWMP) Section 5 TTMPs SMP (Appendix A of SWMP)
L5*	Management of topsoil stockpiles and other excavated material stockpiles to minimise dust and sediment in runoff will include: Minimising the number of stockpiles, area and time they are exposed	Section 5

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Reference Number	Requirement	Document Reference
	- Locating stockpiles away from drainage lines and natural waterways and from where they will be susceptible to erosion - Stockpiles will be bunded in accordance with the Blue Book (Landcom, 2004) Managing Urban Stormwater – Soils and Construction, Volume 1, 4th Edition) - Stabilise stockpiles, establish sediment controls and suppress dust as required.	
VIA2*	- All construction plant, equipment, waste and excess materials will be contained within the designated boundaries of the work site and will be removed from the site following the completion of construction - Stockpiles will be stabilized to prevent erosion by wind and water and avoid the development of dust plumes adversely impacting air and visual quality - On completion of the work disturbed areas will be stabilized and returned to as close to original condition.	Section 5

3 Existing Environment

3.1 Land Use and Topography

As detailed by the Environmental Impact Statement (EIS) (Jacobs, 2020), the project is located within the Australian Alps in southern NSW. Topography is highly variable within the project area, and includes elevated plateaus in the west, to steeply incised valleys and ridges surrounding Talbingo Reservoir and the Yarrangobilly River, with narrow alluvial terraces at the base of the Yarrangobilly River valley. Elevations across the project area range from 544 metres to 1,190 metres Australian Height Datum (AHD).

3.2 Climate

Climate data were sourced from the Bureau of Meteorology (BOM) website for Tumbarumba (station 072043). The weather monitoring station is approximately 20km from the project.

Data is presented in Table 3-1, showing that temperatures are warm in summer, with cold winters. Rainfall occurs throughout the year but with a distinct winter dominance. Mean annual rainfall is 976 mm/yr.

Average morning and afternoon wind speeds are mostly benign and are not expected to cause major concerns for dust rise providing adequate ground cover is in place over disturbed areas.

Table 3-1 Climate data for Tumbarumba, NSW (BoM station 072043)

	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Mean max temp (°C)	29.0	28.4	25.1	20.1	15.2	11.8	10.8	12.2	15.5	19.7	22.9	26.2
Mean min temp (°C)	12.3	12.0	9.0	5.1	2.3	0.2	-0.1	0.9	3.0	5.3	7.8	9.8
Mean rainfall (mm)	63.8	54.4	66.1	66.1	82.5	102.2	104.0	105.9	90.1	94.7	76.1	71.0
Avg no of days >1mm rain	5.3	4.6	5.4	6.0	7.9	10.3	11.3	11.4	9.5	8.6	7.1	5.9

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	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Mean 9am wind speed (kmh)	6.9	5.9	5.6	5.4	4.7	4.5	5.2	6.5	7.5	8.0	7.5	7.4
Mean 3pm wind speed (kmh)	9.6	9.0	8.4	7.1	6.4	7.0	7.9	9.2	10.4	10.2	10.3	9.8

3.3 Soils

According to the Project EIS, the geology of the project area is dominated by Silurian age plutonic intrusives, including the Greenhills Granodiorite and Rough Creek Tonalite. These lithologies are capped in places by Tertiary olivine basalts, however, the occurrence of tertiary basalt is limited within the project area. The plutonic lithologies are intruded against the meta-sediments and meta-volcanics of the East Lachlan Orogen.

Substantial faulting, along the Tumut Ponds Fault and the Gilmore Fault Zone, occurs roughly perpendicular to the project through the steeply incised valley that holds the Talbingo Reservoir. The fault is a complex zone of strike slip and dip slip (reverse) movement. The fault zone hosts bodies of serpentinite that are known to contain occurrences of asbestiform minerals (chrysotile and tremolite) also so known as Naturally Occurring Asbestos (NOA).

As with the geology, the soils of the project area are varied and depend on landform. The soils are generally red and brown earths/structured red earths, with sandy loam and clay loam textures. Erosion has been identified as a significant issue on poorly constructed or maintained forest tracks.

3.4 Surface Water and Sensitive Receiving Environments

According to the Project EIS (Jacobs, 2020), the project is located at the headwaters of the Murrumbidgee catchment within the Snowy Mountains region. The catchment is characterised by 5,100 square kilometres of national parks and reserves including KNP.

The Tumut River passes beneath the project, flowing for 182 kilometres before entering the lower Murray Darling Basin. The waterway is the largest tributary of the Murrumbidgee River and contains several water storage dams along its length including Talbingo Reservoir and Blowering Dam. Talbingo Reservoir is a major rock fill dam forming part of the Snowy Scheme and is located approximately 2.5 kilometres downstream of the project area at the confluence of the Tumut River and Yarrangobilly River. Blowering Dam is an additional 22 kilometres downstream.

In addition to the Tumut River, the project area also contains five named waterways including Wallaces Creek, Yarrangobilly River, Sheep Station Creek, Cave Gully, and Lick Hole Gully. Thirteen unnamed gullies/drainage lines also occur within the project area, these gullies are anticipated to be ephemeral and have minimal channel definition.

The Booroolong Frog is known to inhabit the Yarrangobilly River, and Wallaces Creek and the lower section of Sheep Station Creek, close to its confluence with the Yarrangobilly River. The prevention of erosion will be prioritised at all times during soil management onsite, to reduce reliance on sedimentation controls and the risk of potential impacts on both Booroolong Frog individuals and habitat features. Any discrepancies in habitat monitoring results will assess the potential for impact from sedimentation and water quality in accordance with the TARPs provided in Appendix G of the Project Biodiversity Management Plan (BMP).

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3.5 Groundwater

According to the Project EIS (Jacobs, 2020), geotechnical investigations have been undertaken at the substation site, including the drilling of 17 boreholes and seven test pits. Ground water levels at this location ranged from 6.1 to 11.0 metres below ground level (mbgl).

From these geotechnical investigations and investigations as part of Snowy 2.0, groundwater occurrence is mostly anticipated to be associated with fractured or weathered basement lithologies. Some thin veneers of colluvium or residual soils are likely; however these are not expected to be saturated and would generally sit above the regional water table. Some alluvial deposits may be associated with the major drainages, such as Yarrangobilly River at the eastern end of the project, however, these would be within the narrow valley floors and typically away from the project. Alluvial deposits associated with the Yarrangobilly River are estimated to be of the order of three to four metres thick.

Two of the monitoring bores (TMB01A/B) installed as part of the Snowy 2.0 are located near the project. Monitoring bores TMB01A/B indicate that the depth to ground water is about 5.1 to 6.1 mbgl on the Talbingo valley floor.

Indicative depths to water for the three main topographic/geomorphological environments, derived from the Snowy 2.0 Exploratory Works Groundwater Assessment (EMM, 2017) are as follows:

- Elevated plateau areas: 4.6 to 48.8 mbgl (average 16.4 mbgl)
- Steeply incised valleys and ridges: 3.5 to 21.9 mbgl (average 11.21 mbgl)
- Valley floor/alluvial: 3.1 to 6.1 mbgl (average 4.4 mbgl).

There are no registered groundwater bores within five kilometres of the project.

3.6 Flooding

The project EIS (Jacobs, 2020) identified the following flooding potential:

- New Zealand Gully and an unnamed tributary of Yorkers Creek at the substation site are ephemeral in nature and would experience short duration overland flooding during heavy rainfall events only.
- Sheep Station Creek is affected by flooding, with the Snowy 2.0 modelling results indicating existing peak flood depths of up to 1.5 metres in the Annual Exceedance Probability (AEP) (1% AEP) event and up to eight metres in the PMF.
- Yarrangobilly, Lickhole Gully, Cave Gully and Wallaces Creek are also subject to flooding in the 1% AEP.

The Tumut River water levels are controlled by the Talbingo Reservoir operations.

3.7 Erosion Hazard

Erosion hazard has been assessed using the Revised Universal Soil Loss Equation (RUSLE) (Landcom, 2004) for a range of typical topographic conditions. The results are in Table 3-2.

Also included in Table 3-2 is an assessment of the catchment size trigger that would warrant sediment basins (200 t/yr, based on Landcom, 2004). This is assessed for both a C-factor of 1.0 (no ground cover in the catchment) and 0.15 (50% effective ground cover in the

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catchment). This demonstrates that sediment basins can feasibly be avoided for tower sites and under-line clearing areas if extensive ground cover is retained *in situ*.

Table 3-2 Erosion hazard assessment (based on Landcom, 2004)

Parameter	Definition	Gently sloped areas	Moderately sloped areas	Steeper areas
R	Rainfall erosivity factor (Appendix B of Landcom, 2004)	1500	1500	1500
K	Soil erodibility factor (assumed)	0.05	0.05	0.05
LS	Slope length and gradient factor	1.19 (80m, 5%)	5.06 (80m, 15%)	11.60 (80m, 30%)
P	Conservation practice factor	1.3	1.3	1.3
C	Ground cover factor	1	1	1
A	Total calculated soil loss (t/ha/yr)	116	494	1131
Soil loss class (1 to 7)		1 (low)	4 (moderate)	6 (high)
Soil loss (t/ha/yr) if 50% effective ground cover retained (e.g. mulch left <i>in situ</i> after clearing)		17 (very low)	74 (very low)	170 (low)
Catchment area triggering a sediment basin (assuming no effective ground cover)		1.72 ha	0.4 ha	0.25 ha
Catchment area triggering a sediment basin (assuming 50% effective ground cover)		11.76 ha	2.7 ha	1.18 ha

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4 Environmental aspects and impacts

4.1 General Impacts of Erosion and Sedimentation

Land that has been disturbed or cleared of protective ground cover is potentially subject to erosion as a result of stormwater runoff. Soil particles that are eroded in such a way are transported down-slope, usually settling in watercourses, wetlands and lakes.

Erosion and sedimentation can result in many adverse environmental impacts including:

- Reduction in water quality
- Increased turbidity in receiving waters
- Nutrient enrichment of water bodies
- Damage to vegetation communities
- Disturbance to aquatic flora and fauna
- Increased potential for flooding
- Restrictions to navigation
- Reduction in recreational values
- Reduction in aesthetic values
- Increased maintenance costs
- Promotion of weed growth
- Reduced agricultural, forestry and biomass production.

As detailed in Section 1, this plan aims to minimise on-site erosion and off-site sedimentation, and therefore reduce adverse environmental impacts.

4.2 Project Impact Assessment

Table 4-1 provides a summary of potential impacts relating to erosion from project work areas. Note that other impacts to soil and water resources (e.g. from chemical storage, fuel spills etc.) are addressed in the SWMP.

Table 4-1 Potential impacts relating to erosion and sedimentation

Proposed activity	Potential impact(s)
Vegetation clearing and grubbing	Increased erosion as a result of loss of ground cover. Potential offsite sedimentation impacts. Potential for sediment-laden runoff into receiving waters. Accidental disturbance outside of clearing limits. Potential for soil destabilization by creating infiltration points from grubbing activities
Earthworks - general	Increased erosion due to exposure of subsoils. Potential offsite

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Proposed activity	Potential impact(s)
	sedimentation impacts. Potential for sediment-laden runoff into receiving waters. Disturbance of areas outside the Project footprint, e.g. from dislodged rocks or overfilled batters Potential for rocks or sediments to be tracked onto public roads. Potential for dust to be blown offsite.
Works in and adjacent to waterways.	Sediment impacts during auguring, rock placement or filling. Mobilisation of existing sediment. Flows and floods could scour active or completed works. De-watering risks (see below).
Earthworks below the water table	Potential groundwater ingress, leading to the need for de-watering (see below). Potential for pollution of groundwater.
Earthworks in areas prone to flooding or high flows	Potential for floods to inundate active work areas, causing erosion. Potential for construction activities to impact flood heights and flowpaths.
Loading and transport of materials	Potential for sedimentation impacts in receiving waters. Potential for rocks or sediments to be tracked onto public roads, leading to traffic safety issues and pollution of receiving waters. Potential for dust to be blown from trucks or plant.
Stockpiling of materials	Potential for sediment-laden runoff to wash offsite into receiving waters. Potential for dust to be blown offsite.
De-watering of groundwater or surface water detained onsite	Potential for polluted water to be accidentally discharged offsite.

4.3 Risk Assessment

Expected plant, machinery and vehicles onsite will include (but is not limited to):

- Excavators
- Rollers
- Bulldozers
- Piling rigs
- Graders
- Mobile cranes

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- Articulated truck combinations
- Body trucks
- Light vehicles.

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5 Erosion and Sediment Control Strategy

5.1 Staging, Scheduling and Decommissioning of Works

The following commitments apply to the timing, maintenance and decommissioning of all erosion and sediment control measures:

- Erosion and sediment controls will be implemented as part of initial site setup in all new work areas. This includes the construction of sediment retention basins (where required), including spillways and marker pegs.
- Erosion and sediment controls will be updated and modified as required as works proceed to ensure they remain relevant to the current stage of works and the identified level of environmental risk.
- Temporary erosion and sediment controls will remain in place until the upslope catchment has been rehabilitated/stabilised to achieve at least 75% functional ground cover over at least 90% of the catchment area.
- Erosion and sediment controls will be maintained, repaired and cleaned out as required until they can be safely decommissioned.
- Temporary erosion and sediment controls will not be left in place once works are complete and the upslope catchment rehabilitated/stabilised.

5.2 Safeguards

Table 5-1 contains a series of safeguards for the management of erosion and sediment control on this project.

Table 5-1 Safeguards and commitments for erosion and sediment control

Item	Detail	Responsibility*	Timing
General			
ESC1	Progressive ESCPs will be prepared for each specific stage or parcel of work prior to commencing construction in consultation with construction staff. These will be prepared in accordance with this table of safeguards.	Senior Environmental Advisor (SEA), Construction Manager (CM) & Project Engineer (PE)	Prior to construction
ESC2	A register of Progressive ESCPs will be maintained in the Project office, along with copies of all current Progressive ESCPs.	SEA	During construction
ESC3	Progressive ESCPs will be approved for use by the Environment Manager (or their representative).	SEA & CM	Prior to construction
ESC4	Progressive ESCPs will be updated as required to reflect the work activities. This can include "red-line markups" for minor changes.	SEA	During construction

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Item	Detail	Responsibility*	Timing
ESC5	Proposed water sources for construction activities will be determined. All necessary approvals and licences will be obtained before commencing extraction.	SEA	During construction
ESC6	All erosion and sediment controls will be designed and installed in accordance with best-practice guidelines such as with the Blue Book Volumes 1 and 2 (Landcom, 2004 and DECC, 2008), or, if those documents are insufficient, IECA (2008).	SEA, CM & PE	During construction
ESC7	Prior to or immediately following vegetation or soil disturbance, ESCMs will be implemented. These measures will remain in place for the duration of works unless revegetation or stabilisation has occurred in accordance with the requirements of this Primary ESCP.	SEA, CM & PE	During construction
ESC8	Weather forecasts will be monitored daily and relevant information passed onto construction personnel to allow for adequate planning for significant rain events.	SEA, CM & Safety	During construction
ESC9	Key management structures such as sediment traps and clean water diversions will be installed as early works to assist in effective site management. (i.e. prior to clearing and stripping) wherever practicable.	SEA, CM & PE	During construction
ESC10	Sufficient supplies of erosion and sediment control materials / products will be stored on site at all times. Storage locations will be provided in suitable location/s within the site compound(s).	SEA & CM	During construction
ESC11	Environmental events where pollution is caused or threatened will be managed in accordance with the TARP in Appendix C of the SWMP.	SEA & CM	During construction
ESC12	Environmental performance will be monitored and this Primary ESCP (and subsequent Progressive ESCPs and procedures) will be reviewed, updated and amended in accordance with the schedule in Section 5.1 of this Primary ESCP.	SEA	During construction
ESC13	Detailed design specifications for relevant erosion and sediment control devices are to be contained within the Progressive ESCPs and must be distributed to site crews before starting works	SEA & CM	During construction
Training and Resources			
ESC14	Erosion and sediment control aspects will be included in the site induction process for this project.	SEA & CM	Prior to and during construction

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Item	Detail	Responsibility*	Timing
ESC15	One or more CPESC-certified erosion and sediment control specialist(s) will be engaged and retained for the Project works (i.e. during 'high-risk' ESC work stages as a minimum) to provide specific advice and support on erosion and sediment control matters.	SEA	Prior to and during construction
ESC16	Erosion and sediment control training will be provided to relevant project staff in accordance with Section 5.3.	SEA	Prior to and during construction
Erosion and Drainage Control			
ESC17	Disturbance will be minimised to only that necessary for the upcoming works. Any exposed surfaces not required for construction will be progressively stabilised or revegetated.	SEA, CM & PE	During construction
ESC18	Progressive ESCPs will include a distinct focus on source control to minimise the generation of sediment from the Project.	SEA, CM & PE	Prior to and during construction
ESC19	Temporary ground covers (e.g. geofabric, soil binders, tarps or similar) will be used to provide temporary surface protection prior to rainfall on exposed surfaces within 20m of waterways. Rainfall forecast triggers are to be included in Progressive ESCPs for implementing this requirement. Note that if soil binders are to be used within KNP, selection shall be based on limited ecotoxicity and EPA endorsement	SEA & CM	During construction
ESC20	Minimise the volume of dirty water generated onsite. Dirty water collected will be reused onsite such as for dust suppression.	SEA & CM	During construction
ESC21	Separate 'clean' (offsite) run-on water from 'dirty' (onsite) construction area runoff.	SEA & CM	During construction
ESC22	Maximise the diversion of sediment-laden construction runoff into sediment controls. Use berms, bunds, sandbags, drains, pipes etc to achieve this.	SEA & CM	During construction
ESC23	Control runoff during the construction of batters (e.g. temporary windrows and batter chutes) to minimise the risk of scour.	SEA & CM	During construction
ESC24	Outlets of culverts / pipes are to include appropriate energy dissipation structures (e.g. scour rock).	SEA	During construction
ESC25	Adequate erosion controls (such as scour protection) will be applied to areas of concentrated flow to minimise erosion potential.	SEA & CM	During construction

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Item	Detail	Responsibility*	Timing
ESC26	Drains will be designed and sized to accommodate anticipated flows. Drain sizing and catchments are to be indicated on the Progressive ESCPs and, wherever practicable, align with the final design.	SEA, CM & PE	Prior to and during construction
Sediment Control			
ESC27	Turbid construction runoff from terrestrial construction areas will be directed into sediment retention devices.	SEA & CM	During construction
ESC28	Site generated mulch from clearing activities will be used as bunds wherever reasonable and practicable to minimise sediment loss.	SEA & CM	During construction
ESC29	Sediment controls will only be removed after appropriate stabilisation (to 75% minimum ground cover) of the upslope catchment is achieved or if catchment conditions dictate that they are no longer required.	SEA & CM	During construction
ESC30	Flocculant and coagulant use within KNP will be considerate of potential ecotoxicity and the requirement to comply with Section 120 of the POEO Act.	SEA	During construction
Access and Sediment Tracking			
ESC31	All vehicles leaving site onto sealed public roads will be required to ensure tyres, guards and drawbars are clear of excess sediment.	SEA & CM	During construction
ESC32	Use stabilised access points (in accordance with Blue Book) where vehicles exit onto sealed public roads from unsealed work areas.	SEA & CM	During construction
ESC33	Use street sweepers and broom trucks as required on public sealed roads to manage any sediment tracking.	SEA & CM	During construction
ESC34	Cover loads to minimise soil loss during transport on public roads.	SEA & CM	During construction
ESC35	Vehicle movements from site will be minimised during wet weather if the tracking of mud becomes an issue. Haul roads will be stabilised if they become a significant source of sediment using chemical sealers (e.g. Vital HR), or similar.	SEA & CM	During construction
ESC36	Clearly delineate access tracks, boundaries, exclusion zones using flagging, tape or similar.	SEA& CM	Prior to and during construction

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Item	Detail	Responsibility*	Timing
ESC37	Access tracks will be shaped and formed to minimise erosion and will be constructed and compacted using suitable material.	CM & PE	During construction
ESC38	Any imported materials (e.g. roadbase) observed to have washed offsite from access tracks is to be rectified as soon as is practicable.	SEA & CM	During construction
Waterway Crossings			
ESC39	Progressive ESCPs and/or Environmental Work Method Statements (EWMSs) are to indicate the specific controls to be used when working in and around natural or constructed drainage lines. These are to include (but are not limited to): - Monitoring weather forecasts and taking appropriate action prior. - Scheduling works to occur during no-flow or low-flow conditions. - Monitoring flows to aid with access. - Minimising the extent of work and the amount of time of disturbance. - Using clean rock, sheeting, steel plates, sheet piling or similar measures to isolate work areas from natural flows. - Use of temporary ground covers to minimise erosion of exposed soils during rainfall or high flows. - Permanent scour protection and stabilisation measures required for the operational phase will be installed early.	SEA, CM & PE	Prior to and during construction
ESC40	EWMSs will be prepared in accordance with <i>Guidelines for Controlled Activities on Waterfront Land</i> (NRAR, 2018) and <i>Policy and Guidelines for Fish Habitat Conservation</i> (DPI, 2013) and <i>Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings</i> (NSW Fisheries, 2003).	SEA	Prior to and during construction
ESC41	In-stream sediment controls must be fit for purpose and installed and maintained as per the manufacturer's recommendations.	SEA, CM & PE	Prior to construction

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Item	Detail	Responsibility*	Timing
ESC42	Clean rock will be used in drainage lines as required to form dissipaters, piling platforms, create crossing points or line channels. Work platforms or access tracks required in the vicinity of drainage lines will be constructed of large clean rock material wrapped or underlain with geofabric.	SEA, CM & PE	Prior to and during construction
ESC43	Stabilisation of drainage lines is to be commenced immediately after the completion of any works within these areas.	SEA, CM & PE	Prior to construction
ESC44	Waterway crossings (i.e. Sheep Station Creek) will be installed as per Blue Book detail and relevant guidelines. Any temporary crossings and/or 'in-stream' works will have an agreed work methodology applied, and relevant protective measures installed.	SEA & CM	During construction
Stockpiling and Soil Management			
ESC45	Stockpiles of soil material will only be placed in low-hazard areas, at least 50 m away from drainage lines, within total clear zones and away from the dripline of any retained trees.	SEA & CM	During construction
ESC46	Separate mulch, topsoil and subsoil, and stockpile them separately wherever practicable. Mixing and subsequent loss of materials will be avoided wherever practicable.	SEA & CM	During construction
ESC47	Topsoil can be used to construct clean water drain diversions upslope of work areas with the intention to reuse the topsoil during site rehabilitation.	SEA & CM	During construction
ESC48	Inactive or non-working sections of stockpiles will be covered / stabilised within 10 days.	SEA & CM	During construction
ESC49	Topsoil and mulch stockpiles or windrows will be constructed to no more than 2m in height. Stockpiles of spoil can be higher than 2m if required.	SEA & CM	During construction
ESC50	Stockpiles will be battered down to no steeper than 2:1 (H:V) where space permits.	SEA & CM	During construction
ESC51	Spray weed-infested topsoil to minimise weed growth and re-spray weeds regularly as they emerge.	SEA	During construction
ESC52	Efforts will be made to identify problem soils early (i.e. geotechnical investigations) and ensure avoidance, treatments or mitigations are applied as best practicable to mitigate issues – e.g. gypsum on dispersive soils, or lime for acidic soils.	SEA	During construction

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Item	Detail	Responsibility*	Timing
ESC53	Short-term (<30 days) stockpiles of mulch will be positioned at least 20m from waterways and will be bunded or have a ditch drain excavated around their base to detain any tannin-rich runoff. Long-term (>30 days) stockpiles of mulch will be positioned at least 50m from watercourses or sensitive areas and will be bunded or have a ditch drain excavated around their base to detain any tannin-rich runoff.	CM	During construction
Dust Control			
ESC54	Dust suppression will be carried out whenever necessary to minimise sediments becoming air borne due to wind erosion.	SEA & CM	During construction
ESC55	Where suitable, water detained onsite will be re-used for dust control.	SEA & CM	During construction
ESC56	Cover dust-creating loads while in transit on public roads.	SEA & CM	During construction
ESC57	Monitor weather forecasts to identify hot, windy and/or dry conditions when dust rise might be significant, and tailoring works to minimise dust issues if apparent	SEA & CM	During construction
Clearing and Stripping			
ESC58	Relevant erosion and sediment control measures will be implemented in accordance with the Blue Book (Landcom, 2004) for each particular section of works prior to the commencement of any clearing, stripping or earthworks (other than works required to install such controls).	SEA & CM	Prior to and during construction
ESC59	Clearing limits and work boundaries will be established and clearly defined prior to any construction, clearing or stripping works commencing.	SEA, CM & PE	During construction
ESC60	All vegetation that is to be maintained will be clearly delineated.	SEA & CM	During construction
ESC61	Land clearing will occur progressively and for the areas associated with the current section/stage of works only.	SEA, CM & PE	During construction
ESC62	Tree removal in waterways and in between tower structures will involve cut stump method, leaving grasses and small understory species undisturbed as much as possible.	SEA, CM & PE	During construction
ESC63	Cleared vegetation will be mulched onsite as left <i>in situ</i> as a ground cover (erosion control).	SEA & CM	During construction

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Item	Detail	Responsibility*	Timing
	However, mulch will not be used within 20m of a waterway if it is likely to produce excess tannins.		
De-watering			
ESC64	Water detained onsite will be re-used for dust control and other non-potable uses. This includes surface water accumulating within any sort of excavation, trap, trench or low point on site (but not groundwater inflows).	SEA & CM	During construction
ESC65	Dewatering is to be conducted in accordance with the SWMP and the relevant UGLMS.	SEA & CM	During construction
ESC66	Any groundwater encountered during construction will be managed such that it is not discharged off site. Options include on site reuse if compliant with testing requirements, or off-site disposal in accordance with the Waste Classification Guidelines (EPA, 2014).	SEA & CM	During construction
ESC67	It is reasonable to assume that applied ESC measures may reach overflow capacity when rainfall events exceed design. Where this is likely, such measures will have appropriate scour protection and/or dissipation measures applied.	SEA, CM & PE	During construction
Wet Weather Preparedness and Response			
ESC68	Prior to forecast rainfall events of 10mm or more, end-of-day controls to be utilised to help reduce erosion and control sediment will include one or more of the following: • Check dams • Slope breaks • Batter chutes • Fill windrows • Temporary ground covers. • This will be detailed on Progressive ESCPs.	SEA & CM	During construction
ESC69	Prior to forecast heavy rainfall (more than 20mm), the Environment manager or their representative will inspect active work areas and note any areas requiring additional management measures.	SEA	During construction
ESC70	Earthworks will cease during heavy rainfall events where a risk of sediment loss from site is apparent.	SEA & CM	During construction
Site Inspection and Maintenance of ESCMs			

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Item	Detail	Responsibility*	Timing
ESC71	The Environment Manager (or their representative) will inspect erosion and sediment controls measures across the site: • at least weekly; and • prior to forecast rainfall of 20mm; and • if safe to do so, following rainfall of 20mm or more. Inspections will include checks of drainage, erosion and sediment controls and site discharge points to determine effectiveness and maintenance requirements. Inspections will consider issues such as: - Sediment transport and or deposition either on or off site; - Evidence of excessive erosion; - Erosion & sediment control device maintenance & loading (including basins) - Any additional controls required; - Any updates required to Progressive ESCPs; - Maintenance, treatment and or de-watering requirements; and - Stability of reinstatement, rehabilitation and revegetation works.	SEA	During construction
ESC72	Corrective maintenance to address any damage to erosion and sediment controls is to be scheduled and completed as necessary (i.e. prior to rainfall events).	SEA & CM	During construction
ESC73	Sediment controls will be cleaned out as required no more than 5 days after rainfall to ensure at least 60% capacity in all sediment controls. Sediment will be taken to a stockpile or added to general fill.	SEA & CM	During construction
ESC74	Any sediment basins applied will be designed, verified, and have depth markers added to provide visibility on storage levels and sediment accumulation. Basins will be managed for dewatering requirements as per UGLMS-4-1324 Irrigation and Disposal Permit and be regularly checked (at least 3 monthly) for sediment accumulation. If sediment accumulation exceeds the allocated settling zone, basin de-mucking will occur. Removed sediment should be tested and treated for reinstatement under the Spoil Management Plan; or managed in accordance	SEA & CM	During construction

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Item	Detail	Responsibility*	Timing
	with the Waste Classification Guidelines (EPA, 2014) for off-site disposal.		
Stabilisation and Rehabilitation			
ESC75	Undertake progressive stabilisation of ground surfaces as they are completed rather than at the end of the works program.	SEA & CM	During construction
ESC76	In areas to be revegetated, progressively rehabilitate disturbed areas utilising appropriate species. Refer to the project Rehabilitation Plan in the Biodiversity Management Plan when developed. Required 12 months after the start of construction.	SEA	During construction
ESC77	Stabilise and/or rehabilitate lands within 20 days of works being completed; or if an area will be left inactive for more than 20 days.	SEA, CM & PE	During construction
ESC78	In revegetation areas, re-spread topsoil to minimum 50mm depth (or to natural depth if less than 50mm) over completed areas prior to seeding or planting. Ensure topsoil is properly keyed with subsoil, especially on slopes, to avoid slippage/slumping.	SEA, CM & PE	During construction

5.3 Erosion and Sediment Control Training

Erosion and sediment control training will include (but not be limited to) the following topics:

- Environmental legislation
- The environmental impacts of erosion and sedimentation from construction sites
- Principles of erosion and sediment control
- Techniques for erosion and sediment control
- Inspecting and maintaining erosion and sediment controls
- Dewatering.

This can be provided as part of the wider project induction or as specialised, targeted training for key site personnel.

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6 Performance Tracking and Document Review

6.1 Reporting

Reporting is required as part of the CEMP. Refer to that document for relevant requirements.

A requirement for inspection of erosion and sediment controls is included in Table 5-1 in Section 5.1.

6.2 Record Keeping

All documents and records referred to within and required to implement this Primary ESCP (including relevant Progressive ESCPs) will be maintained according to the Project's QA and record management system. Refer to the CEMP and SWMP for details. Progressive ESCPs will be kept up to date with measures applied in the field, with advice first sort from the project CPESC(s) should field constraints prompt ESC alterations or modifications.

6.3 Non-Conformance, Corrective and Preventative Actions

Environmental inspection, observation and monitoring results are interpreted to identify actual and potential non-conformances with this Primary ESCP and events that could result in nuisance, environmental harm events, or unacceptable loss of amenity or community complaints.

Refer to the relevant UGL process relating to non-conformance as detailed in the CEMP. All incidents and non-conformances and their corresponding actions will be entered into UGL's internal tracking system (i.e. Synergy) and then closed out.

Where failures are identified, investigation and consultation will occur to remedy or improve outcomes and as best practicable prevent reoccurrence.

6.4 Document Review

Continual improvement is achieved through constant measurement and evaluation, audit and review of the effectiveness of the plan, and adjustment and improvement of the CEMP and relevant sub-plans.

This Primary ESCP will be updated as required:

- To take into account changes to the environment or generally accepted environmental management practices, new risks to the environment, or changes in law;
- Where required by the client, NSW EPA or any other regulatory authority; or
- In response to internal or external audits or regular management reviews.

The updated plan must be endorsed and approved internally by the Environment Manager.

If revisions to the Primary ESCP are required, the plan will be submitted to the Planning Secretary for approval and comply with the COA C2 (Revision of Strategies, Plans and Programs) and COA C3 (Updating and Staging of Strategies, Plans and Programs).

Minor changes do not require approval. Minor changes would typically include those that:

- Are editorial in nature (e.g. staff or name changes);

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- Do not increase the magnitude of impacts on the environment when considered individually or cumulatively;
- Do not compromise the ability of the Project to meet approval or legislative requirements.

Preparation of Progressive ESCPs as required by this Primary ESCP does not warrant updating this Primary ESCP unless one of the above update triggers occurs as part of preparing the Progressive ESCP.

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Primary Erosion and Sediment Control Plan

7 References

Landcom (2004). Managing Urban Stormwater: Soils and Construction. Volume 1. NSW Government, Sydney.

DECC (2008). Managing Urban Stormwater: Soils and Construction. Volume 2A: Installation of Services. NSW Government, Sydney.

DECC (2008). Managing Urban Stormwater: Soils and Construction. Volume 2C: Unsealed Roads. NSW Government, Sydney

IECA (2008). Best Practice Erosion and Sediment Control. IECA Australasia, Picton NSW.

OEHS NSW Government eSpade web portal. www.espade.environment.nsw.gov.au

APPENDIX E: Progressive Erosion and Sediment Control Plan

BACKGROUND

This Progressive Erosion and Sediment Control Plan (PESCP) provides details for soil and water management associated with the Maragle 330kV Switching Station, Transmission Line Access Tracks and Associated Tower Pad works. This Progressive ESCP has been prepared to meet recognised best–practice as defined by Landcom (2004) and DECC (2008) (The Blue Book Volumes 1 and 2C respectively).

EROSION HAZARD ASSESSMENT

A = R x K x LS x P x C

The following values have been used:

- R : 1,500
- K : 0.05 (conservative assumption)
- LS : ranges from 2.03 (5.5m, 50%) to 4.15 (80m, 13%)
- P : 1.3 (construction stage – i.e. no soil surface protection or ground cover applied)
- C : 1 (for disturbed construction areas)

Based on the above data, the potential soil loss at this site ranges from approx. 198 t/ha/yr (Soil Loss Class 2: low) to 405 t/ha/yr (Soil Loss Class 4: moderate).

330kV Switching Yard

Under Blue Book standards sediment basins are required if the soil loss in any catchment is >200 t/yr. The 330kV switching yard comprises of three (3) disturbed catchments of approx. 5.1 ha (CA1), 0.85 ha (CA2) and 0.25 ha (CA3), with the potential soil loss in each catchment being 1,020 t/yr (CA1), 344.3 t/yr (CA2) and 37.2 t/yr (CA3). Therefore, sediment basins are required for CA1 and CA2 as the potential soil loss in each catchment is >200 t/yr.

However, due to the proximity to the existing transmission line on the eastern side of the existing track a sediment basin cannot feasibly be constructed within CA2. Therefore an alternative control (i.e. mulch bund sediment trap) is required augmented with a requirement to apply at least 60% cover on all exposed batters and steep slopes >10%, either within 14 days of batter completion, or prior to forecast rainfall (>50% chance of 10mm or more in 24 hours) (which ever is triggered first). Erosion protection will be either mulch, Erosion Control Blanket (ECB), or a biodegradable spray on soil binder (if usage is first endorsed by the EPA).

Transmission Line Access Tracks, Tower Pads and Brake and Winch Sites

Refer to PESCP03–22 for Transmission Line Access Tracks and Associated Tower Pads Erosion Hazard Assessments.

SEDIMENT BASIN DESIGN ASSUMPTIONS

- Sediment basin design rainfall depth: 5–day, 90th percentile rainfall depth = 41.1 mm. Calculated from IFD Data (1yr, 120hr) rainfall intensity (0.803 mm/hr).
- Volumetric runoff coefficient (Cv) = 0.69 (assuming hydrologic group D runoff coefficient – low infiltration, high runoff)
- The sediment basin is to be properly designed and constructed to the required standard, inclusive of all key requirements. Refer to the ‘Sediment Basin Construction and Maintenance Instructions’ notes on PESCP29.

GENERAL INSTRUCTIONS

- Weather forecasts are to be monitored daily and the site prepared to minimise erosion, control drainage and maximise sediment capture during rain events. Erosion and sediment controls removed or damaged during construction are to be repaired or reinstated prior to forecast rainfall.
- Numbering on PESCP02–23 indicates the order that works are to be undertaken (i.e. 1 then 2, then 3 etc).
- Erosion and sediment controls are to be implemented as part of initial site works, except as noted in this plan.
- Minimise disturbance at any one time to only what is necessary for safe and efficient construction. Do not disturb new areas when rain is imminent unless appropriate controls can be implemented prior to rain occurring.
- Undertake dust suppression as required to minimise the risk of dust rise.
- Biodegradable soil polymers are to be applied as per the manufacturers specifications to achieve at least 60% cover.
- Refer to the project specific Trigger Action Response Plan (TARP) for management actions to address the risk of sediment loads detrimental to the Booroolong Frog entering the system.
- Undertake regular site inspections, monitoring and maintenance in accordance with the ‘Site Inspections, Monitoring and Maintenance’ notes.
- Undertake progressive stabilisation of lands as final earthworks are completed in each area (rather than waiting until the completion of all works).
 - Final rehabilitation is to achieve the C–factors (ground cover) detailed below:
 - C–factor of 0.1 (>= 60% ground cover) within 20 days; and
 - C–factor of 0.05 (at least 70% ground cover) within 2 months/at completion of works.
 - Areas to be revegetated are to be topsoiled first. Refer to Blue Book Standard Drawing SD 4–2 on PESCP26.
 - Appropriate seedbed preparation should be carried out when revegetating lands. Refer to Blue Book Standard Drawing SD 7–1 on PESCP28.
- As areas are completed (i.e. at least 90% of any finished area has at least 70% final ground cover), temporary sediment and drainage controls can be decommissioned and removed.
 - Where possible maintain coir log or rock check dams within permanent drains to aid in reducing run off velocities.

TOPSOIL STRIPPING AND SOIL MANAGEMENT

Soils are to be stripped and managed in accordance with the following:

- As much as possible soil is to be stripped when moist (not too wet or dry).

All stockpiles must be constructed and maintained in accordance with Blue Book Standard Drawing SD 4–1 (PESCP25) and the following:

- Mulched vegetation, topsoil and subsoil (if applicable) are to be stockpiled separately wherever possible.
- Inactive stockpiles are to be stabilised to achieve a C–factor of 0.1 (i.e. – equivalent to 60% grass cover) within 10 days of formation using a biodegradable soil polymer (e.g. Vital Stonewall), geotextile, jute matting or equivalent.

- Topsoil stockpiles should be constructed to no more than 2 meters in height wherever possible.
- Stockpiles should be battered down at a maximum slope of 2:1 wherever possible.

SEDIMENT BASIN MAINTENANCE INSTRUCTIONS

- The sediment basin is to be maintenance–cycled following rainfall. Within 5–days after rainfall causing runoff:
 - De–water the sediment basin following the ‘Dirty Water Treatment and Discharge Requirements’ noted below;
 - Check the level of accumulated sediment in sediment basin SB1. If it exceeds a volume of 131 m³, de–silt the basin. Material removed from the basin must be taken to an active stockpile or spoil dump.
 - Note the maximum nominated depth/level of accumulated sediment in the basin will depend on a detailed sediment basin design (completed by others).
 - Note that if rainfall (sufficient to generate runoff) occurs within 5 days of the previous rainfall event, the 5–day maintenance requirement is reset.
- After each rainfall event, inspect sediment basins to ensure spillways and inlet points are stable and free from scour. Repair as required.

Additional sediment basin notes:

- Refer to the ‘Sediment Basin Construction and Maintenance Instruction’ notes on PESCP29 for additional notes and instructions.
- Min. total sediment basin sizing volume = 1,609 m³ (1,609 ML).

DIRTY WATER TREATMENT AND DISCHARGE REQUIREMENTS

- If the water is going to be used within the construction site for dust–suppression or construction purposes and will drain back into the sediment capture system it does not require treatment or will be irrigated onto vegetated lands within the project area.

SITE INSPECTIONS, MONITORING AND MAINTENANCE

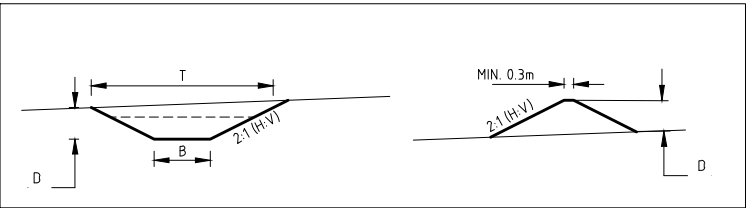
- Prior to forecast rainfall of 10mm or more in 24 hours, undertake the ‘Pre and Post Rainfall Inspection Checklists (Appendix K of the Project CEMP)’.
- Regular site inspections are to be conducted by the site environment manager (or their representative) of temporary controls and general site conditions and records of all such inspections are to be retained onsite. Inspections are to be undertaken in accordance with the UGL inspection checklist or as per the below:
 - At least weekly during normal construction hours; and
 - Prior to forecast significant rainfall (>50% chance of 20mm or more in 24 hours); and
 - Following rainfall of 20mm or more (if safe to do so).
- Additional erosion and sediment controls will be installed as necessary to ensure satisfactory outcomes in keeping with the project approval conditions and best–practice Blue Book guidelines.
- Progressive ESCPs will be updated as required to reflect changes in design or site conditions.
- After rainfall, sediment accumulated within trapping devices (e.g. sediment traps, check dams, mulch or earth bunds) will be removed to a secure location where it cannot wash or blow offsite (preferably to an active stockpile).
- Weather conditions will be monitored onsite and daily rainfall will be recorded.
- Safe storage areas for wastes, fuels, excess concrete and other potential contaminants are to be delineated by the site manager. Exact locations TBC onsite.
- Adequate supplied of erosion control measures (e.g. geofabric rolls, jute matting, biodegradable soil polymers) are to be maintained in the site compound for rapid deployment as required.
- Batter chutes (Refer to IECA Standard Drawings CH–01 & 02 on PESCP28) are to be provided down batters (where necessary) to minimise the risk of scour. Refer to PESCP02–23 for locations.
- Prior to significant rainfall (>50% chance of 20mm or more in 24 hours) and forecast high winds the Environment Manager (or their representative) will advise required ESC protective measures to be applied, following a pre–rainfall inspection detailed above.
- Prior to site shutdown (e.g. Christmas/New Year break) conduct the site shutdown checklist within the UGLMS Emergency Response Plan.

ASPECTS OF MARAGLE 330kV SWITCHING AND TRANSMISSION LINE ESCP CONSIDERED ‘BEYOND BLUE BOOK’

- The requirement to maintain mulch cover over all inactive areas where ground disturbance has occurred, using mulch won onsite as a result of vegetation clearing. Typical Blue Book requirements are for disturbed lands to be stabilised within 20 days of inactivity. However, the ESCP requires the use of mulch cover to stabilise all inactive areas following disturbance.
- The requirement to ‘Rapidly Rehabilitate’ disturbed areas within 14 days of completion. Typical Blue Book requirements are for disturbed lands to be stabilised within 20 days of inactivity.
- The requirement to stage disturbance to minimise the amount of exposed area at any one time is designed to minimise the potential soil loss in each catchment by minimising the amount of disturbed area. Typical Blue Book standards do not include a specific requirement to stage disturbance within a single catchment.
- The sediment basin design rainfall event has been increased to the 5day, 90th%ile event (41.1mm). Typical Blue Book standard require the 5day, 85th%ile to be adopted.
- The inclusion of large mulch or earth bunds (min. 700–1,000mm high) with regular ‘returns’ and lined spillway weirs in all low points. These are proposed in catchments where sediment basins are not required under Blue Book standards (based on the erosion hazard assessment detailed in Section 6.3.2 (d)). The sediment retention performance of large mulch or earth bunds exceeds that of typical Blue Book controls such as silt fence, and provides a significant sustainability benefit through beneficial reuse of cleared vegetation.
- The inclusion of multiple sediment traps/sumps (or large fabric–wrapped rock check dams) in ‘higher risk’ sections of the access tracks to provide additional capacity, to reduce runoff velocities in those area and to minimise the risk of point loading high risk areas of site. Typical Blue Book standards do not include a specific requirement for the number of sediment traps/sump in a single catchment.
- A CPESC is to be engaged to support and advise during ‘high risk’ ESC activities. CPESC should be ‘field inspection authority’ qualified.



PHOTO 1: EXAMPLE OF SILT FENCE WRAPPED UP AND BEHIND PIPE OUTLET.



DETAIL 1: CLEAN/DIRTY WATER DIVERSION DRAIN/BUND

TABLE 1: CLEAN/DIRTY WATER DIVERSION DRAIN/BUND MIN. LINING AND SIZING REQUIREMENTS.

DRAIN SIZING DETAILS	Refer to ‘Detail 1’ above		
Structure Name	CD1	DD1a	DD1b
Channel Details			
Flow Rate, Q (m ³ /s)	0.107	0.828	0.279
Flow depth (m)	0.14	0.13	0.13
Channel/bund depth, D (m)	0.3	0.3	0.3
Channel base width, B (m)	0.5	3.5	1
Channel side slope (H:V)	2	2	2
Channel top width, T (m)	1.7	4.7	2.2
Lining Type	A	A	A
Drain slope (%)	1.5	5	5.5

DRAIN/BUND STABILISATION AND LINING

Soil preparation prior to lining drains:

- Refer to Blue Book Standard Drawing SD 5–7 on ESCP07;
- Place topsoil over entire drain/bund surface to a minimum depth of 75mm.

Drain lining:

TYPE A:

- Jute mesh + seeding (or equivalent) + increased binder/backfiller & cellulose fibre.
- Vital P47 to be applied at a maximum dilution of 1:10 (Vital:Water).
- Seeding: Only native seed mixes are to be used.

Watering:

- Regular watering required where rainfall is insufficient.
- Ensure water is applied gently (not with a pressure spray).

DOCUMENT CERTIFICATION

This plan has been developed based on agreed requirements as understood by SEEC at the time of engagement. If applies only to a specific task on the nominated lands. Other interpretations should not be made, including changes in scale or application to other projects. Changes to the project scope or extent might impact on the validity of this plan. This plan is not to be updated or modified except by consultation with SEEC.

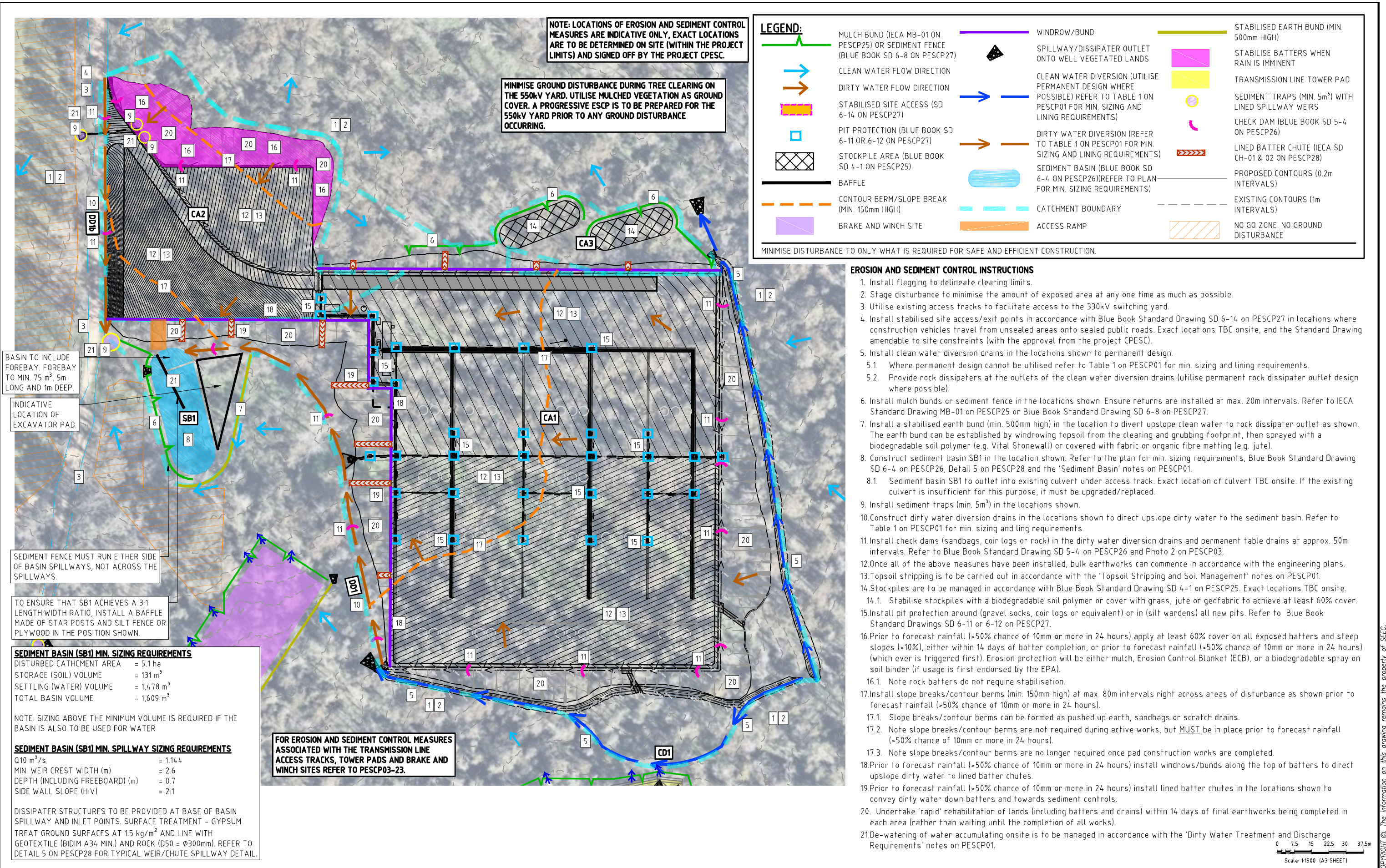
Any recommendations contained in this plan are based on an honest appraisal of the opportunities and constraints that existed at the site at the time of investigation, or as advised to us. Such recommendations are potentially subject to the limited scope and resources available. Within the confines of the above statements and to the best of my knowledge, this plan does not contain any incomplete or misleading information.



10564
Liam O’Rourke

REV	DATE	DES.	DRN.	APP.	REVISION DETAILS	DRAWING STATUS	North	CLIENT	PROJECT TITLE	DRAWING TITLE						
06	25/10/23	L.O.	L.O.	A.M.	FINAL ISSUE – MINOR AMENDMENTS TO REFLECT CLIENT COMMENTS	DESIGN BY L.O.				MARAGLE 330kV SWITCHING STATION AND 300kV TRANSMISSION LINE CONNECTIONS	ESCP – BACKGROUND INFORMATION, INSTRUCTIONS AND GENERAL NOTES – SHEET 1 OF 29					
05	24/10/23	L.O.	L.O.	A.M.	FINAL ISSUE – AMENDED TO REFLECT CLIENT COMMENTS	DRAWN BY L.O.										
04	14/09/23	L.O.	L.O.	A.M.	FINAL ISSUE – AMENDED TO REFLECT CLIENT COMMENT	FINAL APPROVAL A.M.										
03	04/09/23	L.O.	L.O.	A.M.	FINAL ISSUE	SCALE: (on A3 Original) N.T.S.										
02	12/05/23	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.03)	FINAL										
01	14/11/22	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.02)											
00	05/10/22	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.01)											
A	04/10/22	L.O.	L.O.	A.M.	DRAFT ISSUE – FOR CONSULTATION											
Plot Date: Wednesday, 25 October 2023 6:59:01 PM CAD File Name: M:\22000398 Snowy 2 – Moragle Transmission Line\Drawings\22000398_PO2_PESCP_REV 06.dwg																

This drawing is subject to COPYRIGHT ©. The information on this drawing remains the property of SEEC.



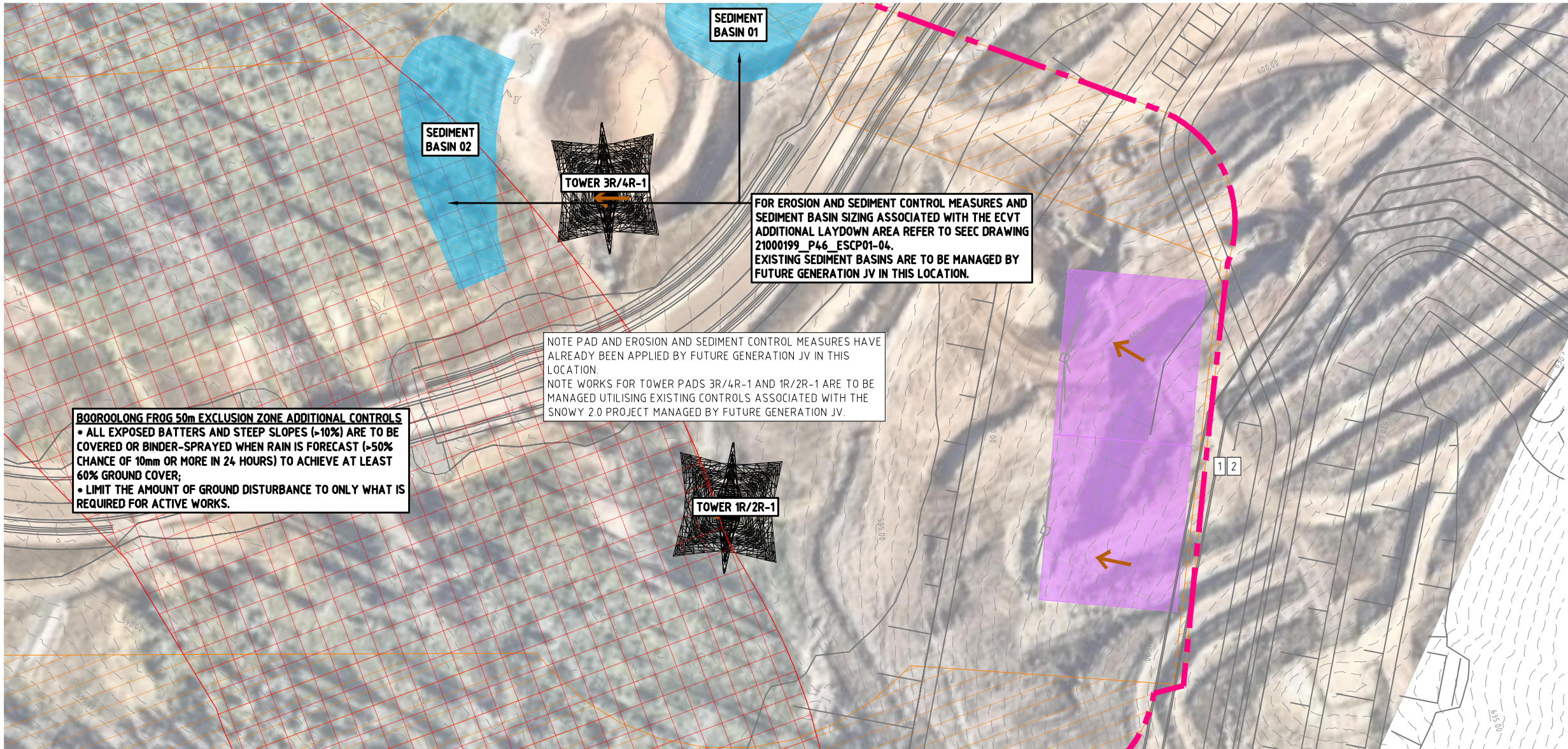
REV	DATE	DES.	DRN.	APP.	REVISION DETAILS	DESIGN BY	L.O.	DRAWING STATUS	North	CLIENT	PROJECT TITLE	DRAWING TITLE	PROJECT NO.	SUB-PR NO.	DRAWING NO.	REV
06	25/10/23	L.O.	L.O.	A.M.	FINAL ISSUE - MINOR AMENDMENTS TO REFLECT CLIENT COMMENTS	DESIGN BY	L.O.	FINAL				MARAGLE 330kV SWITCHING STATION AND 300kV TRANSMISSION LINE CONNECTIONS	22000398	P02	PESCP02	06
05	24/10/23	L.O.	L.O.	A.M.	FINAL ISSUE - AMENDED TO REFLECT CLIENT COMMENTS	DESIGN BY	L.O.									
04	14/09/23	L.O.	L.O.	A.M.	FINAL ISSUE - AMENDED TO REFLECT CLIENT COMMENT	FINAL APPROVAL	A.M.									
03	04/09/23	L.O.	L.O.	A.M.	FINAL ISSUE	SCALE: (on A3 Original)	1:1000									
02	12/05/23	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.03)											
01	14/11/22	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.02)											
00	05/10/22	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.01)											
A	04/10/22	L.O.	L.O.	A.M.	DRAFT ISSUE - FOR CONSULTATION											

Plot Date: Wednesday, 25 October 2023 6:59:53 PM CAD File Name: M:\22000398 Snowy 2 - Moragale Transmission Line\Drawings\22000398_P02_PESCP_REV 06.dwg

Suites 7 & 8, 68-70 Station Street PO Box 1098, Bowral NSW 2576. (0) 02 4862 1633 (0) 02 4862 3088 email: reception@seec.com.au WWW.SEEC.COM.AU

Scale: 1:1500 (A3 SHEET)

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NOTE: LOCATIONS OF EROSION AND SEDIMENT CONTROL MEASURES ARE INDICATIVE ONLY, EXACT LOCATIONS ARE TO BE DETERMINED ON SITE (WITHIN THE PROJECT LIMITS) AND SIGNED OFF BY THE PROJECT CPSC.

BOOROOLOONG FROG 50m EXCLUSION ZONE ADDITIONAL CONTROLS
• ALL EXPOSED BATTERS AND STEEP SLOPES (>10%) ARE TO BE COVERED OR BINDER-SPRAYED WHEN RAIN IS FORECAST (>50% CHANCE OF 10mm OR MORE IN 24 HOURS) TO ACHIEVE AT LEAST 60% GROUND COVER;
• LIMIT THE AMOUNT OF GROUND DISTURBANCE TO ONLY WHAT IS REQUIRED FOR ACTIVE WORKS.

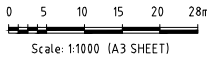
NOTE PAD AND EROSION AND SEDIMENT CONTROL MEASURES HAVE ALREADY BEEN APPLIED BY FUTURE GENERATION JV IN THIS LOCATION.
NOTE WORKS FOR TOWER PADS 3R/4R-1 AND 1R/2R-1 ARE TO BE MANAGED UTILISING EXISTING CONTROLS ASSOCIATED WITH THE SNOWY 2.0 PROJECT MANAGED BY FUTURE GENERATION JV.

FOR EROSION AND SEDIMENT CONTROL MEASURES AND SEDIMENT BASIN SIZING ASSOCIATED WITH THE ECVT ADDITIONAL LAYDOWN AREA REFER TO SEEC DRAWING 21000199_P46_ESCP01-04. EXISTING SEDIMENT BASINS ARE TO BE MANAGED BY FUTURE GENERATION JV IN THIS LOCATION.

- LEGEND:**
- MULCH OR EARTH BUND (MIN. 700-1,000mm HIGH) (DETAIL 4 & IECA MB-01 ON PESCP25)
 - CLEAN WATER FLOW DIRECTION
 - DIRTY WATER FLOW DIRECTION
 - WHOA-BOYS (OR EQUIVALENT)
 - CLEAN WATER DIVERSION (UTILISE PERMANENT DESIGN WHERE POSSIBLE)
 - CHECK DAM (BLUE BOOK SD 5-4 ON PESCP26 & PHOTO 2 ON PESCP03)
 - DISSIPATER OUTLET ONTO WELL VEGETATED LANDS
 - TRANSMISSION LINE TOWER PAD
 - EXISTING CONTOURS (1m INTERVALS)
 - SEDIMENT TRAP (REFER TO DETAIL 3 ON PESCP25)
 - STABILISED EARTH BUND (MIN. 500mm HIGH)
 - SILT FENCE WRAPPED UP AND BEHIND NEW HEADWALLS (REFER TO PHOTO 1 ON PESCP01)
 - LINED SPILLWAY WEIR (REFER TO DETAIL 4 ON PESCP25)
 - TEMPORARY CLEAN WATER PIPE
 - WINDROW/BUND
 - CONSTRUCTION BOUNDARY
 - LINED BATTER CHUTE (IECA SD CH-01 & 02 ON PESCP28)
 - BRAKE AND WINCH SITE
 - BOOROOLOONG FROG 50m EXCLUSION ZONE
 - NO GO ZONE. NO GROUND DISTURBANCE
 - STABILISED SITE ACCESS/EXIT (BLUE BOOK SD 6-14 ON PESCP27)
 - ECVT ADDITIONAL LAYDOWN AREA SEDIMENT BASINS (REFER TO SEEC DRAWING 21000199_P46_ESCP01-04 FOR MIN. SIZING REQUIREMENTS)
- MINIMISE DISTURBANCE TO ONLY WHAT IS REQUIRED FOR SAFE AND EFFICIENT CONSTRUCTION.

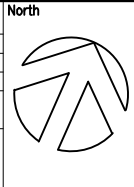


PHOTO 2: EXAMPLE OF CHECK DAM WITH CENTRALISED SPILLWAY.



REV	DATE	DES.	DRN.	APP.	REVISION DETAILS
06	25/10/23	L.O.	L.O.	A.M.	FINAL ISSUE - MINOR AMENDMENTS TO REFLECT CLIENT COMMENTS
05	24/10/23	L.O.	L.O.	A.M.	FINAL ISSUE - AMENDED TO REFLECT CLIENT COMMENTS
04	14/09/23	L.O.	L.O.	A.M.	FINAL ISSUE - AMENDED TO REFLECT CLIENT COMMENT
03	04/09/23	L.O.	L.O.	A.M.	FINAL ISSUE
02	12/05/23	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.03)
01	14/11/22	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.02)
00	05/10/22	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.01)
A	04/10/22	L.O.	L.O.	A.M.	DRAFT ISSUE - FOR CONSULTATION

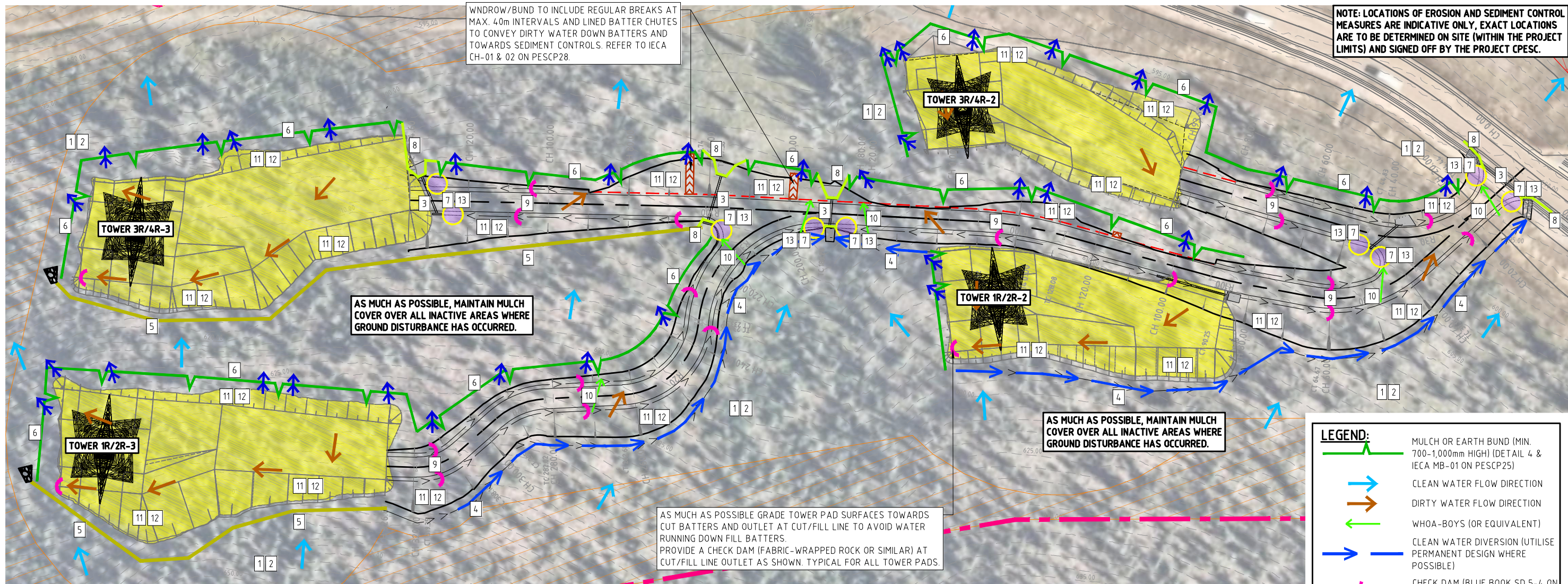
DRAWING STATUS	
DESIGN BY	L.O.
DRAWN BY	L.O.
FINAL APPROVAL	A.M.
SCALE:	1:1000
(on A3 Original)	
FINAL	



Suites 7 & 8, 68-70 Station Street
PO Box 1098, Bowral NSW 2576.
(t) 02 4862 1633
(f) 02 4862 3088
email: reception@seec.com.au
WWW.SEEC.COM.AU

PROJECT TITLE
**MARAGLE 330kV SWITCHING
STATION AND 300kV
TRANSMISSION LINE
CONNECTIONS**

DRAWING TITLE EROSION AND SEDIMENT CONTROL PLAN - TOWER PADS 3R/4R-1 & 1R/2R-1 - SHEET 3 OF 29			
PROJECT NO.	SUB-PR NO.	DRAWING NO.	REV
22000398	P02	PESCP03	06



EROSION HAZARD ASSESSMENT – Transmission Line Access Track 8 and Associated Tower Pads

A = R x K x LS x P x C

The following values have been used:

R	: 1,500
K	: 0.05 (conservative assumption)
LS	: 6.69 (40m, 30%)(existing surface)
P	: 1.3 (construction stage – i.e. no soil surface protection or ground cover applied)
C	: 1 (for disturbed construction areas)

Based on the above data, the potential soil loss at this site is approx. 652 t/ha/yr (Soil Loss Class 5: (high).

Under Blue Book standards sediment basins are required if the soil loss in any catchment is >200 t/yr. Therefore, under Blue Book Standards sediment basins are required for all disturbed catchments greater than 0.3 ha on this site. However, sediment basins cannot feasibly be constructed due to the existing steep topography (approx. 30%). As such alternative controls are proposed instead, augmented with a requirement to cover or binder-spray all batters (not including rock batters) and steep slopes (>10%) when rain is imminent. Access Track 8 and associated Tower Pad works must also be staged as much as possible to minimise the amount of disturbed area at any one time.

EROSION AND SEDIMENT CONTROL INSTRUCTIONS

1. Install flagging to delineate clearing limits.
2. Stage disturbance to minimise the amount of exposed area at any one time as much as possible.
3. Construct permanent culverts/pipes early and utilise as construction phase cross alignment drainage. Refer to Details 1 and 2 on PESCP24.
4. Construct upslope clean water diversions. Utilise permanent design wherever possible for this purpose.
 - 4.1. Alternatively install stabilised earth bunds (min. 500mm high). Refer to instruction 5 below.

5. Construct stabilised earth bunds (min. 500mm high) upslope of areas of disturbance to direct upslope clean water to culverts/pipes or rock dissipater outlets as shown.
 - 5.1. Earth bunds can be established by windrowing topsoil from the clearing and grubbing footprint, then sprayed with a biodegradable soil polymer (e.g. Vital Stonewall) or covered with fabric or organic fibre matting (e.g. jute).
6. Install mulch or earth bunds (min. 700-1,000mm high) downslope of disturbance areas as shown. Mulch or earth bunds must include regular returns at max. 20m intervals and lined spillway weirs in all low points. Refer to Detail 4 and IECA Standard Drawing MB-01 on PESCP25.
7. Construct sediment traps in the locations shown. Refer to Detail 3 on PESCP25.
 - 7.1. Alternatively install large fabric wrapped rock check dams. Refer to Blue Book Standard Drawing SD 5-4 on PESCP26.
8. Wrap sediment fence up and behind new head walls. Refer to Photo 1 on PESCP01.
9. Place check dams (sandbags, coir logs or rock) in new drains prior to forecast rainfall (>50% chance of 10mm or more in 24 hours) at max. 20m intervals in high risk areas and where drains grade at 10% or more, or approx. 50m intervals in all other areas (<10% grade). Refer to Blue Book Standard Drawing SD 5-4 on PESCP26 and Photo 2 on PESCP03.
10. During initial earthworks (prior to access tracks being properly graded), install whoa-boys (or equivalent) at max. 80m intervals right across access tracks to turn water out into downslope perimeter controls at regular intervals and to avoid having all water run down the access tracks to a single low point.
11. All exposed batters and steep slopes (>10%) are to be covered or binder-sprayed when rain is forecast (>50% chance of 10mm or more in 24 hours) to achieve at least 60% ground cover. Erosion protection will be either mulch, Erosion Control Blanket (ECB), or a biodegradable spray on soil binder (if usage is first endorsed by the EPA).
 - 11.1. Note rock batters do not require temporary stabilisation.
12. Undertake 'rapid' rehabilitation of lands (including batters and drains) within 14 days of final earthworks being completed in each area (rather than waiting until the completion of all works).
13. De-watering of water accumulating onsite is to be managed in accordance with the 'Dirty Water Treatment and Discharge Requirements' notes on PESCP01.

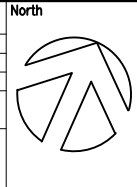
LEGEND:

- MULCH OR EARTH BUND (MIN. 700-1,000mm HIGH) (DETAIL 4 & IECA MB-01 ON PESCP25)
- CLEAN WATER FLOW DIRECTION
- DIRTY WATER FLOW DIRECTION
- WHOA-BOYS (OR EQUIVALENT)
- CLEAN WATER DIVERSION (UTILISE PERMANENT DESIGN WHERE POSSIBLE)
- CHECK DAM (BLUE BOOK SD 5-4 ON PESCP26 & PHOTO 2 ON PESCP03)
- DISSIPATER OUTLET ONTO WELL VEGETATED LANDS
- TRANSMISSION LINE TOWER PAD
- EXISTING CONTOURS (1m INTERVALS)
- SEDIMENT TRAP (REFER TO DETAIL 3 ON PESCP25)
- STABILISED EARTH BUND (MIN. 500mm HIGH)
- SILT FENCE WRAPPED UP AND BEHIND NEW HEADWALLS (REFER TO PHOTO 1 ON PESCP01)
- LINED SPILLWAY WEIR (REFER TO DETAIL 4 ON PESCP25)
- TEMPORARY CLEAN WATER PIPE
- WINDROW/BUND
- CONSTRUCTION BOUNDARY
- LINED BATTER CHUTE (IECA SD CH-01 & 02 ON PESCP28)
- NO GO ZONE. NO GROUND DISTURBANCE
- STABILISED SITE ACCESS/EXIT (BLUE BOOK SD 6-14 ON PESCP27)
- MINIMISE DISTURBANCE TO ONLY WHAT IS REQUIRED FOR SAFE AND EFFICIENT CONSTRUCTION.

0 5 10 15 20 28m
Scale: 1:1000 (A3 SHEET)

REV	DATE	DES.	DRN.	APP.	REVISION DETAILS
06	25/10/23	L.O.	L.O.	A.M.	FINAL ISSUE – MINOR AMENDMENTS TO REFLECT CLIENT COMMENTS
05	24/10/23	L.O.	L.O.	A.M.	FINAL ISSUE – AMENDED TO REFLECT CLIENT COMMENTS
04	14/09/23	L.O.	L.O.	A.M.	FINAL ISSUE – AMENDED TO REFLECT CLIENT COMMENT
03	04/09/23	L.O.	L.O.	A.M.	FINAL ISSUE
02	12/05/23	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.03)
01	14/11/22	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.02)
00	05/10/22	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.01)
A	04/10/22	L.O.	L.O.	A.M.	DRAFT ISSUE – FOR CONSULTATION

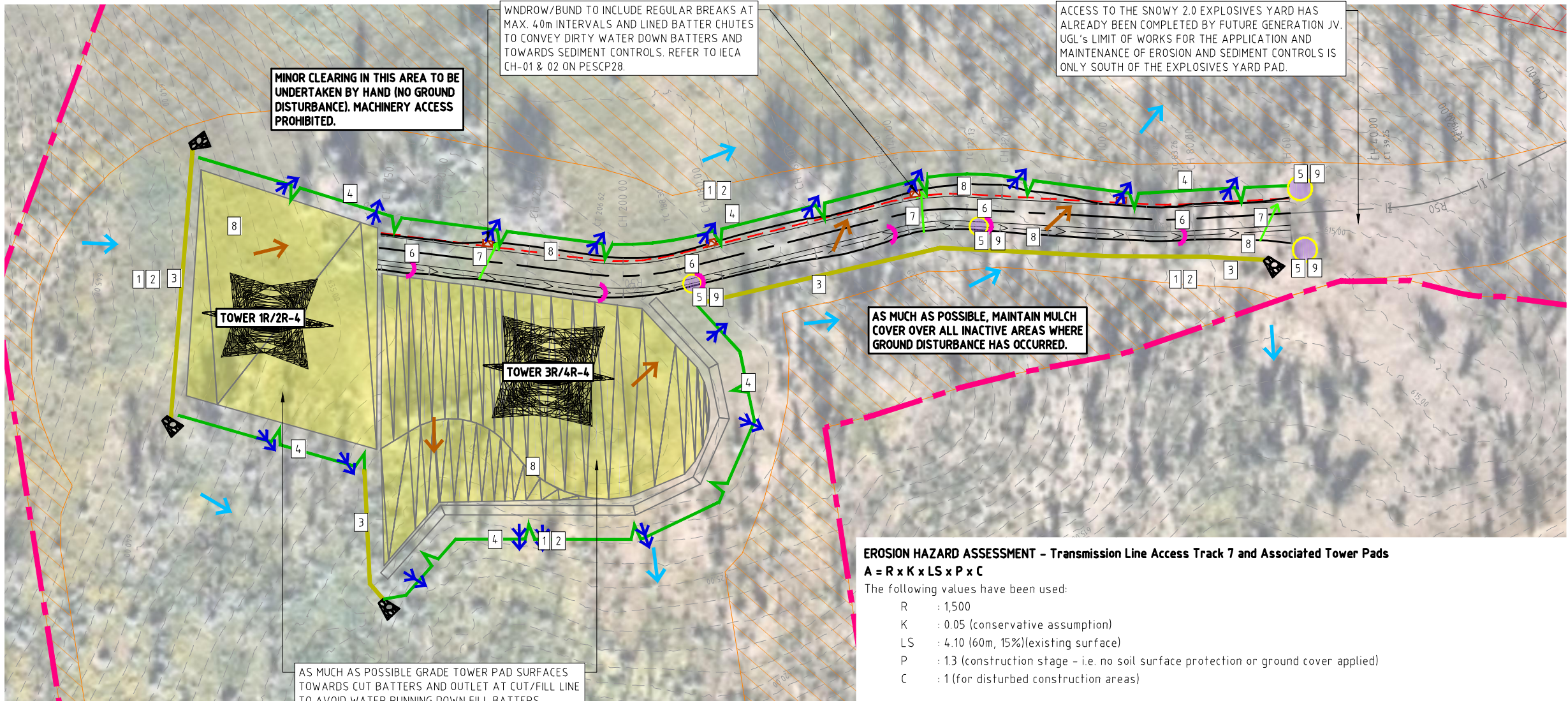
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DESIGN BY	L.O.
DRAWN BY	L.O.
FINAL APPROVAL	A.M.
SCALE:	1:1000
(on A3 Original)	
FINAL	



Suites 7 & 8, 68-70 Station Street
PO Box 1098, Bowral NSW 2576.
(t) 02 4862 1633
(f) 02 4862 3088
email: reception@seec.com.au
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PROJECT TITLE
**MARAGLE 330kV SWITCHING
STATION AND 300kV
TRANSMISSION LINE
CONNECTIONS**

DRAWING TITLE EROSION AND SEDIMENT CONTROL PLAN – ACCESS TRACK 8 & TOWER PADS – SHEET 4 OF 29			
PROJECT NO.	SUB-PR NO.	DRAWING NO.	REV
22000398	P02	PESCP04	06



LEGEND:

- MULCH OR EARTH BUND (MIN. 700–1,000mm HIGH) (DETAIL 4 & IECA MB-01 ON PESCP25)
- CLEAN WATER FLOW DIRECTION
- DIRTY WATER FLOW DIRECTION
- WHOA-BOYS (OR EQUIVALENT)
- CLEAN WATER DIVERSION (UTILISE PERMANENT DESIGN WHERE POSSIBLE)
- CHECK DAM (BLUE BOOK SD 5-4 ON PESCP26 & PHOTO 2 ON PESCP03)
- DISSIPATER OUTLET ONTO WELL VEGETATED LANDS
- TRANSMISSION LINE TOWER PAD
- EXISTING CONTOURS (1m INTERVALS)
- SEDIMENT TRAP (REFER TO DETAIL 3 ON PESCP25)
- STABILISED EARTH BUND (MIN. 500mm HIGH)
- SILT FENCE WRAPPED UP AND BEHIND NEW HEADWALLS (REFER TO PHOTO 1 ON PESCP01)
- LINED SPILLWAY WEIR (REFER TO DETAIL 4 ON PESCP25)
- TEMPORARY CLEAN WATER PIPE
- WINDROW/BUND
- CONSTRUCTION BOUNDARY
- LINED BATTER CHUTE (IECA SD CH-01 & 02 ON PESCP28)
- NO GO ZONE. NO GROUND DISTURBANCE
- STABILISED SITE ACCESS/EXIT (BLUE BOOK SD 6-14 ON PESCP27)

MINIMISE DISTURBANCE TO ONLY WHAT IS REQUIRED FOR SAFE AND EFFICIENT CONSTRUCTION.

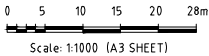
NOTE: LOCATIONS OF EROSION AND SEDIMENT CONTROL MEASURES ARE INDICATIVE ONLY, EXACT LOCATIONS ARE TO BE DETERMINED ON SITE (WITHIN THE PROJECT LIMITS) AND SIGNED OFF BY THE PROJECT CPSC.

Based on the above data, the potential soil loss at this site is approx. 400 t/ha/yr (Soil Loss Class 4: (moderate).

Under Blue Book standards sediment basins are required if the soil loss in any catchment is >200 t/yr. This site comprises of two (2) disturbed catchment of less than 0.45 ha, with the maximum potential catchment soil loss being approximately 180 t/yr. Therefore under Blue Book Standards sediment basins are not required for Access Track 7 and associated Tower Pad works as the potential catchment soil loss is <200 t/yr.

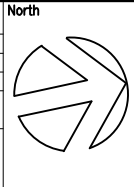
EROSION AND SEDIMENT CONTROL INSTRUCTIONS

1. Install flagging to delineate clearing limits.
2. Stage disturbance to minimise the amount of exposed area at any one time as much as possible.
3. Construct stabilised earth bunds (min. 500mm high) upslope of areas of disturbance to direct upslope clean water to rock dissipater outlets as shown.
 - 3.1. Earth bunds can be established by windrowing topsoil from the clearing and grubbing footprint, then sprayed with a biodegradable soil polymer (e.g. Vital Stonewall) or covered with fabric or organic fibre matting (e.g. jute).
4. Install mulch or earth bunds (min. 700–1,000mm high) downslope of disturbance areas as shown. Mulch or earth bunds must include regular returns at max. 20m intervals and lined spillway weirs in all low points. Refer to Detail 4 and IECA Standard Drawing MB-01 on PESCP25.
5. Construct sediment traps in the locations shown. Refer to Detail 3 on PESCP25.
 - 5.1. Alternatively install large fabric wrapped rock check dams. Refer to Blue Book Standard Drawing SD 5-4 on PESCP26.
6. Place check dams (sandbags, coir logs or rock) in new drains prior to forecast rainfall (>50% chance of 10mm or more in 24 hours) at max. 20m intervals in high risk areas and where drains grade at 10% or more, or approx. 50m intervals in all other areas (<10% grade). Refer to Blue Book Standard Drawing SD 5-4 on PESCP26 and Photo 2 on PESCP03.
7. During initial earthworks (prior to access tracks being properly graded), install whoa-boys (or equivalent) at max. 80m intervals right across access tracks to turn water out into downslope perimeter controls at regular intervals and to avoid having all water run down the access tracks to a single low point.
8. Undertake 'rapid' rehabilitation of lands (including batters and drains) within 14 days of final earthworks being completed in each area (rather than waiting until the completion of all works).
9. De-watering of water accumulating onsite is to be managed in accordance with the 'Dirty Water Treatment and Discharge Requirements' notes on PESCP01.



REV	DATE	DES.	DRN.	APP.	REVISION DETAILS
06	25/10/23	L.O.	L.O.	A.M.	FINAL ISSUE – MINOR AMENDMENTS TO REFLECT CLIENT COMMENTS
05	24/10/23	L.O.	L.O.	A.M.	FINAL ISSUE – AMENDED TO REFLECT CLIENT COMMENTS
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01	14/11/22	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.02)
00	05/10/22	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.01)
A	04/10/22	L.O.	L.O.	A.M.	DRAFT ISSUE – FOR CONSULTATION

DRAWING STATUS	
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DRAWN BY	L.O.
FINAL APPROVAL	A.M.
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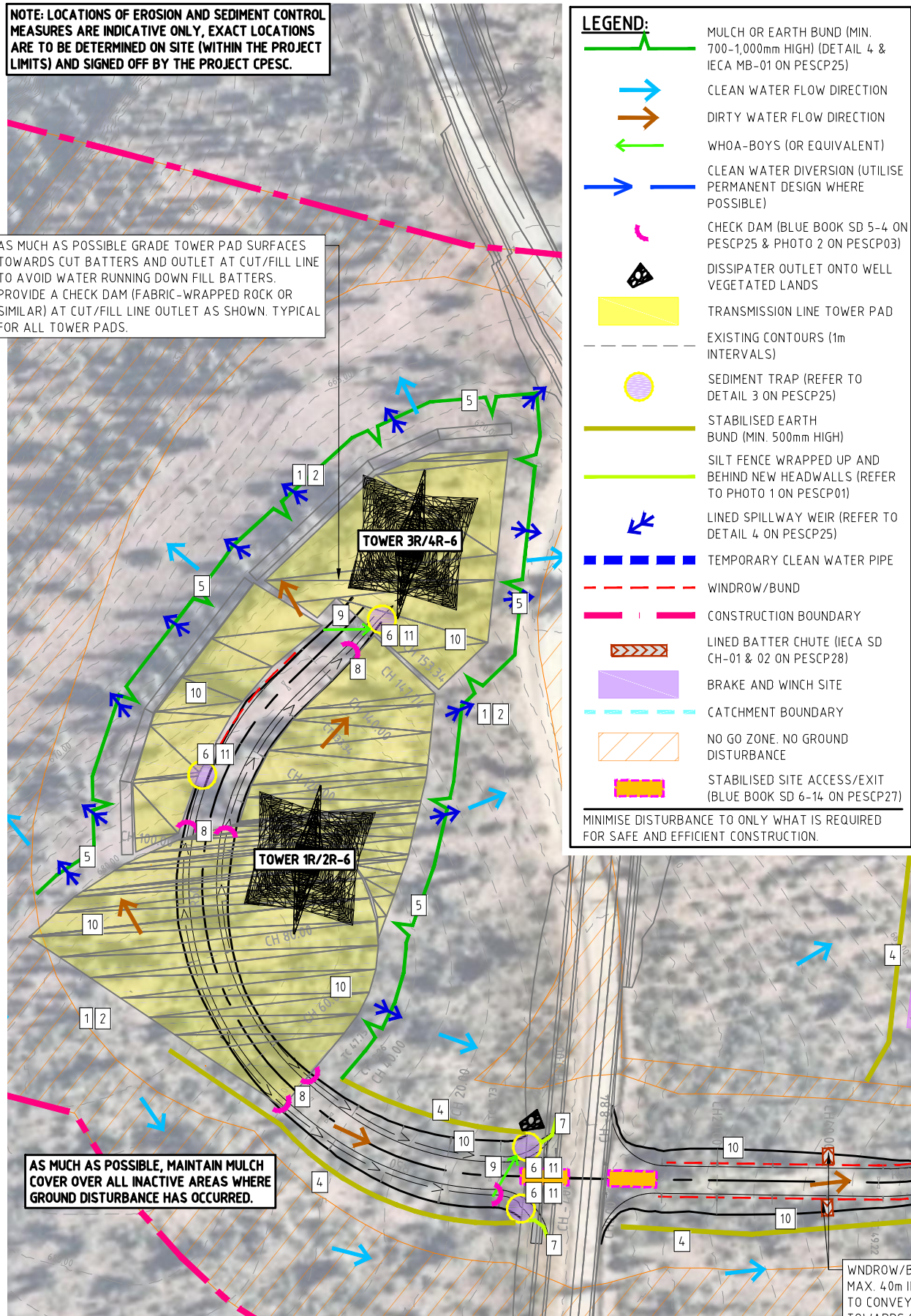


PROJECT TITLE
MARAGLE 330kV SWITCHING STATION AND 300kV TRANSMISSION LINE CONNECTIONS

DRAWING TITLE			
EROSION AND SEDIMENT CONTROL PLAN – ACCESS TRACK 7 & TOWER PADS – SHEET 5 OF 29			
PROJECT NO.	SUB-PR NO.	DRAWING NO.	REV
22000398	P02	PESCP05	06

NOTE: LOCATIONS OF EROSION AND SEDIMENT CONTROL MEASURES ARE INDICATIVE ONLY, EXACT LOCATIONS ARE TO BE DETERMINED ON SITE (WITHIN THE PROJECT LIMITS) AND SIGNED OFF BY THE PROJECT CPESC.

AS MUCH AS POSSIBLE GRADE TOWER PAD SURFACES TOWARDS CUT BATTERS AND OUTLET AT CUT/FILL LINE TO AVOID WATER RUNNING DOWN FILL BATTERS. PROVIDE A CHECK DAM (FABRIC-WRAPPED ROCK OR SIMILAR) AT CUT/FILL LINE OUTLET AS SHOWN. TYPICAL FOR ALL TOWER PADS.



LEGEND:

- MULCH OR EARTH BUND (MIN. 700-1,000mm HIGH) (DETAIL 4 & IECA MB-01 ON PESCP25)
- CLEAN WATER FLOW DIRECTION
- DIRTY WATER FLOW DIRECTION
- WHOA-BOYS (OR EQUIVALENT)
- CLEAN WATER DIVERSION (UTILISE PERMANENT DESIGN WHERE POSSIBLE)
- CHECK DAM (BLUE BOOK SD 5-4 ON PESCP25 & PHOTO 2 ON PESCP03)
- DISSIPATER OUTLET ONTO WELL VEGETATED LANDS
- TRANSMISSION LINE TOWER PAD
- EXISTING CONTOURS (1m INTERVALS)
- SEDIMENT TRAP (REFER TO DETAIL 3 ON PESCP25)
- STABILISED EARTH BUND (MIN. 500mm HIGH)
- SILT FENCE WRAPPED UP AND BEHIND NEW HEADWALLS (REFER TO PHOTO 1 ON PESCP01)
- LINED SPILLWAY WEIR (REFER TO DETAIL 4 ON PESCP25)
- TEMPORARY CLEAN WATER PIPE
- WINDROW/BUND
- CONSTRUCTION BOUNDARY
- LINED BATTER CHUTE (IECA SD CH-01 & 02 ON PESCP28)
- BRAKE AND WINCH SITE
- CATCHMENT BOUNDARY
- NO GO ZONE. NO GROUND DISTURBANCE
- STABILISED SITE ACCESS/EXIT (BLUE BOOK SD 6-14 ON PESCP27)
- MINIMISE DISTURBANCE TO ONLY WHAT IS REQUIRED FOR SAFE AND EFFICIENT CONSTRUCTION.

EROSION HAZARD ASSESSMENT – Transmission Line Access Track 6, Associated Tower Pads and Brake and Winch sites

$A = R \times K \times LS \times P \times C$

The following values have been used:

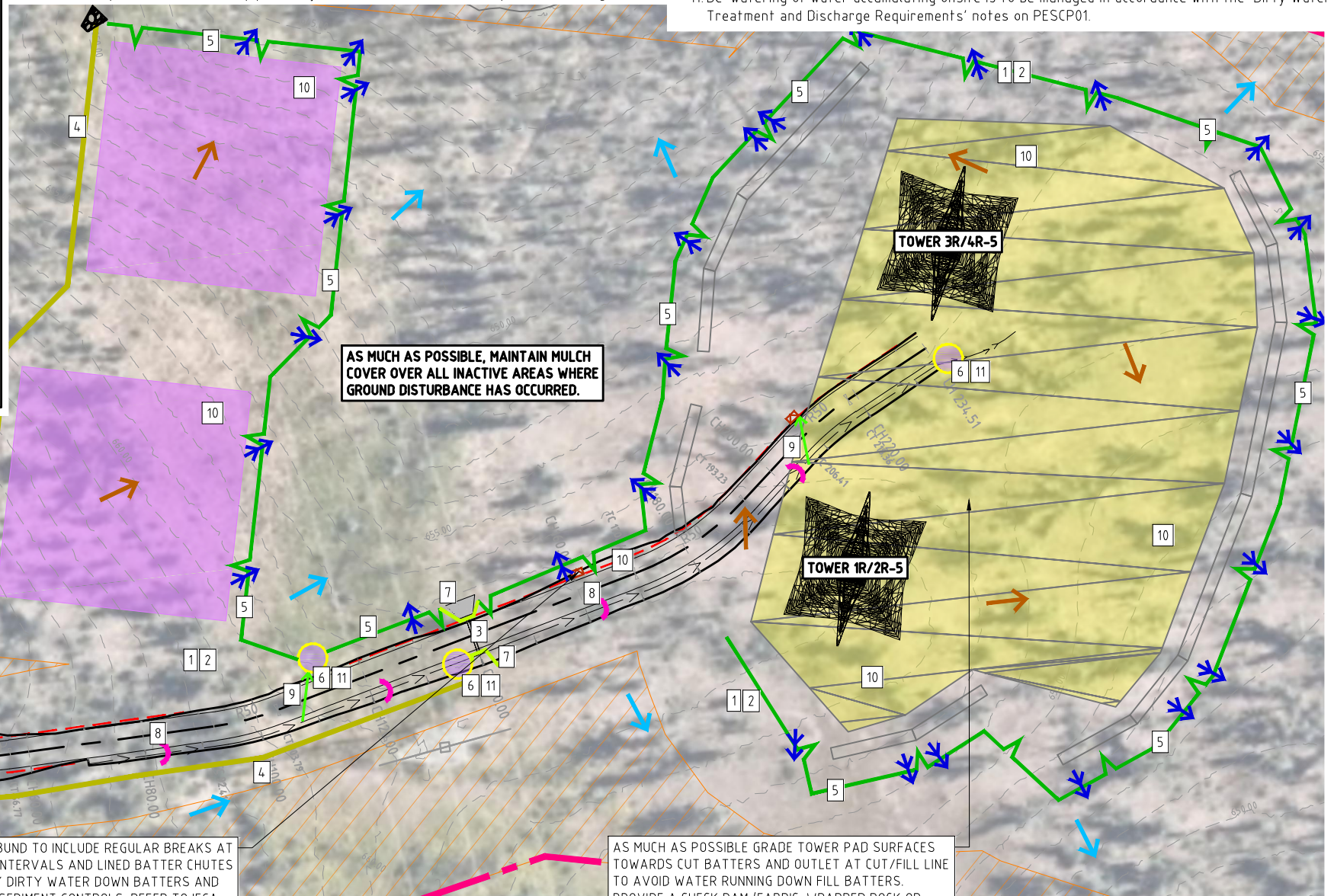
- R : 1,500
- K : 0.05 (conservative assumption)
- LS : 3.28 (80m, 11%)(existing surface)
- P : 1.3 (construction stage – i.e. no soil surface protection or ground cover applied)
- C : 1 (for disturbed construction areas)

Based on the above data, the potential soil loss at this site is approx. 317 t/ha/yr (Soil Loss Class 3: (low-moderate).

Under Blue Book standards sediment basins are required if the soil loss in any catchment is >200 t/yr. Therefore, under Blue Book Standards sediment basins are required in any disturbed catchment greater than 0.63 ha. This site does not comprise of any disturbed catchments greater than 0.63 ha. As such, no sediment basins are required for for Access Track 6, associated Tower Pads and Brake and Winch site works as the potential soil loss in all disturbed catchments in <200 t/yr.

EROSION AND SEDIMENT CONTROL INSTRUCTIONS

1. Install flagging to delineate clearing limits.
2. Stage disturbance to minimise the amount of exposed area at any one time as much as possible.
3. Construct permanent culverts/pipes early and utilise as construction phase cross alignment



AS MUCH AS POSSIBLE, MAINTAIN MULCH COVER OVER ALL INACTIVE AREAS WHERE GROUND DISTURBANCE HAS OCCURRED.

WINDROW/BUND TO INCLUDE REGULAR BREAKS AT MAX. 40m INTERVALS AND LINED BATTER CHUTES TO CONVEY DIRTY WATER DOWN BATTERS AND TOWARDS SEDIMENT CONTROLS. REFER TO IECA CH-01 & 02 ON PESCP28.

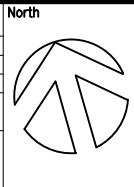
AS MUCH AS POSSIBLE GRADE TOWER PAD SURFACES TOWARDS CUT BATTERS AND OUTLET AT CUT/FILL LINE TO AVOID WATER RUNNING DOWN FILL BATTERS. PROVIDE A CHECK DAM (FABRIC-WRAPPED ROCK OR SIMILAR) AT CUT/FILL LINE OUTLET AS SHOWN. TYPICAL FOR ALL TOWER PADS.

drainage. Refer to Details 1 and 2 on PESCP24.

4. Construct stabilised earth bunds (min. 500mm high) upslope of areas of disturbance to direct upslope clean water to rock dissipater outlets as shown.
 - 4.1. Earth bunds can be established by windrowing topsoil from the clearing and grubbing footprint, then sprayed with a biodegradable soil polymer (e.g. Vital Stonewall) or covered with fabric or organic fibre matting (e.g. jute).
5. Install mulch or earth bunds (min. 700-1,000mm high) downslope of disturbance areas as shown. Mulch or earth bunds must include regular returns at max. 20m intervals and lined spillway weirs in all low points. Refer to Detail 4 and IECA Standard Drawing MB-01 on PESCP25.
6. Construct sediment traps in the locations shown. Refer to Detail 3 on PESCP25.
 - 6.1. Alternatively install large fabric wrapped rock check dams. Refer to Blue Book Standard Drawing SD 5-4 on PESCP26.
7. Wrap sediment fence up and behind new head walls. Refer to Photo 1 on PESCP01.
8. Place check dams (sandbags, coir logs or rock) in new drains prior to forecast rainfall (>50% chance of 10mm or more in 24 hours) at max. 20m intervals in high risk areas and where drains grade at 10% or more, or approx. 50m intervals in all other areas (<10% grade). Refer to Blue Book Standard Drawing SD 5-4 on PESCP26 and Photo 2 on PESCP03.
9. During initial earthworks (prior to access tracks being properly graded), install whoa-boys (or equivalent) at max. 80m intervals right across access tracks to turn water out into downslope perimeter controls at regular intervals and to avoid having all water run down the access tracks to a single low point.
10. Undertake 'rapid' rehabilitation of lands (including batters and drains) within 14 days of final earthworks being completed in each area (rather than waiting until the completion of all works).
11. De-watering of water accumulating onsite is to be managed in accordance with the 'Dirty Water Treatment and Discharge Requirements' notes on PESCP01.

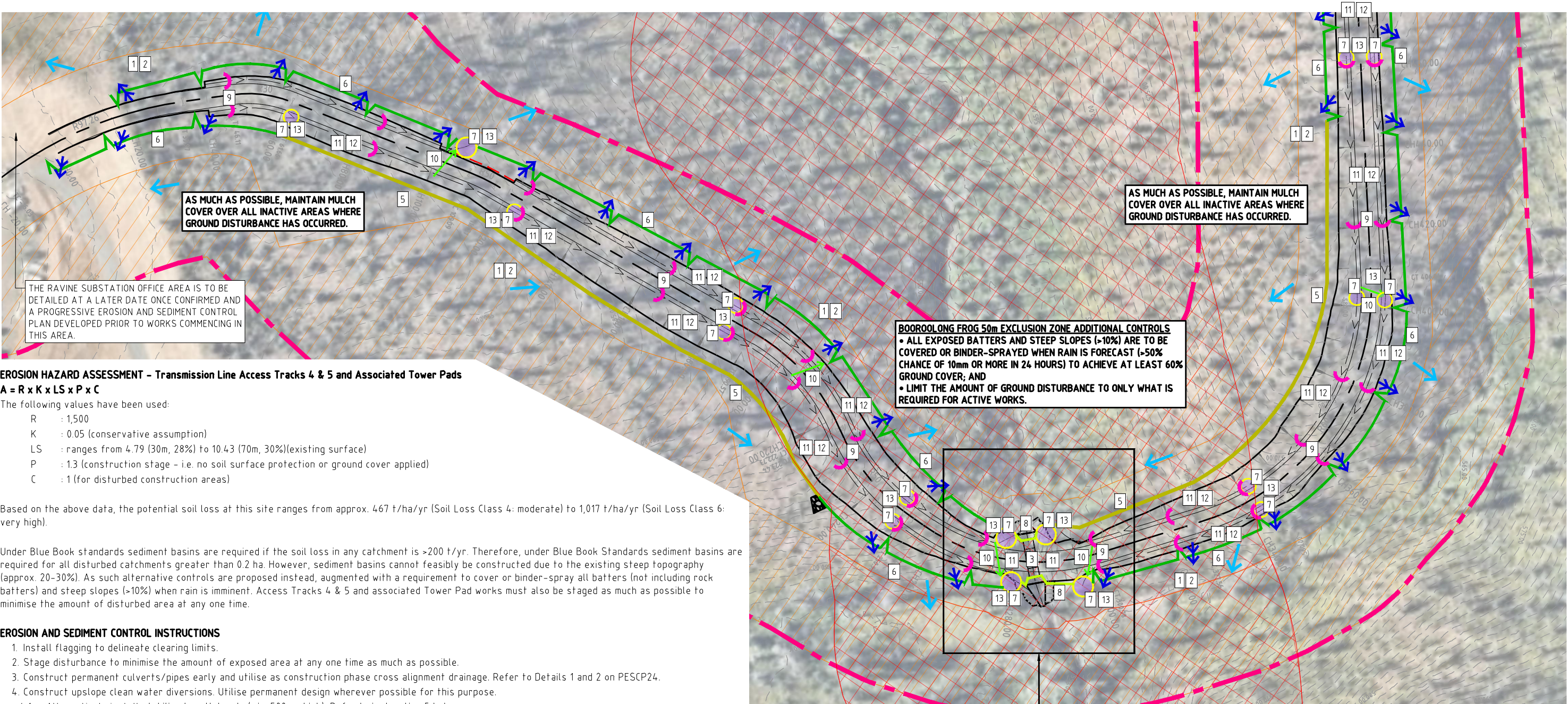
REV	DATE	DES.	DRN.	APP.	REVISION DETAILS
06	25/10/23	L.O.	L.O.	A.M.	FINAL ISSUE – MINOR AMENDMENTS TO REFLECT CLIENT COMMENTS
05	24/10/23	L.O.	L.O.	A.M.	FINAL ISSUE – AMENDED TO REFLECT CLIENT COMMENTS
04	14/09/23	L.O.	L.O.	A.M.	FINAL ISSUE – AMENDED TO REFLECT CLIENT COMMENT
03	04/09/23	L.O.	L.O.	A.M.	FINAL ISSUE
02	12/05/23	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.03)
01	14/11/22	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.02)
00	05/10/22	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.01)
A	04/10/22	L.O.	L.O.	A.M.	DRAFT ISSUE – FOR CONSULTATION

DRAWING STATUS	
DESIGN BY	L.O.
DRAWN BY	L.O.
FINAL APPROVAL	A.M.
SCALE:	1:1000
(on A3 Original)	
FINAL	



PROJECT TITLE
MARAGLE 330kV SWITCHING STATION AND 300kV TRANSMISSION LINE CONNECTIONS

DRAWING TITLE EROSION AND SEDIMENT CONTROL PLAN – ACCESS TRACK 6 & TOWER PADS – SHEET 6 OF 29			
PROJECT NO.	SUB-PR NO.	DRAWING NO.	REV
22000398	P02	PESCP06	06



EROSION HAZARD ASSESSMENT – Transmission Line Access Tracks 4 & 5 and Associated Tower Pads

A = R x K x LS x P x C

The following values have been used:

- R : 1,500
- K : 0.05 (conservative assumption)
- LS : ranges from 4.79 (30m, 28%) to 10.43 (70m, 30%)(existing surface)
- P : 1.3 (construction stage – i.e. no soil surface protection or ground cover applied)
- C : 1 (for disturbed construction areas)

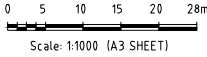
Based on the above data, the potential soil loss at this site ranges from approx. 467 t/ha/yr (Soil Loss Class 4: moderate) to 1,017 t/ha/yr (Soil Loss Class 6: very high).

Under Blue Book standards sediment basins are required if the soil loss in any catchment is >200 t/yr. Therefore, under Blue Book Standards sediment basins are required for all disturbed catchments greater than 0.2 ha. However, sediment basins cannot feasibly be constructed due to the existing steep topography (approx. 20–30%). As such alternative controls are proposed instead, augmented with a requirement to cover or binder-spray all batters (not including rock batters) and steep slopes (>10%) when rain is imminent. Access Tracks 4 & 5 and associated Tower Pad works must also be staged as much as possible to minimise the amount of disturbed area at any one time.

EROSION AND SEDIMENT CONTROL INSTRUCTIONS

1. Install flagging to delineate clearing limits.
2. Stage disturbance to minimise the amount of exposed area at any one time as much as possible.
3. Construct permanent culverts/pipes early and utilise as construction phase cross alignment drainage. Refer to Details 1 and 2 on PESCP24.
4. Construct upslope clean water diversions. Utilise permanent design wherever possible for this purpose.
 - 4.1. Alternatively install stabilised earth bunds (min. 500mm high). Refer to instruction 5 below.
5. Construct stabilised earth bunds (min. 500mm high) upslope of areas of disturbance to direct upslope clean water to rock dissipater outlets as shown.
 - 5.1. Earth bunds can be established by windrowing topsoil from the clearing and grubbing footprint, then sprayed with a biodegradable soil polymer (e.g. Vital Stonewall) or covered with fabric or organic fibre matting (e.g. jute).
6. Install mulch or earth bunds (min. 700–1,000mm high) downslope of disturbance areas as shown. Mulch or earth bunds must include regular returns at max. 20m intervals and lined spillway weirs in all low points. Refer to Detail 4 and IECA Standard Drawing MB-01 on PESCP25.
7. Construct sediment traps in the locations shown. Refer to Detail 3 on PESCP25.
 - 7.1. Alternatively install large fabric wrapped rock check dams. Refer to Blue Book Standard Drawing SD 5-4 on PESCP36.
8. Wrap sediment fence up and behind new head walls. Refer to Photo 1 on PESCP01.
9. Place check dams (sandbags, coir logs or rock) in new drains prior to forecast rainfall (>50% chance of 10mm or more in 24 hours) at max. 20m intervals in high risk areas and where drains grade at 10% or more, or approx. 50m intervals in all other areas (<10% grade). Refer to Blue Book Standard Drawing SD 5-4 on PESCP26 and Photo 2 on PESCP03.
10. During initial earthworks (prior to access tracks being properly graded), install whoa-boys (or equivalent) at max. 80m intervals right across access tracks to turn water out into downslope perimeter controls at regular intervals and to avoid having all water run down the access tracks to a single low point.
11. All exposed batters and steep slopes (>10%) are to be covered or binder-sprayed when rain is forecast (>50% chance of 10mm or more in 24 hours) to achieve at least 60% ground cover. Erosion protection will be either mulch, Erosion Control Blanket (ECB), or a biodegradable spray on soil binder (if usage is first endorsed by the EPA).
 - 11.1. Note rock batters do not require temporary stabilisation.
12. Undertake ‘rapid’ rehabilitation of lands (including batters and drains) within 14 days of final earthworks being completed in each area (rather than waiting until the completion of all works).
13. De-watering of water accumulating onsite is to be managed in accordance with the ‘Dirty Water Treatment and Discharge Requirements’ notes on PESCP01.

FOR EROSION AND SEDIMENT CONTROL MEASURES ASSOCIATED WITH THE SHEEP STATION CREEK CROSSING CULVERT INSTALLATION WORKS REFER TO PESCP23.



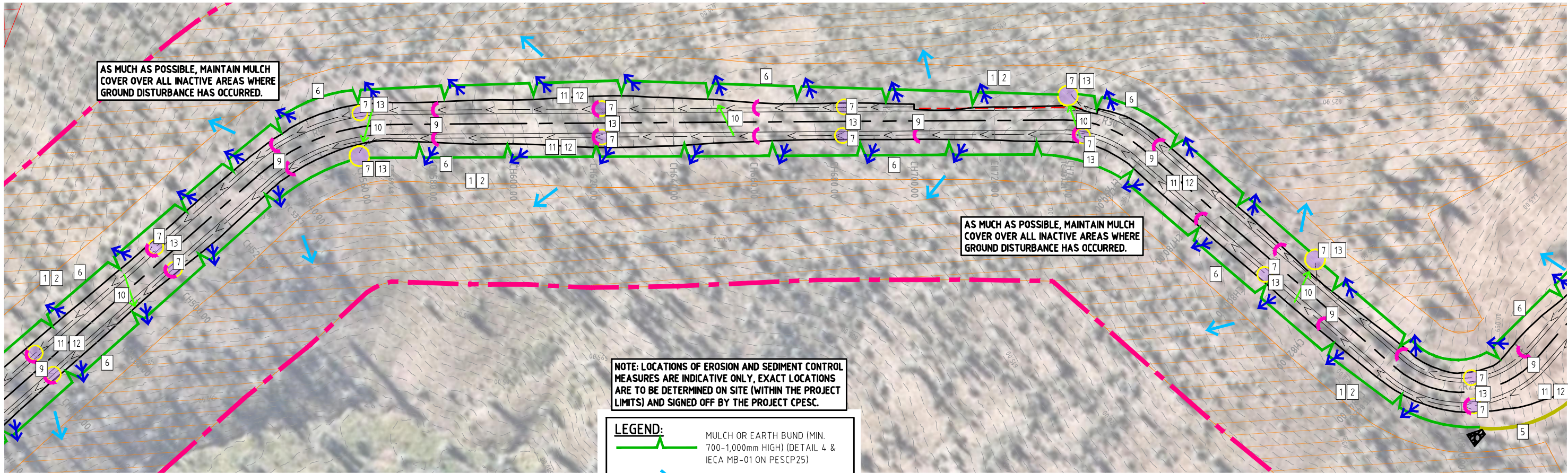
NOTE: LOCATIONS OF EROSION AND SEDIMENT CONTROL MEASURES ARE INDICATIVE ONLY, EXACT LOCATIONS ARE TO BE DETERMINED ON SITE (WITHIN THE PROJECT LIMITS) AND SIGNED OFF BY THE PROJECT CPESC.

LEGEND:

- | | |
|--|--|
| MULCH OR EARTH BUND (MIN. 700–1,000mm HIGH) (DETAIL 4 & IECA MB-01 ON PESCP25) | TRANSMISSION LINE TOWER PAD |
| CLEAN WATER FLOW DIRECTION | EXISTING CONTOURS (1m INTERVALS) |
| DIRTY WATER FLOW DIRECTION | SEDIMENT TRAP (REFER TO DETAIL 3 ON PESCP25) |
| WHOA-BOYS (OR EQUIVALENT) | STABILISED EARTH BUND (MIN. 500mm HIGH) |
| CLEAN WATER DIVERSION (UTILISE PERMANENT DESIGN WHERE POSSIBLE) | SILT FENCE WRAPPED UP AND BEHIND NEW HEADWALLS (REFER TO PHOTO 1 ON PESCP01) |
| CHECK DAM (BLUE BOOK SD 5-4 ON PESCP26 & PHOTO 2 ON PESCP03) | LINED SPILLWAY WEIR (REFER TO DETAIL 4 ON PESCP25) |
| WINDROW/BUND | LINED BATTER CHUTE (IECA SD CH-01 & 02 ON PESCP28) |
| CONSTRUCTION BOUNDARY | DISSIPATER OUTLET ONTO WELL VEGETATED LANDS |
| BOOROO LONG FROG 50m EXCLUSION ZONE | |
| NO GO ZONE, NO GROUND DISTURBANCE | |
- MINIMISE DISTURBANCE TO ONLY WHAT IS REQUIRED FOR SAFE AND EFFICIENT CONSTRUCTION.**

REV	DATE	DES.	DRN.	APP.	REVISION DETAILS	DRAWING STATUS	North	CLIENT	PROJECT TITLE	DRAWING TITLE	PROJECT NO.	SUB-PR NO.	DRAWING NO.	REV
06	25/10/23	L.O.	L.O.	A.M.	FINAL ISSUE – MINOR AMENDMENTS TO REFLECT CLIENT COMMENTS	DESIGN BY L.O.			MARAGLE 330kV SWITCHING STATION AND 300kV TRANSMISSION LINE CONNECTIONS	EROSION AND SEDIMENT CONTROL PLAN – ACCESS TRACK 5 & TOWER PADS – SHEET 7 OF 29	22000398	P02	PESCP07	06
05	24/10/23	L.O.	L.O.	A.M.	FINAL ISSUE – AMENDED TO REFLECT CLIENT COMMENTS	DRAWN BY L.O.								
04	14/09/23	L.O.	L.O.	A.M.	FINAL ISSUE – AMENDED TO REFLECT CLIENT COMMENT	FINAL APPROVAL A.M.								
03	04/09/23	L.O.	L.O.	A.M.	FINAL ISSUE	SCALE: (on A3 Original) 1:1000								
02	12/05/23	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.03)									
01	14/11/22	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.02)									
00	05/10/22	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.01)									
A	04/10/22	L.O.	L.O.	A.M.	DRAFT ISSUE – FOR CONSULTATION	FINAL								

Suites 7 & 8, 68-70 Station Street
PO Box 1098, Bowral NSW 2576.
(t) 02 4862 1633
(f) 02 4862 3088
email: reception@seec.com.au
WWW.SEEC.COM.AU



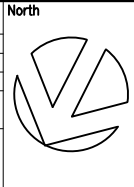
EROSION HAZARD ASSESSMENT – Transmission Line Access Track 5 and Associated Tower Pads
Refer to PESCP07 for Access Track 5 and Associated Tower Pad works Erosion Hazard Assessment.

EROSION AND SEDIMENT CONTROL INSTRUCTIONS

1. Install flagging to delineate clearing limits.
2. Stage disturbance to minimise the amount of exposed area at any one time as much as possible.
3. Construct permanent culverts/pipes early and utilise as construction phase cross alignment drainage. Refer to Details 1 and 2 on PESCP24.
4. Construct upslope clean water diversions. Utilise permanent design wherever possible for this purpose.
 - 4.1. Alternatively install stabilised earth bunds (min. 500mm high). Refer to instruction 5 below.
5. Construct stabilised earth bunds (min. 500mm high) upslope of areas of disturbance to direct upslope clean water to rock dissipater outlets as shown.
 - 5.1. Earth bunds can be established by windrowing topsoil from the clearing and grubbing footprint, then sprayed with a biodegradable soil polymer (e.g. Vital Stonewall) or covered with fabric or organic fibre matting (e.g. jute).
6. Install mulch or earth bunds (min. 700-1,000mm high) downslope of disturbance areas as shown. Mulch or earth bunds must include regular returns at max. 20m intervals and lined spillway weirs in all low points. Refer to Detail 4 and IECA Standard Drawing MB-01 on PESCP25.
7. Construct sediment traps in the locations shown. Refer to Detail 3 on PESCP25.
 - 7.1. Alternatively install large fabric wrapped rock check dams. Refer to Blue Book Standard Drawing SD 5-4 on PESCP26.
8. Wrap sediment fence up and behind new head walls. Refer to Photo 1 on PESCP01.
9. Place check dams (sandbags, coir logs or rock) in new drains prior to forecast rainfall (>50% chance of 10mm or more in 24 hours) at max. 20m intervals in high risk areas and where drains grade at 10% or more, or approx. 50m intervals in all other areas (<10% grade). Refer to Blue Book Standard Drawing SD 5-4 on PESCP26 and Photo 2 on PESCP03.
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11. All exposed batters and steep slopes (>10%) are to be covered or binder-sprayed when rain is forecast (>50% chance of 10mm or more in 24 hours) to achieve at least 60% ground cover. Erosion protection will be either mulch, Erosion Control Blanket (ECB), or a biodegradable spray on soil binder (if usage is first endorsed by the EPA).
 - 11.1. Note rock batters do not require temporary stabilisation.
12. Undertake 'rapid' rehabilitation of lands (including batters and drains) within 14 days of final earthworks being completed in each area (rather than waiting until the completion of all works).
13. De-watering of water accumulating onsite is to be managed in accordance with the 'Dirty Water Treatment and Discharge Requirements' notes on PESCP01.

REV	DATE	DES.	DRN.	APP.	REVISION DETAILS
06	25/10/23	L.O.	L.O.	A.M.	FINAL ISSUE – MINOR AMENDMENTS TO REFLECT CLIENT COMMENTS
05	24/10/23	L.O.	L.O.	A.M.	FINAL ISSUE – AMENDED TO REFLECT CLIENT COMMENTS
04	14/09/23	L.O.	L.O.	A.M.	FINAL ISSUE – AMENDED TO REFLECT CLIENT COMMENT
03	04/09/23	L.O.	L.O.	A.M.	FINAL ISSUE
02	12/05/23	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.03)
01	14/11/22	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.02)
00	05/10/22	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.01)
A	04/10/22	L.O.	L.O.	A.M.	DRAFT ISSUE – FOR CONSULTATION

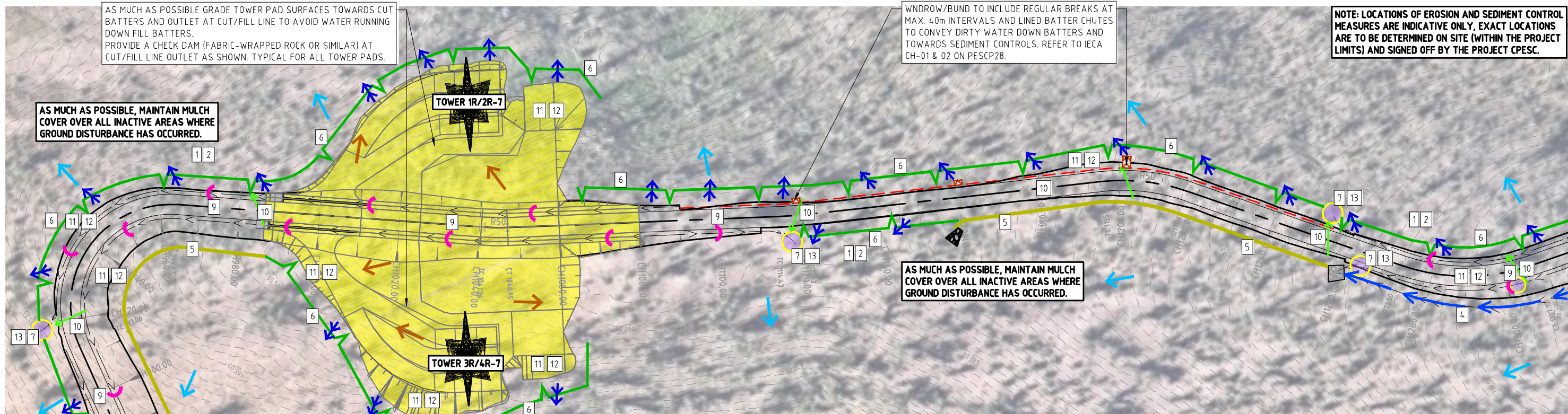
DRAWING STATUS	
DESIGN BY	L.O.
DRAWN BY	L.O.
FINAL APPROVAL	A.M.
SCALE:	1:1000
(on A3 Original)	
FINAL	



Suites 7 & 8, 68-70 Station Street
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PROJECT TITLE
**MARAGLE 330kV SWITCHING
STATION AND 300kV
TRANSMISSION LINE
CONNECTIONS**

DRAWING TITLE EROSION AND SEDIMENT CONTROL PLAN – ACCESS TRACK 5 & TOWER PADS – SHEET 8 OF 29			
PROJECT NO.	SUB-PR NO.	DRAWING NO.	REV
22000398	P02	PESCP08	06



EROSION HAZARD ASSESSMENT - Transmission Line Access Track 5 and Associated Tower Pads
Refer to PESCP07 for Access Track 5 and Associated Tower Pad works Erosion Hazard Assessment.

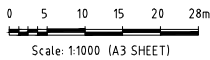
EROSION AND SEDIMENT CONTROL INSTRUCTIONS

1. Install flagging to delineate clearing limits.
2. Stage disturbance to minimise the amount of exposed area at any one time as much as possible.
3. Construct permanent culverts/pipes early and utilise as construction phase cross alignment drainage. Refer to Details 1 and 2 on PESCP24.
4. Construct upslope clean water diversions. Utilise permanent design wherever possible for this purpose.
 - 4.1. Alternatively install stabilised earth bunds (min. 500mm high). Refer to instruction 5 below.
5. Construct stabilised earth bunds (min. 500mm high) upslope of areas of disturbance to direct upslope clean water to rock dissipater outlets as shown.
 - 5.1. Earth bunds can be established by windrowing topsoil from the clearing and grubbing footprint, then sprayed with a biodegradable soil polymer (e.g. Vital Stonewall) or covered with fabric or organic fibre matting (e.g. jute).
6. Install mulch or earth bunds (min. 700-1,000mm high) downslope of disturbance areas as shown. Mulch or earth bunds must include regular returns at max. 20m intervals and lined spillway weirs in all low points. Refer to Detail 4 and IECA Standard Drawing MB-01 on PESCP25.
7. Construct sediment traps in the locations shown. Refer to Detail 3 on PESCP25.
 - 7.1. Alternatively install large fabric wrapped rock check dams. Refer to Blue Book Standard Drawing SD 5-4 on PESCP26.
8. Wrap sediment fence up and behind new head walls. Refer to Photo 1 on PESCP01.
9. Place check dams (sandbags, coir logs or rock) in new drains prior to forecast rainfall (>50% chance of 10mm or more in 24 hours) at max. 20m intervals in high risk areas and where drains grade at 10% or more, or approx. 50m intervals in all other areas (<10% grade). Refer to Blue Book Standard Drawing SD 5-4 on PESCP26 and Photo 2 on PESCP03.
10. During initial earthworks (prior to access tracks being properly graded), install whoa-boys (or equivalent) at max. 80m intervals right across access tracks to turn water out into downslope perimeter controls at regular intervals and to avoid having all water run down the access tracks to a single low point.
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 - 11.1. Note rock batters do not require temporary stabilisation.
12. Undertake 'rapid' rehabilitation of lands (including batters and drains) within 14 days of final earthworks being completed in each area (rather than waiting until the completion of all works).
13. De-watering of water accumulating onsite is to be managed in accordance with the 'Dirty Water Treatment and Discharge Requirements' notes on PESCP01.

LEGEND:

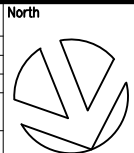
- MULCH OR EARTH BUND (MIN. 700-1,000mm HIGH) (DETAIL 4 & IECA MB-01 ON PESCP25)
- CLEAN WATER FLOW DIRECTION
- DIRTY WATER FLOW DIRECTION
- WHOA-BOYS (OR EQUIVALENT)
- CLEAN WATER DIVERSION (UTILISE PERMANENT DESIGN WHERE POSSIBLE)
- CHECK DAM (BLUE BOOK SD 5-4 ON PESCP26 & PHOTO 2 ON PESCP03)
- DISSIPATER OUTLET ONTO WELL VEGETATED LANDS
- TRANSMISSION LINE TOWER PAD
- EXISTING CONTOURS (1m INTERVALS)
- SEDIMENT TRAP (REFER TO DETAIL 3 ON PESCP25)
- STABILISED EARTH BUND (MIN. 500mm HIGH)
- SILT FENCE WRAPPED UP AND BEHIND NEW HEADWALLS (REFER TO PHOTO 1 ON PESCP01)
- LINED SPILLWAY WEIR (REFER TO DETAIL 4 ON PESCP25)
- TEMPORARY CLEAN WATER PIPE
- WINDROW/BUND
- CONSTRUCTION BOUNDARY
- LINED BATTER CHUTE (IECA SD CH-01 & 02 ON PESCP28)
- NO GO ZONE. NO GROUND DISTURBANCE
- STABILISED SITE ACCESS/EXIT (BLUE BOOK SD 6-14 ON PESCP27)

MINIMISE DISTURBANCE TO ONLY WHAT IS REQUIRED FOR SAFE AND EFFICIENT CONSTRUCTION.



REV	DATE	DES.	DRN.	APP.	REVISION DETAILS
06	25/10/23	L.O.	L.O.	A.M.	FINAL ISSUE - MINOR AMENDMENTS TO REFLECT CLIENT COMMENTS
05	24/10/23	L.O.	L.O.	A.M.	FINAL ISSUE - AMENDED TO REFLECT CLIENT COMMENTS
04	14/09/23	L.O.	L.O.	A.M.	FINAL ISSUE - AMENDED TO REFLECT CLIENT COMMENT
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02	12/05/23	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.03)
01	14/11/22	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.02)
00	05/10/22	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.01)
A	04/10/22	L.O.	L.O.	A.M.	DRAFT ISSUE - FOR CONSULTATION

DRAWING STATUS	
DESIGN BY	L.O.
DRAWN BY	L.O.
FINAL APPROVAL	A.M.
SCALE:	1:1000
(on A3 Original)	
FINAL	



CLIENT



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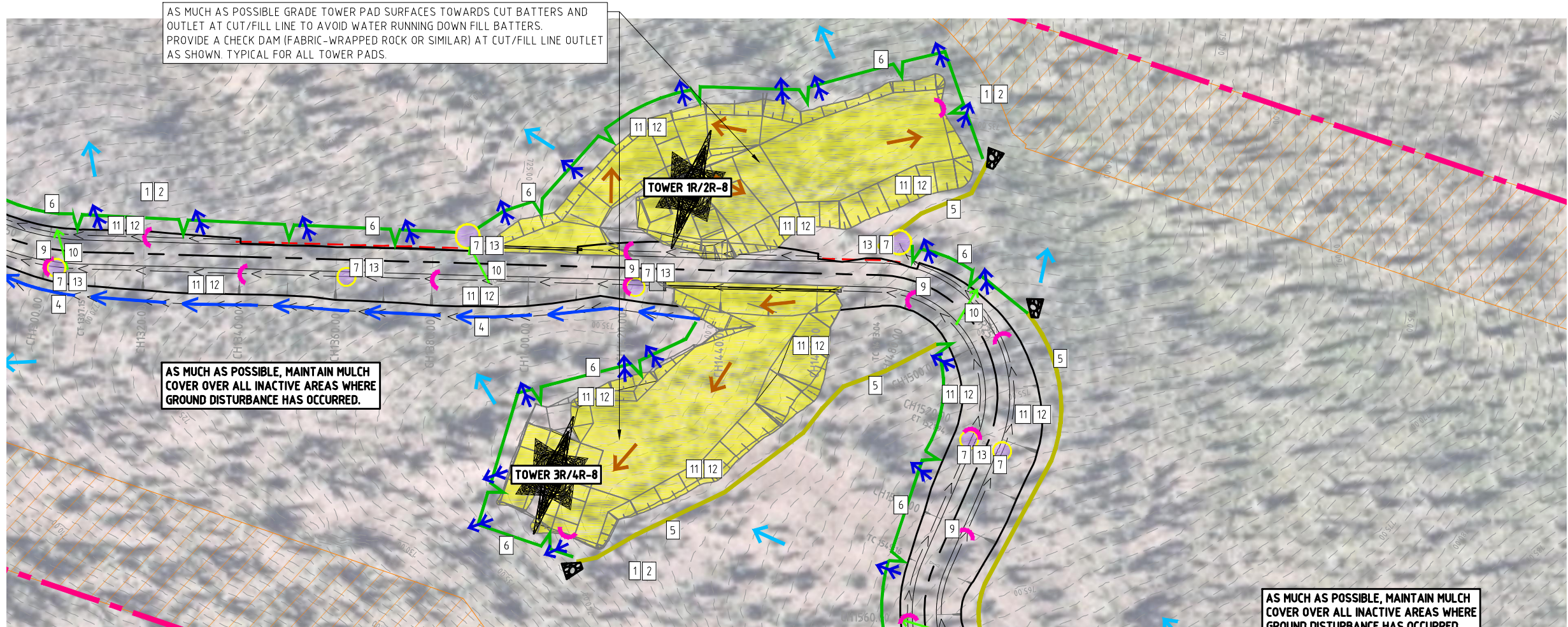
PROJECT TITLE

MARAGLE 330kV SWITCHING
STATION AND 300kV
TRANSMISSION LINE
CONNECTIONS

DRAWING TITLE

EROSION AND SEDIMENT CONTROL
PLAN - ACCESS TRACK 5 &
TOWER PADS - SHEET 9 OF 29

PROJECT NO.	SUB-PR NO.	DRAWING NO.	REV
22000398	P02	PESCP09	06



EROSION HAZARD ASSESSMENT – Transmission Line Access Track 5 and Associated Tower Pads

Refer to PESCP07 for Access Track 5 and Associated Tower Pads works Erosion Hazard Assessment.

EROSION AND SEDIMENT CONTROL INSTRUCTIONS

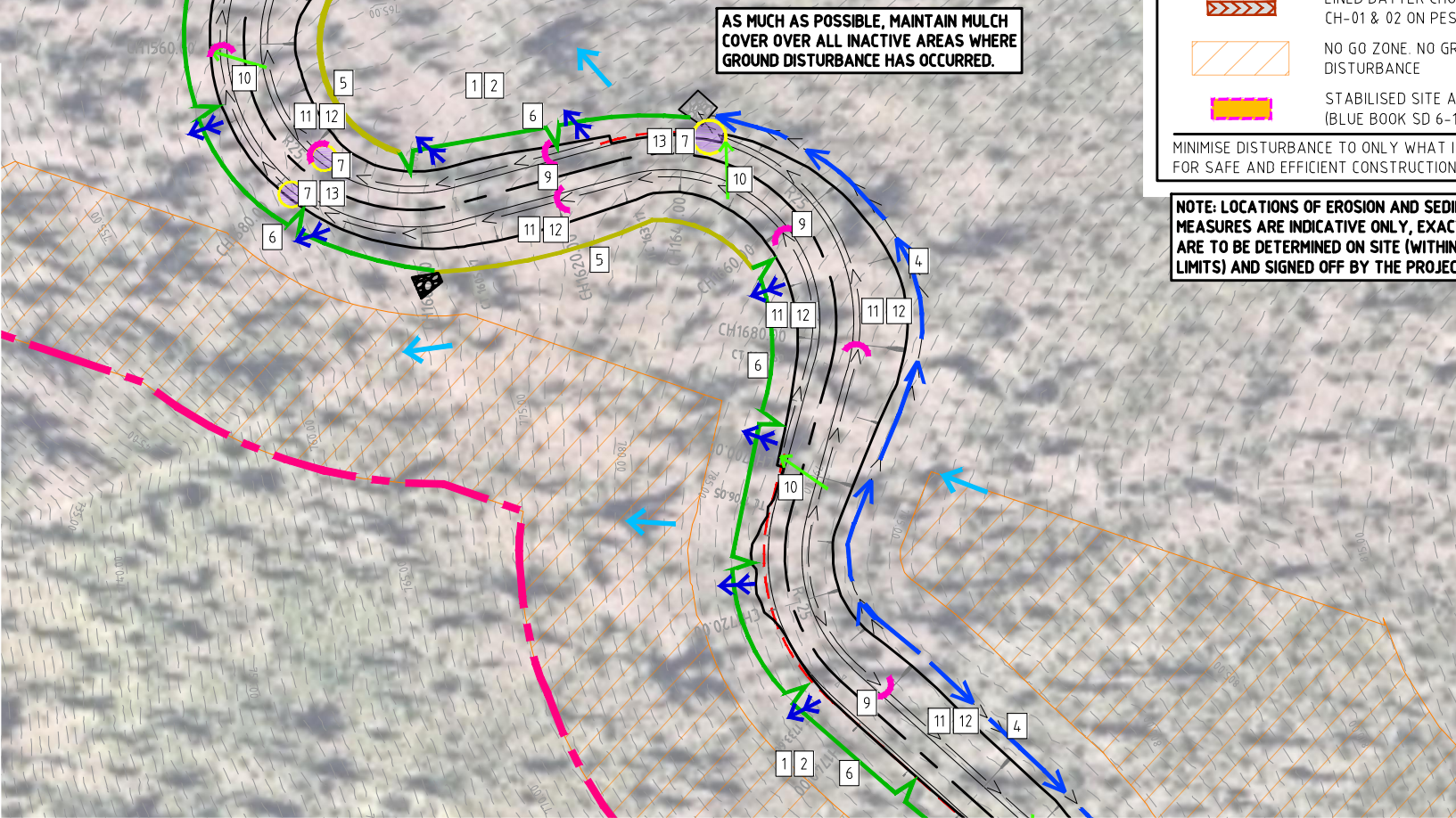
1. Install flagging to delineate clearing limits.
2. Stage disturbance to minimise the amount of exposed area at any one time as much as possible.
3. Construct permanent culverts/pipes early and utilise as construction phase cross alignment drainage. Refer to Details 1 and 2 on PESCP24.
4. Construct upslope clean water diversions. Utilise permanent design wherever possible for this purpose.
 - 4.1. Alternatively install stabilised earth bunds (min. 500mm high). Refer to instruction 5 below.
5. Construct stabilised earth bunds (min. 500mm high) upslope of areas of disturbance to direct upslope clean water to rock dissipater outlets as shown.
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7. Construct sediment traps in the locations shown. Refer to Detail 3 on PESCP25.
 - 7.1. Alternatively install large fabric wrapped rock check dams. Refer to Blue Book Standard Drawing SD 5-4 on PESCP26.
8. Wrap sediment fence up and behind new head walls. Refer to Photo 1 on PESCP01.
9. Place check dams (sandbags, coir logs or rock) in new drains prior to forecast rainfall (>50% chance of 10mm or more in 24 hours) at max. 20m intervals in high risk areas and where drains grade at 10% or more, or approx. 50m intervals in all other areas (<10% grade). Refer to Blue Book Standard Drawing SD 5-4 on PESCP26 and Photo 2 on PESCP03.
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12. Undertake 'rapid' rehabilitation of lands (including batters and drains) within 14 days of final earthworks being completed in each area (rather than waiting until the completion of all works).
13. De-watering of water accumulating onsite is to be managed in accordance with the 'Dirty Water Treatment and Discharge Requirements' notes on PESCP01.

LEGEND:

- MULCH OR EARTH BUND (MIN. 700–1,000mm HIGH) (DETAIL 4 & IECA MB-01 ON PESCP25)
- CLEAN WATER FLOW DIRECTION
- DIRTY WATER FLOW DIRECTION
- WHOA-BOYS (OR EQUIVALENT)
- CLEAN WATER DIVERSION (UTILISE PERMANENT DESIGN WHERE POSSIBLE)
- CHECK DAM (BLUE BOOK SD 5-4 ON PESCP26 & PHOTO 2 ON PESCP03)
- DISSIPATER OUTLET ONTO WELL VEGETATED LANDS
- TRANSMISSION LINE TOWER PAD
- EXISTING CONTOURS (1m INTERVALS)
- SEDIMENT TRAP (REFER TO DETAIL 3 ON PESCP25)
- STABILISED EARTH BUND (MIN. 500mm HIGH)
- SILT FENCE WRAPPED UP AND BEHIND NEW HEADWALLS (REFER TO PHOTO 1 ON PESCP01)
- LINED SPILLWAY WEIR (REFER TO DETAIL 4 ON PESCP25)
- TEMPORARY CLEAN WATER PIPE
- WINDROW/BUND
- CONSTRUCTION BOUNDARY
- LINED BATTER CHUTE (IECA SD CH-01 & 02 ON PESCP28)
- NO GO ZONE. NO GROUND DISTURBANCE
- STABILISED SITE ACCESS/EXIT (BLUE BOOK SD 6-14 ON PESCP27)

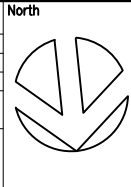
MINIMISE DISTURBANCE TO ONLY WHAT IS REQUIRED FOR SAFE AND EFFICIENT CONSTRUCTION.

NOTE: LOCATIONS OF EROSION AND SEDIMENT CONTROL MEASURES ARE INDICATIVE ONLY. EXACT LOCATIONS ARE TO BE DETERMINED ON SITE (WITHIN THE PROJECT LIMITS) AND SIGNED OFF BY THE PROJECT CPSC.



REV	DATE	DES.	DRN.	APP.	REVISION DETAILS
06	25/10/23	L.O.	L.O.	A.M.	FINAL ISSUE – MINOR AMENDMENTS TO REFLECT CLIENT COMMENTS
05	24/10/23	L.O.	L.O.	A.M.	FINAL ISSUE – AMENDED TO REFLECT CLIENT COMMENTS
04	14/09/23	L.O.	L.O.	A.M.	FINAL ISSUE – AMENDED TO REFLECT CLIENT COMMENT
03	04/09/23	L.O.	L.O.	A.M.	FINAL ISSUE
02	12/05/23	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.03)
01	14/11/22	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.02)
00	05/10/22	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.01)
A	04/10/22	L.O.	L.O.	A.M.	DRAFT ISSUE – FOR CONSULTATION

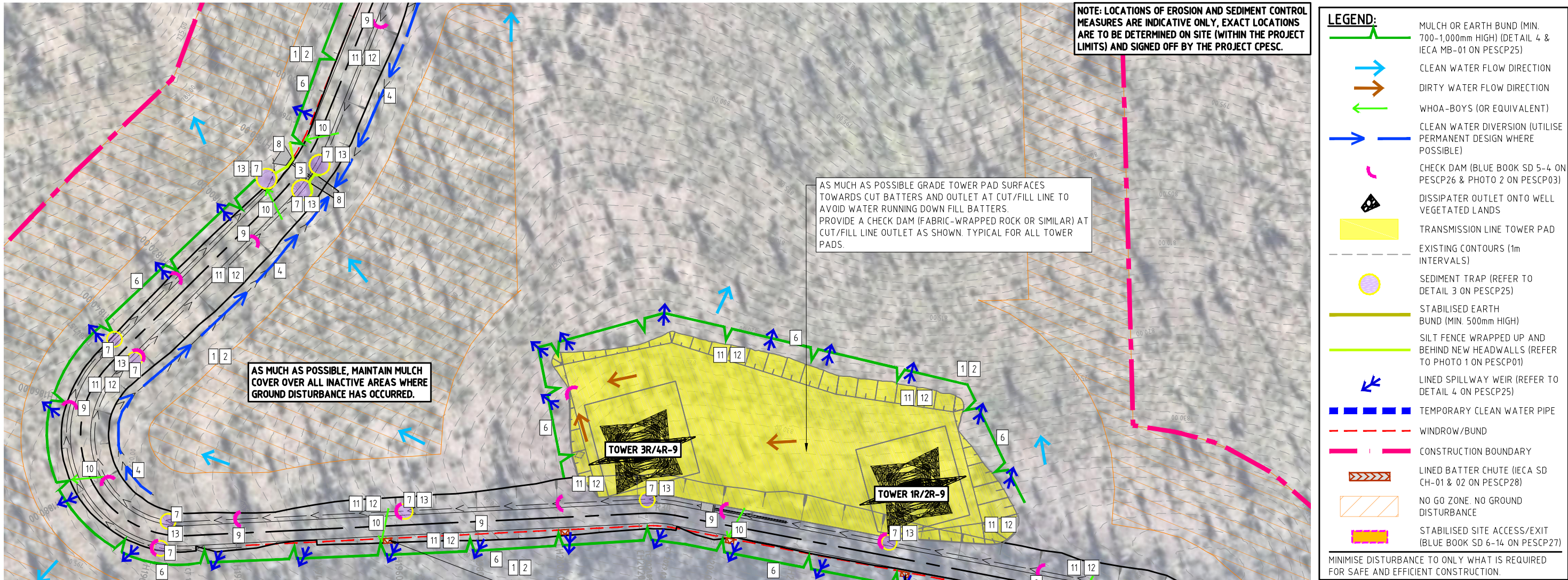
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DESIGN BY	L.O.
DRAWN BY	L.O.
FINAL APPROVAL	A.M.
SCALE:	1:1000
(on A3 Original)	
FINAL	



PROJECT TITLE

MARAGLE 330kV SWITCHING STATION AND 300kV TRANSMISSION LINE CONNECTIONS

DRAWING TITLE			
EROSION AND SEDIMENT CONTROL PLAN – ACCESS TRACK 5 & TOWER PADS – SHEET 10 OF 29			
PROJECT NO.	SUB-PR NO.	DRAWING NO.	REV
22000398	P02	PESCP10	06



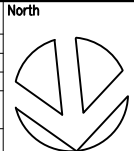
EROSION HAZARD ASSESSMENT – Transmission Line Access Track 5 and Associated Tower Pads
Refer to PESCP07 for Access Track 5 and Associated Tower Pads works Erosion Hazard Assessment.

EROSION AND SEDIMENT CONTROL INSTRUCTIONS

1. Install flagging to delineate clearing limits.
2. Stage disturbance to minimise the amount of exposed area at any one time as much as possible.
3. Construct permanent culverts/pipes early and utilise as construction phase cross alignment drainage. Refer to Details 1 and 2 on PESCP24.
4. Construct upslope clean water diversions. Utilise permanent design wherever possible for this purpose.
 - 4.1. Alternatively install stabilised earth bunds (min. 500mm high). Refer to instruction 5 below.
5. Construct stabilised earth bunds (min. 500mm high) upslope of areas of disturbance to direct upslope clean water to rock dissipater outlets as shown.
 - 5.1. Earth bunds can be established by windrowing topsoil from the clearing and grubbing footprint, then sprayed with a biodegradable soil polymer (e.g. Vital Stonewall) or covered with fabric or organic fibre matting (e.g. jute).
6. Install mulch or earth bunds (min. 700-1,000mm high) downslope of disturbance areas as shown. Mulch or earth bunds must include regular returns at max. 20m intervals and lined spillway weirs in all low points. Refer to Detail 4 and IECA Standard Drawing MB-01 on PESCP25.
7. Construct sediment traps in the locations shown. Refer to Detail 3 on PESCP25.
 - 7.1. Alternatively install large fabric wrapped rock check dams. Refer to Blue Book Standard Drawing SD 5-4 on PESCP26.
8. Wrap sediment fence up and behind new head walls. Refer to Photo 1 on PESCP01.
9. Place check dams (sandbags, coir logs or rock) in new drains prior to forecast rainfall (>50% chance of 10mm or more in 24 hours) at max. 20m intervals in high risk areas and where drains grade at 10% or more, or approx. 50m intervals in all other areas (<10% grade). Refer to Blue Book Standard Drawing SD 5-4 on PESCP26 and Photo 2 on PESCP03.
10. During initial earthworks (prior to access tracks being properly graded), install whoa-boys (or equivalent) at max. 80m intervals right across access tracks to turn water out into downslope perimeter controls at regular intervals and to avoid having all water run down the access tracks to a single low point.
11. All exposed batters and steep slopes (>10%) are to be covered or binder-sprayed when rain is forecast (>50% chance of 10mm or more in 24 hours) to achieve at least 60% ground cover. Erosion protection will be either mulch, Erosion Control Blanket (ECB), or a biodegradable spray on soil binder (if usage is first endorsed by the EPA).
 - 11.1. Note rock batters do not require temporary stabilisation.
12. Undertake 'rapid' rehabilitation of lands (including batters and drains) within 14 days of final earthworks being completed in each area (rather than waiting until the completion of all works).
13. De-watering of water accumulating onsite is to be managed in accordance with the 'Dirty Water Treatment and Discharge Requirements' notes on PESCP01.

REV	DATE	DES.	DRN.	APP.	REVISION DETAILS
06	25/10/23	L.O.	L.O.	A.M.	FINAL ISSUE – MINOR AMENDMENTS TO REFLECT CLIENT COMMENTS
05	24/10/23	L.O.	L.O.	A.M.	FINAL ISSUE – AMENDED TO REFLECT CLIENT COMMENTS
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01	14/11/22	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.02)
00	05/10/22	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.01)
A	04/10/22	L.O.	L.O.	A.M.	DRAFT ISSUE – FOR CONSULTATION

DRAWING STATUS	
DESIGN BY	L.O.
DRAWN BY	L.O.
FINAL APPROVAL	A.M.
SCALE:	1:1000
(on A3 Original)	
FINAL	



CLIENT



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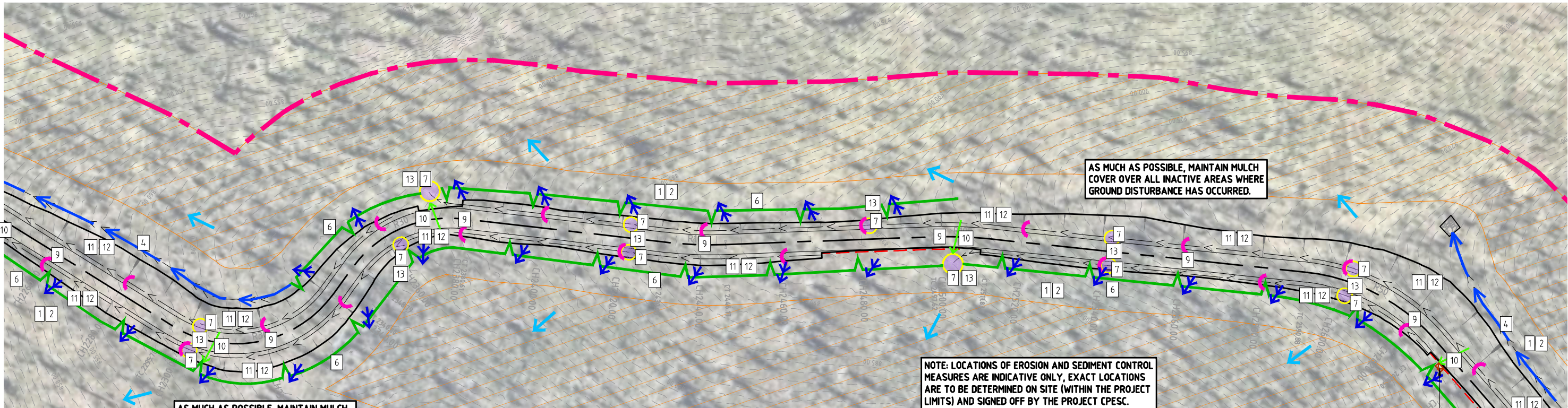
PROJECT TITLE

**MARAGLE 330kV SWITCHING
STATION AND 300kV
TRANSMISSION LINE
CONNECTIONS**

DRAWING TITLE

**EROSION AND SEDIMENT CONTROL
PLAN – ACCESS TRACK 5 &
TOWER PADS – SHEET 11 OF 29**

PROJECT NO.	SUB-PR NO.	DRAWING NO.	REV
22000398	P02	PESCP11	06



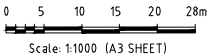
EROSION HAZARD ASSESSMENT – Transmission Line Access Track 5 and Associated Tower Pads
Refer to PESCP07 for Access Track 5 and Associated Tower Pads works Erosion Hazard Assessment.

EROSION AND SEDIMENT CONTROL INSTRUCTIONS

1. Install flagging to delineate clearing limits.
2. Stage disturbance to minimise the amount of exposed area at any one time as much as possible.
3. Construct permanent culverts/pipes early and utilise as construction phase cross alignment drainage. Refer to Details 1 and 2 on PESCP24.
4. Construct upslope clean water diversions. Utilise permanent design wherever possible for this purpose.
 - 4.1. Alternatively install stabilised earth bunds (min. 500mm high). Refer to instruction 5 below.
5. Construct stabilised earth bunds (min. 500mm high) upslope of areas of disturbance to direct upslope clean water to rock dissipater outlets as shown.
 - 5.1. Earth bunds can be established by windrowing topsoil from the clearing and grubbing footprint, then sprayed with a biodegradable soil polymer (e.g. Vital Stonewall) or covered with fabric or organic fibre matting (e.g. jute).
6. Install mulch or earth bunds (min. 700-1,000mm high) downslope of disturbance areas as shown. Mulch or earth bunds must include regular returns at max. 20m intervals and lined spillway weirs in all low points. Refer to Detail 4 and IECA Standard Drawing MB-01 on PESCP25.
7. Construct sediment traps in the locations shown. Refer to Detail 3 on PESCP25.
 - 7.1. Alternatively install large fabric wrapped rock check dams. Refer to Blue Book Standard Drawing SD 5-4 on PESCP26.
8. Wrap sediment fence up and behind new head walls. Refer to Photo 1 on PESCP01.
9. Place check dams (sandbags, coir logs or rock) in new drains prior to forecast rainfall (>50% chance of 10mm or more in 24 hours) at max. 20m intervals in high risk areas and where drains grade at 10% or more, or approx. 50m intervals in all other areas (<10% grade). Refer to Blue Book Standard Drawing SD 5-4 on PESCP26 and Photo 2 on PESCP03.
10. During initial earthworks (prior to access tracks being properly graded), install whoa-boys (or equivalent) at max. 80m intervals right across access tracks to turn water out into downslope perimeter controls at regular intervals and to avoid having all water run down the access tracks to a single low point.
11. All exposed batters and steep slopes (>10%) are to be covered or binder-sprayed when rain is forecast (>50% chance of 10mm or more in 24 hours) to achieve at least 60% ground cover. Erosion protection will be either mulch, Erosion Control Blanket (ECB), or a biodegradable spray on soil binder (if usage is first endorsed by the EPA).
 - 11.1. Note rock batters do not require temporary stabilisation.
12. Undertake 'rapid' rehabilitation of lands (including batters and drains) within 14 days of final earthworks being completed in each area (rather than waiting until the completion of all works).
13. De-watering of water accumulating onsite is to be managed in accordance with the 'Dirty Water Treatment and Discharge Requirements' notes on PESCP01.

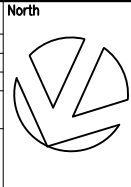
- LEGEND:**
- MULCH OR EARTH BUND (MIN. 700-1,000mm HIGH) (DETAIL 4 & IECA MB-01 ON PESCP25)
 - CLEAN WATER FLOW DIRECTION
 - DIRTY WATER FLOW DIRECTION
 - WHOA-BOYS (OR EQUIVALENT)
 - CLEAN WATER DIVERSION (UTILISE PERMANENT DESIGN WHERE POSSIBLE)
 - CHECK DAM (BLUE BOOK SD 5-4 ON PESCP26 & PHOTO 2 ON PESCP03)
 - DISSIPATER OUTLET ONTO WELL VEGETATED LANDS
 - TRANSMISSION LINE TOWER PAD
 - EXISTING CONTOURS (1m INTERVALS)
 - SEDIMENT TRAP (REFER TO DETAIL 3 ON PESCP25)
 - STABILISED EARTH BUND (MIN. 500mm HIGH)
 - SILT FENCE WRAPPED UP AND BEHIND NEW HEADWALLS (REFER TO PHOTO 1 ON PESCP01)
 - LINED SPILLWAY WEIR (REFER TO DETAIL 4 ON PESCP25)
 - TEMPORARY CLEAN WATER PIPE
 - WINDROW/BUND
 - CONSTRUCTION BOUNDARY
 - LINED BATTER CHUTE (IECA SD CH-01 & 02 ON PESCP28)
 - NO GO ZONE. NO GROUND DISTURBANCE
 - STABILISED SITE ACCESS/EXIT (BLUE BOOK SD 6-14 ON PESCP27)
- MINIMISE DISTURBANCE TO ONLY WHAT IS REQUIRED FOR SAFE AND EFFICIENT CONSTRUCTION.

WINDROW/BUND TO INCLUDE REGULAR BREAKS AT MAX. 40m INTERVALS AND LINED BATTER CHUTES TO CONVEY DIRTY WATER DOWN BATTERS AND TOWARDS SEDIMENT CONTROLS. REFER TO IECA CH-01 & 02 ON PESCP28.



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06	25/10/23	L.O.	L.O.	A.M.	FINAL ISSUE – MINOR AMENDMENTS TO REFLECT CLIENT COMMENTS
05	24/10/23	L.O.	L.O.	A.M.	FINAL ISSUE – AMENDED TO REFLECT CLIENT COMMENTS
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03	04/09/23	L.O.	L.O.	A.M.	FINAL ISSUE
02	12/05/23	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.03)
01	14/11/22	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.02)
00	05/10/22	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.01)
A	04/10/22	L.O.	L.O.	A.M.	DRAFT ISSUE – FOR CONSULTATION

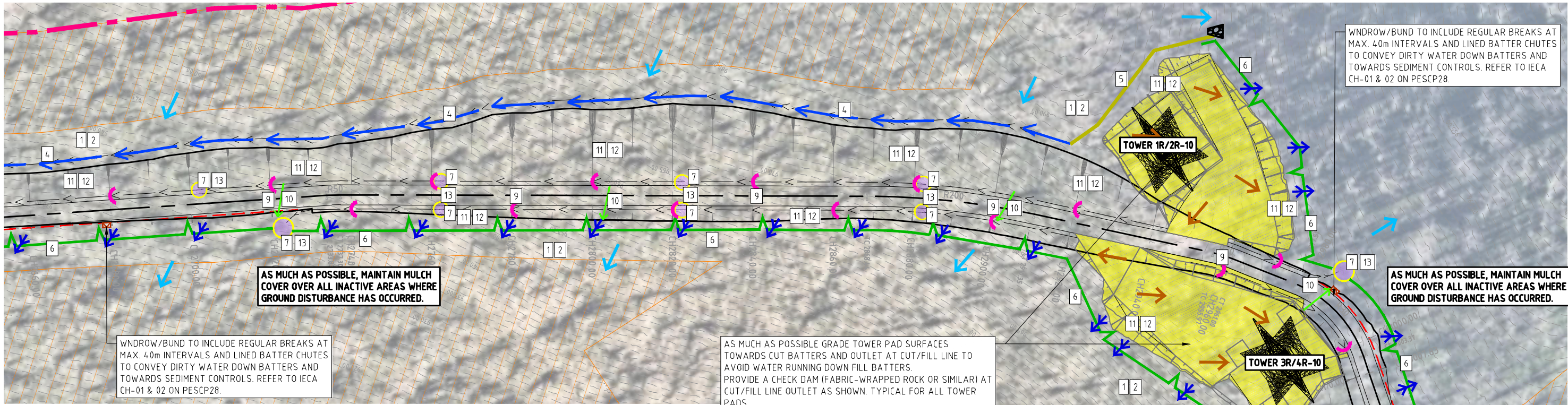
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DESIGN BY	L.O.
DRAWN BY	L.O.
FINAL APPROVAL	A.M.
SCALE:	1:1000
(on A3 Original)	
FINAL	



Suites 7 & 8, 68-70 Station Street
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PROJECT TITLE
**MARAGLE 330kV SWITCHING
STATION AND 300kV
TRANSMISSION LINE
CONNECTIONS**

DRAWING TITLE			
EROSION AND SEDIMENT CONTROL PLAN – ACCESS TRACK 5 & TOWER PADS – SHEET 12 OF 29			
PROJECT NO.	SUB-PR NO.	DRAWING NO.	REV
22000398	P02	PESCP12	06



EROSION HAZARD ASSESSMENT – Transmission Line Access Tracks 4 & 5 and Associated Tower Pads

Refer to PESCP07 for Access Tracks 4 & 5 and Associated Tower Pads works Erosion Hazard Assessment.

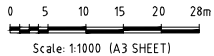
EROSION AND SEDIMENT CONTROL INSTRUCTIONS

1. Install flagging to delineate clearing limits.
2. Stage disturbance to minimise the amount of exposed area at any one time as much as possible.
3. Construct permanent culverts/pipes early and utilise as construction phase cross alignment drainage. Refer to Details 1 and 2 on PESCP24.
4. Construct upslope clean water diversions. Utilise permanent design wherever possible for this purpose.
 - 4.1. Alternatively install stabilised earth bunds (min. 500mm high). Refer to instruction 5 below.
5. Construct stabilised earth bunds (min. 500mm high) upslope of areas of disturbance to direct upslope clean water to rock dissipater outlets as shown.
 - 5.1. Earth bunds can be established by windrowing topsoil from the clearing and grubbing footprint, then sprayed with a biodegradable soil polymer (e.g. Vital Stonewall) or covered with fabric or organic fibre matting (e.g. jute).
6. Install mulch or earth bunds (min. 700-1,000mm high) downslope of disturbance areas as shown. Mulch or earth bunds must include regular returns at max. 20m intervals and lined spillway weirs in all low points. Refer to Detail 4 and IECA Standard Drawing MB-01 on PESCP25.
7. Construct sediment traps in the locations shown. Refer to Detail 3 on PESCP26.
 - 7.1. Alternatively install large fabric wrapped rock check dams. Refer to Blue Book Standard Drawing SD 5-4 on PESCP26.
8. Wrap sediment fence up and behind new head walls. Refer to Photo 1 on PESCP01.
9. Place check dams (sandbags, coir logs or rock) in new drains prior to forecast rainfall (>50% chance of 10mm or more in 24 hours) at max. 20m intervals in high risk areas and where drains grade at 10% or more, or approx. 50m intervals in all other areas (<10% grade). Refer to Blue Book Standard Drawing SD 5-4 on PESCP26 and Photo 2 on PESCP03.
10. During initial earthworks (prior to access tracks being properly graded), install whoa-boys (or equivalent) at max. 80m intervals right across access tracks to turn water out into downslope perimeter controls at regular intervals and to avoid having all water run down the access tracks to a single low point.
11. All exposed batters and steep slopes (>10%) are to be covered or binder-sprayed when rain is forecast (>50% chance of 10mm or more in 24 hours) to achieve at least 60% ground cover. Erosion protection will be either mulch, Erosion Control Blanket (ECB), or a biodegradable spray on soil binder (if usage is first endorsed by the EPA).
 - 11.1. Note rock batters do not require temporary stabilisation.
12. Undertake 'rapid' rehabilitation of lands (including batters and drains) within 14 days of final earthworks being completed in each area (rather than waiting until the completion of all works).
13. De-watering of water accumulating onsite is to be managed in accordance with the 'Dirty Water Treatment and Discharge Requirements' notes on PESCP01.

LEGEND:

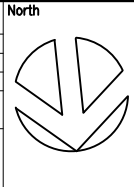
- MULCH OR EARTH BUND (MIN. 700-1,000mm HIGH) (DETAIL 4 & IECA MB-01 ON PESCP25)
 - CLEAN WATER FLOW DIRECTION
 - DIRTY WATER FLOW DIRECTION
 - WHOA-BOYS (OR EQUIVALENT)
 - CLEAN WATER DIVERSION (UTILISE PERMANENT DESIGN WHERE POSSIBLE)
 - CHECK DAM (BLUE BOOK SD 5-4 ON PESCP26 & PHOTO 2 ON PESCP03)
 - DISSIPATER OUTLET ONTO WELL VEGETATED LANDS
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 - EXISTING CONTOURS (1m INTERVALS)
 - SEDIMENT TRAP (REFER TO DETAIL 3 ON PESCP25)
 - STABILISED EARTH BUND (MIN. 500mm HIGH)
 - SILT FENCE WRAPPED UP AND BEHIND NEW HEADWALLS (REFER TO PHOTO 1 ON PESCP01)
 - LINED SPILLWAY WEIR (REFER TO DETAIL 4 ON PESCP25)
 - TEMPORARY CLEAN WATER PIPE
 - WINDROW/BUND
 - CONSTRUCTION BOUNDARY
 - LINED BATTER CHUTE (IECA SD CH-01 & 02 ON PESCP28)
 - NO GO ZONE. NO GROUND DISTURBANCE
 - STABILISED SITE ACCESS/EXIT (BLUE BOOK SD 6-14 ON PESCP27)
- MINIMISE DISTURBANCE TO ONLY WHAT IS REQUIRED FOR SAFE AND EFFICIENT CONSTRUCTION.

NOTE: LOCATIONS OF EROSION AND SEDIMENT CONTROL MEASURES ARE INDICATIVE ONLY, EXACT LOCATIONS ARE TO BE DETERMINED ON SITE (WITHIN THE PROJECT LIMITS) AND SIGNED OFF BY THE PROJECT CPESC.



REV	DATE	DES.	DRN.	APP.	REVISION DETAILS
06	25/10/23	L.O.	L.O.	A.M.	FINAL ISSUE – MINOR AMENDMENTS TO REFLECT CLIENT COMMENTS
05	24/10/23	L.O.	L.O.	A.M.	FINAL ISSUE – AMENDED TO REFLECT CLIENT COMMENTS
04	14/09/23	L.O.	L.O.	A.M.	FINAL ISSUE – AMENDED TO REFLECT CLIENT COMMENT
03	04/09/23	L.O.	L.O.	A.M.	FINAL ISSUE
02	12/05/23	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.03)
01	14/11/22	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.02)
00	05/10/22	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.01)
A	04/10/22	L.O.	L.O.	A.M.	DRAFT ISSUE – FOR CONSULTATION

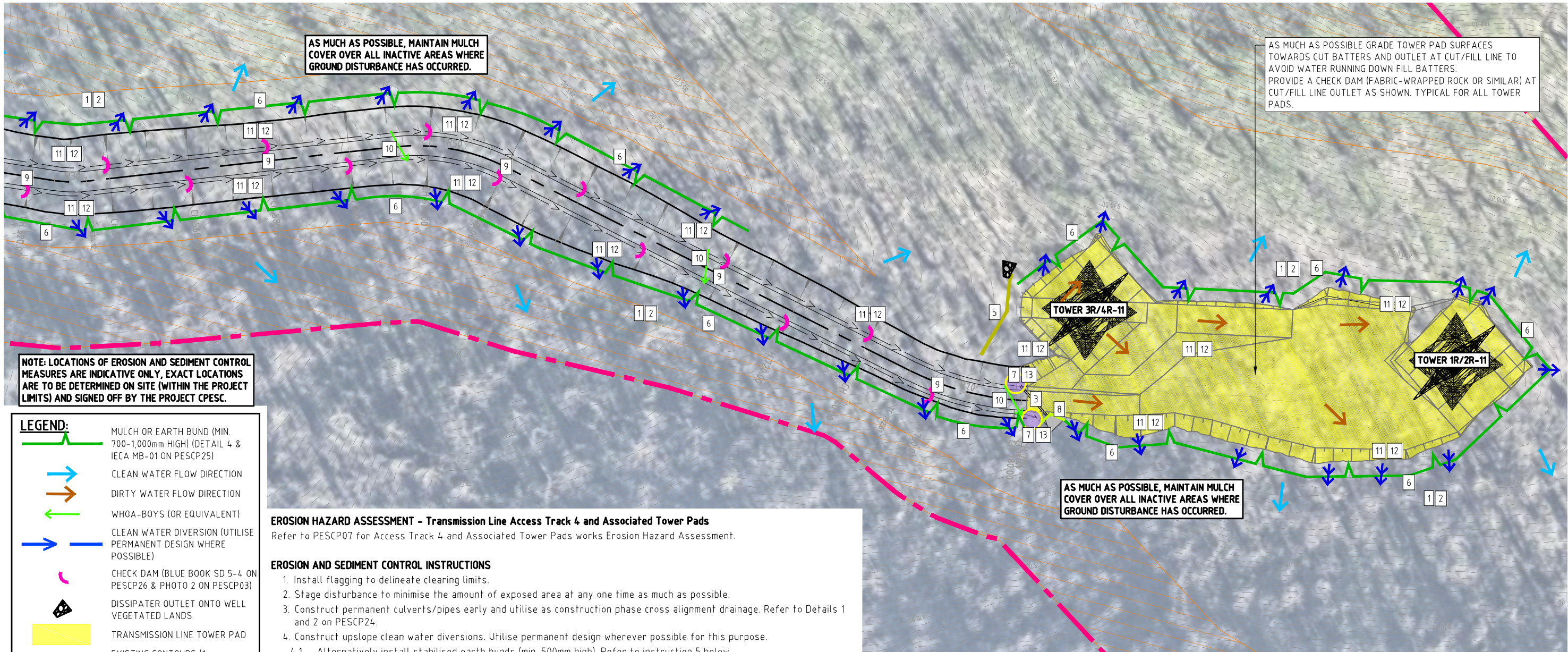
DRAWING STATUS	
DESIGN BY	L.O.
DRAWN BY	L.O.
FINAL APPROVAL	A.M.
SCALE:	1:1000
(on A3 Original)	
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PROJECT TITLE
MARAGLE 330kV SWITCHING STATION AND 300kV TRANSMISSION LINE CONNECTIONS

DRAWING TITLE			
EROSION AND SEDIMENT CONTROL PLAN – ACCESS TRACKS 5 & 4 & TOWER PADS – SHEET 13 OF 29			
PROJECT NO.	SUB-PR NO.	DRAWING NO.	REV
22000398	P02	PESCP13	06



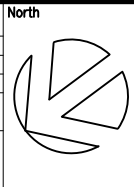
EROSION HAZARD ASSESSMENT - Transmission Line Access Track 4 and Associated Tower Pads
Refer to PESCP07 for Access Track 4 and Associated Tower Pads works Erosion Hazard Assessment.

EROSION AND SEDIMENT CONTROL INSTRUCTIONS

1. Install flagging to delineate clearing limits.
2. Stage disturbance to minimise the amount of exposed area at any one time as much as possible.
3. Construct permanent culverts/pipes early and utilise as construction phase cross alignment drainage. Refer to Details 1 and 2 on PESCP24.
4. Construct upslope clean water diversions. Utilise permanent design wherever possible for this purpose.
 - 4.1. Alternatively install stabilised earth bunds (min. 500mm high). Refer to instruction 5 below.
5. Construct stabilised earth bunds (min. 500mm high) upslope of areas of disturbance to direct upslope clean water to rock dissipater outlets as shown.
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6. Install mulch or earth bunds (min. 700-1,000mm high) downslope of disturbance areas as shown. Mulch or earth bunds must include regular returns at max. 20m intervals and lined spillway weirs in all low points. Refer to Detail 4 and IECA Standard Drawing MB-01 on PESCP25.
7. Construct sediment traps in the locations shown. Refer to Detail 3 on PESCP25.
 - 7.1. Alternatively install large fabric wrapped rock check dams. Refer to Blue Book Standard Drawing SD 5-4 on PESCP26.
8. Wrap sediment fence up and behind new head walls. Refer to Photo 1 on PESCP01.
9. Place check dams (sandbags, coir logs or rock) in new drains prior to forecast rainfall (>50% chance of 10mm or more in 24 hours) at max. 20m intervals in high risk areas and where drains grade at 10% or more, or approx. 50m intervals in all other areas (<10% grade). Refer to Blue Book Standard Drawing SD 5-4 on PESCP26 and Photo 2 on PESCP03.
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03	04/09/23	L.O.	L.O.	A.M.	FINAL ISSUE
02	12/05/23	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.03)
01	14/11/22	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.02)
00	05/10/22	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.01)
A	04/10/22	L.O.	L.O.	A.M.	DRAFT ISSUE - FOR CONSULTATION

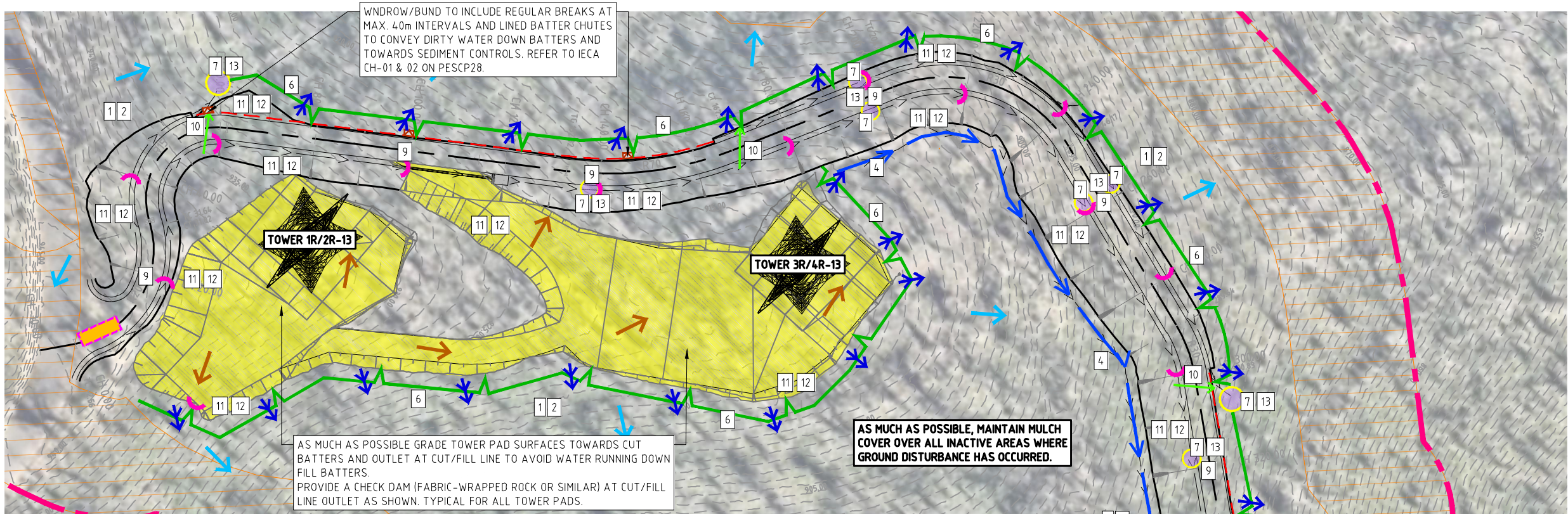
DRAWING STATUS	
DESIGN BY	L.O.
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FINAL APPROVAL	A.M.
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PROJECT TITLE
MARAGLE 330kV SWITCHING
STATION AND 300kV
TRANSMISSION LINE
CONNECTIONS

DRAWING TITLE			
EROSION AND SEDIMENT CONTROL PLAN - ACCESS TRACK 4 & TOWER PADS - SHEET 15 OF 29			
PROJECT NO.	SUB-PR NO.	DRAWING NO.	REV
22000398	P02	PESCP15	06



EROSION HAZARD ASSESSMENT – Transmission Line Access Track 2 and Associated Tower Pads

A = R x K x LS x P x C

The following values have been used:

- R : 1,500
- K : 0.05 (conservative assumption)
- LS : approx. 10.43 (70m, 30%)(existing surface)
- P : 1.3 (construction stage – i.e. no soil surface protection or ground cover applied)
- C : 1 (for disturbed construction areas)

Based on the above data, the potential soil loss at this site is approx. 1,017 t/ha/yr (Soil Loss Class 6: very high).

Under Blue Book standards sediment basins are required if the soil loss in any catchment is >200 t/yr. Therefore, under Blue Book Standards sediment basins are required for all disturbed catchments greater than 0.2 ha. However, sediment basins cannot feasibly be constructed due to the existing steep topography (approx. 30%). As such alternative controls are proposed instead, augmented with a requirement to cover or binder-spray all batter (not including rock batters) when rain is imminent. Access Track 2 and associated Tower Pad works must also be staged as much as possible to minimise the amount of disturbed area at any one time.

EROSION AND SEDIMENT CONTROL INSTRUCTIONS

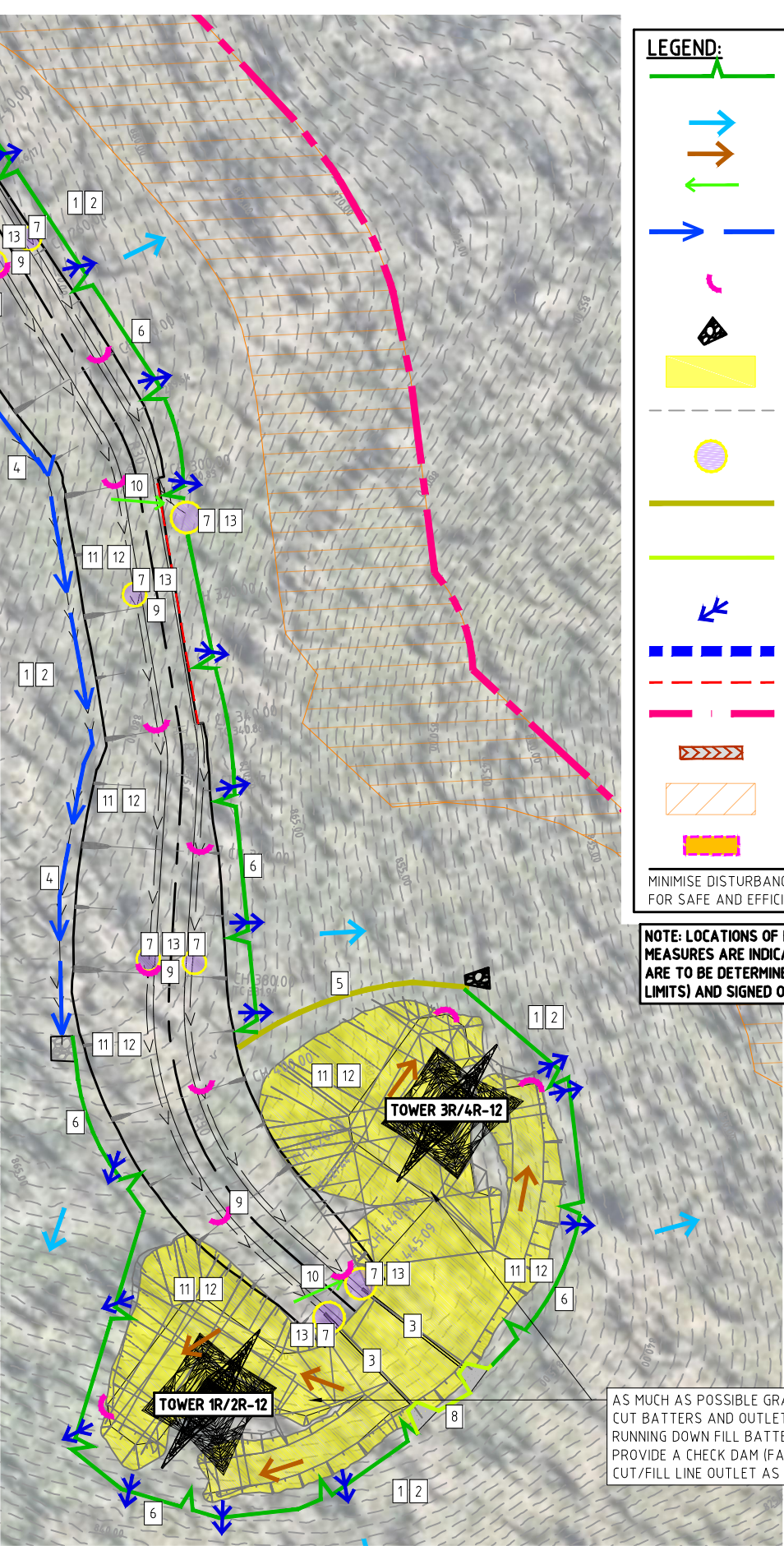
1. Install flagging to delineate clearing limits.
2. Stage disturbance to minimise the amount of exposed area at any one time as much as possible.
3. Construct permanent culverts/pipes early and utilise as construction phase cross alignment drainage. Refer to Details 1 and 2 on PESCP24.
4. Construct upslope clean water diversions. Utilise permanent design wherever possible for this purpose.
 - 4.1. Alternatively install stabilised earth bunds (min. 500mm high). Refer to instruction 5 below.
5. Construct stabilised earth bunds (min. 500mm high) upslope of areas of disturbance to direct upslope clean water to rock dissipater outlets as shown.
 - 5.1. Earth bunds can be established by windrowing topsoil from the clearing and grubbing footprint, then sprayed with a biodegradable soil polymer (e.g. Vital Stonewall) or covered with fabric or organic fibre matting (e.g. jute).
6. Install mulch or earth bunds (min. 700-1,000mm high) downslope of disturbance areas as shown. Mulch or earth bunds must include regular returns at max. 20m intervals and lined spillway weirs in all low points. Refer to Detail 4 and IECA Standard Drawing MB-01 on PESCP25.
7. Construct sediment traps in the locations shown. Refer to Detail 3 on PESCP25.
 - 7.1. Alternatively install large fabric wrapped rock check dams. Refer to Blue Book Standard Drawing SD 5-4 on PESCP26.
8. Wrap sediment fence up and behind new head walls. Refer to Photo 1 PESCP01.
9. Place check dams (sandbags, coir logs or rock) in new drains prior to forecast rainfall (>50% chance of 10mm or more in 24 hours) at max. 20m intervals in high risk areas and where drains grade at 10% or more, or approx. 50m intervals in all other areas (<10% grade). Refer to Blue Book Standard Drawing SD 5-4 on PESCP26 and Photo 2 on PESCP03.
10. During initial earthworks (prior to access tracks being properly graded), install whoa-boys (or equivalent) at max. 80m intervals right across access tracks to turn water out into downslope perimeter controls at regular intervals and to avoid having all water run down the access tracks to a single low point.
11. All exposed batters and steep slopes (>10%) are to be covered or binder-sprayed when rain is forecast (>50% chance of 10mm or more in 24 hours) to achieve at least 60% ground cover. Erosion protection will be either mulch, Erosion Control Blanket (ECB), or a biodegradable spray on soil binder (if usage is first endorsed by the EPA).
 - 11.1. Note rock batters do not require temporary stabilisation.
12. Undertake 'rapid' rehabilitation of lands (including batters and drains) within 14 days of final earthworks being completed in each area (rather than waiting until the completion of all works).
13. De-watering of water accumulating onsite is to be managed in accordance with the 'Dirty Water Treatment and Discharge Requirements' notes on PESCP01.

LEGEND:

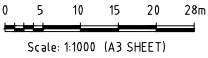
- MULCH OR EARTH BUND (MIN. 700-1,000mm HIGH) (DETAIL 4 & IECA MB-01 ON PESCP25)
- CLEAN WATER FLOW DIRECTION
- DIRTY WATER FLOW DIRECTION
- WHO-A-BOYS (OR EQUIVALENT)
- CLEAN WATER DIVERSION (UTILISE PERMANENT DESIGN WHERE POSSIBLE)
- CHECK DAM (BLUE BOOK SD 5-4 ON PESCP26 & PHOTO 2 ON PESCP03)
- DISSIPATER OUTLET ONTO WELL VEGETATED LANDS
- TRANSMISSION LINE TOWER PAD
- EXISTING CONTOURS (1m INTERVALS)
- SEDIMENT TRAP (REFER TO DETAIL 3 ON PESCP25)
- STABILISED EARTH BUND (MIN. 500mm HIGH)
- SILT FENCE WRAPPED UP AND BEHIND NEW HEADWALLS (REFER TO PHOTO 1 ON PESCP01)
- LINED SPILLWAY WEIR (REFER TO DETAIL 4 ON PESCP25)
- TEMPORARY CLEAN WATER PIPE
- WINDROW/BUND
- CONSTRUCTION BOUNDARY
- LINED BATTER CHUTE (IECA SD CH-01 & 02 ON PESCP28)
- NO GO ZONE. NO GROUND DISTURBANCE
- STABILISED SITE ACCESS/EXIT (BLUE BOOK SD 6-14 ON PESCP27)

MINIMISE DISTURBANCE TO ONLY WHAT IS REQUIRED FOR SAFE AND EFFICIENT CONSTRUCTION.

NOTE: LOCATIONS OF EROSION AND SEDIMENT CONTROL MEASURES ARE INDICATIVE ONLY, EXACT LOCATIONS ARE TO BE DETERMINED ON SITE (WITHIN THE PROJECT LIMITS) AND SIGNED OFF BY THE PROJECT CPSC.

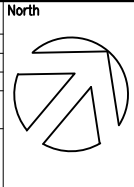


AS MUCH AS POSSIBLE GRADE TOWER PAD SURFACES TOWARDS CUT BATTERS AND OUTLET AT CUT/FILL LINE TO AVOID WATER RUNNING DOWN FILL BATTERS. PROVIDE A CHECK DAM (FABRIC-WRAPPED ROCK OR SIMILAR) AT CUT/FILL LINE OUTLET AS SHOWN. TYPICAL FOR ALL TOWER PADS.



REV	DATE	DES.	DRN.	APP.	REVISION DETAILS
06	25/10/23	L.O.	L.O.	A.M.	FINAL ISSUE – MINOR AMENDMENTS TO REFLECT CLIENT COMMENTS
05	24/10/23	L.O.	L.O.	A.M.	FINAL ISSUE – AMENDED TO REFLECT CLIENT COMMENTS
04	14/09/23	L.O.	L.O.	A.M.	FINAL ISSUE – AMENDED TO REFLECT CLIENT COMMENT
03	04/09/23	L.O.	L.O.	A.M.	FINAL ISSUE
02	12/05/23	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.03)
01	14/11/22	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.02)
00	05/10/22	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.01)
A	04/10/22	L.O.	L.O.	A.M.	DRAFT ISSUE – FOR CONSULTATION

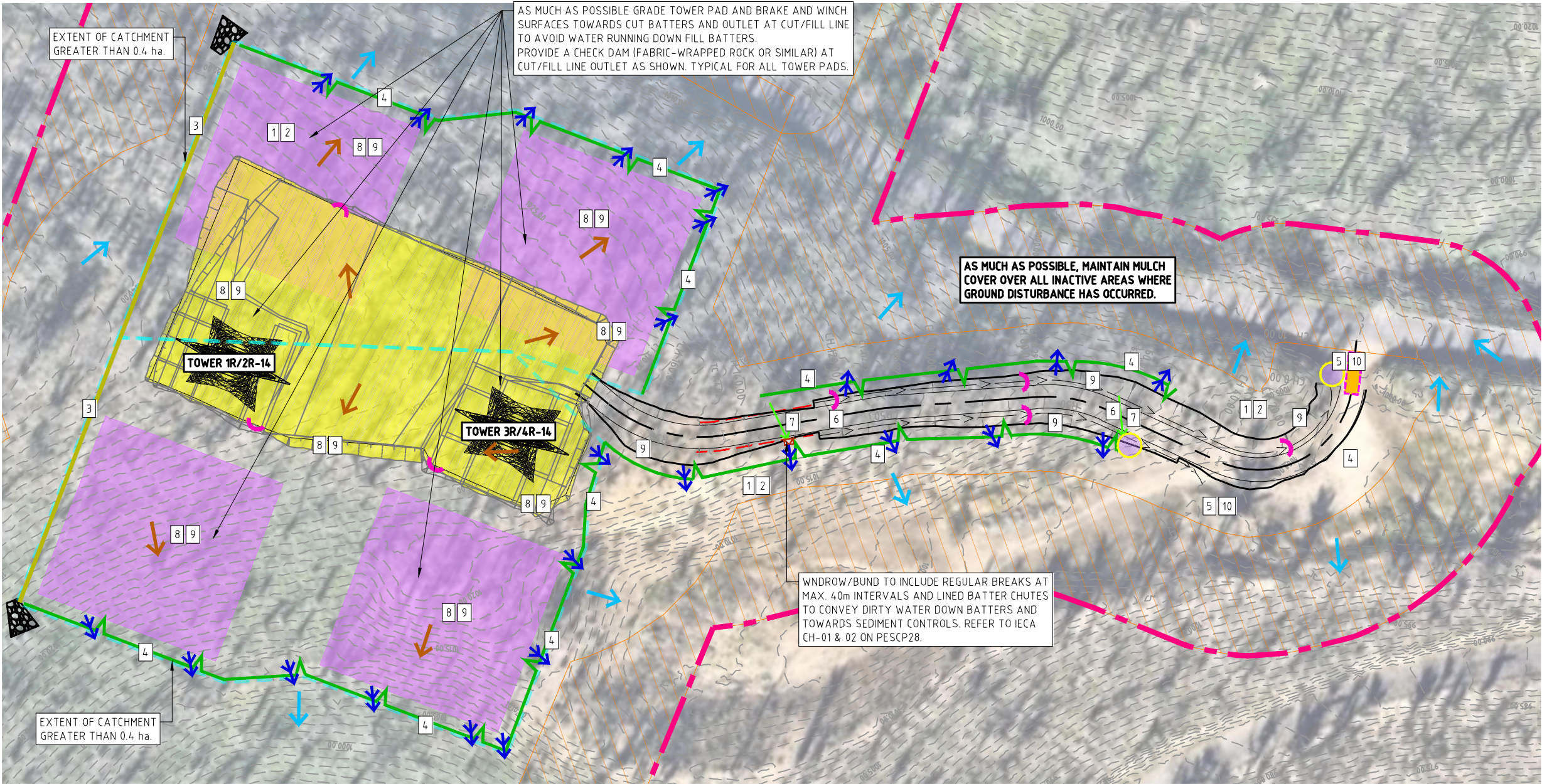
DRAWING STATUS	
DESIGN BY	L.O.
DRAWN BY	L.O.
FINAL APPROVAL	A.M.
SCALE:	1:1000
(on A3 Original)	
FINAL	



Suites 7 & 8, 68-70 Station Street
PO Box 1098, Bowral NSW 2576.
(t) 02 4862 1633
(f) 02 4862 3088
email: reception@seec.com.au
WWW.SEEC.COM.AU

PROJECT TITLE
**MARAGLE 330kV SWITCHING
STATION AND 300kV
TRANSMISSION LINE
CONNECTIONS**

DRAWING TITLE EROSION AND SEDIMENT CONTROL PLAN – ACCESS TRACK 2 & TOWER PADS – SHEET 16 OF 29			
PROJECT NO.	SUB-PR NO.	DRAWING NO.	REV
22000398	P02	PESCP16	06



LEGEND:

- MULCH OR EARTH BUND (MIN. 700-1,000mm HIGH) (DETAIL 4 & IECA MB-01 ON PESCP25)
- CLEAN WATER FLOW DIRECTION
- DIRTY WATER FLOW DIRECTION
- WHOA-BOYS (OR EQUIVALENT)
- CLEAN WATER DIVERSION (UTILISE PERMANENT DESIGN WHERE POSSIBLE)
- CHECK DAM (BLUE BOOK SD 5-4 ON PESCP25 & PHOTO 2 ON PESCP03)
- DISSIPATER OUTLET ONTO WELL VEGETATED LANDS
- TRANSMISSION LINE TOWER PAD
- EXISTING CONTOURS (1m INTERVALS)
- SEDIMENT TRAP (REFER TO DETAIL 3 ON PESCP25)
- STABILISED EARTH BUND (MIN. 500mm HIGH)
- SILT FENCE WRAPPED UP AND BEHIND NEW HEADWALLS (REFER TO PHOTO 1 ON PESCP01)
- LINED SPILLWAY WEIR (REFER TO DETAIL 4 ON PESCP25)
- TEMPORARY CLEAN WATER PIPE
- WINDROW/BUND
- CONSTRUCTION BOUNDARY
- LINED BATTER CHUTE (IECA SD CH-01 & 02 ON PESCP28)
- BRAKE AND WINCH SITE
- CATCHMENT BOUNDARY
- NO GO ZONE. NO GROUND DISTURBANCE
- STABILISED SITE ACCESS/EXIT (BLUE BOOK SD 6-14 ON PESCP27)

MINIMISE DISTURBANCE TO ONLY WHAT IS REQUIRED FOR SAFE AND EFFICIENT CONSTRUCTION.

NOTE: LOCATIONS OF EROSION AND SEDIMENT CONTROL MEASURES ARE INDICATIVE ONLY, EXACT LOCATIONS ARE TO BE DETERMINED ON SITE (WITHIN THE PROJECT LIMITS) AND SIGNED OFF BY THE PROJECT CPSC.

EROSION HAZARD ASSESSMENT – Transmission Line Access Track 1, Associated Tower Pads and Brake and Winch Sites

A = R x K x LS x P x C

The following values have been used:

- R : 1,500
K : 0.05 (conservative assumption)
LS : approx. 5.06 (80m, 15%)(existing surface)
P : 1.3 (construction stage – i.e. no soil surface protection or ground cover applied)
C : 1 (for disturbed construction areas)

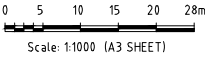
Based on the above data, the potential soil loss at this site is approx. 494 t/ha/yr (Soil Loss Class 4: moderate).

Under Blue Book standards sediment basins are required if the soil loss in any catchment is >200 t/yr. Therefore, under Blue Book Standards sediment basins are required for all disturbed catchments greater than 0.4 ha. This site comprises of several catchments, with two (2) greater than 0.4 ha (refer to plan for indicated catchments). Therefore sediment basins are required in these catchments. However, sediment basins cannot feasibly be constructed due to the existing steep topography (approx. 15-20%). As such alternative controls are proposed instead, augmented with a requirement to cover or binder-spray all batters (not including rock batters) and steep slopes (>10%) within the indicated catchments when rain is imminent. Access Track 1, associated Tower pads and brake and winch site works must also be staged as much as possible to minimise the amount of disturbed area at any one time.

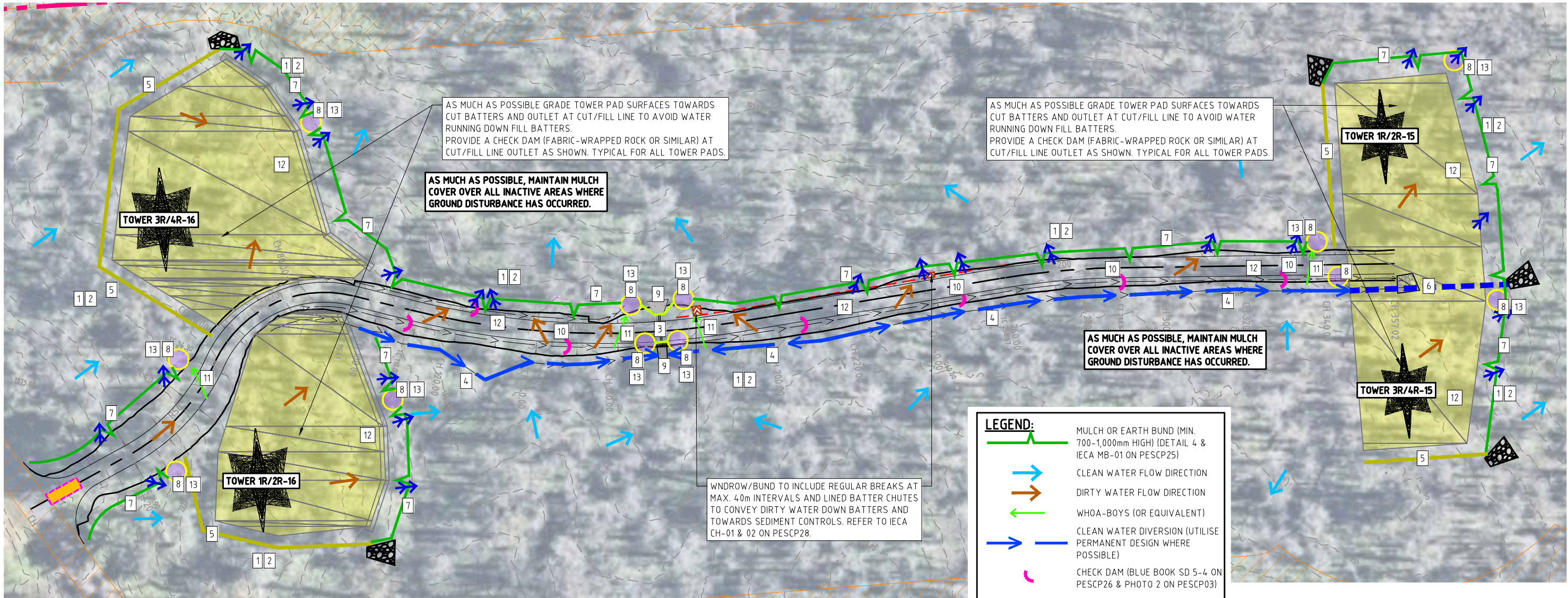
EROSION AND SEDIMENT CONTROL INSTRUCTIONS

1. Install flagging to delineate clearing limits.
2. Stage disturbance to minimise the amount of exposed area at any one time as much as possible.

3. Construct stabilised earth bunds (min. 500mm high) upslope of areas of disturbance to direct upslope clean water to rock dissipater outlets as shown.
- 3.1. Earth bunds can be established by windrowing topsoil from the clearing and grubbing footprint, then sprayed with a biodegradable soil polymer (e.g. Vital Stonewall) or covered with fabric or organic fibre matting (e.g. jute).
4. Install mulch or earth bunds (min. 700-1,000mm high) downslope of disturbance areas as shown. Mulch or earth bunds must include regular returns at max. 20m intervals and lined spillway weirs in all low points. Refer to Detail 4 and IECA Standard Drawing MB-01 on PESCP25.
5. Construct sediment traps in the locations shown. Refer to Detail 3 on PESCP25.
- 5.1. Alternatively install large fabric wrapped rock check dams. Refer to Blue Book Standard Drawing SD 5-4 on PESCP26.
6. Place check dams (sandbags, coir logs or rock) in new drains prior to forecast rainfall (>50% chance of 10mm or more in 24 hours) at max. 20m intervals in high risk areas and where drains grade at 10% or more, or approx. 50m intervals in all other areas (<10% grade). Refer to Blue Book Standard Drawing SD 5-4 on PESCP26 and Photo 2 on PESCP03.
7. During initial earthworks (prior to access tracks being properly graded), install whoa-boys (or equivalent) at max. 80m intervals right across access tracks to turn water out into downslope perimeter controls at regular intervals and to avoid having all water run down the access tracks to a single low point.
8. All exposed batters and steep slopes (>10%) are to be covered or binder-sprayed when rain is forecast (>50% chance of 10mm or more in 24 hours) to achieve at least 60% ground cover. Erosion protection will be either mulch, Erosion Control Blanket (ECB), or a biodegradable spray on soil binder (if usage is first endorsed by the EPA).
- 8.1. Note rock batters do not require temporary stabilisation.
9. Undertake 'rapid' rehabilitation of lands (including batters and drains) within 14 days of final earthworks being completed in each area (rather than waiting until the completion of all works).
10. De-watering of water accumulating onsite is to be managed in accordance with the 'Dirty Water Treatment and Discharge Requirements' notes on PESCP01.



REV	DATE	DES.	DRN.	APP.	REVISION DETAILS	DRAWING STATUS	North	CLIENT	PROJECT TITLE	DRAWING TITLE
06	25/10/23	L.O.	L.O.	A.M.	FINAL ISSUE – MINOR AMENDMENTS TO REFLECT CLIENT COMMENTS	DESIGN BY L.O.				MARAGLE 330kV SWITCHING STATION AND 300kV TRANSMISSION LINE CONNECTIONS
05	24/10/23	L.O.	L.O.	A.M.	FINAL ISSUE – AMENDED TO REFLECT CLIENT COMMENTS	DRAWN BY L.O.				
04	14/09/23	L.O.	L.O.	A.M.	FINAL ISSUE – AMENDED TO REFLECT CLIENT COMMENT	FINAL APPROVAL A.M.				
03	04/09/23	L.O.	L.O.	A.M.	FINAL ISSUE	SCALE: (on A3 Original) 1:1000				
02	12/05/23	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.03)	FINAL				
01	14/11/22	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.02)					
00	05/10/22	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.01)					
A	04/10/22	L.O.	L.O.	A.M.	DRAFT ISSUE – FOR CONSULTATION					
Plot Date: Wednesday, 25 October 2023 7:12:34 PM CAD File Name: M:\22000398 Snowy 2 – Moragale Transmission Line\Drawings\22000398_P02_PESCP_REV 06.dwg Suites 7 & 8, 68-70 Station Street PO Box 1098, Bowral NSW 2576. (t) 02 4862 1633 (f) 02 4862 3088 email: reception@seec.com.au WWW.SEEC.COM.AU									MARAGLE 330kV SWITCHING STATION AND 300kV TRANSMISSION LINE CONNECTIONS	
PROJECT NO. 22000398		SUB-PR NO. P02		DRAWING NO. PESCP17		REV 06				



EROSION HAZARD ASSESSMENT – Transmission Line Access Track 10 and Associated Tower Pads
A = R x K x LS x P x C

The following values have been used:

R	: 1,500
K	: 0.05 (conservative assumption)
LS	: ranges from 1.75 (70m, 7.5%) to 5.12 (50m, 20%)
P	: 1.3 (construction stage – i.e. no soil surface protection or ground cover applied)
C	: 1 (for disturbed construction areas)

Based on the above data, the potential soil loss at this site ranges from approx. 170 t/ha/yr (Soil Loss Class 2: low) to 499 t/ha/yr (Soil Loss Class 4: moderate).

Under Blue Book Standards sediment basins are required if the soil loss in any catchment is >200 t/yr. Therefore, under Blue Book Standards sediment basins are required for all disturbed catchments greater than 0.4 ha (based on a potential soil loss of 499 t/ha/yr). This site does not comprise of any disturbed catchments greater than 0.4 ha. As such, no sediment basins are required for the Access Track 10 and Associated Tower Pad works as the potential soil loss in all disturbed catchments is <200 t/yr.

EROSION AND SEDIMENT CONTROL INSTRUCTIONS

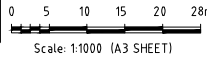
1. Install flagging to delineate clearing limits.
2. Stage disturbance to minimise the amount of exposed area at any one time as much as possible.
3. Construct the permanent culvert early and utilise as construction phase cross alignment drainage. Refer to Details 1 and 2 on PESCP24.
4. Construct upslope clean water diversions. Utilise permanent design wherever possible for this purpose.

- 4.1. Alternatively install stabilised earth bunds (min. 500mm high). Refer to instruction 5 below.
5. Construct stabilised earth bunds (min. 500mm high) upslope of areas of disturbance to direct upslope clean water to rock dissipater outlets as shown.
- 5.1. Earth bunds can be established by windrowing topsoil from the clearing and grubbing footprint, then sprayed with a biodegradable soil polymer (e.g. Vital Stonewall) or covered with fabric or organic fibre matting (e.g. jute).
6. Install a temporary pipe or lined clean water diversion in the location shown to direct upslope clean water through the transmission tower pad work area as shown.
7. Install mulch or earth bunds (min. 700-1,000mm high) downslope of disturbance areas as shown. Mulch or earth bunds must include regular returns at max. 20m intervals and lined spillway weirs in all low points. Refer to Detail 4 and IECA Standard Drawing MB-01 on PESCP25.
8. Construct sediment traps in the locations shown. Refer to Detail 3 on PESCP25.
- 8.1. Alternatively install large fabric wrapped rock check dams. Refer to Blue Book Standard Drawing SD 5-4 on PESCP26.
9. Wrap sediment fence up and behind new head walls. Refer to Photo 1 on PESCP01.
10. Place check dams (sandbags, coir logs or rock) in new drains prior to forecast rainfall (>50% chance of 10mm or more in 24 hours) at max. 20m intervals in high risk areas and where drains grade at 10% or more, or approx. 50m intervals in all other areas (<10% grade). Refer to Blue Book Standard Drawing SD 5-4 on PESCP26 and Photo 2 on PESCP03.
11. During initial earthworks (prior to access tracks being properly graded), install whoa-boys (or equivalent) at max. 80m intervals right across access tracks to turn water out into downslope perimeter controls at regular intervals and to avoid having all water run down the access tracks to a single low point.
12. Undertake ‘rapid’ rehabilitation of lands (including batters and drains) within 14 days of final earthworks being completed in each area (rather than waiting until the completion of all works).
13. De-watering of water accumulating onsite is to be managed in accordance with the ‘Dirty Water Treatment and Discharge Requirements’ notes on PESCP01.

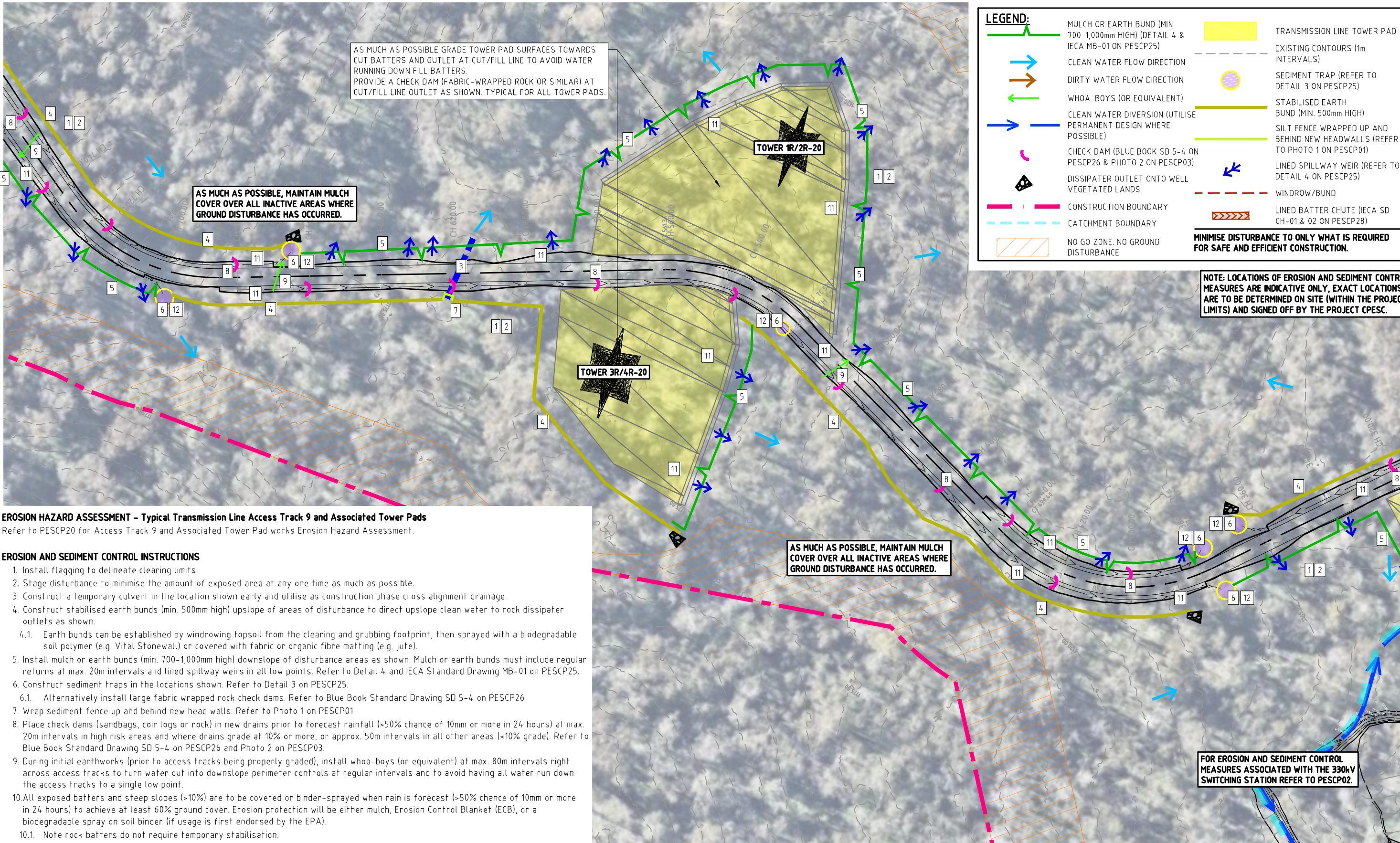
LEGEND:

- MULCH OR EARTH BUND (MIN. 700-1,000mm HIGH) (DETAIL 4 & IECA MB-01 ON PESCP25)
- CLEAN WATER FLOW DIRECTION
- DIRTY WATER FLOW DIRECTION
- WHOA-BOYS (OR EQUIVALENT)
- CLEAN WATER DIVERSION (UTILISE PERMANENT DESIGN WHERE POSSIBLE)
- CHECK DAM (BLUE BOOK SD 5-4 ON PESCP26 & PHOTO 2 ON PESCP03)
- DISSIPATER OUTLET ONTO WELL VEGETATED LANDS
- TRANSMISSION LINE TOWER PAD
- EXISTING CONTOURS (1m INTERVALS)
- SEDIMENT TRAP (REFER TO DETAIL 3 ON PESCP25)
- STABILISED EARTH BUND (MIN. 500mm HIGH)
- SILT FENCE WRAPPED UP AND BEHIND NEW HEADWALLS (REFER TO PHOTO 1 ON PESCP01)
- LINED SPILLWAY WEIR (REFER TO DETAIL 4 ON PESCP25)
- TEMPORARY CLEAN WATER PIPE
- WINDROW/BUND
- CONSTRUCTION BOUNDARY
- LINED BATTER CHUTE (IECA SD CH-01 & 02 ON PESCP28)
- NO GO ZONE. NO GROUND DISTURBANCE
- STABILISED SITE ACCESS/EXIT (BLUE BOOK SD 6-14 ON PESCP27)
- MINIMISE DISTURBANCE TO ONLY WHAT IS REQUIRED FOR SAFE AND EFFICIENT CONSTRUCTION.

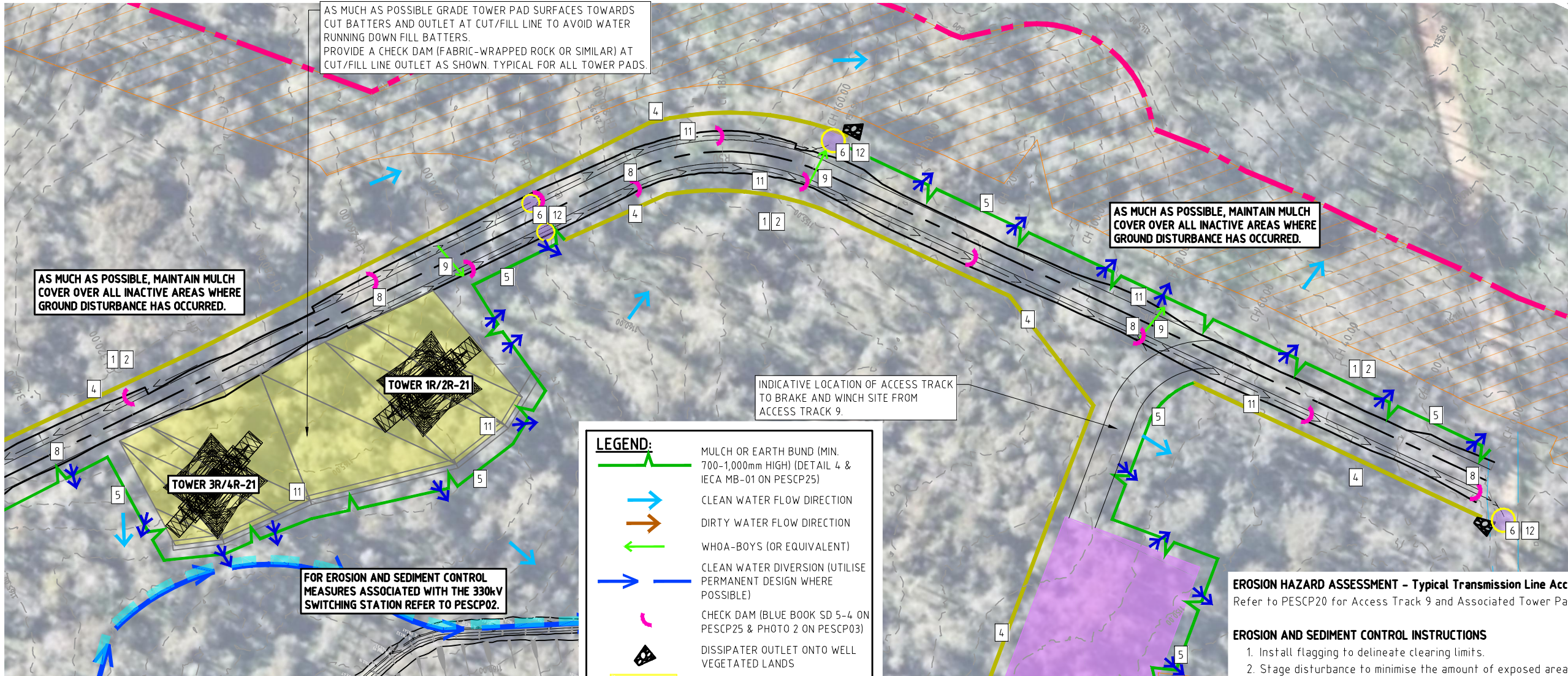
NOTE: LOCATIONS OF EROSION AND SEDIMENT CONTROL MEASURES ARE INDICATIVE ONLY, EXACT LOCATIONS ARE TO BE DETERMINED ON SITE (WITHIN THE PROJECT LIMITS) AND SIGNED OFF BY THE PROJECT CPSC.



REV	DATE	DES.	DRN.	APP.	REVISION DETAILS	DRAWING STATUS	North	CLIENT	PROJECT TITLE	DRAWING TITLE
06	25/10/23	L.O.	L.O.	A.M.	FINAL ISSUE – MINOR AMENDMENTS TO REFLECT CLIENT COMMENTS	DESIGN BY L.O.		  Suites 7 & 8, 68-70 Station Street PO Box 1098, Bowral NSW 2576. (0) 02 4862 1633 (f) 02 4862 3088 email: reception@seec.com.au www.seec.com.au	MARAGLE 330kV SWITCHING STATION AND 300kV TRANSMISSION LINE CONNECTIONS	EROSION AND SEDIMENT CONTROL PLAN – ACCESS TRACK 10 & TOWER PADS – SHEET 18 OF 29
05	24/10/23	L.O.	L.O.	A.M.	FINAL ISSUE – AMENDED TO REFLECT CLIENT COMMENTS	DRAWN BY L.O.				
04	14/09/23	L.O.	L.O.	A.M.	FINAL ISSUE – AMENDED TO REFLECT CLIENT COMMENT	FINAL APPROVAL A.M.				
03	04/09/23	L.O.	L.O.	A.M.	FINAL ISSUE	SCALE: (on A3 Original) 1:1000				
02	12/05/23	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.03)	FINAL				
01	14/11/22	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.02)					
00	05/10/22	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.01)					
A	04/10/22	L.O.	L.O.	A.M.	DRAFT ISSUE – FOR CONSULTATION					



REV	DATE	DES.	DRN.	APP.	REVISION DETAILS	DRAWING STATUS	North	CLIENT	PROJECT TITLE	DRAWING TITLE			
06	25/10/23	L.O.	L.O.	A.M.	FINAL ISSUE – MINOR AMENDMENTS TO REFLECT CLIENT COMMENTS	DESIGN BY L.O.		  Suites 7 & 8, 68-70 Station Street PO Box 1098, Bowral NSW 2576. (t) 02 4862 1633 (f) 02 4862 3088 email: reception@seec.com.au WWW.SEEC.COM.AU	MARAGLE 330kV SWITCHING STATION AND 300kV TRANSMISSION LINE CONNECTIONS	EROSION AND SEDIMENT CONTROL PLAN – ACCESS TRACK 9 & TOWER PADS – SHEET 21 OF 29			
05	24/10/23	L.O.	L.O.	A.M.	FINAL ISSUE – AMENDED TO REFLECT CLIENT COMMENTS	DRAWN BY L.O.							
04	14/09/23	L.O.	L.O.	A.M.	FINAL ISSUE – AMENDED TO REFLECT CLIENT COMMENT	FINAL APPROVAL A.M.							
03	04/09/23	L.O.	L.O.	A.M.	FINAL ISSUE	SCALE: (on A3 Original) 1:1000							
02	12/05/23	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.03)	FINAL							
01	14/11/22	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.02)								
00	05/10/22	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.01)								
A	04/10/22	L.O.	L.O.	A.M.	DRAFT ISSUE – FOR CONSULTATION								



LEGEND:

- MULCH OR EARTH BUND (MIN. 700-1,000mm HIGH) (DETAIL 4 & IECA MB-01 ON PESCP25)
- CLEAN WATER FLOW DIRECTION
- DIRTY WATER FLOW DIRECTION
- WHOA-BOYS (OR EQUIVALENT)
- CLEAN WATER DIVERSION (UTILISE PERMANENT DESIGN WHERE POSSIBLE)
- CHECK DAM (BLUE BOOK SD 5-4 ON PESCP25 & PHOTO 2 ON PESCP03)
- DISSIPATER OUTLET ONTO WELL VEGETATED LANDS
- TRANSMISSION LINE TOWER PAD
- EXISTING CONTOURS (1m INTERVALS)
- SEDIMENT TRAP (REFER TO DETAIL 3 ON PESCP25)
- STABILISED EARTH BUND (MIN. 500mm HIGH)
- SILT FENCE WRAPPED UP AND BEHIND NEW HEADWALLS (REFER TO PHOTO 1 ON PESCP01)
- LINED SPILLWAY WEIR (REFER TO DETAIL 4 ON PESCP25)
- TEMPORARY CLEAN WATER PIPE
- WINDROW/BUND
- CONSTRUCTION BOUNDARY
- LINED BATTER CHUTE (IECA SD CH-01 & 02 ON PESCP28)
- BRAKE AND WINCH SITE
- CATCHMENT BOUNDARY
- NO GO ZONE. NO GROUND DISTURBANCE
- STABILISED SITE ACCESS/EXIT (BLUE BOOK SD 6-14 ON PESCP27)

MINIMISE DISTURBANCE TO ONLY WHAT IS REQUIRED FOR SAFE AND EFFICIENT CONSTRUCTION.

NOTE: LOCATIONS OF EROSION AND SEDIMENT CONTROL MEASURES ARE INDICATIVE ONLY, EXACT LOCATIONS ARE TO BE DETERMINED ON SITE (WITHIN THE PROJECT LIMITS) AND SIGNED OFF BY THE PROJECT CPESC.

EROSION HAZARD ASSESSMENT - Typical Transmission Line Access Track 9 and Associated Tower Pads
Refer to PESCP20 for Access Track 9 and Associated Tower Pad works Erosion Hazard Assessment

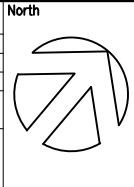
EROSION AND SEDIMENT CONTROL INSTRUCTIONS

1. Install flagging to delineate clearing limits.
2. Stage disturbance to minimise the amount of exposed area at any one time as much as possible.
3. Construct a temporary culvert in the location shown early and utilise as construction phase cross alignment drainage.
4. Construct stabilised earth bunds (min. 500mm high) upslope of areas of disturbance to direct upslope clean water to rock dissipater outlets as shown.
 - 4.1. Earth bunds can be established by windrowing topsoil from the clearing and grubbing footprint, then sprayed with a biodegradable soil polymer (e.g. Vital Stonewall) or covered with fabric or organic fibre matting (e.g. jute).
5. Install mulch or earth bunds (min. 700-1,000mm high) downslope of disturbance areas as shown. Mulch or earth bunds must include regular returns at max. 20m intervals and lined spillway weirs in all low points. Refer to Detail 4 and IECA Standard Drawing MB-01 on PESCP25.
6. Construct sediment traps in the locations shown. Refer to Detail 3 on PESCP25.
 - 6.1. Alternatively install large fabric wrapped rock check dams. Refer to Blue Book Standard Drawing SD 5-4 on PESCP26.
7. Wrap sediment fence up and behind new head walls. Refer to Photo 1 on PESCP01.
8. Place check dams (sandbags, coir logs or rock) in new drains prior to forecast rainfall (>50% chance of 10mm or more in 24 hours) at max. 20m intervals in high risk areas and where drains grade at 10% or more, or approx. 50m intervals in all other areas (<10% grade). Refer to Blue Book Standard Drawing SD 5-4 on PESCP26 and Photo 2 on PESCP03.
9. During initial earthworks (prior to access tracks being properly graded), install whoa-boys (or equivalent) at max. 80m intervals right across access tracks to turn water out into downslope perimeter controls at regular intervals and to avoid having all water run down the access tracks to a single low point.
10. All exposed batters and steep slopes (>10%) are to be covered or binder-sprayed when rain is forecast (>50% chance of 10mm or more in 24 hours) to achieve at least 60% ground cover. Erosion protection will be either mulch, Erosion Control Blanket (ECB), or a biodegradable spray on soil binder (if usage is first endorsed by the EPA).
 - 10.1. Note rock batters do not require temporary stabilisation.
11. Undertake 'rapid' rehabilitation of lands (including batters and drains) within 14 days of final earthworks being completed in each area (rather than waiting until the completion of all works).
12. De-watering of water accumulating onsite is to be managed in accordance with the 'Dirty Water Treatment and Discharge Requirements' notes on PESCP01.

0 5 10 15 20 28m
Scale: 1:1000 (A3 SHEET)

REV	DATE	DES.	DRN.	APP.	REVISION DETAILS
06	25/10/23	L.O.	L.O.	A.M.	FINAL ISSUE - MINOR AMENDMENTS TO REFLECT CLIENT COMMENTS
05	24/10/23	L.O.	L.O.	A.M.	FINAL ISSUE - AMENDED TO REFLECT CLIENT COMMENTS
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03	04/09/23	L.O.	L.O.	A.M.	FINAL ISSUE
02	12/05/23	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.03)
01	14/11/22	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.02)
00	05/10/22	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.01)
A	04/10/22	L.O.	L.O.	A.M.	DRAFT ISSUE - FOR CONSULTATION

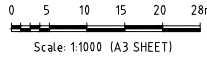
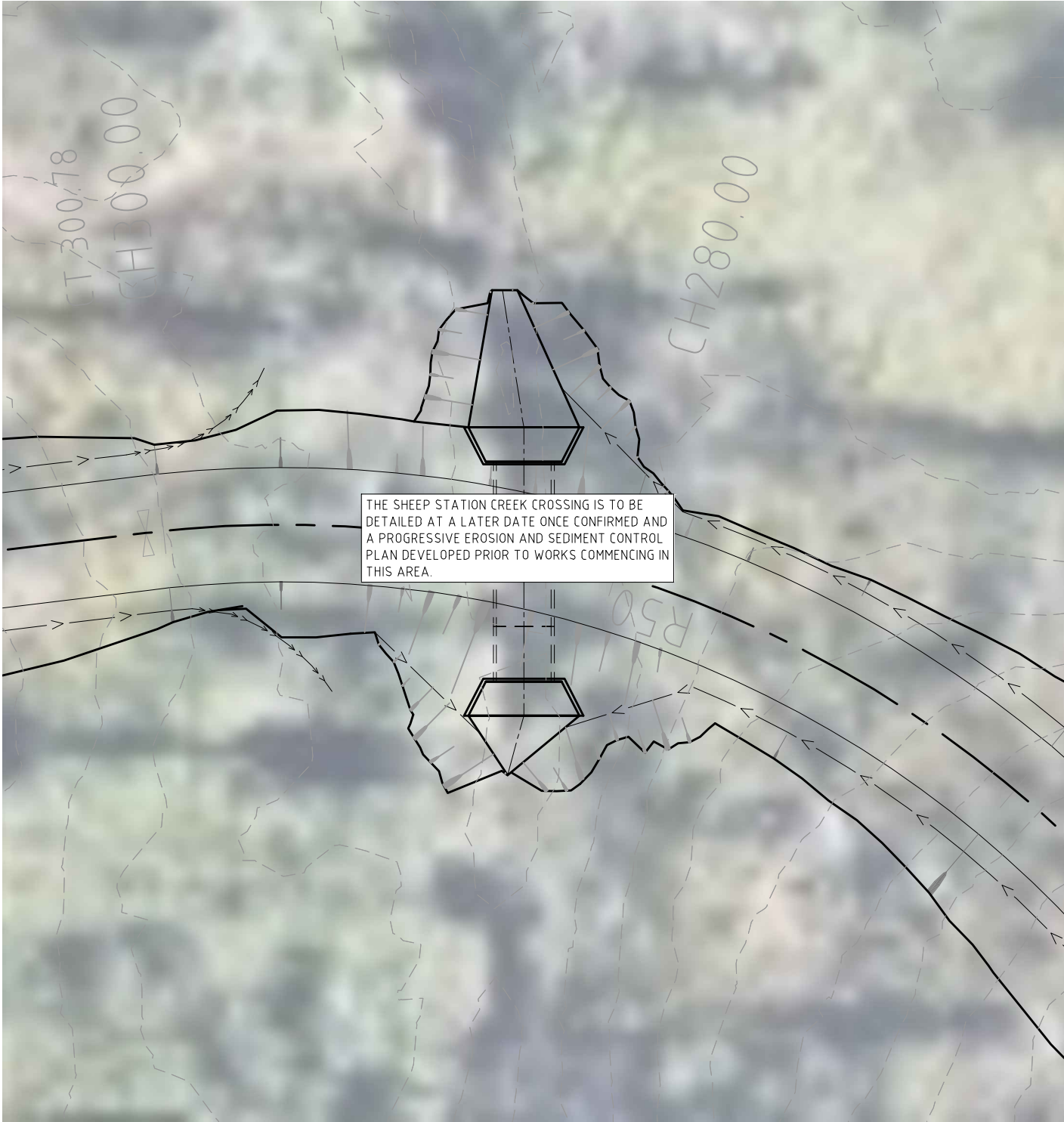
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DESIGN BY	L.O.
DRAWN BY	L.O.
FINAL APPROVAL	A.M.
SCALE:	1:1000
(on A3 Original)	
FINAL	



Suites 7 & 8, 68-70 Station Street
PO Box 1098, Bowral NSW 2576.
(t) 02 4862 1633
(f) 02 4862 3088
email: reception@seec.com.au
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PROJECT TITLE
MARAGLE 330kV SWITCHING
STATION AND 300kV
TRANSMISSION LINE
CONNECTIONS

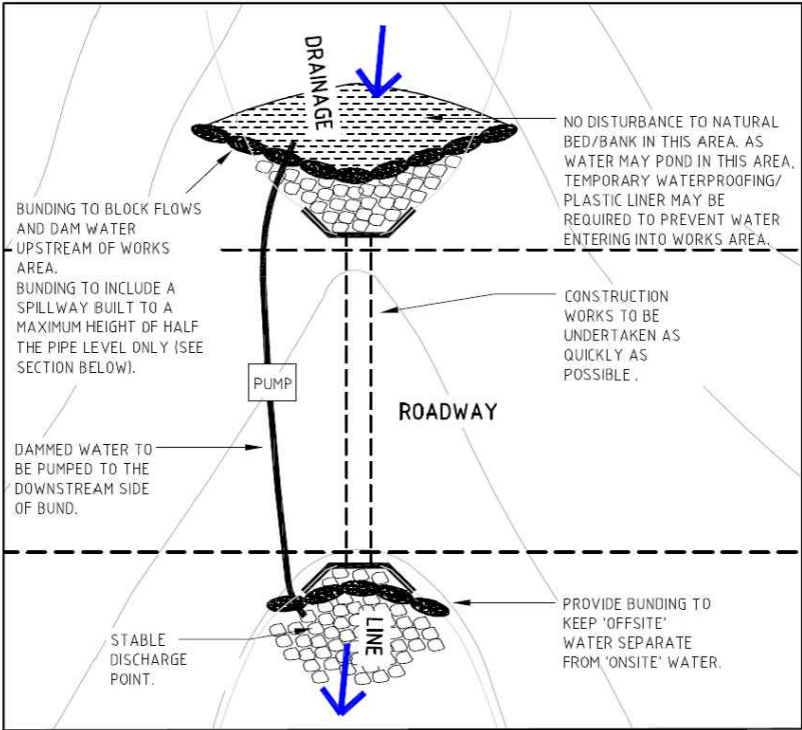
DRAWING TITLE			
EROSION AND SEDIMENT CONTROL PLAN - ACCESS TRACK 9 & TOWER PADS - SHEET 22 OF 29			
PROJECT NO.	SUB-PR NO.	DRAWING NO.	REV
22000398	P02	PESCP22	06



REV					DATE	DES.	DRN.	APP.	REVISION DETAILS		DRAWING STATUS		North	CLIENT		PROJECT TITLE		DRAWING TITLE									
06	25/10/23	L.O.	L.O.	A.M.	FINAL ISSUE – MINOR AMENDMENTS TO REFLECT CLIENT COMMENTS				DESIGN BY		L.O.			  Suites 7 & 8, 68-70 Station Street PO Box 1098, Bowral NSW 2576. (t) 02 4862 1633 (f) 02 4862 3088 email: reception@seec.com.au www.seec.com.au	MARAGLE 330kV SWITCHING STATION AND 300kV TRANSMISSION LINE CONNECTIONS		EROSION AND SEDIMENT CONTROL PLAN – SHEEP STATION CREEK CROSSING – SHEET 23 OF 29										
05	24/10/23	L.O.	L.O.	A.M.	FINAL ISSUE – AMENDED TO REFLECT CLIENT COMMENTS				DRAWN BY		L.O.																
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02	12/05/23	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.03)				(on A3 Original)																		
01	14/11/22	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.02)																						
00	05/10/22	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.01)									  Suites 7 & 8, 68-70 Station Street PO Box 1098, Bowral NSW 2576. (t) 02 4862 1633 (f) 02 4862 3088 email: reception@seec.com.au www.seec.com.au		MARAGLE 330kV SWITCHING STATION AND 300kV TRANSMISSION LINE CONNECTIONS		EROSION AND SEDIMENT CONTROL PLAN – SHEEP STATION CREEK CROSSING – SHEET 23 OF 29									
A	04/10/22	L.O.	L.O.	A.M.	DRAFT ISSUE – FOR CONSULTATION																						
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PROJECT NO.					SUB-PR NO.					DRAWING NO.					REV												
22000398					P02					PESCP23					06												

DETAIL 1

ONLINE PIPE REPLACEMENT/INSTALLATION
- SMALL INTERMITTENT DEPRESSIONS ONLY
(PUMP OPTION)



SITE STABILISATION

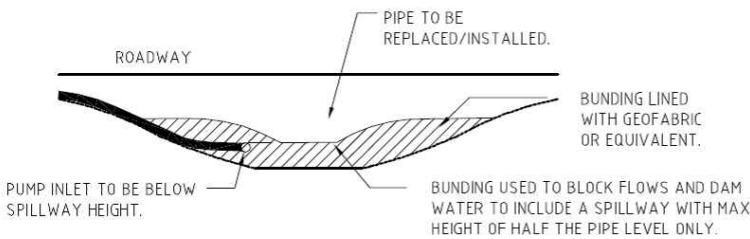
THIS METHOD IS ONLY SUITABLE FOR SIMPLE DEPRESSIONS WITH INTERMITTENT FLOWS. TO BE IN PLACE FOR NO MORE THAN 3 MONTHS.

CONSTRUCTION NOTES

WORKS TO BE UNDERTAKEN IN THE ORDER GIVEN BELOW

1. Ensure suitable temporary groundcover materials (e.g. geofabric, blankets) are located on site.
2. Ensure a suitable pump is available.
3. Watch the weather forecast to ensure rainfall is not forecast and monitor creek flows ensuring flows are minimal.
4. Position the bunding and line if required.
5. Undertake construction works (including inlet and outlet stabilisation) as quickly as possible. Drainage line to be blocked for no more than 3 months.

At any time during steps 4 - 5 where a significant rain or flow event is forecast or if the site is left unattended for prolonged periods temporary groundcover should be applied to all exposed soils in the works area.



SECTION THROUGH BUNDING LOCATION

LEGEND

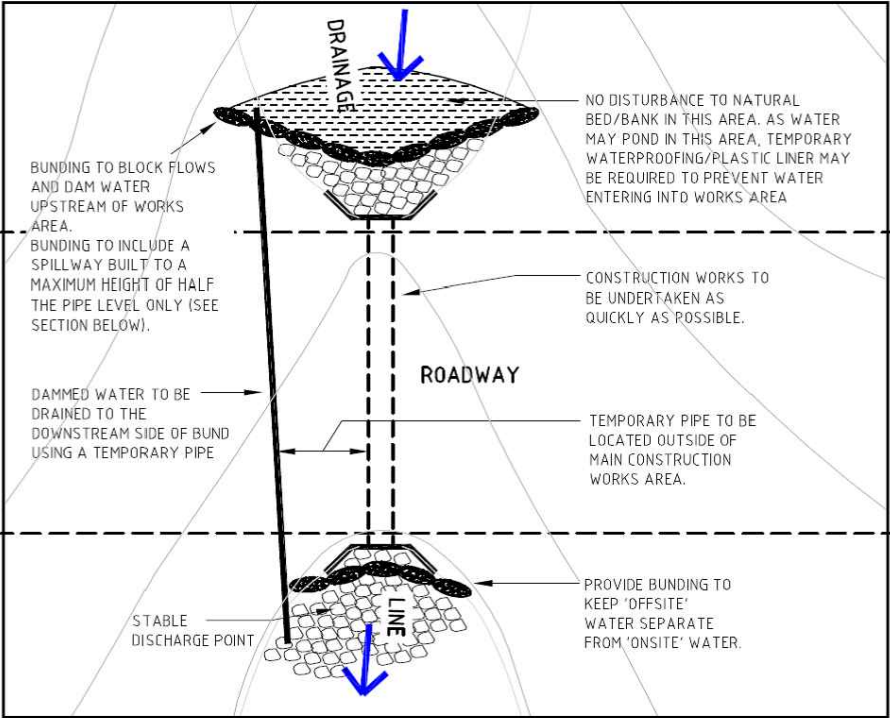
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- ONSITE WATER DRAINS (SD 5-6)
- SURFACE CONTOURS
- ROCK STABILISED OUTLET (SD 5-8)
- CREEK/PIPE FLOW ROUTE
- SEDIMENT FENCE (SD 6-8)
- BUNDS

NOTE THAT NOT ALL ONSITE WATER MANAGEMENT AND SEDIMENT CONTROLS ARE SHOWN HERE.

AT ALL TIMES DURING WORKS, ENSURE THAT 'OFFSITE' WATER IS PASSED AROUND OR THROUGH THE SITE WITHOUT COMING INTO CONTACT WITH EXPOSED SOIL OR 'ONSITE' WATER

DETAIL 2

ONLINE PIPE REPLACEMENT/INSTALLATION
- SMALL INTERMITTENT DRAINAGE LINES
(TEMPORARY PIPE OPTION)



SITE STABILISATION

THIS METHOD IS ONLY SUITABLE FOR SMALL CHANNELS WITH INTERMITTENT FLOWS.

TEMPORARY PIPE TO BE SIZED TO AT LEAST HALF THE PERMANENT PIPE.

- e.g. - PERMANENT: 600φ
- TEMPORARY: MINIMUM 300φ

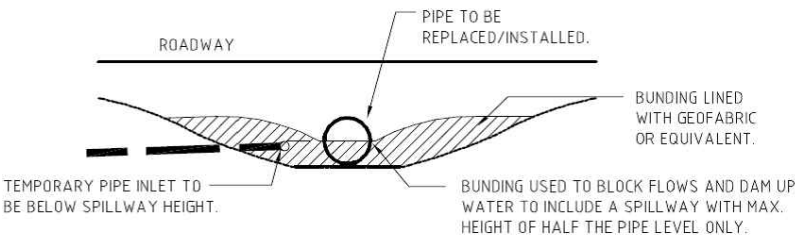
THIS METHOD (TEMPORARY PIPE SYSTEM) WILL NOT BE SUITABLE IN STEEP LOCATIONS WHERE TEMPORARY PIPE CANNOT BE LOCATED OUTSIDE OF WORKS AREA.

CONSTRUCTION NOTES

WORKS TO BE UNDERTAKEN IN THE ORDER GIVEN BELOW

1. Ensure suitable temporary groundcover materials (e.g. geofabric, blankets) are located on site.
2. Ensure a temporary pipe is available. Install temporary pipe to ensure flow, preferably by providing continuous fall.
3. Watch the weather forecast to ensure rainfall is not forecast and monitor creek flows ensuring flows are minimal.
4. Position the bunding within the channel to secure the site.
5. Undertake construction works (including inlet/outlet stabilisation) as quickly as possible.

At any time during steps 4 - 5 where a significant rain or flow event is forecast or if the site is left unattended for prolonged periods temporary groundcover should be applied to all exposed soils in the works area.



SECTION THROUGH BUNDING LOCATION

LEGEND

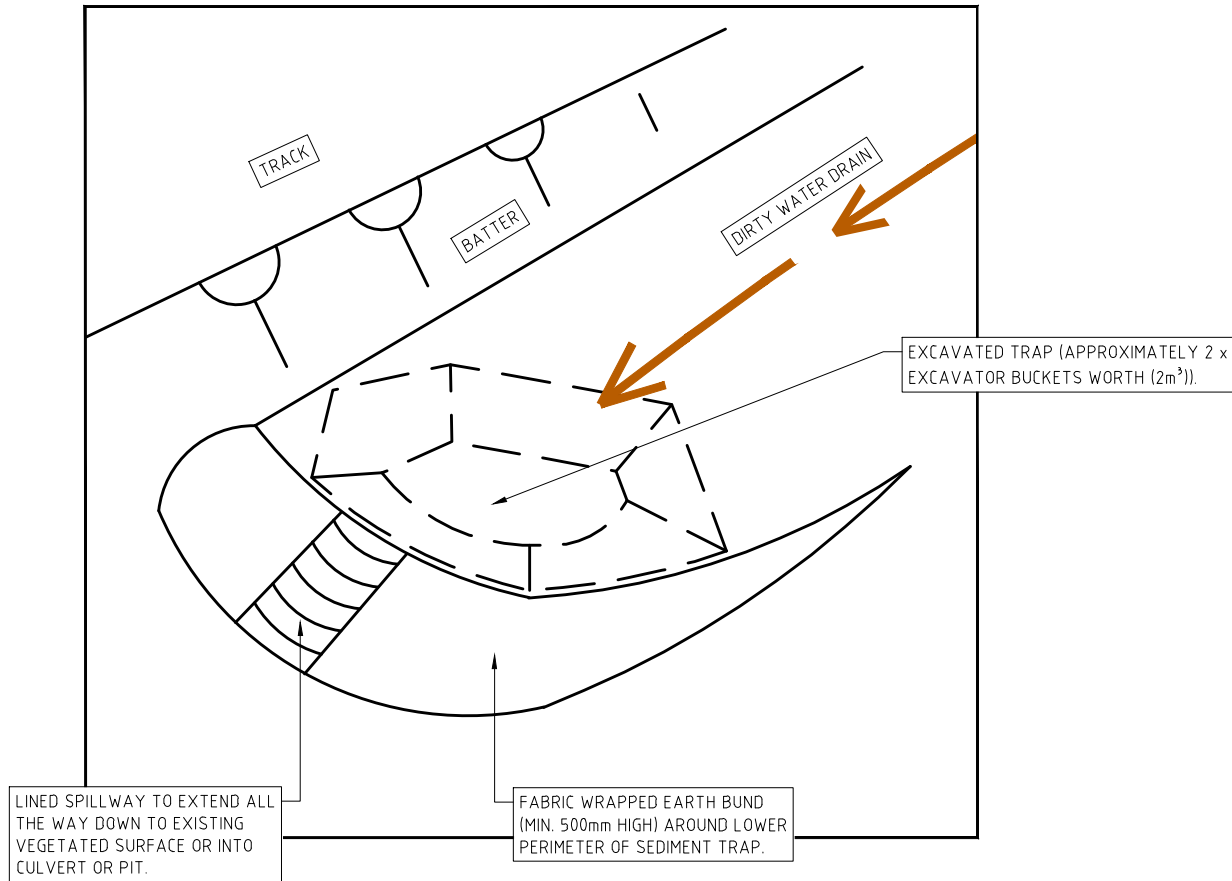
- OFFSITE WATER DIVERSION DRAIN (SD 5-6)
- ONSITE WATER DRAINS (SD 5-6)
- SURFACE CONTOURS
- ROCK STABILISED OUTLET (SD 5-8)
- CREEK/PIPE FLOW ROUTE
- SEDIMENT FENCE (SD 6-8)
- BUNDS

NOTE THAT NOT ALL ONSITE WATER MANAGEMENT AND SEDIMENT CONTROLS ARE SHOWN HERE.

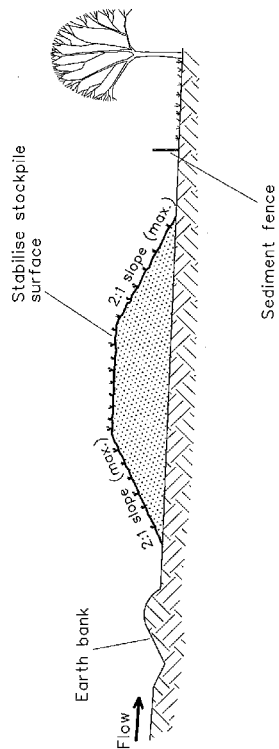
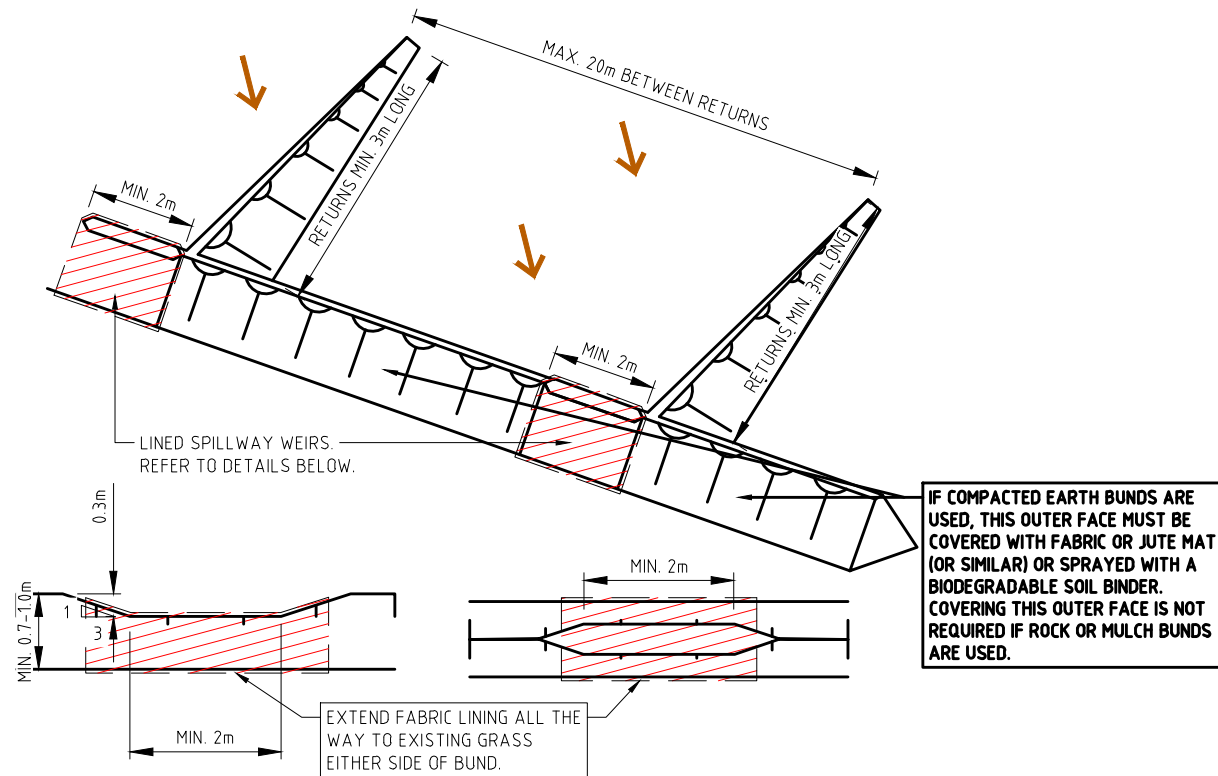
AT ALL TIMES DURING WORKS, ENSURE THAT 'OFFSITE' WATER IS PASSED AROUND OR THROUGH THE SITE WITHOUT COMING INTO CONTACT WITH EXPOSED SOIL OR 'ONSITE' WATER

REV	DATE	DES.	DRN.	APP.	REVISION DETAILS	DRAWING STATUS	North	CLIENT	PROJECT TITLE	DRAWING TITLE	PROJECT NO.	SUB-PR NO.	DRAWING NO.	REV
06	25/10/23	L.O.	L.O.	A.M.	FINAL ISSUE - MINOR AMENDMENTS TO REFLECT CLIENT COMMENTS	DESIGN BY L.O.			MARAGLE 330kV SWITCHING STATION AND 300kV TRANSMISSION LINE CONNECTIONS	EROSION AND SEDIMENT CONTROL DETAILS 1 AND 2 SHEET 24 OF 29	22000398	P02	PESCP24	06
05	24/10/23	L.O.	L.O.	A.M.	FINAL ISSUE - AMENDED TO REFLECT CLIENT COMMENTS	DRAWN BY L.O.								
04	14/09/23	L.O.	L.O.	A.M.	FINAL ISSUE - AMENDED TO REFLECT CLIENT COMMENT	FINAL APPROVAL A.M.								
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02	12/05/23	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.03)									
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00	05/10/22	L.O.	L.O.	A.M.	ISSUED FOR REVIEW (REVISION 0.01)									
A	04/10/22	L.O.	L.O.	A.M.	DRAFT ISSUE - FOR CONSULTATION	FINAL								

DETAIL 3 - SEDIMENT TRAP



DETAIL 4 - TYPICAL MULCH/EARTH BUND



Construction Notes

1. Place stockpiles more than 2 (preferably 5) metres from existing vegetation, concentrated water flow, roads and hazard areas.
2. Construct on the contour as low, flat, elongated mounds.
3. Where there is sufficient area, topsoil stockpiles shall be less than 2 metres in height.
4. Where they are to be in place for more than 10 days, stabilise following the approved ESCP or SWMP to reduce the C-factor to less than 0.10.
5. Construct earth banks (Standard Drawing 5-5) on the upslope side to divert water around stockpiles and sediment fences (Standard Drawing 6-6) 1 to 2 metres downslope.

SD 4-1

STOCKPILES

STANDARD DRAWING SD 4-1 IS COPYRIGHT FROM LANDCOM. 2004.

STANDARD DRAWING MB-01 IS COPYRIGHT CATCHMENT AND CREEKS REPRODUCED FROM IECA. 2008.

MATERIALS

- (i) MULCH MUST COMPLY WITH THE REQUIREMENTS OF AS4454.
- (ii) MAXIMUM SOLUBLE SALT CONCENTRATION OF 5dS/m.
- (iii) MOISTURE CONTENT OF 30 TO 50% PRIOR TO APPLICATION.

INSTALLATION

1. REFER TO APPROVED PLANS FOR LOCATION AND EXTENT. IF THERE ARE QUESTIONS OR PROBLEMS WITH THE LOCATION, EXTENT, MATERIAL TYPE, OR METHOD OF INSTALLATION CONTACT THE ENGINEER OR RESPONSIBLE ON-SITE OFFICER FOR ASSISTANCE.
2. WHEN SELECTING THE LOCATION OF A MULCH FILTER BERM, TO THE MAXIMUM DEGREE PRACTICAL, ENSURE THE BERM IS LOCATED:
 - (i) TOTALLY WITHIN THE PROPERTY BOUNDARIES;
 - (ii) ALONG A LINE OF CONSTANT ELEVATION (PREFERRED, BUT NOT ALWAYS PRACTICAL);
 - (iii) AT LEAST 1m, IDEALLY 3m, FROM THE TOE OF A FILL EMBANKMENT;
 - (iv) AWAY FROM AREAS OF CONCENTRATED FLOW.

3. ENSURE THE BERM IS INSTALLED IN A MANNER THAT AVOIDS THE CONCENTRATION OF FLOW ALONG THE BERM, OR THE UNDESIRABLE DISCHARGE OF WATER AROUND THE END OF THE BERM.
4. ENSURE THE BERM HAS BEEN PLACED SUCH THAT PONDING UP-SLOPE OF THE BERM IS MAXIMISED.

5. ENSURE BOTH ENDS OF THE BERM ARE ADEQUATELY TURNED UP THE SLOPE TO PREVENT FLOW BYPASSING PRIOR TO WATER PASSING OVER THE BERM.

6. ENSURE 100% CONTACT WITH THE SOIL SURFACE.

7. WHERE SPECIFIED, TAKE APPROPRIATE STEPS TO VEGETATE THE BERM.

MAINTENANCE

1. DURING THE CONSTRUCTION PERIOD, INSPECT ALL BERMS AT LEAST WEEKLY AND AFTER ANY SIGNIFICANT RAIN. MAKE NECESSARY REPAIRS IMMEDIATELY.
2. REPAIR OR REPLACE ANY DAMAGED SECTIONS.

3. WHEN MAKING REPAIRS, ALWAYS RESTORE THE SYSTEM TO ITS ORIGINAL CONFIGURATION UNLESS AN AMENDED LAYOUT IS REQUIRED OR SPECIFIED.

4. REMOVE ACCUMULATED SEDIMENT IF THE SEDIMENT DEPOSIT EXCEEDS A DEPTH OF 100mm OR 1/3 THE HEIGHT OF THE BERM.

5. DISPOSE OF SEDIMENT IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

REMOVAL (IF REQUIRED)

1. WHEN DISTURBED AREAS UP-SLOPE OF THE BERM ARE SUFFICIENTLY STABILISED TO RESTRAIN EROSION, THE BERM MAYBE REMOVED.

2. REMOVE ANY COLLECTED SEDIMENT AND DISPOSE OF IN A SUITABLE MANNER THAT WILL NOT CAUSE AN EROSION OR POLLUTION HAZARD.

3. REHABILITATE/REVEGETATE THE DISTURBED GROUND AS NECESSARY TO MINIMISE THE EROSION HAZARD.

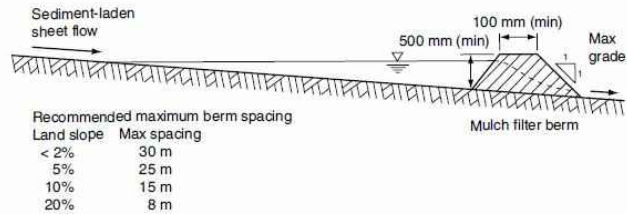


Figure 1 - Typical placement of mulch filter berm

Drawn:	Date:		
GMW	Apr-10	Mulch Filter Berms	MB-01

REV	DATE	DES.	DRN.	APP.	REVISION DETAILS
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A	04/10/22	L.O.	L.O.	A.M.	DRAFT ISSUE - FOR CONSULTATION

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DESIGN BY	L.O.
DRAWN BY	L.O.
FINAL APPROVAL	A.M.
SCALE:	N.T.S.
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North

CLIENT



Suites 7 & 8, 68-70 Station Street
PO Box 1098, Bowral NSW 2576.
(t) 02 4862 1633
(f) 02 4862 3088
email: reception@seec.com.au
WWW.SEEC.COM.AU

PROJECT TITLE

MARAGLE 330kV SWITCHING
STATION AND 300kV
TRANSMISSION LINE
CONNECTIONS

DRAWING TITLE

EROSION AND SEDIMENT CONTROL
DETAILS 3 & 4, BLUE BOOK AND
IECA SD'S - SHEET 25 OF 29

PROJECT NO.	SUB-PR NO.	DRAWING NO.	REV
22000398	P02	PESCP25	06

REV	DATE	DES.	DRN.	APP.	REVISION DETAILS
06	25/10/23	L.O.	L.O.	A.M.	FINAL ISSUE – MINOR AMENDMENTS TO REFLECT CLIENT COMMENTS
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FINAL APPROVAL	A.M.
SCALE: (on A3 Original)	N.T.S.
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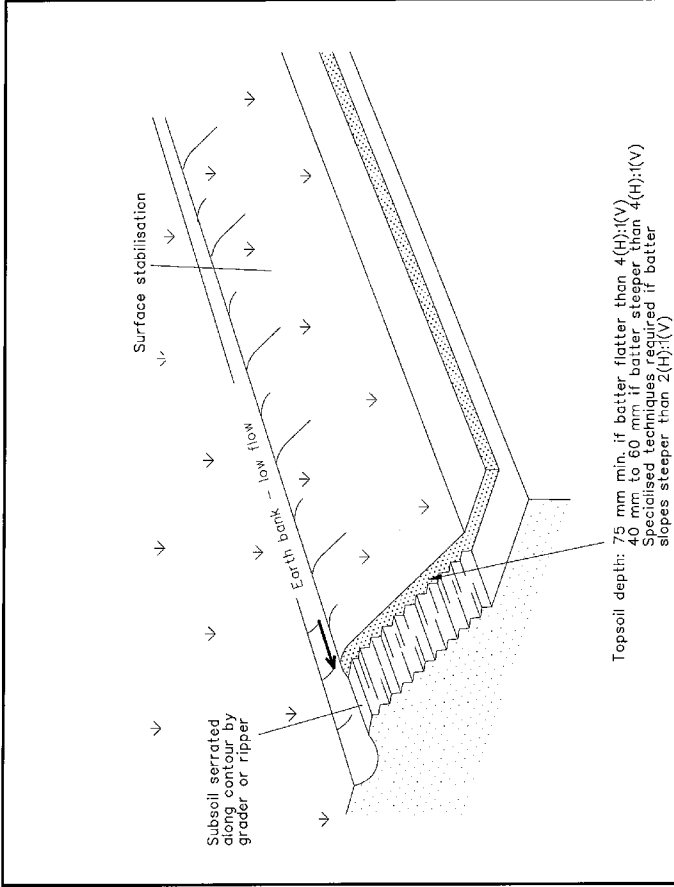
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PROJECT TITLE
**MARAGLE 330kV SWITCHING
STATION AND 300kV
TRANSMISSION LINE
CONNECTIONS**

DRAWING TITLE EROSION AND SEDIMENT CONTROL BLUE BOOK STANDARD DRAWINGS SHEET 26 OF 29			
PROJECT NO.	SUB-PR NO.	DRAWING NO.	REV
22000398	P02	PESCP26	06

Plot Date: Wednesday, 25 October 2023 7:18:14 PM

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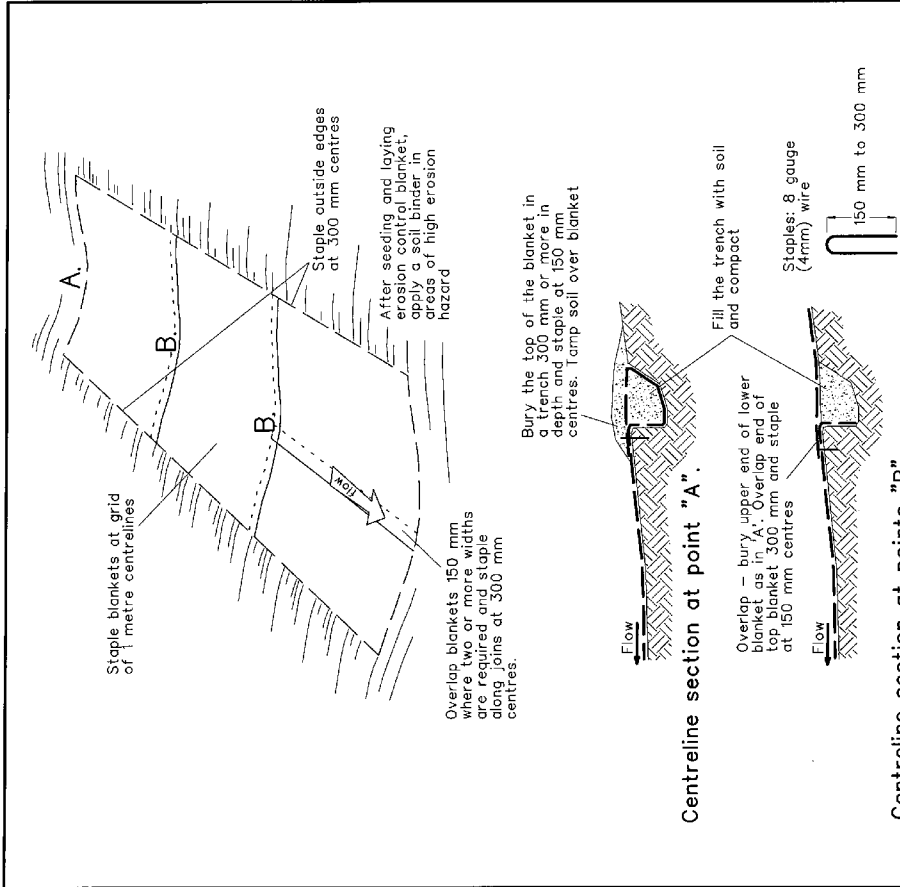


Construction Notes

1. Scarify the ground surface along the line of the contour to a depth of 50 mm to 100 mm to break up any hardsetting surfaces and to provide a good bond between the respread material and subsoil.
2. Acid soil ameliorants as required by the ESCP or SWMP.
3. Rip to a depth of 300 mm if compacted layers occur.
4. Where possible, replace topsoil to a depth of 40 to 60 mm on lands where the slope exceeds 4(H):(V) and to at least 75 mm on lower gradients.

REPLACING TOPSOIL

SD 4-2

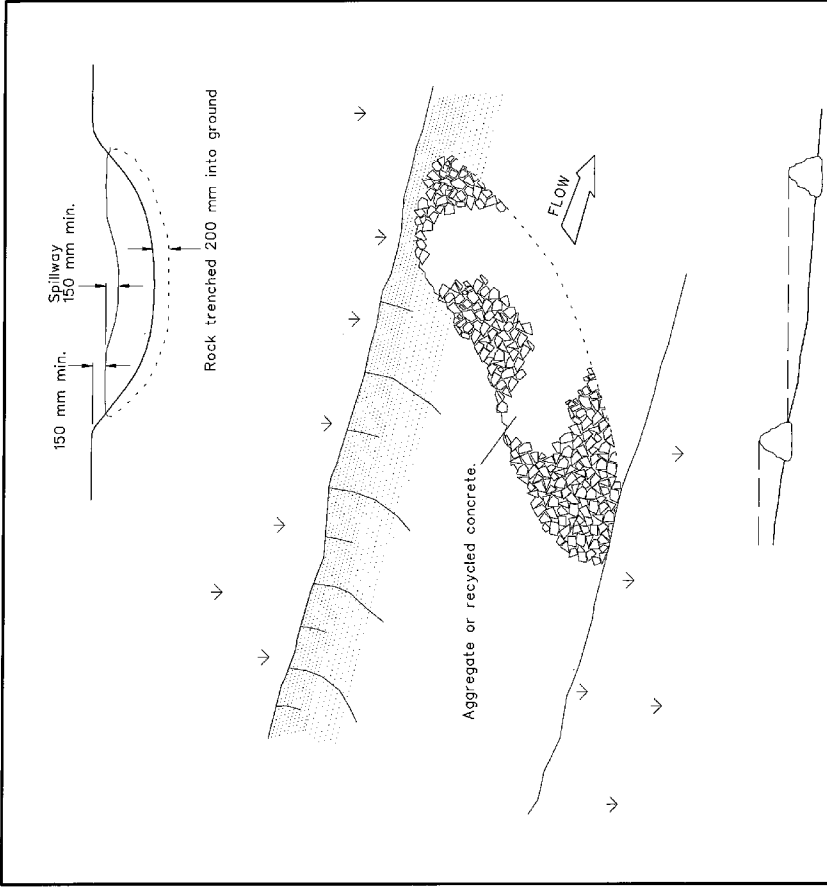


Construction Notes

1. Remove any rocks, clods, sticks or grass from the surface before laying matting
2. Ensure that topsoil is at least 75 mm deep.
3. Complete fertilising and seeding before laying the matting.
4. Ensure fabric will be continuously in contact with the soil by grading the surface carefully first.
5. Lay the fabric in "shingle-fashion", with the end of each upstream roll overlapping those downstream. Ensure each roll is anchored properly at its upslope end (Standard Drawing 5-7b).
6. Ensure that the full width of flow in the channel is covered by the matting up to the design storm event, usually in the 10-year ARI time of concentration storm event.
7. Divert water from the structure until vegetation is stabilised properly.

RECP : CONCENTRATED FLOW

SD 5-7

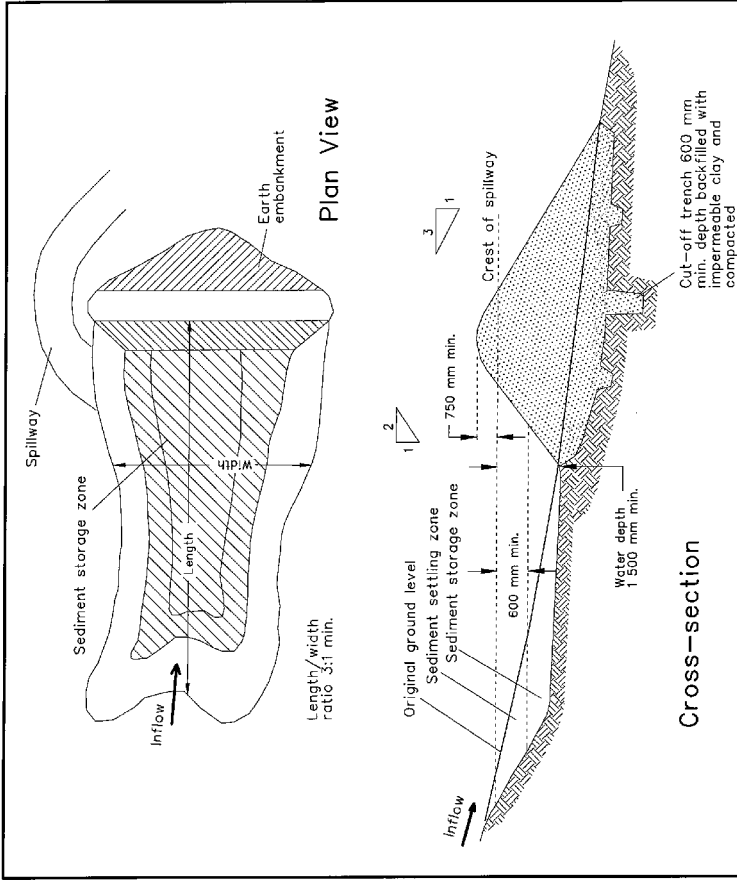


Construction Notes

1. Check dams can be built with various materials, including rocks, logs, sandbags and straw bales. The maintenance program should ensure their integrity is retained, especially where constructed with straw bales. In the case of bales, this might require their replacement each two to four months.
2. Trench the check dam 200 mm into the ground across its whole width. Where rock is used, fill the trenches to at least 100 mm above the ground surface to reduce the risk of undercutting.
3. Normally, their maximum height should not exceed 600 mm above the gully floor. The centre should act as a spillway, being at least 150 mm lower than the outer edges.
4. Space the dams so the toe of the upstream dam is level with the spillway of the next downstream dam.

ROCK CHECK DAM

SD 5-4



Construction Notes

1. Remove all vegetation and topsoil from under the dam wall and from within the storage area.
2. Construct a cut-off trench 600 mm deep and 1200 mm wide along the centreline of the embankment extending to a point on the gully wall level with the riser crest.
3. Maintain the trench free of water and recompact the materials with equipment as specified in the SWMP to 95 per cent Standard Proctor Density.
4. Select fill following the SWMP that is free of roots, wood, rock, large stone or foreign material.
5. Prepare the site under the embankment by ripping to at least 100 mm to help bond compacted fill to the existing substrate.
6. Spread the fill in 100 mm to 150 mm layers and compact it at optimum moisture content following the SWMP.
7. Construct the emergency spillway.
8. Rehabilitate the structure following the SWMP.

EARTH BASIN - WET

(APPLIES TO TYPE D' AND TYPE F' SOILS ONLY)

SD 6-4

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A	04/10/22	L.O.	L.O.	A.M.	DRAFT ISSUE — FOR CONSULTATION

DRAWING STATUS	
DESIGN BY	L.O.
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FINAL APPROVAL	A.M.
SCALE:	N.T.S.
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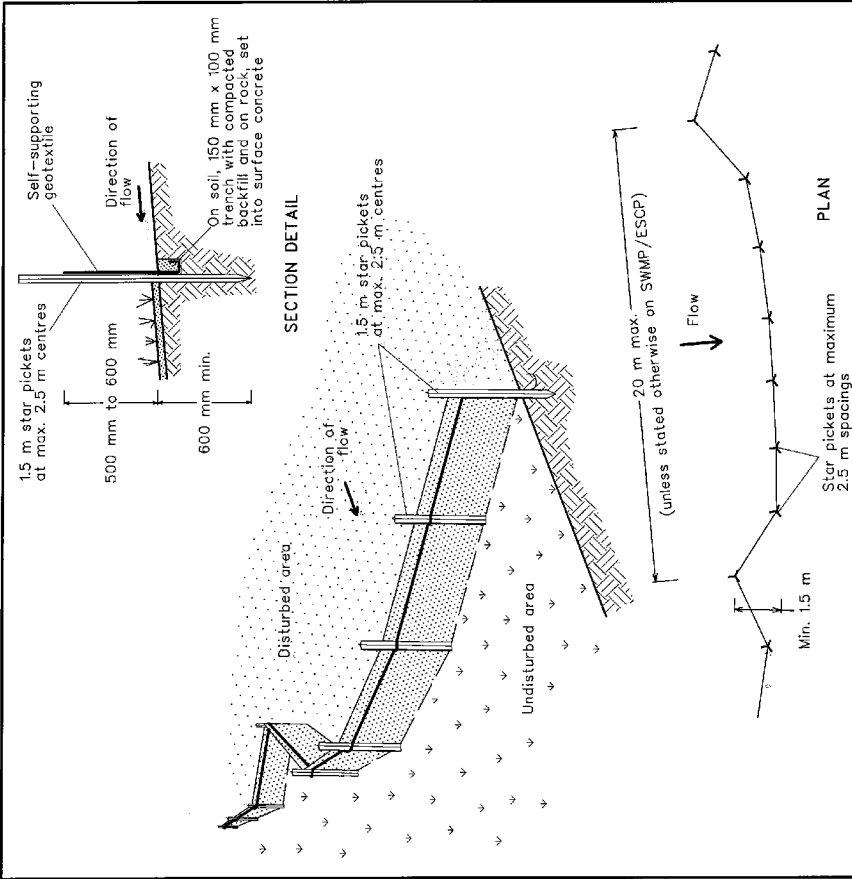
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PO Box 1098, Bowral NSW 2576.
(0) 02 4862 1633
(0) 02 4862 3088
email: reception@seec.com.au
WWW.SEEC.COM.AU

PROJECT TITLE
**MARAGLE 330kV SWITCHING
STATION AND 300kV
TRANSMISSION LINE
CONNECTIONS**

DRAWING TITLE EROSION AND SEDIMENT CONTROL BLUE BOOK STANDARD DRAWINGS SHEET 27 OF 29			
PROJECT NO.	SUB-PR NO.	DRAWING NO.	REV
22000398	P02	PESCP27	06

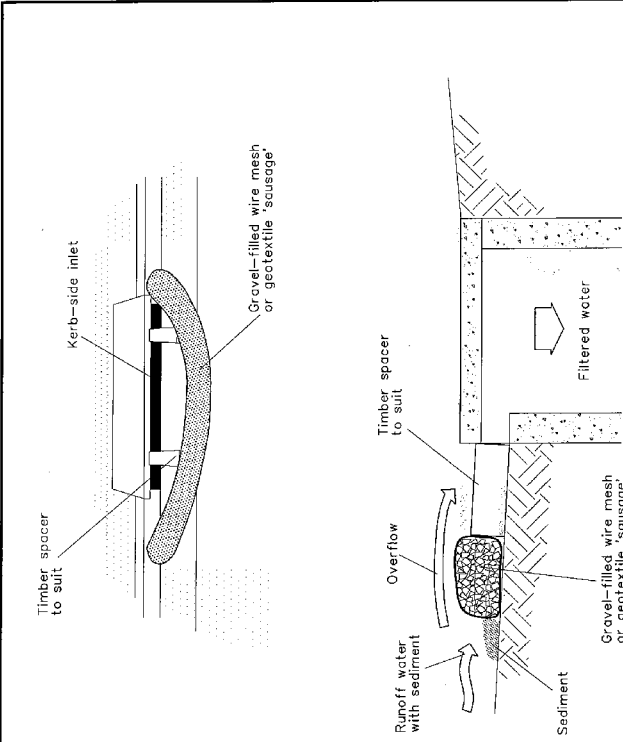


Construction Notes

- Construct sediment fences as close as possible to being parallel to the contours of the site, but with small returns as shown in the drawing to limit the catchment area of any one section. The catchment area should be small enough to limit water flow if concentrated at one point to 50 litres per second in the design storm event, usually the 10-year event.
- Cut a 150-mm deep trench along the upslope line of the fence for the bottom of the fabric to be entrenched.
- Drive 1.5 metre long star pickets into ground at 2.5 metre intervals (max) at the downslope edge of the trench. Ensure any star pickets are fitted with safety caps.
- Fix self-supporting geotextile to the upslope side of the posts ensuring it goes to the base of the trench. Fix the geotextile with wire ties or as recommended by the manufacturer. Only use geotextile specifically produced for sediment fencing. The use of shade cloth for this purpose is not satisfactory.
- Join sections of fabric at a support post with a 150-mm overlap.
- Backfill the trench over the base of the fabric and compact it thoroughly over the geotextile.

SEDIMENT FENCE

SD 6-8



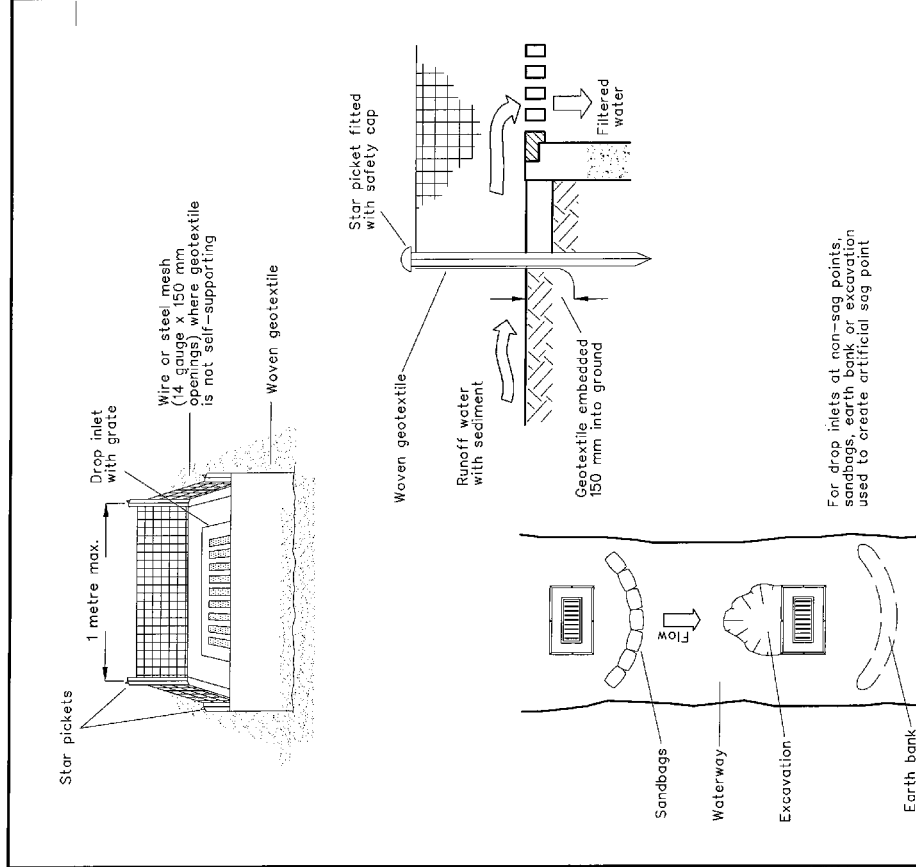
NOTE: This practice only to be used where specified in an approved SWMP / ESCP.

Construction Notes

- Install filters to kerb inlets only at sag points.
- Fabricate a sleeve made from geotextile or wire mesh longer than the length of the inlet pit and fill it with 25 mm to 50 mm gravel.
- Form an elliptical cross-section about 150 mm high x 400 mm wide.
- Place the filter at the opening leaving at least a 100-mm space between it and the kerb inlet. Maintain the opening with spacer blocks.
- Form a seal with the kerb to prevent sediment bypassing the filter.
- Sandbags filled with gravel can substitute for the mesh or geotextile providing they are placed so that they firmly abut each other and sediment-laden waters cannot pass between.

MESH AND GRAVEL INLET FILTER

SD 6-11

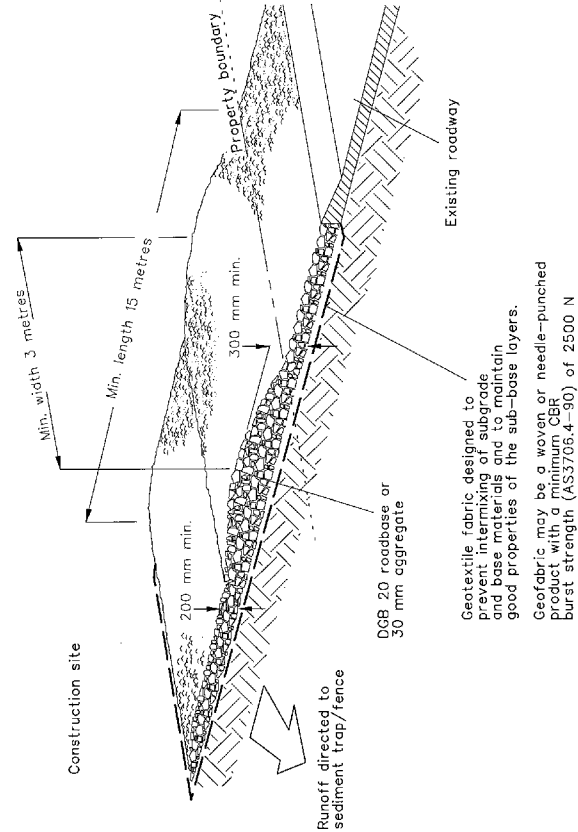


Construction Notes

- Fabricate a sediment barrier made from geotextile or straw bales.
- Follow Standard Drawing 6-7 and Standard Drawing 6-8 for installation procedures for the straw bales or geofabric. Reduce the picket spacing to 1 metre centres.
- In waterways, artificial sag points can be created with sandbags or earth banks as shown in the drawing.
- Do not cover the inlet with geotextile unless the design is adequate to allow for all waters to bypass it.

GEOTEXTILE INLET FILTER

SD 6-12

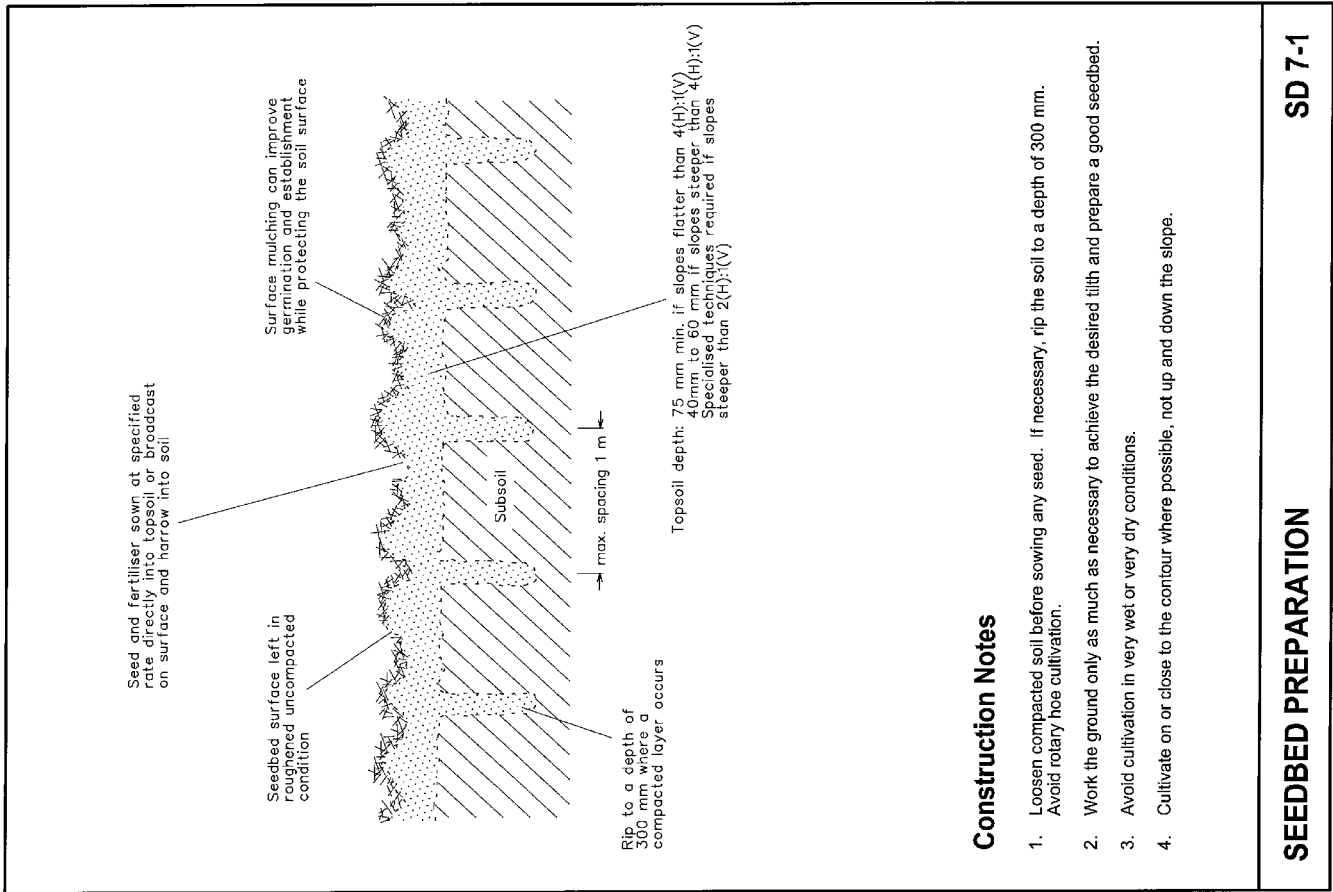


Construction Notes

- Strip the topsoil, level the site and compact the subgrade.
- Cover the area with needle-punched geotextile.
- Construct a 200-mm thick pad over the geotextile using road base or 30-mm aggregate.
- Ensure the structure is at least 15 metres long or to building alignment and at least 3 metres wide.
- Where a sediment fence joins onto the stabilised access, construct a hump in the stabilised access to divert water to the sediment fence

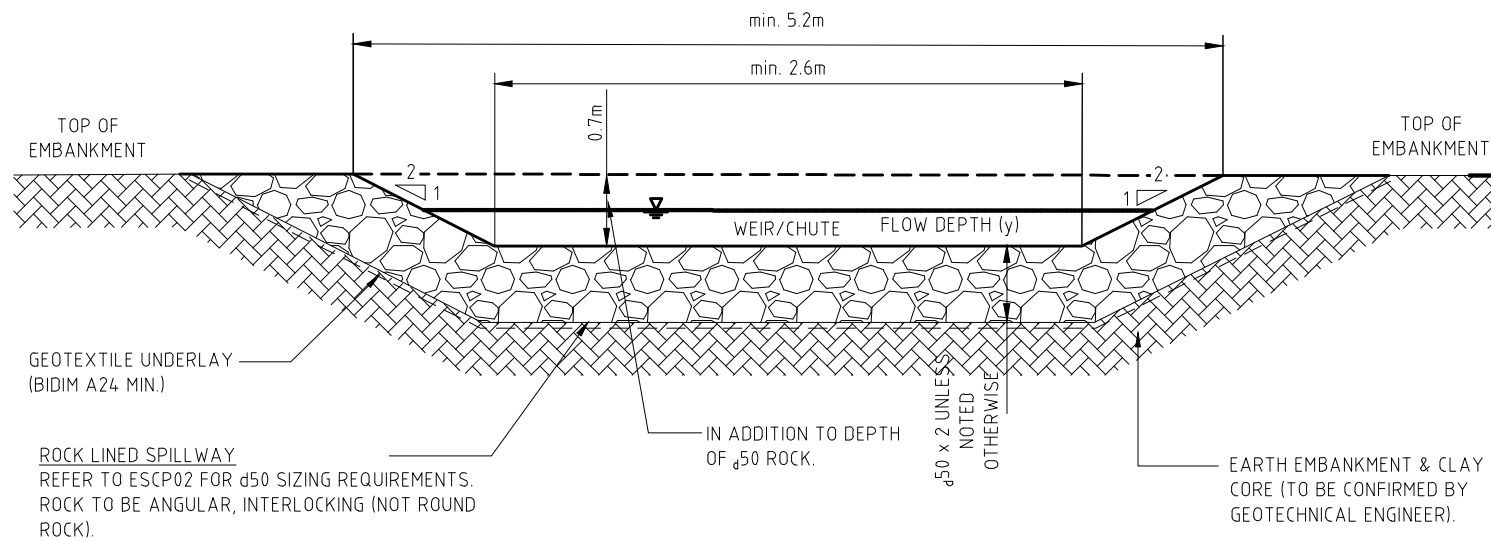
STABILISED SITE ACCESS

SD 6-14

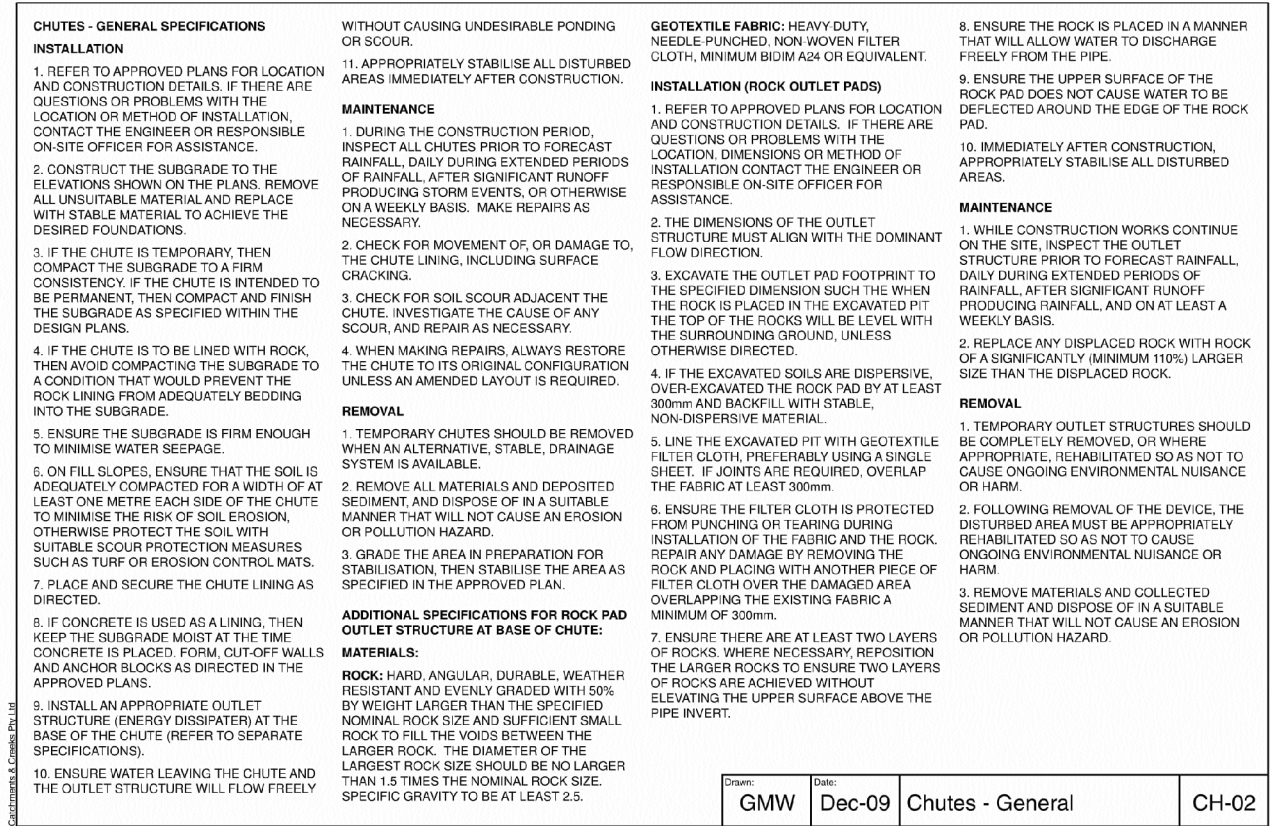
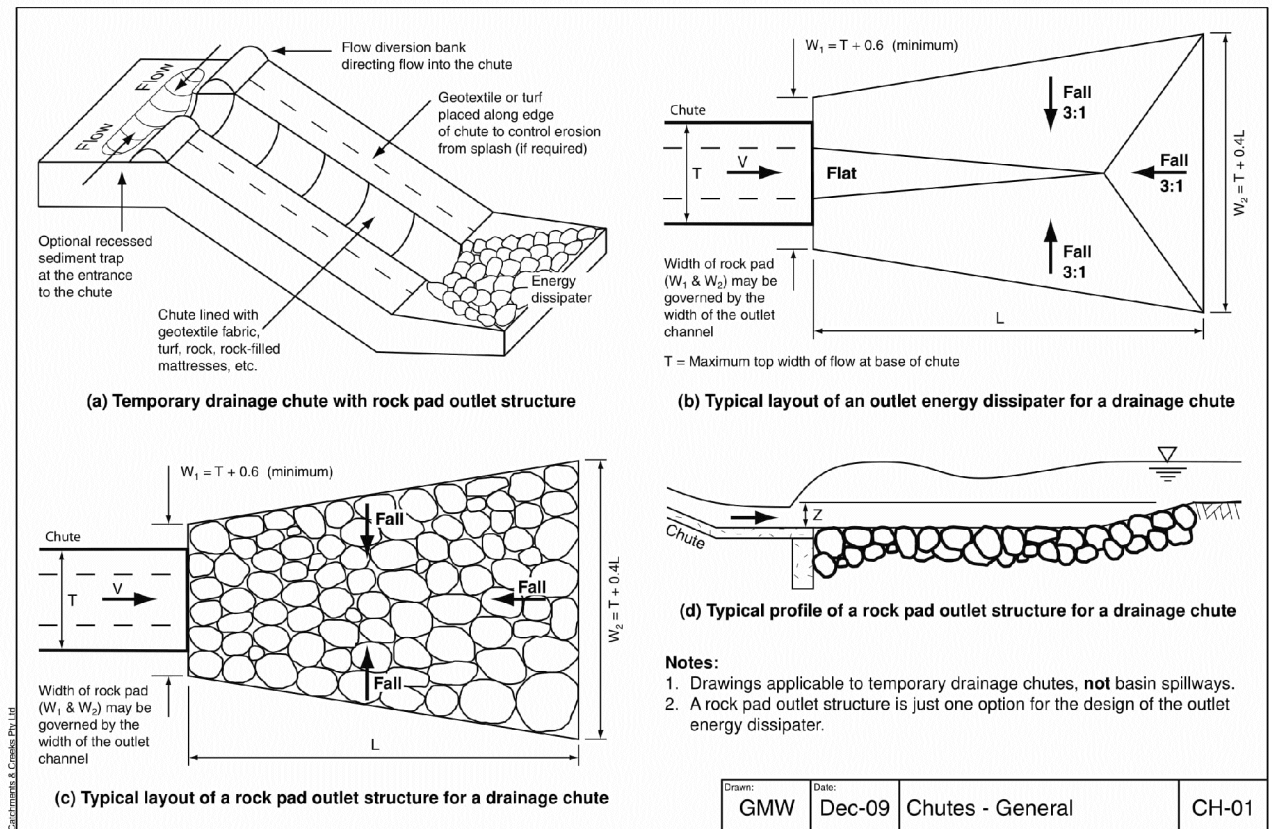


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- NOTES:**
- CHUTES ASSUMED TO BE AT A LONGITUDINAL GRADE OF 1 IN 3.
 - ROCK SIZE OF CHUTE LINING BASED ON IECA 2008 WITH A SAFETY FACTOR OF 1.2, SPECIFIC GRAVITY OF ROCK = 2.4 WITH A SIZE DISTRIBUTION OF $d_{50}/d_{90} = 0.5$.
 - MONITOR ALL ROCK OUTLET STRUCTURES OVER SEVERAL STORMS EVENTS AND ANY SUBSEQUENT LARGE EVENTS TO CONFIRM THAT THE ROCK LINING IS PERFORMING AS EXPECTED. IF SIGNS OF SCOUR OR MOVEMENT IS OBSERVED CONTACT THE DESIGNERS FOR FURTHER ADVICE.
 - SEEC HAVE ONLY PROVIDED HYDRAULIC CALCULATIONS FOR THE CONSTRUCTION OF SEDIMENT BASINS, WEIRS, CHUTES AND DISSIPATER OUTLETS.



DETAIL 5: TYPICAL PROFILE OF TRAPEZOIDAL SPILLWAY AND CHUTE.



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Suites 7 & 8, 68-70 Station Street
PO Box 1098, Bowral NSW 2576.
(0) 02 4862 1633
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email: reception@seec.com.au
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MARAGLE 330kV SWITCHING
STATION AND 300kV
TRANSMISSION LINE
CONNECTIONS

EROSION AND SEDIMENT CONTROL
IECA STANDARD DRAWINGS
SHEET 28 OF 29

22000398 P02 PESCP28 06

SEDIMENT BASIN CONSTRUCTION AND MAINTENANCE INSTRUCTIONS:

- Monitor weather forecasts and schedule basin construction for a period of relatively dry weather.
- Peg out or use tape to delineate the proposed areas of disturbance for basin construction.
- Install a sediment fence, mulch bund or coir log filter immediately downslope of the proposed basin construction area as a short-term backup control. Alternatively, a bund can be formed at the downslope edge of the basin construction area by pushing topsoil and vegetation into a windrow.
- Clear vegetation and strip topsoil from sediment basin and embankment footprint. Stockpiles are to be located and formed as per the Master ESCP instructions.
- Undertake dust suppression as required.

MATERIALS –

- Using competent earth-fill material (assessed by the project geotechnical engineer), form the basin wall (including cut-off trench if required) in layers and compact each progressively.
- Geotextile fabric: heavy duty, needle-punched, non-woven cloth, minimum 'bidim' A24 or equivalent.

CONSTRUCTION –

- Notwithstanding any description contained with approved plans or specifications, the Contractor shall be responsible for satisfying themselves as to the nature and extent of the specified works and ensuring they have all the required approvals prior to carrying out works. This shall include means of access, extent of clearing, nature of materials to be excavated, type and size of mechanical plant required, location and suitability of water supply for construction and testing purposes, and any other likely matters affecting the construction of the works.
- Refer to approved plans for location, dimensions, and construction details. If there are any questions or problems with the location, dimensions, or method of installation, contact the engineer or responsible on-site officer for assistance.
- Before starting any clearing or construction, ensure all the necessary materials and components are on the site to avoid delays in completing the sediment basins once work begins.
- Install requires short term sediment controls measures downstream of the proposed earthworks to control sediment runoff during construction of the sediment basin. Refer to Instruction 3 above.
- The area to be covered by the embankment, borrow pits and incidental works, together with an area extending beyond the limits of each for a distance not exceeding five (5) metres all around must be cleared of all trees, shrubs, stumps, roots, dead timber and rubbish and disposed of in a suitable manner. Delay clearing the main basin area until the embankment is complete.
- Ensure all holes made by grubbing within the embankment footprint are filled with sound material (to be assessed by the project geotechnical engineer), adequately compacted, and finished flush with the natural surface.

CUT OFF TRENCH –

- Project geotechnical engineer to advise if any basin embankment requires a cut-off trench.
- Project geotechnical engineer to advise depth, location and extent of any cut-off trench.
- Project geotechnical engineer to advise cut-off wall material, construction methodology and compaction requirements.

EMBANKMENT–

- Scarify areas on which fill is to be placed before placing fill.
- Ensure all fill material used to form the embankment meets the specifications certified by the project geotechnical engineer.
- Where specified, construct the embankment to an elevation 10% higher than the design height to allow for settling; otherwise finished dimensions of the embankment after spreading of topsoil must conform to the drawing with a tolerance of 75mm from specified dimensions.
- Ensure debris and other unsuitable building waste is not placed within the earth embankment.
- Embankment construction method (e.g. moisture content and compaction method and limits) to be advised by the project geotechnical engineer.
- After completion of the embankment all loose uncompacted earth-fill material on the upstream and downstream batter must be removed prior to spreading topsoil.
- Topsoil and re-vegetate/stabilise all exposed earth.

ESTABLISHING SETTLING POND–

- Trees must be cut down stump high and removed from the immediate vicinity of works.
- Establish all required inflow chutes and inlet baffles, if specified, to enable water to discharge into the basin in a manner that will not cause soil erosion or the re-suspension of settled sediment. If pipes are used for basin inlets, ensure they have at least 5% (1 in 20) grade on them to minimise the risk of sediment accumulating in the pipe.
- Ensure dirty water from the upstream catchment reports to the basin forebay.
- Install a sediment storage level marker post with a cross member set to just below the top of the sediment storage zone (as specified on PESCP02). Use at least a 75mm wide post firmly set into the basin floor.
- Install internal settling pond baffle (75% weave shade cloth and pool noodle) across the full width of the sediment basins where the required 3:1 length:width ratio cannot be achieved.
- Install all appropriate measures to minimise safety risk to onsite personnel and the public caused by the presence of the settling pond. Avoid steep, smooth internal slopes. Appropriately fence the settling pond and post warning signs if unsupervised public access is likely or there is considered to be an unacceptable risk to the public.

SPILLWAY–

- Shape the spillway (weir, chute and energy dissipater), line with geofabric and rock to the dimensions noted on PESCP02. The fabric must extend all the way to the edge of the work area, onto undisturbed or natural ground.
- Spillway outlet made up of spillway crest, chute and energy dissipater. Refer to PESCP02 for rock sizes and dimensions and Detail 5 on PESCP28.

ADDITIONAL INSTRUCTIONS –

- Check that the basin capacity achieves the required surface area and volumes as shown on PESCP02.

MAINTENANCE OF SEDIMENT BASINS

- Inspection the sediment basin during the following periods:
 - During construction to determine whether machinery, falling trees, or construction activity has damaged any components of the sediment basins. If damage has occurred, repair sediment basin immediately;
 - After each runoff event inspect the erosion damage at flow entry and exit points. If damage has occurred, make the necessary repairs immediately;
 - At least weekly during the nominated wet season (if any) otherwsie at least fortnightly;
 - Prior to, and immediately after, periods of 'stop work' or site 'shutdown'.
- Clean out accumulated sediment when it reaches the sediment storage marker board/post, and restore the original storage volume. Place sediment in a disposal area or, if appropriate, mix with dry soil on site.
- Do not dispose sediment in a manner that will create an erosion or pollution hazard.
- Check all visible pipe connections for leaks, and repair as necessary.
- Check fill material in the dam/embankment for excessive settlement, slumping of the slopes or piping between the conduit and the embankment; make all necessary repairs immediately.
- Remove all trash and other debris from the basin (including any risers, decant arms etc).
- Submerged inflow pipes must be inspected and de-silted (as required) after each inflow event.

DE-WATERING

Type D Sediment Basin –

- Type D sediment basins must be effectively settled and emptied to the bottom of the settling zone within 5-days or preferably less following a rainfall event. To increase their ability to capture and treat more water, treat and discharge water in 2-3 days.
 - Dirty water from the sediment basin is to be utilised for construction purposes (i.e. dust suppression) or irrigated over well vegetated lands with the project boundary.
 - If the water is going to be used within the construction site for dust-suppression or construction purposes and will drain back into the sediment capture system it does not require treatment or will be irrigated onto vegetated lands within the project area.
 - Refer to the 'Dirty Water Treatment and Discharge Requirements' notes on PESCP01.

DE-SILTING PROCEDURES

- An appropriately marked (e.g. painted) de-silting marker post must be installed in the sediment basin to indicate the top of the sediment storage zone. The sediment basin must be de-silted if the next storm is likely to cause the settled sediment to rise above this marker point, or if the settled sediment has exceeded 90% of the nominated sediment storage volume.

REMOVAL OF SEDIMENT BASIN

- When grading and construction works in the drainage area above a temporary sediment basin is completed and the disturbed areas are adequately stabilised, the sediment basin must be removed or otherwise incorporated into the permanent stormwater drainage system. In either case, sediment should be cleared and properly disposed of an the basin area stabilised.
- Before starting any maintenance work on the basin or spillway, install all necessary short-term sediment control measures downstream of the sediment basin.
- All water and sediment must be removed from the basin prior to the embankments removal. Dispose of sediment and water in a manner that will not create an erosion or pollution hazard.
- Bring the disturbed area to a proper grade, then smooth, compact, and stabilise and/or revegetate as required to establish a stable land surface.

SAFETY

Construction sites are often located in publicly accessible areas. In most cases it is not reasonable to expect a parent or guardian of a child to be aware of the safety risks associated with a neighbouring construction site. Thus fencing of a sediment basin maybe warranted even if the basins are located adjacent to other permanent water bodies such as a stream, lake, or wetland.

Responsibility of safety issues on a construction site ultimately rests with the site manager; however, each person working on a site has a duty of care in accordance with the state's work place safety legislation. Similarly, designers of sediment basins have a duty of care to investigate the safety requirements of the site on which the basin is to be constructed.

Install all appropriate measures to minimise safety risk to on-site personnel and the public caused by the presence of the settling pond. Avoid steep, smooth internal slopes as much as possible. Appropriately fence the settling pond and post warning signs if unsupervised public access is likely or there is considered to be an unacceptable risk to the public.

If the basins internal banks are steeper than 1:5 (V:H), and the basin will not be fenced, then a suitable method

of egress during wet weather needs to be installed. Examples include a ladder, steps cut into the bank, or at least one bank turfed for a width of at least 2m from the top of bank to the toe of bank.

NOTE: A geotechnical engineer is required to design, review, approve and certify all earthworks associated with sediment basins, embankments, weirs, chutes and dissipater outlet construction. SEEC have only provide hydraulic calculations for the construction of sediment basins, weirs, chutes and dissipater outlets.

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APPENDIX F: Water Quality Monitoring Program

Construction Water Quality Monitoring Program and Methodology

Snowy 2.0 Transmission Connection Project

Stage 1 Document Number: 3200-0645-PLN-021-CEMP-CWQMP

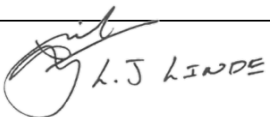
Stage 2 Document Number: HLW-HLJV-PRW-ENM-PLN-000020 – Appendix F

TransGrid
Date 01/11/2024

Snowy 2.0 TCP
Construction Water Quality Monitoring Program and Methodology

Document Control

Approvals

Title	Snowy 2.0 Transmission Connection Project – Construction Water Quality Monitoring Program and Methodology
Approved on behalf of Transgrid (Snowy 2.0 TLP) by	Andrew Buttigieg
Signed	
Dated	22/11/2024
Approved on behalf of Transgrid HumeLink by	Jeremy Roberts
Signed	
Dated	05 Nov 2024
Approved on behalf of UGL by	Louis Linde
Signed	
Dated	20/11/2024
Approved on behalf of HLWJV by	Tim Burns
Signed	
Dated	04 Nov 2024

Snowy 2.0 TCP Construction Water Quality Monitoring Program and Methodology

Version Control

Revision	Date		Author	Reviewer	Approver
Rev 0.01	30/10/2023	Initial issue for review	Whitney Heiniger	Kim Lembke	Tim McCarthy
Rev 0.02	01/11/2023	Addressing Transgrid comments	Jason Snape	Kim Lembke	Tim McCarthy
Rev 0.03	01/11/2024	Update to include Stage 2	Nicholas Mok	Ian Irwin	Louis Linde / Tim Burns

Distribution of controlled copies

This Environmental Program is available to all personnel and sub-contractors via the Project document control management system.

The document is uncontrolled when printed. One controlled hard copy of the CEMP and supporting documentation will be maintained by the Quality Manager at the Project office (and relevant documentation is available on the Snowy 2.0 TCP website [Snowy 2.0 Transmission Connection | Transgrid](#)).

Copy number	Issued to	Version

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Acronyms and abbreviations

Abbreviation	Explanation
ANZG	Australian and New Zealand Guidelines
BTEXN	Benzene, toluene, ethylbenzene, xylene, naphthalene
CEMP	Construction environmental management plan
DES	Department of Environment and Science
DCCEEW - NSW	NSW Department of Climate Change, Energy, the Environment and Water
DGV	Default guideline values
DPE	Department of Planning and Environment (NSW)
DPHI	Department of Planning, Housing and Infrastructure (formerly DPE)
DPI	NSW Department of Primary Industries
DPIRD	NSW Department of Primary Industries and Regional Development, formerly Department of Primary Industries (DPI)
D/s	Downstream
EIS	Environmental Impact Statement
EPA	NSW Environment Protection Authority
EPL	Environment Protection Licence
EP&A Act	<i>Environmental Planning and Assessment Act 1979 (NSW)</i>
ha	hectares
KFH	Key Fish Habitat
km	kilometres
Kv	kilovolts
KNP	Kosciuszko National Park
m	metres
MW	megawatts
LOR	Limit of reporting (laboratory)
NEM	National Energy Market
NPWS	National Parks and Wildlife Service
NSW	New South Wales
NWQMS	National Water Quality Management Strategy

Snowy 2.0 TCP
Construction Water Quality Monitoring Program and Methodology

Abbreviation	Explanation
POEO Act	<i>Protection of the Environment Operations Act 1997</i>
QA	Quality Assurance
QC	Quality Control
SWMP	Soil and Water Management Plan
SWMS	Safe Work Method Statement
TARP	Trigger Action Response Plan
TDS	Total dissolved solids
TRH	Total recoverable hydrocarbons
TSS	Total suspended solids
U/s	Upstream
WQO	Water Quality Objectives
WSP	Water sharing plans

1. Introduction

1.1 Context

In 2020 Snowy Hydro Limited (Snowy Hydro) obtained approval (application number SSI 9208 and EPBC 2018/8322) to expand the existing Snowy Mountains Hydro-electric Scheme (Snowy Scheme), by linking the existing Tantangara and Talbingo reservoirs through a series of underground tunnels and constructing a new underground hydro-electric power station (referred to as 'Snowy 2.0'). Snowy 2.0 will increase the generation capacity of the Snowy Scheme by almost 50% by providing an additional 2,000 megawatts (MW).

To connect Snowy 2.0 to the National Energy Market (NEM), a new transmission connection is required. NSW Electricity Networks Operations Pty Ltd as a trustee for NSW Electricity Operations Trust (known as Transgrid and the Proponent) that received development approval on 2 September 2022 to construct a 500kV substation and 330kV switching station at Maragle (Maragle Substation) and overhead transmission lines (the Project) to facilitate the connection of Snowy 2.0 to the existing electrical transmission network, approximately 27 kilometres (km) east of Tumbarumba, New South Wales (NSW). UGL and UGL/CPB have been engaged on behalf of the Proponent (Transgrid) to undertake the Project (refer to Section 1.1 of the Soil and Water Management Plan).

1.2 Project description

The Project is located within the Australian Alps in Southern NSW, about mid-way between Canberra and Albury and located wholly within the Snowy Valleys Local Government Area (LGA). The nearest large towns to the Project area are Cooma and Tumut. Cooma is about 80km south-east and Tumut is about 55km north of the Project.

The eastern extent of the Project is defined by the location of the Snowy 2.0 cable yard at Lobs Hole in Kosciuszko National Park (KNP). From the cable yard, the transmission connection extends west through KNP and up Sheep Station Ridge characterised by steep, mountainous terrain before traversing Talbingo Reservoir. The transmission connection then continues west, crossing Elliott Way at three locations before entering Bago State Forest to the Maragle Substation site.

Waterways with potential to be impacted by construction of the Project include Yarrangobilly Creek, Yorkers Creek, New Zealand Gully, Lick Hole Gully, Sheep Station Creek, Cave Gully and Wallaces Creek.

Key elements of the Project include:

- The new Maragle Substation located within Bago State Forest and adjacent to Transgrid's existing Line 64, which forms a 330kV connection between Upper Tumut and Lower Tumut switching stations.
- Upgrade and widening of an existing access road off Elliott Way to the switching station including the construction of new driveways into the Maragle Substation.
- Two new 330kV overhead double-circuit transmission lines from the Snowy 2.0 cable yard to the new switching station. Each line would be approximately 9km long and comprise approximately 21 steel lattice structures up to 75 metres (m) in height.

Snowy 2.0 TCP Construction Water Quality Monitoring Program and Methodology

- One short overhead 33kV transmission line connection (approximately 300m in length) comprising both steel lattice structures and pole structures as required between the Maragle Substation and Line 64.
- Construction of up to 8km of new access tracks to the transmission structures at Sheep Station Ridge, and upgrade to existing access tracks where required. The access tracks would remain following the completion of construction to service ongoing maintenance activities along the transmission lines.
- Establishment of a helipad (approximately 30m wide by 30m long) to support the transmission line construction activities carried out at higher elevations.
- Ancillary construction activities, including the establishment of tensioning and pulling sites for conductor and earth wire stringing, crane pads, site compounds and equipment laydown areas, and the transport and haulage of equipment and waste to and from the Project area.

1.3 Purpose and objectives

The purpose of this Preliminary Water Quality Monitoring Program (the Program) is to address the requirements of the Environmental Impact Statement (EIS) (Jacobs 2020) that was prepared by the Proponent under Part 5, Division 5.2 of the NSW *Environmental Planning and Assessment Act 1979* to assess the environmental impacts of the proposed Project. Subsequently, an Amendment Report (Transgrid 2021b) was submitted with the Response to Submissions (Transgrid 2021a) to the Department of Planning and Environment (DPE) with updated mitigation measures for the Project. The Project received approval from the Minister for Planning on 2 September 2022.

An EPL for the Project premises was issued to Transgrid by the NSW EPA on 23rd December 2022 under the *Protection of the Environment Operations Act 1997* (POEO Act). This EPL requirement was triggered under Schedule 1 of the Protection of the Environment Operations (General) Regulation 2022 due to extractive activities required during construction.

Following the environmental assessment, the Project is required to provide water quality monitoring (WQM) data, including this Program with consultation with the NSW Environmental Protection Authority (EPA).

The mitigation measures from the Amendment Report (Transgrid 2021b), the Soil and Water Management Plan (UGL 2022) (SWMP) and Infrastructure Approval SSI 9717 pertinent to this Program are provided in Table 1-1. These mitigation measures are designed to ensure that aquatic ecosystems throughout the national park and downstream are maintained. Particularly, protecting key habitat of the Booroolong Frog in the Yarrangobilly River and its tributaries.

The overarching key objectives of surface water quality monitoring are to inform and respond to changes in water quality to ensure that:

- Water quality is maintained to protect aquatic ecosystems
- Water quality is maintained for water supply, primary and secondary contact recreation and consumption of cooked aquatic foods
- Maintain visual amenity.

The objectives of the pre-construction surface water quality monitoring are to collect baseline data prior to Project construction works. Baseline data will be compared to ANZG (2018) guidelines to characterise the existing surface water quality. The data will be compared to the water quality

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objectives (WQO) for the Project area (refer to section 3.2). The baseline data will also be compared to the construction and operation monitoring data to characterise any changes in water quality that may be associated with the Project and to inform an appropriate response (refer Trigger Action Response Plan (TARP) in Appendix D of the SWMP).

1.4 Consultation

Consultation with NSW EPA has been undertaken during development of this pre-construction surface water quality monitoring program. The initial draft of this program was provided to the EPA via email on 2 March 2022. NGH spoke with an EPA representative Claudine Jeffery about the report on 31 March 2022. EPA provided comments on the report on 19 April 2022 (Appendix A).

Additional consultation was undertaken with NSW EPA on 21 March 2023, where NSW EPA provided guidance on the amount of baseline data required for the expert determination of Project-specific water quality objectives and also on reporting and notification requirements for the Project.

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Table 1-1 Mitigation measures and conditions of approval relevant to this WQMP

ID	Measure/requirements	Resources needed	When to be implemented	Responsibility	Reference
Conditions of Approval					
B16	Prior to the commencement of construction, the Proponent must prepare a Water Management Plan for the development to the satisfaction of the Planning Secretary. This sub-plan must: (a) be prepared by a suitably qualified and experienced person in consultation with the EPA, FCNSW, NPWS, the Water Group and NSW DPI; (b) include provisions for: (i) detailed baseline data on surface water flows and quality in the watercourses that could be affected by the development, and a program to augment this baseline data over time; (ii) detailed criteria for determining surface water impacts of the development (flows, quality and flooding), including criteria for triggering remedial action (if necessary); and (iii) a description of the measures that would be implemented to minimise the surface water impacts of the development and comply with the relevant water management requirements in conditions B10 to B15 are complied with; and (c) managing flood risk during construction. Following the Planning Secretary's approval, the Proponent must implement the Water Management Plan.	WQM Program	Prior to construction During construction	Senior Environmental Advisor	COAs
Mitigation Measures					
W4	A water quality monitoring program will be developed as part of the SWMP as described in Appendix E. It will be developed and implemented to gain an appreciation of background water quality, to	WQM Program	Prior to construction	Senior Environmental	Amendment Report

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ID	Measure/requirements	Resources needed	When to be implemented	Responsibility	Reference
	observe any changes in surface water quality that may be attributable to the project and inform appropriate management responses. The surface water quality monitoring program will be carried out during the pre-construction, construction, and operational stages of the project.		During construction During operation	Advisor	
SWM17	A water quality monitoring program will be developed as part of the SWMP and will be carried out prior to, during and following construction.	WQM Program	Prior to construction During construction	Senior Environmental Advisor Project Environmental Consultant	W4 Amendment Report
SWM18	For water quality samples collected for laboratory analysis, QA/QC will include the collection of one field blank and one field duplicate per sampling event.	Water quality records	During construction	Senior Environmental Advisor	Best practice
SWM20	Monitoring shall be undertaken in accordance with the Environmental Protection Authority Approved Methods for the Sampling and Analysis of Water Pollutants in NSW (2022). All laboratory analyses are to be undertaken at a National Association of Testing Authorities (NATA) accredited laboratory. Samples are to be submitted appropriately i.e. under Chain of Custody, documentation, within the holding times and with appropriate preservation.	Water quality records COC documents	During construction	Senior Environmental Advisor	Best practice
SWM21	Field data sheets will be used to record visual observations of potential	Environmental	During	Senior	Best

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ID	Measure/requirements	Resources needed	When to be implemented	Responsibility	Reference
	pollutants and contaminants along with site details, sampling details, sampling conditions and details of samples collected.	inspection records	construction	Environmental Advisor	practice

2. Legal and policy requirements

2.1 Protection of the Environment Operations Act 1997 (POEO Act)

The *Protection of the Environment Operations Act 1997* (POEO Act) regulates waste management, noise, and air and water pollution. Under section 120 of the POEO Act the pollution of waters is an offence. An environment protection licence, under Chapter 3 of the Act, is normally required for an activity where water quality could be impacted.

An Environment Protection Licence (EPL) for the Project premises was issued to Transgrid by the NSW Environment Protection Authority (EPA) on 23rd December 2022 under the *Protection of the Environment Operations Act 1997* (POEO Act). This EPL requirement was triggered under Schedule 1 of the Protection of the Environment Operations (General) Regulation 2022 due to extractive activities required during construction.

2.2 Fisheries Management Act 1994 (FM Act)

Aims of the *Fisheries Management Act 1994* (FM Act) protects aquatic flora and fauna, and their habitats. The FM Act is governed by the Department of Primary Industries (DPI). One of the objectives of the FM Act is to 'conserve key fish habitats'. A policy definition of Key Fish Habitat (KFH) includes "all marine and estuarine habitats to the astronomical tide level and most permanent and semi-permanent freshwater habitats including rivers, creeks, lakes, lagoons, billabongs, weir pools and impoundments up to the top of the bank" (DPI 2017). The Project is located adjacent to the following waterways, which are identified as KFH:

- Yarrangobilly River
- Lick Hole Gully
- Sheep Station Creek
- Cave Gully
- Wallaces Creek
- Yorkers Creek
- Logbridge Creek
- Talbingo Reservoir (Tumut River).

The policy and guidelines for aquatic habitat conservation are to ensure minimal impact of the Project on receiving sensitive species and environments protected under the Act.

2.3 Water Management Act 2000

The *Water Management Act 2000* (WM Act) provides guidance for sustainable and integrated management of the water sources within NSW. The WM Act ensures sustainable use and management of water sources through ecologically sustainable development, protection and enhancement of water resources, social and economic benefits, equitable sharing of water, management of water resources with native vegetation and native fauna and efficient use of water. Water sharing plans (WSPs) define the rules for water sharing for each regulated river between the users and the environment. Most WSPs fall under the WM Act.

2.4 Australian and New Zealand Guidelines for Fresh and Marine Water Quality

The Australian and New Zealand Governments (ANZG 2018 – previously ANZECC 2000) have published the Australian and New Zealand Guidelines for Fresh and Marine Water Quality to provide benchmarks for assessment of the existing water quality of freshwater, groundwater and marine waters. These guidelines were developed as part of the National Water Quality Management Strategy (NWQMS).

The objectives of these guidelines are to provide guidance on the management of water quality of uses or values which include natural aquatic ecosystems, drinking water, primary industries, recreation and cultural and spiritual values. The Project is located adjacent to sensitive receiving environments within the KNP and Bago State Forest. The water quality in the waterways within the Project area should meet the recommended ANZG (2018) guidelines for upland rivers and the recommended guideline values (ANZG 2018) for species protection level of 99% (refer to section 3.2).

3. Water Quality

3.1 Existing surface water quality

Existing surface water quality has been described in Jacobs (2021) for the waterbodies surrounding the Project. These waterbodies include:

- Yarrangobilly River
- Wallaces Creek
- Lick Hole Gully
- Talbingo Reservoir
- Tumut River.

Yarrangobilly River, Yorkers Creek, New Zealand Gully, Lick Hole Gully, Sheep Station Creek, Cave Gully and Wallaces Creek have been assigned default guideline values (DGV) for Upland Rivers and 99% species protection level (Jacobs 2021).

3.2 Water quality objectives

The surface water quality objectives for the receiving waters adjacent to the Project are provided in Table 3-1. The Project area within Kosciuszko National Park is an area of high conservation value. Therefore, the water quality objectives for physical and chemical stressors includes **no change beyond natural variability** (ANZG 2018). These water quality objectives also apply to works within Bago State Forest. The DGV for physical and chemical stressors in Upland Rivers has been provided in Table 3-1. The DGV for toxicants for 95% and 99% species protection level has been provided in Table 3-1. The field shaded in grey represent trigger values applying to typical slightly – moderately disturbed systems (ANZG 2018).

The guideline values for 99% species protection level for upland rivers (Table 3-1) have been adopted as the laboratory limit of reporting (LOR). A value of 0.5 milligrams per litre (mg/L) has been adopted for the LOR for total suspended solids.

3.3 Trigger Values and Trigger Action Response Plan

A Trigger Action Response Plans (TARP) has been developed for water quality monitoring during construction and is included in Appendix D of the Soil and Water Management Plan (SWMP). Trigger values for determining water quality exceedances during Project works will be included upon the completion of baseline monitoring.

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Table 3-1 Surface water quality objectives for upland rivers

Category	Analyte	Units	Default Guideline Value		Comment
			Upland Rivers – National Parks, Nature Reserves and State Forests ¹	Upland Rivers – streams affected by the Snowy Scheme ²	
Physico-chemical	pH		6.5-8	6.5-8	Low pH can cause adverse effects to fish and aquatic insects (ANZG 2018). Changes to pH, particularly a reduction, can lead to the increase in toxicity of several pollutants including aluminium, ammonia and cyanide.
	Electrical conductivity	µS/cm	30-350	30-350	The ability of water to conduct an electrical current. Changes in salinity (conductance) should be less than 5% from background levels in estuarine waters (ANZG 2018).
	Turbidity	NTU	2-25	2-25	Direct impacts of increases in suspended solids include blanketing of the macrophytes and bed-dwelling organisms (Dunlop et al 2005). Fine sediment is also responsible for clogging the gills of fish. The high capacity of the fine particles for ion exchange enables them to bind with biological membranes gills in fish and invertebrates (Pusey and Arthington 2003). The high ion exchange capacity of the fine silt and clay particles also enables them to bind with contaminants such as heavy metals and nutrients (Dunlop et al 2005). Light is the primary source of energy in aquatic ecosystems (Boulton and Brock 1999). High levels of turbidity result in a reduction of light penetration in the water column (Pusey and Arthington 2003). The impact of reduced light penetration on aquatic environments is decreased primary production as a result of reduced ability for plants to photosynthesise (ANZG 2018).

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Category	Analyte	Units	Default Guideline Value		Comment
			Upland Rivers – National Parks, Nature Reserves and State Forests ¹	Upland Rivers – streams affected by the Snowy Scheme ²	
					Depleted food sources result in declines in populations of fish, insects, molluscs, invertebrates and microorganisms (Henly et al. 2010).
	Dissolved oxygen	%	90-110	90-110	Indicates if the presence of a disturbance to the equilibrium of oxygen-consuming processes and oxygen-releasing processes and defines the saturation of oxygen in the water column (ANZG 2018). Reduction in DO leads to low or hypoxic conditions, limiting living conditions for aerobic organisms. When DO is too low, it can lead to loss of biota (e.g. fish kills) (ANZECC 2000). Low DO concentrations range from <2 – 4 mg/L and hypoxic DO concentrations (>0 – 2.0 mg/L) (WA Government 2017). Therefore, the levels of DO concentrations range from hypoxic to high. However, it is also noted that the DO concentrations should be taken determined by consecutive diurnal measurements under different weather conditions as DO concentrations fluctuate with temperature, salinity and air pressure (USGS n.d.). For example, at 20°C, 100% dissolved oxygen saturation for freshwater is 9.09 mg/L.
	Total suspended solids (TSS)	mg/L	No guideline	No guideline	Refer to detail associated with turbidity, above.

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Category	Analyte	Units	Default Guideline Value		Comment
			Upland Rivers – National Parks, Nature Reserves and State Forests ¹	Upland Rivers – streams affected by the Snowy Scheme ²	
	Total dissolved solids (TDS)	mg/L	No guideline	No guideline	Increases or decreases in TDS can limit the growth of aquatic organisms and can be fatal. High levels of TDS reduce water clarity and increase turbidity.
	Total hardness (as CaCO ₃)	mg/L	No guideline	No guideline	Water hardness can affect the toxicity of metals and metalloids in aquatic ecosystems, often by increasing the uptake of metals in aquatic organisms.
Nutrients	Ammonia (NH ₄)	mg/L	0.013	0.013	The toxicity of ammonia is primarily the un-ionised NH ₃ , which is able to cross epithelial membranes of aquatic organisms (ANZG 2018). pH and temperature can impact its toxicity. A study by the United States EPA (1985) found that ammonia was toxic to freshwater organisms in concentrations of 0.5 mg/L to 23 mg/L, not corrected for pH or temperature. Toxicity can be displayed as loss of equilibrium, hyperexcitability and in some cases death, in fish (ANZG 2018).
	Oxidised nitrogen (NO _x)	mg/L	0.015	0.015	
	Total Nitrogen (TN)	mg/L	0.25	0.25	Increase in TN concentration stimulates nuisance plant growth (e.g., algal blooms).
	Total kjeldhal	mg/L	No guideline	No guideline	

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Category	Analyte	Units	Default Guideline Value		Comment
			Upland Rivers – National Parks, Nature Reserves and State Forests ¹	Upland Rivers – streams affected by the Snowy Scheme ²	
	nitrogen				
	Filterable reactive phosphorus (FRP)	mg/L	0.015	0.015	
	Total phosphorus (TP)	mg/L	0.02	0.02	Increase in TP concentration stimulates nuisance plant growth (e.g., algal blooms).
Inorganics (total and dissolved)	Cyanide	mg/L	0.004	0.004	There are different forms of cyanide, each with different degrees of toxicity to aquatic organisms, which is predominantly through the inhibition of cellular respiration (ANZG 2018). Cyanide in water is impacted by other water quality physio-chemical parameters including pH, temperature, dissolved oxygen, salinity and sunlight (Leduc et al., 1982; CCREM 1987).
Metals and metalloids (total and dissolved)	Aluminium (Al) ³	mg/L	0.055	0.027	Toxicity of aluminium is increased at low (e.g., <5.5) and high (e.g., >9) pH. Single-celled aquatic plants are generally more sensitive to aluminium toxicity, with fish generally more sensitive than aquatic invertebrates (ANZG 2018). Aluminium toxicity can impact the functioning of the gills in fish.

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Category	Analyte	Units	Default Guideline Value		Comment
			Upland Rivers – National Parks, Nature Reserves and State Forests ¹	Upland Rivers – streams affected by the Snowy Scheme ²	
	Arsenic (As) ⁴	mg/L	0.013	0.0008	Toxicity of arsenic (V) increases with increasing temperature. Phytoplankton are some of the most sensitive aquatic organisms to arsenic, whereas adult freshwater fish are less sensitive, and arsenic (V) seems more toxic to aquatic plants than arsenic (III) (ANZG 2018).
	Cadmium	mg/L	0.0002	0.00006	Cadmium may be accumulated by some aquatic organisms. Toxicity is dependent on water hardness and is less toxic in freshwater at lower pH. Dissolved organic matter, suspended solids and chloride can reduce toxicity (ANZG 2018).
	Chromium (Cr) ⁵	mg/L	0.001	0.00001	Toxicity of chromium (VI) increases in freshwater at lower pH. Chromium may bioaccumulate and is generally toxic at high temperatures (ANZG 2018). Freshwater algae and invertebrates are more sensitive to chromium (VI) than fish (ANZG 2018).
	Copper (Cu)	mg/L	0.0014	0.001	Copper is bioaccumulated in aquatic plants and animals. Toxicity expresses itself when the rate of uptake exceeds the rates of which the organism can detoxify or excrete the metal (Rainbow 1996). The uptake and toxicity of copper in freshwater aquatic organisms generally decreases with increasing water hardness and alkalinity (Erickson et al., 1998).

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Category	Analyte	Units	Default Guideline Value		Comment
			Upland Rivers – National Parks, Nature Reserves and State Forests ¹	Upland Rivers – streams affected by the Snowy Scheme ²	
	Iron (Fe)	mg/L	0.3	0.3	Iron is an essential trace element for aquatic organisms. However, when concentrations are high, can cause acute toxicity (ANZG 2018). Iron can often form colloidal suspensions, which can settle out of the water column or remain in suspension. When remaining in suspension, it can increase turbidity, decrease light penetration and smother bed-dwelling organisms (ANZG 2018).
	Lead (Pb)	mg/L	0.0034	0.001	Lead toxicity is water hardness dependent. It is strongly absorbed by suspended organic matter and humic substances (ANZG 2018). Low pH increases the uptake and toxicity of lead (ANZG 2018).
	Manganese (Mn)	mg/L	1.9	1.2	The toxicity of manganese is low in aquatic organisms compared to other trace metals. It can bioaccumulate (ANZG 2018). Can be soluble at low pH or low dissolved oxygen (ANZG 2018).
	Mercury (inorganic)	mg/L	0.0006	0.00006	The uptake rate of mercury in aquatic organisms increases with decreasing water hardness and pH (ANZG 2018).
	Nickel (Ni)	mg/L	0.011	0.008	Nickel toxicity decreases with increased hardness and increases as pH decreases. Nickel uptake increases with increasing toxicity (ANZG 2018).

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Category	Analyte	Units	Default Guideline Value		Comment
			Upland Rivers – National Parks, Nature Reserves and State Forests ¹	Upland Rivers – streams affected by the Snowy Scheme ²	
	Silver (Ag)	mg/L	0.00005	0.00002	Silver is a one of the most toxic metals to aquatic life with toxicity correlated to water hardness. Toxicity decreases as water hardness increases (ANZG 2018).
	Zinc (Zn)	mg/L	0.008	0.0024	Zinc is essential for the growth and development of aquatic organisms although elicits a toxic response when in high concentrations. Zinc toxicity is dependent on water hardness and generally decreases with decreasing pH. Zinc is absorbed by suspended material (ANZG 2018).

1. DGVs for metals and metalloids 95% Species protection (ANZG 2018)
2. DGVs for metals and metalloids 99% Species protection (ANZG 2018)
3. DGV AI for pH >6.5 (ANZG 2018)
4. For As (V) (ANZG 2018)
5. For Cr (VI) (ANZG 2018)

4. Methodology

Surface water quality monitoring will be undertaken in accordance with the:

- Environmental Protection Authority Approved Methods for the Sampling and Analysis of Water Pollutants in NSW (2022)
- AS/NZ 5567.1 Water Quality — Sampling — Guidance on the Design of Sampling Programs, Sampling Techniques and the Preservation and Handling of Samples.

4.1 Monitoring locations

Twelve (12) surface water quality monitoring locations have been identified in the Snowy 2.0 Transmission Connection Project – Water Quality Monitoring Program (Jacobs 2021).

The surface WQM locations are presented in Figure 4-1 and specified in Condition P1.1 of EPL 21753.

Of the 12 locations, five are reference sites that are located in areas not associated with transmission connection construction works. The remaining seven locations are adjacent to transmission connection construction works. Details of the monitoring locations are provided in Table 4-3. These locations have been ground-truthed against the locations provided in Jacobs (2021). The Lick Hole Gully reference site has been removed and replaced with a reference site upstream of the Wallaces Creek impact site (WC-IS) and is referenced in the table as WC-RS.

In addition to baseline monitoring points, additional monitoring points will be added to the water quality monitoring program to monitor impacts on Booroolong Frog populations and habitat. These points will be determined in consultation with NPWS and BCS and will be identified in the Booroolong Frog Monitoring Strategy included as Appendix K of the Biodiversity Management Plan (BMP).

4.2 Pre-construction monitoring frequency

At least 2 years' worth of data will be collected pre-construction to provide the baseline data and inform trigger values and discharge criteria. This data will be compared to the water quality objectives (refer to section 3.2). Baseline sampling is anticipated to occur until the commencement of construction. Background data gained may be augmented with data received from Snowy 2.0 Main Works if provided.

Table 4-1 Timing of sampling events

Sampling event	Date
Event 1	16 and 17 March 2022
Event 2	27 and 28 April 2022
Event 3	30 and 31 May 2022

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Sampling event	Date
Event 4	28 and 29 June 2022
Event 5	27 and 28 July 2022
Event 6	30 and 31 August 2022
Event 7	11 and 12 October 2022
Event 8	26 and 27 October 2022
Event 9	23 and 24 November 2022
Event 10	14 and 15 December 2022
Event 11	18 and 19 January 2023
Event 12	22 and 23 February 2023
Event 13	15 and 16 March 2023
Event 14	26 and 27 April 2023
Event 15	6 and 7 June 2023
Event 16	28 and 29 June 2023
Event 17	26 and 27 July 2023
Event 18	28 and 29 August 2023
Event 19	27 and 28 September 2023
Event 20	30 and 31 October 2023
Event 21	20 and 21 November 2023*
Event 22	12 and 13 December 2023*
Event 23	17 and 18 January 2024*

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Sampling event	Date
Event 24	21 and 22 February 2024*

* - Timing may be subject to change

4.3 Construction monitoring frequency

In accordance with Licence Condition M2.2 of EPL 21753, the following pollutants will be sampled at all twelve locations at a monthly frequency. Details of pollutants, units of measure, frequency and sample method are outlined in Table 4-2.

Table 4-2 Monitoring required in accordance with EPL 31753 M2.2

Pollutant	Units of measure	Frequency	Sampling method
Aluminium	milligrams per litre	Monthly	Grab sample
Ammonia	milligrams per litre	Monthly	Grab sample
Arsenic	milligrams per litre	Monthly	Grab sample
Cadmium	milligrams per litre	Monthly	Grab sample
Chromium	milligrams per litre	Monthly	Grab sample
Copper	milligrams per litre	Monthly	Grab sample
Cyanide	milligrams per litre	Monthly	Grab sample
Dissolved Oxygen	percent	Monthly	In situ
Electrical conductivity	microsiemens per centimetre	Monthly	In situ
Iron	milligrams per litre	Monthly	Grab sample

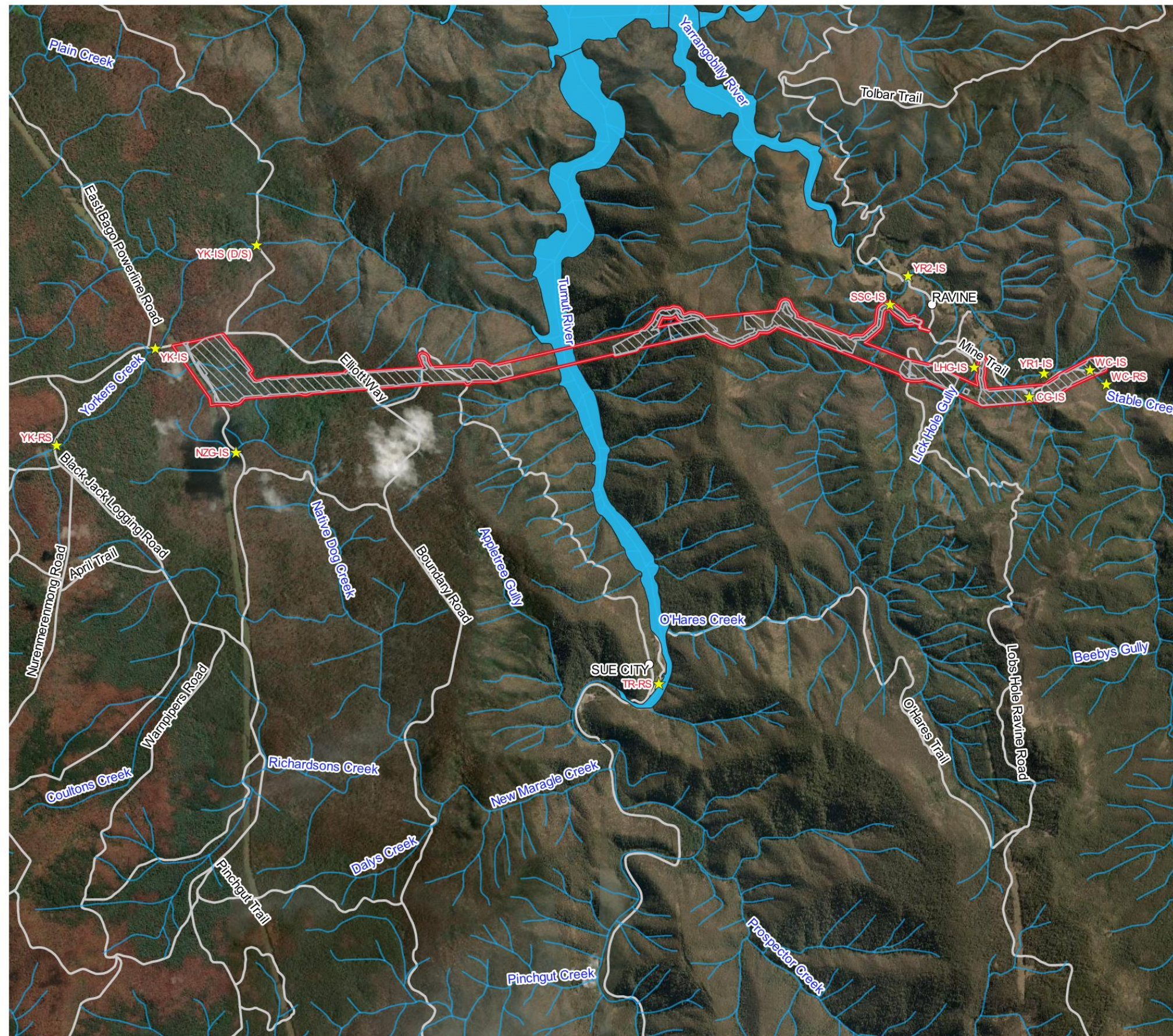
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Pollutant	Units of measure	Frequency	Sampling method
Lead	milligrams per litre	Monthly	Grab sample
Manganese	milligrams per litre	Monthly	Grab sample
Mercury	milligrams per litre	Monthly	Grab sample
Nickel	milligrams per litre	Monthly	Grab sample
Nitrogen (total)	milligrams per litre	Monthly	Grab sample
Nitrogen Oxides	milligrams per litre	Monthly	Grab sample
pH	pH	Monthly	In situ
Phosphorus (total)	milligrams per litre	Monthly	Grab sample
Reactive Phosphorus	milligrams per litre	Monthly	Grab sample
Silver	milligrams per litre	Monthly	Grab sample
Total dissolved solids	micrograms per litre	Monthly	Grab sample
Total Hardness	micrograms per litre	Monthly	Grab sample
Total Kjeldahl Nitrogen	milligrams per litre	Monthly	Grab sample
TSS	milligrams per litre	Monthly	Grab sample

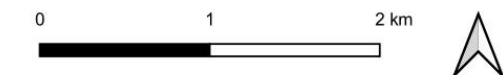
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Pollutant	Units of measure	Frequency	Sampling method
Turbidity	nephelometric turbidity units	Monthly	In situ
Zinc	milligrams per litre	Monthly	Grab sample

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- Legend
- Hydroareas
 - Placepoint
 - Roads
 - Project Area
 - Disturbance Footprint
 - WQM Locations



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Ref: 22-013 Snowy 2.0 Transmission Connection
WQM \ 22-013 WQM points 20220315
Author: N. Smith
Date created: 10.05.2022
Datum: 'EPSG:28355 GDA94 / MGA zone 55



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Figure 4-1 Water quality monitoring locations in proximity to the project area

Table 4-3 Details of surface water quality monitoring sites

Monitoring site	Site type	Monitoring site identification	UTM	Easting	Northing	Description	Photograph
Yorkers Creek upstream (u/s)	Reference	YK-RS	55	617280.636	6037332.07	Reference site for Yorkers Creek and tributaries that have potential to be impacted by works downstream. Access via Black Jack Logging Road, off Elliott Way, in Bago State Forest. Sample taken downstream of culvert under unsealed track. Upstream flow backed up to form a wetland. Vegetated banks, some bank erosion from use by wildlife (evidence of horses and kangaroos), shallow sand bed channel, flowing.	
Yorkers Creek at Western end of alignment	Impact	YK-IS	55	618278.312	6038308.91	Access via Elliott Way. Sample point is adjacent to Elliott Way. Flowing, cloudy in appearance. Evidence of bank erosion. Sand silt and boulders as bed substrate. Large woody debris in and across channel.	

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Monitoring site	Site type	Monitoring site identification	UTM	Easting	Northing	Description	Photograph
Yorkers Creek downstream (d/s)	Impact	YK-IS (d/s)	55	619301.617	6039351.85	Access via Brown Fire Trail (off Elliott Way) downstream of disturbance area and YK-IS. Sample point upstream of wooden track bridge. Fast flowing, deep incised channel. Vegetated banks. Sand and gravel channel bed substrate.	
New Zealand Gully	Impact	NZG-IS	55	619093.379	6037258.73	Access via unnamed road off Elliott Way within the Bago State Forest. Sampling point upstream of culvert under track. Shallow channel, vegetated banks. Lots of bank erosion evident from horse / kangaroo. No cloudiness to flow. Sandy clay bed substrate with gravel.	

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Monitoring site	Site type	Monitoring site identification	UTM	Easting	Northing	Description	Photograph
Tumut River u/s O'Hares Creek	Reference	TR-RS	55	623366.181	6034923.86	Reference site for water quality downstream. Access via Goat Ridge Road. Sampling point from picnic area. Accessed in waders due to the width and depth of the channel. Eddies noticeable along the bank. Some in-channel aquatic vegetation. Clear water. Channel width approximately 65m. Channel depth unknown - >1.5m.	

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Monitoring site	Site type	Monitoring site identification	UTM	Easting	Northing	Description	Photograph
Lick Hole Gully d/s alignment	Impact	LHG-IS	55	626552.661	6038118.53	Downstream of disturbance area and proposed access track. Access via Mine Trail. Sampling point is upstream from road culvert. Lick Hole Gully at the sampling point is marsh-like. Flow is very shallow <0.03m and clear. lots of fine particles that have dropped out of suspension are easily unsettled. Clay underfoot. Lots of bank and in-channel vegetation with large woody debris. Area has a marsh-like odour of decaying organic matter. Flow not deep enough for physio-chemical monitoring with the water quality multi-probe.	
Sheep Station Creek	Impact	SSC-IS	55	625702.573	6038091.82	Within disturbance area and proposed access track. Access via unnamed road of Lobs Hole Ravine Road. Clay and gravel bed substrate. The sampling point is at the confluence of two channels. Sheep Station Creek was dry and is known to be dry. Observations of channel erosion indicate erosive flow likely following large or consistent rainfall events.	

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Monitoring site	Site type	Monitoring site identification	UTM	Easting	Northing	Description	Photograph
Cave Gully	Impact	CG-IS	55	627110.931	6037821.01	Within disturbance area and proposed access track. Access via Mine Trail. Sampling point is located upstream of road culvert. Banks are sparsely vegetated with weeds, predominantly St John's Wort and thistles. Channel is incised with a sandy clay substrate. Shallow flow was clear.	
Yarrangobilly River at alignment	Reference	YR1-RS	55	627259.028	6038056.92	Adjacent to disturbance area and proposed access road. Access via Mine Trail. Sampling point downstream of road and sediment dam. Vegetated banks with phragmites, blackberry, lomandra and eucalypts. Fast flowing river, bedrock bed with boulders. Shallow with a uniform depth across the channel bed.	

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Monitoring site	Site type	Monitoring site identification	UTM	Easting	Northing	Description	Photograph
Yarrangobilly River d/s alignment	Reference	YR2-RS	55	625885.236	6039041.40	Downstream of disturbance area and proposed access road (option A). Access via Lobs Hole Ravine Road. Sampling point upstream of overbridge from a rock bar. Channel bedrock with boulders. Sample taken from a pool, therefore deeper than YR1-RS. Fast flowing clear water. Some green algae growing close the bank.	
Wallaces Creek u/s alignment	Reference	WC-RS	55	627888.596	6037947.27	Reference site, upstream of alignment. The sampling location is upstream of the overbridge across the channel. Access is via a track used for Snowy 2.0 works. The sampling point is adjacent to a large, disturbed area, which is covered in erosion and sediment controls. Gravel bed channel with boulders, fast flowing, clear.	

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Monitoring site	Site type	Monitoring site identification	UTM	Easting	Northing	Description	Photograph
Wallaces Creek	Impact	WC-IS	55	627723.678	6038091.82	Within disturbance area. Access via Mine Trail. Sampling point located upstream of overbridge. Channel banks covered with rip rap and geofabric. Area starting to be colonised with weeds, particularly St John's Wort. Fast flowing, gravel bed channel, clear.	

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4.4 Safety

Safe Work Method Statement (SWMS) will be prepared and implemented during sampling including travel to and from sampling locations.

4.5 Site access

Prior to surface water monitoring events, notice will be provided to Snowy Hydro Limited where it is necessary to access land involved in the Snowy 2.0 Main Works.

4.6 Field and laboratory analysis

Surface water monitoring will include:

- Field parameters – A YSI ProDSS (digital sampling system) water quality multiparameter instrument (or similar) for the measurement of several critical parameters including pH, turbidity, temperature, dissolved oxygen (% and mg/L), oxidation reduction potential, electrical conductivity and GPS coordinates.
- Visual observation – Oil and grease (i.e., hydrocarbon sheen).
- Laboratory analysis – Dissolved metals (aluminium, arsenic, cadmium, chromium, copper, lead, mercury, nickel, zinc, iron, silver and manganese), total phosphorus, total nitrogen, total suspended solids (TSS), total dissolved solids (TDS) and cyanide at a NATA accredited laboratory. In the instance that oil, petrol or grease sheens are identified on the surface of water body, water samples will also be analysed for total recoverable hydrocarbons (TRH) and BTEXN (Benzene, toluene, ethylbenzene, xylene, naphthalene).
- Field observations – weather and rainfall (prior to and at the time of the sampling event), surrounding influencing factors/ e.g. land use activities, events, incidents.

4.7 Sampling methodology

NGH will undertake monthly sampling at the locations identified in Figure 4-1. Event sampling will be undertaken over two days. The methodology will include:

- Monitoring personnel will wear a new pair of nitrile disposable gloves for each sampling location.
- Surface water samples will be collected using a grab sample technique. Samples will be collected into unpreserved laboratory containers with the use of a telescopic sampling pole or by hand. The sample will be collected 100 to 500 mm below the surface of the water. The collected water is then decanted into preserved containers (as required by the laboratory).
- Record all visual observations including taking a photographic record of water bodies and surrounds to assist in the justification of anomalous data. Photos will be taken immediately adjacent to the sampling point framing upstream, cross stream, downstream and close up of the sample point.
- Record coordinates from the hand-held GPS.
- Sample containers will be labelled appropriately, and sample details recorded onto the chain of custody documentation. All required details will be entered onto the laboratory chain of

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custody documentation. Samples will be immediately placed into an esky cooled with ice bricks. The esky will be packed to minimise the likelihood of samples being damaged during transit.

- Reusable sampling equipment is decontaminated between sampling locations by rinsing the equipment and sampling bottle with the stream water at the subsequent location.
- Field analysis is undertaken by placing the water quality multi-probe directly into the water and allowing for the parameters to stabilise before taking a recording. We would use a YSI ProDSS (digital sampling system) water quality multiparameter instrument (or similar) for the measurement of several critical parameters. The water quality meter will be calibrated prior to use and calibration certificates stored electronically and provided with the monthly report.
- Prior to laboratory dispatch the esky will be sealed and the chain of custody double checked. Samples will be dispatched to the laboratory as soon as practicable following sampling.

4.7.1 Quality Assurance / Quality Control

The following QA/QC program will be completed for this Project:

- **Sampling Team:** All field work will be conducted by appropriately trained NGH environmental scientists in accordance with the standard QA/QC operating procedures.
- **Equipment Calibration:** The WQM will be calibrated pre and post fieldwork; calibration reports will be supplied in the Appendix of each report.
- **Chain of Custody:** All samples will be logged and transferred under appropriately completed Chain of Custody forms.
- **Preservation:** All samples will be collected in the appropriate preserved containers supplied by the laboratory and transported on ice bricks in eskies.
- **Decontamination:** Reusable equipment will be decontaminated between each sampling location by rinsing the equipment and sampling bottle with the stream water at the subsequent location.
- For water quality samples collected for laboratory analysis, QA/QC will include a container blank and the collection of one field blank and one field duplicate per sampling event (DES 2018).

4.8 Data analysis and reporting

4.8.1 Monthly report

Field and lab monitoring results will be analysed and compared against the water quality criteria. The results and discussion will be compiled into a brief report and accompanying data table following the receipt of results from the laboratory after each sampling event. Results that exceed the relevant criteria in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC 2000 and ANZG 2018) will be identified and highlighted. A summary of local weather conditions during the relevant month and field records will also be provided.

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4.8.2 Final report

At completion of the pre-construction surface water quality monitoring, the results of the 18 months of baseline data will be compiled into a brief report including an assessment against the criteria and discussion of results. This report will be appended to the SWMP and provided to NSW EPA, BCD, DPE and NPWS. The report will also include a summary of weather conditions and field records.

5. Roles and responsibilities

The Environmental Advisor is responsible for the monitoring including:

- Reviewing the SWMS and ensuring all risks have been assessed and controls implemented.
- Training staff in accordance with this baseline surface water monitoring plan.
- Ensure all required data is collected in accordance with this baseline surface water monitoring plan.
- Reviewing data, monthly reports and final reports.
- Coordinate logistics and timing to ensure the program is adhered to.

Field staff are responsible for:

- Reviewing the SWMS and ensuring all risks have been assessed and controls implemented
- Collecting data and undertaking sampling in accordance with this surface water monitoring plan
- Maintenance and calibration of sampling equipment
- Analysing data, monthly reports and final reports.

5.1 Training

Training will be conducted to ensure the objectives of this baseline surface water monitoring plan are achieved.

All staff that perform monitoring and sample collection will be appropriately trained in the technical and administrative aspects of sample collection, equipment calibration and use, field reporting requirements and all WH&S aspects of the work.

6. References

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Appendix A NSW EPA Consultation Records

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Soil and Water Management Plan

APPENDIX G: Water Take Register

Date	Time	Vehicle registration	Location	Controls in place (Y/N)	Amount taken (L)	Comments

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Soil and Water Management Plan

Appendix H: Contaminated Land Management Plan

Contaminated Land Management Plan

Snowy 2.0 Transmission Connection Project

Stage 1 Document Number: 3200-0645-PLN-029-CEMP-CLMP

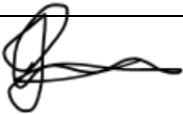
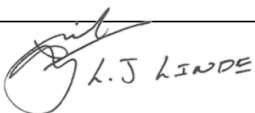
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TransGrid
Date 01/11/2024

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Contaminated Land Management Plan

Document Control

Approvals

Title	Snowy 2.0 Transmission Connection Project – Contaminated Land Management Plan
Approved on behalf of Transgrid (Snowy 2.0 TCP) by	Andrew Buttigieg
Signed	
Dated	22/11/2024
Approved on behalf of Transgrid HumeLink by	Jeremy Roberts
Signed	
Dated	05 Nov 2024
Approved on behalf of UGL by	Louis Linde
Signed	
Dated	20/11/2024
Approved on behalf of HLWJV by	Tim Burns
Signed	
Dated	04 Nov 2024

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Version Control

Revision	Date	Description	Author	Reviewer	Approver
0.01	29/09/2022	Initial issue for review	Whitney Heiniger	Kim Lembke	Trevor Noble
0.02	9/11/2022	Required plan review	Jane Love	Kim Lembke	Trevor Noble
0.03	15/12/2022	Transgrid comments	Jane Love	Kim Lembke	Trevor Noble
0.04	12/05/2023	Stakeholder comments	Whitney Heiniger	Kim Lembke	Trevor Noble
0.05	17/05/2023	Transgrid comments	Whitney Heiniger	Kim Lembke	Trevor Noble
0.06	08/09/2023	Required plan review	Whitney Heiniger	Kim Lembke	Tim McCarthy
0.07	30/10/2023	Stakeholder comments	Jane Love	Kim Lembke	Tim McCarthy
0.08	01/11/2023	NPWS comments	Jane Love	Kim Lembke	Tim McCarthy
0.09	5/08/2024	Update to include Stage 2	Nicholas Mok	Ian Irwin	Louis Linde / Tim Burns

Distribution of controlled copies

This Environmental Management Plan is available to all personnel and sub-contractors via the Project document control management system.

The document is uncontrolled when printed. One controlled hard copy of the CEMP and supporting documentation will be maintained by the Quality Manager at the Project office (and relevant documentation is available on the Snowy 2.0 TCP website [Snowy 2.0 Transmission Connection | Transgrid](#)).

Copy number	Issued to	Version

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Acronyms and Abbreviations

Abbreviation	Explanation
CEMP	Construction Environmental Management Plan
CLMP	Contaminated Land Management Plan
CM	Construction Managers
CSSI	Critical State Significant Infrastructure
EIS	Environmental Impact Statement
EMS	Environmental Management System
EP&A Act	Environmental Planning and Assessment Act 1979
EPA	Environment Protection Authority
EPL	Environmental Protection Licence
ESCP	Erosion and Sediment Control Plans
EWMS	Environmental Work Method Statement
FCNSW	Forestry Corporation of NSW
HSE	Health Safety and Environment
HSMP	Health Safety Management Plan
LGA	Local Government Area
KNP	Kosciuszko National Park
kV	Kilovolts
m	Metres
MPPS	Minister for Planning and Public Spaces
MW	Megawatts
MWh	Megawatt hours
NAF	Non-acid forming
NEM	National Electricity Market

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Abbreviation	Explanation
NOA	Naturally Occurring Asbestos
NOAMP	Naturally Occurring Asbestos Management Plan
PAF	Potentially acid forming
PC	Principal Contractor as defined in the Soil and Water Management Plan
PPE	Personal Protective Equipment
Proponent, the	NSW Electricity Networks Operations Pty Ltd as a trustee for NSW Electricity Operations Trust (Transgrid)
SWMP	Soil and Water Management Plan
SWMS	Safe Work Method Statement
TG	Transgrid
UGLMS	UGL Management System

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1 Introduction

1.1 Context

To connect Snowy 2.0 to the National Energy Market (NEM), a new transmission connection is required. NSW Electricity Networks Operations Pty Ltd as a trustee for NSW Electricity Operations Trust (known as Transgrid and the Proponent) received development approval on 2 September 2022 construct a 500kiloVolt (kV) substation and 330kV switching station (Maragle Substation) and overhead transmission lines ('the Project') to facilitate the connection of Snowy 2.0 to the existing electrical transmission network, approximately 27 kilometres (km) east of Tumbarumba, New South Wales (NSW).

This Contaminated Land Management Plan (CLMP) describes how unexpected contaminated land, naturally occurring asbestos (NOA), and waste will be managed by the Principal Contractors (PC) during transmission line construction. The CLMP describes anticipated hazards during contaminated land and waste management and mitigation measures to identify and manage potential impacts that may occur during Project works.

1.2 Environmental Management System

The overall Environmental Management System (EMS) for the Project is described in the Construction Environmental Management Plan (CEMP). This Contaminated Land Management Plan (CLMP) forms part of the CEMP for the Project and is to be read in conjunction with the overarching CEMP. It is applicable to all staff, contractors and sub-contractors associated with the construction of the Project.

The UGL Management System (UGLMS) incorporates the following for the management of contaminated land and waste on the Project:

- UGLMS-131-807 Contractor HSEQ Handbook
- UGLMS-131-547 Spill Response and Remediation Procedure
- UGLMS-131-376 Asbestos and SMF Management Procedure
- UGLMS-131-362 Respiratory Protective Equipment Procedure
- UGLMS-131-387 Waste Management Procedure
- UGLMS-4-1730 Environmental Inspection Checklist
- UGLMS-4-1549 Environmental Inspection Weekly Checklist
- UGLMS-4-1750 Asbestos Removal Checklist
- UGLMS-4-2138 Site Environmental Plan Template
- UGLMS-4-1617 Soil Test Inspection Checklist.

These documents will support the implementation of the CLMP.

1.3 Purpose and objectives

The purpose of this CLMP is to provide a consistent and transparent process for the management of areas of known or potential contamination and Naturally Occurring Asbestos (NOA) sites to ensure the Project team design and undertake construction activities to avoid or mitigate disturbance of contamination and NOA. This plan also outlines management of waste during construction.

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This CLMP applies specifically to proposed activities carried out within the Project area.

This Plan outlines the minimum requirements to protect people, so far as reasonably practicable, from potential hazards associated with exposure to contamination and fibrous minerals. Specific minimum health and safety requirements relating to construction works within the works area are outlined in this Plan. This Plan complies with NSW and Australian legislative and Company requirements.

Investigations have been carried out to ensure that all hazards related to fibrous minerals have been identified and risk assessed, and that adequate management controls have been identified for implementation.

If a construction area is determined to be potential for contamination, a risk assessment will be conducted, required additional controls will be documented in an area specific Safe Work Method Statement (SWMS) and controls will be implemented by the Construction Manager/s.

Where asbestiform minerals are encountered, airborne asbestos fibres may appear as a contaminant in the dust produced from construction activities. The potential effect on health from any low-level exposure to asbestos requires that approved procedures are implemented to ensure that exposures are kept low wherever asbestiform minerals are encountered.

This plan will be considered to be a live document that is amended considering the learning experienced during its implementation. Further information about the nature of works to be completed and details on the Project can be found in the overarching CEMP.

1.4 Consultation

Agency consultation during development of the CLMP has been undertaken in accordance with consultation requirements for the Project Soil and Water Management Plan (SWMP) due to the addition of the CLMP as a SWMP appendix. The CLMP was provided by Transgrid to the National Parks and Wildlife Service (NPWS), Forestry Corporation of NSW (FCNSW), NSW Environment Protection Authority (NSW EPA), Department of Planning and Environment Water (DPE Water) and Department of Primary Industries (DPI) on 13 October 2022. Consultation records for the overarching SWMP and all appendices including the CLMP is provided in Section 1.5 of the SWMP. This plan has been developed in accordance with all relevant guideline documents listed in Section 2.1.2.

2 Environmental Assurance

2.1 Relevant Legislation and guidelines

2.1.1 Legislation

Legislation relevant to this Plan includes:

- Protection of the Environment Operations Act 1997
- Protection of the Environment Operations (Waste) Regulation 2014
- Contaminated Land Management Act 1997 (the CLM Act)
- Waste Avoidance and Resource Recovery Act 2001
- Environmentally Hazardous Chemicals Act 1985
- Environmental Planning and Assessment Act 1979 (EP&A Act)
- Environmental Planning and Assessment Regulation 2021
- Work Health and Safety Act 2011
- NSW Work Health and Safety Regulation 2017
- NSW Work Health and Safety Act 2011.

Relevant provisions of the above legislation are explained in the register of legal and other requirements included in Appendix C of the CEMP.

2.1.2 Guidelines

The main guidelines, specifications, and policy documents relevant to this Plan include:

- Managing Land Contamination Planning Guidelines SEPP 55 – Remediation of Land (Department of Urban Affairs and Planning and EPA, 1998)
- Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites (OEH, 2011a)
- Contaminated Sites: Guidelines on the Duty to Report Contamination under the Contaminated Land Management Act 1997 (EPA, 2015a)
- National Environment Protection (Assessment of Site Contamination) Measure 1999, 2013 amendment (the site contamination NEPM)
- NSW EPA (2015) Guidelines on the Duty to Report Contamination under the *Contaminated Land Management Act 1997*
- NSW EPA Waste Classification Guidelines 2014
- NSW Waste Avoidance and Resource Recovery Strategy 2014 – 21
- DEC (2007) Guidelines for the Assessment and Management of Groundwater Contamination
- NSW EPA (1995) Sampling Design Guidelines
- NEPC (2013) Schedule B (1) Guideline on Investigation Levels for Soil and Groundwater

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- NEPC (2013) Schedule B (2) Guideline on Site Characterisation
- OEH (2011) Guidelines for Consultants Reporting on Contaminated Sites
- NSW EPA (2017) Guidelines for the NSW Site Auditor Scheme 3rd Edition
- Forestry Corporation of NSW Asbestos Management Procedure Version 3.0 - WHSP 2021-4.4 (23/04/2021).

2.2 Permits and licences

No permits or licences are currently required regarding contaminated land, however an internal PC Spoil Movement and Placement Permit (Appendix A of the Spoil Management Plan [SWMP Appendix A]) will be used for all spoil movement undertaken as part of Project works. Further details regarding permits and licences are provided in Appendix C of the CEMP.

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2.3 Project Conditions of consent

The Conditions of Approval and mitigation measures relevant to this Plan are listed in Table 2-1 below. A cross reference is also included to indicate where the requirement is addressed in this Plan or other Project management documents.

Table 2-1 Project conditions of consent relevant to the CLMP

Reference number	Requirement	Document Reference
Conditions of Approval		
B8	Prior to the commencement of construction, the Proponent must prepare a Spoil Management Plan to the satisfaction of the Planning Secretary for the development. This plan must: a) Be prepared by a suitably qualified and experienced person in consultation with the NPWS, FCNSW, EPA, Water Group, NRAR and DPI; b) Include a description of the measures that would be implemented to: (i) minimise the spoil generated by the development; (ii) maximise the reuse of non-reactive spoil on site and in other parts of the Kosciuszko National Park, Bago State Forest and/or offsite; (iii) minimise the water quality impacts of the temporary spoil stockpiles; c) Provide an overarching framework for the management of all spoil generated on site, including the testing, classification, handling, temporary storage, chain of custody and disposal of spoil – that complies with the spoil management requirements in condition B7 above; d) Include a detailed plan for managing the temporary spoil stockpiles of the development, which includes suitable triggers for remedial measures (if necessary) and describes the contingency measures that would be implemented to address any water quality risks; e) Investigating, assessing and managing contaminated land and soils in the development area; f) Investigation, assessing and managing the potential for naturally occurring asbestos, potentially acid forming material and other hazardous materials in the development area; g) Include a detailed plan for managing and the disposal of all the reactive or contaminated spoil generated on site, including the contingency measures that would be implemented if the volumes of this spoil are greater than expected and unsuitable for land disposal; h) Include a program to monitor and publicly report on: (i) the management of spoil on site;	Spoil Management Plan Investigating, assessing and managing contaminated land and soils, naturally occurring asbestos, potentially acid forming material and other hazardous materials are addressed in this Plan (Section 5). A detailed plan for managing and the disposal of all the reactive or contaminated spoil generated on site is addressed in this Plan (Section 5).

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Reference number	Requirement	Document Reference
	(ii) progress against the detailed completion criteria and performance indicators. Following the Planning Secretary's approval, the Proponent must implement the approved Spoil Management Plan.	
B43	Excluding the spoil generated by the development from within KNP, waste generated during construction, operation, upgrading and decommissioning must be dealt with in accordance with the following priorities: a) Waste generation must be avoided and where avoidance is not reasonably practicable, waste generation must be reduced; b) Where avoiding or reducing waste is not possible, waste must be re-used, recycled, or recovered; and c) Where re-using, recycling or recovering waste is not possible, waste must be treated or disposed of.	Appendix B – Waste Management Strategy
B44	The importation of waste and storage, treatment, processing, reprocessing or disposal of such waste must comply with the Protection of the Environment Operations Act 1997, the Protection of the Environment Operations (Waste) Regulation 2014, and orders or exemptions under the regulation.	Appendix B – Waste Management Strategy
B45	Waste must only be exported to a site licensed by the EPA for the storage, treatment, processing, reprocessing or disposal of the subject waste, or in accordance with a Resource Recovery Exemption or Order issued under the Protection of the Environment Operations (Waste) Regulation 2014, or to any other place that can lawfully accept such waste.	Appendix B – Waste Management Strategy
B46	All waste that is removed from site must be classified in accordance with the EPA's Waste Classification Guidelines, with appropriate records and disposal dockets retained for audit purposes.	Appendix B – Waste Management Strategy
Mitigation measures		
L1	Targeted geological investigations will be undertaken in areas of surface disturbance using a risk-based approach. Results from these investigations will determine the level of management to be implemented for soils and contamination (including NOA).	Section 5.1
L2	A Contaminated Land Management Plan (CLMP) will be prepared prior to construction works commencing. It will include management measures to:	This plan

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Reference number	Requirement	Document Reference
	- Manage areas of known or potential contamination that will be impacted during construction. - Manage unexpected finds if unexpected contamination sources are identified (including NOA). This will include guidance on identifying potential contaminated land characteristics (visual, odours, etc), steps to cease works in the affected area, further investigation to assess the extent, magnitude and type of contaminants and appropriate remedial actions.	Section 5 Appendix A – Unexpected Finds Procedure for contaminated soils
L3	- Further assessment will be carried out during the geotechnical investigation for the Project to verify the presence/absence of NOA within the NOA risk zones. Should NOA be detected, an NOA management plan will be prepared and implemented to guide the handling, transport, and disposal of the material. - NOA awareness training will be provided to all staff and contractors working in areas with NOA risk. - If asbestiform and/or indicator minerals and/or textures are encountered or suspected during excavation works, work is to stop in the area and management be alerted. The area will be isolated with a 10-metre exclusion zone and sign posted, access will be restricted, and specialist geological and occupational hygiene advice will be sought prior to further progressing work in that area.	Section 5 (Geotech) Section 6.2 Appendix A – Unexpected Finds Procedure for contaminated soils
WR1	Further consultation with local waste facilities will be carried out during detailed design to further determine potential disposal locations.	Transgrid
WR2	A construction waste management plan (CWMP) will be prepared for the project and outline appropriate management procedures. It will include, but not be limited to: - Identification of the waste types and volumes that are likely to be generated by the project - Adherence to the waste minimisation hierarchy principles of avoid/reduce/ reuse/recycle/dispose - Waste management procedures to manage the handling and disposal of waste, including vegetation, spoil, unsuitable material or unexpected waste volumes - Identification of reporting requirements and procedures for tracking of waste types and quantities - A resource management strategy detailing the process to identify reuse options for surplus materials.	Appendix B – Waste Management Strategy Spoil Management Plan (SWMP Appendix A)
WR3	Excess spoil generated in project area east will be transported by truck to Lobs Hole where it will be managed and disposed of by Snowy Hydro (in accordance with the methods described in the Snowy 2.0 Major Works EIS and any conditions of their approval).	Spoil Management Plan (SWMP Appendix A)

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Reference number	Requirement	Document Reference
WR4	All waste, including surplus soils, which cannot be reused will be classified in accordance with the Waste Classification Guidelines (EPA, 2014), removed from the site and disposed of at a facility that can lawfully accept the waste in accordance with the POEO Act and POEO Waste Regulation.	Appendix B – Waste Management Strategy
WR5	Operational waste will be managed in accordance with Transgrid waste management procedures and associated work instructions.	Transgrid

Note: Mitigation Measures taken from the Amendment Report, Snowy 2.0 Transmission Connection Project (December 2021)

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3 Existing Environment

3.1 Contaminated Land Register

A search of the NSW Environment Protection Authority (EPA) contaminated sites register for the Snowy Valleys LGA in November 2022 identified the following sites:

- T3 spoil dump and adjoining river sediments
- Old Town Landfill
- Former grit blasting site,

All of these sites are located in Talbingo, approximately 20 km north of the Project area.

A search of the public contaminated land record of notices and Environmental Protection Licences (EPLs) databases was also undertaken in November 2022. Two EPLs were identified within the greater Snowy 2.0 Project area, for electricity generation of the Snowy Scheme (EPL 10515) and the Snowy 2.0 Exploratory Works (EPL 21266).

3.2 Lobs Hole Ravine

Lobs Hole is the main area of potential contamination concern, due to its previous use as a copper mine and existing areas of identified metal contamination primarily associated with historical stockpiles. Copper mining was undertaken in the eastern portion of Lobs Hole for over a 42-year period between 1874 and 1916. The Lobs Hole mine is also identified as a geo-heritage site in the KNP Geodiversity Action Plan (OEH 2012).

There is potential to encounter localised areas of contamination associated with historical land uses of the former Lobs Hole Copper Mine in Project area east. Exposure to these contaminants may present a risk to human health during construction through inhalation and/or direct contact, or impacts to the environment due to contamination, if not managed appropriately.

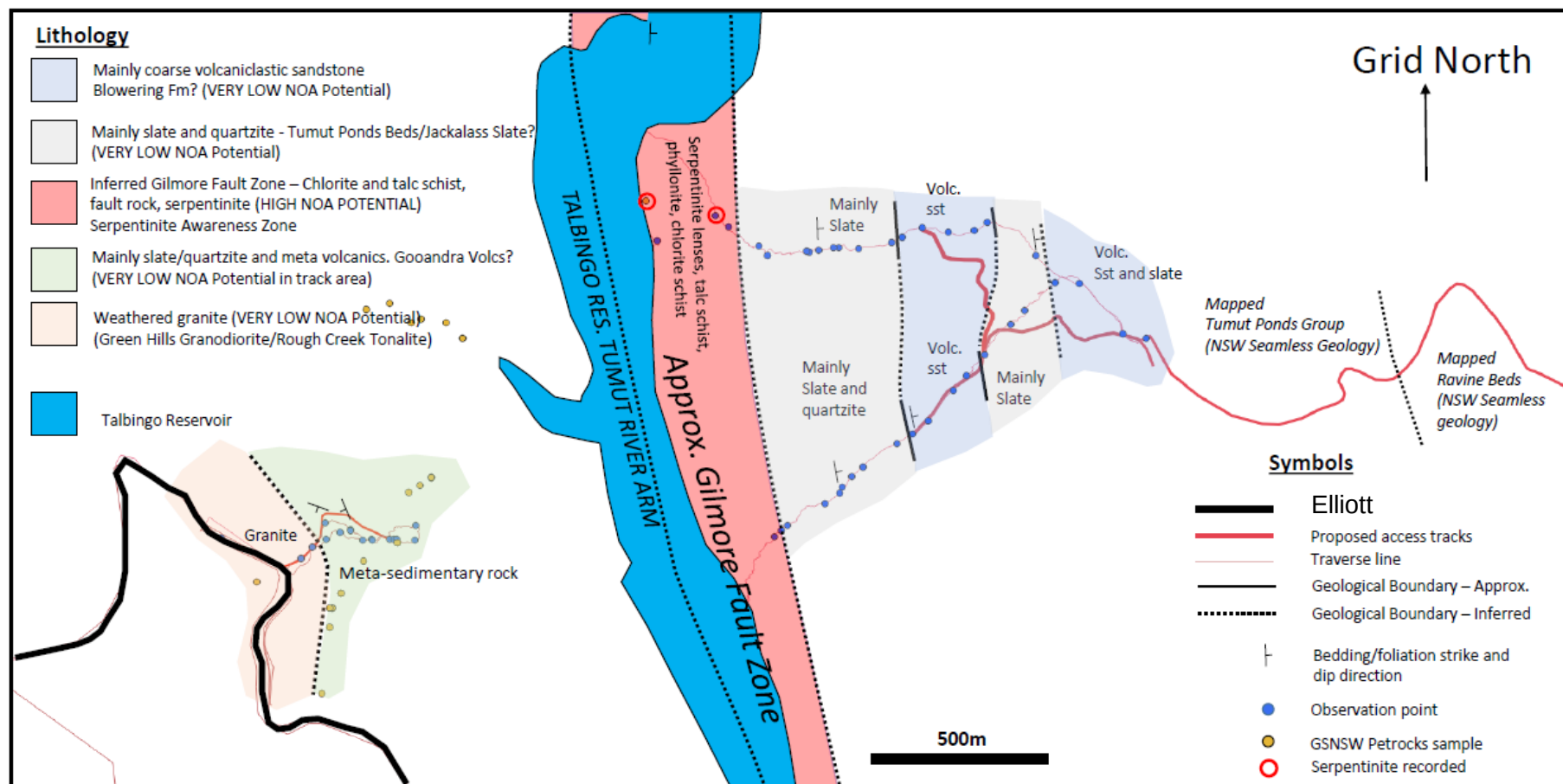
3.3 Naturally Occurring Asbestos

NOA mapping for the region (NSW Trade & Investment, Division of Resources and Energy, 2015) indicates there is a risk of encountering NOA around Sheep Station Ridge in geology associated with the Gilmore Fault Zone, Gooandra Volcanics and the Tumut Ponds Group, refer to Figure 3-1.

Marc Hendrickx and Associates Pty Ltd (2020) were engaged by Transgrid to assess the potential for NOA within the Project area. Based on the assessment and observed geology of the Project area these areas mapped on Figure 3-1 as having a potential risk of NOA have been re-classed with a very low potential to contain NOA. Assessment of NOA will be carried out in accordance with Section 5.4 of the Spoil Management Plan.

While the risk of encountering asbestiform mineral is low/unlikely, works which would intersect or excavate these potential asbestos occurring areas and formations will require specific management strategies.

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Revised geology interpretation and NOA potential assessment over area of proposed new transmission line. The proposed tracks and towers are in areas assessed to have VERY LOW NOA potential.

Figure 3-1 Naturally Occurring Asbestos Risk Zones (Marc Hendrickx 2020)

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4 Environmental aspects and impacts

4.1 Construction activities

An environmental aspect is an element of an organisation's activities, products, or services that has or may have an impact on the environment (ISO 14001 Environmental management systems). The relationship of aspects and impacts is one of cause and effect.

Key aspects or construction activities of the Project that could result in contamination impacts are identified in Table 4-1. The extent of these impacts will depend on the nature, extent, and magnitude of construction activities and their interaction with the natural environment (Column 2). This is further exacerbated by environmental factors (Column 3).

The EIS determined in Section 7.5 that the key impacts relevant to land include erosion and sedimentation from earthworks, and contamination risks associated with Naturally Occurring Asbestos (NOA) and historical land uses at Lobs Hole which may be encountered during earthworks. The NOA risk and impacts from earthworks will be managed with the implementation of mitigation measures during construction.

Table 4-1 Project aspects and impacts relevant to land contamination

Environmental Activities	Environmental Impacts	Environmental Factors (Conditions)
- Topsoil stripping - Minor earthworks (tower pad benching works) - Major earthworks (Maragle Substation cut to fill works) - Soil/spoil movement and transfer - Rock emplacement - Drilling and piling - Storage and use of fuels, oils and other hazardous substances - Access track development	- Spreading existing contaminated materials into soil, surface water and ground water - Construction activities resulting in the creation of additional areas of contamination - Release spoil, acid leachate etc. potential acid-forming substances - Releasing immobile metals from sediments	- Increased concentrations of contamination have increased impact potential. - Soil/spoil movement through wind and rain erosion processes. - Extent of vegetation cover vegetation assists in stabilising soils and reduces the ability for erosion and spread of soils and contamination.

4.2 Impacts

During construction there will be potential for construction activities to result in contamination of soil and/or water due to leaks and spills of potentially contaminating materials which would pollute the local environment including waterways and impact the land capability if not appropriately managed. NOA has the potential to impact upon human health if exposed, as NOA presents the same health risks as asbestos contained in building products and other asbestos-containing materials (ACM). Management of chemicals, hazardous substances and spills are addressed in the Soil and Water Management Plan (SWMP). Management of air quality is also addressed in the SWMP.

There is potential to encounter localised areas of contamination associated with historical land uses including the former Lobs Hole Copper Mine in Project area east. Exposure to these contaminants may present a risk to human health during construction through inhalation and/or direct contact, or impacts to the environment due to contamination, if not managed appropriately.

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While the risk of encountering NOA has been determined to be very low by Marc Hendrickx and Associates Pty Ltd (2020), there is potential that NOA may be within the disturbance area at locations associated with the Gooandra Volcanics Tumut Ponds Group geological units (refer to Figure 3-1) and may present a risk to human health during construction.

Further assessment will be carried out during the geotechnical investigation for the Project to verify the presence/absence of NOA within the NOA risk zones. Should NOA be detected, this CLMP will be implemented to guide the handling, transport, and disposal of the material.

Refer also to the Aspects and Impacts Register included in Appendix F of the CEMP.

5 Environmental Mitigation and management measures

5.1 Further geotechnical surveys

Targeted geotechnical investigations will be undertaken in areas of surface disturbance using a risk-based approach. NOA testing will only be undertaken in areas identified as having risk of NOA presence. In areas identified in the published geological mapping by the Geological Survey of NSW as having a **low to high** potential to contain NOA the following additional investigations, assessments and testing will be undertaken prior to disturbance (including clearing unless leaving stumps in situ) of virgin natural material within the identified area:

- Visual site inspection where accessible
- Sampling and laboratory testing to confirm the presence of asbestos to the maximum depth of excavation of virgin material
- The above may be undertaken progressively depending on depth of excavation required
- Should NOA be confirmed through laboratory testing a site-specific AMP complying with Clause 432 of the Work Health and Safety Regulations 2017 will be developed and included as part of the work health and safety management plan

The Work Health and Safety Asbestos Management Plan will consider the following:

- Worker awareness training
- Access to the worksite will be controlled
- Continuous air monitoring conducted
- Hygiene protocols will be implemented
- Appropriate PPE will be worn and suitable filters fitted to plant
- Appropriate material management processes will be in place
- Materials will be managed so as to minimise dust generation.

Geotechnical investigations for NOA will be undertaken by a suitably qualified and experienced person in accordance with guidelines made or approved under the *Work Health and Safety Act 2011* and Workplace Health and Safety Regulations 2017.

Results from these investigations will determine the level of management to be implemented for soils and contamination (including NOA).

5.2 Minimum requirements for NOA

This section provides further clarification regarding minimum requirements for working in 'potentially fibrous' or 'fibrous' areas outlined in Figure 3-1. If NOA is discovered during works, an Asbestos Management Plan (AMP) will be developed and implemented.

No NOA will be relocated until an AMP is in place and risks are controlled. The following controls are only provided for testing and investigation works.

5.2.1 Personal Protective Equipment (PPE)

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Those entering 'potentially fibrous' or 'fibrous' areas must carry a P2 disposable mask or Powered Air Purifying Respirator and must be clean shaven if using a negative pressure disposable or re-usable respirator.

5.2.2 Signage and Demarcation Requirements

'Potentially fibrous' and 'fibrous' areas must be sign posted and demarcated in accordance with the UGL procedure. These areas must also be captured on relevant Site Environmental Plans.

5.2.3 Dust Management

Dust suppression will be used to minimise dust generation as required based on risk assessment and considering the activity and conditions. Dust suppression will include the watering the area down in response to generated dust being observed.

5.3 Controls During Construction Works for NOA

5.3.1 Fibrous Area Controls

This section outlines the potential controls required in addition to the minimum requirements when working in 'potentially fibrous' or 'fibrous' areas. Site procedures will be developed by the Site HSE Manager as required to document specific exposure prevention measures, area management and cleaning/decontamination requirements, and disposal of contaminated material and items.

5.3.2 Potentially Fibrous Area

When working in a "Potentially Fibrous Area", the following controls are required in addition to the minimum PPE requirements:

- Respiratory protection (minimum P2 filter half face respirator) must be worn if working in dusty conditions and not in a pressurised cab (i.e., on foot)
 - Respirator wearer must be clean shaven in the area of the seal.
 - Half face non-disposable particulate respirator with cartridge is preferred but it must be decontaminated after each use.
- Upon exit from a pressurised cab: Personnel must check person, clothing, and boots for the presence of fibrous material. If required, remove material from or change clothing and remove dirt from boots
- Personnel must check equipment (e.g., truck, drill, auxiliary equipment) for the presence of potential fibrous material, particularly any build-up or hang up of material that may contain NOA fibres
- If required equipment must be washed before exiting the 'potentially fibrous area'

Note: If potential fibrous material is suspected, the area supervisor must be notified.

The level of cleaning required will be determined by the Construction Manager based on a risk assessment of the type of work conducted, and potential level of exposure including:

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- Provision for vacuuming clothing and facilities for disposing of items such as vacuum collection bags and filters and used masks (in compliant bags). Laundering facilities will also need to be made available
- Procedures and facilities for disposal of potentially contaminated items.

The Construction Manager shall require further measures specified in NSW legislation depending on the extent of contamination including:

- Vehicle washdown area with a lined sump for collecting potentially contaminated water from vehicles and procedures for disposal of sump contents.

Vehicle washdown for weeds and pathogens is addressed in the Biodiversity Management Plan (BMP).

5.3.3 Fibrous Area

When working in a “Fibrous Area” the following controls are required in addition to the minimum PPE requirements:

- Respiratory protection (minimum P2 filter half face respirator) must be worn when not in a pressurised cab. If deemed necessary based on risk assessment, disposable overalls can be worn within a ‘fibrous’ area
- Upon exit from a pressurised cab: Personnel must check person, clothing, and boots for the presence of fibrous material. If required remove material using a compliant (AS/NZS 60335.2.69:2003) vacuum cleaner or change clothing, and remove dirt from boots
- Personnel must check equipment (e.g., truck, drill, auxiliary equipment) for the presence of fibrous material, particularly any build-up or hang up of fibrous material
- If required equipment must be washed before exiting the ‘potentially fibrous area’
- The Project will install personnel and vehicle/equipment cleaning/decontamination facilities at the defined and signed exit point of a “Fibrous Area”.

The level of cleaning required will be determined by the Construction Manager based on a risk assessment addressing level of fibres detected, preventative measures in place e.g., disposable overalls and boot covers, type of work conducted, and potential level of exposure. The Construction Manager shall require measures up to and including decontamination measures specifically:

- Personnel cleaning facility with provision for vacuuming clothing and washing/showering
- Vehicle washdown area with a lined sump for collecting potentially contaminated water from vehicles, and from the cleaning facility
- Procedures for disposal of sump contents, items such as vacuum collection bags and filters, and disposable PPE (including coveralls, gloves, safety footwear, shoe covers, gloves, and protective eyewear) in compliant asbestos waste bags for appropriate disposal. Seal all asbestos waste bags using duct tape and the double bag method.
- Construction of an approved asbestos waste area located so that it will not be disturbed during subsequent rehabilitation, for disposal of contaminated items and other site waste such as slurry pit content

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- Transport of asbestos waste material to the designated waste disposal area and management of the area will be conducted to prevent liberation of fibres to atmosphere

5.3.4 Fibrous Material Waste Disposal

Waste rock containing fibrous material must be placed in the identified approved waste disposal area and encapsulated to prevent fibrous material from becoming airborne. Refer to Appendix B – Waste Management Strategy Table B-1 and Section 5.2 for NOA management.

Procedures will be developed for preventing liberation of fibres to atmosphere during transport and placement e.g., haul trucks must be loaded to minimise spillage and load covered, dust suppression measures during placement of contaminated material.

Contaminated material will be encapsulated with at least one metre of clean waste material in a manner which prevents unplanned disturbance and eliminates future risk. .

Fibrous waste encapsulation must be sign posted (and located as far as reasonably practicable from buildings and areas personnel may work). The locations and quantities of fibrous waste containment must be recorded on-site for reporting purposes and provided to the relevant stakeholder.

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Table 5-1 Contaminated land management measures

ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Source document
General					
CL01	Training will be provided to all Project personnel, including relevant sub-contractors on contaminated land management practices, and naturally occurring asbestos including the unexpected finds procedure and the requirements from this plan through inductions, toolboxes, and targeted training.	Induction package Toolbox training material Targeted training material	Pre-construction and construction	Construction Manager Site Environmental Advisor (SEA)	Best practice Amendment Report L3
CL02	Relevant contaminated land management and naturally occurring asbestos measures from this plan will be included in site environmental documents including for example, Environmental Work Method Statements (EWMS) and/or Site Environmental Plans (SEPs).	CEMP	Pre-construction and construction	SEA	Best practice
Procedures and plans					
CL03	In the event of unexpected contamination including asbestos, whether from known or unexpected sources, work within the areas will cease until a contamination assessment is prepared to advise the need for further investigation or a specific management/remediation strategy where appropriate. The investigation will determine the extent, magnitude, and type of contaminants. The unexpected finds procedure included within Appendix A – Unexpected Finds Procedure for	Refer to Unexpected Finds Protocol Appendix A – Unexpected Finds Procedure for contaminated soils of this CLMP.	Construction	Construction Manager Senior Environmental Advisor	Amendment Report L2

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ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Source document
	contaminated soils of this CLMP will be followed in these circumstances. Works in the vicinity will be stopped or modified and will not recommence until the material has been analysed and management measures developed to address disposal or remediation of the contaminated waste.				
CL04	Any erosion and sediment control measures required for the area/s of contamination and / or unexpected finds will be installed and maintained in accordance with the SWMP.	SWMP ESCPs	Construction	SEA	Amendment Report L2
CL05	Spills and emergency response will be managed in accordance with the spill response procedure included in Appendix B of the SWMP.	SWMP	Construction	Site Supervisor SEA	Amendment Report L2
Contaminated land management					
CL06	Demarcation will be placed around or adjacent to contaminated sites (NOA areas at Lobs Hole) located directly beside the Project disturbance areas. Refer to Figure 3-1.	SEP	Construction	Site Supervisor SEA	Amendment Report L2
CL07	Transgrid and NPWS will be promptly notified of the discovery of any suspected or potential contamination exposed during construction activities.	Unexpected Finds Protocol Appendix A – Unexpected Finds Procedure for contaminated soils of this CLMP.	Construction	Construction Manager SEA	Amendment Report L2

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ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Source document
CL08	Site staff and workers will be made aware of likely indicators for contamination such as discoloration or staining of soils, visible signs of plant stress, presence of drums or other waste material, stockpiles or fill material, and odours.	Induction package Toolbox training material Targeted training material	Construction	SEA	Amendment Report L2
CL09	Contamination investigation will be undertaken by a suitably qualified and experienced person in accordance with guidelines made or approved under the <i>Contaminated Land Management Act 1997</i> .	Personnel	Construction	Construction Manager SEA	Requirement
CL10	Prior to the disturbance of contaminated soils diversion drains or bunds will be installed to divert clean surface water around the site and limit the amount of surface water entering the contaminated area.	SEPs ESCPs	Construction	SEA	Amendment Report L2
CL11	Prior to the disturbance of contaminated soils bunding will be installed downslope to capture any water that may become contaminated during disturbance. The water captured will be tested and suitably treated prior to discharge in accordance with the SWMP.	SWMP Bunding	Construction	SEA	Amendment Report L2
CL12	Hydrocarbon or chemically contaminated materials will be identified for disposal offsite will be tested and classified in accordance with the Waste Classification Guidelines (NSW EPA 2014) and Waste Management Plan.	WMP	Construction	Senior Environmental Advisor	Amendment Report L2

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ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Source document
CL13	Excavated material, which is classified as contaminated, which is not suitable for reuse on site, will be transported to a treatment or disposal facility that is legally able to accept the material for treatment, reuse or disposal. The material will be classified and disposed of to an appropriately licensed facility in accordance with the Waste Classification Guidelines (NSW EPA 2014).	WMP	Construction	Senior Environmental Advisor	Amendment Report L2
Naturally occurring asbestos management					
CL14	Targeted geotechnical investigations will be undertaken in areas of surface disturbance using a risk-based approach. Results from these investigations will determine the level of management to be implemented for soils and contamination (including NOA). Geotechnical investigations for NOA will be undertaken by a suitably qualified and experienced person in accordance with guidelines made or approved under the <i>Contaminated Land Management Act 1997</i> , <i>Work Health and Safety Act 2011</i> and <i>Workplace Health and Safety Regulations 2017</i> .	Personnel	Pre-construction	Construction Manager SEA	Amendment Report L1, L3
CL15	In areas identified in the EIS as having a low to high potential to contain NOA, or risk areas identified during site investigations, the following additional investigations, assessments and testing will be undertaken prior to disturbance of virgin natural material within the identified area: Visual site inspection where accessible	Geotechnical mapping Personnel PPE	Construction	Construction Manager SEA	Amendment Report L3

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ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Source document
	Sampling and laboratory testing to confirm the presence of asbestos to the maximum depth of excavation of virgin material The above may be undertaken progressively depending on depth of excavation required i.e clearing the area in 2m depths or other suitable depth.				
CL16	Should NOA be detected and confirmed through laboratory testing a site-specific NOAMP complying with Clause 432 of the Work Health and Safety Regulations 2017 will be developed and included as part of the work health and safety management plan. The NOA management plan will be prepared and implemented to guide the handling, transport, and disposal of the material. The Work Health and Safety Asbestos Management Plan will consider the following: - Worker awareness training - Access to the worksite will be controlled - Continuous air monitoring conducted - Hygiene protocols will be implemented - Appropriate PPE will be worn, and suitable filters fitted to plant - Appropriate material management processes will be in place - Materials will be managed so as to minimise dust generation.	Laboratory	Construction	Construction Manager Safety Advisor SEA	Amendment Report L3

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ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Source document
CL17	Proposed track and tower construction will be undertaken in areas of VERY LOW or negligible NOA potential and in relation to NOA, work may proceed on an unexpected finds basis. Site foreman shall undertake NOA awareness training that will entail recognition of key NOA bearing rock types in the region that might be encountered; mainly serpentinite.	Unexpected Finds Protocol Appendix A – Unexpected Finds Procedure for contaminated soils of this CLMP.	Construction	Safety Advisor SEA	Amendment Report L3
CL18	If asbestiform and/or indicator minerals and/or textures are encountered or suspected during excavation works, work is to stop in the area and management be alerted. The area is to be isolated with a 10m exclusion zone and sign posted, access is to be restricted and specialist geological and occupational hygiene advice is to be sought prior to further progressing work in that area. If NOA is confirmed a NOAMP is to be developed and implemented.	Unexpected Finds Protocol Appendix A – Unexpected Finds Procedure for contaminated soils of this CLMP. Personnel	Construction	Safety Advisor SEA	Best practice
CL19	Potential Acid-forming material will be managed in accordance with the Spoil Management Plan (SWMP Appendix A).	Spoil Management Plan (SWMP Appendix A)	As required	SEA	Best practice
CL20	Any NOA uncovered during works in Bago State Forest will be managed with consideration to WH&S requirements outlined in FCNSW Asbestos Management Procedure WHSP 2021-4.4 (Version 3.0).	FCNSW Asbestos Management Procedure WHSP 2021-	As required	Safety Advisor	Consultation

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ID	Measure / Requirement	Resources needed	When to implement	Responsibility	Source document
		4.4 (Version 3.0)			

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6 Compliance management

6.1 Responsibilities

The PC's organisational structure and overall roles and responsibilities are outlined in Section 4.11 of the CEMP. Specific responsibilities for the implementation of environmental controls are detailed in Table 6-1 of this Plan.

Table 6-1 Roles and responsibilities

Roles	Responsibilities
Project Manager (PM)	• Approve the CLMP and subsequent revisions • Ensure all non-conformance events are investigated and corrected • Stop work or otherwise mitigate effects of an activity when contamination and or NOA is discovered • Ensure relevant contamination and NOA expectations expressed by the customer or authorities are communicated to the PC's Project personnel
Construction Managers (CM)	• Ensure that any changes to the schedule of works are communicated to the SEA/HSSE in a timely manner, if environmental aspects are likely to become affected • Ensure works proceed with all necessary permits • Ensure that all site personnel and subcontractors are aware of their responsibilities • Stop work or otherwise mitigate the effects of an activity if contamination and or NOA is an issue
Senior Environmental Advisor (SEA) / HSE Advisor	• Motivate CLMP compliance • Confirm that all necessary contamination and NOA controls are implemented and maintained for the duration of the contract • Manage and advise on regulated disposal of contaminated waste • Assist with investigation of all non-conformance events are investigated and corrected
Employees and Subcontractors	• Committed to identifying, assessing, controlling, and/or reporting contamination and NOA risks in their workplace • Understand and comply with the CLMP, and local area guidelines and task specific SWMSs related to contamination and NOA • Use PPE supplied in line with relevant workplace instructions and requirements • Prior to and after working in a potentially fibrous or designated area, ensure that all documentation is completed • Stop work immediately when an unexpected contamination and NOA find is encountered. Cordon off area until HSE advises that work can recommence

6.2 Training

All personnel accessing or visiting the site will complete the following mandatory training:

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- Complete the stand-alone Site induction
- Awareness and Risks of NOA
- Awareness of chemical contamination indicators (smells, staining etc.)

All site personnel will undergo site induction training relating to contaminated land management issues. The induction training will address elements related to contaminated land management including:

- Existence and requirements of this CLMP
- Relevant legislation
- Roles and responsibilities for contaminated land management
- Contaminated land mitigation and management measures
- Identification of contaminated materials
- Procedures to be followed in the event of an unexpected find
- Safe handling of potentially contaminated materials
- Procedures in the event of an incident (e.g., fuel spill)

Targeted training in the form of toolbox talks or specific training will also be provided to personnel with a key role in contaminated land management.

Examples of training topics for toolboxes include:

- Safe refuelling techniques (to prevent spills)
- Chemical storage
- Unexpected finds procedure for contaminated soil
- Emergency spill response procedure.

Further details regarding staff induction and training are outlined in Section 6 of the CEMP.

Targeted training in the form of toolbox talks or specific training will also be delivered to personnel with a key role in contamination and NOA management.

6.3 Monitoring and inspection

Inspections of activities with the potential to impact contamination and NOA will occur for the duration of the Project.

Requirements and responsibilities in relation to monitoring and inspections are documented in Section 9 of the CEMP.

6.4 Reporting and incidents

Reporting requirements and responsibilities are documented in Section 9.4 of the CEMP.

Details on incident reporting is included in Section 8 of the CEMP. Environmental incidents relating to contaminated land and NOA may include but not be limited to:

- Unauthorised damage or interference to known contaminated sites

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- Potential contamination of waterways or land
- Unauthorised dumping of waste
- Any potential breach of legislation, including a potential breach of a condition of an environment protection licence, approval, or any agency permit condition.

Transgrid are to notify NPWS or FCNSW immediately and provided information as to the location and specifics of any contamination identified.

6.5 Auditing

Audits (both internal and external) will be undertaken to assess the effectiveness of environmental controls, compliance with this sub plan, infrastructure approval and other relevant approvals, licenses, and guidelines. Audit requirements are detailed in Section 9.3 of the CEMP.

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7 References

Asbestos Awareness (2021) *Asbestos Awareness Fact Sheet and Checklists*
<https://asbestosawareness.com.au/fact-sheets/> accessed 24/02/2022

Jacobs. (2020). Snowy 2.0 Transmission Connection Project EIS. Jacobs Pty Ltd.

Marc Hendrickx and Associates Pty Ltd (2020) Assessment of potential NOA, Transgrid Talbingo Reservoir

Transgrid (2021). Snowy 2.0 Transmission Connection Project Amendment Report.

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Appendix A – Unexpected Finds Procedure for contaminated soils

To prevent further disturbance, follow these measures:

- Stop works in the potentially hazardous area immediately, including excavations or drilling
- Isolate material or spill from further movement, where practicable
- Move to a designated meeting point or safe area
- Notify the SEA OR Construction Foreman OR Superintendent OR SEA OR Person in control of the workplace
- Make the area temporarily “safe”
- Use dust suppression to dampen the area for any suspected asbestos impacted soil
- Cover the unexpected finds if safe to do so (wearing PPE) and covering using geofabric or plastic
- Delineate an exclusion zone around the area using fencing and appropriate barriers and signage. The exclusion zone shall be at least a 10-metre buffer from the unexpected find
- Comply with incident notification requirements as detailed in Section 6.4 of the SWMP including notification of potential unexpected find to DPE, EPA and NPWS" under "Inspection and Investigation.

Examples of signage include:



Inspection and investigation

- Assess the potential risk to human health and the environment posed by the unexpected find and assess if evacuation or emergency services need to be contacted.
- A suitably experienced environmental consultant shall undertake an assessment of any unexpected finds and determine any further actions required e.g., sampling and/or validation of material, potential for remediation and/or management.
- Construction Foreman to arrange inspection by SEA and external environmental consultant to assess the unexpected find and provide advice as follows:
 - Preliminary assessment of the find and need for immediate management controls (if any)

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- What further assessment and / or remediation works are required and how such works are to be undertaken in accordance with contaminated site regulations and guidelines and management procedures
- Preparation of a Remedial Action Plan for large scale contamination or specification for smaller or minor volumes of material (if necessary)
- Remediation works required (where applicable)
- Validation works required following remediation works (if applicable).

Remediation Action Plan

- If the SEA and external environmental consultant determine there is a risk to human and environmental health, remediation and validation is required. The site validation report must be forwarded to the EPA for review and endorsement prior to occupancy of the site.
- If required by the SEA / external environmental consultant, a Remedial Action Plan (RAP) will be prepared and implemented in accordance with the following endorsed guidelines as a minimum:
 - National Environmental Protection Measure, Assessment of Contaminated Sites, 2013 (NEPM 2013)
 - NSW EPA Consultants Reporting on Contaminated Land – Contaminated Land Guidelines 2020 (NSW EPA 2020)
 - NSW EPA Contaminated Land Management: Guidelines for the NSW Site Auditor Scheme 2017 (3rd Edition) (NSW EPA 2017)
 - NSW EPA Duty to Report Contamination under the *Contaminated Land Management Act 1997* (CLM Act 1997).
- Works are not to recommence in the affected area until appropriate advice has been obtained from the environmental consultant or suitably qualified person and they have provided clearance.
- Intrusive works (excavation and drilling) will not recommence until the extent of the contamination has been assessed and, if necessary, a RAP has been prepared and the site has been validated.

Validation

- Recommencement of development activities in an area requiring remediation and validation cannot take place until the EPA has reviewed and endorsed the consultant's validation report into the suitability of the area for its permitted uses.
- If it is deemed safe to do so, the environmental consultant will provide clearance for works to proceed in the affected area. If it is not considered to be safe, works must remain on hold until appropriate assessment, remediation and / or validation measures have been actioned.
- The material will be separated from other materials and stockpiled for assessment. Sampling of the materials will be undertaken in accordance with the relevant guidelines or professional judgement where justification is applied. Samples will be analysed for a range of analytes as required.

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- Laboratory results will be assessed to determine the appropriate waste classification of the material in accordance with the NSW EPA Waste Classification Guidelines – Part 1: Classification of Waste (NSW EPA 2014).
- Depending on the classification, material already excavated and stockpiled will be transported to an appropriate waste facility that is licensed to accept waste of the relevant classification or beneficially reused if appropriate.
- A waste tracking system recording the volume of material, waste classification status, removal documentation and truck and receiving landfill facility details must be recorded to ensure all waste is accounted for and disposed of appropriately in accordance with NSW EPA requirements.
- Any unexpected finds must be documented in the validation report to be prepared at the completion of construction, if required.
- Keep a record of the unexpected find. Any validation reports or remedial works will also act as a record of works undertaken to minimise risks to human health and the environment. The record must include exact location / GPS coordinates of the find.

Appendix B – Waste Management Strategy

Overview

As part of construction activities associated with the Project, various waste streams will be generated. All waste will be appropriately classified, managed and stored in accordance with this Waste Management Strategy throughout the Project lifetime.

Waste management hierarchy

The waste and resource management hierarchy, as described in the NSW Waste Avoidance and Resource Recovery Strategy 2014 – 21, is a tool used to quantify and prioritise methods of waste management, ensuring that resource management options are considered against a hierarchy of:

- Avoidance of unnecessary resource consumption
- Resource recovery (including reuse, recycling, reprocessing and energy recovery)
- Disposal.

A summary of the waste hierarchy is presented in below

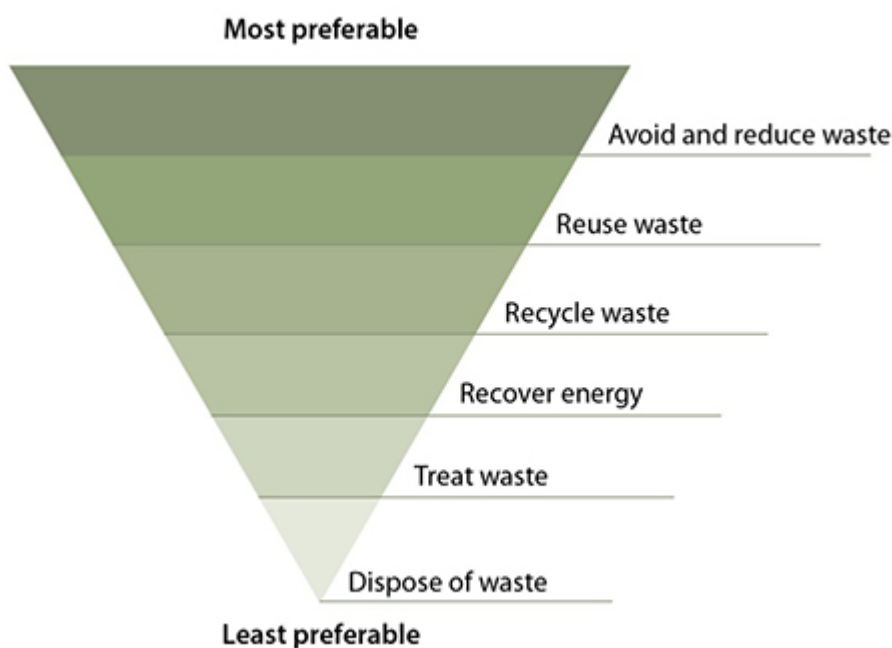


Figure B-1 The waste hierarchy - extracted from the NSW Waste Avoidance and Resource Recovery Strategy 2014 - 2021, NSW EPA

Reduce or avoid

Reducing or avoiding the generation of waste is of primary importance to the Project. The following approach will be adopted:

- Consider construction options that have a higher waste reduction capacity than other alternatives
- Order materials / goods with minimal packaging or request suppliers to remove packaging from site
- Accurately estimate materials required to minimise wastage.

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Reuse and recycling

Waste separation and segregation will be promoted onsite to facilitate reuse and recycling as a priority of the waste management program as follows:

- Segregate waste onsite – waste materials, including spoil and demolition waste, will be separated on site into dedicated bins / areas for either reuse onsite or collection by a waste contractor and transported to offsite facilities; where reasonable and feasible, secondary waste material will be used in construction.

Waste handling and storage

Where waste is required to be handled and stored onsite prior to onsite reuse or offsite recycling / disposal, the following measures apply:

- Spoil, topsoil, and mulch are to be stockpiled onsite in allocated areas, and mitigation measures for dust control and surface water management will be implemented as per the CEMP and ESCP
- Liquid wastes are to be stored in appropriate containers or area with appropriate bunding until transported offsite. Bunds will have the capacity to hold 110 per cent of the liquid waste volume for bulk storage or 120 per cent of the volume of the largest container for smaller packaged storage
- Hazardous waste will be managed by appropriately qualified and licensed contractors, in accordance with the requirements of the *Environmentally Hazardous Chemicals Act 1985* and the NSW EPA waste disposal guidelines.

All other recyclable or non-recyclable wastes are to be stored in appropriate covered receptacles (e.g., bins or skips) in compound and stockpile sites onsite. Contractors will be commissioned to regularly remove/empty the bins to approved disposal or recycling facilities.

Waste disposal

The disposal of waste is to be treated as a last resort. Wastes that are unable to be reused or recycled will be disposed of offsite to an appropriately licenced waste management facility following classification. If any materials generated by Project works are to be taken to a location other than an approved, licenced waste facility, documentation will be submitted to Transgrid for approval.

All waste and spoil disposal will be undertaken in accordance with the Protection of the Environment Operations Act 1997 and the Waste Avoidance and Resource Recovery Act 2001.

Details of waste types, volumes and destinations, including asbestos and PFAS-waste, are to be recorded in the Waste Management Register (Appendix C).

Classification of waste streams

Where waste cannot be avoided, reused or recycled it will be classified and appropriate disposal will then occur. The classification of waste is undertaken in accordance with the NSW EPA Waste Classification Guidelines Part 1: Classifying Waste (2014). This document 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. This process is described below:

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Step 1: Is it 'special waste'?

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

Waste contaminated with per-and poly-fluoroalkyl substances (PFAS) is classed as special waste under the Addendum to the Waste Classification Guidelines (2014) – Part 1: classifying waste, issued by the NSW EPA in 2016.

Note: Asbestos and clinical wastes must be managed in accordance with the requirements of Clauses 42 and 43 of the Protection of the Environment Operations (Waste) Regulation 2005.

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

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assessment is not undertaken, the waste must be managed as general solid waste (putrescible).

Waste management mitigation measures

A number of waste management measures will be employed during Project works. These include, but are not limited to:

- Adoption and promotion of the waste hierarchy
- Keeping site free of litter and maintaining good housekeeping
- Provide separate bins in site compound and in site offices to promote recycling of materials such as paper, cardboard, glass, plastics, and metals
- Implement agreements with suppliers to return excess construction materials or packaging for future reuse
- Limit use of non-recyclable materials such as geotextiles and sediment fence as far as practicable.

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Waste streams and volumes anticipated to be produced during Project works are provided in Table B-1 below.

Table B-1 Waste streams and volumes anticipated to be produced during Project works

Construction activity	Waste type	Waste classification	Anticipated volume (t)	Legal obligations
Clearing and grubbing	Native vegetation (branches, loppings, tree trunks, tree stumps) These are items that can't be salvaged for restoration or habitat onsite.	Recyclable as clean mulch; or as General solid waste (non-putrescible)	0 (Complete re-use on site)	Prior to engaging a contractor to collect, transport and dispose/re-process the waste, the SEA will obtain a copy of all relevant qualifications, accreditations, permits and licences from the nominated contractor to ensure the contractor and receiving facility are legally permitted to accept the waste type, as required by the POEO Act.
Excavation works	Excess spoil	VENM / ENM classification	500,000	Refer to the Spoil Management Plan. For VENM/ENM determination to apply, all the conditions of the exemption must be met.
	Contaminated soils (including concrete fines)	Subject to chemical assessment	Unknown - refer to SMP	Prior to engaging a contractor to collect, transport and dispose/re-process the waste, the SEA to obtain a copy of all relevant qualifications, accreditations, permits and licences from the nominated contractor to ensure the contractor and receiving facility are legally permitted to accept the waste type, as required by the POEO Act.
	Asbestos or Naturally Occurring Asbestos	Special waste (Asbestos)	Unknown - refer to SMP	If removed from site, prior to engaging a contractor to collect, transport and dispose/re-process the special waste, the SEA to obtain a copy of all relevant qualifications, accreditations, permits and licences from the nominated

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Construction activity	Waste type	Waste classification	Anticipated volume (t)	Legal obligations
				contractor to ensure the contractor and receiving facility are legally permitted to accept the waste type, as required by the POEO Act. The asbestos waste is to be tracked and all dockets and receipts retained. COA B7(d) permits NOA spoil to be placed at Tantangara in constructed containment cell. This option may be preferred by Transgrid, following consultation with stakeholders and acquiring relevant approvals, and only relevant in the unlikely event of encountering NOA contaminated materials.
Construction waste	Metals – steel, copper, aluminium	Recyclable	15 – 20	Prior to engaging a contractor to collect, transport and dispose/re-process the waste, the SEA will obtain a copy of all relevant qualifications, accreditations, permits and licences from the nominated contractor to ensure the contractor and receiving facility are legally permitted to accept the waste type, as required by the POEO Act. Return cable drums to manufacturer where possible.
	Surplus concrete (hardset)	General solid waste (non-putrescible); or recyclable	25	Prior to engaging a contractor to collect, transport and dispose/re-process the waste, the SEA will obtain a copy of all relevant qualifications, accreditations, permits and licences from the nominated contractor to ensure the contractor and receiving facility are legally permitted to accept the waste type, as required by the POEO Act.
	Conduits and pipes	General solid waste (non-putrescible)	2	Prior to engaging a contractor to collect, transport and dispose/re-process the waste, the SEA will obtain a copy of all relevant qualifications, accreditations, permits and licences from the nominated contractor to ensure the contractor and receiving facility are legally permitted to accept the waste type, as required by the POEO Act.

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Construction activity	Waste type	Waste classification	Anticipated volume (t)	Legal obligations
	Timber formwork	General solid waste (non-putrescible) (pre-classified as 'building and demolition waste' by the EPA)	5	Prior to engaging a contractor to collect, transport and dispose/re-process the waste, the SEA will obtain a copy of all relevant qualifications, accreditations, permits and licences from the nominated contractor to ensure the contractor and receiving facility are legally permitted to accept the waste type, as required by the POEO Act.
	Packaging materials, including wood, plastic, cardboard and metals	General solid waste (non-putrescible); or recyclable	250	Prior to engaging a contractor to collect, transport and dispose/re-process the waste, the SEA will obtain a copy of all relevant qualifications, accreditations, permits and licences from the nominated contractor to ensure the contractor and receiving facility are legally permitted to accept the waste type, as required by the POEO Act.
	Geotextile, sediment fence and stakes, coir logs, jute matting	General solid waste (non-putrescible)	10	Prior to engaging a contractor to collect, transport and dispose/re-process the waste, the SEA will obtain a copy of all relevant qualifications, accreditations, permits and licences from the nominated contractor to ensure the contractor and receiving facility are legally permitted to accept the waste type, as required by the POEO Act.
Site compounds and office	Drained oil filters, rags and oil-absorbent materials that only contain non-volatile petroleum hydrocarbons and do not	General solid waste (non-putrescible) (pre-classified by the EPA)	0.5	Prior to engaging a contractor to collect, transport and dispose/re-process the waste, the SEA will obtain a copy of all relevant qualifications, accreditations, permits and licences from the nominated contractor to ensure the contractor and receiving facility are legally permitted to accept the waste type, as required by the POEO Act.

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Construction activity	Waste type	Waste classification	Anticipated volume (t)	Legal obligations
	contain free liquids.			
	Oily rags, and containers with liquids, grease cartridges etc	Subject to chemical assessment and regulated disposal at a licensed facility	Included above	Prior to engaging a contractor to collect, transport and dispose/re-process the waste, the SEA will obtain a copy of all relevant qualifications, accreditations, permits and licences from the nominated contractor to ensure the contractor and receiving facility are legally permitted to accept the waste type, as required by the POEO Act.
	Food waste	General solid waste (putrescible) (pre-classified by the EPA)	150	Prior to engaging a contractor to collect, transport and dispose/re-process the waste, the SEA will obtain a copy of all relevant qualifications, accreditations, permits and licences from the nominated contractor to ensure the contractor and receiving facility are legally permitted to accept the waste type, as required by the POEO Act.
	Sewage from amenities	Liquid Waste	800	Prior to engaging a contractor to collect, transport and dispose/re-process the waste, the SEA will obtain a copy of all relevant qualifications, accreditations, permits and licences from the nominated contractor to ensure the contractor and receiving facility are legally permitted to accept the waste type, as required by the POEO Act.
	Paper, office waste, cardboard and plastic, glass, aluminium cans	Recyclable or as General solid waste (non-putrescible)	300	Prior to engaging a contractor to collect, transport and dispose/re-process the waste, the SEA will obtain a copy of all relevant qualifications, accreditations, permits and licences from the nominated contractor to ensure the contractor and receiving facility are legally permitted to accept the waste type, as required by the POEO Act.
	Unwanted liquid chemicals	Liquid waste	0.5	Prior to engaging a contractor to collect, transport and dispose/re-process the waste, the SEA will obtain a copy of all relevant qualifications, accreditations, permits and

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Construction activity	Waste type	Waste classification	Anticipated volume (t)	Legal obligations
				licences from the nominated contractor to ensure the contractor and receiving facility are legally permitted to accept the waste type, as required by the POEO Act.
Stormwater irrigation (dewatering)	pH or hydrocarbon contaminated wastewater (e.g., from bunds or washout pits)	Subject to chemical assessment and regulated disposal at a licensed facility	1	Prior to engaging a contractor to collect, transport and dispose/re-process the waste, the SEA will obtain a copy of all relevant qualifications, accreditations, permits and licences from the nominated contractor to ensure the contractor and receiving facility are legally permitted to accept the waste type, as required by the POEO Act.
Use of plant and equipment	Used batteries	Recyclable or as General solid waste (non-putrescible)	0.1	Prior to engaging a contractor to collect, transport and dispose/re-process the waste, the SEA will obtain a copy of all relevant qualifications, accreditations, permits and licences from the nominated contractor to ensure the contractor and receiving facility are legally permitted to accept the waste type, as required by the POEO Act.
Use of plant and equipment	Used tyres	Recyclable or as General solid waste (non-putrescible)	Nil	Prior to engaging a contractor to collect, transport and dispose/re-process the waste, the SEA will obtain a copy of all relevant qualifications, accreditations, permits and licences from the nominated contractor to ensure the contractor and receiving facility are legally permitted to accept the waste type, as required by the POEO Act.

Appendix C – Waste Management Register

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Soil and Water Management Plan

Appendix I: **Water Irrigation and Disposal Permit**

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Soil and Water Management Plan

PART A: INFORMATION

Permit Number:

Area:

☐ Substation ☐ Sediment Basin

☐ Tower Number:

Site Location:

Location of Water (From):

☐ Basin ☐ Bund ☐ Drain ☐ Excavation

☐ Sump

☐ Other:

ID (where relevant):

Transfer Volume (m³):

And / Or

Basin Depth (m):

Dewatering Method:

☐ Irrigation (Part B) ☐ Transfer to Basin (Part C)

☐ Transfer to Watercart (Part D) ☐ Disposal offsite (Part E)

Permit Start

Date:

Time:

Permit Expiry

Date:

Time:

PART B: IRRIGATION

Irrigation Location:

CONTROL MEASURES	YES	NO / NA	COMMENTS
Pumping and irrigation equipment checked and operational	☐	☐	
Float or similar device installed to prevent inlet from sinking into mud	☐	☐	
Water testing equipment field calibrated	☐	☐	
Water quality meets the irrigation criteria for the specific location			
Irrigation area is within an approved location	☐	☐	
Irrigation area is well vegetated or in an approved disturbed footprint	☐	☐	
Irrigation area is not saturated from rainfall	☐	☐	
Irrigation area has no sensitive receiving environments (e.g., waterways, heritage sites)	☐	☐	
Irrigation area has no areas of contamination (e.g., former copper mine)	☐	☐	

WATER QUALITY	Date	Time	Tested by	pH (6.5-8)	Visible Oil / Grease	Ok to irrigate?
DAY 1						-
DAY 2						
DAY 3						
DAY 4						

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Soil and Water Management Plan

DAY 5						
CONDITIONS / INSTRUCTIONS						
- If saturation of proposed irrigation area due to rainfall or previous days irrigation is observed do not irrigate. - Check saturation of irrigation area hourly. Monitoring to be recorded using Part G. - Ensure irrigated water does not reach sensitive areas or watercourses. - If visible oil and grease, or other contaminants do not irrigate. - If water is observed to be pooling and not infiltrating stop irrigation immediately.						
Permit conditions accepted, understood and communicated to work party						
Name (Supervisor / Leading Hand / Delegate)			Signed		Date	

PART C: TRANSFER TO BASIN						
Basin ID:						
CONTROL MEASURES	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	
Date						
Remaining Basin Capacity (depth marker reading m or volume m³)						
Rainfall in the last 24 hours	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	
Rainfall forecast in the next 48 hours	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	
Visible Oil / Grease	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	
CONDITIONS / INSTRUCTIONS						
Permit conditions accepted, understood, and communicated to work party						
Name (Supervisor / Leading Hand / Delegate)			Signed		Date	

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Soil and Water Management Plan

PART D: TRANSFER TO WATERCART					
Watercart ID:		Watercart Operator:			
CONTROL MEASURES	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5
Date					
Purpose	☐ Basin transfer - Part C ☐ Dust suppression	☐ Basin transfer - Part C ☐ Dust suppression	☐ Basin transfer -Part C ☐ Dust suppression	☐ Basin transfer - Part C ☐ Dust suppression	☐ Basin transfer - Part C ☐ Dust suppression
Visible Oil / Grease	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
CONDITIONS / INSTRUCTIONS					
Permit conditions accepted, understood and communicated to work party					
Name (Supervisor / Leading Hand / Delegate)		Signed		Date	

PART E: DISPOSAL OFFSITE		
Communicate with Environmental Advisor regarding offsite disposal requirements and tracking certificates.		
Permit conditions accepted, understood and communicated to work party		
Name (Supervisor / Leading Hand / Delegate)	Signed	Date

PART F: SIGN OFF (CONTROL MEASURES IMPLEMENTED AND WATER QUALITY MEETS THE CRITERIA?)		
Name (Environmental Advisor)	Signed	Date

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Soil and Water Management Plan

Any other conditions / instructions

Comments

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PART G: MONITORING RECORD

[illegible]